Agroecology and EU Law

Finding potential for agroecology at the nexus between biodiversity law and human rights law

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For Amelia, Sophie, and Alec

Declaration of Authenticity and Author's Rights

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COVID-19 Disclaimer

The University of Strathclyde recommends that students who have written their thesis during the pandemic include a COVID-19 disclaimer to detail any adverse impacts for examiners.

Notably, COVID-19 has had an impact on the total length of the PhD research period. I was somewhat fortunate that I was able to start my maternity leave early when the first lockdown was imposed, which allowed me to look after our toddler when childcare facilities shut, and I only resumed studies in November 2020. However, we experienced significant childcare issues when Scotland went into lockdown again in January 2021. And, even when restrictions eased and family members felt comfortable enough again to include our children within their households, a lack of consistent childcare for my youngest remained a problem until September 2021, due to diminished options for private childcare in rural Angus after the pandemic. This meant that I had to unexpectedly take additional voluntary leave during this period. I appreciate the University's flexibility to accommodate these changes in light of my care responsibilities.

In addition to the emotional stresses of raising and expanding a family during the pandemic, alongside work and PhD commitments, the successive suspensions meant that it was at times difficult to keep on top of fast-changing EU policies. Considerable parts of Chapter 3 have been rewritten since then to reflect the adoption of the European Green Deal, whereas recent or potential future reforms were flagged and included in the Conclusion. I have done my very best to be inclusive of all relevant changes, and I apologise if any points of oversight remain.

Related Publications and Presentations

Peer-reviewed publications

M Geelhoed, 'Agroecology and the Regulation of GM Crops' in A Cavoski et al (eds) *Sustainable Agriculture in post-Brexit UK* (Routledge *forthcoming* 2021).

E Morgera, M Geelhoed, and M Ntona, 'EU Environmental Law' in E Techera et al (eds) *Routledge Handbook of International Environmental Law* (Routledge 2021).

M Gaglia Bareli et al, 'The unintended consequences of the Common Agricultural Policy for local communities: reading EU law and politics in Ikaria, Greece' in *Handbook on the Politics of EU law* (Edward Elgar 2020).

M Geelhoed, 'Divided in Diversity: The Future of the EU's GMO Regime' (2016) 18 The Cambridge Yearbook of European Legal Studies 20.

Presentations

'Finding Agroecology at the Nexus Between Biodiversity and Human Rights Law. A Journey from PhD to Practice (University of Strathclyde, Glasgow, 4 May 2022).

'Law and Agroecology' (University of Leicester, Leicester, 3 May 2019).

'Agroecology, Law and the Ecosystem Approach' (Queen's University Belfast, Belfast, 26 November 2018).

'The Ecosystem Approach and Agroecology' (University of Strathclyde, Glasgow, 15 November 2018).

'The Ecosystem Approach and Agroecology' (University of Dundee, Dundee, 23 November 2017).

'Risk, Precaution & GMOs' (University of Strathclyde, Glasgow, 23 October 2017).

'Agroecology and the Ecosystem Approach' (James Hutton Institute, Aberdeen, 24 May 2017).

'The Impacts of BREXIT on Scottish Agro-Environmental Stewardship' (Scottish Parliament, Edinburgh, 17 April 2017).

'Socio-Economic Considerations in the Regulation of GMOs' (Iran Food and Drug Administration. Teheran, 14 December 2016).

'In varietate discordia: de recente hervorming van het Europese regime voor genetisch gemodificeerde gewassen' (University of Leiden, Leiden, 27 November 2015).

Abstract

The negative environmental and social impacts of an industrial agricultural and food system have increasingly become a focus of attention of international and EU law. Agroecology provides a promising, alternative model for farming and food production, based upon principles of ecology and equity. However, the uptake of agroecology in law is limited and where explicit references are made, they are often defined by a lack of conceptual clarity and the absence of objectives and principles that are required to guide comprehensive and systemic change.

This thesis argues that whilst there is a huge need for laws and policies to be more supportive of agroecological transitions, there is no need to reinvent the legal wheel as ecological thinking is already evident in other areas of law- and policymaking. In particular, it finds that the ecosystem approach under the Convention on Biological Diversity – and its elements of integration, conservation, and equity – could provide a framework to guide regulatory actions and reform in an agroecological direction. This thesis then uses two case studies on EU risk regulation of pesticides and GMOs and EU regulation on organic production to identify where and how EU law is currently delivering on a vision that integrates and prioritises ecological stewardship and where it is falling short. The analyses reveal that whilst considerations related to the protection of agroecosystem functions are increasingly included in high level provisions, principles and aims, they are not translated into concrete measures such as decisions on authorisation in the case of GMOs and pesticides, and specific production rules in the case of organic certification. The (increasing) marginalisation of agroecological farmers as ecosystem stewards in the relevant processes and the lack of (meaningful) integration of local knowledge are recognised as common inhibiting factors to a more (agro)ecological approach to regulation.

This thesis, therefore, turns to human rights law to see how agroecological stewards can be (re)empowered in relevant law- and policymaking processes. In this regard, it further examines the important dynamics between the ecological and social elements of agroecology, drawing synergies with the CBD's ecosystem approach. This analysis exposes the great potential that lies at the nexus between biodiversity and human rights law, to design a framework that is sufficiently detailed and (quasi-)justiciable, to address injustices and power imbalances in economic and regulatory spaces and further the uptake of agroecological practices. Through the reframing of underlying problems and questions in substantive human rights terms, and by exposing current gaps in the implementation of procedural rights, this thesis, lastly, uses the case studies to propose specific and detailed reforms, and to draw more general conclusions on the potential of a combined biodiversity- and human rights framework to foster agroecology.

Acknowledgements

Although this thesis is the product of many lonely hours in makeshift home offices, it was never written in solitude. So many people have in diverse ways contributed to the inception, drafting, and enrichment of this thesis and I am going to do my very best here to put into words what those invaluable contributions have meant for the writing in front of you, and for me personally.

Firstly, I would like to thank my amazing supervisors. Professor Elisa Morgera, I am so grateful for the opportunity to join you at the Strathclyde Centre for Environmental Law and Governance (SCELG), to tap into your vast expertise on biodiversity and human rights law and to, ultimately, with just enough guidance, being made to feel empowered to create a unique approach to foster agroecology. I have come to know you as a very dear colleague, who always tries to include me in the next project, and I hope that the coming years will provide many more opportunities to work together. Dr Antonio Cardesa-Salzman: we might have different ways of doing research in EU environmental law, but this has meant that you were always able to bring a different perspective to the table. Thank you for this. I believe that there is an unwritten article on 'epistemic subsidiarity' out there that has our names on it. Thanks also goes to my reviewer, Dr Stephanie Switzer, who has been such a superstar in supporting me on this long journey, not just through her great feedback during annual reviews but also, more generally, for being a listening ear whenever I felt stuck with my writing, in my career or in impossible childcare situations, and for being my advocate within a university which at times was still figuring out the 'PhD mum'. I would like to thank my colleagues at SCELG, notably Francesco, Saskia, and Mara, for creating and maintaining such a friendly and level-headed space to conduct research in and to explore commonalities and connections. There was no place I rather would have been. Lastly, I would like to thank the Strathclyde Law School for their financial and practical support and, in particular, Helen Larmour. I did not make things easy for you at all with an everchanging PhD schedule, but you never made me feel like I was asking too much.

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anxious mind would get in the way of enjoying high-school life, but your unconditional support and practical solutions, allowed me to flourish. I would not be here today if it was not for you.

I would like to thank my friends and family who stood by me. My parents, pa and ma, who left sixty years of life in the Netherlands behind to join me in rural Angus. Thank you for your love and encouragement, your support and for the many, many hours that you looked after the grandchildren (or helped me with the garden, the house, transport… what do you not do?). My in-laws, Jimi and Hamish, who welcomed me into the Gray family and who are always there to help with our kids and dogs, to give a kind word over a morning coffee and even to do the spelling and grammar check of this thesis. My brother Rowan and his partner Olly, who make our lives colourful and filled with boardgames. My friends, notably the 'Cheesecakes' (Marloes, Jenny, Tabitha, Brigitta, Sindhuja and Renske), Malou, Nikky and Rachel, and the WBS ladies, who were always understanding when I disappeared when the great juggle became too much. I cannot wait to catch up! Those that helped our lives in professional capacities, Laura & Laura: one who filled my son's life with alpacas, cakemaking and crafts, and another who with fortnightly magic prevented our home from turning into an inexplicable ecosystem.

And lastly, but definitely not least, my family, who I love. Ed, thank you for the afternoons and evenings that we spent in your tractor, debating the carbon footprint of cultivating practices, reasons to use or avoid chemicals, and the integration of livestock in arable rotations. Thank you for your love and calmness when stresses were high, for always keeping an open mind, and for letting me rant about welfare standards for sheep, even after a 14-hour sowing day. And a huge thank you to our children. Amelia, Sophie, and Alec, you make every struggle in the fight towards a fairer and more sustainable food system worthwhile. Let us never stop singing 'What a Wonderful World' together, to celebrate trees of green and the colours of the rainbow. But let me also play my part in making sure that our world is and will stay wonderful, for you, for your children and for all current and future generations. I dedicate this thesis to you.

Arbroath, June 2022

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1 Introduction

"The ultimate goal of farming is not the growing of crops, but the cultivation and perfection of human beings." – Masanobu Fukuoka (1913-2018)[1]

During my rather unusual and complicated PhD journey I often wondered whether Fukuoka's organic thinking could be extended to doctoral research, of which it can be said that the ultimate goal is not completion of the dissertation but, indeed, the cultivation and perfection of human beings. As it is the process of research and writing, not just over a single harvest resulting in completion of a chapter or publication of a paper, but spanning multiple growing seasons, that fundamentally makes the biggest contribution to personal development and the ability to provide increasingly more meaningful input to public debates on legal reform. And whilst the many pages in front of you are the fruits of often painstaking labour, broader analogies could be drawn with Fukuoka's philosophy of so-called 'do nothing farming' which holds that human inaction is often key to a good crop. As I have found that the many periods of reflection that have marked my PhD – when I had to step away to attend to family or other work – have been at least as important for its development as those times of active exploration and drafting.

The rest of this dissertation will read as an academic piece of work of the sort that I have written before and that I hope to write again, in one capacity or another. However, I would like to use the space of this introductory chapter to sketch a more personal and contextual picture, as I do not believe that an overview of this PhD's structure and justification of selected case studies will alone be sufficient to explain the words that I have put down on paper. This, because my PhD studies started in May 2016 and came to completion in May 2022, a period that involved significant turmoil and transition on an individual and on a broader level. Put simply, my own world and the world around me are not the same to what they were six years ago. The next two sections will, therefore, first look back on these years to link the content of this PhD to events that have been of great personal significance – notably, my move to the countryside, starting a family and taking on relevant work (§1.1) – as well as those that have been experienced more widely – Brexit, the twin environmental crises and food emergencies (§1.2). It will then discuss the overall structure of the dissertation, and the chosen methodologies and case studies, before it outlines the content of Part I (Chapters 2-3: *Agroecology, Law, and the Ecosystem Approach*), Part II (Chapters 4-5: *Case Studies: Risk Regulation and Organic Certification*) and Part III (Chapter 6: *The Added Value of a Human Rights-Based Approach to Agroecology*) (§1.3).

1.1 From a Change of Scenery to a Change of Perspective

The focus of this thesis and other work that I have undertaken during the PhD on regulatory regimes for food production and agriculture, is not something that followed naturally from my legal studies or my pre-academic life more generally. Born and raised in the city of Zoetermeer in the Netherlands, which is part of The Greater The Hague urban area in the province of South Holland, my interactions with farming were initially limited to regular bike trips to goat farm 'Het Geertje': a peri-urban, family farm that dates back to the 1940s and which has been

[1] M Fukuoka, *The One-Straw Revolution* (The New York Review of Books 2009 (Originally published in 1975)).

working under organic certification since 2000. As part of a cooperative of 100 *landwinkels* or land-based shops, the farm sells homemade cheese and local products, and it receives a record number of visitors during its kidding season. In many ways, het Geertje is the type of farm that I often work with nowadays, with its focus on ecological cycles, short supply chains and the provision of other community benefits such as educational activities. It was not until the start of my legal studies at the University of Leiden that I gained more first-hand experience of the type of agriculture that is dominant in the Netherlands and other parts of the EU. In 2009, I moved to a village situated between the municipalities of Delft and the Westland, with the latter also being known as 'glass city' due to its largescale greenhouse horticultural industry which makes significant contributions to the Netherlands' total agricultural exports, worth €95.6 billion in 2020.[2] Indeed, many of my 'Westlander' friends, with their distinct accents, owned or were directly employed by vegetable or flower growing businesses, or the locally founded, now multinational seed firm Rijk Zwaan. On a basic level, this meant that whilst my city mates, or my colleagues at the Rotterdam-based law firm where I worked as a paralegal in private law, would make the most of post-work happy hours and vibrant, urban club scenes, I would occasionally spend early Saturday mornings helping friends plant their new, monoculture crop and, more frequently, I would find myself at a barn party on Saturday night. At that time, my involvement in agriculture was superficial, whilst I did not fully grasp the systemic issues that underpinned conversations that were held over a 'Heineken': from concerns about supermarket price wars to the cost of seeds, and from the availability of predominantly Polish immigrant pickers and other labourers to disgruntlement over increasingly stringent pesticides regulations.

This all started to change in 2013 when I received funding to pursue a second LLM specialisation in environmental law at the University of Edinburgh. Where others will have most likely been put off by one of the early seminars in EU environmental law on the legal regime for genetically modified organisms ('GMOs'), riddled with both scientific and legal technicisms, I felt like I had gained a completely different perspective on the life that I had left behind and its relevance for my studies – not at least because my partner at the time had started a temporary job at 'Monsanto Holland'. The seminar provided the basis for my dissertation,[3] and, ultimately, for further developing my interests in other topics related to the regulation of agriculture and food production, as illustrated by this PhD thesis. More generally, my LLM studies in Edinburgh had confirmed feelings of true belonging in Scotland, and, specifically, the Scottish countryside, which meant that I did not hesitate to take the opportunity to return when, two years later, I was offered a four-year scholarship at the Strathclyde School of Law.

1.1.1. From Townie to Muddy: Family Life on the Scottish East Coast

My lack of understanding of the agricultural sector at the start of my PhD is possibly most strikingly reflected in the fact that when I moved back to Scotland, I subscribed to a UK dating site for anyone who loves anything rural – a broad mix of hippies, adventurists and, indeed, farmers – and ended up with a profound friendship with the operations manager of an industrial

[2] G Jukema et al, *De Nederlandse agrarische sector in internationaal verband* (University of Wageningen, 2021).
[3] An edited version of this LLM dissertation was published in 2016: M Geelhoed, 'Divided in Diversity: Reforming the EU's GMO Regime' (2016) 18 Cambridge Yearbook of European Legal Studies 20.

agricultural estate on the Scottish East Coast. Not long after my return to Scotland, I was forced out of my Edinburgh flat under difficult circumstances. What should have been a temporary move to the farm, led to an unusual romance and, eventually, marriage between my friend – a 6ft 6ins tall farm worker, born-and-bred in Angus, with a drive for the neatest, precision-farmed field – and me – a restless, Dutch lawyer and environmentalist with a passion for biodiversity.

In practice, this means that every (sub-)topic in this thesis has, at one point or another, been a point of lengthy discussions in our household, the tone of which – amicable or less so – usually dependent on the time in the farming calendar. It also means that, more than I ever expected, the issues outlined in this thesis have become part of my own life. Whilst the vision of former European Commissioner Sicco Mansholt to consolidate EU farms to allow many former farmers to enjoy a better standard of living, as discussed in Chapter 6,[4] should be considered reductionist and void of an understanding of the intrinsic motives and true value of farmers, I cannot deny that farming can be an intense life and that impacts extend beyond the farmer. Having now experienced six sowing and five harvest seasons myself, during which our lives become completely dictated by the weather, and I am, ultimately, left in charge of our home and kids with undeniable impacts on my own career, I am only still scratching the surface when it comes to grasping the fundamental role of women in farming worldwide. Indeed, in many ways, industrialisation has given us privileges, as specialisation means that there are quiet times on the farm and that help can be hired in, contrarily to many of the agroecological farmers that I know well, whose diverse and mostly mixed farms require year-round dedication, sometimes with little assistance. Yet, in other ways, risks of industrial farming are always present in our life, as best illustrated by the widespread use of chemicals. I have written parts of this thesis whilst a sprayer passed within 15 yards of my office window, have witnessed employees' indifference towards some of the risks, and even, on occasion, have washed down my kids out of fear for them having accidentally played in recently sprayed fields. Overall, my experiences have meant that I have a better grasp of conflict between personal and public, ecological, and social losses and gains in agriculture. Where I might have previously mainly built my analyses around environmental interests,[5] I have gained a more holistic – although still incomplete – understanding of the role of people in ecosystem management, for better or for worse, meaning that issues around equity and human rights-based solutions became a much more logical focus.

1.1.2. The Simplicity of Sustainability Through the Eyes of a Child

My drive to explore the 'human side' of agriculture and food, has been further shaped by the fact that during my PhD I became a stepmum to one and a mum to two awesome children (now aged 7, 4 and 2 years). Undoubtedly, I will have raised eyebrows by combining a very young family with postgraduate studies and maybe I was naïve to think that the kids would easily fit into already hectic lives. Yet, despite obvious challenges, I believe it is impossible to prepare for all eventualities – including a pandemic that led to a childcare crisis – and, overall, I believe parenthood has enriched the PhD experience. It has taught me to prioritise: this PhD is not all-encompassing nor without trade-offs and there are many more areas of law that I would love

[4] Chapter 6, §6.4.1.
[5] For example, Geelhoed 2016.

to explore further,[6] but time is limited, and I think that tough choices have sharpened the PhD analysis. The everyday presence of my children has also made me appreciative of the simplicity of increasingly more and sometimes unnecessarily complex legal and scientific debates around sustainability. Nature is such a fundamental part of childhood and time outdoors has helped me to bring arguments back to the basics. From jumping in puddles to finding utmost concentration in busy minds of children to study a leaf, from collecting sticks and stones to dreaming about which places the birds have come from; my young children – like any other that I know – are never happier than when they are roaming and exploring the garden, fields, and woodlands. My 'fussy eater' never passes on an opportunity to pick homegrown or wild fruit, vegetables, and nuts, and despite common fears of insects, she will make a strong case for them all as she states that we must be "nice to flies" and make sure that the "spider can go back to his mummy".

It is against this background of true connectedness with our natural surroundings and other beings that it is sometimes hard to comprehend how we, as adults and as a society, have become so estranged. The agroecological vision may be considered idealistic but it can be brought back to straight-forward values of co-existence, natural limitations and consequences, and kindness, which we educate our children about – and more often they teach us. Whilst the human rights-based Chapter in this thesis is focused on the rights of current agroecological stewards, it is their dedication to the responsible use of natural resources in a way that conserves or enhances the functioning of ecosystems, that protects the rights of our children and future generations.

1.1.3. Putting Advocacy and Participation into Practice

Just how dedicated many agroecological farmers are to a vision for a system that is ecologically sound and equitable, for current and future generations, did not hit home until I started working with them directly. As a researcher and a lawyer, I have always been most interested in the real-world impacts of law- and policymaking, and the Strathclyde Centre for Environmental Law and Governance provided the perfect enabling environment to explore this. My doctoral studies were marked by opportunities to put research into practice, as my supervisors and I led on capacity building-projects on biosafety mainstreaming for the Secretariat to the Convention on Biological Diversity,[7] and a project on digital sequence information (DSI) in the context of international biodiversity law, for the European Commission.[8] Involvement in the analysis of the consultation responses to the Scottish National Islands Plan gave a first insight into Scottish politics,[9] and gave me confidence to apply to a position that I came across during PhD research – for Policy and Campaigns Coordinator for the Landworkers' Alliance (LWA) in Scotland.

[6] See, hereafter, Chapter 7 (Conclusion).
[7] M Geelhoed et al, *Capacity-building to promote integrated implementation of the Cartagena Protocol on Biosafety and the Convention on Biological Diversity at the national level. Synthesis Report – National Desk Studies* (CBD Secretariat, 2016).
[8] E Morgera et al, *Study for the European Commission on 'Possible Ways to Address Digital Sequence Information – Legal and Policy Aspects'* (European Commission, 2021).
[9] M Geelhoed and J Gibson, *National Islands Plan and Island Communities Impact Assessments. Analysis of responses to the public consultation exercise* (Scottish Government, 2019).

The LWA is a union of agroecological farmers, crofters, foresters and other land-based workers and a member of the international organisation *La Via Campesina*.[10] The position that I held between January 2021 and March 2022, meant that I represented agroecological landworkers in Scottish policy- and decision-making contexts. The views and positions in this thesis are my own, and the thesis is primarily based on desk-based research, yet the LWA and its members have still made a profound impact on my work. Being someone who struggles to keep the kitchen herbs alive, food growing, to me, can only be described as an art: a creation of true skill, dedication, and imagination. Agroecology is not only about nutrition and nurture, but also about connectedness and community, ecology and education, and I have come to truly admire those who practise it against all the odds: by the sweat of their brow, often with little financial return and too little recognition for ingenuity, craftsmanship and, ultimately, public benefit.

However, my work at the LWA has also created and understanding of the more practical challenges that inhibit effective lobbying on agroecology, and thereby of some of the limits of purely legal research. As aptly described by Strathclyde scholar Catherine Eschle, the lumping together of non-state actors in generic terms like 'civil society' may blind us "to the hierarchical and oppressive relations that exist *within* civil society".[11] This is true, as the case studies in this thesis show, for relations between farmer organisations and corporations for agri-inputs, but similar but more obscured dynamics exist within the farming sector. For example, in Scotland, a strong narrative exists that post-Brexit policies are being informed and shaped by farmers, but there is a lack of transparency on the narrow types of farmers represented and the careful selection of those that are deemed to be progressive but not too radical; often preventing many agroecological farmers from getting a seat around the table.[12] As I started this PhD with only a vague notion of these power dynamics that are amplified by law, policy and institutional frameworks, I would rarely question the specificities of generic terms like public and stakeholder participation but I have become much more explicit about where true needs for acknowledgment and assistance lie, and for substantive and procedural reform. This thesis should, however, not be seen to vilify the individual and often hardworking industrial farmer – a person who is not easily defined in any case – but as a critique of a system of production that has marginalised farmers, and of a lobby that has lost sight of diversity within the sector.

Other issues are of an internal nature, relating to the workings of representative organisations. High-level arguments on the significance of public and stakeholder participation, as included in this thesis, will rarely be preoccupied with the person who is voicing concerns within law- and decision-making settings and where their legitimacy comes from. As a young organisation (active in the UK since 2012 and in Scotland since 2018), the LWA is still developing internal institutional structures and decision-making processes; processes that are complicated by an admirable desire for workable but non-hierarchical systems that reflect horizontality as a

[10] 'La Via Campesina. International Peasant's Movement' (*La Via Campesina*, N.D.) <https://viacampesina.org/en/> accessed May 2022.
[11] C Eschle, 'Globalizing Civil Society? Social Movements and the Challenge of Global Politics from Below' in P Hamel et al (eds), *Globalization and Social Movements* (Palgrave Macmillan 2001), p 71.
[12] See, for example, the farmer-led climate change groups that were led by the industrial sector: 'Agriculture and the environment' (*Scottish Government*, 2020) <https://www.gov.scot/policies/agriculture-and-the-environment/farmer-led-climate-change-groups/> accessed May 2022.

characteristic of the wider (international) agroecological movement. Being well-aware that I was an external expert turned lobbyist and did not embody the ideal bottom up-approach to policy advocacy, I set up an advisory committee to ensure farmers' voices from different Scottish regions and sectors were reflected in my activities. Yet, this was only one step and comprehensive work to ensure that policy positions truly incorporate (ideally consensus views) of farmer-members is made difficult by the fact that time and money are limited, with project-based funds often being easier to access than support for core activities or internal structuring. Ultimately, this means that legal provisions and processes that support a participatory approach that integrates local farmers' knowledge, as put forward in this thesis, can only be holistically implemented when practical issues are recognised and understood, with a crucial role for social research, and agroecological farmers unions are better supported to represent and participate.

1.2 A Unifying Approach to the Unexpected

In addition to events and experiences that have shaped my person and PhD and have added a subtle empirical perspective to the analytical work, the past six years have also been marked by a level of societal tumult and environmental emergency that could not have been predicted and that most certainly have had an impact on the content of this thesis. The Brexit vote, cast only seven weeks after starting my PhD studies as an EU environmental lawyer in the UK, initially led me to question the value of my research proposal for long-term aspirations to build a life in Scotland. Political will within the nation to possibly re-join the EU put aside, I quickly learned to value the continuous worth of an EU law perspective, as I actively engaged with the work of the Strathclyde Centre for Environmental Law and Governance to offer insights on the potential implications (positive or negative) of the decision to leave the EU for law on the environment, food and agriculture, and to provide recommendations to address possible implementation gaps.[13] The need for and advantage of expertise and skillsets that combine knowledge of relevant EU laws and policies with an increasing understanding of the UK and Scottish contexts (regulations, political landscape, actors and power relations) has been proven through my work with the Landworkers' Alliance, e.g., when I was asked to lead on their campaign against the deregulation of certain gene-editing technologies. Nonetheless, for my thesis, the decision to leave the EU has partly motivated the choice of case studies, which I, due to shared market- and trade-features, anticipate will still have relevance for the UK and for Scotland. Additionally, Brexit confirmed for me the significance of an approach to help agroecological transitions that is rooted in international (biodiversity and human rights) law, which allows for conclusions and recommendations that are transferable to domestic contexts.

An international framework also brings into focus the global and timely relevance of this research. The previous decade saw the publication of key scientific reports on the state of the environment, notably in relation to climate change and biodiversity. Already in 2014, the International Panel of Climate Change (IPCC) concluded that "warming of the climate is

[13] For a list of activities and publications see: 'Our Work on Brexit' (*SCELG*, N.D.) <https://www.strath.ac.uk/research/strathclydecentreenvironmentallawgovernance/ourwork/research/labsincubators/globalenvironmentallawlab/ourworkonbrexit/> accessed May 2022.

unequivocal, and […] the observed changes are unprecedented over decades to millennia".[14] In 2019, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) found that biodiversity is declining faster than at any time in human history, and human actions threaten more species with global extinction than ever before.[15] Crucially, unsustainable agriculture has been steadily gaining attention as a major contributor to these crises, adding to the International Assessment of Agricultural Knowledge, Science and Technology for Development that is a starting point for analysis in the next Chapter.[16] For example, the IPCC's latest report on vulnerability emphasises the links between ecosystem functioning and climate change, highlighting the expansion of unsustainable agriculture as a driving force of ecosystem and human vulnerability and competition for land and/or water resources.[17] Conversely, the IPBES Assessment flags the potential of sustainable practices for biodiversity conservation, e.g., genetic diversity, and for achieving food security.[18] While this thesis focuses on transitions towards agroecology at farm/ecosystem level, and integration of local ecosystem knowledge in national and EU decision-making, the positive impacts of an agroecological approach exceed these contexts as biodiversity is a global/common concern.

Yet, the significance of local, agroecological production for systemic resilience – the ability to effectively respond and recover from shock and surprise[19] – goes beyond environmental crises, as has become evident during the COVID-19 pandemic and, more recently, the Ukraine war. Agroecology has been described as the "ecology of food systems",[20] reflecting the fact that agroecosystems are managed within a broad – political, economic, and environmental – system, which humans are an integral part of. Indeed, food is what directly or more indirectly connects every human being to the land and to the farmer. Whilst the current food system seemingly allows us to set aside ecological laws, as we enjoy the fruits of all-year-round global supplies, there is a clear lack of resilience. In the case of COVID-19, increasingly long and complicated supply chains were disrupted when the shackles of distribution and (seasonal) labour were impacted by lockdown travel restrictions and the rapid spread of illness within industrial food factories.[21] At the same time, short supply chains showed remarkable flexibility and ingenuity to adapt to the rapidly changing needs of consumers who turned to local markets to fulfil their nutritious needs alongside a need for reconnection with their community, and with food and food producers.[22] The Ukraine war, however, exposed, in an unusually explicit way, the dangers of a false food security narrative that fails to recognise the need to protect ecosystem

[14] *Climate Change. Synthesis Report to the Fifth Assessment Report* (IPCC, 2014), p 40.
[15] S Díaz et al, *Summary for policymakers of the global assessment report on biodiversity and ecosystem services* (IPBES Secretariat, 2019a).
[16] B D Mcintyre et al, *Agriculture at a Crossroads* (International Assessment of Agricultural Knowledge, Science and Technology for Development, 2009).
[17] *Climate Change 2022: Impacts, Adaptation and Vulnerability. Summary for Policymakers* (IPCC, 2022), par B.2.3.
[18] Díaz 2019a, par D6.
[19] M Ungar, 'Systemic resilience: principles and processes for a science of change in contexts of adversity' (2018) 23 Ecology and society 34.
[20] C Francis et al, 'Agroecology: The Ecology of Food Systems' (2003) 22 Journal of Sustainable Agriculture 99; S R Gliessman, *Agroecology : the Ecology of Sustainable Food Systems* (CRC Press 2015).
[21] M Szczepański, *Resilience of global supply chains. Challenges and solutions* (European Parliament, 2021).
[22] G Nemes et al, 'The impact of COVID-19 on alternative and local food systems and the potential for the sustainability transition: Insights from 13 countries' (2021) 28 Sustainable Production and Consumption 591.

functions. The industrial agricultural sector has been lobbying heavily against implementation of the EU's Farm to Fork objectives, discussed further in Chapter 3, "to unleash the potential of European agriculture to mitigate the effects of [the Ukrainian] war".[23] At the same time, the EU has put rules on ecological focus areas – CAP designated areas of fallow land which very aim is to improve biodiversity – aside as they would "constrain EU production potential";[24] a measure that has seen Germany take one million hectares of fallow land back into production.[25] The above signals a strong need for an ecosystem and human rights-based approach that protects against the negative environmental and social impacts of short-term policy initiatives.

1.3 A Practical and Holistic Approach to Solving Complexities

My objectives for the thesis when I started on the journey were twofold: to better understand obstacles in law and governance to an agroecological revolution and to offer solutions and recommendations for regulatory reform that support agroecological thinking and practices. Desk-based, detailed analyses of international soft and hard law, notably on biodiversity due to a perceived potential for developing an ecological approach to food production and farming, and relevant EU regulations and institutional frameworks, would be at its core. The added value of the project for the field would not only lie in the making of links between agroecology and law – which, at the time, was hardly ever recognised as a topic worthy of legal study or policy support – and the identification and refining of a workable, high-level framework that could support EU legal and policy reform, but also in the application of abstract notions to regulations and specific and technical rules to identify concrete obstacles to an (agro)ecological approach.

The thesis, which aims to answer *if, and, if so, how an ecosystem approach to EU law on food production and agriculture could support agroecology*, has not strayed far off this track, but its execution has been informed by personal values and ways of doing that I was not fully aware of at the very start. Firstly, the thesis takes a rather pragmatic approach, relying on theory, e.g., on policy paradigms or (mis)framing, and on existing knowledge or ideas, only to help make sense of a wealth of (new) information at the beginning of every step in legal analysis and discovery, but otherwise it identifies and offer solutions for complex problems through detailed investigation of the specifics and practical application of implementing rules, measures and processes, and through (social, economic and political) contextualisation. Only where an understanding of the workings of regulations could not be derived from legal texts or (socio)-legal doctrine, have I enhanced my understanding through formal or informal, direct, or indirect engagement with experts and stakeholders. Secondly, the thesis echoes ecological thinking as it takes an integrated approach, exploring connections between different areas and levels of law, and between legal research and the social and natural sciences. It also recognises that the

[23] 'Europe must equip its agriculture with a food shield to face the consequences of two major crises: the war in Ukraine and climate change' (7 March 2022) <https://farming.co.uk/news/europe-must-equip-its-agriculture-with-a-food-shield-to-face-the-consequences-of-two-major-crises-the-war-in-ukraine-and-climate-change> accessed May 2022.

[24] European Commission, 'Safeguarding food security and reinforcing the resilience of food systems' COM(2022) 133 final, p 10.

[25] 'Germans allow over one million hectares of greening land to enter production' *Irish Farmers Journal* (11 March 2022) <https://www.farmersjournal.ie/germans-allow-over-one-million-hectares-of-greening-land-to-enter-production-685493> accessed May 2022

whole is more than a sum of its parts: food and agricultural systems cannot be fully understood, and issues cannot be fully addressed, by a focus only on laws and policies, or on specific elements of regulations and regimes, e.g., normative provisions, technical rules and procedures or institutional structures. A holistic perspective reveals inconsistencies and trade-offs and allows for priority-setting as the ultimate objectives for reform are determined by the framework: a combined ecosystem- and human rights-based approach. Nevertheless, true comprehensiveness on a topic so wide –a systemic approach to food and agriculture – cannot be achieved in a PhD, and areas for further research will be flagged in the concluding Chapter.

1.3.1. The Structure of the PhD Thesis: Parts I, II and III

The structure of this PhD reflects my research path; the path of a lawyer with a keen interest in the topic of food and agricultural systems but also an acute awareness of all the things that I did not (yet) know. Part I is, therefore, of an exploratory nature, as Chapter 2 starts with an overview of the historic and scientific processes that underpin an industrial agricultural model and food system, and their environmental and socioeconomic impacts. It introduces the concept of agroecology as an alternative model that combines a focus on ecological processes with an agenda for food system change. Chapter 3 then places this discussion within a legal and policy context, with brief, general reflections on the impact that EU law- and policymaking has had on local agroecosystem management decisions. It argues that a radical shift in the way society looks at agriculture and food production – from a focus on outputs to the prioritisation of long-term ecosystem functionality – requires a shift in the policy paradigm: a framework of normative and organisational components that determines how problems are addressed through law making. It, however, finds that interactions between law and agroecology have, so far, been limited or they lack a level of conceptual clarity that is necessary to guide comprehensive and systemic change and reform. Nonetheless, there might not be a need to reinvent the wheel as building blocks for a framework to guide a shift towards agroecology in law can be found in other areas of law that have already recognised the need for ecosystem centrality. Links are specifically drawn between agroecology and the ecosystem approach as developed under the Convention on Biological Diversity (CBD),[26] broken down in three elements of integration, conservation, and equity, to substantiate the belief that ecosystem approach could provide a framework for the redirection of EU legislation on agriculture and food towards agroecology.

Focusing initially on the prioritisation of the conservation of ecosystem functions, Part II uses two case studies to identify where relevant EU legislation is making positive steps and where crucial gaps in the implementation of an ecosystem approach remain. The reasons why I chose EU risk regulations on pesticides and GMOs, and EU regulations on organic production are threefold. Firstly, I wanted to start research within an area of law that I had already done work on (risk regulations) so that I could rely on existing expertise to develop a completely new analysis, before expanding towards an area of law that I had never worked on before (organic regulations), thereby giving myself an opportunity to increase my knowledge and abilities. In this regard, I completed a MSc Module on Organic Production: Practices & Principles at the

[26] Convention on Biological Diversity (adopted 5 June 1992, entered into force 29 December 1993) 1760 UNTS 79 ('CBD').

Scotland's Rural College, which covered the history and principles of the organic movement, and relevant legislation, production rules and decision-making processes at EU and UK level. Secondly, being aware that there was a likelihood that my PhD would stretch beyond my four-year scholarship, due to other work and family commitments, I opted for areas that would likely be relatively stable. Contrarily, the CAP has been in a phase of significant transition since 2016 and although agricultural payments would be an interesting topic for further study, I believed that for this thesis the constant need for updating would have distracted from the argument. Lastly, as stated above, due to a common trade- and product-focus, I expect that these specific case studies will continue to be relevant to the UK context and my research career in Scotland. The case studies reveal that whilst the need for (agro)ecosystem protection is getting more recognition as a regulatory objective, supported by principles and interpretative guidance, in practice, conservation of ecosystem functioning is not prioritised in decisions on authorisation of GMOs and pesticides, or specific production rules for organic certification. Importantly, heavy reliance on external expertise, the (deepening) marginalisation of agroecological farmers as ecosystem stewards and the lack of integration of local, ecological knowledge are identified in both cases as foremost inhibiting factors to the implementation of an ecosystem approach.

Part III, therefore, looks at (international) human rights law to find ways of (re)empowering agroecological farmers in relevant law- and decision-making processes. It explores the social and ecological elements of agroecology, and the concept of food sovereignty as put forward by the international agroecological movement, before drawing synergies with the ecosystem approach. Taking the United Nations Declaration on the Rights of Peasants and Other People Working in Rural Areas ('UNDROP')[27] as a starting point for the identification of relevant human rights, this thesis finds that there is great potential at the nexus between biodiversity and human rights law to design a framework that is sufficiently detailed and (quasi-)justiciable to address current inequities, and further the uptake of agroecology. By reframing problems and questions of law- and decision-making in substantive human rights' terms, and by exposing gaps in the implementation of procedural rights, this thesis, lastly, uses the case studies to illustrate what positive impacts a combined ecosystem- and human rights-based approach could have for the position of agroecological stewards and the uptake of agroecology in law- and policymaking; findings that can be used to guide reform in other relevant areas of (EU) law.

[27] UN General Assembly, 'United Nations Declaration on the Rights of Peasants and Other People Working in Rural Areas (UNDROP)' (2018) A/RES/73/165.

Part I

Agroecology, Law and the Ecosystem Approach

2 Agroecology: From Farm to Food System

The impact of industrial agriculture and the potential of agroecology

2.1 Introduction

An age-old profession, farming has recently seen an unprecedented and continuous transition of technological modernisation, which started with the agricultural revolutions of the twentieth century. A combination of gradual and complimentary advances in the fields of engineering, chemistry, biology, and informatics have allowed for significant increases in agricultural production. However, the widespread application of industrial practices has also been held responsible for the degradation of agroecosystems and the exacerbation of inequalities within rural communities. This Chapter seeks to shed light on the processes and thinking behind the adoption of an industrial model of food production, characterised by its primary objective to enhance and maximise agricultural outputs, in industrialised countries and, in particular, in the EU. In this context it does not only consider the scientific revolutions that underpin the wide-scale adoption of industrial agricultural practices in the last century (§2.2), but also the major changes in the global food market in the same time period that resulted in regional specialisation and segregation within the food supply chain (§2.3). This Chapter then discusses the negative environmental and social implications of the relative success of the industrial food system, which emphasise the need for change towards a more sustainable model (§2.4). It thus provides the background and practical foundations for the detailed analysis in this thesis of the role of EU law in supporting the continuous predominance of industrial food production in the EU, as well as its potential for supporting transitions towards an alternative food system.

This Chapter also analyses how agroecology promises to provide for an alternative structure for a more sustainable approach to farming and food production, which ultimately seeks to conserve agroecosystem functions and support equitable food system management. It attempts to unravel the concept of agroecology as an interdisciplinary scientific discipline and set of farming practices and it supports a broad understanding of agroecology as a movement for systemic change, which includes questions of sovereignty and equity (§2.5). The next Chapter will build upon this analysis to explore the current relations between law and agroecology, and notably the synergies and divergences between the principles of agroecology and the ecosystem approach as developed under the Convention on Biological Diversity (CBD),[1] to see if the latter could provide a frame to guide regulatory reform in support of agroecological transitions.

2.2 The Making of Industrial Agriculture: Building Upon Scientific Revolutions

Whomever has travelled in the industrialised nations, has become accustomed to a countryside dominated by golden fields of cereals and oilseeds, with large tractors from 200 to 500 horsepowers and impressive combine harvesters. For those who have grown up in these parts of the world, it may be difficult to imagine that only at the end of the nineteenth century the adding of a few horses to replace manual labour by animal traction was considered a major

[1] W Settle, *Ecosystem Management in Agriculture: Principles and Application of the Ecosystem Approach* (FAO, 2002).

development, which allowed for the doubling of the productivity of labour.[2] That, in fact, until the second world war, animal-drawn farming was still the main method of farming in the United States and Europe, and that to this day around eighty percent of the farmers in Africa, and forty to sixty percent of farmers in Latin America and Asia, still work with manual tools only.[3]

Despite its geographical and temporal limitations, the impacts of the agricultural revolution of the twentieth century on the outlook of the countryside, its rural communities and agro-environment are visibly undeniable. More land was converted to cropland in the 30 years after 1950 than in the 150 years between 1700 and 1850,[4] and a large percentage of changes in the diversity of life on Earth has been attributed to land conversions to farm land.[5] Whilst the world population grew by a factor 2.6 from 2.5 billion people in 1950 to 6.5 billion in 2005, it is estimated that the world agricultural output, notably cereals and meat production, increased even more in this period.[6] At the same time, nine out of ten family farms disappeared in the industrialised world during the twentieth century,[7] and there is a continuous decline in the agricultural workforce in the EU.[8] The advances in agriculture in the first half of the twentieth century were in many ways delayed reactions to the industrial revolution and breakthroughs in science. This delay has been attributed to conservativism in farming and the risk associated with transitions, which, if proven to be unsuccessful, could set the farmer back by a harvest or two.[9] Although change in farming practices did not happen suddenly or swiftly, once started, impacts were dramatic whilst change happened simultaneously at mechanical, chemical and biological level,[10] with more recent advances in informatics also allowing for more targeted applications. Moreover, as will be discussed in the next chapters, the scientific and technological revolutions that underpin today's industrial food system – a system that ultimately seeks to enhance and maximise efficiency and output of production, were actively supported by regulatory measures that sought to increase agricultural productivity in the EU.

2.2.1. Mechanical Revolution: From Horse to Horsepower

Whilst the mechanical revolution of the nineteenth century sought to provide new animal-drawn mechanical equipment, the twentieth century focussed on motorisation and the development of more complex machines.[11] The commercialisation of gasoline-powered tractors was begun in the early twentieth century by companies some of which, like John Deere

[2] M Mazoyer and L Roudart, *A History of World Agriculture. From the Neolithic Age to the Current Crisis* (Earth Scan 2006), p 447.
[3] Ibid, p 20; see also on the distribution of small-scale farms, McIntyre 2009, p 9.
[4] P Ciais et al, 'Effects of land use change and management on the European cropland carbon balance' (2011) 17 Global Change Biology 320, p 26.
[5] Ibid, p 4.
[6] McIntyre 2009, p 6.
[7] Mazoyer and Roudart 2006, p 433.
[8] A Maucorps et al, *The EU farming employment: current challenges and future prospects* (European Parliament, 2019); see on the United Kingdom also Y Zayed, *Agriculture: historical statistics. Briefing Paper* (House of Commons, 2016), p 12; and worldwide *The State of Food and Agriculture - Lessons from the Past 50 Years* (FAO, 2000), p 186-187.
[9] Similarly, D Paarlberg and P Paarlberg, *The Agricultural Revolution of the 20th Century* (Iowa State University Press 2000), p xv.
[10] Ibid, p xv; see also H Cochet, *Comparative agriculture* (Springer 2015), p 53.
[11] Mazoyer and Roudart 2006, p 381.

and Case, still exist today.[12] Cereal, oilseed and legume farmers were the first to adopt motorised techniques, followed by row crop farmers. Large-scale use of tractors after World War II tripled worker productivity compared to use of animal power, to 30 hectares.[13] Productivity increased not only with increases in horsepower, but also with innovations in design and size of pulled machinery such as ploughs, cultivators, and rollers. According to Mazoyer and Roudart, today's machines allow the "best equipped, the best proportioned, the best situated farms" to attain 2 million kilograms of cereal-equivalents per worker per year.[14]

2.2.2. Chemical Revolution: Synthetic Fertilisers and Pesticides

The fact that the most efficient industrial farms today can produce 2000 times more than those farms relying on manual labour only,[15] cannot solely be attributed to mechanical innovations. In the nineteenth century, mankind gained a better understanding of the critical chemicals needed for plant growth: phosphate, potash, and, later, nitrogen.[16] Relying on the traditional knowledge of Peruvians, Europeans started to import seabird manure or guano, rich in all three elements, for fertilisation.[17] Other extractive sources for nitrate, superphosphates and potassium chloride were discovered worldwide and one would provide a substitute for the other when a source ran out. The chemical revolution came with the development of synthetic chemicals in the inter-war period.[18] Combining nitrogen extracted from the air with hydrogen, through what is known as the Haber-Bosch process, created ammonia. Produced on a large-scale during the second world war to serve as the basis for explosive munition, post-war ammonia was used as the basis for synthetic nitrogen fertilisers.[19] The use of phosphorus fertilisers tripled between 1960 and 1990.[20] In terms of productivity this means that today's yields of grain per hectare are ten times more than they were at the beginning of the twentieth century, at 10.000 kilos, the production of which can require 200 kilos of nitrogen.[21] Stark increases in yields have also been made possible by the use of chemical pesticides.[22] Plant protection products, notably insecticides and herbicides, seek to protect crops against natural competitors, which are in direct combat with the crop or which are competing for the same means of survival like sources of light and nutrition. Pesticides can be used to prevent or control

[12] Paarlberg and Paarlberg 2000, p 23.
[13] Mazoyer and Roudart 2006, p 382.
[14] Ibid, p 11.
[15] Ibid, p 11.
[16] Paarlberg and Paarlberg 2000, p 33.
[17] Mazoyer and Roudart 2006, p 385; see for example, 'The Guano Crisis' *The Farmer's Magazine* (London, 1857) < > accessed May 2022.
[18] Paarlberg and Paarlberg 2000, 33 and Mazoyer and Roudart 2006, 385.
[19] A J O'connor, 'Arsenal Of Chemistry: The Haber Bosch Process and the Great War' (2014) 2 The Undergraduate Historical Journal at UC Merced 67.
[20] W V Reid et al, *Millenium Ecosystem Assessment. Ecosystems and Human Well-Being. Synthesis.* (World Resources Institute, 2005), p 35.
[21] Mazoyer and Roudart 2006, p 386.
[22] E Bozzini, *Pesticide Policy and Politics in the European Union. Regulatory Assessment, Implementation and Enforcement* (Palgrave MacMillan 2017), Chapter 1.

pests, but they can also be used to aid farm efficiency, for example, as a pre-harvest desiccant – mostly the use of glyphosate to kill leaves or plant – to allow for faster harvesting.[23]

2.2.3. Biological Revolution: Selection, Hybridisation and Biotechnology

The mere application of chemicals to crops is by itself not enough to ensure the growth in yields that we have seen since the last century. The varieties used must also be capable of absorbing the increased amount of nutrients, must be able to withstand the pesticides used when applied to prevent and control weeds, must be resilient in the face of abiotic stresses like weather conditions and must be adapted to the use of large-scale machinery, which replaced manual labour.[24] Although selective breeding in agriculture has been happening for 10,000 years,[25] at the beginning of the twentieth century the results were still unpredictable and the process was lengthy. Scientific breakthroughs from as early as the 1940s allowed for faster and more targeted breeding,[26] accelerated by the discovery of the DNA double helix in the 1950s. Furthering the understanding of the biological make-up of plants did not only aid the advances in selection and hybridisation, but also provided the foundations for genetic engineering or biotechnology. Whereas selection and hybridisation work within the reproductive boundaries, biotechnology can overcome these restrictions through the lab-based transfer of genes with desirable traits between organisms. Examples include insect-resistant genetically modified organisms (GMOs), e.g., the Bt-GMOs, herbicide-resistant crops like the Roundup-Ready GMOs, and new, drought-resistant DroughtGard Hybrid maizes by agro-chemical company Monsanto. Although GMOs dominate the market for crops like soybeans and maize, public resistance in parts of the world and notably the EU has led to regulatory restrictions on GMO cultivation and therefore still emphasises the importance of selective breeding techniques.[27]

2.2.4. The 21st Century: The Age of Information

It is clear from the above that the mechanical, chemical, and biological revolutions in agriculture in the twentieth century should not be seen in isolation, but as mutually enforcing drivers that have together created a model of industrial agriculture that aims to increase yields and absolute production levels. The current technological advances in agriculture largely built upon this model, yet adding a fourth dimension, namely that of the information revolution of the twenty-first century. Whilst farm machinery continues to increase in size, new farm chemicals are developed and improved plant varieties are put on the market every year, the speedy gains in the collection, storage, processing and sharing of data is allowing for more targeted and synergetic evolvements in these domains. Particularly noteworthy in this regard are the developments in precision agriculture, which seeks to use data generated with the help of relatively low-cost remote sensing, geographic information systems, positioning systems

[23] M Cuhra et al, 'Glyphosate: Too Much of a Good Thing?' (*Frontiers in Environmental Science* 2016) <https://www.frontiersin.org/article/10.3389/fenvs.2016.00028> accessed May 2022.
[24] Mazoyer and Roudart 2006, p 390.
[25] Paarlberg and Paarlberg 2000, 43.
[26] See for example the process of mutagenesis, which allowed for the making of mutations in plant DNA through the use of chemicals or radiation: A M Wieczorek and M G Wright, 'History of Agricultural Biotechnology: How Crop Development Has Evolved' (2012) 3 Nature Education Knowledge 9.
[27] See for example Geelhoed 2016, on public resistance to GMOs in the EU, notably in light of a lack inclusiveness in the centralised authorisation process for GMOs, see also, hereafter, Chapter 4.

like Global Navigation Satellite Systems (GNSS) and process control.[28] Applications include machine guidance and controlled traffic farming, recording and mapping of, amongst others, stages of plant growth, soil quality, nutrient levels and yield potential, using samples, sensors and remote sensing techniques like aerial and satellite imagery.[29] With the necessary equipment and farm machinery, this data generation could allow for more targeted applications of chemicals and the selection of varieties most-suited to the ecological conditions of the field.

With regard to the latter, the field of synthetic biology promises to provide for additional innovation. Synthetic biology has been defined as "a further development and new dimension of modern biotechnology that combines science, technology and engineering to facilitate and accelerate the understanding, design, redesign, manufacture and/or modification of genetic materials, living organisms and biological systems".[30] Rather than transferring genes between organisms, new technologies falling within the realm of synthetic biology, like CRISPR/Cas9, allow for the editing of the genes themselves through the use of short DNA sequences (CRISPR) found in bacteria.[31] These techniques do therefore rely less on the exchange of physical plant materials and put more emphasis on the wide availability of DNA sequence data. Applications of synthetic biology in agriculture include the modification of crops to better resist stresses and pests, better absorb nutrients and provide larger crop yields.[32] Yet, they could also allow for the engineering of more precise and fast-degradable biological pesticides.[33] And lastly, these techniques could be applied to modify the pests themselves, with a view to for example, eliminate traits that cause disease or by reversing pesticide and herbicide resistance in a pest population, through the introduction of so-called dominant 'gene drivers'.[34]

2.3 Specialisation and Separation in a Global Food Market

The revolutions in engineering, chemistry, biology, and, more recently, agri- and bioinformatics, have laid the foundations for the development of an agricultural model that is characterised by large scales, high productivity, chemical and capital intensity, and low labour intensity. Although innovations may be regulated as distinct and separate practices under EU law, as Part II of this thesis will show, this Chapter has also highlighted the interconnectedness of industrial practices and the continuing technological developments in this realm. The wide-scale adoption of the industrial agricultural model in the industrialised world can, however, not

[28] 'Precision Farming' (*European Global Navigation Satelite Systems Agency*, 2016) <https://www.gsa.europa.eu/library/case-studies/precision-farming> accessed May 2022.
[29] For a complete list of examples of applications of precision farming, see: P J Zarco-Tejada et al, *Precision Agriculture: An Opportunity for EU Farmers - Potential Support with the CAP 2014-2020* (European Parliament, 2014), Table 1.
[30] Ad Hoc Technical Expert Group on Synthetic Biology to the CBD, 'Report on Synthetic Biology' (2015) UNEP/CBD/SYNBIO/AHTEG/2015/1/3, par 24; see also the acknowledgement in Conference of the Parties to the CBD, 'Decision XIII/17. Synthetic Biology' (2016) CBD/COP/DEC/XIII/17, 4.
[31] *Future Brief: Synthetic Biology and Biodiversity* (European Commission, 2016a), p 22.
[32] *A Synthetic Biology Roadmap for the UK* (UK Synthetic Biology Roadmap Coordination Group, 2012), p 26.
[33] Conference of the Parties to the CBD, 'Potential Positive and Negative Impacts of Components, Organisms and Products Resulting from Synthetic Biology Techniques on the Conservation and Sustainable Use of Biodiversity, and Associated Social, Economic and Cultural Considerations. Note by the Executive Secretary' (2014) UNEP/CBD/COP/12/INF/11 (Report by the Subsidiary Body on Scientific, Technical and Technological Advice 2014), p 26.
[34] Ibid, p 25.

be solely attributed to advances in sciences and farmers' willingness to modernise. "Science remains in the laboratory unless there is the incentive to adopt the knowledge. This is the difference between science and technology. Economics is the integrator".[35] The relative success of industrial farming can therefore only be fully understood in light of the changes in commodity and food markets and associated trends towards specialisation in production. The next Chapter and Part II of this thesis will further highlight how these changes have been intensified by the EU's establishment of single markets for agricultural produce and inputs.

2.3.1. Horizontal Divisions: From Home Production to Specialised Regions

Whereas the diversified crop systems of the early twentieth century primarily served to satisfy the needs of the local rural population and the farm itself,[36] subsequent trends towards specialisation would prove that "the narrow circle of home production is broken as soon as mechanisation sets in".[37] The invention of the steam engine, the first mechanical revolution, provided for much faster transport over water and land. It thus allowed farmers to sell their products in distant markets and to get access to consumable and capital inputs from outside sources, like fertilisers and new equipment.[38] However, this development in transport meant that farmers now had to contend with competition from their overseas counterparts. To successfully address this competition, regions in the industrialised world specialised in niche or bulk products that stood a chance on the multiregional and multinational markets, taking into consideration the ecological conditions of the area. The use of motorised machinery and chemical inputs had, furthermore, allowed farmers to overcome some of the natural and human restrictions previously associated with specialised farming, making it possible to harvest a large amount of a singular crop in a short harvest window, to abandon traditional fallowing, rotation and biological pest control practices and to remove animal from arable farms altogether (thus also freeing them from the obligation to produce fodder).[39] The market developments and the technological innovations together led to the large-scale separation of farming practices: flat regions with fertile soils would focus on the production of sought after grains, whilst hilly, wet regions would specialise in livestock-breeding,[40] and fruit, vegetable and flower production was left to warmer regions or those with greenhouse farms. [41] Increased competition since the early twentieth century, due to the expansions in agricultural markets and increased yields due to the technological innovations in farming , moreover, led to a steep decline in the market prices of farmed goods.[42] For those farms that were not able to keep up with the trends in productivity this meant that they inevitably saw their income decline.[43] If this income was no longer sufficient to remunerate labour at market price and renew the means of production, the

[35] Paarlberg and Paarlberg 2000, p 59.
[36] Mazoyer and Roudart 2006, p 380.
[37] S Giedion, *Mechanization Takes Command. A Contribution to Anonymous History.* (Oxford University Press 1970), p 131.
[38] Mazoyer and Roudart 2006, p 366-367.
[39] Ibid, p 393.
[40] Ibid, p 392-393.
[41] Ibid, p 394; see for example on the history of greenhouse farming in the Netherlands: M H Jensen and A J Malter, *Protected Agriculture: A Global Review* (The World Bank 1995), p 103.
[42] Mazoyer and Roudart 2006, p 406; Gliessman 2015, p 3.
[43] Mazoyer and Roudart 2006, p 406.

farm would be considered in crisis and would usually only temporarily survive until the retirement of the head of the farm. If the income would fall under the 'threshold of survival' or minimum wage, the farm would disappear even sooner.[44] This explains the large-scale elimination of farms that were not able to keep up, as "the only farms that remain are those which, from generation to generation, have had the means to adopt the most productive systems, one after another".[45] The accumulation and concentration of wealth within farms under free market conditions supported the survival of large farms that could continuously invest to enhance productivity, or, following the basic principles of a capitalist system: those farms that were able to use their value to create more value.[46] As we will briefly discussed in the next chapter, the legal framework that was adopted by the EU in the second half of the twentieth century often actively supported regional specialisation within the EU and the market's drive towards more efficiency, through regulations for the establishment of a single European agricultural market and for the modernisation of farming practices in line with the Common Agricultural Policy's objective "to increase agricultural productivity".[47] However, early measures in the form of price support subsidies and high import tariffs initially had also sought to protect European farmers from fierce competition from their overseas counterparts.[48]

2.3.2. Vertical Divisions: The Industrialisation of Food Systems

In addition to the specialisation and thereby division of regional farming practices, the focus of industrial farms on increased productivity and their reliance on technological innovations has led to vertical divisions in the supply chain, or the development of what we now know as the agri-food industry. The upstream and downstream agri-industries that developed in parallel with the transitions towards industrial farms, took on increasingly specialised tasks that had previously been performed by the farm itself or in artisanal units,[49] such as value-adding, food processing tasks (e.g., for grain: flour milling, the making of bread and beer) and sales, but also breeding, seed regeneration, the manufacture of farm implements and the production of fertilisers.[50] Farmers have thus largely been reduced to being producers of raw agricultural commodities, their income dependent on the revenue generated by a handful of crops only. In 2020, agriculture only makes up 1.65% of the Gross Domestic Product (GDP) in the EU and 0.6% in the UK,[51] whereas the wider food and drink value chain generates 7% of EU GDP,[52] and upstream and downstream agri-industries have together been held to represent more than 10% of GDPs in industrialised nations.[53] These industries for fertilisers, seeds, biotechnology,

[44] Ibid, p 400; see also FAO 2000, p 183.
[45] Mazoyer and Roudart 2006,p 410.
[46] See on the relationship between market forces and capitalism in agriculture also E Holt-Giménez, *A Foodie's Guide to Capitalism. Understanding the Political Economy of What we Eat* (Monthly Review Press 2017).
[47] Article 33(a) EC; see likewise nowadays Article 39(1)(a) TFEU and hereafter section §3.2.
[48] I Garzon, *Reforming the Common Agricultural Policy. History of a Paradigm Change* (Palgrave Macmillan 2006), p 23.
[49] Mazoyer and Roudart 2006, p 396; see also FAO 2000, p 187.
[50] See, hereafter Chapter 6.
[51] 'Agriculture, value added (% of GDP)' (*World Bank*, 2015) <http://data.worldbank.org/indicator/NV.AGR.TOTL.ZS> accessed May 2022.
[52] European Economic and Social Committee, 'An EU Industrial Policy for the Food and Drinks Sector' CCMI/129.
[53] Mazoyer and Roudart 2006, p 397.

processing, and retail are, moreover, characterised by strong concentrations of market powers. In 2017, the market share of the four biggest companies (4-firm concentration) in seeds, agrochemicals and farm machinery was estimated to range between 54% and 62% in global market sales,[54] and the four biggest national supermarkets own an average of 60% of the market across Member States.[55] For farm machinery, further concentration is expected as companies are looking to secure better access and control over big data through integrated precision-farming GPS equipment.[56] Similarly, major mergers have happened in the seed and agrochemical sectors, which supply conventional and GMO seeds that can have a tailor-made dependency on the fertilisers and pesticides.[57] These big upstream and downstream firms, which supply products or services which today's industrial farms are highly dependent on, may thus have a significant power to shape the prices of agricultural products and of international commodities, as well as steer research and development conducted in the relevant scientific fields and the management decisions by farmers.[58] Any analysis of industrial farming and any attempt for reform against the backdrop of its negative impacts, discussed hereafter, should therefore not only recognise the many factors that have contributed to the predominance of these farming practices in the industrialised world, but also the marginalised position of the farmer in today's market.[59] These trends have indeed only been exacerbated by regulatory measures that have prioritised information generated by industry over farmers' knowledge or that put up obstacles that, for example, emphasise increasing demands on farmers to obtain and sustain specialised knowledge (including legal knowhow), thereby preventing the continuation of diverse farming practices. Effective efforts for regulatory reform need to be holistic in their recognition of industrialisation beyond the farm, extending to the entire food system.

2.4 The Negative Environmental and Social Impacts of Industrial Agriculture

The model of industrial and technology driven agriculture, that is widely put in practice in the industrialised world today, has delivered on some of its productivity objectives.[60] Proponents of a system of the current food system have highlighted how the adoption of industrial 'tools' for agricultural production, such as fertilisers, pesticides and high-yielding varieties have allowed for food supplies that, at least in some developed parts of the world, are able to meet ever-growing population and consumer demands, thereby, at least in absolute terms, ensuring

[54] P Mooney, *Too big too feed. Exploring the impacts of mega-mergers, consolidation and concentration of power in the agri-food sector* (iPES-Food, 2017), p 21.
[55] V Dam, Iris et al, 'A detailed mapping of the food industry in the European single market: similarities and differences in market structure across countries and sectors' (*International Journal of Behavioral Nutrition and Physical Activity* 2021) <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8074488/> accessed May 2022.
[56] Mooney 2017, p 33; see also A Peterson, 'Google didn't lead the self-driving vehicle revolution. John Deere did.' (22 June 2015) <https://www.washingtonpost.com/news/the-switch/wp/2015/06/22/google-didnt-lead-the-self-driving-vehicle-revolution-john-deere-did/?utm_term=.125e1aaa3fb6> accessed May 2022.
[57] See, hereafter, Chapter 6, §6.3.1.
[58] McIntyre 2009, p 8; *Corporate concentration within the agri-food sector* (iPES-Food, 2016b), p 1; Paarlberg and Paarlberg 2000, p 46.
[59] See, hereafter, Chapter 6.
[60] I refer here to absolute increases in yields and production levels. As discussed above, it is questionable to what extent industrial agriculture has led to more efficiency in food production, as it is reliant on more external inputs generated by the agri-industry. See also Mazoyer and Roudart 2006, p 397.

short-term food security.[61] However, it has also been said that "the greatest triumphs, as long as they are poorly controlled, always lead to excess".[62] Agricultural overproduction in parts of the world has been a chronic by-product of the efficiency gains of industrial agriculture. Land conversion and overuse, together with the substitution of natural processes with the products of technological advances, have led to the degradation of the environment and ecosystems functions and processes. Linking these functions to the benefits that ecosystems provide for human wellbeing, and following the terminology introduced by the Millennium Ecosystem Assessment, it could also be held that in industrial agriculture has emphasised the provisioning services of agroecosystems, by temporarily maximising food production, but has neglected the regulating and supporting services that people obtain from agroecosystems and that are necessary to sustain production to ensure the food security of current *and future* generations.[63] Although it must be noted that this 'ecosystem services terminology' is still evolving,[64] the significance of the processes at stake, being the focus of this paragraph, is less likely to be subject to debate. Additionally, the revolutions in agriculture have led to increased inequalities in rural communities. Although regulatory measures have been put in place to address some of these negative impacts, the next chapters will show that these efforts have been fragmented and overall insufficient to provide an effective counterbalance for the productivity ambitions of the industrial model. The negative impacts are, moreover, predicted to worsen with increasing demands to meet the consumption patterns of a bigger and wealthier world population, with an estimated 9 billion people by 2050,[65] and an increase in GDP of 2.4 times current levels.[66]

2.4.1. Biodiversity Loss and Excessive 'Pest' Control

Today, 40% of the Earth's terrestrial surface,[67] 39% of the land area of the EU Member States,[68] and 70% of the UK's land surface,[69] is used for agriculture and food production. Conversions of land cover to cropland are considered the most important driver of ecosystem change and

[61] Bozzini 2017, p 9. However, it must also be noted that food security even in this narrow sense can be compromised by a decrease in nutritional value of production, see, hereafter, §2.4.5.
[62] Mazoyer and Roudart 2006, p 439.
[63] This qualification is based on Reid et al 2005, p v and will be discussed hereafter in further detail.
[64] Note, for example, the fact that the Intergovernmental Panel on Biodiversity and Ecosystem Services (IPBES) speaks in broader terms of 'nature's contributions to people' (NCPs), which has, although building upon MEA 2005, dismissed the category of 'supporting services' as being considered a property of ecosystems rather than a contribution to people, see IPBES, 'Update on the classification of nature's contributions to people by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. Note by the Secretariat' (2017) IPBES/5/INF/24. The approach of the IPBES has also been held to be more inclusive of world views. See in this regard, U Pascual et al, 'Valuing nature's contributions to people: the IPBES approach' (2017) 26 Current Opinion in Environmental Sustainability 7 and S Díaz et al, 'The IPBES Conceptual Framework — connecting nature and people' (2015) 14 Current Opinion in Environmental Sustainability 1.
[65] R Serraj et al, 'Agriculture and Food Systems to 2050: A Synthesis' in R Serraj and P Pingali (eds), *Agriculture & Food Systems to 2050 Global Trends, Challenges and Opportunities* (CGIAR 2018), p 3.
[66] D Bartley et al, *The State of the World's Land and Water Resources for Food and Agriculture. Managing Systems at Risk* (Routledge 2011), p 52; the Reid et al 2005, p 2 even predicts a three to six fold increase compared to current levels.
[67] S Díaz et al, *The global assessment report on biodiversity and ecosystem services* (IPBES Secretariat, 2019b) , p 109.
[68] 'Farms and farmland in the European Union - statistics' (*EuroStat*, 2018) <https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Farms_and_farmland_in_the_European_Union_-_statistics> accessed May 2022.
[69] A Bailey et al, *Agriculture in the UK* (National Institute for Economic and Social Research, 2017), p 1.

are held responsible for the loss of a considerable proportion of the world's major types of forests and woodlands.[70] Despite the obvious loss of habitats and species with changes in land use, the agroecosystems themselves are also home to many plants and animals. It is estimated that 50% of European bird species,[71] 255 species and 57 habitat types protected under EU environmental legislation, are partially or fully dependent on agricultural management.[72]

Industrial farming practices have, however, been associated with a steep decline in biodiversity. A significant drop in diversity in types and genetic variations of crops can be attributed to the replacement of traditional varieties with the products of the biological revolutions.[73] Negative relationships have, furthermore, been found between increased cereal yields and the diversity of wild plants and farmland birds.[74] Such relationships can at least in part be ascribed to the large-scale use of chemicals for pest control.[75] Insecticides, despite their intended selectivity, may have impacts on non-targeted species and the species that rely upon them, like predators and insect-pollinated plants.[76] Pre-emergent, post-emergent and non-selective herbicides may be applied at different growth stages and will eradicate most weeds, thereby causing significant habitat loss.[77] Biodiversity loss is aggravated by high specialisation in farming, which requires increased chemical use, whilst monocultures are more susceptible to pests.[78] The loss of natural predators and resistance in pests due to high pesticide exposure, may, moreover, require the use of stronger chemicals that cause further biodiversity decline.[79] Slim margins between the revenues and costs of crop production in today's market are, lastly, driving large-scale preventive pesticide use, as no losses can be permitted if to ensure the farm's viability.[80]

Biodiversity decline is not only a concern due to nature's inherent value, but also negatively impacts nature's regulating services upon which food production relies, notably natural pest

[70] Reid et al 2005, p 4 and 67.
[71] F Geiger et al, 'Persistent negative effects of pesticides on biodiversity and biological control potential on European farmland' (2010) 11 Basic and Applied Ecology 97, p 98.
[72] C Olmeda et al, *Farming for Natura 2000* (European Commission, Institute for European Environmental Policy, 2014), pp i and 12.
[73] *The Second Report on the State of the World's Plant Genetic Resources for Food and Agriculture* (FAO, 2010), p 44; see also F Wolff, 'Legal Factors Driving Agrobiodiversity Loss' (2004) 1 Environmental Law Network International Review 25, p 2.
[74] S A Cunningham et al, 'To close the yield-gap while saving biodiversity will require multiple locally relevant strategies' (2013) 173 Agriculture, Ecosystems & Environment 20.
[75] Geiger et al 2010, p 103.
[76] For example, J C Biesmeijer et al, 'Parallel declines in pollinators and insect-pollinated plants in Britain and the Netherlands' (2006) 313 Science 351and C A Hallmann et al, 'Declines in insectivorous birds are associated with high neonicotinoid concentrations' (2014) 511 Nature 341
[77] A Mclaughlin and P Mineau, 'The impact of agricultural practices on biodiversity' (1995) 55 Agriculture, Ecosystems and Environment 201, p 206; E J P Marshall et al, 'The role of weeds in supporting biological diversity within crop fields' (2003) 43 Weed Research 77.
[78] M A Altieri and C I Nicholls, *Agroecology and the Search for a Truly Sustainable Agriculture* (United Nations Environment Programme 2005), p 15; R Carson, *Silent Spring* (Penquin Books 1962); *From Uniformity to Diversity. A paradigm shift from industrial agriculture to diversified agroecological systems* (iPES Food, 2016a), pp 15-16.
[79] Gliessman 2015, p 5.
[80] Mazoyer and Roudart 2006, p 391.

control and pollination.[81] Yet, some of the most aggressive pesticides of the post-war era were banned when scientific knowledge and public awareness grew regarding their harmful properties. Particularly infamous is the insecticide DDT, the use of which was initially prohibited in the United States, and eventually almost worldwide,[82] following the publication of the book *Silent Spring*.[83] Impacts of some early pesticides, notably organochlorine based chemicals such as DDT and PCBs,[84] on biodiversity were exacerbated due to a process called biomagnification, which meant that active substances would accumulate in the bodies of predators leading to higher concentrations when moving up the food chain.[85] Yet, despite the known negative impacts of pesticides and bans on particularly harmful chemicals, overall global production, sale and use of pesticides are still growing,[86] and 452 active substances for pesticides are authorised in the EU today.[87] Although the latter may restrict the placing on the market of such products if they pose unacceptable environmental effects,[88] as will be further analysed in particular in Chapter 4, the tests and procedures applied to assess and manage such risks have been unsuccessful in effectively addressing the negative impacts of wide-scale use.

2.4.2. Soil Degradation and Nutrient Waste

On a micro-level, biodiversity losses also happen due to fast degradation of soils, as the basis for microbe, plant, and animal life. Pesticides can be retained by soils to different degrees and can negatively affect beneficial soil microorganisms that are needed to convert organic compounds into plant nutrition.[89] Additionally, the use of modern farm machinery for intensive (or 'conventional') tillage, combined with short rotations, have led to increased soil erosion at a rate 10 to 100 times greater than the soil's ability for replenishment.[90] This means that every year between five and seven million hectares of agricultural land is lost to soil degradation.[91] Soil health is also compromised by compaction due to use of large machines.[92]

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[81] Reid et al 2005, p 43; see also M Lexmond et al, 'Worldwide integrated assessment on systemic pesticides' (2015) 22 Environmental Science and Pollution Research 1 (part of the *Worldwide Integrated Assessment of the Impacts of Systemic Pesticides on Biodiversity and Ecosystems* (the Task Force on Systemic Pesticides 2015)).
[82] Paarlberg and Paarlberg 2000, p 38; see also the Human Rights Council, 'Report of the Special Rapporteur (Olivier de Schutter) on the right to food' (2017) A/HRC/34/48.
[83] Carson 1962.
[84] DDT stands for dichlorodiphenyltrichloroethane, PCB stands for polychlorinated biphenyl.
[85] Bozzini 2017, p 4.
[86] McIntyre 2009, p 7 and 34; also Bozzini 2017, p 5 who notes that the banning of persistent pollutants like DDT has only favoured the diffusion of other categories of conventional chemicals, including glyphosate, despite the fact that the acute toxicity for humans (and other mammals) is higher.
[87] 'EU Pesticide Database' (*European Commission*, N.D.) <https://ec.europa.eu/food/plants/pesticides/eu-pesticides-database_en> accessed May 2022.
[88] Regulation No 1107/2009 concerning the placing of plant protection products on the market [2009] OJ L 309/1.
[89] W Aktar et al, 'Impact of pesticides use in agriculture: their benefits and hazards' (2009) 2 Interdisciplinary Toxicology 1, p 5; M Chagnon et al, 'Risks of large-scale use of systemic insecticides to ecosystem functioning and services' (2015) 22 Environmental Science and Pollution Research 119 (part of the *Worldwide Integrated Assessment of the Impacts of Systemic Pesticides on Biodiversity and Ecosystems* (the Task Force on Systemic Pesticides 2015)); see also Carson 1962.
[90] D R Montgomery, 'Soil erosion and agricultural sustainability' (2007) 104 Proceedings of the National Academy of Sciences of the United States 13268, p 13269; do note that also in traditional farming systems soil erosion is a persistent problem, McIntyre 2009, p 10.
[91] Gliessman 2015, p 8.
[92] McIntyre 2009, p 400.

Specialisation and separation of livestock and arable practices on most industrial farms, has, moreover, led to gaps in what were previously closed nutrient cycles. Nature knows no waste; it has been said. Animals can be fed on crop residues, and animal manure, in turn, can be transformed into plant nutrition by soil microbes.[93] The absence of mixed farming practices and physical and economic limitations for inter-farm cooperation, has often led to reliance on synthetic fertilisers. Such fertilisers can cause stress in microbial activity, thus leading to further soil degradation.[94] Their application, furthermore, often leads to an overall surplus of (organic and inorganic) fertiliser, which creates a liability for farmers.[95] Overall, industrial farming has thus neglected and eroded the regulating and supporting services that ecosystems provide us with, notably the regulation of erosion, soil formation and nutrient cycling.[96]

2.4.3. Water Pollution and Depletion

Excess nutrients and pesticides may also leak into fresh water sources, such as rivers, lakes and aquifers, and near-shore marine ecosystems. In large parts of Europe, including the UK, nitrogen transport into river mouths has been estimated to have increased more than 500% compared to pre-industrial times, and global flux of nitrogen to coastal ecosystems is expected to increase by a further 10-20% by 2030.[97] Although it was initially believed that phosphorus was immobile in soils, its runoff potential and its ability to impact water quality at very small concentrations, is now widely recognised.[98] The resulting eutrophication, or enrichment of the water body, may cause explosive growth of algae, which can cause oxygen depletion and sunlight obstruction, thus killing fish, organisms and photosynthetic plants in the aquatic ecosystem.[99] Pesticides provide an additional source of pollution, which reduces the survival, growth and reproduction of organisms at the base of the aquatic food web.[100] Simplification of agricultural landscapes and soil erosion has, moreover, increased the 'leakiness' of soils, thereby easing the run off from surface water, and degrading soils' ability to filter water.[101]

Irrigation, in turn, can lead to further soil erosion and run-off of toxic substances, thus creating a vicious cycle. It is estimated that 70% of water use worldwide is linked to agriculture,[102] and stark increases in irrigated land have been necessary to achieve the gains from "high-yielding fertiliser-responsive crop varieties."[103] However, irrigation is inefficient as more than half of the water for farming is never taken up by the crop.[104] Irrigation may also lead to salinization,

[93] See on this cycle of nutrient recycling also Altieri and Nicholls 2005, p 15 and Reid et al 2005, pp 121-122.
[94] M S Coyne and R Mikkelsen, 'Soil Microorganisms Contribute to Plant Nutrition and Root Health' (2015) 99 Better Crops 18, p 20.
[95] Altieri and Nicholls 2005, p 15.
[96] Terminology: Reid et al 2005; Chagnon et al 2015; Díaz 2019b, p 120.
[97] Reid et al 2005, pp 121-122.
[98] M R Hart et al, 'Phosphorus runoff from agricultural land and direct fertilizer effects: a review' (2004) 33 Journal of Environmental Quality 1954; also Reid et al 2005, p 122.
[99] Altieri and Nicholls 2005, pp 18-19; J Ebbesson and P Okowa, *Environmental Law and Justice in Context* (Cambridge University Press 2009).
[100] Chagnon et al 2015, p 124; Gliessman 2015, p 9.
[101] Reid et al 2005, p 122; Chagnon et al 2015, p 120.
[102] Reid et al 2005, p33; Gliessman 2015, p 8; J A Foley et al, 'Global consequences of land use' (2005) 309 Science 570, p 571 puts this estimate at 85%.
[103] McIntyre 2009, p 151; see also Bartley et al 2011, p 3.
[104] Gliessman 2015, p 8.

the release of new or already present salts, with subsequent declines in yields.[105] Water over usage at rates much higher than replenishment through rainfall, has, moreover, led to water depletion.[106] Water consumption and pollution in agriculture thus impairs the ecosystem's ability to provide fresh water and weakens its water regulation and purification functions.[107]

2.4.4. Climate Change: Agriculture a Cause and a Sector at Risk

In terms of environmental problems, agriculture is, moreover, considered a major contribution to climate change, accounting for 10-12% of greenhouse gas, and 56% of non-CO2 emissions (nitrous oxide and methane).[108] Industrial agricultural practices have allowed farmland to move beyond natural limitations. Conversions to cropland, particularly of forests that act as carbon sinks, are considered the cause of the largest net flux of carbon.[109] Intensive ploughing practices may, furthermore, negatively impact the sequestration capacity of soils and it is estimated that 25-30% of carbon in the upper meter of the soil is reduced due to cultivation.[110] The use of large quantities of nitrogen-based fertilisers is, moreover, responsible for increased levels of nitrous oxide in the atmosphere,[111] and changing consumption patterns and the reliance on particular food types, notably meat and rice, have led to increased methane levels.[112] Industrial agriculture and food systems are, moreover, held to be greatly dependent on fossil fuels. These include use for the operation of farm machinery, for the manufacturing of fertilisers and for the transport of produce within global markets.[113] Although agriculture negatively impacts climate regulation, agriculture itself is also at risk due to its weather dependency, with increasingly unpredictable patterns, increased precipitation or droughts, and rising temperature.[114]

2.4.5. Impoverishment and Inequality Within and Beyond Rural Communities

In addition to the environmental impacts of industrial farming, transitions towards this model of agriculture have also had negative implications for the rural communities that the farms are part of. The large-scale disappearance of farms that have not been able to keep up with productivity and innovation demands and the gains in efficiency at workforce level have led to agricultural job losses.[115] The capital intensity of industrial farming and high prices of farmland do not only inhibit the continuity of competing small-scale farms, but also prevent new farmers

[105] Bartley et al 2011, p 114.
[106] Gliessman 2015, pp 8-9; McIntyre 2009, p 324; Bartley et al 2011, p 119.
[107] Terminology: Reid et al 2005.
[108] P Smith et al, 'Agriculture, Forestry and Other Land Use' in O R Edenhofer et al (eds), *Climate Change: Mitigation of Climate Change Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press 2014).
[109] R A Houghton and C L Goodale, 'Effects of Land-Use Change on the Carbon Balance of Terrestrial Ecosystems' in R S Defries et al (eds), *Ecosystems and Land Use Change* (American Geophysical Union 2004).
[110] Ibid, p 88.
[111] S Park et al, 'Trends and seasonal cycles in the isotopic composition of nitrous oxide since 1940' (2012) 5 Nature Geoscience 261.
[112] Gliessman 2015, p 12; Reid et al 2005, p 47; Smith et al 2014, p 63.
[113] Gliessman 2015, p 11; *The State of Food and Agriculture. Climate Change, Agriculture and Food Security* (FAO, 2016).
[114] Terminology: Reid et al 2005; see on the risk also Bartley et al 2011, p 121; FAO 2016, p 21.
[115] L Lobao and C Stofferahn, 'The community effects of industrialized farming: Social science research and challenges to corporate farming laws' (2008) 25 Agriculture and Human Values 219, p 223.

from going into agriculture.[116] It is estimated that in the EU nowadays only 3% of farms control 50% of the land;[117] a significant limiting factor in the distribution of the benefits that can be acquired from farmland. Additionally, industrial agricultural practices, and notably the use of chemicals, may directly impact upon the wellbeing of rural communities and their enjoyment of internationally recognised human rights, such as the right to life, the right to health and the right to water.[118] Despite issues in establishing direct causal links, chronic pesticide exposure has now been associated with diseases like cancer, Alzheimer's and Parkinson's, hormone disruption, developmental disorders, sterility and neurological disorders.[119] Pollution of ground water used for domestic purposes also particularly affects rural communities,[120] and environmental degradation may have negative impacts on the cultural services provided by the agroecosystem, such as recreation, aesthetic enjoyment, and spiritual fulfilment.[121]

Socio-economic impacts will also be felt beyond the rural community. It follows from the above that industrial agricultural practices lead to the degradation of the regulating and supporting ecosystem services that underpin the long-term sustainability of food production. Together with risks of food contamination, this impoverishment of the agro-environment undermines global food security and the human right to adequate food, as emphasised by a 2017 report by the Special Rapporteur on the right to food.[122] Despite its short-term productivity gains, industrial food systems have, furthermore, not been able to address global nutritional inequalities.[123] Although the percentage of hungry people in the world has declined, progress has been uneven in parts of the world and increased competitiveness has led to export-oriented agriculture that often neglects domestic needs.[124] Yet, nutritional deficiencies are not only apparent in the poorest regions. The sacrifice of nutritional density to productivity aims

[116] L-A Sutherland, *New entrants into farming: lessons to foster innovation and entrepreneurship* (EIP-AGRI Focus Group, 2015), pp 10-11; see also on Scotland more particularly P Cook et al, *Barriers to New Entrants to Scottish Farming* (Tenant Farming Forum, 2008).
[117] S Kay et al, *Extent of farmland grabbing in the EU* (European Parliament, 2015), p 24, also stating that 80% of farms only own 12% of the land.
[118] See on the relevance of human rights for the agriculture context, and for the transition towards agroecology hereafter Chapter 6, notably §6.2.4.
[119] A/HRC/34/48, p 5; iPES Food 2016a, p 29; see also the study led by the cancer-research arm of the World Health Organization: K Z Guyton et al, 'Carcinogenicity of tetrachlorvinphos, parathion, malathion, diazinon, and glyphosate' (2015) 16 The Lancet Oncology 490.
[120] R P Schwarzenbach et al, 'Global Water Pollution and Human Health' (2010) 35 Annual Review of Environment and Resources 109.
[121] Terminology Reid et al 2005; see also C Romanelli et al, *Connecting Global Priorities: Biodiversity and Human Health: A State of Knowledge Review* (World Health Organization and Secretariat of the Convention on Biological Diversity, 2015), pp 212-214.
[122] Special Rapporteur on the Right to Food 2017; see also the media coverage of this report: D Carrington, 'UN experts denounce 'myth' pesticides are necessary to feed the world' *The Guardian* (7 March 2017) <https://www.theguardian.com/environment/2017/mar/07/un-experts-denounce-myth-pesticides-are-necessary-to-feed-the-world> accessed May 2022. Note that yields of high yielding crop varieties have already failed to improve, stagnated or collapsed yields in maize, rice, wheat and soybean production, iPES Food 2016a, p 15.
[123] See also R M Welch and R D Graham, 'A new paradigm for world agriculture: meeting human needs' (1999) 60 Field Crops Research 1on the issue of micronutrient malnutrition in relation to industrial farming.
[124] S Fan et al, *Global Food Policy Report* (International Food Policy Research Institute, 2015); iPES Food 2016a, p 26.

in selective breeding and engineering of crops, and the high specialisation in energy-rich crops is considered a major contributor to the prevalence of diseases of affluence, such as obesity.[125]

2.5 Agroecology as a Science, a Practice, and a Movement for Change

An increased understanding of the extent and gravity of the negative environmental and socio-economic impacts of industrial agricultural practices has provided the basis for appeals for a fundamental change in agriculture and a redirection of agricultural innovation. In 2010, the UN Special Rapporteur on the Right to Food highlighted how agroecology, as a model for agricultural development, could guide such transitions.[126] Similarly, the International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) has held that agroecology could enrich agricultural practices and technologies in a way that is environmentally, socially, and culturally sustainable.[127] The more recent IPBES global report on biodiversity and ecosystem services puts agroecology forward as a key pathway to achieve transformative change in the agricultural sector.[128] Whereas industrial agriculture relies on technology to constrain, simplify and tweak natural processes, agroecology seeks to increase the sustainability of food production by relying upon, mimicking and conserving these natural processes.[129] At its heart is the concept of the agroecosystem, which, although its boundaries are not fixed or easily definable, can be understood as an "integrated region of agricultural production",[130] characterised by productivity, resilience, sustainability and equity.[131] Complex interactions between ecological, technological and socioeconomic factors define this system.[132]

Agroecology has been understood as the science that relies on ecological principles for the study, design and management of agroecosystems,[133] a set of sustainable practices that apply the science in the farm field, and a movement for agricultural transformations and food system change.[134] Although this section recognises and further explores these various understandings of agroecology, it also, for clarity purposes, puts forward an interpretation of an agroecological model of food production as defined by its ultimate aim. Notably, and in contrast to an industrial model of agriculture and food production, an agroecological food system does not view productivity maximisation as a goal to be achieved at all (environmental and social) cost,

[125] iPES Food 2016a, pp 28-29.
[126] Human Rights Council, 'Report submitted by the Special Rapporteur (Olivier de Schutter) on the right to food' (2010) A/HRC/16/49, p 3.
[127] McIntyre 2009, p 411.
[128] Díaz 2019b, XLIX.
[129] See similarly A/HRC/16/49, p 245; Gliessman 2015, p 287; M A Altieri, 'Agroecology: the science of natural resource management for poor farmers in marginal environments' (2002) 93 Agriculture, Ecosystems & Environment 1, p 8; and M Wibbelmann et al, *Mainstreaming Agroecology: Implications for Global Food and Farming Systems* (The Centre for Agroecology and Food Security, 2013), p 6.
[130] Gliessman 2015, p 21.
[131] G R Conway, *Agroecosystem Analysis* (Imperial College Centre for Environmental Technology Series 1983), p 3. Although Conway originally referred to 'stability' rather than 'resilience', the latter provides better recognition of the changing and adaptive nature of (agro)ecosystems, see also Gliessman 2015, p 207.
[132] Francis et al 2003, p 102; see also Gliessman 2015, Chapter 2.
[133] M A Altieri, *Agroecology: The Science of Sustainable Agriculture* (Westview Press 1995).
[134] A Wezel et al, 'Agroecology as a science, a movement and a practice. A review' (2009) 29 Agronomy for Sustainable Development 503; also L Silici, *Agroecology. What it is and what it has to offer* (IIED, 2014), p 6.

but rather as a logical consequence of the primary objective to ensure long-term sustainability of production by conserving ecosystem functions and by supporting equitable management.

2.5.1. Agroecology as a Science: Breaking Through Disciplinary Divides

Agroecology as a scientific discipline initially sought to break through divisions between agricultural sciences and biological sciences, notably ecology, and later between agricultural and social sciences.[135] The application of ecological principles to agriculture relies on a deep understanding of the nature and functioning of agroecosystems.[136] Agroecology, interpreted as ecology in agriculture, studies the interrelated components and complex dynamics of ecological processes within agroecosystems.[137] It considers the functionality of biotic factors, the living organisms in the system such as crops, organisms, pollinators and other animals, and abiotic factors, like soil, water, wind and temperature.[138] It defines and studies organic matter accumulation and nutrient cycling, soil biological activity, natural control mechanisms, resource conservation and the general enhancement of agrobiodiversity and synergies between components.[139] As agroecology has found that sustainability lies in imitation and conservation of these natural processes, research in this field supports closed cycles, including the recycling of biomass, nutrients, water and energy, the conservation of resources like soil and water and the promotion of functional biodiversity and biological interactions.[140] Where conventional agronomic research focuses on the development of new technologies that help to achieve short-term gains in productivity, the discipline of agroecology searches for integrated solutions that can provide a scientific basis for agricultural practices that support long-term sustainability.[141]

Whereas the limited ecological focus of agroecology, as a branch science that already emerged in the 1930s, has not lost its significance in the present day, the field has increasingly embraced socio-economic aspects of agroecosystem management as part of its research agenda.[142] In doing so agroecology has gradually widened its scope from the plot, to the farm and, more recently, to the food system, thereby emphasising the different anthropogenic factors in agroecosystems.[143] It acknowledges that although agroecology seeks to mimic nature, human management is very much a determining factor for the overall health of the agroecosystem.[144] The analysis of the relative success of industrial farming in this Chapter illustrates that farm management decisions are strongly influenced by the wider economic and social context in

[135] T P Tomich et al, 'Agroecology: A Review from a Global-Change Perspective' (2011) 36 Annual Review of Environment and Resources 193, p 195.
[136] Altieri 2002, p 7.
[137] Ibid, p 7.
[138] More extensively on these factors, see Gliessman 2015, Section II and III.
[139] Altieri 2002, p 8; see on this also Gliessman 2015.
[140] Altieri 1995; Altieri 2002, p 8; Gliessman 2015.
[141] Gliessman 2015, p 278; Altieri 2002.
[142] A Wezel and V Soldat, 'A quantitative and qualitative historical analysis of the scientific discipline of agroecology' (2009) 7 International Journal of Agricultural Sustainability 3, p 10; sometimes distinctions are also drawn between 'hard agroecology' (ecology, agronomy and economics) and 'soft agroecology' (including interactions with human activities), see T Dalgaard et al, 'Agroecology, scaling and interdisciplinarity' (2003) 100 Agriculture, Ecosystems & Environment 39, pp 40-41.
[143] Wezel et al 2009, p 505; Wezel and Soldat 2009, p 12.
[144] See also V E Méndez et al, 'Agroecology as a Transdisciplinary, Participatory, and Action-Oriented Approach' (2013) 37 Agroecology and sustainable food systems 3.

which the farm is placed.[145] Yet, at the same time, farm practices can have negative impacts, directly or indirectly through the deterioration of ecosystem services, on the wellbeing of the people and communities that are an integral part of the ecosystem.[146] In recognition of the broader framework within which farmers, as ecosystem stewards, operate, researchers have referred to agroecology as the integrative study of the "ecology of food systems".[147] Agroecology draws upon the social and economic sciences to better understand humans as the cause, subject, and solution to the long-term sustainability problems of agroecosystems.[148] It must be noted, however, that although agroecology is nowadays widely acknowledged as a scientific discipline,[149] it is still setting its outer limits, whilst simultaneously trying to address and overcome persisting traditional academic barriers to interdisciplinary cooperation.[150]

2.5.2. Agroecology as a Practice: Partial Transitions, Participation and Precaution

Although research has shown that in Europe agroecology is mainly conceived as a science,[151] agroecology as a concept goes beyond its theoretical framework, to include practices that are considered to follow agroecological principles, which reflect natural processes and focus on the mimicking and conservation of ecosystem functions. Whilst industrial agricultural research and innovation has driven practical applications, the relationship between science and practice is less straightforward in agroecology.[152] Agroecology does not necessarily depend upon the development of *new* techniques, as it is in fact traditional, pre-industrial farming that often best applies agroecology's ideas of the 'mimicking' of nature.[153] Agroecology as a science thus relies on practice and farmers' knowledge to further its understanding of the agroecosystem, whilst also feeding back into practice to optimise and upscale sustainable management. The relationship is characterised by an inherent complexity as practices must be targeted and adapted to the local specificities of the agroecosystem for optimal sustainability, making it difficult – although not impossible – to induce general principles that are replicable.[154] Agroecology's emphasis on the need for management practices to adapt to ever-evolving, local conditions will also require recognition by legal rules that shape management decisions. The

[145] Above § 2.3.
[146] Above §2.4.
[147] Francis et al 2003; Gliessman 2015.
[148] See for example Gliessman 2015, Chapter 24; M A Altieri, 'Agroecology: A New Research and Development Paradigm for World Agriculture' (1989) 27 Agriculture, Ecosystems and Environment 37; Altieri 2002, p 5; Francis et al 2003; Tomich et al 2011, p 196.
[149] See notably Dalgaard et al 2003, pp 42-44 who subject agroecology to the norms of science.
[150] Ibid, p 47; Francis et al 2003; Tomich et al 2011, p 199; also *Scaling Up Agroecology Initiative. Transforming Food and Agricultural Systems in Support of the SDGs. A Proposal Prepared for the International Symposium on Agroecology* (FAO, 2018a), p 2. On the persistent difficulties in achieving transdisciplinarity and true co-creation in agroecological research, also C Fernández González et al, 'Transdisciplinarity in agroecology: practices and perspectives in Europe' (2020) 45 Agroecology and Sustainable Food Systems 523.
[151] F Gallardo-López et al, 'Development of the Concept of Agroecology in Europe: A Review' (2018) 10 Sustainability 1210.
[152] See on case studies emphasising differences in the order of development of agroecology as a science, practice and movement in different countries: Wezel et al 2009.
[153] Wibbelmann et al 2013, p 6; see also M A Altieri, 'Agroecology versus Ecoagriculture: balancing food production and biodiversity conservation in the midst of social inequity' (CEESP Occasional Papers 2004), p 20.
[154] A Wezel et al, 'Agroecological principles and elements and their implications for transitioning to sustainable food systems. A review' (*Agronomy for Sustainable Development* 2020) <https://link.springer.com/article/10.1007/s13593-020-00646-z> accessed May 2022.

adherence to agroecological principles translates to a multitude of practical applications. Examples include practices that are classed as integrated pest and nutrient management, crop rotation and fallowing, intercropping and agroforestry, water harvesting and zero tillage, those that integrate livestock, enhance (agro)biodiversity, and aim to increase animal health through hygiene.[155] Although some studies suggest slightly lower yields compared to industrial practices in developed countries,[156] their positive impacts on agroecosystem health and resilience suggest that they will provide for stable and increased long-term productivity.[157]

It must be recognised, however, that the boundaries of agroecological farming are not clearly defined and reliance on agroecological principles comes in various gradations. Whereas permacultures and some traditional farms may apply these principles extensively, many other recognised forms of farming will only apply some principles and may emphasise one principle over another. Conservation agriculture, for example, is characterised by soil preservation and zero or minimum tillage but is still dependent on pesticides.[158] Organic farming, conversely, often provides for some degree of integrated pest management,[159] but can be combined with intensive tillage for pest control. Mixed and silvopastoral farming emphasise nutrient recycling but may rely upon external inputs.[160] And even farms categorised as industrial may apply some agroecological practices for the economic benefits of reducing external inputs and conserving natural resources, often classifying them under the umbrella of sustainable intensification.[161]

This piecemeal uptake of agroecology highlights the knowledge investment that is required for adoption of practices that are adapted to local ecological realties. Recognition of and support for partially agroecological practices, as intermediate steps, are essential, but the ultimate aims

[155] See, for example, Silici 2014, p 8; Gliessman 2015.
[156] C Badgley et al, 'Organic agriculture and the global food supply' (2007) 22 Renewable Agriculture and Food Systems 86, however, this study emphasis the differences are small and in developing countries yields were higher. See in that regard also J N Pretty et al, 'Resource-conserving agriculture increases yields in developing countries' (2006) 40 Environmental Science & Technology 1114.
[157] iPES Food 2016a, p 31.
[158] Conservation agriculture also allows for climate change mitigation and water conservation. See, however, on the limitations of conservation agriculture and notably its reliance on heavy machinery and disregard for local realities: K E Giller et al, 'Beyond conservation agriculture' (*Frontiers in Plant Science* 2015) <https://www.frontiersin.org/articles/10.3389/fpls.2015.00870/full> accessed May 2022.
[159] Note, however, that organic farming may also rely on biological pesticides, which are also considered external inputs that do not match agroecology's idea of closed systems. Organic certification, moreover, faces increased criticism for its narrow focus on chemical use, and its disregard for the wider environmental and social aspects of sustainable farm management, including the need for recognition of locally adapted methods. See, for example, M A Altieri and C I Nicholls, 'Agroecology rescuing organic agriculture from a specialized industrial model of production and distribution' (2003) 34 Ecology and Farming 24, and, hereafter, Chapter 5.
[160] See, for example, C Watson et al, 'Perspectives on nutrient management in mixed farming systems' (2005) 21 Soil Use Manage 132.
[161] Farmers rely upon many ecosystem services that are degraded by industrial practices (§2.4). An increased understanding of the economic impacts of such degradation, combined with the costs of external inputs, has led to wider adoption of certain agroecological practices, for example, cover cropping and intercropping and integrated pest management. Although practices may overlap sometimes, agroecology and sustainable or ecological intensification differ significantly in their objectives. See, for example, S Cook et al, *Sustainable intensification revisited* (IIED, 2015), p 12.

of comprehensive changes should be kept in mind.[162] This also concerns the question how technical innovations that promise a sustainable agricultural future relate to agroecology. Precision farming techniques could, for example, help to conserve soils and water and mitigate climate change,[163] but do not challenge – and in fact build upon – the pillars of the industrial model.[164] Similarly, crop breeding for the development of varieties that are more adapted to the particularities of the ecosystem, has been considered complementary to agroecology.[165] Yet, the modern-day products of the biological revolution are often targeted at the needs of industrial agriculture, with relevant molecular biological research also primarily directed at enhancing this model.[166] Not dismissing or accepting the agroecological value of particular practices at this stage of research, it is noted here that when determining such value in the next chapters – notably in the context of regulatory measures that have supported certain practices over other – practices will be tested against the primary objectives of an industrial model versus an agroecological model of food production: maximisation of commodity outputs versus conservation of ecosystem functioning, and the fostering of equity within the food system.

Yet, two preliminary observations will be made with regard to the compatibility of new techniques with agroecological transitions. Firstly, most innovations rely upon a 'top-down transfer-of-technology' approach.[167] Scientific success is often based upon technological performance in isolation and, due to high levels of investment, upon widespread adoption.[168] The approach conflicts with agroecology's emphasis on local conditions and realities for sustainable agroecosystem management. A shift in agricultural research and innovation towards participatory processes, with recognition of the value of local people, knowledge, and resources, is therefore necessary.[169] Secondly, agroecology's mimicking of natural processes implicitly embodies an element of precaution regarding the introduction of external inputs. Whereas, for example, biotechnology applications may hold to support resource conservation and the reduction of chemical inputs,[170] agroecology's reservations towards these techniques cannot only be explained by looking at known impacts of specific innovations and related farm practices,[171] but include concerns regarding uncertain impacts on subtle ecosystem dynamics.

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[162] See for an overview of steps S R Gliessman, 'The Framework for Conversion' in S R Gliessman and M Rosemeyer (eds), *The Conversion to Sustainable Agriculture Principles, Processes, and Practices* (Taylor and Francis 2010), p 6.
[163] Silici 2014, p 5.
[164] See for criticism of precision farming against the background of agroecology: K Falkenberg, *Sustainability Now! A European Vision for Sustainability* (European Political Strategy Centre of the European Commission, 2016), p 21.
[165] A/HRC/16/49, p 7.
[166] Many modern hybrid varieties may, for example, aim to provide high yields or be better adapted to high levels of chemicals (see above §2.2.3). Due to the high level of investment in agricultural research, modern varieties are often developed to suit large-scale adoption, and will be less adapted to local specificities. Agricultural research is also often conducted in close cooperation with downstream agri-industries (§2.3.2), and Chapter 6.
[167] Altieri 2002, p 1; D Quist et al, 'Hungry for Innovation: from GM Crops to Agroecology' in D Gee et al (eds), *Late lessons from early warnings: science, precaution, innovation* (European Environment Agency 2013), p 458.
[168] Quist et al 2013, p 461.
[169] See, for example, Altieri 2002, p 2; McIntyre 2009, p 17; Quist et al 2013, p 461.
[170] See above §2.2.3; see on the limitations of these innovations in light of agroecological principles also M Giampietro, 'The precautionary principle and ecological hazards of genetically modified organisms' (2002) 31 Ambio 466, p 468.
[171] See in this regard, for example, Altieri 2004.

Agroecology's emphasis on precaution and the need for adaptation does not only limit the use of new techniques that suppose universality, but also highlights the need for regulatory accommodation. However, legal scholarship on agroecology and precaution is still limited.[172]

2.5.3. Agroecology as a Movement: Sovereignty and Equity in Food Systems

Reflections on agroecology in society are not limited to the application of ecological principles in farm fields and businesses. A 'food system' conceptualises "the relationship between the different forces acting upon the commodity flows from producer to consumer".[173] Acknowledgement of this wider framework within which farms operate, has led to agroecology embracing an agenda for food system change.[174] In essence, it considers food production to be a 'no technical solution problem': one which cannot be made sustainable by natural sciences techniques only, but which requires "a change in human values or ideas of morality".[175] As a movement, agroecology strives towards fundamental ethical, cultural and social transitions in society's approach to food production, raising issues of food sovereignty, equity and justice.[176]

It follows from the above that technological revolutions have formed a segregated industrialised food system that has marginalised the decision-making capacity of farmers and has contributed to impoverishment of rural communities and social inequalities.[177] Although agroecological movements come in many different shapes,[178] they almost always support arguments of food sovereignty. The latter does not only address questions of availability of and access to food (or 'food security'), as the principle responsibility of the state,[179] but also addresses issues regarding the origin of food, conditions of production and empowerment of communities, in this regard.[180] Food sovereignty has been described as a "transformative process that seeks to recreate the democratic realm and regenerate a diversity of autonomous food systems"[181] and the right of people "to define their own food and agriculture".[182] It promotes community autonomy, cultural integrity and environmental stewardship.[183] A more

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[172] See, for example, J W Head, *International Law and Agroecological Husbandry. Building legal foundations for a new agriculture* (Routledge 2017).
[173] P J Atkins and I R Bowler, *Food in society. Economy, Culture, Geography* (Arnold Publishers 2001), p 9, for a schematic overview of these forces see also p. 12.
[174] See in this regard also Francis et al 2003, p 114 and Gliessman 2015, p 335.
[175] This wording has been derived from the famous essay by ecologist G Hardin, 'The Tragedy of the Commons' (1968) 162 Science 1243, p 1243. See on the limitations of technical solutions in the context of agroecology also Altieri 1989.
[176] Chapter 6, §6.2.2.
[177] Above §2.3 and §2.4.5.
[178] Wezel et al 2009, p 511 and for examples also E Holt-Giménez et al, 'Linking farmers' movements for advocacy and practice' (2010) 37 The Journal of Peasant Studies 203
[179] A Higgins, 'A War of Words: The Construction of Food Sovereignty in the US & UK' (Centre for Rural Economy Discussion Paper Series 2015), p 2.
[180] See on the difference between the two: M Pimbert, *Towards Food Sovereignty. Reclaiming autonomous food systems* (IIED, 2009), p 50.
[181] Ibid, p 3.
[182] Ibid, with reference to the website of the peasant movements La Via Campesina; 'La Via Campesina. International Peasant's Movement' (*La Via Campesina*, N.D.). See on this organisation in the context of agroecology and food sovereignty also E Holt-Giménez and M A Altieri, 'Agroecology, Food Sovereignty and the New Green Revolution' (2012) 37 Journal of Sustainable Agriculture 90 and, hereafter, Chapter 6, §6.2.2.
[183] Pimbert 2009, p 50. Note also that food sovereignty as an objective, with its focus on the local rather than the global, and its compatibility with the objective of ensuring (global) food security is contentious. See in this regard

in-depth analysis of food sovereignty in an agroecological and legal context is reserved for Chapter 6,[184] it is noted here that its elements resonate with agroecology's focus on local ecological processes to enhance the long-term sustainability of food production and to reduce dependency of farmers on external inputs.[185] Food sovereignty also reflect agroecology's 'bottom-up' approach, which trusts farmers as ecosystem stewards to be best equipped to make management decisions.[186] Simplifying and shortening supply chains to strengthen relationships between producer and consumer is often seen as an important way to re-connect agroecosystem management and food consumption and to re-empower farmers and local communities.[187]

Yet, power redistribution does not only underpin agroecology's concern with food sovereignty, but also its emphasis on equity and justice. The above has shown that the model of industrial agriculture has led to a reduction in the number of land owners, farmers and farm workers and a shift in the allocation of revenue generated by food production, from farmers and local communities as ecosystem stewards towards upstream and downstream industries.[188] Distinctions have been made in agroecological scholarship between aspects of equity that concern unequal distribution of natural resources, and aspects of equity that concern power asymmetries between the agrarian sector and other parts of the food production chain and between territories.[189] However, equity is not only concerned with the fair dispersion of the social and economic benefits of farming, but also of the costs of environmental degradation associated with industrial production.[190] Negative impacts on human wellbeing are rarely limited to and equally divided between those that drive ecosystem change.[191] Agroecological movements increasingly seek to build bridges between local practices and questions of global equity in terms of nutrition, health, as well as short-term and long-term food security.[192] Their integrated campaigns for ecological and social sustainability recognise that inequality can both be the cause and outcome of ecological decline.[193] Appeals are made to justice in its widest

notably the discussion between Olivier De Schutter, former Special Rapporteur on the Right to Food and Pascal Lamy, former Director-General of the WTO (although food sovereignty is not mentioned explicitly): O D Schutter, *The World Trade Organization and the Post-Global Food Crisis Agenda. Putting Food Security First in the International Trade System. Activity Report.* (United Nations Special Rapporteur on the Right to Food, 2011) and P Lamy, 'Lamy rebuts UN food rapporteur's claim that WTO talks hold food rights 'hostage'' (14 December 2011) <https://www.wto.org/english/news_e/news11_e/agcom_14dec11_e.htm#letter> accessed May 2022. See also, hereafter, Chapter 6 which analyses food sovereignty in a human rights context.

[184] Chapter 6, §6.2.2.

[185] See in this regard A/HRC/16/49.

[186] Similarly, M Gonzalez De Molina, 'Agroecology and Politics. How To Get Sustainability? About the Necessity for a Political Agroecology' (2012) 37 Journal of Sustainable Agriculture 45; Gliessman 2015, p 319; also Holt-Giménez and Altieri 2012, p 92. Also, McIntyre 2009, p 43 on issues of equity within the context of limited access to and influence over the outputs of agricultural research.

[187] Where such relationships in industrialised food systems are only defined by the exchange of money, awareness of the connection between food and the environment is lost and farm management becomes highly influenced by intermediary forces that do not have a direct interest in the sustainability of the ecosystem. See, Francis et al 2003, p 102 and Gliessman 2015, p 315.

[188] Above §2.3 and 2.4.5; also Altieri 2002, p 21 and McIntyre 2009, p 44.

[189] Gonzalez De Molina 2012, p 47.

[190] Above §2.4.

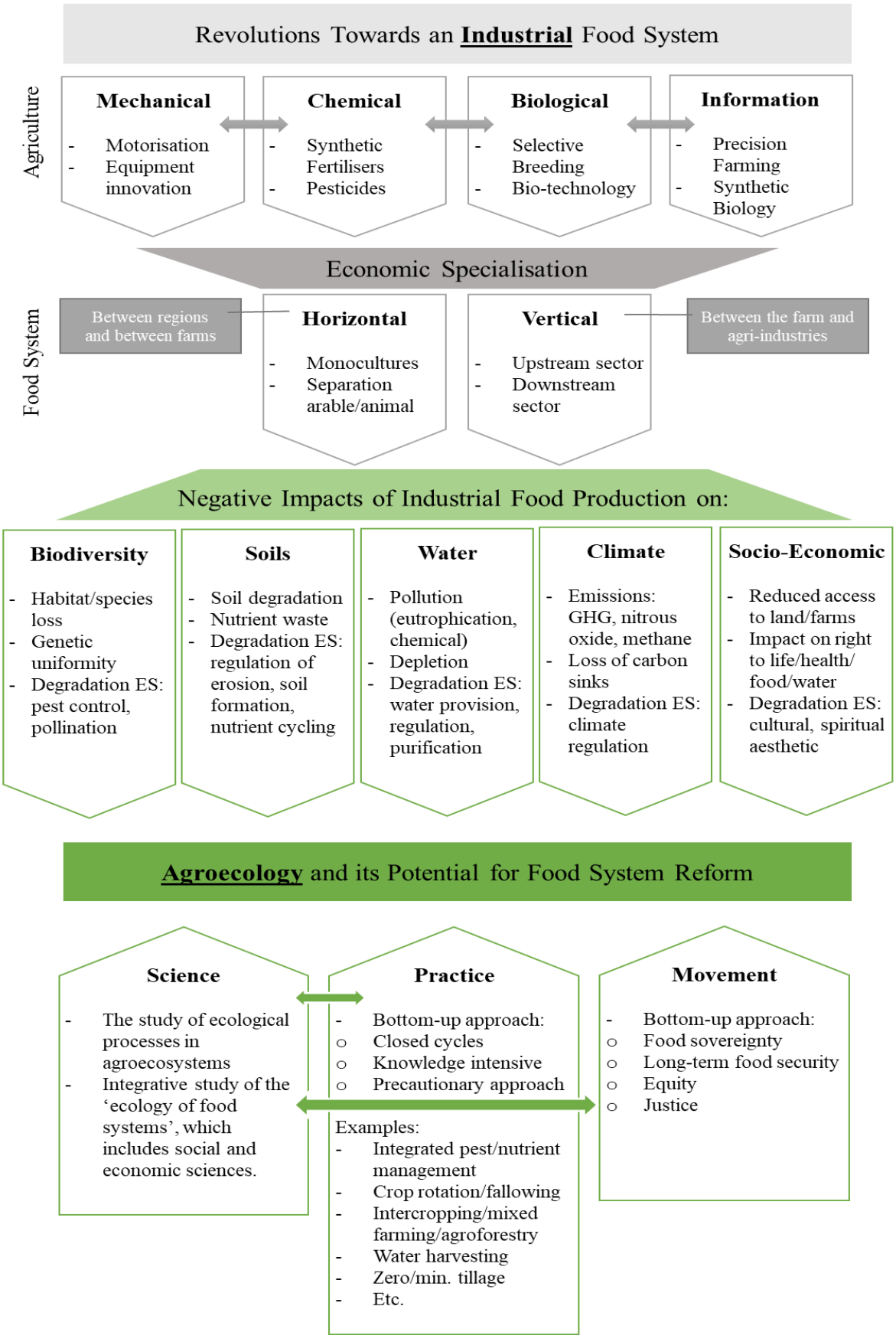
[191] Such impacts are often referred to as the negative externalities of industrial production and consumption.

[192] Notably Francis et al 2003, p 103; see on agroecological movements within the broader context of social food movements also E H Gimenez and A Shattuck, 'Food crises, food regimes and food movements: rumblings of reform or tides of transformation?' (2011) 38 Journal of Peasant Studies 109.

[193] Gliessman 2015, p 309.

sense to guide transitions towards equitable food systems.[194] This is also increasingly putting into focus the question of the role of law, policy and institutional frameworks in fostering transitions towards food systems based on agroecological values.[195] The next chapters will not only explore how regulatory reform could support the achievement of agroecology's objective to ensure long-term sustainability by recognising and conserving agroecosystem functions, but also how it can support equitable management of food systems. In particular, the next Chapter will discuss equity as an element of a wider international legal approach for regulatory action on ecological principles, under the Convention on Biological Diversity, and Chapter 6 will propose a human rights frame to support agroecology which integrates concerns of (in)equity to empower farmers as agroecosystem stewards within regulatory and economic spaces.[196]

[194] The concept of equity in a legal sense will be discussed in Chapter 3 in the context of the ecosystem approach, and Chapter 6 in the context of a human rights approach. In the context of agroecological movements 'justice' is often used in a wide sense as an appeal for recognition, empowerment, and redistribution to achieve an equitable food system. Although explicitly references are often made to food justice (for example, Gimenez and Shattuck 2011 and Gliessman 2015) agroecology embraces many elements of environmental justice and social justice more broadly. On the similarities between these different justice movements see: D M Purifoy, 'Food policy councils: integrating food justice and environmental justice' (2014) 24 Duke Environmental Law & Policy Forum 375.
[195] For example, Gonzalez De Molina 2012, p 55; A/HRC/16/49.
[196] Chapter 6, §6.2.



2-1 Schematic overview – from an industrial to an agroecological food system

2.6 Conclusion

Despite its relatively short life, the model of industrial agriculture and its widespread application has had critical negative ecological and social implications for rural areas and the wider (global) community. This chapter has shown that the extent and multiplicity of these impacts can only be fully understood and addressed when the different innovations in industrial agriculture are acknowledged as mutual and inseparable forces that work towards the maximisation of production, and which are to be seen within the broader economic framework of the global food system. Agroecology is increasingly recognised in local and international circles as holding potential for holistic reform. As an integrated and interdisciplinary scientific discipline, it studies the ecological and social and economic processes that underpin agroecosystems. Translated to a model of agroecological practices, agroecology relies on closed cycles, a bottom-up approach, and elements of precaution in support of farming for long-term sustainability. Combined with social movements for food sovereignty, justice and equity, agroecology could provide for comprehensive system change. For the purpose of this thesis, the multiple dimensions of agroecology are understood, together, to support a model of food production the primary aim of which is to conserve ecosystem functions and promote equity.

An important element that has, however, only been briefly touched upon in this chapter, is the significance of legislation, policy, and institutions in shaping agricultural management and systems of food production and consumption. Regulatory frameworks have played a crucial role in the success of industrial food systems, as laws and policies have been insufficient to address market failure, have actively supported the continuation of the industrial agricultural model in many instances, and have not supported agroecological practices and transitions in a consistent and comprehensive way. The next chapter finds that efforts in the EU for policy reform towards sustainability have, indeed, been insufficient to support agroecological change. It argues that replacing normative ideas that reflect industrial thinking with the principles of the ecosystem approach under the CBD could allow for new legal instruments and reforms that do support, accelerate and upscale transitions towards an agroecological food system.

3 Agroecology in Law, and the Ecosystem Approach

The CBD's ecosystem approach as a framework for agroecological change

3.1 Introduction

Advances in engineering, chemistry, biology and informatics, combined with developments in the global food market, have come together to create an industrial agricultural and food system that is primarily aimed at the maximisation of outputs for commodity markets, but which comes with negative environmental and social impacts, as Chapter 2 has shown. Yet, to fully grasp the dominance of this model in the developed world and the European Union ('EU'), despite its adverse effects, it should be considered within the institutional and regulatory frameworks that fostered and still often foster its success. There are a multitude of ways in which law- and policymaking (or the absence thereof) impact on agroecosystem management decisions, by prescribing or financially supporting desirable practices, including the use of certain inputs, or by restricting and sanctioning undesirable ones, and through recognition of the public value of practices and the allocation of rights. Indeed, science and economics have been allowed to evolve in an 'industrial direction' because of an enabling regulatory environment which failed to prevent or actively encouraged these trends. Sometimes, the role of law is obvious in this regard, as exemplified by the EU's post-war agricultural policies which explicitly sought to increase production to address severe food shortages as self-sufficiency ratios (domestic production to consumption) had been low in many nations during the Second World War,[1] and most still required rationing policies to meet demand for years after conflict ended.[2] Increasing food security through EU production of staple foods was a clear objective and the potential negative ecological and social implications were not, yet, known or appreciated. Yet, more recently, as will be illustrated by the case studies in this thesis, it may not always be evident straight away why regulations support the continuation of an industrial model of food production. The language used may be more in tune with environmental and/or social aims, and one has to dig deeper to reveal more obscure but often fundamental beliefs and institutional structures that fail to capture the knowledge of local, agroecological stewards, to understand why many EU regulations relevant to food and agriculture uphold the industrial *status quo*.

This Chapter starts with some brief, general reflections on EU agricultural and food law, and insights from socio-legal scholarship on policy paradigms. The latter aims to help understand the multi – normative and organisational – dimensions of governance and aid the evaluation of

[1] See, for example, the 30-40% self-sufficiency ratio in the United Kingdom: *Food Security and the UK: An Evidence and Analysis Paper* (DEFRA, 2006), p 47. A tragic consequence of reliance on imports was the Dutch famine or 'Hunger Winter' of 1944-1945, when German occupied forces blocked food supplies.

[2] For example, the United Kingdom did not abolish meat rationing until 1954: 'What you need to know about rationing in the second world war' (*IWM*, N.D.) <https://www.iwm.org.uk/history/what-you-need-to-know-about-rationing-in-the-second-world-war> accessed May 2022. At the same time, in Spain rationing lasted until 13 years after the Civil War (1952): J A Carrasco-Gallego, 'The Marshall Plan and the Spanish postwar economy: a welfare loss analysis' (2012) 65 The Economic History Review 91. In Poland, rationing was officially abolished in 1949 but reintroduced under various different names in the decades thereafter, until the end of Communism in Poland in 1989: A Zawistowski, 'A Ration Card for Survival - Rationing in Communist Poland' (*Polish History*, N.D.) <https://polishhistory.pl/a-ration-card-for-survival-rationing-in-communist-poland/> accessed May 2022.

specific frameworks and regulations in this thesis and the identification of systemic issues that inhibit transformations (§3.2). It then analyses explicit interactions between law and legal doctrine and agroecology, revealing ambiguities and divergent interpretations that may prevent agroecology from providing a solid interpretative frame to guide change (§3.3). Yet, this Chapter also finds that a regulatory shift based on agroecological views and principles does not necessarily require the reinvention of the legal wheel. Building upon increasingly more prominent examples of ecosystem-centrality in law more generally, this Chapter investigates whether the ecosystem approach as developed under the Convention on Biological Diversity ('CBD'), would be able to support alternative understandings of food and farming and their relation to the natural and social environment. An in-depth analysis uncovers crucial synergies between the multi-faceted conceptual framework of agroecology as explored in Chapter 2 and the ecosystem approach's three main elements of integration, conservation, and equity (§3.4).

3.2 Changing the Narrative: A Legal Enabling Environment for Agroecology

The success of the model of industrial agriculture and food systems cannot be fully understood when seen in isolation from the broader regulatory framework within which it evolved. In particular, the influence of EU laws and policies on the decisions of agroecosystem managers and food producers should not be underestimated. Contrary to international law, which – as will be briefly discussed hereafter under §3.3.2 – views agriculture primarily as a matter of national sovereignty, topics related to food and agriculture have always been at the core of European integration. In fact, it has been held that agriculture has always had special status in EU law, being the only sector of industry to be accorded its own title in the Treaties, and that there are fundamental reasons for continued 'exceptionalism' due to, for example, the specific characteristics of the sector and market (natural/weather risks, price inelasticity of food), and the public significance of farming for nutrition, rural life and the environment.[3] Yet, beyond the pillars of the Common Agricultural Policy (CAP), one only has to look at certification standards for quality produce, food safety and marketing rules etcetera, to grasp the breadth of the EU's acquis on agri-food. With continuous expansion comes increased complexity and risk of conflict due to fragmentation, in a legislative sense, with the topic touching upon sectoral and cross-sectoral policies such as health, trade and the environment, and in an institutional sense with topics being covered by the European Commission's DG AGRI, DG ENV, DG SANTE, DG GROW and DG TRADE, with a multitude of agencies taking on specific tasks.

This lack of integration due to the EU's piecemeal adoption of law and policies related to agriculture and food is enforced by the fact that for a long time there was no comprehensive, overarching EU food policy, with common objectives for EU action, a shared understanding of the problems that agriculture and food production face and the priorities that should inform legislative action and decision-making.[4] Nonetheless, there is an inescapable truth that the EU's regulatory regime has not done enough to halt environmentally and socially harmful farming

[3] M Cardwell, *The European model of agriculture* (Oxford University Press 2004), p 7.
[4] See in this regard, for example, O D Schutter et al, *Towards a Common Food Policy for the European Union. The Policy Reform and Realignment that is Required to build sustainable food systems in Europe* (iPES Food, 2019).

practices, described in the previous Chapter, and that, in fact, EU legislation has often encouraged their uptake under the promise to enhance productivity. This section explores socio-legal theory on policy paradigms, to gain a better understanding of what ultimately drives policy action in any given field. It then provides a short, general analysis of the relevance of this scholarship in the context of EU legislation, with more in-depth case studies reserved for Part II of this thesis. Revealing the need for a normative and structural change of direction to create an enabling environment for sustainable, agroecological production, this section then explores the potential role of EU law and policy in fostering holistic food system change.

3.2.1. Understanding EU Action on Food: Scholarship on Paradigms

The transition from an industrial food system to an agroecological food system, as the two have been described in the previous Chapter, would require a radical change; not only in the EU's farming practices but in the very thinking that underpins collective choices on food production and consumption. The idea of a 'paradigm shift' originates from the natural sciences, having been described by Kuhn as a cyclical process of change, where the discovery of anomalies in existing traditions of scientific practice provide the foundations for science itself to rethink its commitments – the basis for "tradition shattering" revolutions.[5] Although recognising the simplifications that this legal thesis applies when reviewing current trends in the life sciences, analogies can be drawn with the scientific understandings that underpin industrial food systems and that support the idea that nature can be manipulated to suit our needs,[6] notably to increase outputs. Whereas initially being perceived as scientifically sound as production levels rose in the post-war era, such an understanding has been undermined by unexpected phenomena and the erosion of the very functions of the agroecosystems that support long-term productivity.[7] Although agroecology as a scientific discipline offers an alternative worldview – one that emphasises ecosystem complexity and highlights (bio)diversity as the key to long-term sustainability[8] – the limited uptake of practices signals that a radical and common shift in thinking has not yet happened. Kuhn's theories on revolutions also offer explanations in this regard. Firstly, Kuhn emphasised the persistent – but always temporary – success of flawed beliefs if the (scientific) community is willing to keeping defending its assumptions.[9] This is an issue that is particularly pressing in the context of food systems as a simplified view of nature is not only linked to the prestige of those institutions that introduced and apply it, but it also comes with great, short-term economic benefits beyond the scientific world. Secondly, industrial and agroecological science provide competing paradigms with characteristics that are practised in different worlds,[10] with engineering, chemistry, synthetic biology and agronomy on the one hand side and ecology and sociology on the other. Before these domains can communicate with each other, the former needs to "experience the conversion that [Kuhn

[5] T S Kuhn, *The Structure of Scientific Revolutions* (The University of Chicago Press 1962), p 5.
[6] Chapter 2, §2.2.
[7] Chapter 2, §2.4.
[8] Chapter 2, §2.5.
[9] Kuhn 1962, p 5.
[10] Ibid, p 150.

calls] the paradigm shift" and then – in light of the absence of a common basis – the radical change in thinking "must occur all at once (though not necessarily in an instant) or not at all".[11]

The paradigm conceptual framework is, however, not only helpful to understand dominant and persistent narratives in science, which have impeded widescale and integrated agroecological research and the widespread uptake of agroecological practices, but also to understand legal action in this field.[12] Analogies between Kuhn's scientific paradigms and policy paradigms were first made by Hall, who understands the latter as an interpretative framework of ideas and standards within policymakers' work and which does not only include the very objectives of law and policy, and the instruments that can be used to obtain it, but also policymakers' normative understanding of the problem that needs to be addressed.[13] In other words, it recognises that legal and policy instruments are not free of bias as they are inherently informed by subjective beliefs of 'how the world works'. Subsequent scholars have described policy paradigms as "cultural frames" which reinforce universalistic discourses,[14] or "idealised rule regimes" which are "the product of actors engaged in real-world problem solving, claims-making, and governing – and negotiation and struggle".[15] Crucially, distinctions have been made between two components of paradigm architecture: 1) a problem-solving policy complex and 2) an organisational complex. The former provides "a cognitive-normative complex for problem-solving and policy choice to be used by the designated or key policymaking agents"[16] and includes values, goals and priorities, problem-conceptualisation and framing, principles, and solutions. The latter provides "a social structural or organisational complex specifying the key roles and social relationships for the problem-solving and policy choice processes,"[17] and includes the location and distribution of public, expert and stakeholder authority and the procedures and structures for deliberation and decision-making to address the problem.

3.2.2. Reform Paths: Sustainable Development, Integration and Multifunctionality

Although the policy-paradigm concept was first developed and used in the context of analysis of national policy making, its potential relevance for the analysis of EU regimes has been

[11] Ibid, p 150. This radical or revolutionary thinking is, however, not undisputed and evidence has been presented in some areas which supports more gradual changes in scientific thinking, whilst also maintaining some of the structures and evidence that comes from the old paradigm, see, for example, the blogpost C O'rafferty, 'Was Kuhn more wrong than right?' *Antimatter* (1 February 2011) <https://antimatter.ie/2011/02/01/was-kuhn-more-wrong-than-right/> accessed May 2022.

[12] It has been recognised that despite its scientific focus, Kuhn's work (with Kuhn himself being both a physicist and philosopher) was inherently political in nature; being a challenge to the idea of science being a simple truth-seeking exercise. See, for example, M Carson et al, *Paradigms in public policy: Theory and practice of paradigm shifts in the EU* (Peter Lang 2010), p 11.

[13] P A Hall, 'Policy Paradigms, Social Learning, and the State: The Case of Economic Policymaking in Britain' (1993) 25 Comparative Politics 275, p 279.

[14] S S Andersen, 'European Integration and the Changing Paradigm of Energy Policy. The case of natural gas liberalisation' (ARENA Centre for European Studies Working Papers 1999). See also, N Fligstein, 'Institutional entrepreneurs and cultural frames - the case of the European Union's Single Market Program' (2001) 3 European Societies 261.

[15] Carson et al 2010, p 142.

[16] Ibid, p 143. See in this regard also J L Campbell, 'Ideas, Politics and Public Policy' (2002) 28 Annual review of Sociology 21.

[17] Carson et al 2010, p 143. Recognition of this institutionalised aspect of the paradigm concept is crucial for the analysis in this thesis, notably the understanding of knowledge and authority in the context of the case studies.

widely recognised and tested.[18] Understanding what common normative ideas underpin EU law on food and farming, where authority lies, and what is necessary to bring about a paradigm shift, is, however, complicated by the fact that until 2020 there was no overarching EU policy to comprehensively and holistically direct legal action and reform on food (or land use). This means that the CAP has provided the main umbrella and although, for reasons explained in the introductory Chapter, it will not feature as a case study in this thesis, some historical and current reflections on its content and working are helpful to understand the background against which other regulatory measures – such as those that will be analysed in Part II – have developed. Like most post-war agricultural policies, the CAP sought,[19] and still seeks,[20] "to increase agricultural productivity by promoting technical progress […] and the optimum utilisation of the factors of production". World War II had emphasised the need for food security and self-sufficiency,[21] and European countries had adopted legal measures to increase agricultural outputs.[22] Most small farms were considered to "lack the structural conditions"[23] to guarantee reasonable farm income and to achieve the CAP's productivity objectives, and measures to modernise or cease farming were put in place to encourage farm operation and development only "under rational conditions".[24] Although such measures were not as ambitious as originally foreseen in their active support for farm and land concentration, they ultimately only reinforced a trend that was already headed in this direction.[25] The CAP, namely, found itself at the very heart of European integration and the freedoms of the single internal market,[26] and the elimination of tariff and non-tariff barriers to the free movement of goods supported increased competition between farms and regional specialisation within the EU as described in Chapter 2. Although Member States like Germany had voiced concerns regarding the viability of their agricultural sector in a competitive market, their farmers were ultimately sacrificed in a package deal on the Common Market that promised great benefits for other industries.[27] Price support measures that were directly coupled to production levels, adopted by European market organisations in the 1960s to support farm income with regard to many popular produce like cereal crops,[28] naturally favoured large-scale, and specialised producers. And although EU farmers were initially largely sheltered from global competition, through import tariffs and export refunds that followed principle of community preference – meaning preference for the consumption of European agricultural goods over third-country goods as long as the EU

[18] Ibid.
[19] Article 33(a) EC.
[20] Article 39(1)(a) TFEU.
[21] C Delayen, *The Common Agricultural Policy: A Brief Introduction* (Institute for Agriculture and Trade Policy, 2007), p 1; D Harvey, 'What does the History of the Common Agricultural Policy tell us?' in J A Mcmahon and M N Cardwell (eds), *Research Handbook on EU Agriculture Law* (Edward Elgar 2015), p 7.
[22] Harvey 2015, p 7.
[23] Directive 72/159/EEC on the modernization of farms [1972] OJ L 96/1, Preamble.
[24] Directive 72/159/EEC, Article 1; also, Directive 72/160/EEC concerning measures to encourage the cessation of farming and the reallocation of utilized agricultural area for the purposes of structural improvement [192] OJ L 96/9, both part of the '1980 Agricultural Programme' launched by agricultural Commissioner Sicco Mansholt.
[25] Harvey 2015, p 11.
[26] Garzon 2006, p 21. B Jack, 'Ecosystem Services: European Agricultural Law and Rural Development' in M Monteduro et al (eds), *Law and Agroecology A Transdisciplinary Dialogue* (SpringerLink 2015).
[27] Garzon 2006, p 23; also B Jack, *Agriculture and EU Environmental Law* (Ashgate 2009), p 1.
[28] Jack 2009, p 6.

producers could meet EU demand[29] – more recent years have seen increased pressures to liberalise EU markets.[30] This, notably due to developments in global liberal trade policies, like the General Agreement on Tariffs and Trade (GATT)[31] and the Agreement on Agriculture (AoA),[32] following the Uruguay Round of negotiations on worldwide trade liberalisations, which were concluded within the framework of the World Trade Organisation (WTO).[33]

EU agricultural policy has, however, seen significant change throughout the last decades of the twentieth century and the start of the millennium, following three paths of reform: sustainable development, environmental integration and multifunctionality. *Sustainable development*, with its origin in the Brundtland Report of the World Commission for the Environment and Development of 1987, is a "process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are made consistent with future as well as present needs".[34] It is normally broken down into three core elements: economic growth, social inclusion, and environmental protection. The concept has found broad recognition in the EU Treaties,[35] and its significance for agricultural reform was already highlighted in the EU's Fifth Environmental Action Programme of 1993.[36] Further mainstreaming was supported by the EU Sustainable Development Strategy of 2001, which called for the CAP to "reward quality rather than quantity by, for example, encouraging the organic sector and other environmentally-friendly farming methods and a further shift of resources from market support to rural development".[37] The realisation of sustainable development in the EU has also been supported by the principle of *environmental integration* (Article 11 TFEU).[38] This legal principle obliges the EU to integrate environmental objectives, principles and criteria into the definition and implementation of the Union's policies, such as sectoral policies like those on agriculture, "in particular with a view to promoting sustainable development". Additionally, it holds that EU environmental law should be construed and interpreted broadly, taking into consideration all EU environmental protection requirements.[39]

[29] Garzon 2006, p 24 and Jack 2009, p 7.
[30] For example, Garzon 2006, p 124.
[31] General Agreement on Tariffs and Trade (adopted 15 April 1994, entered into force 1 January 1995) 1867 UNTS. 187 ('GATT').
[32] Agreement on Agriculture (adopted 15 April 1994, entered into force 1 January 1995) 1867 UNTS 410 ('AoA').
[33] On the role of the WTO in shaping agricultural management more generally D Barker, *The Rise and Predictable Fall of Globalized Industrial Agriculture* (The International Forum on Gobalization, 2007) and L Juillet et al, 'Sustainable agriculture and global institutions: Emerging institutions and mixed incentives' (1997) 10 Society & Natural Resources 309; within the EU context (notably regarding the Uruguay Round Agreement on Agriculture) see also Harvey 2015, p 17-18 and Garzon 2006, p. 72.
[34] G H Brundtland, *Our Common Future* (World Commission on Environment and Development, 1987), par 30.
[35] Notably, articles 3(3) and (5) TEU.
[36] European Commission, 'Towards Sustainability. A European Community programme of policy and action in relation to the environment and sustainable development (Fifth Environmental Action Programme)' [1993] OJ L 138/5. See on the history of the concept of sustainable development in the EU also N M L Dhondt, *Integration of Environmental Protection into other EC Policies. Legal Theory and Practice* (Europa Law Publishing 2003), p 68.
[37] European Commission, 'A Sustainable Europe for a Better World: A European Union Strategy for Sustainable Development' COM(2001)264.
[38] Treaty on the Functioning of the European Union (Consolidated Version) [2016] OJ L 202/1.
[39] See on this distinction between 'internal' and 'external' integration under the integration principle notably K Kulovesi et al, 'Environmental Integration and Multi-Faceted International Dimensions of EU Law: Unpacking

In its 1998 Strategy for Integrating Environment into EU Policies, the EU recognised explicitly the significance of environmental integration into sectoral policies and the need to foster inter-sectoral dialogue.[40] It is, indeed, environmental integration that continuous to receive a lot of attention when discussing reform for a more sustainable EU model for agriculture and food.[41] Yet, for the CAP, reform has also been built around the concept of *multifunctionality*, which reflects a "political questioning on the role of agriculture in today's society",[42] and which acknowledges that farming does not only provide nutrition but also has important social and environmental functions, and supports crucial relations with food and land. Multifunctionality originally developed in the context of the EU's trade relations, where it has mainly been understood as a pretext to continue subsidising agriculture.[43] Within the EU context, interpretations of multifunctionality differ greatly among Member States, notably in relation to the types of beneficial 'functions' of agriculture that should be supported through the CAP,[44] with the concept also having been linked to the (public money for) public goods discourse.[45] In essence, multifunctionality brings together sustainable agriculture and rural development, and it has been linked to a multitude of environmental and social topics and measures such as those aimed at the preservation of nature and landscapes,[46] organic and quality production, set-aside and ecological areas,[47] the preservation of jobs and rural population levels, assistance for young farmers,[48] and farmers in less favoured areas,[49] and the continuation of family farming.[50]

Yet, whilst efforts to support and enhance the environmental and social potential of agriculture are welcome, the overall performance of EU agricultural policies are disputable. The UK's 'Dasgupta Review' on the economics of biodiversity stated in 2020: "Governments almost everywhere exacerbate the problem of the commons by paying people to exploit the biosphere. These payments have been called *perverse* subsidies [and] include subsidies to agriculture".[51] Over the years, studies on the CAP have shown limited positive impacts of environmental

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the EU's 2009 Climate and Energy Package' (2011) 48 Common Market Law Review 829, 834 with reference to Dhondt 2003.

[40] European Commission, 'Partnership for Integration. A Strategy for Integrating Environment into EU Policies' COM(1998) 333; see also J Scott, 'Law and Environmental Governance in the EU' (2002) 51 The International and Comparative Law Quarterly 996.

[41] See, for example, Dhondt 2003, Chapter V and J-E Petersen et al, *Integration of environment into EU agriculture policy — the IRENA indicator-based assessment report* (European Environment Agency, 2006).

[42] See Garzon 2006, p 135.

[43] A Swinbank, 'Multifunctionality: A European Euphemism for Protection?' (FWAG Conference - Multifunctional Agriculture – A European Model, Stoneleigh (UK), 2001) and Garzon 2006, p 128, 139 who distinguished between the use of the discourse as an "arguing" and a "bargaining" tool in the EU and WTO contexts respectively.

[44] Garzon 2006, p 125.

[45] J Bryden et al, *Towards a Policy Model of Multifunctional Agriculture and Rural Development* (JRC, 2006). The public money for public goods narrative has been particularly prevalent in the context of English discussions on a post-Brexit agricultural policy, see Chapter 7, §7.2.1.

[46] European Parliament, 'Resolution on multifunctional agriculture and the reform of the CAP' 2003/2048(INI).

[47] Cardwell 2004, p 37.

[48] 2003/2048(INI).

[49] L Louloudis et al, 'The Dynamics of Local Surival in Greek LFAs' in F Brouwer (ed), *Sustaining Agriculture and the Rural Environment Governance, Policy and Multifunctionality* (Edward Elgar 2004).

[50] Economic and Social Committee, 'Opinion on 'A policy to consolidate the European agricultural model" OJ C 368/76; also Cardwell 2004, p 37.

[51] P Dasgupta, *The Dasgupta Review – Independent Review on the Economics of Biodiversity. Interim Report* (HM Treasury, 2020), par 2.62.

measures,[52] whilst in other instances CAP payments and measures have been linked to poorer environmental conditions, e.g., negative impacts on biodiversity,[53] increased pesticide use,[54] increased emissions,[55] and pressures on water quality.[56] At the same time, European Commission communications signal a continued focus on a narrow understanding of productivity and growth in the CAP context, thereby disregarding the social impacts of reductions in labour input.[57] Direct socioeconomic impacts of the CAP have been found difficult to establish and quantify due to regional differences and local social conditions,[58] yet increased inequalities between farmers follow from direct payments that first rewarded those with the highest production levels, through price support and coupled payments,[59] and, more recently, provide income support that is calculated based on farmed areas in hectares.[60]

A lack of coherence has been identified as a significant stumbling block to a holistic approach to agriculture and rural development,[61] which would be required to deliver on agroecology. Three reasons are identified here to help explain why the current pathways of reform are not reflecting a radical change in thinking that is required for a paradigm shift. Firstly, they do not require environmental and social concerns to be delivered in tandem – with both being part of, and essential to, an (agro)ecological narrative, as will be further explored in Chapter 6. Recent CAP reforms, for example, separate measures which can be considered "greener" than previous mechanisms (e.g., enhanced environmental conditionality and budgets for eco-schemes) from those that are "fairer" (e.g., new social conditionality requirements and the now mandatory redistributive income support for small-scale farmers).[62] Secondly, the pathways do not prioritise environmental and social objectives over short-term economic gains. Environmental integration, notably, has been held to only provide *gleichrang* for conflicting objectives, meaning that it places environmental considerations on equal footing with competing interests, thus neglecting their fundamental nature.[63] As a result, environmental measures are often adopted in parallel with those that reinforce an industrial model, notably through further market

[52] A Gocht et al, *Economic and Environmental Impacts of CAP Greening: CAPRI Simulation Results* (JRC, 2016); *Biodiversity on farmland: CAP contribution has not halted the decline* (European Court of Auditors, 2020); *Productivity in EU agriculture - slowly but steadily growing* (European Commission, 2016b).
[53] *Evaluation of the impact of the CAP on habitats, landscapes, biodiversity* (European Commission, 2019a).
[54] L Gianessi and A Williams, *EU Subsidies Have Led to a Significant Increase in Pesticide Use and Crop Productivity in Poland. International Pesticide Benefits Case Study* (CropLife Foundation, 2011).
[55] *Common Agricultural Policy and Climate. Half of EU climate spending but farm emissions are not decreasing* (European Court of Auditors, 2021).
[56] *Evaluation of the Impact of the CAP on Water* (European Commission, 2019b).
[57] European Commission 2016b.
[58] J Lillemets et al, 'The socioeconomic impacts of the CAP: Systematic literature review' (*Land Use Policy* 2022) <https://www.sciencedirect.com/science/article/pii/S0264837721006918> accessed May 2022.
[59] See Jack 2009, p 62 on the environmental benefits of decoupling.
[60] J Parot et al, *Roots of Resilience: Land Policy for an Agroecological Transition in Europe* (Nyéléni Europe and Central Asia, 2021), p 23.
[61] EESC, 'Evaluation on the CAP's impact on territorial development of rural areas' NAT/806.
[62] 'The new common agricultural policy: 2023-27' (*European Commission*, 2021) <https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/new-cap-2023-27_en> accessed May 2022; Articles 14 and 29. See also, hereafter, Chapter 7 (Conclusion).
[63] Dhondt 2003, p 85.

liberalisation which foster specialised rather than diversified farming practices.[64] Legislative and institutional actions have, in this regard, been described as reformist and complementary to an industrial and neo-liberalist models, whereas agroecology demands progressive and radical transformation.[65] Lastly, the CAP only covers agriculture and policy efforts towards a more sustainable and multifunctional approach will only go so far when issues are more systemic and concern the entire food chain, in absence of an EU Common Food Policy.[66]

3.2.3. Beyond the European Green Deal: An Agroecological Paradigm for Change?

The European Green Deal, a set of policies that was approved by the European Commission in 2020 and endorsed by the European Parliament in 2021,[67] could have helped to remedy the EU's lack of holistic and integrated action on food and agriculture, notably, through the Farm to Fork Strategy and the EU Biodiversity Strategy for 2030.[68] Indeed, the Farm to Fork Strategy promises to provide "a new comprehensive approach to how Europeans value food sustainability",[69] whilst the Biodiversity Strategy aims to provide an "integrated and whole-of-society approach" to biodiversity protection.[70] The measures that are outlined in the Farm to Fork Strategy include tax incentives (e.g., the possibility to set VAT for fruit and vegetables at 0%),[71] advisory services, research and innovation investments, sustainable food procurement, and the Biodiversity Strategy promises, among others, a new governance framework (e.g., action tracker and target dashboard),[72] improved enforcement (e.g., by supporting civil society's role as a compliance watchdog) and a new Knowledge Centre for Biodiversity.[73] Key targets for 2030 include to reduce the overall use and risk of chemical pesticides by 50%, reduce nutrient losses by at least 50%, reduce sales of antimicrobials for farmed animals by 50%, to have at least 10% of agricultural area under high-diversity landscape features, to reverse the decline in pollinators, to plant three billion trees in the EU and to have at least 25% of agricultural land under organic farming management.[74]

However, the Green Deal Strategies come with significant issues that undermine their value for supporting agroecology in the EU. In some instances, this is because pressure to achieve some of the targets – notably on increasing organic land management and afforestation – may

[64] Regarding liberalisation paradigms in recent CAP reforms and the tendencies of these reforms to foster specialised farming, despite policy discourse maintaining that it seeks diversification in agricultural and rural environments, also Garzon 2006, p 175.
[65] Gimenez and Shattuck 2011; *Agro-écologie: La cohérence doit être une ambition* (Confédération Paysanne, 2015).
[66] De Schutter et al 2019.
[67] European Parliament, 'Resolution on a farm to fork strategy for a fair, healthy and environmentally-friendly food system' P9_TA(2021)0425.
[68] European Commission, 'A Farm to Fork Strategy' COM(2020) 381 final; European Commission, 'EU Biodiversity Strategy for 2030. Bringing nature back into our lives' COM/2020/380 final.
[69] COM(2020) 381 final, par 1.
[70] COM/2020/380 final, par 3.3.
[71] P9_TA(2021)0425, par 101.
[72] COM/2020/380 final, par 3.1; 'EU Biodiversity Strategy Dashboard' (*European Commission*, N.D.) <https://dopa.jrc.ec.europa.eu/kcbd/dashboard/> accessed May 2022.
[73] COM/2020/380 final, par 3.3.4; 'Knowledge Centre for Biodiversity' (*European Commission*, N.D.) <https://knowledge4policy.ec.europa.eu/biodiversity_en> accessed May 2022.
[74] COM(2020) 381 final; COM/2020/380 final.

negatively impact on agroecological stewardship, and be contrary to a just transition, if projects are not implemented with (social and environmental) ecological principles at their core, and they compete for already scarce land resources.[75] More broadly, however, the Strategies fail to positively support agroecology and those that best deliver it. Even though the Biodiversity Strategy recognises farmers as "guardians of our land, [who] play a vital role in preserving biodiversity",[76] and the need to improve "the condition and diversity of agroecosystems",[77] there is a strong focus on the perceived need to transform more land area into protected spaces which enforce a human-nature dichotomy that is already evident in agricultural policy,[78] and a lack of acknowledgement of the potential of land management in accordance with ecological principles.[79] The Farm to Fork Strategy explicitly references agroecology, but only in the context of "new knowledge and innovation",[80] whilst the Biodiversity Strategy references the need for 'sound science' to underpin the fight against biodiversity loss.[81] The position of agroecology and the language used signals an overly technocratic approach, similar to the case studies in this thesis, which risks a lack of integration of farmers' and local knowledge and the overlooking of "social innovation and social science and humanities research [which are] crucial in the endeavour to understand and drive the complex social transformations necessary to achieve just and sustainable food systems".[82] Lastly, whilst the Strategies aim to link to and rely on the new CAP and its new eco-schemes (to be developed at national level) for achieving key targets, their non-binding nature is already being used to challenge the need for ambitious action under the CAP, and to advocate business-as-usual or worse, to achieve a false sense of food security in light of the Ukraine war.[83] Only legally binding EU nature restoration targets combined with a regulatory framework for a sustainable food system, as promised under the Strategies,[84] that is drafted and implemented following a truly agroecological approach, would be sufficient to protect against the short-term and economic pressures of an industrial model.

Law, policy, and institutional frameworks are already part of a broad and interdisciplinary understanding of agroecology, which acknowledges the human and socio-economic aspects of agroecosystems.[85] Some scholars consider agroecosystems and legal systems "to be an

[75] For example, afforestation or rewilding projects that are implemented from the 'top-down', and which may come with significant financial opportunities in carbon and natural capital markets, may have negative impacts on the rights of underrepresented groups, such as agroecological farmers, and alienate communities; see in this regard extensive research that has been undertaken in the context of REDD+, e.g., J P S Barletti and A M Larson, *Rights abuse allegations in the context of REDD+ readiness and implementation: A preliminary review and proposal for moving forward* (Center for International Forestry Research, 2017).
[76] COM/2020/380 final, par 2.2.2.
[77] Ibid.
[78] M Lennan et al, *2030 for the EU: Real steps of change? A short commentary on Biodiversity Strategy and Farm to Fork* (SCELG, 2020), p 3; also, above §3.2.2.
[79] 'EU Farm to Fork Strategy: Collective Response from Food Sovereignty Scholars' *Food Governance* (5 June 2020) <https://foodgovernance.com/eu-farm-to-fork-strategy-collective-response-from-food-sovereignty-scholars/> accessed May 2022.
[80] COM(2020) 381 final, par 3.1.
[81] COM/2020/380 final, par 3.3.4.
[82] Parot et al 2021, p 33.
[83] Chapter 1, §1.2.
[84] COM/2020/380 final, par 2.1; COM(2020) 381 final, par 4.
[85] Chapter 2, §2.5.

integrated whole";[86] with power relations that "reproduce both the metabolism between nature and society, and the forms in which it is organised and, therefore, the ways in which energy and materials flow within agroecosystems".[87] Accordingly, they understand agroecology to embrace practical *and* political aspects: an "ecologisation of agricultural practices and public policies".[88] Others have defined the engagement of policy with agroecology through a new discipline of "political agroecology".[89] The question, however, remains whether agroecology can provide a policy paradigm and frame that is sufficiently strong and clear to bring a counter narrative for radical reform of the food and agricultural regulatory realm. To answer this question, the next section will explore current interactions between agroecology and law.

3.3 Mapping the Field: Agroecology, Law, and Legal Doctrine

Despite the different approaches of interdisciplinary scientists to the relationship between regulations and agroecology, there seems to be consensus that incorporation of agroecological ideas and principles in law and policy is crucial to support transitions in agroecological science and movements towards food system change.[90] Legal reform is held to be a requirement for the upscaling of largely localised agroecological practices and systems,[91] and regulations are recognised for their capacity to provide stability and mitigate risks as preconditions for agroecological conversions,[92] and for their distributive potential to foster equity.[93] Yet, little has been said about the specific way legislation should interact with agroecology to reflect and support a revolutionary change in thinking that is necessary for a paradigm shift. The only scholarly edited book that has been published explicitly and exclusively on the topic of law and agroecology, dating from around the start of this PhD, concluded that, at the time, law had "remained separate and very far from the debate within agroecology",[94] and it has been held

[86] O Hospes, 'Addressing Law and Agroecosystems, Sovereignty and Sustainability from a Legal Pluralistic Perspective' in M Monteduro et al (eds), *Law and Agroecology A Transdisciplinary Dialogue* (SpringerLink 2015); see also E B Noe and H F Alrøe, 'Regulation of Agroecosystems: A Social Systems Analysis of Agroecology and Law' in M Monteduro et al (eds), *Law and Agroecology A Transdisciplinary Dialogue* (SpringerLink 2015), p 36 which identifies legislations and subsidies as part of the agroecosystem.

[87] Gonzalez De Molina 2012, p 48; see also F Caporali, 'History and Development of Agroecology and Theory of Agroecosystems' in M Monteduro et al (eds), *Law and Agroecology A Transdisciplinary Dialogue* (SpringerLink 2015).

[88] Translated reference in V Angeon et al, 'Agroecology Theory, Controversy and Governance' (2014) 14 Sustainable Agriculture Reviews 1, p 17 to N Mzoughi and C Napoléone, 'L'écologisation, une voie pour reconditionner les modèles agricoles et dépasser leur simple évolution incrémentale' (2013) 21 Natures Sciences Sociétés 161. Francis et al 2003, p 112, however, note that agricultural policies are often still not included as part of courses on agroecology, which are focused on ecological aspects only.

[89] M G Rivera-Ferre, 'The resignification process of Agroecology: Competing narratives from governments, civil society and intergovernmental organizations' (2018) 42 Agroecology and Sustainable Food Systems 666.

[90] See similarly Gonzalez De Molina 2012, p 56.

[91] Ibid, p 46, 56; M A Altieri, *The scaling up of agroecology: spreading the hope for food sovereignty and resiliency. A contribution to discussions at Rio+20 on issues at the interface of hunger, agriculture, environment and social justice* (Sociedad Científica Latinoamericana de Agroecología, 2012); Altieri 2002, p 17; Holt-Giménez and Altieri 2012, pp 93-95. See also FAO 2018a.

[92] Gonzalez De Molina 2012, p 53; Gliessman 2015, p 277.

[93] Gonzalez De Molina 2012, p 53; Altieri 1989, p 40.

[94] M Monteduro et al, 'Preface' in M Monteduro et al (eds), *Law and Agroecology A Transdisciplinary Dialogue* (SpringerLink 2015), v.

that legal sciences are "alien to agroecology".[95] Interactions between law and agroecology have, however, increased since then as crudely illustrated by the fact that the legal database on agroecology by the UN Food and Agriculture Organization (FAO) saw a widening of its focus beyond the Americas to include approximately one hundred new records since the start of this research;[96] a growth trend that is, as analysed below, also evident for the EUR-Lex database.[97]

The growing use of agroecology in policy and legal documents, however, does not necessarily indicate a shift in thinking. Indeed, risks of agroecology becoming a buzzword and catch-all phrase have been identified,[98] and of agroecology being co-opted by the actors it opposes,[99] if use of the term is not combined with a clear notion of what it means or does not mean, nor a willingness to change the institutions (policy, law, markets, education, research etcetera) that have for too long marginalised its potential.[100] This section aims to shed light on current interactions between law and agroecology at international, EU and national level. This mapping exercise is not meant to be comprehensive in geographic or temporal scope but aims to allow for preliminary observations on the depth and level of current regulatory action on agroecology. In particular, it looks for a potential emerging frame – objectives and principles combined with at least an ambition to put in place new structures that can take agroecology forward – that signals and supports a paradigm shift. This section finds an increase in the use of agroecology as a term at EU level, but also a lack of conceptual clarity as agroecology is often referenced only as a set of practices or techniques without further clarification of its meaning or underlying principles. Also, there has been a lack of engagement in key documents, including the new CAP. Some sources of international and national law and policy could, however, inspire the development of an EU framework to support agroecological transitions. Nonetheless, a lack of coherence across some more principled legislative examples, and a lack of authority or legal status in other instances, could significantly complicate such an ambitious agroecological law-making exercise, which is unlikely to be remedied through legal research in this field as interaction between agroecology and legal doctrine are also still in early, explorative stages.

3.3.1. EU Law: Emerging Trends Without Conceptual Clarity

A significant barrier to relying upon agroecology to guide regulatory reform and the rethinking of the overarching objectives of the legal regime for food and agriculture within the EU, is the fact that agroecology has not been presented or understood as a well-defined legal concept or set of framework principles, which could encourage the drafting of more specific measures and

[95] M Monteduro, 'Environmental Law and Agroecology. Transdisciplinary Approach to Public Ecosystem Services as a New Challenge for Environmental Legal Doctrine' (2013) 22 European Energy and Environmental Law Review 2, p 7.
[96] 'Agroecology Knowledge Hub' (*FAO*, N.D.) <https://www.fao.org/agroecology/policies-legislations/en/> accessed May 2022
[97] See, hereafter, §3.3.1.
[98] 'The time has come for agroecology' *South-North Development Monitor* (2014) <https://twn.my/title2/susagri/2014/sa358.htm> accessed May 2022.
[99] M Altieri et al, 'Technological Approaches to Sustainable Agriculture at a Crossroads: An Agroecological Perspective' (2017) 9 Sustainability 349.
[100] E Isgren and B Ness, 'Agroecology to Promote Just Sustainability Transitions: Analysis of a Civil Society Network in the Rwenzori Region, Western Uganda' (*Sustainability* 2017) <https://www.mdpi.com/2071-1050/9/8/1357> accessed May 2022.

accompanying governance structures. Taking the EUR-Lex as a starting point for analysis, this research identifies a significant increase in the use of agroecology as a term in EU official documents: with only 23 uploaded documents with references to agroecology or agro-ecology before 2016 (with the first reference in 1987),[101] to 130 identifiable records by April 2022.[102] Early engagement sometimes followed directly from the publication of the report on agroecology by the UN Special Rapporteur on the right to food, as introduced in the previous Chapter,[103] with explicit referencing in some cases.[104] At this time, agroecology mainstreaming was particularly prevalent in EU action on international development and cooperation.[105] The start of the negotiations on the new (post-2020) CAP in 2018, followed by the launch of the European Green Deal in 2020, has led to continuous expansion of the uptake of agroecology in EU law- and policy on agriculture and rural development, and more integration in cross-sectoral policies on the environment and climate, and food.[106] However, looking beyond the simple inclusion of the term, there is a consistent lack of depth in the ways EU official records use agroecology. Whilst some documents make simple reference to agroecological resources (10%) or use the term to describe environmental characteristics (7%), the majority of records refer to agroecology as a set of practices, farming methods or techniques (62%), whilst 21% exhibit some understanding of the relevance of agroecology for wider systemic change, or for the achievement of social goals.[107] Furthermore, in almost all instances there is no detail given on what agroecological practices are as agroecology is often listed as one example of a farming model that could help achieve certain objectives, notably in relation to environmental sustainability.[108] A lack of conceptual clarity is reflected in the unclear relations between agroecology and organic farming in many documents – being presented as alternatives in some records and as being the same in others[109] – or other models (e.g., multifunctional land use,[110]

[101] European Commission, 'Written Questions' 454/87.
[102] 'EUR-Lex' (*European Union*, N.D.) <https://eur-lex.europa.eu/homepage.html> accessed May 2022.
[103] Chapter 2, §2.5.
[104] See, for example, European Parliament, 'Resolution on developing a common EU position ahead of the United Nations Conference on Sustainable Development (Rio+20)' P7_TA(2011)0430, Preamble; and European Parliament, 'Resolution on child undernutrition and malnutrition in developing countries' OJ C 289/71.
[105] See, for example, European Parliament, 'Resolution on an EU policy framework to assist developing countries in addressing food security challenges' 2010/2100(INI); European Parliament, 'Resolution on increasing the impact of EU development policy' 2011/2047(INI).
[106] See, for example, Regulation (EU) 2018/841 of the European Parliament and of the Council of 30 May 2018 on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry in the 2030 climate and energy framework, and amending Regulation (EU) No 525/2013 and Decision No 529/2013/EU [2018] OJ L 156/1, Preamble 8; European Commission, 'Recommendations to the Member States as regards their strategic plan for the Common Agricultural Policy' COM/2020/846 final.
[107] Based on analysis of 130 EUR-Lex records citing 'agroecology' or 'agro-ecology'.
[108] A rare example of a proposed definition of agroecology can be found in a European Parliament amendment (gc) that was not included in the final text to: European Parliament, 'Amendments adopted on the proposal for a directive of the European Parliament and of the Council on the reduction of national emissions of certain atmospheric pollutants' P8_TA(2015)0381: "agricultural systems with high biodiversity, resource efficiency and reduced or ideally no dependency on chemical inputs".
[109] Compare, for example, EESC, 'The inclusion of greenhouse gas emissions and removals from LULUCF' COM(2021) 554 final, par 4.4 and COM/2020/380 final, par 2.2.2.
[110] European Commission, 'Staff Working Document Accompanying the Document: A long-term Vision for the EU's Rural Areas - Towards stronger, connected, resilient and prosperous rural areas by 2040' SWD(2021) 166 final.

precision and conservation farming,[111] nature-based solutions,[112] ecological intensification[113]) and paradoxes in phrases such as "agroecological intensification for family farming".[114]

Looking specifically at agricultural policy, the EU, for the first time, recognised the relevance of agroecology in the context of the European Innovation Partnership (EIP-AGRI) under the CAP 2013-2020.[115] The EIP on agroecology has provided a framework for promising work and research, including the set-up of a network of agroecology multi-actor projects, living labs and knowledge exchange projects on agroecological approaches through EU-level platforms.[116] However, its aim to work "towards agro-ecological production systems and […] in harmony with the essential natural resources on which farming and forestry depend",[117] only relates to agricultural research and innovation, with too little attention for how CAP structures undermine good practices. Also, ambiguity on how agroecology is balanced with other EIP "productivity and sustainability" objectives,[118] for example, competitiveness, economic viability, and resilience has meant that, early on, questions were raised about how the EIP would function within the EU's wider Horizon 2020 agenda/funding programme, with strong, competing agri-industry focused claims and less interest in agroecology in DG Research.[119]

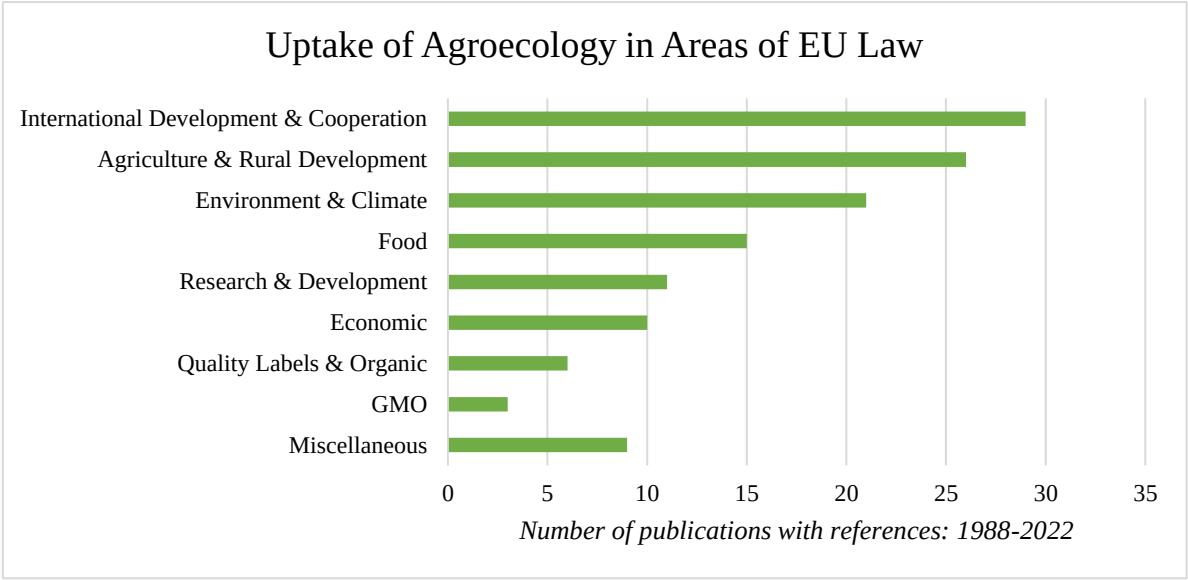
A striking lack of connection between progress in research and wider legal reform is reflected in the juxtaposition between the European Commission's showcasing of its agroecological work under the EIP,[120] but the complete absence of agroecology in its communication on a new "smarter, modern and sustainable" CAP.[121] This, despite the fact that the European Political Strategy Centre – the Commission's in-house think tank – had found that agroecology "deserves full attention in a debate about transforming the Common Agricultural Policy",[122] drawing links between the three sustainable development pillars and agroecology's objectives to sustain production, preserve environments and support viable food and farming

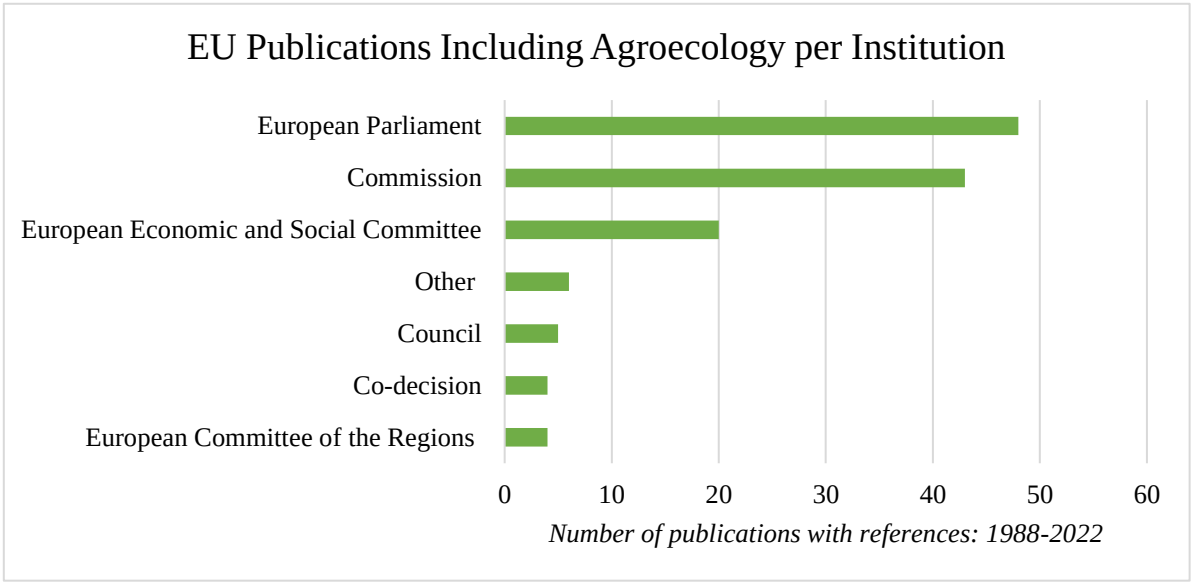
[111] European Commission, 'Proposal for a Regulation establishing rules on support for strategic plans to be drawn up by Member States under the Common agricultural policy (CAP Strategic Plans)' COM/2018/392 final, Preamble 38; European Commission, 'Commission Staff Working Document accompanying Communication 'A sustainable Bioeconomy for Europe: Strengthening the connection between economy, society and the environment" SWD/2018/431 final.
[112] European Commission, 'Proposal for a decision on the signing, on behalf of the European Union, and provisional application of the Partnership Agreement between the European Union, of the one part, and the members of the Organisation of African, Caribbean and Pacific States, of the other part' COM/2021/312 final.
[113] European Parliament, 'Proposal for a decision on establishing the specific programme implementing Horizon Europe – the Framework Programme for Research and Innovation - Outcome of the European Parliament's proceedings' ST_15310_2018_INIT, Amendment 157.
[114] European Commission, 'Implementing EU food and nutrition security policy commitments: Third biennial report' COM/2018/699 final.
[115] Art. 55 Regulation (EU) 1305/2013 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) [2013] OJ L 347/487. For a more extensive interpretation of the agroecological value of Rural Development Programmes, see also G Buia and M Antonucci, 'The Rural Development Programme (RDP) as a Strategic Tool for Linking Legal and Agroecological Perspectives' in M Monteduro et al (eds), *Law and Agroecology A Transdisciplinary Dialogue* (SpringerLink 2015), p 163.
[116] *The EIP-Agri leading the transition to agroecology* (French Ministry of Agriculture, 2019).
[117] Art. 55(1)(a) Regulation 1305/2013.
[118] Ibid.
[119] M Schlüter, *Agroecology & EIP 'Agricultural Productivity and Sustainability'* (IFOAM EU, 2013).
[120] Agri Innovation Summit 2019.
[121] European Commission, 'The Future of Food and Farming' COM(2017) 713.
[122] Falkenberg 2016, p 21.

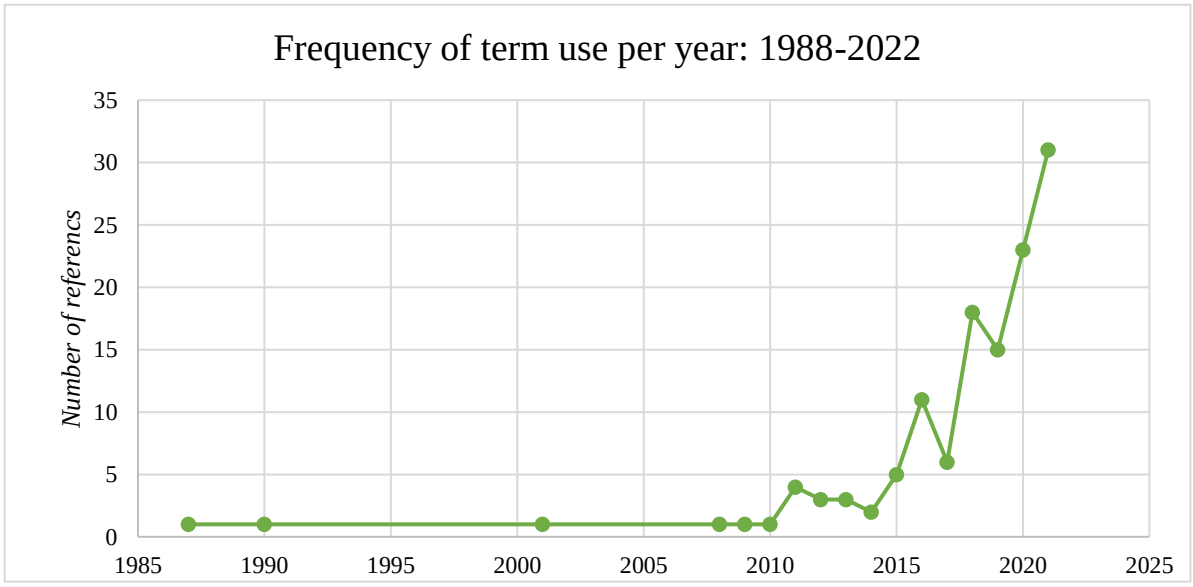
communities.[123] The European Committee of the Regions (CoR), similarly, had argued that "modernisation must be carried out as part of the agro-ecological transition";[124] calling for risk prevention through agroecological practices and the de-specialisation of farms, although failing to effectively challenge the Commission's strong focus on technical innovation. However, the Commission's initial proposal for a new regulation on support for strategic plans for a post-2020 CAP only mentioned agroecology as part of a wide range of 'management commitments' which could be supported by Member States at their discretion.[125] Also, the new Regulation 2021/2115 references the need to advance sustainable farming practices, such as agroecology, but only mentions agroecology in the context of farm advisory services and does not provide further normative guidance on agroecology and the CAP's ways of supporting the transition.[126]

Only the European Economic and Social Council (EESC) and CoR have in own-initiative and advisory opinions recently given voice to the need for a paradigm shift towards agroecology. In this regard, these institutions consider that "agroecology is the horizon towards which European agriculture should be working",[127] "a new prospect for agriculture in Europe",[128] which "does not just take account of food production but covers the entire food system".[129] The EESC has highlight agroecology as a science, set of practices and social movement,[130] and both institutions have stressed links between agroecology and the ecosystem, as agroecology makes "the most of ecosystems as a production factor while maintaining their capacity for renewal"[131] and is a means to "rebuild living ecosystems".[132] The CoR has highlighted several measures of CAP reform that would reflect agroecological thinking, such as crop diversification, long crop rotations, integrated management, mixing species and use of farmer-saved seed,[133] whilst the EESC places agroecology in the context of food system reform and the transition towards short supply chains, focusing, among others, on the need for accessible finance for local and regional infrastructures to support this, food safety rules that are flexible for the small farmer and reform of competition rules for public procurement.[134] However, neither the CAP or the Farm to Fork Strategy have, so far, delivered on agroecology, and rather than suggesting a new EU legally binding, normative frame to steer future initiatives in an agroecological direction, the EESC and CoR cite the FAO 'Agroecology Elements' to help define agroecology and its principles.[135]

[123] Ibid, p 20.
[124] European Committee of the Regions, 'CAP reform' COR 2018/03637, Amendment 53.
[125] COM/2018/392 final, Preamble 38
[126] Regulation (EU) 2021/2115 of the European Parliament and of the Council of 2 December 2021 establishing rules on support for strategic plans to be drawn up by Member States under the common agricultural policy (CAP Strategic Plans) and financed by the European Agricultural Guarantee Fund (EAGF) and by the European Agricultural Fund for Rural Development (EAFRD) and repealing Regulations (EU) No 1305/2013 and (EU) No 1307/2013 [2021] OJ L 435/1. Also, hereafter Chapter 7.
[127] EESC, 'Promoting short and alternative food supply chains in the EU: the role of agroecology' NAT/763, par 1.5.
[128] Ibid, par 1.1.
[129] European Committee of the Regions, 'Agro-ecology' OJ C 106/19, par 24.
[130] NAT/763, par 4.2.
[131] OJ C 106/19, par 13.
[132] NAT/763, par 4.4.
[133] OJ C 106/19.
[134] NAT/763.
[135] Hereafter, §3.3.2.







3-1 Analysis of 130 identified entries in EUR-Lex (1988-2022) which reference agroecology or agro-ecology

3.3.2. International Governance: A Principled Approach that Misses Authority

The absence of normative, agroecological principles to guide legislative action and reform at EU level, raises the question whether such principles could be derived from elsewhere, notably from international law and governance. As will be further explored in Part III of this thesis regarding international human rights and biodiversity law, the EU forms an integral part of the international legal realm. Both the EU and Member States are also parties to a great number of treaties and their legal orders are shaped by the hard and soft law instruments developed at international or regional level, often through governing bodies like the Conference of the Parties.[136] With regard to agroecology, a significant complexity exists at the international level of law-making due to fragmentation of international action on agriculture. Whereas in the EU there is a body of legislation that explicitly deals with agriculture and that provides a broader framework for Member State action in the agricultural field,[137] international law has generally viewed agricultural management as being primarily a national concern that raises delicate questions of sovereignty.[138] The international aspects of agriculture, notably elements of conservation and transboundary pollution (environment), hunger as a threat to peace and human rights (food security) and the distribution of agricultural products (trade), are regulated by different organisations.[139] The declaration of the first World Food Congress organised by the Food and Agriculture Organization (FAO) in 1963 illustrates that, similar to the EU, the international approach to agriculture and food security was also based on industrial ideas. The declaration held that it was "convinced that the scientific and technological progress now make it possible to free the world from hunger" and it urged for "the fullest and most effective use of all human and natural resources, to ensure a faster rate of economic and social growth".[140]

Against the backdrop of the 1992 Rio Declaration of on Environment and Development, Agenda 21 and notably commitments to cooperate to conserve, protect and restore the health and integrity of the Earth's ecosystem and to reduce and eliminate unsustainable patterns of production and consumption,[141] international governance has seen an increased focus on sustainable agriculture and rural development.[142] Particularly, the FAO has explicitly embraced agroecology to guide transitions towards sustainable food systems. Between 2014 and 2018, it organised several regional seminars,[143] as well as two international symposia on Agroecology for Food Security and Nutrition, attended by experts from academia, the private sector, NGOs

[136] On the complex relationship between the EU, Member States and the international regime on environmental law see notably E Morgera, *The External Environmental Policy of the European Union: EU and International Law Perspectives* (Cambridge University Press 2012). See also hereafter §3.4.2 and Chapter 6.
[137] Legislation adopted under Article 39 TFEU.
[138] S D Benedetto, 'Agriculture and the Environment in International Law: Towards a New Legal Paradigm?' in M Monteduro et al (eds), *Law and Agroecology A Transdisciplinary Dialogue* (SpringerLink 2015), p 107.
[139] In particular, the Conference of the Parties to the Convention to Biological Diversity (CBD), the Food and Agriculture Organization (FAO) and the World Trade Organization (WTO).
[140] 'The First World Food Congress' (*Freedom From Hunger Project*, 2016) <https://freedomfromhungerproject.weebly.com/blog> accessed May 2022.
[141] UN General Assembly, 'Rio Declaration on Environment and Development' (1992) A/CONF.151/26, Principles 7 and 8.
[142] Started with UN General Assembly, 'Agenda 21: Programme of Action for Sustainable Development' (1992) A/CONF.151/26, Chapter 14.
[143] R Cluset et al, *Catalysing Dialogue and Cooperation to Scale Up Agroecology: Outcomes of the FAO Regional Seminars on Agroecology* (FAO, 2018).

and governments, including several agricultural ministers.[144] The 'Scaling up Agroecology Initiative' was launched during the last symposium,[145] which is complemented by an 'Agroecology Knowledge Hub' with resources on agroecology on the FAO website.[146] The Scaling Up Initiative highlights the current role of policies in support of global value chains and industrial agriculture and the need for the adoption and reform of national policies to catalyse agroecological practices and support regional and local food markets. It links the concept of agroecology to the 2030 Agenda for Sustainable Development, the environmental, economic and social dimensions of sustainable development and the Sustainable Development Goals (SDGs).[147] The synergies that the FAO draws between the SDGs and agroecology are also of particular relevance for the EU who has committed itself to the SDGs,[148] as, among others, they underscore agroecology's potential to end hunger, ensure sustainable consumption and production patterns, ensure healthy lives and the protection and sustainable use of water and terrestrial ecosystems and for action on climate change. The initiative distinguishes between '10 Elements of Agroecology': diversity, synergies, efficiency, resilience, recycling, co-creation and sharing of knowledge, human and social values; culture and food traditions, circular and solidarity economy, and responsible governance.[149] These elements aim to provide "a guide for policymakers, practitioners and stakeholders in planning, managing and evaluating agroecological transitions",[150] and provide a welcome effort to clarify what agroecology can mean in the international context, and references have been made in EU official documents.[151]

Although the bulk of the international work on agroecology has been conducted by FAO, it is noteworthy that the Conference of the Parties to the CBD has adopted a decision with respect to mainstreaming and the integration of biodiversity within and across sectors in 2016, which "encourages Parties and invites other Governments to promote and support, as appropriate, sustainable agricultural production, that may include increases in productivity based on the sustainable management of ecosystem services and functions, diversification of agriculture, agroecological approaches and organic farming".[152] The International Pollinator Initiative as established under the CBD,[153] recognised the importance of pollinator-friendly, agroecological approaches, "such as crop rotations, intercropping, agroforestry, integrated pest management,

[144] 'International Symposium on Agroecology for Food Security and Nutrition' (*FAO*, 2014) <https://www.fao.org/about/meetings/afns/en/> accessed May 2022; 'Second International Symposium on Agroecology' (*FAO*, 2018) <https://www.fao.org/about/meetings/second-international-agroecology-symposium/en/> accessed May 2022.
[145] FAO 2018a.
[146] 'Agroecology Knowledge Hub' (*FAO*, N.D.).
[147] FAO 2018a, p 1 and Annex 1.
[148] European Commission, 'Next steps for a sustainable European future. European action for sustainability.' COM(2016) 739.
[149] FAO 2018a, Annex 2; also *The 10 Main Elements of Agroecology: Guiding the Transition to Sustainable Food and Agricultural Systems* (FAO, 2018b).
[150] FAO 2018b, p 2.
[151] NAT/763, par 4.
[152] Conference of the Parties to the CBD, 'Decision XIII/3. Strategic actions to enhance the implementation of the Strategic Plan for Biodiversity 2011-2020 and the achievement of the Aichi Biodiversity Targets, including with respect to mainstreaming and the integration of biodiversity within and across sectors' (2016) CBD/COP/DEC/XIII/3 (CBD Decision XIII/3), par 30, see also par 27.
[153] Conference of the Parties to the CBD, 'Decision VI/5. Agricultural biological diversity' (2002) CBD/COP/DEC/VI/5, Annex II.

organic agriculture, and ecological intensification agroecology" in its Plan of Action 2018-2030,[154] which builds upon the foundations of the Report by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) on pollinators.[155] Moreover, the Special Rapporteur on the Right to Food – an independent expert appointed by the inter-governmental Human Rights Council – already published a report in 2010 that linked agroecology to the right to food,[156] which linkages will be further explored in Chapter 6.[157] In this context, the United Nations Declaration on the Rights of Peasants and Other People Working in Rural Areas (UNDROP) also oblige States to stimulate sustainable production, including agroecological production, and to take measures aimed at the conservation and sustainable use of land and other natural resources, including through agroecology.[158]

International law and governance have, however, not been able to provide clarity on the precise values that underpin agroecology and translate them into concrete calls to action for policymakers. Similarly, to what has been observed at EU level,[159] agroecology, in many instances, is used primarily to reference certain practices without reflections on the radical difference in approach when compared to industrial models for agriculture and food. Only in the case of the FAO's 10 Elements, which have been elaborated on by researchers,[160] has concrete progress been made for the development of an agroecological framework, but as a product of desk study and regional seminars on agroecology,[161] it is unclear to what degree the elements are embraced by the international community, the EU, and its Member States. Nevertheless, when read in conjunction with the FAO's more general principles for Sustainable Food and Agriculture – 1) improving efficiency in the use of resources; 2) conserving, protecting and enhancing natural ecosystems; 3) protecting and improving rural livelihoods, equity and social well-being; 4) enhancing the resilience of people, communities and ecosystems; 5) promoting good governance of both natural and human systems – important synergies can be drawn with the CBD's ecosystem approach, which, as explored hereafter, may provide a workable and authoritative framework in support of agroecological transition.[162]

3.3.3. National Legislation: Inspirational but Conflicting Principles

In absence of a normative and authoritative regulatory frame on agroecology at both EU and international level, a question remains whether such a frame has been developed in a national context which could allow for comparative study and inspiration. For a long time, records in the FAO's legal database on agroecology – AgroecologyLex – have reflected a concentration of interplay between law and agroecology in Latin America, including references in key pieces

[154] Subsidiary Body on Scientific, Technical and Technological Advice to the CBD, 'Conservation and sustainable use of pollinators' (2018) CBD/SBSTTA/REC/22/9.
[155] IPBES, 'Thematic assessment on pollinators, pollination and food production' (2017) IPBES/4/INF/1/Rev.1, Annex 1.
[156] A/HRC/16/49.
[157] Chapter 6, §6.2.4.
[158] A/RES/73/165 (UNDROP), Article 17(7).
[159] Above, §3.3.1.
[160] Wezel et al 2020.
[161] The initiative notably refers to principles that follow from the literature by Altieri and Gliessmann (discussed in Chapter 2, §2.5).
[162] §3.4,

of framework legislation. Some of these examples, like Ecuador's Organic Law on Agrobiodiversity, Seeds and Sustainable Agriculture, again, simply recognise agroecology as one example of best practices.[163] Yet, agroecological sentiments resonate in the 14 principles that aim to guide the law's application and which include the sustainable use and conservation of agrobiodiversity, as well as social aspects like respect for traditional values and cultural practices and the promotion of solidarity.[164] Venezuela's Comprehensive Agricultural Health Law has as its primary objective to guarantee agricultural health, which incorporates principles of agroecological science based upon ancestral knowledge of respect, conservation and preservation of all natural components of sustainable agroecosystems.[165] It holds, however, that the principles should "not be transformed into pure legal rules, which as such imply coercion, obligation and punishment",[166] but as guiding principles and objectives to be inserted into new laws.[167] In this regard, the law is possibly one of the most prominent examples of the use of an agroecological framework to bring about radical change and for "transforming the model of economic and social affairs".[168] Yet, its strong links between agroecology as a legal framework and as a science may complicate its practical application in light of the still evolving nature of the discipline.[169] Similarly, the principles of Brazil's 'National Plan for Agroecology and Organic Production echo the very broad aspirations of the agroecological movement, like the promotion of nutritional sovereignty and fair and sustainable systems of production.[170] Yet, the Plan primarily aims to provide a platform for the coordination of policies and actions rather than a legally enforceable standard against which laws and policies on food can be assessed.

Some examples of the piecemeal uptake of agroecology in law also exist closer to home. For example, Switzerland's Law on Agriculture for the Canton of Vaud places on the State the duty to promote sustainable agriculture.[171] Yet, rather than embracing agroecology as a holistic framework to achieve such an aim, it simply identifies a large number of technical instruments under the title of agroecology, including financial assistance through agri-environmental schemes,[172] public loans for sustainable investments,[173] networks of ecological compensation areas,[174] compensation for uninsurable risks,[175] training awards,[176] and financial assistance to

[163] *Ley Orgánica De Agrobiodiversidad, Semillas Y Fomento De La Agricultura Sustentable (Organic Law on Agrobiodiversity, Seeds and Promotion of Sustainable Agriculture)* (Euador, 2017), Article 48.
[164] Ibid, Article 4.
[165] *Ley de Salud Agrícola Integral (Comprehensive Agricultural Health Law)* (Bolivia, 2008), Article 1 and 48; see also M Monteduro, 'From Agroecology and Law to Agroecological Law? Exploring Integration Between Scientia Ruris and Scientia Iuris' in M Monteduro et al (eds), *Law and Agroecology A Transdisciplinary Dialogue* (SpringerLink 2015), p 69.
[166] *Ley de Salud Agrícola Integral (Comprehensive Agricultural Health Law)*, Explanatory Memorandum, p 13.
[167] Ibid, p 13.
[168] C Kjeldsen and H F Alroe, 'How to measure and regulate localness?' (Joint Organic Congress, Odense (Denmark), 2006)Article 49.
[169] Chapter 2, §2.4.
[170] *National Plan for Agroecology and Organic Production* (Federal Government of Brazil, 2013).
[171] *Loi sur l'Agriculture Vaudoise (Vaud Agriculture Law)* (Vaus, Switzerland, 2010).
[172] Ibid, Article 58.
[173] Ibid, Articles 61-63.
[174] Ibid, Articles 64-65.
[175] Ibid, Article 72.
[176] Ibid, Article 77.

peasant farmers.[177] The absence of principles of agroecology and the fact that the law explicitly singles out conservation and organic farming under this heading,[178] mean that it does not provide a strong inspirational basis for the development of an EU framework on agroecology. In Scotland, the Climate Change (Scotland) Act 2019 demands for Ministers to draft a climate change plan which sets out proposals and policies regarding the reduction of Scottish whole farm greenhouse gas emissions through, among others, agroecology, which is understood as "a whole farm approach to land and resource management which integrates the production of food with restoration and maintenance of the natural environment and other social benefits".[179] Yet, agroecology found little recognition in government initiated work to identify ways forward for agriculture and climate, which took a much more segregated and industry-led approach.[180]

More significant– and coming from within the EU's boundaries – is France's very detailed Law of the Future for Agriculture, Food and Forestry.[181] The law provides a strategy for reform of a broad range of agricultural, environmental, health and administrative legislation, based upon 17 objectives.[182] Although the law itself does not yet recognise agroecology as a single frame, it followed directly from French decision-makers' plea for an agroecological transition,[183] and agroecological principles are implicit in many of the listed goals. In particular, the law explicitly provides that public policies and reform should aim to "promote and sustain agro-ecological production systems, including organic production, which combine economic and social performance, in particular through a high level of social, environmental and health protection".[184] However, it puts agroecology forward as the solution for a particular understanding of the problem of agriculture and food production in the EU; one that – in addition to global warming, the depletion of natural resources and food safety – emphasises population growth and the economic value of the agri-food sector.[185] As a result, the law attempts to reconcile two competing primary objectives of fostering "competitiveness and ecological transition, in a context international competition".[186] In fact, this interpretation of agroecology has been held to reflect such competing world views – or paradigms – that they risk irreconcilable policy conflicts,[187] thereby risking continuation of a model that prioritises

[177] Ibid, Article 74.
[178] Ibid, Articles 59-60.
[179] *Climate Change (Scotland) Act* (Scotland, 2019), Section 35(14).
[180] D Long, 'Where is the future for Scotland's food and farming sectors?' *Scottish Environment LINK* (11 June 2021) <https://www.scotlink.org/where-is-the-future-for-scotlands-food-and-farming-sectors/> accessed May 2022.
[181] *Loi d'Avenir pour l'Agriculture, l'Alimentation et la Forêt (Law of the Future for Agriculture, Food and Forestry)* (France, 2014).
[182] Ibid, Article 1.I.
[183] R A Gonzalez et al, 'Translating Agroecology into Policy: The Case of France and the United Kingdom' (*Sustainability* 2018) <https://www.mdpi.com/2071-1050/10/8/2930> accessed May 2022, p 7.
[184] *Loi d'Avenir pour l'Agriculture, l'Alimentation et la Forêt (Law of the Future for Agriculture, Food and Forestry)*, Article 1.II, original text: "Les politiques publiques visent à promouvoir et à pérenniser les systèmes de production agroécologiques, dont le mode de production biologique, qui combinent performance économique, sociale, notamment à travers un haut niveau de protection sociale, environnementale et sanitaire." See also Article 1.IV.
[185] Gonzalez et al 2018, p 8.
[186] *Loi d'Avenir pour l'Agriculture, l'Alimentation et la Forêt (Law of the Future for Agriculture, Food and Forestry)*, Article 1.I and Confédération Paysanne 2015.
[187] Gonzalez et al 2018.

productivity economic development. Indeed, the French government has held that the 'agroecological *transformation*' would not, in fact, require disruptive change.[188] As a result, the law supports a very wide range of practices "that should somehow be made to co-exist in a spectrum ranging from organic farming to conventional farming".[189] And its emphasis on the development "of an entire green industry like bio-control",[190] and on the need for technological and expert-driven innovation,[191] is doubtfully truly compatible with agroecological principles, as questions have been raised whether the Law leaves enough space "for peasant know-how".[192] Lastly, the Law works within the broader EU framework and only allows France to shape its regulation in fields not pre-empted by EU law, for example, in its discretionary implementation of its Rural Development Policies under Pillar II of the CAP. In this regard, reorientation of the CAP has been found to be a crucial catalyst for agroecology in France.[193]

3.3.4. Legal Scholarship on Agroecology: A Discipline in the Making

Despite the recognition of agroecology's significance for the future of agriculture in Europe and beyond, the EU and its institutions are currently not bound by explicit agroecological rules or principles, and neither is there a comprehensive and easily adaptable frame available which could guide the food regime towards agroecology. There may, however, be an opportunity for comparative legal work to distil commonalities from recent initiatives of agroecological regulatory frameworks in several national jurisdictions, with a view to designing a new EU regulatory frame on agroecology. Yet, it follows from the above, that there are stark differences in the content and level of detail of these instruments. These differences reflect both diversity in national (legislative and agricultural) cultures, as well as the ambiguities regarding the scientific and practical sides of agroecology and its boundaries, which underpin the laws. Furthermore, the national initiatives are all of fairly recent date and are therefore not backed by empirical evidence of successful implementation that could aid the drafting of a new regime.

The gaps and disparities in the legal landscape discussed above, moreover, resonate in the limited engagement of legal scholarship – to inform a drafting exercise – with the subject of agroecology. For example, only five succinct references to agroecology were identified in a combined 58 volumes of legal study in the Journal of Environmental Law and the Review of European, Comparative & International Environmental Law. Similarly, only one analysis of current interactions between law and agroecology in legal journals could be identified, which aptly found that there is "a lack of dialogue between the legal doctrine and the scholars of agroecology".[194] In a first attempt to foster such dialogue and fill a wide gap in environmental and agricultural legal scholarship the same author published an edited book called *Law and*

[188] Ibid, p 9.
[189] P Crosskey, *Conversion to agroecology. France's hopes for environmental salvation* (ARC 2020, 2016), p 25.
[190] S L Foll, 'Agroecology: A Different Approach to Agriculture' *Huffington Post* (18 September 2014) <http://www.huffingtonpost.com/stephane-le-foll/post_8359_b_5844088.html> accessed May 2022
[191] Gonzalez et al 2018, p 10.
[192] Crosskey 2016, p 24.
[193] D Bartz et al, *Agriculture Atlas. Facts and figures on EU farming policy* (Heinrich Böll Foundation, Friends of the Earth Europe and BirdLife Europe & Central Asia, 2019), pp 56-57.
[194] Monteduro 2013; see also Gallardo-López et al 2018, p 1215.

Agroecology - A Transdisciplinary Dialogue in 2015.[195] It can be understood from these publications that English legal scholarship on agroecology can be divided into three categories, with the majority of publications seeking to interpret current legal practices as agroecological retrospectively and, more limitedly, others that analyse the existing available examples in national laws and those that seek to develop a new legal framework of agroecological principles. Whereas thorough comparisons of examples of national laws are lacking,[196] the absence of clear legal (or even scientific) agroecological principles to guide scholarship that seeks to identify and shape 'agroecological law' is evident in the stark differences in interpretations of this new discipline's content. For example, whereas it follows from the above that socio-political scholarship has been more suspicious of the overall agroecological value of current CAP reforms, some legal scholars have identified specific measures as being potentially agroecological, due to their perceived value for environmental protection or due to their multifunctional approach.[197] Also, and similarly to some of the examples in national laws, legal scholars have been less likely than interdisciplinary scholars to make distinctions between organic and agroecological farming, basing their similarity on their potential value for the environmental, without regard for agroecology's specific ecological and social principles.[198]

More generally, it could be said that most legal scholarship has interpreted the visible enhancement of relations between agricultural law and environmental law through, for example, environmental integration, as being 'agroecological' *per se*. This thesis, however, argues that effective fostering of connections and cohesion to create a regulatory environment in support of agroecological system change requires more substantial rethinking of the normative ideas, principles and corresponding governance structures that underpin the legal regime on food, regardless of whether specific regulations within such a regime can be qualified as 'agricultural' or 'environmental'. To the extent that scholars partially share such a vision, they are yet to engage in substantive dialogue on the shape and content of such a frame – whether implemented at EU, international, or national level. Some scholars have argued in this regard that agroecological regulation should only be understood as an institutionalised, "second-order platform to obtain a polyocular view" to inform sustainable regulation of agroecosystems – without putting forward clearly defined principles to guide action.[199] Similarly, others have called for "a bottom-up and progressive trans-law" that is made up of different coordination tools such as those for agroecological zoning, agroecological planning

[195] M Monteduro et al, *Law and Agroecology. A Transdisciplinary Dialogue* (SpringerLink 2015).
[196] See, for example, on the recent initiatives in France: C Hermon, 'The Relationship Between Agricultural Law and Environmental Law in France' in M Monteduro et al (eds), *Law and Agroecology A Transdisciplinary Dialogue* (SpringerLink 2015). See also Monteduro 2015, p 66.
[197] See, for example the contribution by Jack 2015, who discusses the 'ecosystem services' value of the CAP Pillar I reforms (without drawing clear analogies with the conceptual framework of agroecology). Also, Buia and Antonucci 2015 on the agroecological value of the Rural Development Programme. On both CAP pillars see also A Isoni, 'The Common Agriculture Policy (CAP): Achievements and Future Prospects' in M Monteduro et al (eds), *Law and Agroecology A Transdisciplinary Dialogue* (SpringerLink 2015), p 203, which deduces its agroecological value from as it increasingly acts as 'a source of common goods'.
[198] See, for example, Buia and Antonucci 2015, Hermon 2015 and M G D Molina, 'Agroecology and Politics: On the Importance of Public Policies in Europe' in M Monteduro et al (eds), *Law and Agroecology A Transdisciplinary Dialogue* (SpringerLink 2015); on the differences between organic and agroecological production, see hereafter Chapter 5.
[199] Noe and Alrøe 2015, p 42-43.

and agroecological impact assessment that together should lead to management decisions that are most respectful of the "characteristics of each agroecological zone".[200] Some international scholars, lastly and perhaps most relevantly, have interpreted agroecological law to provide a set of "formal obligations on states to pursue agro-ecological reforms" based upon principles that focus on integration and cooperation, a transition to a new form of agriculture and on meeting "special structural challenges" including climate change and population issues.[201]

These examples, as well as the examples from national laws, illustrate that the development of a conceptual legal framework on agroecology on an EU or international level is far from straightforward. A process of supranational or intergovernmental law-making in a field that is both scientifically and legally ambiguous and conflicted is likely to be subject to lengthy debate and compromise. This not only calls into question whether such a process would be equipped to address the urgent problems that have arisen from the widescale, and growing adoption of industrial practices described in Chapter 2, but such a process may also curtail evolution of science if legal requirements are drafted restrictively. Or, contrarily, agroecology may lose its significance and added value if the law is too permissive in its recognition of agricultural practices. Considering this all, the question is if, in absence of agroecological legal principles, there are already tools and approaches available that, if implemented correctly and extensively, could fulfil the guidance role that is needed to aid regulatory reform in support of agroecology.

3.4 Filling the Void: Ecology in Law and the CBD's Ecosystem Approach

An evolution that is often only indirectly referenced in legal scholarship on agroecology, is the increased recognition in (international) law of "the powerful, but uncertain status of ecosystems",[202] which goes beyond the sphere of agriculture only. The uncertainties and gaps in the legal protection of ecosystems in international law, which are also evident on EU and national level, can be attributed to the fact that the ecosystem concept calls into question the accuracy and effectiveness of legal dogmas and associated methods for environmental protection in law. This includes the fact that ecosystem protection is only to a lesser extent concerned with protection against immediate harm – as is often the objective of environmental regulations – and more with long term system functioning, the fact that ecosystem protection requires cooperation and coordination across jurisdictions and legal regimes, and the fact that ecology as a science and the understanding of ecosystems is still evolving and thus requires legal flexibility and adaptation.[203] It has been acknowledged that an ecological understanding of law that captures complex relationships, through a bottom-up, community-based approach, is a necessary, but drastic change from the current 'mechanistic' legal vision that is based on

[200] Monteduro 2015, pp. 78-79.
[201] J W Head, 'International law, agro-ecological integrity, and sovereignty - proposals for reform' (2016) 63 The Federal Lawyer 56.
[202] D Tarlock, 'Ecosystems' in D Bodansky et al (eds), *The Oxford Handbook of International Environmental Law* (Oxford University Press 2008), p 575.
[203] Similarly, ibid, p 577; see on uncertainty in the context of ecosystem functioning (and the impacts of activities on ecosystem functioning and resilience) also notably O Woolley, *Ecological Governance. Reappraising Law's Role in Protecting Ecosystem Functionality* (Cambridge University Press 2014), par 3.2.

state hierarchy and "economic-induced individualism".[204] Clear analogies can be drawn between the progression of ecosystem thinking in law and the evolution of agroecology as notably a scientific discipline, as discussed in Chapter 2, and the way it has challenged the short term focus of industrial agriculture, the compartmentalisation of scientific disciplines and the one-size fits all (and forever more) assumptions of agronomy and its application in practice, which resonate in the current legal regimes that impact on agroecosystem management.[205] In fact, it is the radical change embodied by ecosystem-thinking in other areas of law, which could provide the building blocks needed to foster the fundamental shift towards agroecology in law.

Despite the institutional, practical, and legal hurdles that continue to impede the effective management of ecosystems, the legal domain has increasingly acknowledged the need for frameworks and rules to support integrated ecosystem management. After a brief overview of ecosystem centrality in legal thinking, this Chapter focuses on the conceptual framework of the ecosystem approach that has been developed under the CBD. Synergies will be drawn between the CBD's ecosystem approach and, notably, its elements of integration, the conservation (and prioritisation) of ecosystem functioning and resilience and equity, as well as agroecology's social and ecological aspects that have been analysed in Chapter 2. This Chapter finds that the effective implementation of the ecosystem approach and its principles in the EU's regulatory regime on the production of food could help reform EU law in an agroecology direction.

3.4.1. The Increasing Centrality of Ecosystems in International and EU Law

An 'ecosystemic legal regime' has been interpreted as a cluster of rules and roles which, among others, originate out of concerns for human intervention in the functioning of ecosystems, define their objectives in terms of the maintenance and/or restoration of these functions and – in accordance with Hall's analysis of the necessary conditions for a paradigm shift –would rest upon "a public culture of awareness".[206] Examples of the growing centrality of the ecosystem can be found across various environmental legal regimes, on international, national and regional levels.[207] Its presence is possibly most prominent and well-studied regarding topics within the broader water realm,[208] including the marine environment, watercourses and waterbodies, fisheries and wetlands. For example, the Ramsar Convention on Wetlands considers "the fundamental ecological functions of wetlands",[209] the FAO's Voluntary

[204] F Capra and U Mattei, *The Ecology of Law: Toward a Legal System in Tune with Nature and Community* (Berrett-Koehler Publishers 2015), Chapter 8.
[205] See also above §3.2.
[206] R O Brooks et al, *Law and Ecology: The Rise of the Ecosystem Regime* (Ashgate 2002), p 3.
[207] On other EU regulatory initiatives see also: S E Apitz et al, 'European environmental management: Moving to an ecosystem approach' (2006) 2 Integrated Environmental Assessment and Management 80.
[208] See on an ecosystem-based approach in the context of water, for example, J Brunnee and S J Toope, 'Environmental Security and Freshwater Resources: A Case for International Ecosystem Law' (1995) 5 Yearbook of International Environmental Law 41; O Mcintyre, 'The Emergence of an 'Ecosystem Approach' to the Protection of International Watercourses under International Law' (2004) 13 Review of European Community & International Environmental Law 1 and D Diz Pereira Pinto, *Fisheries Management in Areas beyond National Jurisdiction. The Impact of Ecosystem Based Lawmaking* (Martinus Nijhoff 2012).
[209] Convention on Wetlands of International Importance Especially as Waterfowl Habitat (adopted 2 February 1971, entered into force 21 December 1975) 996 UNTS 245 ('Ramsar Convention on Wetlands'), Preamble; the ecosystem concept is also implicit in the notion of the "wise use of wetlands", for example, Article 3(1). See also,

Guidelines for Securing Sustainable Small-Scale Fisheries recognises "the ecosystem approach to fisheries (EAF) as an important guiding principle",[210] and the OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic obliges parties to "take all possible steps to prevent and eliminate pollution […] so as to safeguard human health and to conserve marine ecosystems".[211] Within the EU, the Water Framework Directive seeks to prevent "further deterioration and protects and enhances the status of aquatic ecosystems"[212] and, lastly, the Marine Strategy Framework Directive applies "an ecosystem-based approach to the management of human activities, ensuring that the collective pressure of such activities is kept within levels compatible with the achievement of good environmental status and that the capacity of marine ecosystems to respond to human-induced changes is not compromised, while enabling the sustainable use of marine goods and services by present and future generations".[213] Indeed, within the water context, an integrated, holistic approach that focuses around the concept of the ecosystem has provided recognition and some solutions for issues of fragmentation of governance structures and the reconciliation of competing economic, social and environmental objectives.[214] Additionally, examples of ecosystem centrality are also present in law and policy on climate adaptation, Antarctica and biodiversity protection.[215] In relation to the latter, the EU Biodiversity Strategy for 2030 has, crucially, placed the need for regulatory action on agriculture in an ecological context, citing the need to improve the condition and diversity of agroecosystems, and key ecosystem services such as pollination, nutrient cycling and climate regulation.[216] Yet, despite increased reference to the ecosystem concept in law and policy, it must be kept in mind that often the protection of ecosystem and ecosystem functions is only incidental within these regimes that primarily serve other aims.

Moreover, a complicating factor that inhibits the distilling of principles to inform and guide legal action for ecosystem-based management is the fact that the many institutions that govern relevant instruments have interpreted such an 'ecosystem-based approach' in their own way.[217]

C M Finlayson et al, 'The Ramsar Convention and Ecosystem-Based Approaches to the Wise Use and Sustainable Development of Wetlands' (2011) 14 Journal of International Wildlife Law & Policy 176.

[210] *Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication* (FAO, 2015a), p 3.

[211] Article 2(1)(a) Convention for the Protection of the Marine Environment of the North-East Atlantic (adopted 22 September 1992, entered into force 25 March 1998) 2354 UNTS 67 ('OSPAR Convention').

[212] Article 1(a) Directive (EC) 2000/60 establishing a framework for Community action in the field of water policy [2000] OJ L 327/1; also Á Borja et al, 'Marine management – Towards an integrated implementation of the European Marine Strategy Framework and the Water Framework Directives' (2010) 60 Marine Pollution Bulletin 2175.

[213] Article 1(3) Directive 2008/56/EC establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive) [2008] OJ L 164/19.

[214] See, for example, in the context of the Marine Strategy Framework Directive: "The legislative framework should provide an overall framework for action and enable the action taken to be coordinated, consistent and properly integrated with action under other Community legislation and international agreements" (preamble 9). See also above on the notion of 'good environmental status' as the Directive's ultimate goal (also Annex I).

[215] See on these examples V De Lucia, 'Competing Narratives and Complex Genealogies: The Ecosystem Approach in International Environmental Law' (2015) 27 Journal of Environmental Law 91.

[216] COM/2020/380 final, paras 2.2.2.-2.2.3.

[217] F M Platjouw, *Environmental Law and the Ecosystem Approach: Maintaining ecological integrity through consistency in law* (Routledge 2016), par 2.1.1; K A Waylen et al, 'The need to disentangle key concepts from ecosystem-approach jargon' (2014) 28 Conservation Biology 1215; A Trouwborst, 'The Precautionary Principle and the Ecosystem Approach in International Law: Differences, Similarities and Linkages' (2009) 18 Review of

Although it is important to keep the broader context of ecosystem-oriented legislative developments in mind, for the purpose of this thesis an 'ecosystem approach' will be understood as the framework that has been developed under the international Convention on Biological Diversity (CBD).[218] This is not merely motivated by its comprehensiveness and the level of detail of the CBD's ecosystem approach,[219] but also the fact that as Parties to the Convention the EU and its Member States are bound by its provisions and instructed by the decisions adopted thereunder. More importantly, as the CBD acknowledges biodiversity – meaning ecosystems, species, and genetic resources - as a "common concern of humankind",[220] its scope already stretches beyond international law's traditional focus on transboundary impacts to include aspects that could otherwise be seen as internal matters. Furthermore, agriculture has been explicitly recognised as a sector of relevance for the integration of the ecosystem approach,[221] in particular, in relation to the CBD Initiative on the Conservation and Sustainable Use of Pollinators.[222] Lastly, international support for the CBD's understanding of the ecosystem approach does not only follow from the adoption by consensus by 176 states of all relevant decisions,[223] but the approach has also been referenced in the context of other regimes.[224] Notably, it has been mentioned in FAO's agricultural work,[225] and the relevance of the CBD's approach was highlighted in FAO's publication on the Elements of Agroecology.[226]

3.4.2. Unravelling the Ecosystem Approach under the CBD

The ecosystem approach under the CBD, as a "fully fledged system of soft-law principles and guidelines",[227] has been held to have been built upon the foundations provided by Article 2 of the CBD, which defines an ecosystem as "a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit". The

European Community & International Environmental Law 26, who does distinguish three core elements (p. 28): (1) the holistic management of human activities, (2) based on the best available knowledge on the components, structure and dynamics of ecosystems, (3) and aimed at satisfying human needs in a way that does not compromise the integrity, or health, of ecosystems.

[218] Settle 2002.

[219] About which also Waylen et al 2014.

[220] Preamble CBD.

[221] Conference of the Parties to the CBD, 'Decision V/6. Ecosystem approach' (2000) UNEP/CBD/COP/DEC/V/6 (CBD Decision V/6), Operational guidance for application of the ecosystem approach Point 5; see also Conference of the Parties to the CBD, 'Decision VII/11. Ecosystem approach' (2004) UNEP/CBD/COP/DEC/VII/11 (CBD Decision V/6), Annex II and Conference of the Parties to the CBD, 'The ecosystem approach: towards its application to agricultural biodiversity. Note by the Executive Secretary' (2000) UNEP/CBD/COP/5/INF/11. See on the interactions between the CBD and agroecology also above §3.3.2.

[222] CBD/COP/DEC/VI/5, Annex II.

[223] Consensus was based on the number of Parties in May 2000. The CBD currently has 196 Parties.

[224] Conference of the Parties to the Ramsar Convention, 'A Conceptual Framework for The Wise Use Of Wetlands And The Maintenance Of Their Ecological Character' (2005) Res. IX.1 Annex A; about which Finlayson et al 2011. See also the guidance documents adopted by the International Union for Conservation of Nature: G Shepherd, *The Ecosystem Approach: Five Steps to Implementation* (IUCN, 2008) and the work done by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), Díaz 2019b.

[225] See, for example, W Settle, 'Ecosystem Management in Agriculture: Principles and Application of the Ecosystem Approach' (*FAO*, N.D.) <http://www.fao.org/docrep/005/Y4586E/y4586e12.htm> accessed May 2022 and P Koohafkan and M Altieri, *A methodological framework for the dynamic conservation of agricultural heritage systems* (FAO, 2011).

[226] FAO 2018b.

[227] E Morgera, 'The Ecosystem Approach and the Precautionary Principle' in E Morgera and J Razzaque (eds), *Encyclopaedia of Environmental Law: Biodiversity and Nature Protection* (Edward Elgar 2017), p 71.

CBD's 'ecosystem approach' has been recognised as the primary framework of action to be taken under the Convention and for the implementation of the three objectives of the Convention:[228] the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources.[229] These objectives "should be addressed in a holistic manner, taking into account the three levels of biological diversity and fully considering socio-economic and cultural factors".[230] At the core of the ecosystem approach are a set of 12 complementary and interlinked principles known as the Malawi Principles, which were endorsed by the Conference of the Parties to the CBD in 2000 and which together provide for "a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way".[231] Continuous support of the international community for the CBD's eco-centric approach to biodiversity protection can, moreover, be derived from the strong focus of subsequent decisions of the Conference of the Parties to the CBD on the ecosystem, notably, the Strategic Plan for Biodiversity 2011-2020, which aims to promote effective implementation of the CBD, and the Aichi Biodiversity Targets adopted thereunder.[232] The latter, among others, sought to "improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity" and "enhance the benefits to all from biodiversity and ecosystem services".[233]

Although scholarship on the CBD's ecosystem approach and the Malawi Principles is limited,[234] the framework has been recognised for its ambitious character, its growing influence in different areas of law, the way it seeks to combine objectives of sustainability and equity, and how it has "connected the newest ideas about how to manage ecological processes to ideas about the need to involve people and different forms of knowledge in management".[235] Synergies have also been drawn between the CBD's ecosystem approach, as based on the CBD's three inter-linked objectives, and the economic, environmental and social pillars of sustainable development,[236] with the added advantage, as discussed hereafter, that the CBD's approach prioritises protection of ecosystem functioning and resilience,[237] thereby making the implementation of the framework less vulnerable to political pressures that would favour short-

[228] Conference of the Parties to the CBD, 'Decision II/8. Preliminary Consideration of Components of Biological Diversity Particularly Under Threat And Action Which Could Be Taken Under The Convention' (1995) UNEP/CBD/COP/II/8 (CBD Decision II/8), par 1. See also, Morgera 2017, p 71; Platjouw 2016, par 2.1.2.
[229] Art. 1 CBD.
[230] UNEP/CBD/COP/II/8, par 1.
[231]UNEP/CBD/COP/DEC/V/6, par 1.
[232] Conference of the Parties to the CBD, 'Decision X/2. Strategic Plan for Biodiversity 2011-2020' (2010) UNEP/CBD/COP/DEC/X/2 (CBD Decision X/2).
[233] Ibid, Annex, Aichi Targets Strategic Goals C and D.
[234] See in this regard also Waylen et al 2014 and Morgera 2017.
[235] Waylen et al 2014, p 1218; also Morgera 2017, V Hartje et al, *The International Debate on the Ecosystem Approach* (Bundesamt für Naturschutz, 2003), p 12 and Platjouw 2016, par 2.1.3.
[236] D A Laffoley et al, *The Ecosystem Approach. Coherent actions for marine and coastal environments. A report to the UK Government.* (English Nature, 2004); Platjouw 2016, par 2.1.2.
[237] Hereafter §3.4.4 and also G Winter, 'A Fundament and Two Pillars. The Concept of Sustainable Development 20 Years after the Brundtland Report' in H C Bugge and C Voigt (eds), *Sustainable Development in International and National Law* (Europa Law Publishing 2008), p 28, who finds that the concept of sustainable development loses its value if its environmental/natural resources aspect is not recognised as a fundament which protection should be prioritised. For a different interpretation of the ecosystem approach: Platjouw 2016, par 2.1.3.

term strategies for economic growth.[238] However, the approach's far-reaching and all-inclusive nature has also made it subject to criticism as it has been held that the principles as originally formulated were "vaguely worded, poorly structured and overlapping",[239] and fail to explain how its conflicting and contested 'anthropocentric' and 'eco-centric' aims and perspectives can be made compatible and operational.[240] The question remains, also considering continuous efforts for clarification and refinement of the Malawi Principles, [241] whether the ecosystem approach as developed under the CBD is capable of supporting transitions towards agroecology in law, when implemented effectively in the EU's regime on food production and agriculture.

In order for the CBD's ecosystem approach to be able to provide a framework for the redirection and reform of EU legislation on food and agriculture, its principles and underlying objectives must support agroecology's ecological foundations and its human and social aspects. Considering the nature and evolution of agroecology, this also means that the approach and its implementation must be able to find a balance between a level of prescriptiveness that respect agroecology's adaptive needs, and the need to provide enough detail to prevent agroecological 'greenwashing' of harmful industrial practices. Drawing upon Morgera's useful unpacking of the CBD's ecosystem approach to distil three main elements of 'integration', 'conservation' and 'equity',[242] the next paragraph analyses how these interlinked elements and principles relate to the ecological and social aspects of agroecology as discussed before in Chapter 2.[243]

3.4.3. The Ecosystem Approach: Integration

As "a strategy for the integrated management of land, water, and living resources that promotes conservation and sustainable use in an equitable way",[244] the concept of 'integration' is naturally at the very heart of the ecosystem approach. Although both are in essence an acknowledgement of ecosystem complexity, two dimensions of integration could be distinguished: the recognition of inter-relations between environmental components and the recognition of inter-relations between environmental and human elements. Regarding the former, the ecosystem approach has been interpreted as a paradigm shift from traditional resource management that sees "in nature a collection of resources that deliver economic goods and services that can be manipulated and harvested with humans in control"[245] towards acknowledgement of the "dynamics of ecosystems and their complexity with which its components are interwoven".[246] Whereas industrial agriculture has relied on these ideas of traditional resource management to justify its focus on enhancing productivity by means of manipulation of different natural aspects without consideration of the broader implications, the

[238] See regarding these issues surrounding the concept of sustainable development in the EU also Winter 2008.
[239] Conference of the Parties to the CBD, 'Review of the Principles of the Ecosystem Approach and Suggestions for Refinement: A Framework for Discussion. Note by the Executive Secretary' (2003) UNEP/CBD/EM-EA/1/3.
[240] Hartje, Klaphake and Schliep 2003, p 12; see also De Lucia 2015.
[241] See in this regard notably UNEP/CBD/COP/DEC/VII/11.
[242] Morgera 2017.
[243] Chapter 2, §2.5.
[244] UNEP/CBD/COP/DEC/V/6, par 1.
[245] Hartje, Klaphake and Schliep 2003, p 12.
[246] Ibid, p 12; see also UNEP/CBD/COP/DEC/V/6, Operational Guidance Point 1; UNEP/CBD/COP/DEC/VII/11, Annex I, Annotations to the rationale of Principle 5 of the Ecosystem Approach.

ecosystem approach paradigm finds strong resonance in agroecology's focus on natural cycles and synergies between different ecosystem components.[247] The ecosystem approach does not only recognise the interconnectedness between different natural elements within the ecosystem and the importance of integrated management in this regard, but also the connectedness between ecosystems and the fact that the frequently non-linear and time-lagged "effects of management interventions, or decisions not to intervene, are not confined solely to the point of impact".[248] Agroecology's shift in focus to dynamics beyond the single farm plot is supported by the ecosystem approach's acknowledgement of the need for management at more than one scale to meet management objectives.[249] In other words, despite human inclinations to divide nature into clearly defined and often literally 'fenced off' compartments, an agroecological and an ecosystem approach to management are both based upon and shaped by "the hierarchical nature of biological diversity characterised by the interaction and integration of genes, species and ecosystems".[250] Yet, the ecosystem approach's acceptance of the importance of connections is not limited to natural elements only, but includes recognition of the 'human factor' in systems.[251] Moving beyond a narrow focus of what was known as ecosystem-based management,[252] the ecosystem approach recognises the economic and social context within which management decisions are made and the fact that such decisions are effectively "a matter of societal choice".[253] In this sense, the approach may strengthen evolutions in agroecology towards an 'ecology of food systems' that emphasises anthropogenic factors and influence.[254]

There are substantial and procedural aspects to questions of reform of legal regimes that have the potential to inhibit or support such integrated management. Firstly, interconnectedness must be reflected in the legal structures that govern (agro)ecosystems, thus addressing fragmentation between (e.g., agricultural and environmental) laws and within legal domains (e.g., moving from species-level to ecosystem-level protection in environmental law).[255] Secondly, inter-sectoral communication, coordination and cooperation will need to be fostered through the greater involvement of all relevant stakeholders.[256] The ecosystem approach recognises the complexity of the management of biological diversity, such as agroecosystems, and calls for the involvement of all relevant sectors of society and scientific disciplines, at the local, national, regional and international level, as appropriate.[257] Within the agricultural context, a holistic approach to the management of agroecosystems may not only involve

[247] See Chapter 2, §2.2.
[248] UNEP/CBD/COP/DEC/VII/11, Annex I, Annotations to the rationale of Principle 3 of the Ecosystem Approach; see also ibid, Annex 1, Rationale of Principle 7 of the Ecosystem Approach, which holds that "Connectivity between areas should be promoted where necessary".
[249] Ibid, Annex 1, Annotations to the rationale of Principle 7 of the Ecosystem Approach.
[250] UNEP/CBD/COP/DEC/V/6, Principle 7 of the Ecosystem Approach.
[251] See, for example, ibid, Principle 1 and 4 and UNEP/CBD/COP/DEC/VII/11, Annex I, Annotations to the rationale of Principle 2, and Annotations to the rationale of Principle 7 of the Ecosystem Approach.
[252] Waylen et al 2014, p 1216.
[253] UNEP/CBD/COP/DEC/VII/11, Annex I, Principle 1 of the Ecosystem Approach.
[254] See Chapter 2, §2.5.1.
[255] The former is the main focus of legal literature on agroecology, see above §3.3.4 and notably Monteduro et al 2015. Regarding the latter: Hartje, Klaphake and Schliep 2003, p 12.
[256] UNEP/CBD/COP/DEC/V/6, Operational Guidance Point 5; UNEP/CBD/COP/DEC/VII/11, Annex I, Annotation to the rationale of Principle 1; also Platjouw 2016, par 2.1.5.
[257] UNEP/CBD/COP/DEC/VII/11, Annex I, Principle 12 of the Ecosystem Approach.

farmers (and farmers' unions), agribusiness, agronomists, representatives from the food and drink industry and agricultural ministries, but should involve local communities, local and regional governments, representatives from the forestry sector, water bodies, research institutions, environmental NGOs, natural heritage and consumer protection, the ministry of the environment and the ministry of trade, etcetera. Building an integrated approach on a governance landscape that is – and will likely remain to be – characterised by sectoralisation will not be straightforward and the opportunities for and limits of cooperation, coordination, and public participation in the context of the EU legal regime will be discussed hereafter.[258] A crucial factor, as the case studies hereafter will show, is the integration of different sources of knowledge, notably the meaningful recognition of local and traditional knowledge of farmers.

However, integration by itself, as is evident from the examples from EU law that have sought to integrate environmental considerations into notably EU agricultural law,[259] is insufficient to establish sustainable, agroecological management of ecosystems. Integration, interpreted as the making of linkages between and within regimes, the insertion of considerations or the mainstreaming of aspects that had previously not been considered within (sectoral) legal regimes,[260] raises questions of hierarchy, of the appropriate balance, and of the resolution of conflict when dealing with competing objectives and interests. Therefore, the ecosystem approach's ability to act as "a framework for holistic decision making and action",[261] lies in its prioritisation of conservation to ensure ecosystem functioning and resilience and its emphasis on equity, as the overarching, guiding principles for environmental and social integration.

3.4.4. The Ecosystem Approach: Conservation of Ecosystem Functioning

Integration does not only stretch out to the environmental and social elements within ecosystems, but it also includes the balancing of the three objectives of the CBD regarding conservation, sustainable use, and equitable sharing of benefits from the use of biodiversity. It follows from Principle 5 of the ecosystem approach that in this balancing exercise the "conservation of ecosystem structure and functioning, in order to maintain ecosystem services, should be a priority target".[262] This hierarchy seems to be rightly grounded in the fact that sustainable use and management are ultimately dependent on the successful achievement of conservation objectives.[263] Within the agricultural context, the Aichi targets also highlighted that ensuring conservation of biodiversity was crucial to achieving sustainable agricultural management by 2020.[264] The critical nature of ecosystem functioning has been explained in

[258] Part II.
[259] Above §3.2.2 and Article 11 TFEU.
[260] Above §3.2.2 Also, CBD/COP/DEC/XIII/3.
[261] R D Smith and E Maltby, *Using the Ecosystem Approach to Implement the CBD. A global synthesis report drawing lessons from three regional pathfinder workshops* (CBD, 2001), p 7.
[262] UNEP/CBD/COP/DEC/V/6, Principle 5 of the Ecosystem Approach; see also UNEP/CBD/COP/DEC/V/6, Operational Guidance Point 1; Morgera 2017, p 72. Note, however, that this prioritisation is not uncontested and that other authors have held that equal priority should be given to each objective: Hartje, Klaphake and Schliep 2003, p 12 and Platjouw 2016, §2.1.3.
[263] See in this regard also UNEP/CBD/COP/DEC/VII/11, Annotation to the rationale of Principle 10 of the Ecosystem Approach.
[264] UNEP/CBD/COP/DEC/X/2, Annex, Aichi Target 7.

terms of the 'life-supporting' functions and 'well-being' functions of ecosystem dynamics.[265] In other words, ecosystem functioning is essential for both the very existence of life, including human life, and for the quality of life. Prioritisation of conservation must therefore be understood as the prioritisation of conservation and restoration of ecosystem functioning and resilience, including the "dynamic relationship within species, among species and between species and their abiotic environment, as well as the physical and chemical interactions within the environment",[266] which at least means that "ecosystems must be managed within the limits of their functioning".[267] Human demands should only be placed on the ecosystem in so far the integrity of natural processes and the ecosystem's capacity to continue providing vital functions are maintained.[268] Not unimportantly, and in recognition of "the varying temporal scales and lag-effects that characterise ecosystem processes",[269] ecosystem management strategies that seek to prioritise conservation as an element of the ecosystem approach, must fully consider the long-term impacts of activities. The industrial model of agriculture's prioritisation and glorification of short-term productivity gains is a clear reflection of "the tendency of humans to favour immediate benefits over future ones".[270] Moreover, the way in which industrial agricultural practices, such as the use of particular chemicals, large-scale machines and plant varieties, have contributed to the erosion of a broad spectrum of functions, such as natural pest control, pollination, soil formation, nutrient cycling, water provision and purification, water and climate regulation and the provision of recreation, aesthetic enjoyment, and spiritual fulfilment,[271] is contrary to an ecosystem approach to ecosystem management and legislation that is supportive of such practices has thus failed to effectively integrate the principles of the ecosystem approach.[272] Contrarily, there is an opportunity to integrate and implement these principles in legal regimes in support of agroecological farm and food systems, as the sustainability of agroecology as a science and set of practices explicitly lies in its support and mimicking of natural processes and the maintenance of ecosystem functioning and resilience, in line with the ecosystem approach's objective of the prioritisation of conservation.

Two points of clarification must, however, be made regarding the ecosystem approach's element of conservation to foster agroecological transitions. The first point concerns the use of 'ecosystem services' terminology. The ecosystem approach emphasises that the conservation of ecosystem structure and functioning contributes to the maintenance of ecosystem services,[273] and, more broadly, the Strategic Plan on Biodiversity 2020 recalled that "biological diversity underpins ecosystem functioning and the provision of ecosystem services essential for human well-being".[274] It is noted that the ecosystem services language has also been prevalent in the

[265] Hartje, Klaphake and Schliep 2003, p 13.
[266] UNEP/CBD/COP/DEC/V/6, Rationale to Principle 5 of the Ecosystem Approach.
[267] Ibid, Principle 6 of the Ecosystem Approach.
[268] UNEP/CBD/COP/DEC/VII/11, Annotations to the rationale of Principle 6 of the Ecosystem Approach.
[269] UNEP/CBD/COP/DEC/V/6, Principle 8 of the Ecosystem Approach and UNEP/CBD/COP/DEC/VII/11, Annotations to the rationale of Principle 8 of the Ecosystem Approach.
[270] UNEP/CBD/COP/DEC/V/6, Rationale to Principle 8 of the Ecosystem Approach.
[271] Chapter 2, §2.4.
[272] See in this regard also UNEP/CBD/COP/DEC/V/6, Principle 4 of the Ecosystem Approach.
[273] See, for example, ibid, Principle 5 of the Ecosystem Approach; UNEP/CBD/COP/DEC/VII/11, Annotations to the rationale of and Implementation Guidelines to Principle 4 of the Ecosystem Approach.
[274] UNEP/CBD/COP/DEC/X/2, par 3 describing 'the Rationale for the Plan'.

EU since the Biodiversity Strategy to 2020, which highlighted, for the first time, "the immense value of ecosystem services and the urgent need to maintain and restore these for the benefit of both nature and society".[275] Ecosystem services have, indeed, been described as "the benefits people obtain from ecosystems by way of resources, environmental regulation including, support of biospheric processes, inputs to culture, and the intrinsic values of the systems themselves".[276] In other words, where ecosystem functions underpin the existence and well-being of all life forms, as discussed above, the ecosystem services narrative places emphasis on the value of those functions for humans in particular.[277] The concept of ecosystem services has increasingly gained recognition to a point where it is often used as being synonymous to the ecosystem approach. This has mainly been attributed to the use of the terminology in the widely credited 'Millennium Ecosystem Assessment' (MEA) on ecosystems and human wellbeing – despite the fact that the assessment itself explicitly recognises that actions that affect ecosystems should not only be informed by concerns of human utility, but also by considerations regarding "the intrinsic value of species and ecosystems".[278] The concept has also given scope for a wide debate on the economic value of ecosystem services for human wellbeing, inspired by the study on The Economics of Ecosystems and Biodiversity (TEEB), a global initiative that aimed to "make nature's values visible".[279] Although ecosystem services have been criticised for their anthropocentric character,[280] the concept may enhance the role of conservation considerations in political debates that are often dominated by socio-economic interests. Concerns regarding the moral acceptability and practical implications of the commodification of natural elements through the attribution of financial value,[281] could, moreover, be overcome through explicit recognition of the intangible, non-monetary values at stake.[282] Although this thesis emphasises that ecosystem services are only one factor for consideration in the implementation of the CBD's ecosystem approach and the objective to prioritise conservation, it does appreciate its potential for debates on the future of agriculture and food systems, which are inherently focussed on human interests. In particular, the narrative

[275] *The EU Biodiversity Strategy to 2020* (European Commission, 2011), p 7.
[276] UNEP/CBD/COP/DEC/VII/11, Annotations to the rationale of Principle 5 of the Ecosystem Approach; see on other interpretations of ecosystem services also E Lugo, 'Ecosystem Services, the Millennium Ecosystem Assessment and the Conceptual Difference Between Benefits Provided by Ecosystems and Benefits Provided by People' (2007) 23 Journal of Land Use & Environmental Law 243.
[277] However, as briefly noted in Chapter 2, §2.4.1, the ecosystem services terminology is still evolving and broader definitions are now being applied, for example, by the Intergovernmental Panel on Biodiversity and Ecosystem Services (although building upon the foundation of the MEA). See, IPBES/5/INF/24 and Pascual et al 2017.
[278] Reid et al 2005, p V; Waylen et al 2014, p 1219. Note, however, that the focus on 'ecosystem goods and services', notably in the context of agriculture, was already visible in the context of the CBD prior to the publication of the MEA. For example, Conference of the Parties to the Convention on Biological Diversity, 'The ecosystem approach: towards its application to agricultural biodiversity. Note by the Executive Secretary.' (2000) UNEP/CBD/COP/5/INF/11; and also Morgera 2017, p 74.
[279] P Sukhdev et al, *Mainstreaming the Economics of Nature: A Synthesis of the Approach, Conclusions and Recommendations of TEEB* (UNEP, 2010), p 25.
[280] K H Redford and W M Adams, 'Payment for Ecosystem Services and the Challenge of Saving Nature' (2009) 23 Conservation Biology 785. Contrarily, M Schröter et al, 'Ecosystem Services as a Contested Concept: A Synthesis of Critique and Counter-Arguments' (2014) 7 Conservation Letters 514.
[281] Hartje, Klaphake and Schliep 2003, p 16. On the potential challenges for lawyers: K Mertens et al, 'Ecosystem Services. What's in it for a Lawyer?' (2012) European Energy and Environmental Law Review 31, p 35.
[282] Morgera 2017, p 75.

may help to better "understand and manage the ecosystem in an economic context" to address market distortions and perverse financial incentives, as well as to internalise public costs.[283]

The second point for clarification regarding the ecosystem approach's objective to conserve ecosystem functioning and resilience concerns the diverse, unpredictable, and uncertain nature of (agro)ecosystems and their underlying natural processes and dynamics. Chapter 2's brief analysis of agroecosystem functioning has highlighted agroecology's recognition of environmental diversity that requires a bottom-up approach to take account of local realities in ecosystem management.[284] Moreover, gaps in agroecological sciences on the working of agroecosystem dynamics and recognition of the fact that such processes, even without human intervention, are subject to change, emphasise the need for adaptation and precaution.[285] Contrarily, industrial practices, to a large degree, proclaim universal applications. Rather than adapting techniques to environmental conditions, such conditions are managed and tweaked with a view to impose uniformity that then allows for the adoption of standardised practices.[286] These universality and uniformity imperatives are often also reflected in law, which may, for the sake of legal clarity and certainty, seek to prescribe in detail how agroecosystems should be managed,[287] and which may rely on scientific knowledge to identify ultimate and singular truths to inform ecosystem management.[288] The ecosystem approach recognises that limits to ecosystem functioning "are not static but may vary across sites, through time, and in relation to past circumstances and events".[289] Thus, "change is inevitable"[290] and ecosystem management should not strive towards fixed outcomes but rather the maintenance of natural processes, which requires flexible and adaptive approaches.[291] Moreover, uncertainties regarding the dynamic and complex nature of ecosystems, demand a precautious management approach.[292] The ecosystem approach acknowledges that management should be informed by all relevant information, including indigenous and local knowledge,[293] highlighting the need for participatory approaches. Furthermore, decentralisation to the lowest appropriate level of

[283] UNEP/CBD/COP/DEC/V/6, Principle 4 of the Ecosystem Approach. See also the explicit reference in the Annotations to the rationale (UNEP/CBD/COP/DEC/VII/11): "perverse incentives and subsidies to favour the conversion of land to less diverse systems" as being particularly relevant to agriculture and notably the CAP. See similarly The Conference of the Parties to the CBD, 'Decision VII/12. Sustainable Use (Article 10) (Addis Ababa Principles)' (2004) UNEP/CBD/COP/DEC/VII/12, Practical Principle 3: "International, national policies, laws and regulations that distort markets which contribute to habitat degradation or otherwise generate perverse incentives that undermine conservation and sustainable use of biodiversity, should be identified and removed or mitigated".
[284] Chapter 2, §2.5.
[285] Head 2017.
[286] In this regard also iPES Food 2016a.
[287] In this regard, hereafter, Chapter 5 on the recent reform of EU organic regulations.
[288] See in this regard, for example, the legal regime on GMO cultivation, which relies on (a very limited understanding) of science that is arguably applicable across all Member States, to inform its assessment of environmental risks, thereby ignoring diversity and uncertainty within and beyond science: Geelhoed 2016 and, hereafter, Chapter 4. See also Hartje, Klaphake and Schliep 2003, p 15.
[289] UNEP/CBD/COP/DEC/VII/11, Annotations to Principle 6 of the Ecosystem Approach.
[290] UNEP/CBD/COP/DEC/V/6, Principle 9 of the Ecosystem Approach.
[291] UNEP/CBD/COP/DEC/VII/11, Annotations to Principle 9 of the Ecosystem Approach.
[292] UNEP/CBD/COP/DEC/V/6, Principles 6 and 9 of the Ecosystem Approach. See also UNEP/CBD/COP/DEC/VII/11, Annotations to the rationale of Principle 6 of the Ecosystem Approach; Morgera 2017, p 75 and, more generally, Tarlock 2008, p 581.
[293] UNEP/CBD/COP/DEC/V/6, Principle 11 of the Ecosystem Approach.

management, bringing decision-making and governance structures closer to the physical realities of the ecosystem, is seen as an important way to achieve adaptive management.[294] Nonetheless, and although much of the research on the ecosystem approach is indeed focused on its implementation at local levels,[295] this approach also acknowledges that appropriate and effective decentralisation requires an enabling environment,[296] which includes supportive, overarching legal and policy frameworks, e.g., at EU level, which is the focus of this thesis.

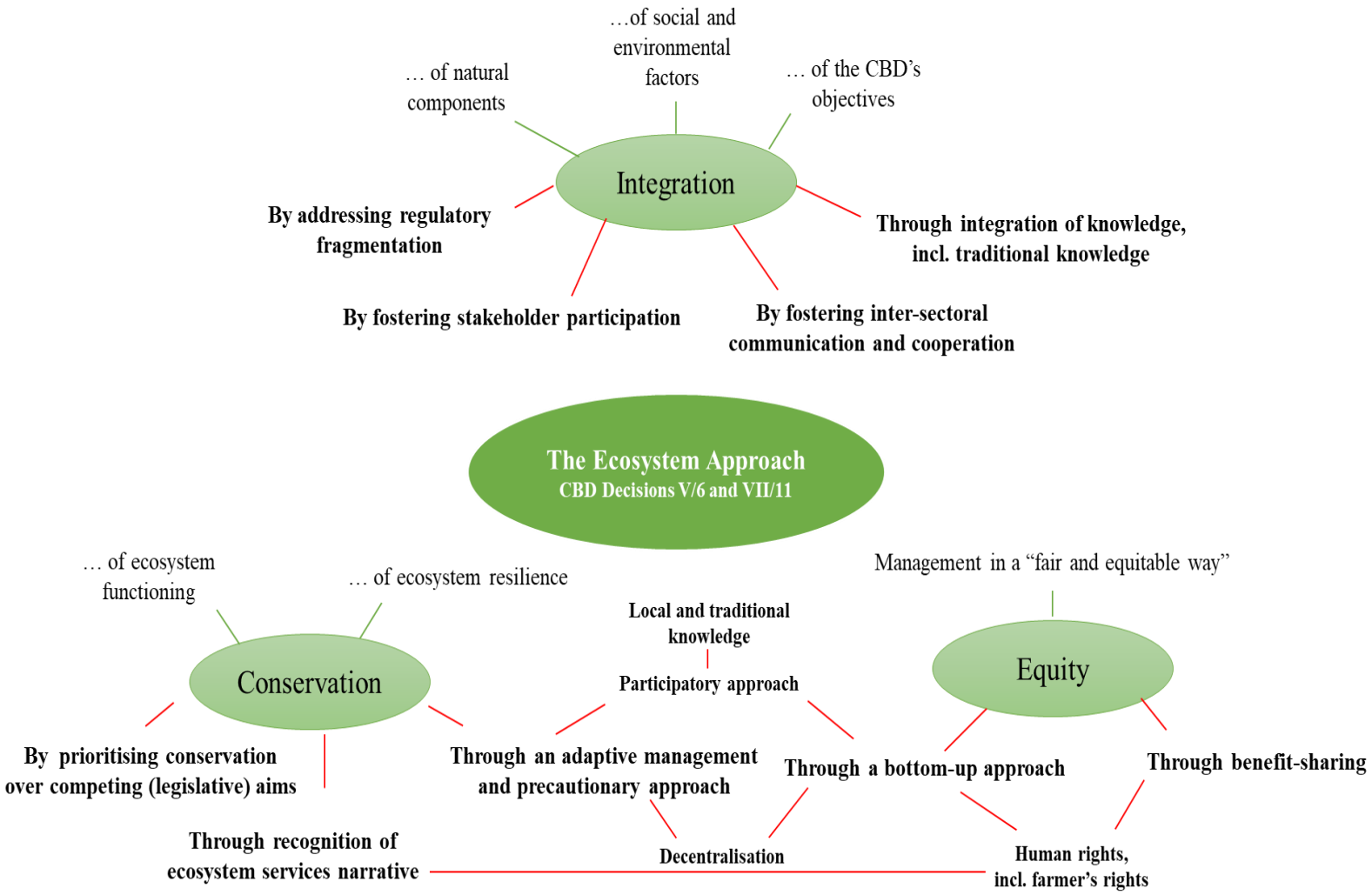
3.4.5. The Ecosystem Approach: Equity

Important linkages can be drawn between the ecosystem approach's objective to conserve ecosystem functioning and resilience and notably its 'ecosystem services' and 'adaptive management' elements and its objective to foster equity. The recognition of humans as an integral part of ecosystems, with management not only having to be respectful of the limits of ecosystem functioning but also having to be done "in a fair and equitable way",[297] finds strong resonance in agroecological movements that call for fundamental ethical, cultural, and social transitions in support of broader food system change. In essence, both emphasise the connections between the ecosystem, farmers as the direct mangers of the ecosystem or ecosystem stewards, local communities, and the wider public. The model of industrial agriculture has increasingly allowed for disconnections in this regard by facilitating a shift in power and benefit-distribution from farmers and local communities towards upstream and downstream industries, and by increasing the distance between those who effectively shape ecosystem management and the negative impacts of management decisions.[298] The ecosystem approach's emphasis on decentralised management is seen as an important way to foster equity, as it would enhance "responsibility, ownership, accountability, participation, and use of local knowledge"[299] in decisions on ecosystem management. Fostering equity is, however, not a simple objective with clearly defined and measurable indicators. Instead, it requires the accommodation of different values to have management decisions checked against the available knowledge and views of stakeholders.[300] A participatory, bottom-up approach to ecosystem management, which seeks to "consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices",[301] therefore does not only have the potential to optimise decision-making with a view to conserve ecosystem functioning, but also to better balance competing, and often underacknowledged, interests.[302] A participatory approach may help to identify the costs and benefits of conserving, maintaining,

[294] Ibid, Principle 2 of the Ecosystem Approach.
[295] See, for example, Smith and Maltby 2001; S A Illiassou and V O Oeba, 'Ecosystem-Based Approach for Sustainable Agricultural Development in Addressing Food Security and Nutrition' (*Zero Hunger* 2019) <https://link.springer.com/referenceworkentry/10.1007/978-3-319-69626-3_65-1> accessed May 2022.
[296] UNEP/CBD/COP/DEC/VII/11, Implementation Guidelines to Principle 2 of the Ecosystem Approach; UNEP/CBD/COP/DEC/V/6, Operational Guidance Point 4.
[297] UNEP/CBD/COP/DEC/V/6, Principle 1 of the Ecosystem Approach.
[298] Chapter 2, §2.3.
[299] UNEP/CBD/COP/DEC/V/6, Principle 2 of the Ecosystem Approach.
[300] Ibid, Principle 11 of the Ecosystem Approach.
[301] Ibid.
[302] See on the ecosystem approach as a social, participatory approach also Morgera 2017 and Waylen et al 2014, the latter who emphasises these elements as unique qualities of the ecosystem approach, as opposed to more narrow ecosystem-management approaches.

using and restoring ecosystems, to come to an equitable sharing of the benefits that arise from ecosystem management.[303] The sharing of benefits and internalisation of costs can be seen as the next step to the (monetary and non-monetary) valuation of ecosystem services; as a reward or penalty for ecosystem-management decisions that serve or hurt the public interest.[304] The sharing of benefits aims to counter ecosystem stewards' tendencies to "initiate unsustainable land use practices from which they will benefit directly in the short term".[305] Reducing perverse incentives that follow from market and legal stimuli, and putting in place reward mechanisms for agroecological management, will help steer ecosystem management towards conservation of ecosystem functioning and resilience, whilst enhancing equity in the wider food system.

[303] UNEP/CBD/COP/DEC/VII/11, Implementation Guidelines to Principle 12 of the Ecosystem Approach.
[304] Benefit-sharing and cost-internalisation essentially being two sides of the same coin. See UNEP/CBD/COP/DEC/V/6, Principle 4 sub c of the Ecosystem Approach and Operational Guidance Point 2.
[305] UNEP/CBD/COP/DEC/VII/11, Annotations to Principle 4 of the Ecosystem Approach.



3-2 Schematic overview of the ecosystem approach as developed under the Convention of Biological Diversity

3.5 Conclusion

The persistent popularity of the industrial model of food production in the EU cannot be fully understood without due acknowledgement of the role of the EU's regulatory regime on food in fostering its relative success. Indeed, whilst some legislation will be further studied in the next part of this thesis, a preliminary analysis in this Chapter has shown that the ideas, norms and organisational structures and processes that together make up the policy paradigm that informs the language and working of many instruments of EU law in this field, reflect an understanding of the problem of agriculture and food production which is more compatible with an industrial model than an agroecological model. As a result, efforts to make the production of food and agriculture within the EU more sustainable, through, for example, environmental integration and the adoption of multifunctional approaches, have been insufficient to address the negative impacts of industrial food production and support transitions towards agroecology. Such efforts often only provide solutions to specific problems that arise from certain land management practices that are otherwise supported by EU policy, e.g., agricultural subsidies, without proper consideration of the interconnections between industrial practices and related environmental issues as discussed in Chapter 2 and without providing a platform for in-depth discussion on the very objectives and vision of the EU's model of food production for now and the future.

Chapter 2 has highlighted the potential of agroecology as a science, set of practices and a movement; as a model for sustainable agriculture that could effectively correct and address the negative implications of the current model of industrial agriculture. In light of anticipated momentum for change, this Chapter has stressed the need for a legal enabling environment for agroecological transitions and has sought to answer the question whether legal principles and corresponding governance structures already exist, which would reflect and/or are supportive of an agroecological worldview. In this regard, it has found that the uptake of agroecology in EU, international and national law and policy is limited, and such interactions are often characterised by a lack of conceptual clarity and normative principles, or authoritative weight.

Yet, rather than inventing a new framework, this Chapter has argued that there is real potential in exploring synergies between agroecology and broader discussions on the position of ecology and ecosystems in law more generally. Notably, the ecosystem approach as developed through the Malawi Principles adopted under the CBD, to which the EU and its Member States are parties, provides a potentially solid framework to guide regulatory reform in an agroecological direction. Indeed, the approach's overarching objectives to prioritise the conservation of ecosystem functioning and resilience and the fostering of equity, to be achieved through *inter alia* the integration of ecological and social relations in ecosystems and the implementation of a broad set of principles, are supportive of agroecology's ecological and social dimensions.

Part II of this thesis will use the framework provided by the ecosystem approach to analyse two case studies on the EU's legal regimes on risk regulation for GM crops and pesticides and on organic production and certification respectively. Accordingly, Part II seeks to identify, on the basis of the legal case studies, the potential for and limitations to the implementation of an ecosystem approach in the EU, which prioritises the protection of ecosystem functioning to support agroecological transitions. It finds that a persistent lack of meaningful consideration of

local, farmers' knowledge is a crucial inhibiting factor for the achievement of these objectives, despite promising language which flags the potential for the adoption of normative principles in support of an agroecological worldview. Building upon the findings in Part II, Part III explores the potential that lies at the nexus between biodiversity and human rights law to make recommendations for reform that better integrate local and farmers' knowledge, in order to better protect agroecosystem functioning as well as foster greater equity in the food system.

Part II

Case Studies: Risk Regulation and Organic Certification

4 EU Risk Regulation of Pesticides and GM Crops

How the dominance of top-down expertise curbs agroecological ambition

4.1 Introduction

In an industrial food system that is primarily geared towards the maximisation of output, chemical inputs and genetically modified (GM) crops can be tools for farmers to achieve such an aim. It follows from Chapter 2 that pesticides were embraced in the EU to boost production in the after-war period.[1] Likewise, GM crops have been held responsible for increases in yields from 6-25% in other developed parts of the world,[2] although the uptake of GMOs has been limited in the EU and evidence of their long-term benefits is heavily debated.[3] At the same time, these products can have impacts, notably on biological diversity. Importantly, such effects, are, at least to a certain degree, not a coincidental by-product of product use, but the simplification, manipulation and elimination of ecological realities are inherent qualities.[4] For example, most herbicides, working either through contact or systemically, are intended to destroy the plant tissue of 'weeds', and many insecticides aim to effect the nervous system of 'harmful bugs' with a view to kill them. The most popular GM crops, either, similarly, kill insects through the production of a toxin, or they allow for widespread use of non-selective herbicides without impacting on the crop itself. It is in fact the promise of a chemical pesticide or GM seed to prioritise the health of the particular crop over competing plant, insect and mammal species, to maintain or increase production levels, that underlines the idea that such products are to be made available on the market for trade and use, unless unacceptable risks to health or the environment justify a ban or restriction on use. The latter mostly concerns impacts beyond the product's intended purpose, notably regarding effects on non-targeted species.

Building upon the findings of a brief historical analysis of the legal regime for the authorisation of pesticides and GM crops in the EU, this Chapter will show that it is this premise of societal merit of industrial agricultural inputs that also underpins EU risk regulations. It is helpful to foreshadow here that this starting point is particularly problematic from an agroecological perspective, and for the implementation of an ecosystem approach which aims to prioritise the protection of ecosystem functions and resilience. This, because an assumption of public benefit of the use of a product which already provides short-term productivity and economic benefits for individuals – be it a farmer, an upstream or downstream industrial player or even a consumer – puts a lot of faith in regulators' ability to correctly identify risks of environmental safety and use this information to decide on levels of risks that are truly in the public interest in each and every case. Indeed, despite promising legislative objectives to provide for a high

[1] Chapter 2, §2.2.

[2] E Pellegrino et al, 'Impact of genetically engineered maize on agronomic, environmental and toxicological traits: a meta-analysis of 21 years of field data' (*Scientific Reports* 2018) <https://www.nature.com/articles/s41598-018-21284-2.pdf> accessed May 2022; W Klümper and M Qaim, 'A Meta-Analysis of the Impacts of Genetically Modified Crops' (*PLOS ONE* 2014) <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0111629> accessed May 2022.

[3] See, for example, contrarily, D Gurian-Sherman, *Failure to Yield. Evaluating the Performance of Genetically Engineered Crops* (Union of Concerned Scientists, 2009).

[4] M J Angelo, *The law and ecology of pesticides and pest management* (Routledge 2016), p 1.

level of environmental protection (§4.2), and even recognition of the relevance of ecosystem functions or services for the formulation of specific protection goals (§4.3), this Chapter will reveal that regulators at EU level often fail to give full consideration to impacts on ecosystem functions, and the persistent uncertainties that plague scientific conclusions. In particular, the regimes' understanding of environmental risk places authority with those who cannot, or who choose not to, oversee all impacts on local agroecosystems, disregarding the potential role of local and traditional knowledge holders as well as the crucial links between environmental and systemic and social concerns (§4.4). Where the EU system has failed to provide adequate protection against the risks of pesticides and GM crops for ecological functioning, and where the potential of current reforms to remedy issues of authority cannot yet be fully understood, this Chapter – also considering the ecosystem approach's focus on decentralised decision-making – considers whether issues can be addressed by Member States. In this regard it identifies some opportunities for high(er) levels of environmental protection at national level, to prioritise the protection of local agroecosystem functioning and resilience. Yet, this Chapter emphasises regulatory constraints due to the harmonising effects of EU safety rules (§4.5).

4.2 The Prohibitive Nature of the Risk Paradigm

It follows from Chapter 2 that scientific revolutions in the twentieth century allowed mankind to gain a better understanding of genetic makeup and chemical components, which led to the development of synthetic applications that ultimately sought to enhance agricultural productivity.[5] Applied research has, furthermore, not stood still since, as previously accepted boundaries to our ability to control ecological realities are explored and expanded with continuous research on, and development of, new agricultural inputs. As discussed in Chapter 2, advances in biological sciences first supported more targeted breeding, then the transfer of genes between organisms and, more recently, gene editing. Similarly, in the chemical realm, pesticide research and use has evolved beyond a mere focus on indiscriminate, conventional chemicals, to more targeted biotechnological solutions and, recently, nanopesticides.[6] Perhaps unsurprisingly, the short-term, productivist benefits of these innovations led to wide adoption and use. Yet, each industrial application comes with proven or potential environmental impacts.

The concept of risk is particularly relevant in the context of biotechnological and chemical input use. It is perceived as a social phenomenon of (late) industrialisation;[7] a characteristic of a modern, fast-changing society that, on the one hand, embraces innovation as part of socio-economic development, but, on the other hand, is increasingly concerned with safety and controllability. Risk has been hailed as an empowering technique to make choices on rational grounds despite unknowns about the future,[8] based on calculations and evaluations of the probability of impacts, to be multiplied by their magnitude. However, the manufactured or

[5] Chapter 2, §2.2.2
[6] See on these different types of pesticides, for example, B D Lade et al, 'Nano Bio Pesticide to Constraint Plant Destructive Pests' (*Journal of Nanomedicine Research* 2017) <https://medcraveonline.com/JNMR/JNMR-06-00158> accessed May 2022; for a historical account see also Bozzini 2017, p 3.
[7] U Beck, *Risk Society, Towards a New Modernity* (Sage Publications 1992).
[8] M Weimer, 'The Origins of "Risk" as an Idea and the Future of Risk Regulation' (2017a) 8 European Journal of Risk Regulation 10, p 12 on the 'bright side of risk'.

man-made risks of innovations provoke distributive questions, conflict, and choices,[9] which are made difficult by the fact that positive or negative impacts of technologies are often not limited by spatial (geographical) or temporal (generational) boundaries. Additionally, decision-making on technologies, which promotes or restrains innovation, is further complicated by increasingly complex and unsolvable uncertainties.[10] Indeed, significant time lags between the rapid development of inputs to boost agricultural production and our understanding of the likelihood, scale or even very nature or existence of impacts, could mean that irreversible damage to (agro)ecosystems is incurred if these inputs are freely available and widely used.

This section seeks to shed light on the essence of the risk paradigm in the context of the EU's regimes for the authorisation of pesticides and GMOs, through analysis of the foundations, provisions, and recitals of historic and current regulations. In particular, and in accordance with the understanding of policy paradigms put forward in the previous Chapter, this section analyses the fundamental cognitive-normative components in the legislation for solving the issue of pesticides and GMOs: their values, objectives, priorities, problem-framing, and conceptualisation. It thereby illustrates how EU risk regulations, with deeply rooted internal market and productivity objectives, put forward an understanding of the place of chemical and biotechnological inputs in food production that is compatible with an industrial worldview. This is not effectively countered by the (increasing) prominence of the objective to provide a high level of environmental protection. Although leaving opportunities for the prioritisation of ecosystem functions in line with an ecosystem approach, taking into account the precautionary principle, the environment still has to compete with notions that support free trade and use.

4.2.1. Historical Market Objectives: An Assumption of Merit

The emergence of agritech products on the European markets in the last century, revealed stark differences in the attitudes of Member States towards such new technologies and their potential merit or risk. The European Commission already noted in 1976 that a number of Member States had adopted restrictions or prohibitions on the use of certain pesticides.[11] Similarly, in 1988, the European Commission observed that several Member States had started to review their existing regulations in light of assessments on the environmental risks of GMOs.[12] It noted that some countries had no legislation in place to restrict releases, but that, among others, Germany had established a general ban, Belgium was covering GMOs under existing legislation and had proposed the release of GM potato plants, the UK had adopted voluntary guidelines for case-by-case consideration, and the Netherlands was preparing the adoption of specific legislation.[13]

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[9] Ibid, p 11.

[10] See on the complex and changing relationship between risk and uncertainty: M Van Asselt and E Vos, 'The Precautionary Principle and the Uncertainty Paradox' (2006) 9 Journal of Risk Research 313.

[11] European Commission, 'Proposal for a Council Directive prohibiting the placing on the market and the use of plant protection products containing certain active substance' OJ C 200/10, Preamble. See also Hermon 2015, p 244 who, contrarily, observed that the first French pesticide regulations were "at the heart of the legal system intended to support the green revolution".

[12] European Commission, 'Proposal for a Council Directive on the Deliberate Release to the Environment of Genetically Modified Organisms' COM(88) 160 final, Explanatory Memorandum, p 3. See also, G C Shaffer and M A Pollack, 'Regulating Between National Fears and Global Disciplines: Agricultural Biotechnology in the EU' (The Jean Monnet Working Papers 2004).

[13] COM(88) 160 final, p 3-4.

The lack of uniformity in these national approaches reflect the complexity of decision-making in face of ignorance and uncertainty, and divergent political views on acceptable levels of risk.

In the context of the EU, however, these differences were considered particularly problematic. As discussed in Chapter 2, major advances in transport had lowered physical barriers to the movement of goods, in support of widespread trade in chemical and biological agri-inputs such as seeds and pesticides. Within the EU, these developments were strengthened by the establishment of a single market which guarantees the free movement of goods within the EU's territorial boundaries, and which includes agricultural products like seeds.[14] Conflicting regulatory approaches and notably national restrictions or prohibitions on the use of products, however, distorted trade. In 1978 and 1991 the EU thus harmonised provisions on prohibited substances for plant protection and the authorisation of active substances and plant protection products.[15] At the same time, the EU adopted the first Community-wide legal regime on GMOs, which included a Directive on the deliberate release into the environment, notably for GM seeds for cultivation.[16] The primary objective of the different pieces of legislation to protect the functioning of the internal market was not only reflected in their preambles and provisions that recognised that "rules present differences which constitute barriers not only to trade in plant protection products but also to trade in plant products"[17] and that "disparity between the rules […] create unequal conditions of competition or barriers to trade in [GMOs]",[18] which underpinned the need to "eliminate these obstacles by aligning the relevant provisions".[19] More fundamentally, it was reflected in the fact that these regulations were adopted on the sole basis of the EU's internal market competence (Article 100 and 100a of the Treaty Establishing the European Economic Community (TEEC)) with a view to approximate or harmonise laws.[20]

This legal basis and its accompanying objective are characteristic features of a paradigm that has favoured an industrial model of agriculture, although they are not necessarily inhibiting factors for the adoption of an ecosystem approach. They are characteristic features, because a focus on protection of free-trade, with bans for specific products, is indicative of an approach that does not question the overall place and role of agri-inputs in our system of food production: being prominent elements of an industrial model, but not of an agroecological vision which promotes closed cycles. In essence, it signals an assumption of merit; a belief that, in principle,

[14] Article 26 and 28 of the TFEU, and Article 38 which holds that "the internal market shall extend to agriculture, fisheries and trade in agricultural products" (*ex* Article 32(1) Treaty establishing the European Community (Consolidated Version) [2002] OJ L 325/33) (hereafter: TEC). Agricultural products include seeds, *per* Annex I.
[15] Council Directive 79/117/EEC of 21 December 1978 prohibiting the placing on the market and use of plant protection products containing certain active substances [1978] OJ L 33/36 and Council Directive 91/414/EEC of 15 July 1991 concerning the placing of plant protection products on the market [1991] OJ L 230/1, see also Council Directive 97/57/EC establishing Annex VI to Directive 91/414/EEC concerning the placing of plant protection products on the market [1997] OJ L 265/87.
[16] Council Directive 90/220/EEC of 23 April 1990 on the deliberate release into the environment of genetically modified organisms [1990] OJ L 117/15.
[17] Directive 91/414/EEC, Preamble.
[18] Directive 90/220/EEC, Preamble.
[19] Directive 79/117/EEC, Preamble.
[20] Article 100 Treaty establishing the European Economic Community (Treaty of Rome) (adopted 25 March 1957, entered into force 1 January 1958) 298 UNTS 11 ('Treaty of Rome') and 100a Single European Act [1986] OJ L 1987/169.

we could benefit from the use of these ecologically invasive, external inputs. Illustrative of the emphasis on societal benefits is, notably, the 1978 Pesticide Directive. Despite providing prohibitions for specific active substances in its Annex, the directive strongly emphasised the "important place" of plant production in the Community and pesticides' potential to avoid falls in yields by providing "absolutely essential" protection against harmful organisms and weeds.[21] In fact, the very use of the term 'plant protection product' (or sometimes *phytopharmaceutical*: plant medication),[22] rather than the more common 'pesticide', most likely reflects influences from industrial lobbies and implies a positive outlook on the role of pesticides in farming.

Approximation, however, only requires uniformity in decision-making whilst allowing for EU-wide restrictions on trade and use to be based on reasons related to the protection of ecosystem functioning and resilience. Article 100a TEEC, adopted under the Single European Act and providing the legal basis for the risk regulations from the early nineties, already required that regulations that concern issues of safety and environmental protection would adopt "a high level of protection".[23] In this regard, the 1991 Pesticide Directive emphasised the need to "ensure a high standard of protection",[24] which meant that it aimed to prioritise environmental protection over the directive's objective to improve plant production. And along the same lines, the EU's 1990 GMO Directive embraced dual aims to both harmonise laws, as well as to provide a high level of protection for human health and the environment.[25] The possible relevance for agroecosystems is also reflected in the legislation's preparatory documents, in which the Commission highlighted the potential disruptive impacts of GMOs on ecosystems, including the alteration of ecological cycles and interactions, to justify EU legislative action.[26]

The internal-market foundation, in combination with a focus on the protection against environmental *risks*, have meant that both regimes, since their very inception, have assumed that regulators are both willing and able to provide adequate protection against the ecological risks posed by a product in each and every case, and under a wide range of circumstances. As aptly put by one author with regard to the regulation of certain pesticides: "the modus operandi of the risk paradigm is to manage pollution by permitting chemical production, use, and release, as long as discharges of certain individual substances do not exceed some quantitative standard of acceptable contamination".[27] Where legislative reforms and implementing measures have sought to shape and sharpen the standard of acceptability, in practice, as we will see hereafter,

[21] Directive 79/117/EEC, Preamble.
[22] A term that is used within the context of EU risk management (comitology), see hereafter §4.3.1.
[23] The fact that first reference was made to the standard of a high level of environmental protection in the context of the internal market legislative basis reflected Member States' fear to have their standards lowered by the Commission in the approximation of laws, see, D Misonne, 'The Importance of Setting a Target: The EU Ambition of a High Level of Protection' (2015) 4 Transnational Environmental Law 11, p 14.
[24] Directive 91/414/EEC, Preamble.
[25] Directive 90/220/EEC, Article 1 and Preamble. See also, European Commission, 'A Community Framework for the Regulation of Biotechnology' COM(86) 573 final, p 2, that emphasised that "the internal market arguments are clear" and that "nothing short of Community-wide regulation can offer necessary human and environmental protection".
[26] COM(88) 160 final, Explanatory Memorandum, p 2.
[27] J Thornton, 'Beyond Risk: An Ecological Paradigm to Prevent Global Chemical Pollution' (2000) 6 Journal of Occupational Environmental Health 318, p 318.

they have not departed from the fundamental notion that (uncertain) environmental risks must justify a ban, as opposed to a risky product needing justification before environmental release.

4.2.2. The Millennium Packages: A High Level of Protection and Precaution

The most significant reforms are the regulations on pesticides and GM crops that were adopted after the millennium change, replacing earlier risk regulations with a view to address issues of implementation, integrate scientific and technical development, and practical experiences.[28] In the context of pesticides, a multitude of EU laws was adopted,[29] including implementing legislation, with at its core Regulation 1107/2009 ('Pesticides Regulation') on the authorisation of plant protection products in commercial form,[30] and with rules for the EU approval of active substances. At the same time, the EU also established a framework for Community action to achieve the sustainable use of pesticides ('Sustainable Use of Pesticides Framework').[31] For GM crops, the EU replaced its 1990 directive with Directive 2001/18/EC on the deliberate release into the environment of GMOs ('Deliberate Release Directive'), and a new Regulation 1829/2003 on genetically modified food and feed ('GM Food and Feed Regulation').[32]

As noted above, with regard to their aims and approach, the legislative packages in many ways resemble and build upon the legacy of their predecessors. The Pesticides Regulation reiterates its purpose "to increase the free movement of [plant protection] products and availability of these products in the Member States"[33] through harmonisation and mutual recognition.[34] Moreover, the GMO regime and the Pesticides Regulation were again adopted on the basis of the EU's competence to progressively establish the internal market,[35] although the Pesticides Regulation now reflects its value for the implementation of the Common Agricultural Policy.[36]

The millennium packages are, however, more explicit on the prominence of the role of environmental concerns within the regulatory regime for the authorisation of pesticides. In this regard, the need for a high level of environmental protection was included in the provisions on

[28] Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC [2009] OJ L 309/1, Preamble; Directive 2001/18/EC of the European Parliament and of the Council on the deliberate release into the environment of genetically modified organisms and repealing Council Directive 90/220/EEC [2001] OJ L 106/1, Preamble.
[29] For example, Regulation (EC) No 396/2005 of the European Parliament and of the Council of 23 February 2005 on maximum residue levels of pesticides in or on food and feed of plant and animal origin and amending Council Directive 91/414/EEC [2005] OJ L 70/1; Regulation (EC) No 1185/2009 of the European Parliament and of the Council of 25 November 2009 concerning statistics on pesticides [2009] OJ L 324/1; see also Regulation 1107/2009, Article 84 and the regulations adopted thereunder.
[30] See in this regard also Commission Regulation (EU) No 546/2011 of 10 June 2011 implementing Regulation (EC) No 1107/2009 of the European Parliament and of the Council as regards uniform principles for evaluation and authorisation of plant protection products [2011] OJ L 155/127.
[31] Directive 2009/128/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for Community action to achieve the sustainable use of pesticides [2009] OJ L 309/71.
[32] Regulation (EC) No. 1829/2003 of the European Parliament and of the Council on genetically modified food and feed [2003] OJ L 268/1.
[33] Regulation 1107/2009, Preamble.
[34] About mutual recognition in the context of risk regulations, see hereafter §4.5.
[35] Article 95 TEC (*ex* 100 and 100a TEEC), see also Article 14 TEC.
[36] Article 37(2) TEC.

the very purpose of the legislation,[37] reflecting the environmental integration principle in the Treaty.[38] The Pesticides Regulation, furthermore, explicitly holds that its environmental objective takes priority over the objective of improving plant production,[39] in accordance with established case law on the precedence of environmental requirements over economic interests.[40] Significantly, the Regulation seeks to promote a high level of protection by highlighting the relevance of principles of integrated pest management, as developed under the Sustainable Use of Pesticides Framework, and giving priority to non-chemical and natural alternatives.[41] The Framework defines integrated pest management as placing emphasis on "the growth of a healthy crop with the least possible disruption to agro-ecosystems" and "encouraging natural pest control mechanisms",[42] which resonates with agroecological principles that promote natural processes and pest management and restrict the use of inputs.[43]

Additionally, the regimes explicitly reference the precautionary principle, reflecting its inclusion in the EU Treaty.[44] The Regulation on Pesticides and the Deliberate Release Directive respectively hold that their environmental objectives are "underpinned by" or to be implemented "in accordance with" the precautionary principle.[45] As noted above, in the context of decision-making on the risks of tradeable products like pesticides and GMOs, which is inherently characterised by a degree of scientific uncertainty regarding ecological impacts, the implementation of the precautionary principle to achieve a high level of environmental protection is particularly relevant.[46] As will be discussed in the next section, although the principle does not effectively challenge the presumption of benefit of pesticides and GM

[37] For example, Regulation 1107/2009, Article 1(3): "The purpose of this Regulation is to ensure a high level of protection of both human and animal health and the environment and to improve the functioning of the internal market through the harmonisation of the rules on the placing on the market of plant protection products, while improving agricultural production". And Regulation 1829/2003, Article 1(a): "The objective of this Regulation […] is to: provide the basis for ensuring a high level of protection of human life and health, animal health and welfare, environment and consumer interests in relation to genetically modified food and feed, whilst ensuring the effective functioning of the internal market".

[38] Article 6 TEC (now: Article 11 TFEU). See also, Case T-429/13 and T-451/13 *Bayer CropScience and others v Commission* [2018] ECLI:EU:T:2018:280, par 105-106 on the relationship between Regulation 1107/2009, Article 1(3) and Articles 11 and 114(3) TFEU.

[39] Regulation 1107/2009, Preamble 24 and 35.

[40] See, for example, in the context of pesticide regulation: Case T-475/07 *Dow AgroSciences v European Commission* [2011] ECR II-05937, par 143-144. See, more generally, on prioritisation of environmental over economic aims in the context of the precautionary principle, also Case T-74/00 *Artegodan and Others v Commission* [2002] ECLI:EU:T:2002:283, par 184: "the precautionary principle can be defined as a general principle of Community law requiring the competent authorities to take appropriate measures to prevent specific potential risks to public health, safety and the environment, by giving precedence to the requirements related to the protection of those interests over economic interests".

[41] Regulation 1107/2009, Preamble 35 and Article 31(4)(c).

[42] Article 3(6) Directive 2009/128/EC.

[43] Regulation 1107/2009, Annex III on 'General principles of integrated pest management'.

[44] *Ex* Article 130R Treaty on European Union ('Treaty of Maastricht') [1992] OJ L 191/1, now Article 191(2) TFEU; note also the binding nature of the principle: "Union policy on the environment shall aim at a high level of protection […] it shall be based on the precautionary principle".

[45] Regulation 1107/2009, Article 1(4) and Directive 2001/18/EC, Article 1.

[46] More generally about the importance of the precautionary principle to achieve a high level of environmental protection: European Commission, 'Communication on the precautionary principle' COM/2000/1 final, par 3 and also on the relationship between risk regulation and the principle through the regulatory aim of 'a high level of protection' E Fisher, *Risk regulation and administrative constitutionalism* (Hart Publishing 2007), pp 210-211.

crops,[47] it does also indicate a strong potential for negative environmental impact, thus putting a burden on the proponent of use (the producer) to prove otherwise.[48] This means that decision-makers cannot justify authorisations for active substances, commercial plant protection products and GMOs for cultivation with simple reference to uncertainty.[49] Conversely, they are able to justify restrictions and prohibitions on use with reference to such uncertainty,[50] as long as they meet the minimal level of proof needed to trigger application of the precautionary principle.[51] In certain cases, they may even "be required to act".[52] Only to the extent that Member States still have discretionary powers, to be analysed hereafter in §4.5, the above also means that national precautionary action may be allowed despite its distortive impacts for the functioning of the internal market.[53] Chapter 3 has highlighted the relevance of precautionary management when prioritising the conservation of ecosystem functioning and resilience under an ecosystem approach, in light of the complexity of processes within ecosystems and our incomplete knowledge of their functions and limits.[54] Indeed, the emphasis of the legal regimes for the authorisation of pesticides and GMOs for cultivation on precaution could support decisions that reflect reservations towards invasive (bio)technological inputs with reference to their potential, but uncertain impact on subtle ecosystem dynamics,[55] and could provide a basis for discussions for alternative options that better suit a sustainable approach to food production.

Nonetheless, the many cases where the regimes –in hindsight – failed to provide protection against risks of ecological harm or to highlight and prioritise agroecological alternatives, or the

[47] Note, in this regard, that Regulation 1107/2009, Preamble 10 states: "Substances should only be included in plant protection products where it has been demonstrated that they present a clear benefit for plant production and they are not expected to have any harmful effect on human or animal health or any unacceptable effects on the environment". See also Bozzini 2017, p 37. Nonetheless, as will be analysed hereafter, in practice, any discussion on benefits under the approval procedure for active substances has mainly focus on questions of efficacy, with limited consideration of alternatives and no consideration of the place of pesticides in a wider EU vision on food.
[48] COM/2000/1 final, par 6.4.
[49] See on the different elements of the principle, J Wiener, 'Precaution' in D Bodansky et al (eds), *The Oxford Handbook of International Environmental Law* (Oxford University Press 2007) and Morgera 2017, p 76.
[50] Also COM/2000/1 final.
[51] This is also called the 'knowledge condition', Van Asselt and Vos 2006, p 317 and, hereafter, §4.3. Scholars have found that the principle "regulates understandings of reasonable administrative discretion" and that its real value lies in its requirement for administrators to "take a position justifying their decisions", see respectively: Fisher 2007, p 208 and N D Sadeleer, 'The Precautionary Principle in European Community Health and Environment Law: Sword or Shield for the Nordic Countries?' in N De Sadeleer (ed), *Implementing the Precautionary Principle Approaches From the Nordic Countries, the EU and USA* (Earthscan 2007), p 164.
[52] Case T-13/99 *Pfizer Animal Health SA v. Council of the European Union* [2002] II-03305, and, similarly, *Artegodan* (T-74/00), par 184. See, however, J Zander, *The Application of the Precautionary Principle in Practice. Comparative Dimensions.* (Cambridge University Press 2010), p 108 who observes that, in practice, the precautionary principle facilitates action, but does not sanction inaction.
[53] For example, Regulation 1107/2009, Article 1(4): "In particular, Member States shall not be prevented from applying the precautionary principle where there is scientific uncertainty as to the risks with regard to human or animal health or the environment posed by the plant protection products to be authorised in their territory". The discretionary powers of Member States, notably under the GMO regime, are limited due to the legislation's harmonising effect, see, for example, Case T-366/03 and T-235/04 *Land Oberösterreich and Republic of Austria v European Commission* [2005] ECLI:EU:T:2005:347 and hereafter §4.5. See also more generally, N D Sadeleer, 'The precautionary principle in EU law' (2010) 5 Aansprakelijkheid, Verzekering & Schade 173, p 175: "In an area where Member State legislation has been harmonised, it is for the Community legislature to apply the precautionary principle".
[54] Chapter 3, §3.3.4 and, notably, Morgera 2017, p 75.
[55] Chapter 2, §2.4.

many other cases where the regimes were unable to come to legitimate and widely accepted authorisation decisions, signal an unbalanced and altogether ineffective approach. Regrettably, it indicates that promising language to prioritise the environment and integrated management approaches, and to act with precaution, still often acts as window dressing for a risk paradigm that, overall, has supported the continuous uptake and use of industrial inputs. The next sections will show that the predominance of an industrial world view on food production in the context of EU risk regulation, manifests itself in the organisational complex that underpins the approval procedures, including deliberation and decision-making processes. In particular, they find that the regimes' distribution of authority, prioritising the abilities of technocratic experts acting at high level over those of ecosystem stewards, notably local and traditional knowledge holders, and the disconnections between environmental and fundamental systemic and social concerns, act as barriers to the adoption of an ecosystem approach in support of agroecological change.

4.3 EU Risk Assessment and Management: Procedures and Protection Goals

The millennium packages' objective to secure a high level of environmental protection for harmonising measures, the interpretation that this requires prioritisation of the objective over that of improving plant production under the Pesticide Regulation, and the adoption of a precautionary approach under both regimes, mean that there is scope for a teleological interpretation in accordance with an ecosystem approach to risk regulation that supports conservation of agroecosystem functions. Yet, historical presumptions of societal benefit place a lot of faith in the ability and willingness of risk governors to protect against safety risks in each case. Considering the continuous negative impacts of pesticide use discussed in Chapter 2,[56] the steady increase of approved active substances,[57] and the fact that statistics in 16 Member States showed that the majority saw increases in pesticide sales between 2011 and 2016,[58] suggest that the EU's pesticide regime has, in practice, not been implemented in line with an ecosystem approach. In the GM context, the stalemate situation in decision-making on GM crops has meant that the cultivation of GMOs is very limited in the EU,[59] with only one currently valid authorisation for the MON 810 Maize.[60] However, the legality of this situation is questionable to say the least,[61] and, as will be discussed hereafter,[62] the impasse in decision-

[56] Chapter 2, §2.4.
[57] G Fortuna, 'Commission and capitals not fully on same page over plant protection' *EurActiv* (22 November 2018) <https://www.euractiv.com/section/agriculture-food/news/commission-and-capitals-not-fully-on-same-page-over-plant-protection/> accessed May 2022.
[58] 'Agri-environmental indicator - consumption of pesticides' (2018) <https://ec.europa.eu/eurostat/statistics-explained/index.php/Agri-environmental_indicator_-_consumption_of_pesticides> accessed May 2022.
[59] The latest monitoring report holds that the MON 810 was planted in the EU on approximately 102 367 hectares in only two Member States: Spain and Portugal, *Annual monitoring report on the cultivation of MON 810 in 2020. Portugal and Spain* (Monsanto Europe S.A., 2021), p 5.
[60] Commission Decision 98/294 concerning the placing on the market of genetically modified maize (Zea mays L. line MON 810) [1998] OJ L 131/32, renewed in 2017: Commission Implementing Decision 2017/1207 renewing the authorisation for the placing on the market of genetically modified maize MON 810 (MON-ØØ81Ø-6) products pursuant to Regulation (EC) No 1829/2003 [2017] OJ L 173/18.
[61] See, for example, Case T-164/10 *Pioneer Hi-Bred International Inc v Commission* [2013] ECLI:EU:T:2013:503, in which the General Court had condemned procedural delays resulting in a failure to act regarding the application for cultivation of GM Maize 1507 by Pioneer.
[62] §4.4.2.

making could also be explained in light of the limited consideration of diverse (agro)ecological considerations in the EU's authorisation process that inhibits truly informed decision-making.

The Regulation on Pesticides and the GMO regime respectively provide that plant protection products should only include active substances that are approved at EU level and that no GMO shall be cultivated unless covered by an EU authorisation.[63] Thus, the primary responsibility to implement the regulations in conformity with the aim to provide a high level of environmental protection lies with the EU authorities that decide on authorisations and conditions of use. In order to address difficult questions of approval of pesticides and GM crops, those authorities are assigned specific roles within the EU's regimes' two-tiered approach to risk governance: risk assessment and risk management. This section seeks to outline the EU's authorisation procedures for pesticides and GMOs, including the role of different risk assessors, notably the European Food and Safety Authority (EFSA), and risk managers, notably the European Commission. It finds that the separation of scientific assessment and political management of risks has created a rather hierarchical system which attributes an important role to EFSA as an independent, technocratic entity. This section, furthermore, discusses how risk assessment breaks the abstract notion of a high level of environmental protection down into protection goals, emphasising the largely untapped potential for the adoption of an ecosystem approach.

4.3.1. Authorisation of Active Substances and GM Crops: Procedures and Actors

The procedures for the authorisation of active substances in pesticides and GM crops begin when a notification or application is submitted to a national competent authority, such as an environmental, agricultural or health ministry or protection agency.[64] Under the early laws, the boundaries between risk assessment and management were not clear, with dossiers either being directly forwarded to hybrid EU risk governors,[65] or with risk-assessment and management decisions both being made primarily at national level.[66] A tiered approach to risk governance,[67] in which risk assessments performed by independent technocrats provide the basis for informed decisions on risk management by political authorities, was enforced with the establishment of

[63] Regulation 1107/2009, Preamble 10, see also Article 4; Directive 2001/18/EC, Article 4(1) and Regulation 1829/2003, Article 4(2). Note that only active substances are authorised at EU level and that the authorisation for placing on the market and use of plant protection products that contain approved active substances is decided at national level, as will be discussed, hereafter, in §4.5.1.

[64] Regulation 1107/2009, Article 7; Directive 2001/18/EC, Article 6; and Regulation 1829/2003, Article 5.

[65] Directive 91/414/EEC, Article 6 and Annex II.

[66] The 1990 Deliberate Release Directive provided for 'mutual recognition of data', see L Levidow et al, 'European Biotechnology Regulation: contested boundaries of environmental risk' (*BioSafety* 1997) <http://www.bioline.org.br/request?by97001> accessed May 2022 and also required national authorities to submit a preliminary opinion (including risk-management considerations) to the European Commission. The procedures were found to be inadequate to settle Member States' difference and against the backdrop of international pressures, the European Commission adopted a more centralised regime, see also M Lee, 'Multi-level Governance of Genetically Modified Organisms in the European Union: Ambiguity and Hierarchy' in L Bodiguel and M N Cardwell (eds), *The Regulation of Genetically Modified Organisms: Comparative Approaches* (Oxford University Press 2010).

[67] Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety [2002] OJ L 31/1, Article 3(1) speaks of 'risk analysis' and recognises three stages: risk assessment, management and communication.

the European Food Safety Authority (EFSA) in 2002.[68] EFSA's remit covers a broad range of topics, from food and feed safety to plant protection and health.[69] Its instigation sought to address issues of (public) confidence regarding food safety, as well as problems of capacity.[70]

Although EFSA also provides for significant centralisation of risk-assessment procedures on food safety, both the pesticide and GMO regimes have not completely discarded the role of national authorities. In particular, for pesticides, the millennium package adopted an ambitious, hazard-based approach under which a national authority or 'rapporteur Member State' (RMS) is tasked with identifying particularly hazardous properties, as the first step in risk assessment.[71] If a property is identified on the basis of sufficient evidence, the authorisation of the active substance is instantly rejected.[72] In other words, these properties, known as 'cut-off criteria', are considered by the Pesticide Regulation to be so intrinsically dangerous that, in principle,[73] there would be no scope for further risk assessment, including exposure and risk characterisation, and risk management measures that could justify placement on the internal market.[74] Cut-off criteria include being PBT (persistent, bioaccumulative and toxic),[75] endocrine (hormone) disruptive, or the substance being a POP (persistent organic pollutant).[76] It is noted here that some cut-off criteria also reflect international consensus on the harmful nature of certain pesticides, for example, those falling under the Stockholm Convention.[77]

However, if it is believed that the available information does not indicate that any of the cut-off criteria are met, the RMS submits a full draft risk assessment to EFSA, who adopts a "conclusion in the light of current scientific and technical knowledge".[78] Under the GMO

[68] Ibid; see also European Commission, 'Proposal for a Regulation on the transparency and sustainability of the EU risk assessment in the food chain' COM(2018) 179 final, Explanatory Memorandum, which puts forward various proposed initiatives to enhance Member States involvement in increasingly centralised risk assessment, to allow for more synergies between the work of the central authority and national bodies. See, also §4.4.3.
[69] 'About Us' (*EFSA*, N.D.) <https://www.efsa.europa.eu/en/aboutefsa> accessed May 2022.
[70] P Shears et al, 'The European Food Safety Authority' (2004) 106 British Food Journal 336, p 339; see also COM(2018) 179 final and D Chalmers, ''Food for Thought': Reconciling European Risks and Traditional Ways of Life' (2003) 66 Modern Law Review 532.
[71] Hazard identification precedes hazard characterisation, exposure characterisation and risk characterisation: COM/2000/1 final, Annex III.
[72] Regulation 1107/2009, Article 4 and 11 and Bozzini 2017, p 47.
[73] Two possibilities for derogation are provided in the Regulation, as Article 4(7) and Annex II provide that an active substance that meets a particular (primarily health related) cut-off criteria can still be authorise temporarily if "necessary to control that serious danger" or if "exposure of humans […] under realistic proposed conditions of use, is negligible".
[74] See on the difference between risk and hazard-based approaches to product regulation, for example, European Commission, 'Communication on endocrine disruptors and the draft Commission acts setting out scientific criteria for their determination in the context of the EU legislation on plant protection products and biocidal products' COM(2016) 350 final, p 6.
[75] Note also that if an active substance only meets two of the PBT-criteria, it is often still qualified as a 'Candidate for Substitution' (CfS) under Regulation 1107/2009, Article 24 and Annex II, par 4.
[76] Regulation 1107/2009 Article 4(1) and Annex II, points 3.6.2 to 3.6.4 and 3.7.
[77] Stockholm Convention on Persistent Organic Pollutants (adopted 22 May 2001, entered into force 17 May 2004) 2256 UNTS 119 ('Stockholm Convention'). The Convention follows a similar risk-based approach as the EU's regime, see Thornton 2000. Another international treaty with great relevance for pesticides is the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (adopted 10 September 1998, entered into force 24 February 2004) 224 UNTS 337 ('Rotterdam Convention').
[78] Regulation 1107/2009, Article 11-12.

regime, the role of EFSA is more instant and prominent. Despite the possibility of national risk assessments under the current Deliberate Release Directive, in practice, EFSA has always given scientific opinions in order to settle differences when "reasoned objections" had been made by other Member States against the placing on the market of the GMO on the basis of the initial, national assessment.[79] Moreover, where there is overlap between the Deliberate Release Directive and the Food and Feed Regulation,[80] a single application under the latter suffices, which then integrates the environmental risk-assessment procedure.[81] Under the Regulation, the national authority only acts as a portal, which directs the application to EFSA.[82]

Most important is the fact that EFSA and notably its Panel on Plant Protection Products and their Residues (PPR) and the Panel on Genetically Modified Organisms,[83] whose members are selected after an open call on the basis of their scientific expertise, do not generate their own safety tests, but, instead, rely on available information to inform their opinions. Therefore, the General Food Law Regulation that governs EFSA's involvement in both regulatory regimes, establishes, at least on paper, a network of national organisations and public and private, scientific and lay experts with EFSA at its nexus, that would allow for broad-scale collection of diverse data and for multilevel cooperation and debate.[84] Moreover, Member States' competent bodies are represented in EFSA's Advisory Forum to ensure synergies between scientific work.[85] Lastly, under the GMO Food and Feed Regulation, EFSA may ask a national authority to carry out an assessment and it has to consult Member States when an environmental risk assessment is a mandatory part of the evaluation.[86] Nevertheless, in practice, as will be further explored in the next section, it has been observed that EFSA, arguably due to time

[79] Directive 2001/18/EC, Article 15 and 28.

[80] This concerns GMOs for cultivation *and* use as food and feed. An exception to the rule that most applications are assessed under the Food and Feed Regulation was the Amflora Potato for industrial use only, which authorisation was annulled in 2013: Commission Decision 2010/135/ of 2 March 2010 concerning the placing on the market, in accordance with Directive 2001/18/EC of the European Parliament and of the Council, of a potato product (Solanum tuberosum L. line EH92-527-1) genetically modified for enhanced content of the amylopectin component of starch (notified under document C(2010) 1193) [2010] OJ L 53/11 and Case T-240/10 *Hungary v Commission* [2013] ECLI:EU:T:2013:645.

[81] Regulation 1829/2003, Article 17(5) and Directive 2001/18/EC, Annex II and VII.

[82] Regulation 1829/2003, Article 5 (1)(2) and 17(1)(2); also M Lee, *EU Regulation of GMOs. Law and Decision-making for a New Technology* (Edward Elgar Publishing 2008).

[83] Regulation 178/2002, Article 28(4) and Commission Regulation 575/2006 amending Regulation (EC) No 178/2002 as regards the number and names of the permanent Scientific Panels of the European Food Safety Authority [2006] OJ L 100/3. The Panel Members are selected after an open call, on the basis of their scientific expertise, and with the obligation that they declare interests which might be considered prejudicial to their independence: *Policy on Independence and Scientific Decision-Making Processes of the European Food Safety Authority* (EFSA, 2011a) and *Decision Concerning the establishment and operations of the Scientific Committee, Scientific Panels and of their Working Groups* (EFSA, 2017).

[84] Regulation 178/2002, Article 22(7) and 23; see also Commission Regulation (EC) No 2230/2004 of 23 December 2004 laying down detailed rules for the implementation of European Parliament and Council Regulation (EC) No 178/2002 with regard to the network of organisations operating in the fields within the European Food Safety Authority's mission [2004] OJ L 379/64 and COM(2018) 179 final; also Bozzini 2017, p 47 on pesticides and M Weimer, 'Legitimacy through Precaution in European Regulation of GMOs? From the Standpoint of Governance as Analytical Perspective' in C Joerges and P F Kjaer (eds), *Transnational Standards of Social Protection Contrasting European and International Governance* (ARENA 2008), p 179.

[85] Regulation 178/2002, Article 27.

[86] Regulation 1829/2003, Article 6(3)(b) and (c) and 6(4). See on the possibilities for Member States' involvement at EU level also Lee 2010.

constraints, relies heavily on data produced by the industrial applicant only, calling into question the inclusiveness of its opinions that are submitted to the European Commission.[87]

The European Commission is the main risk manager for the authorisation of pesticides and GMOs;[88] its powers to adopt implementing legislation overseen by Member States through the framework of 'comitology'.[89] Although the Commission is not bound by EFSA's opinion when it decides to include a substance in the EU's list of approved active substances or authorise a GMO for cultivation, in practice, it is known to closely (and in the case of GMOs exclusively) follow EFSA's recommendations.[90] The Commission forwards its draft Decision or Regulation to the first authority in comitology: The Standing Committee on Plants, Animals, Food and Feed (PAFF).[91] PAFF consists of expert representatives nominated by Member States who, despite their technical character, often negotiate and vote according to strict instructions from their ministries.[92] PAFF votes by qualified majority, thus requiring a conclusively favourable or negative decision on the Commission's proposal.[93] In the context of pesticides, euphemistically referred to as 'phytopharmaceuticals', PAFF has more often than not been able to adopt (predominantly favourable) decisions by qualified majority to authorise or ban an active substance,[94] with the exception of particularly contentious dossiers like those on glyphosate or neonicotinoids.[95] In contrast, PAFF has never reached a qualified majority when

[87] See in the context of GMOs M Van Asselt and E Vos, 'Wrestling with uncertain risks: EU regulation of GMOs and the uncertainty paradox' (2008) 11 Journal of Risk Research 281, p 284 and Geelhoed 2016, p 24.
[88] Within the European Commission it is Pesticide and Biocides Unit within DG Sante who deals with pesticides.
[89] Regulation (EU) No 182/2011 of the European Parliament and of the Council of 16 February 2011 laying down the rules and general principles concerning mechanisms for control by Member States of the Commission's exercise of implementing powers [2011] OJ L 55/13.
[90] Under Regulation 1107/2009, Article 13, the Commission only has to take the EFSA conclusion into account, whereas under the GMO regime the Commission has to "provide an explanation for the differences" when it diverts from the EFSA's opinion: Regulation 1829/2003, Article 19(1). The Commission has been hesitant to do so, sometimes asserting that it is bound by EFSA's opinion although in Case T-177/13 *TestBioTech ev and Others v European Commission* [2016] ECLI:EU:T:2016:736 the General Court confirmed that this is not the case. See about this case also V Paskalev, 'Losing the Battle, but Winning the War? Standing to Challenge GMO Authorisations and other Acts Concerning the Environment' (2017) 8 European Journal of Risk Regulation 580. In other food safety areas the Commission has been more inclined to divert from EFSA's opinions: M Groenleer, *The Autonomy of European Union Agencies. A Comparative Study of Institutional Development* (University of Leiden 2009), p 187.
[91] Regulation 1107/2009, Article 79; Regulation 178/2002, Article 58 and Regulation 1829/2003, Article 35.
[92] C Klika et al, 'Why Science Cannot Tame Politics: The New EU Comitology Rules and the Centralised Authorisation Procedure of GMOs' (2013) 4 European Journal of Risk Regulation 327, p 330.
[93] Regulation 182/2011, Article 5.
[94] *Guidance on the environmental risk assessment of genetically modified plants* (EFSA, 2010b). Note that this does not mean that PAFF always agrees with the Commission in the context of pesticides, but that the Commission often postpones a vote if reasoned objections are raised by Committee members, with a view to further investigate or amend the proposal. See Bozzini 2017, p 50. More generally also: M Alfé et al, 'The Functioning of Comitology Committees in Practice' in T Christiansen et al (eds), *21st Century Comitology: The Role of Implementation Committees in the Wider European Union* (EIPA 2009).
[95] 'No opinion' was reached by PAFF in those cases: European Commission, 'Summary Report of the Standing Committee on Plants, Animals, Food and Feed held in Brussels on 8 November 2017 - 10 November 2017' sante.ddg2.g.5(2017)6290482 (failure to reach qualified majority on draft renewal of glyphosate) and 'Bees & Pesticides: Commission to proceed with plan to better protect bees (Press Release)' (29 April 2013) <http://europa.eu/rapid/press-release_IP-13-379_en.htm> accessed May 2022 (failure to reach qualified majority on draft ban of the neonicotinoid 'clothianidin, thiamethoxam and imidacloprid'). Other examples where PAFF was unable to vote conclusively include diquat, thiram and pymetrozine, see, for example: Commission

deciding on the Commission's consistently positive Decisions to authorise GM crops.[96] Where no opinion or a negative opinion is reached, the draft act is submitted to an Appeal Committee, whose political members are selected by Member States "with a view to achieving a level of representation as homogeneous as possible".[97] In practice, the Appeal Committee has only once been able to break the impasse in decision-making on active substances and never on GM crops.[98] When no decision is made, the ball is back in the Commission's court, who, despite absence of national support to reflect its legitimacy,[99] may still adopt its initial decision.[100]

Implementing Regulation 2018/1532 concerning the non-renewal of approval of the active substance diquat [2018] OJ L 257/10, Preamble 15.

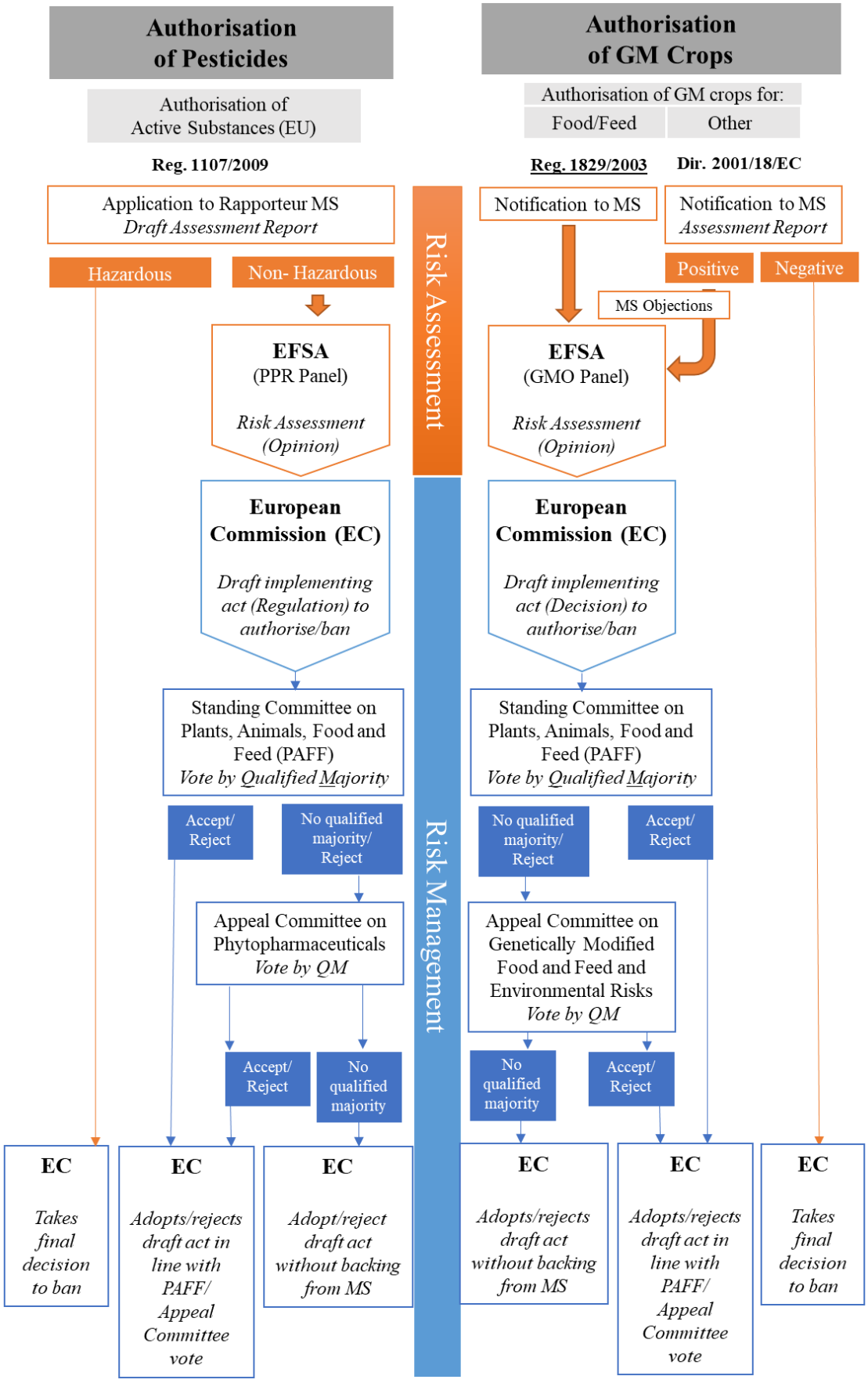
[96] Klika et al 2013, p 327 and V Paskalev, 'Can Science Tame Politics: The Collapse of the New GMO Regime in the EU' (2012) 3 European Journal of Risk Regulation 190, p 193.; see also the annual reports on the work of the comitology committees: *Bayer CropScience and others v Commission* (T-429/13 and T-451/13).

[97] Article 5(1) Appeal Committee, 'Rules of procedure for the appeal committee (Regulation (EU) No 182/2011)' 2011/C 183/05.

[98] Only in the case of the renewal of glyphosate did the Appeal Committee rule in favour of the Commission's decision: Commission Implementing Regulation 2017/2324 renewing the approval of the active substance glyphosate in accordance with Regulation (EC) No 1107/2009 of the European Parliament and of the Council concerning the placing of plant protection products on the market, and amending the Annex to Commission Implementing Regulation (EU) No 540/2011 [2017] OJ L 333/10.

[99] The European Commission has been hesitant to adopt its Implementing Acts without Member States support. Yet, examples where it has done so include the non-renewals of several neonicotinoids in 2013 and, recently, on diquat, thiram and pymetrozine. See, for example: Commission Implementing Regulation (EU) No 485/2013 of 24 May 2013 amending Implementing Regulation (EU) No 540/2011, as regards the conditions of approval of the active substances clothianidin, thiamethoxam and imidacloprid, and prohibiting the use and sale of seeds treated with plant protection products containing those active substances [2013] OJ L 139/12, Preamble 20.

[100] Regulation 182/2011, Article 6(3) "Where no opinion is delivered, the Commission *may* adopt the draft implementing act" [emphasis added]. Compare Article 5(6) Council Decision 1999/468/EC laying down the procedures for the exercise of implementing powers conferred on the Commission [1999] OJ L 184/23.



4-1 Schematic overview of risk assessment and risk management for active substances and GMOs

4.3.2. Risk Assessment: Specific Protection Goals and Ecosystem Services

It follows from the previous section that, despite a historical focus on the productivity (and thus presumed societal) benefits of risky agricultural inputs, the objective of the legal regimes on pesticides and GM crops to ensure a high level of environmental protection, underpinned by precaution, leaves scope for the adoption of an ecosystem approach that prioritises ecosystem functioning and resilience. Yet, the generic nature of the objective and qualifying provisions that hold that the product "shall have no unacceptable effects on the environment"[101] and the staged approach to risk assessment and managements, all means that such prioritisation depends first and foremost on the precise content of environmental risk assessments. Notably, it is the place and consideration of impacts on ecosystem functioning and resilience, taking into account diverse conditions and uncertainties at various levels, that determines the potential value of risk assessments as the basis for risk management decisions that support agroecology.

Of particular relevance in this regard is the very first step of risk assessment: hazard identification and problem formulation. It includes the identification of characteristics or properties of the particular product that are capable of causing potential adverse effects to the environment.[102] The most popular GMOs for cultivation, for example, have traits introduced through genetic modification to make them resistant to insects that could stifle yields or tolerant of particular herbicides to allow wide-spread use of the chemical without harm to the crop.[103] In the context of pesticides, active substances are used in agroecosystems with a view to reduce or eliminate organisms that could compete with or damage the crop, such as weeds or insects.[104] When determining the environmental impact of the product beyond its intended purpose (or 'the problem'), the abstract objective of a high level of environmental protection needs to be translated into precise goals.[105] Defining the specificities of risk assessment involves crucial but ultimately political decisions on the environmental elements that are most valued by society and that are therefore worthy of protection.[106] Nonetheless, for GMOs and pesticides – beyond the limited assessment of cut-off criteria under the Pesticides Regulation[107] – it so far has been EFSA who has primarily attempted to clarify and shape risk assessment, through its scientific

[101] Regulation 1107/2009, Article 4(3) with particular regard to the active substance's "impact on biodiversity and the ecosystem" (Article 4(3)(e)(ii)), also compare Article 49 with regard to treated seeds which sale or use may be restricted if they "constitute a serious risk" to the environment. EFSA has interpreted 'no unacceptable effect' and 'no serious risk' to mean the same: *Scientific Opinion on the development of specific protection goal options for environmental risk assessment of pesticides, in particular in relation to the revision of the Guidance Documents on Aquatic and Terrestrial Ecotoxicology (SANCO/3268/2001 and SANCO/10329/2002)* (EFSA, 2010a), p 11. In the GMO context see Directive 2001/18/EC, Annex II that states that the objective of the environmental risk assessment is to, on a case by case basis, "identify and evaluate potential adverse effects of the GMO".

[102] See, for example, EFSA 2010b, p 14.

[103] Pioneer's Maize 1507 is an example of a GMO that includes both traits: tolerance to herbicides based on glufosinate and resistance to lepidopteran 'pests'.

[104] Glyphosate, for example, is a non-selective herbicide that, when absorbed through leaves, prevents plants from making certain proteins that are necessary for growth, thus ultimately killing the broadleaf plant or grass.

[105] See, for example, EFSA 2010a, p 7 and *Guidance to develop specific protection goals options for environmental risk assessment at EFSA, in relation to biodiversity and ecosystem services* (EFSA, 2016a), p 9.

[106] See in this regard also, K M Nienstedt et al, 'Development of a framework based on an ecosystem services approach for deriving specific protection goals for environmental risk assessment of pesticides' (2012) 415 Science of the Total Environment 31, p 32.

[107] Above §4.3.1.

opinions and guidance documents. It is in this context that protection of ecosystem functions is gaining prominence. The EFSA's guidance on the environmental risk assessment of GM plants highlights several ecological functions as examples of more concrete protection aims, with reference to EU law and policy including, for example, the Water Framework Directive and the Thematic Strategies for soil protection and the sustainable use of natural resources.[108] In the context of pesticides, reference has been made to the ecological threshold concept that aims to protect sensitive populations and processes, and the ecological recovery concept that limits pesticides' exposure to an intensity that causes reversible impacts on populations only.[109]

Yet, most noteworthy are the proposals for developing 'specific protection goals' (SPGs) that aim to clarify to risk assessors "*what* to protect, *where* to protect it and over *what period of time*".[110] For risk assessment on pesticides, notably in relation to ecotoxicology,[111] EFSA's PPR Panel suggests the use of a clear and explicit 'ecosystem services' framework for deriving targeted environmental objectives.[112] In line with an understanding of ecosystem services that was put forward in Chapter 3, it defines ecosystem services as "the benefits humans receive from ecosystems" and as a concept that shows "the dependency of mankind on ecosystems".[113] In fact, it was "the causal relationship between inadequate ecosystem services and low levels of human well-being" and the potential for integrating social and environmental sustainability, that were put forward in support of the need of an ecosystem services concept for developing specific protection goals.[114] With explicit reference to the Millennium Ecosystem Assessment (MEA),[115] EFSA identifies provisioning, regulating, supporting and cultural services.[116] Moreover, when deciding on trade-offers EFSA's guidance seems to promote decisions that prioritise overall ecosystem functioning. Namely, it holds that the use of a service should (1) not lead to its exhaustion or destruction locally, (2) allow for other services, as far as possible, and for (3) the recovery capacity of the ecosystem to remain intact, (4) leave sufficient space for other services and (5) not harm its surroundings, including contingent ecosystems.[117]

In an attempt to harmonise risk-assessment procedures, EFSA recently proposed to extend the use of ecosystem services to the definition of specific goals in other areas of work,[118] including

[108] EFSA 2010b, p 17. Long-term impacts on ecosystem functions do not only include primary effects (e.g. severe depletion of the seedbank and weed flora that support biodiversity and food production), but also secondary effects (e.g. loss of habitat and food for the invertebrates and vertebrates dependent on the plants), see p 107.
[109] Nienstedt et al 2012, p 32 and *Recovery in environmental risk assessments at EFSA* (EFSA, 2016b). See also, for relevant normative work done by the European Commission, for example, European Commission, 'Guidance Document on Terrestrial Ecotoxicology Under Council Directive 91/414/EEC' SANCO/10329/2002.
[110] EFSA 2010a, p 26.
[111] Regulation 1107/2009, Annex II, par 3.8.
[112] EFSA 2010a.
[113] Ibid, p 20; see also EFSA 2016a, p 7.
[114] EFSA 2010a, p 22.
[115] Reid et al 2005; EFSA 2010a, p 21. See similarly, EFSA 2016a, p 15.
[116] EFSA 2010a, p 20. It has broken the categories down into specific services for agricultural landscapes, including, for example, food and fuel, pollination, pest, water and erosion regulation, soil formation, education, recreation and cultural heritage (p. 26).
[117] Ibid, p 20; note that EFSA 2016a, p 11 is more conservative, stating: "EFSA is not responsible for trade-off discussions, as they fall under the domain of risk management".
[118] EFSA 2016a. In addition to active substances for plant protection products and GMOs for deliberate release the Guidance extends to feed additives and invasive alien species. Apart from available guidance documents for

GMOs. However, it is important to note that all EFSA's efforts only reflect its own preferences, with a final decision on specific protection goals still having to be made by risk managers,[119] as the development of specific protection goals is subject to discussions in comitology.[120] Furthermore, significant issues have been flagged regarding the way the ecosystem services approach is being developed, interpreted, and intended to be implemented, as it follows from the Commission's sparse communications on the topic.[121] In particular, concerns have been raised regarding a lack of a comprehensive approach in proposed methodologies, which would, contrary to an ecosystem approach, seek to segment ecosystems and place great emphasis on protection of certain species and human-focused services.[122] In November 2021, the European Ombudsman also recognised the validity of a complaint regarding the lack of disclosure of a conflict of interest of a leading expert who was recruited for training and stakeholder engagement on an ecosystem services approach to formulating specific protection goals.[123]

In absence of binding rules,[124] and insofar existing documents leave sufficient leeway,[125] the implementation of an ecosystem approach to risk assessment which is truly holistic is currently still fundamentally conditioned on risk assessors' own commitment to recognise potential impacts on ecosystem functions in a specific case. This has meant, for example, that EFSA's GMO Panel did consider the potential impacts of Maize 1507 on "key ecological functions (including ecosystem services)" provided by non-target organisms, such as pollination, biological control and decomposition.[126] Yet, the Panel on PRRs noted when assessing glyphosate that consideration and protection of ecosystem services and biodiversity in risk assessment requires endorsement from risk managers,[127] thus taking a more narrow approach.

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risk assessment, the proposed framework also includes input from *Summary Report - Biodiversity as protection goal in environmental risk assessment for EU agro-ecosystems* (EFSA, 2013).

[119] EFSA 2016a, p 3: "The definition of SPGs should take place in dialogue between risk assessors and risk managers as it involves normative considerations, which cannot be set through natural sciences alone".

[120] As it stands in May 2022, the last documents of PAFF's section on phytopharmaceuticals that mentions the need to define specific protection goals dates from December 2021 and refers to a separate Working Group whose remit and details on meetings could not be found online. See also, on the status of EFSA's 'high level documents' on risk assessment: *Bayer CropScience and others v Commission* (T-429/13 and T-451/13), par 236-240: "The final decision on protection goals needs to be taken by risk managers. […] That does not, however, mean that EFSA could not rely on its own opinion in the context of the risk assessment".

[121] *Activities on environmental relevant topics in the context of the PPP Regulation (presentation)* (European Commission, 2021).

[122] Letter from Pesticide Action Network to Ms. Kyriakides European Commissioner for Health and Consumer Policy (15 February 2021, personal copy).

[123] European Ombudsman, 'Decision on how the European Commission involved stakeholders and managed conflicts of interest in reviewing the protection goals for assessing environmental risks of pesticides' 1402/2020/TE.

[124] For example, in the context of GMOs, the only available guidance for environmental risk assessment is the EFSA's Opinion: EFSA 2010b.

[125] For example, as noted above, the ecological recovery and threshold concepts under the guidance document on terrestrial ecotoxicology (SANCO/10329/2002) adopted by the European Commission, leave scope for the adoption of an ecosystem approach to risk assessment, albeit lacking details on its content.

[126] *Scientific Opinion updating the evaluation of the environmental risk assessment and risk management recommendations on insect resistant genetically modified maize 1507 for cultivation* (EFSA, 2011b), p 11.

[127] *Peer Review Report on Glyphosate - Member States' comments on the draft EFSA Conclusion on glyphosate* (EFSA, 2015b), p 27, in response to comments by Greece. Note that no references to 'ecosystem services' (or even 'ecosystem') were made in EFSA's final conclusion: *Conclusion on Pesticide Peer Review of the pesticide risk assessment of the active substance glyphosate* (EFSA, 2015a).

Crucially, although it is beyond the scope of this legal study to comprehensively assess the specific testing requirements that underpin EFSA's guidelines,[128] it is important to note that EFSA's focus on impacts on particular species mostly mean that the methodologies used also primarily aim to generate such specific information, rather than data on the ecosystem as a whole. Consequently, narrowly defined results, may convey a false sense of security that does not fully acknowledge (the potential of) complex interactions and effects. Illustrative in this regard is EFSA's position on the ecotoxicity of pesticides that losses of certain insects up to 50%, on the basis of tests run under strict laboratory conditions, are generally considered acceptable.[129] Not only may this rather political methodological choice raise some eyebrows, despite the requirement that the potential for recovery or recolonisation needs to be demonstrated, it also pays insufficient attention to the role of the insect in the wider ecosystem. The above also means that where the validity of current testing methodologies have been called into question, the impacts of continuation may extend beyond the obvious. An example in this regard is the EU's use of the FOCUS (FOrum for the Co-ordination of pesticide fate models and their USe) modelling technique – as no monitoring data will be available on first release – to assess surface water exposure to pesticides. Where studies have shown that these models have not accurately predicted insecticide or fungicide concentrations,[130] having been attributed to their failure to consider real-world scenarios,[131] the miscalculations on exposure do not only affect the specific specie under assessment, but, more generally, the ecosystem as a whole.

4.4 Risk Governance in Practice: Issues of Authority and Framing

It follows from the previous section that the responsibility for achieving a high level of environmental protection lies with the key players in the EU's authorisation procedures for active substances and GM crops. Moreover, the recognition of (short-term and long-term) ecosystem functioning as a specific (and priority) protection goal, which requires assessment of potential risks posed by the product in question for such functions, is an indispensable step for the effective implementation of an ecosystem approach. Yet, the fact that contentious and potentially inadequate proposals have been on regulators' agendas for years without political endorsement, mean that ecosystem functions have only found protection on an *ad hoc* basis with existing testing methods still being unsuitable for the achievement of holistic aims.[132]

The regimes' risk-based approach that focuses on the potential for or lack of environmental impact, specifically on particular biotic or abiotic components rather than the ecosystem as a whole, signals an understanding of the problem of food production that relies on simplification of the natural or environmental realties that underpin agriculture. Moreover, proposals for

[128] Note that EFSA's testing requirements are often themselves based on international OECD protocols.
[129] SANCO/10329/2002.
[130] A Knäbel et al, 'Fungicide field concentrations exceed FOCUS surface water predictions: urgent need of model improvement' (2014) 48 Environmental Science & Technology 455; A Knäbel et al, 'Regulatory FOCUS surface water models fail to predict insecticide concentrations in the field' (2012) 46 Environmental Science & Technology 8397.
[131] R B Schäfer et al, 'Future pesticide risk assessment: narrowing the gap between intention and reality' (*Environmental Sciences Europe* 2019) <https://enveurope.springeropen.com/articles/10.1186/s12302-019-0203-3> accessed May 2022.
[132] Ibid.

change, promising for a cognitive-normative complex that could embrace agroecological thinking, are largely overshadowed by the dominance of structural, institutional frameworks, and accompanying decision-making processes that are incompatible with a system that seeks to prioritise the protection of ecosystem functioning and resilience. As discussed above,[133] the legal regimes, on paper, allow for broadscale collection of information, from public and private, scientific and lay experts, to be translated into an advisory statement that could underpin a risk-management measure. However, the workings of the EU's one-door-one-key risk-assessment procedures for active substance and GM crops, with EFSA as their main operator, have been criticised for their bias towards certain sources of information over others[134] and this lack of inclusiveness inhibits the adoption of an approach that fully embraces ecosystem complexity.

This section seeks to shed light on how the organisational complex that underpins EU risk governance, notably the way it distributes authority through its deliberation and decision-making processes, is indicative of a paradigm that supports an industrial world view on food production. In this regard, it discusses how normative choices in EU risk-assessment processes reflect favouritism towards certain sources of information over other types of knowledge. It also discusses why, in many cases, the staged approach to risk governance means that disregard for diverse or alternative authorities in risk assessment, has a trickle-down effect; limiting the possibilities for risk managers to adopt a comprehensive and inclusive approach that prioritises the protection of ecosystem functions. In other cases, it is shown that risk managers themselves choose to adopt a narrow and incomplete scientific base for their political decisions to authorise industrial agricultural inputs. This section, lastly, analyses the extent to which the new regulation on transparency and sustainability of the EU risk assessment in the food chain enhances inclusivity of risk governance and the distribution of authority in support of agroecological change.[135] It finds that, although the regulation brings some welcome elements, it does not effectively move beyond a 'public deficit' model of risk reform which pushes information to authority in an improved way rather than brings authority to information.

4.4.1. Risk Assessment: Disregard for Subjectivity and Diversity of Knowledge

An analysis of the practical issues that plague the EU's risk assessment of active substances and GMOs for cultivation, requires a few more general words on the nature of science in risk governance. In particular, on the fact that risk assessment is part of a 'sound science' approach to the authorisation of products that could potentially have negative environmental impacts; the idea that science as the basis for decision-making (with a scientific assessment preceding political deliberation) would reduce conflict. Sound science can in this regard primarily be

[133] §4.3.1.

[134] The 'one-door-one-key' principle of food law means that the regimes "apply a single procedure to assess all relevant risks": European Commission, 'Green Paper on the General Principles of Food Law in the European Union' COM(97) 176 final, p 36. See more extensively in the context of GMOs also M Bernd Van Der and Y Neshe, 'One-Door-One-Key Principle: Observations Regarding Integration of GM Authorization Procedures in the EU' (2014) 118 Penn State Law Review 877.

[135] Regulation (EU) 2019/1381 of the European Parliament and of the Council of 20 June 2019 on the transparency and sustainability of the EU risk assessment in the food chain and amending Regulations (EC) No 178/2002, (EC) No 1829/2003, (EC) No 1831/2003, (EC) No 2065/2003, (EC) No 1935/2004, (EC) No 1331/2008, (EC) No 1107/2009, (EU) 2015/2283 and Directive 2001/18/EC [2019] OJ L 231/1.

understood as objective knowledge. As has been argued by Jasanoff, objectivity is the ultimate source of authority for regulatory science and provides a "rationale for power".[136] In other words, the reason why – in general – we trust regulators to make decisions on our behalf on the basis of institutionalised knowledge – even when generated above national/local levels – is that we believe that the underlying 'objective' information is capable of legitimising high level policy. It is not objectivity as an abstract notion that explains the issues discussed in this section, but an interpretation that objective science "speak[s] only in the singular voice of Nature".[137] Equating objectivity with simple fact ignores the complexities that characterise scientific evaluations of risk and local ecosystem dynamics, and that objective opinions and conclusions disguise normative choices.[138] Various concepts that relate to objectivity, such as impartiality, neutrality and being free from bias,[139] still require the making of value-judgements as to their precise content in a given context. As Jasanoff says: "objectivity reflects, in this sense, locally powerful ideologies of public reason".[140] Or, put simply: objectivity is inherently subjective.

It follows from the previous sections that EU law, policy and other relevant documents, notably guidance on risk assessment, leave some scope for the adoption of an ecosystem approach that prioritises ecosystem functioning and resilience. This also means that the EU's science-based approach does not necessarily oppose agroecological transitions; dispelling a myth that – contrary to industrial practices – an agroecological approach is devoid of scientific backing. This section reveals that the tendency of EU risk assessment to favour the uptake and use of pesticides and GMOs can be attributed to the subjective and often hidden choices that inform EFSA's scientific conclusions. In particular, these concern responses to the question what type of knowledge is considered to be most relevant and, consequently, how authority should be distributed among industrial actors, experts, farmers, the public etc. to inform and frame debate.

Regarding the above there is an important procedural aspect that impacts on the way authority is attributed. Under the risk regimes, it is the industry itself who provides the very foundations for EU or national scientific conclusions, as the applicant is obliged to submit a technical dossier when seeking approval for the product, which must already contain a full environmental risk assessment.[141] To many this may be considered a peculiar choice in itself, which puts pressure on the idea that objectivity is best achieved by "detaching knowledge from potentially biased standpoints".[142] As explained by the European Commission, the EU's reliance on industry inputs stems from "the principle that it is for the applicant to prove that the subject matter of an authorisation procedure complies with Union safety requirements given the

[136] S Jasanoff, 'The Practices of Objectivity in Regulatory Science' in C. Camic et al (eds), *Social Knowledge in the Making* (University of Chicago Press 2011), p 311.
[137] F Wickson and B Wynne, 'The anglerfish deception. The light of proposed reform in the regulation of GM crops hides underlying problems in EU science and governance' (2012) 13 EMBO Rep 100, p 101.
[138] See, on issues regarding claims of 'objective' science in the context of EU risk regulation also L Levidow and S Carr, 'Europeanising advisory expertise: the role of `independent, objective, and transparent' scientific advice in agri-biotech regulation' (2007) 25 Environment and Planning C: Government and Policy 880.
[139] Jasanoff 2011, p 308.
[140] Ibid.
[141] Article Article 6(1) and (2)(a) and (vii) and Annex II Directive 2001/18/EC; see also V Storck et al, 'Towards a better pesticide policy for the European Union' (2017) 575 Science of The Total Environment 1027, p 1030.
[142] Jasanoff 2011, p 310.

scientific knowledge in its possession [and the idea that] public money should not be used to commission costly studies (several thousand to several million Euros) that will eventually help the industry to place a product on the market".[143] The dossier includes the industry's own or commissioned safety studies, which may be the only relevant source of knowledge available if applications concern new products that have not yet otherwise been tested and used within the EU or comparable environments.[144] Yet, the EU relies on procedural practices and tools to produce what it would consider to be objective scientific assessments, that serve as a basis for risk-management decisions. For example, in the context of pesticides,[145] dossiers are required to include scientific peer-reviewed open literature dealing with effects on the environment and non-target species, from the last ten years,[146] to be selected on the basis of fundamental principles of systemic review: methodological rigour, transparency and reproducibility.[147] Furthermore, as already discussed in section §4.3.1, it establishes a network with EFSA's at its core, for broad-scale collection of information and comprehensive debate and peer-review.

However, the inclusiveness of dossiers when it comes to the systematic integration of findings from independent studies has been questioned,[148] and the scientific opinions and conclusions by national risk assessors and EFSA are held to be largely based on the data and science generated by the applicant only.[149] For example, in the case of Maize 1507 EFSA's reliance on industry studies has been explained in light of absence of independent science. The lack of independent thinking was even more prominent in the case of glyphosate, with the German Federal Institute for Risk Assessment (BfR) and EFSA having been criticised for copying entire pages from the applicant's dossier into the assessment report for the renewal of the authorisation, thus effectively making the content of these industry studies their own.[150] As will be further explored in Chapter 6, the way the authorisation procedures place authority with input industries at the expense of local actors including (agroecological) farmers mimics and exacerbates power imbalances that exist within the wider supply chain and food system.[151]

[143] COM(2018) 179 final, Explanatory Memorandum, p 3.
[144] Where independent studies are available, assessments submitted by the applicant, who seeks to profit from securing market access, have been held to be more inclined to confirm safety: *Conflicts on the menu. A decade of industry influence at the European Food Safety Authority (EFSA)* (Corporate Europe Observatory and Earth Open Source, 2012), p 10. J Diels et al, 'Association of financial or professional conflict of interest to research outcomes on health risks or nutritional assessment studies of genetically modified products' (2011) 36 Food Policy 197.
[145] See in the context of GMOs for food and feed also: *Guidance for renewal applications of genetically modified food and feed authorised under Regulation (EC) No 1829/2003* (EFSA, 2015c) on data provision requirements for authorisations for renewal, including "systematic search and evaluation of literature".
[146] Implementing Regulation 2017/2324, Article 8(5).
[147] *Guidance of EFSA. Submission of scientific peer-reviewed open literature for the approval of pesticide active substances under Regulation (EC) No 1107/2009* (EFSA, 2011c). See also, hereafter §4.4.3, on the enhanced inclusivity under the new Regulation 2019/1381.
[148] *White Paper on ensuring a higher level of protection from pesticides in Europe. The problems with current pesticide risk assessment procedures in the EU - and Proposed solutions* (Citizens for Science, 2018), p 30.
[149] See, for example, COM(2018) 179 final, p 2; Citizens for Science 2018, p 30-32. A notable exception is the reassessment of neonicotinoids, see Bozzini 2017, par 78.
[150] S Weber et al, *Detailed Expert Report on Plagiarism and superordinated Copy Paste in the Renewal Assessment Report (RAR) on Glyphosate* (2019).
[151] Chapter 6, §6.3.

Indeed, for agroecology, the attribution of determinative authority to a single source of knowledge is particularly problematic, as an ecosystem approach, which prioritises the conservation of complex and potentially locally divergent ecosystem functions, requires recognition and mediation of diverse perspectives. Moreover, heavy reliance on information of certain origin only, means that, in practice, the holder of such knowledge has considerable power in the shaping of scientific and political debate.[152] With regard to an ecosystem approach to risk regulation, three elements are especially relevant: (1) choice of baseline of receiving environments (2) recognition of uncertainty and (3) the space for other public concerns.

Firstly, the safety assessment's choice of baseline is paramount for determining its support or impediment of food system change. Safety is not an absolute concept: positive or negative scientific conclusions on safety will depend on the context in which potential use of a product is considered. In particular, the content of such opinions depend on what assessors take as the appropriate baseline status of the receiving environment, which serves as a point of comparison or starting point against which any effects arising from product use are assessed.[153] The receiving environment does not only include natural biotic and abiotic components, such as biodiversity, but also human elements like specific agro-management systems for cultivation, pest management and conservation.[154] In the context of pesticides, the Pesticides Regulation recognises the need to take "due account of local conditions and of the possibilities for cultural and biological control".[155] With regard to GMOs, EFSA's Guidance Document on environmental risk assessment explicitly recognises the "broad range of environments in terms of fauna and flora, climatic conditions, habitat composition and ecosystem functions" in the EU and that this environmental heterogeneity is a cross-cutting consideration that influences every step of the case-by-case risk-assessment process.[156] It also acknowledges the great diversity in current and continuously evolving agroecosystem management practices and cultivation techniques, ranging from intensive, to integrated and organic.[157] The applicant is asked to consider worst-case scenarios in which exposure and impacts are expected to be the highest,[158] and to consider changes in agro-management techniques, drawing comparisons in particular with pest management of non-GM counterparts that is compatible with the principles of good agricultural practice and Integrated Pest Management that are being introduced under

[152] See the next section §4.4.2 on the close link between scientific opinions and political management decisions.
[153] Council Decision of 3 October 2002 establishing guidance notes supplementing Annex VII to Directive 2001/18/EC of the European Parliament and of the Council on the deliberate release into the environment of genetically modified organisms and repealing Council Directive 90/220/EEC [2002] OJ L 280/27.
[154] See, for example, EFSA 2010b, p 23.
[155] Regulation 1107/2009, Article 3(18), which provides a definition of "Good Plant Protection Practice" (GPP). GPP is relevant in the context of the approval of active substances, although risk assessment only evaluates "one or more representative uses of at least one plant protection product containing that active substance": Regulation 1107/2009, Article 4(2)(3) and (5), and also Annex II, par 3.2, with further analysis of impacts of use of pesticides in national and local contexts being left to the realm of Member States, see Regulation 1107/2009, Article 49 and hereafter §4.5.1. Note that the proposed specific protection goals also require consideration of "spatial and temporal dimensions of use and hence of agro-ecological scenarios", see EFSA 2010a, p 13. See also, hereafter, §4.5.1 on the restricted scope of the EU's risk assessment.
[156] EFSA 2010b, p 20; J N Perry et al, 'Response to "The anglerfish deception"' (2012) 13 EMBO reports 481.
[157] EFSA 2010b, p 70.
[158] Ibid, p 25.

the Sustainable Use of Pesticides Framework.[159] Yet, despite recognition of the need to be comprehensive in EFSA's Guidance, the level to which the applicant's studies on GMOs and, consequently, EFSA's opinions, are, in practice, inclusive of diverse conditions is disputable.

Although the involvement of national risk assessors would allow for integration of concern of impacts on local ecological realities,[160] EFSA has been accused of "aggressive treatment of national work".[161] Requests from national authorities for additional information regarding the representativeness of studies conducted by the applicant in particular Member States only, have been dismissed by EFSA by simply stating that field trials "allow for conclusions for other European environments".[162] Similarly, in the context of pesticides, national authorities have shown only limited interest in participation in peer-review as they have felt that their comments are not taken into account properly by EFSA.[163] The supposed universality is contrary to an ecosystem approach that emphasises the need for adaptive management, and which allocates powers to those actors that are closest to the ecological realities that decision-making impacts on.[164] Moreover, EFSA bases a GMO's relative safety on comparisons with level of harm caused by current and predominantly industrial practices[165] that are more representative than "untreated' regimes which may be agronomically less realistic",[166] despite the known impacts on industrial agriculture on the environment. It thus fails to use the potential of its opinions to go beyond maintenance of current food systems, towards food system change. Similarly, in the context of pesticides, the applicant in the glyphosate dossier tried to argue that environmental risk assessment on active substances is not the right forum for a broad debate on what "Europe wants to produce and protect on its farms and arable land",[167] in response to the RMS' findings

[159] Ibid, p 69. Although options for integrated pest management have some relevance within the environmental risk assessment of active substances (e.g. Regulation 1107/2009, Annex II, par 3.2), the consideration of alternative pest control is mainly left to Member States, see, Regulation 1107/2009, Article 50 and Annex VII. See also, Directive 2009/128/EC.

[160] P Dabrowska-Klosinska, 'Towards more experimentalism in the EU governance on GMO risks?: Regulatory experience, responsive reforms and remaining problems' (American Political Science Association - Annual Meeting, Chicago (USA), 2013); see also Perry et al 2012, p 482 and above §4.3.1.

[161] D Chalmers, 'Risk, anxiety and the European mediation of the politics of life' (2005) 30 European Law Review 649, p 661.

[162] *Application EFSA-GMO-CZ-2008-54 (MON88017 maize CULTIVATION) – Scientific comments and opinions submitted by EU Member States (National Competent Authorities under Directive 2001/18/EC) during the three-months consultation period* (EFSA, 2008) ('Member States' comments Mon88017'); also *Application EFSA-GMO-NL-2005-23 (maize 59122) - Comments and opinions submitted by Member States during the three-month consultation period* (EFSA, 2005a) and Geelhoed 2016, p 17. See also J Mcglade and S V D Hove, 'Ecosystems and managing the dynamics of change' in D Gee et al (eds), *Late lessons from early warnings: science, precaution, innovation* (European Environment Agency 2013), p 408 on different scientific approaches that can explain why significant differences between sites can be overlooked due to methodological choices.

[163] A Dinu and E Karamfilova, *European Implementation Assessment of Regulation (EC) 1107/2009 on the placing of plant protection products on the market* (European Parliamentary Research Service, 2018), p 49.

[164] Chapter 3, §3.4.4 on the ecosystem approach's principle on the prioritisation of the conservation of ecosystem functioning and resilience.

[165] EFSA 2010b, p 24: "Relevant baselines refer to current production systems for which generally published literature is available". Also, *Scientific Opinion on an application (EFSA-GMO-NL-2005-24) for the placing on the market of the herbicide tolerant genetically modified soybean 40-3-2 for cultivation under Regulation (EC) No 1829/2003 from Monsanto* (EFSA, 2012a), p 59.

[166] EFSA 2010b, p 21.

[167] *Peer Review Report on Glyphosate: Comments of Glyphosate Task Force on the renewal assessment report on glyphosate* (EFSA, 2015), p 49.

on potential indirect effects of biodiversity.[168] Although EFSA did briefly recognise the importance of the issue of indirect effects, it left evaluation to the realm of risk managers.[169]

The second element of environmental risk assessment that is crucial for an ecosystem approach to risk regulation is acknowledgement of uncertainties, as a precondition for precaution.[170] As discussed in Chapter 3 and above,[171] technological innovation and ecosystem dynamics are characterised by complexities that often surpass our understanding or inhibit firm conclusions. Scientific uncertainty does not only arise when scientific evidence is insufficient, but also when evidence itself or its interpretation by experts is contradictory.[172] Uncertainty comes in various guises: it can concern the probability, magnitude of risk or both,[173] or – more problematically – it can concern the very nature of the problem itself.[174] The importance of acknowledgement of and transparency towards scientific uncertainty is recognised throughout documents that underpin environmental risk assessment at EU level. In the context of pesticides, the Pesticides Regulation requires consideration of uncertainty of data when assessing ecotoxicology,[175] and, among others, its Guidance on Risk Assessment for Birds and Mammals lists major sources of uncertainty, including variability, reliability, representativeness and quality of evidence.[176] For GMOs, EFSA's Guidance recognises that "it may be impossible to identify all the uncertainties, [but that] the assessment shall include a description of the types of uncertainties encountered and considered during the different risk assessment steps".[177] In essence, it demands acceptance of the limited scope of the risk assessment, which "is only as good as our state of scientific knowledge at the time it was conducted".[178] Yet, it confirms that the primary responsibility to acknowledge and integrate uncertainty lies with the industrial applicant. In practice, the latter and, subsequently, EFSA have not been keen to highlight the potential but uncertain risks of GMOs, and only with regard to the authorisation of the Amflora Potato did two dissenting panellists affirm for the first time the limits to "the current state of knowledge".[179] When evidence has been submitted by Member States to dispute studies by the applicant, EFSA has dismissed its relevance with simple reference to the information that it aimed to contradict,[180]

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[168] *Risk assessment provided by the rapporteur Member State Germany and co-rapporteur Member State Slovakia for the active substance Glyphosate - Final addendum to the Renewal Assessment Report* (RMS Germany, 2015). The RMS, for example, states that: "glyphosate must therefore be considered the most significant herbicide regarding indirect effects".

[169] EFSA 2015a, p 18. Note that no further reference to these "indirect effects (biodiversity) on non-target organisms via trophic interaction of extensively used herbicides such as glyphosate" were made in the conclusion.

[170] See, hereafter, §4.4.2.

[171] §4.2.2 and Chapter 3, §3.3.4.

[172] COM/2000/1 final, par 5.1.3; see also *Pfizer* (T-13/99) and A-M Janssen and M B a V Asselt, 'The Precautionary Principle in Court. An Analysis of Post-Pfizer Case Law' in M B a Van Asselt (ed), *Balancing Between Trade and Risk Integrating Legal and Social Science Perspectives* (Routledge 2013) on the potential issues arising from a too permissive interpretation of the ruling for the meaning of the precautionary principle.

[173] See, for example, EFSA 2010b, p 34.

[174] See ibid, p 34: "uncertainties may arise from problem formulation". However, it follows from *Pfizer* (T-13/99), par 143 that a precautionary, "preventive measure cannot properly be based on a purely hypothetical approach to the risk" meaning that a certain level of understanding regarding the character of potential risk is required.

[175] Regulation 1107/2009, Annex II, par 3.8.

[176] *Risk Assessment for Birds and Mammals* (EFSA, 2009), Figure 21.

[177] EFSA 2010b, p 34.

[178] Ibid, p 34.

[179] Paskalev 2012, p 203; *Hungary v Commission* (T-240/10), par 37.

[180] For example, EFSA 2008.

rather than admitting to uncertainty. Only in the supplementary scientific opinion on Maize 1507 did EFSA show some willingness to acknowledge counterevidence of possible and regional-specific risks, thereby repealing its initial firm conclusion that the corn would "not have an adverse effect".[181] Although EFSA has been more transparent towards limits to science in the context of pesticides, its recognition of uncertainty mainly concerns acknowledgement of data gaps.[182] However, where studies are inherently conflicted, or where alternative evidence is presented, risk assessor's reconciliation through an unsystematic weight-of-evidence approach or the exclusion of independent studies on the basis of incomprehensive criteria,[183] inhibits proper assessment of all relevant information to reveal genuine uncertainty.[184]

Lastly, another problematic element of risk assessment that requires to be flagged in the context of this Chapter, but which will be discussed in more detail in Chapters 6 on equity and human rights, concerns the place of other public concerns in risk assessment.[185] The EU's focus on risks of environmental safety has meant that so-called ethical, social, or socioeconomic concerns are often dismissed for being outside the scope of risk assessment due to their 'non-environmental' and 'non-scientific' character.[186] Two observations are worth making in this regard. Notably, it follows from Chapter 3 that the ecosystem approach, contrary to EFSA's silo mentality, emphasises important linkages between its environmental objective to prioritise the conservation of ecosystem functioning and its social aim to foster equity, in recognition of the fact that human beings are considered an integral part of ecosystems.[187] It highlights the close relationship between biodiversity, ecosystems and wellbeing that stands in the way of a strict divide between environmental versus social concerns; between science versus politics. In this regard, as will be further analysed in Chapter 6,[188] the framing of problems as ethical, social, or socioeconomic, disregards the fundamental nature of the interests at stake, with various issues – such as the inequitable distribution of costs and benefits and power within the

[181] *Scientific Opinion supplementing the conclusions of the environmental risk assessment and risk management recommendations on the genetically modified insect resistant maize 1507 for cultivation* (EFSA, 2012b): "there is a potential hazard to non-target lepidopteran larvae on their host-plants in fields cropped with non-Lepidoptera-active crops when they neighbour the maize 1507 field under consideration". See also, Van Asselt and Vos 2008 and V Paskalev, 'GMO Regulation in Europe: Undue Delegation, Abdication or Design Flaw?' (2015) 6 European Journal of Risk Regulation 573 on EFSA's "uncertainty intolerance".

[182] See, for example, EFSA 2015a, p 3 (Summary): "For the section on ecotoxicology, two data gaps were identified to provide an assessment to address the long-term risk for small herbivorous mammals and for insectivorous birds". See on the persistent shortcomings in recognition of incomplete dossiers, however, Citizens for Science 2018, p 27.

[183] Citizens for Science 2018, paras 2.5 and 2.9.

[184] Notably, COM(2018) 179 final: "Divergences between Union and national risk assessor […] can be explained by a variety of factors including for instance: the legal framework to which the question refers, the type of question put to scientific bodies by the relevant risk managers and how these are framed, whether the assessment relates to a hazard or a risk, the methodologies followed, or the data, which are utilised. The reasons underlying differences […] should be better communicated to the public in order to facilitate their understanding." See also, Levidow and Carr 2007, p 891 on the issue of delegating responsibility for adjudicating expert disagreements to a 'non-political' EU actor.

[185] Chapter 6, §6.3.

[186] M Kritikos, 'Traditional risk analysis and releases of GMOs into the European Union: space for non-scientific factors?' (2009) 34 European Law Review 405, p 418;

[187] Chapter 3, §3.4.5.

[188] Chapter 6, §6.2.

agricultural supply chains – not only having impacts on farmers' agroecosystem management decisions but also on their human rights as protected under international and EU law.

Where this section has highlighted issues that are related to the procedures that underpin scientific conclusions, and the implementation of more detailed guidance documents, EFSA structurally fails to recognise that any normative choices in the process of the generation of regulatory knowledge are ultimately informed by the answers to comprehensive questions on the role of agricultural inputs in our food system. For GMOs, EFSA has stated that it is not empowered to integrate such broader notions into its work.[189] For pesticides, concerns that "combine human and ecological interests" have been recognised in guidance on risk assessment,[190] and further integration can be expected if EFSA's proposed ecosystem-services framework is formerly adopted.[191] Yet, in practice, it follows from the above that EFSA has left reflections on indirect effects – which include those on wellbeing beyond direct health impacts – to the next stages of authorisation.[192] Moreover, and despite opportunities for public participation in risk assessment,[193] EFSA's emphasis on particular sources of authority or on a specific understanding of science has meant that the role of other actors has been very limited, with it being believed that the issues are "exclusively technical and the European public is not appropriately trained on risk technologies".[194] A vicious 'chicken-or-the-egg' cycle, in which problems are framed in such a way to render other expertise irrelevant and which limits the potential of 'lay' experts to bring new issues to the table, means that consideration in risk assessment of fundamental public concerns, linked to ecosystem degradation, is very limited.

4.4.2. Risk Management: Restricted Actions, Precaution and Equitable Solutions

It follows from the above that a lack of transparency regarding subjective choices that underpin objective risk assessments and heavy reliance on limited sources of information to inform such choices, make that EU risk assessments have in general favoured the authorisation of pesticides and GM crops. It has also been argued that the primary cause of the persistent problems of EU risk assessment is not law itself or even EFSA's willingness, on paper, to embrace diverse considerations, but rather the implementation of an approach that wrongly has put certainty and universality at the core of regulatory knowledge generation. With reference to examples from the GMO regime, this section demonstrates how risk assessment's excluding nature impacts on the ability of EU risk managers to take decisions in accordance with an ecosystem approach to risk regulation.[195] Furthermore, even when (uncertain) risks to ecosystem services

[189] EFSA 2010b, p 10. See, more generally, also Levidow and Carr 2007, p 885 on the idea behind the constitution of EFSA, which very aim would have been to ensure that risk assessment work is not "swayed by policy or other external considerations".
[190] SANCO/10329/2002, p 4.
[191] EFSA 2010a, p 22 states: "the ecosystem services approach provides a vehicle for integrating social and environmental sustainability".
[192] See, for example, EFSA 2015a, p 18 in which the RMS' extensive findings on indirect effects were considered "an important risk management issue" – see also above §4.4.1 on the baseline..
[193] See, for example,]Directive 2001/18/EC, Article 24; Regulation 1829/2003, Article 6(7) and Regulation 1107/2009, Article 12(1). See also, *EFSA Stakeholder Engagement Approach* (EFSA, 2016c).
[194] Quote by a member of EFSA's Management Board in Kritikos 2009, p 419; see also Bozzini 2017, p 47 on the practical limitations on public participation "on highly technical toxicological dossiers".
[195] See hereafter §4.5 with regard to similar restrictions being imposed on national risk managers.

are recognised in risk assessment, EU risk management on pesticides illustrates that much is still needed for decisions to prioritise the conservation of ecosystem functioning and resilience.

"Risk management corresponds to the body of actions taken by an institution faced with a risk in order to reduce it to a level deemed acceptable for society having regard to its obligation to ensure a high level of protection of public health, safety and the environment".[196] Protective actions can be to refuse or withdraw authorisation, to impose mitigation measures like safety requirements for the use of protective gear or the instalment of buffer zones, or monitoring measures. When determining the level of risk that is acceptable to society, risk managers have discretion to take account of other factors relevant to the matter. Like the observations made above on risk assessment, regarding risk management the EU's General Food Law also describes other public concerns to include "societal, economic, traditional, ethical and environmental factors and the feasibility of controls",[197] indicating potential inattention to the fundamental (and legal) character of the interests at stake. Notably, factors could include costs and benefits associated with the use of a (potentially) risky product,[198] and its distribution. Whereas EU risk-assessment procedures do not require submission by the applicant of data on non-safety impacts, some avenues for participation in risk management have been created. For example, in the context of GMOs, the public – albeit retrospectively – may make comments to the Commission within 30 days of the publication of EFSA's opinion.[199] And the Commission is able to consult a committee on its own initiative or at the request of the European Parliament, the Council or a Member State to gain insight on the ethical implications of biotechnology.[200]

However, a vital precondition for inclusive risk management that takes account of any public concern when determining the acceptable level of risk, also when faced with uncertainties, is often not met. Put simply, to manage a (potential) risk, there needs to be a (potential) risk.[201] Notably in the context of GMOs, EFSA's strong conclusion in the majority of its opinions that the particular GM crop "has no adverse effect" on health or the environment,[202] leaves the risk managers' hands tied. The staged approach of EU risk regulations and their focus on safety concerns limits the autonomous value of stakeholder concerns that are not linked to (potential) direct environmental impacts.[203] Although ideological arguments can be made against the sole focus of EU (and international) trade law on scientifically substantiated safety risks to validate restrictions,[204] such an approach is – as long as science is interpreted in a holistic and inclusive

[196] Case T-257/07 *French Republic v European Commission* [2011] ECLI:EU:T:2011:444, par 81.
[197] Regulation 178/2002, Preamble 19; Article 13(2) Regulation 1107/2009 and Article 7 Regulation 1829/2003.
[198] See, for example, Bozzini 2017, p 84, also noting that the possibilities and limits of inclusion of such considerations as part of an 'Integrated Impact Assessment' are poorly defined in the EU.
[199] Regulation 1829/2003, Article 22(1). Note that for pesticides, public comments submitted under Regulation 1107/2009, Article 11, become part of the peer review report, which is publicly available online.
[200] Directive 2001/18/EC, Article 29, for example, the European Group on Ethics in Science and New Technologies.
[201] Case T-31/07 *Du Pont and Others v European Commission* [2013] ECLI:EU:T:2013:167, par 137; see also *Bayer CropScience and others v Commission* (T-429/13 and T-451/13), par 112.
[202] See, for example, *Opinion of the Scientific Panel on Genetically Modified Organisms for the placing on the market of insect-tolerant genetically modified maize 1507 for import, feed and industrial processing and cultivation from Pioneer Hi-Bred International/Mycogen Seeds* (EFSA, 2005b).
[203] Chapter 6, §6.3.2.
[204] See, for example, Weimer 2008; Kritikos 2009 and Paskalev 2012.

manner – not necessarily contrary to an ecosystem approach. Indeed, it follows from Chapter 3, that the ecosystem approach emphasises relations between ecosystem functioning and social impacts. The latter includes questions such as who benefits from risky management decisions and who may be negatively impacted. This underscores the importance of better recognition of risks to local, ecological, and often uncertain realities as foundations for a broader debate.[205]

Nevertheless, where impacts on ecosystem functions are recognised in risk assessment,[206] EU risk managers have yet to use their broad discretionary powers to use this scientific basis to prioritise the conservation of such functions and tackle complex distributive challenges in each case. A report by the Pesticide Action Network Europe from 2012 observed that until then not a single pesticide had been banned on environmental grounds, despite the fact that with regard to many active substances that are still authorised in the EU, the environmental risk assessment and EFSA's conclusion had identified significant environmental concerns or uncertainties.[207] For example, the fungicide myclobutanil was found to be extremely persistent and the assessment recognised significant data gaps,[208] the insecticide pyridaben was held to pose high risks to various water organisms, birds, mammals, bees and non-targeted anthropods,[209] and EFSA's conclusions on glyphosate emphasised concerns by the RMS on indirect effects on non-target organisms as "an important risk management issue".[210] Moreover, environmental concerns were on occasion highlighted by Member States in comitology, but authorisations were nonetheless confirmed.[211] The Commission has been firmly criticised for its approval of pesticides when significant information is missing, whilst allowing the applicant to validate the approval retrospectively by submitting 'confirmatory data' on safety,[212] thus leaving the environment exposed to risk during substantial periods of the unknown. The European Ombudsman condemned the practice for being "unlawful and contrary to the principles of good administration".[213] Moreover, in cases where EFSA had identified 'critical areas of concern' the European Ombudsman found it "difficult to understand how the Commission could legitimately decide that […] the use of PPPs containing these active substances, would have no harmful effect on human or animal health and no unacceptable influence on the

[205] Chapter 3, §3.4.4 and 3.4.5.
[206] Bozzini 2017, p 48 notes that, contrary to GMOs, for pesticides, in 2016, only two EFSA reports did not signal any concerns out of a total of 25 procedures.
[207] *Twisting and bending the rules: in 'resubmission' all efforts are aimed to get pesticides approved* (PAN Europe, 2012), p 11.
[208] Ibid, Annex and *Conclusion on the peer review of the pesticide risk assessment of the active substance myclobutanil* (EFSA, 2010c).
[209] PAN Europe 2012, Annex and *Conclusion on the peer review of the pesticide risk assessment of the active substance pyridaben* (EFSA, 2010d).
[210] EFSA 2015a, p 18.
[211] See, for example, the comments by the Netherlands in the PAFF of the risks of thiacloprid to bees: European Commission, 'Summary Report of the Standing Committee on Plants, Animals, Food and Feed Section Phytopharmaceuticals - Legislation from the Meeting held in Brussels from 12 – 13 December 2018' sante.ddg2.g.5(2019)1264306. See also Member States' reasons for abstention/negative opinion on renewing the approval of zoxamide due to potential leaching of metabolites in groundwater and lack of data on non-target organisms: European Commission, 'Summary Report of the Standing Committee on Plants, Animals, Food and Feed Section Phytopharmaceuticals - Legislation from the Meeting held in Brussels from 22 - 23 March 2018' sante.ddg2.g.5(2018)3683504.
[212] PAN Europe 2012.
[213] European Ombudsman, 'Proposal of the European Ombudsman for a solution to complaint 12/2013/JN against the European Commission' 12/2013/MDC.

environment".[214] With limited insight into the precise reasons behind Commission's decisions, it is difficult to know to what extent other considerations play a role in risk management on pesticides. The recent, phased ban on neonicotinoids, which is still rather unique for its purely environmental justifications,[215] illustrates that recognition of environmental safety risks – both in risk assessment and management – is a critical basis for a fundamental debate at EU level on the way we want to produce food. Because only when the expanded EU-wide restrictions on neonicotinoids were imminent, and despite decades of use,[216] did it become clear that non-chemical alternative methods were readily available for 78% of neonicotinoid applications.[217]

4.4.3. Regulation 2019/1381: Beyond a 'Public Deficit' Model of Participation?

It follows from the above that the (potential) safety risks of active substances of pesticides and GMOs for cultivation are often assessed and managed at EU level on the basis of very limited sources of information, with objectivity primarily and presumably to be achieved through procedural checks rather than expansion of the knowledge base. The EU's heavy reliance on specific sources of authority that proclaim uniform truths can only be understood as both a problem of law – as the sequence of processes favours some sources over another – and of implementation – where both law and policy call for inclusivity and comprehensive to risk governance but assessors and/or managers have failed to realise such an approach. These structural failings of EU risk governance signal an underlying understanding of the role of external inputs in food production that favours their uptake and continuous use. For the purpose of this thesis, the problems that have been analysed in this section mean that the already limited potential for the implementation of an ecosystem approach in the context of the current regimes for the authorisation of pesticides and GM crops has remained largely untapped. However, the failings of EU risk governance are understood far beyond those circles that seek to promote an ecological focus in support of agroecological transitions. Indeed, the regulatory framework has seen many revisions and reforms over the years, with the Regulation on the transparency and sustainability of the EU risk assessment in the food chain (Regulation 2019/1381) being the latest attempt of reform to enhance the smoothness and legitimacy of risk governance.

The Regulation is, in the Commission's own words, a direct response to the concerns expressed by citizens regarding the inadequacies of the pesticide approval procedure in light of the

[214] European Ombudsman, 'Decision of the European Ombudsman closing the inquiry into complaint 12/2013/MDC against the Commission' 12/2013/MDC; see also A Vries–Stotijn De, 'The European Ombudsman Urges the European Commission to Abandon its Unlawful Pesticide Approval Practice' (2017) 7 European Journal of Risk Regulation 413.

[215] For example, Commission Implementing Regulation (EU) 2018/783 of 29 May 2018 amending Implementing Regulation (EU) No 540/2011 as regards the conditions of approval of the active substance imidacloprid [2018] OJ L 132/31 citing several "high risk for bees" for several uses.

[216] L Maxim and J V D Sluijs, 'Seed-dressing systemic insecticides and honeybees' in D Gee et al (eds), *Late lessons from early warnings: science, precaution, innovation* (European Environment Agency 2013).

[217] European Parliament, 'Implementation of the Plant Protection Products Regulation' P8_TA-PROV(2018)0356; see also, 'Neonicotinoids: ANSES publishes its second progress report on the alternatives and the conclusions of its expert appraisal work on the impact of these active substances on human health' *ANSES* (5 March 2018) <https://www.anses.fr/en/content/neonicotinoids-anses-publishes-its-second-progress-report-alternatives-and-conclusions-its> accessed May 2022.

reauthorisation of glyphosate,[218] as well as more general "public controversy" over the EU's approach to pesticides and GMOs.[219] The European Citizen's initiative listed as its objectives to ban glyphosate-based herbicides on the basis of its impacts on human health and ecosystems, to ensure that "scientific evaluation of pesticides for EU regulatory approval is based only on published studies, which are commissioned by competent public authorities instead of the pesticide industry" and to "set EU-wide mandatory reduction targets for pesticide use, with a view to achieving a pesticide-free future".[220] Regulation 2019/1381 acknowledges public concerns over the narrow foundations of risk assessments, and, consequently, of risk-management decisions, in light of the reliance of current procedures on the applicant as the primary source of information.[221] The response of the regulatory reform – with the proof being in the name – can be considered to be two-fold. On the one hand, the Regulation seeks to enhance transparency. This concerns transparency regarding the information that underpins the assessment, as well as better communication regarding the content of risk assessment. On the other hand, which can arguably be considered the 'sustainability' element of the Regulation, it seeks to broaden the knowledge base of risk assessment and, consequently, risk management.

The first (transparency) element, in combination with improved communication of risks, only enforces a 'public-deficit' model of stakeholder involvement that assumes that public concerns are grounded upon a mis- or lack of understanding of science.[222] The Regulation puts forward the idea that better communication would "strengthen citizens' trust that the risk analysis is underpinned by the objective of ensuring a high level of protection",[223] and that "transparency of the risk assessment process contributes to greater legitimacy of the Authority".[224] The idea is that public distrust – with the public including anyone from concerned consumers to farmers, producers and NGOs – is either unscientific or based on misconceptions, is nothing new.[225] In fact, the reform builds upon heavily criticised but nonetheless deeply rooted ideas of risk governance, or even top-down environmental regulations more generally.[226] These seek to simplify the relationship between science and the public; between technical expertise and lay knowledge. Accordingly, attempts to improve the dissemination of information and to foster

[218] European Commission, 'Communication on the European Citizens' Initiative "Ban glyphosate and protect people and the environment from toxic pesticides"' COM(2017) 8414 final; Regulation 2019/1381, Preamble 27.
[219] COM(2018) 179 final, Explanatory Memorandum, p 2.
[220] COM(2017) 8414 final, p 1.
[221] COM(2018) 179 final, p 2 "Many stakeholders and citizens complain that the EFSA's evaluations of authorisation applications are essentially based on studies, data and information generated (and paid for) by the applicant for authorisation"; and also worded less strongly: Regulation 2019/1381, Preamble 24.
[222] B Wynne, 'Public Engagement as a Means of Restoring Public Trust in Acience - Hitting the Notes, but Missing the Music?' (2006) 9 Community Genet 211; also W Brian, 'Public uptake of science: a case for institutional reflexivity' (1993) 2 Public Understanding of Science 321.
[223] Regulation 2019/1381, Preamble.
[224] Regulation 2019/1381, Preamble 12; see also Article 1, which sets out the objectives of risk communication, including to: "raise awareness and understanding of the specific issues" and "foster public understanding of the risk analysis".
[225] Widely cited in this regard is *Science and Technology - Third Report* (House of Lords, 2000) which already refers to "a condescending assumption that any difficulties in the relationship between science and society are due entirely to ignorance and misunderstanding on the part of the public" (par 3.9). Nonetheless, the sentiments that underpin the report have not been readily endorsed, see R Jackson et al, 'Strengths of Public Dialogue on Science-related Issues' (2005) 8 Critical Review of International Social and Political Philosophy 349 and Wynne 2006.
[226] See C Holley and E Sofronova, 'New Environmental Governance: Adaptation, Resilience and Law' in B M Hunter (ed), *Risk, Resilience, Inequality and Environmental Law* (Edward Elgar Publishing 2017).

public engagement only aim to remedy scepticism "by educating an ignorant public into scientifically proper attitudes",[227] and legitimise decisions by ticking off procedural boxes.

This attitude towards public engagement was already reflected in the restricted possibilities for the public (and sometimes Member States)[228] to comment on national or EU risk assessments under the legislation that existed prior to the adoption of Regulation 2019/1381. Effective participation in this regard has been heavily restricted by the fact that such conclusions are practically incomprehensible, with consultations being framed in such a way to only allow for a technocratic response.[229] Indeed, EFSA's electronic template emphasises the need for comments to relate to specific content of the scientific assessment in question, often sparking only methodological debate and making lay expertise redundant. Put simply, and as will be discussed in further detail in Chapter 6, where many participants such as farmers may be able to formulate general responses in relation to the benefit of a product or lack thereof, or its place in our food system, only few will be able to ask for justification of "the adequacy of the of the use of the single radiolabel" in relation to the draft 'mammalian toxicology' assessment.[230] By putting emphasis on the latter, opportunities for public consultation only strengthen the EU's focus on technocratic authority. Furthermore, participation has been undermined by the inaccessibility of specific facts, due to the ever-increasing volume of science.[231] Where it follows from the previous sections that a narrow understanding of science itself – as universal truths that are generated from the top-down – is the problem,[232] it is unlikely that transparency or improved communication regarding science is going to bring comprehensive change. In fact, it is still to be seen to what degree Regulation 2019/1381 codifies rather than enhances access to information as two judgments by the General Court that proceeded the adoption of the Regulation already emphasised opportunities to demand transparency, when it condemned EFSA's unwillingness – for reasons that related to the commercial and financial interests of the applicant – to make publicly available several studies for the renewal of the glyphosate.[233]

It is therefore not the reform's transparency element that holds potential to make a difference for risk governance, but its – albeit limited – possibilities to expand the knowledge base of

[227] Wynne 2006, p 213.
[228] See also above §4.4 and E Bozzini, *Assessing criteria and capacity for reliable and harmonised 'hazard identification' of active substances* (European Parliamentary Research Service, 2018), p 85.
[229] Ibid p. 84: "The procedure is meant to be highly technical; EFSA will not take into consideration comments that are not related to the contents of the document and those that 'are related to policy or risk management aspects, which is out of the scope of EFSA's activity'. Therefore, comments must refer to specific issues pertaining to one of the sections (toxicology, MRL, ecotoxicology, etc.) of the report".
[230] This is the example of a public comment provided by the electronic template for public consultation on rapporteur assessment reports, available, for example, 'Public consultation on the active substance isoflucypram' (*EFSA*, 2019) <https://www.efsa.europa.eu/en/consultations/call/public-consultation-active-substance-isoflucypram> accessed May 2022.
[231] For example, the final RMS Germany 2015 covered more than 4000 pages of analysis and studies. See also Bozzini 2018, p 73.
[232] Wynne 2006, p 213. Note that S Jasanoff, 'EPA's Regulation of Daminozide: Unscrambling the Messages of Risk' (1987) 12 Science, Technology, & Human Values 116 already challenged the persistent narrative of objective science (against the backdrop of controversy regarding the pesticide daminozide) in 1987 by holding that it "underestimate[s] the extent to which perceptions about risk are socially constructed".
[233] Case T-329/17 *Hautala and Others v the European Food Safety Authority* [2019] ECLI:EU:T:2019:142 and Case T-716/14 *Tweedale v European Food Safety Authority* [2019] ECLI:EU:T:2019:141.

scientific opinions and political decisions. In this regard, the Regulation provides that under the new rules: (1) EFSA must be notified about all studies that are commissioned in support of an application,[234] (2) the non-confidential version of the application must be made public "in order to identify whether other relevant scientific data or studies are available on the subject matter",[235] (3) in case of renewal, stakeholders must be consulted at an even earlier stage, when the applicant notifies EFSA of its intention to renew and the studies it plans to carry out for that purpose, so comments can be made, "including on the proposed design of studies";[236] and (4) the Commission can, in exceptional circumstances of "serious controversies or conflicting results" ask the Authority to commission scientific studies in order to verify evidence.[237]

These provisions that have been introduced by Regulation 2019/1381 hold potential to address some of these issues that have been discussed above, by both seeking to expand the knowledge base that underpins EFSA's opinions (where information has previously been withheld by the applicant) and by providing some opportunities for stakeholder involvement within (rather than retrospective of) the risk assessment process. In particular, it should be welcomed that it is recognised that stakeholders and the public have a role to play in the shaping of scientific debate, with a potential to influence the choice of baseline of receiving environments, the level of recognition of uncertainty and the role of other public concerns. Nonetheless, it also follows from the previous sections that often it has been EFSA who has put determinative authority with the applicant, despite the availability of alternative sources of knowledge and viewpoints. Also, much will be dependent on the interpretation of the provisions (e.g., its understanding of 'studies') and the design of consultation processes, to which extent it will leave sufficient scope for consideration of bottom-up, local, and traditional knowledge, or whether it will further enhance the technocratic nature of current processes and the public-deficit character of public involvement. Where many questions regarding the implementation of Regulation 2019/1381 remain, this Chapter will, lastly, consider whether support for an ecosystem approach can be found elsewhere. Notably, where the EU risk regimes reflect an industrial perspective on the role of synthetic inputs in food production, the next section will analyse to what degree it leaves scope for the adoption of alternative views and an ecosystem approach at Member State level.

4.5 National Agroecological Ambitions: Limited Potential and Support

It follows from the previous section that the narrow focus of EU legislation for the authorisation of active substances and GMOs on protection against environmental risks, without challenging more fundamental assumptions that industrial inputs have an important role in food production, places a lot of faith in the ability and willingness of risk assessors and managers to provide for adequate protection in each specific case. Legal standards to provide a high level of protection, possibly including the protection of agroecosystem functioning, ought to qualify the discretion of risk governance in this regard. However, in practice, the way in which the procedures that underpin the EU system and their implementation have valued and prioritised technocratic and

[234] New article 32b Regulation 178/2002.
[235] New article 32c(2) ibid
[236] New article 32c(1) ibid.
[237] New article 32d ibid.

top-down sources of authority over local and traditional knowledge that is generated from the bottom up, signals an understanding of agriculture and food production that is more supportive of the continuation of industrial practices than transitions towards agroecology. Put simply, the ecological risk of pesticide and GMO use, which is often characterised by uncertainties due to the novelty of such products and the complexity of ecosystem functioning, are not receiving the attention that they deserve. The cumulative impacts of novel products that are authorised despite potential ecological risks, on the basis of narrow and limited knowledge foundations, are exacerbated by periods of time between risk assessments. For example, for pesticides, authorisations are granted for a maximum of ten and fifteen years respectively for initial approvals and every renewal thereafter,[238] during which time the product may be widely sold and used in the EU. 'Confessions of risk' after decades of use are not uncommon, as illustrated by the fact that, until July 2015, the EU had already banned 48 formerly approved active substances.[239] For GMOs, the situation in the EU has been less pressing as approvals have been few and far between.[240] Yet, a few applications for GM crops are still in the pipeline and the Commission is considering whether it should adopt alternative authorisation procedures for certain gene editing-techniques, which the CJEU found to fall within the scope of the Deliberate Release Directive,[241] which could raise new questions of epistemic inclusivity.[242]

Where the EU fails to support and implement an ecosystem approach to risk regulation, this section, lastly, analyses to what extent it allows Member States to do so themselves. Although a high level of environmental protection at EU level is significant, it follows from Chapter 3 that the ecosystem approach stresses the importance of bringing decision-making closest to the physical realities of ecosystems.[243] Decentralisation would allow for adaptive management and better fostering of equity, as it would enhance "responsibility, ownership, accountability, participation, and use of local knowledge"[244] in decisions on ecosystem management.[245] Yet, national discretion is constrained by the harmonising effect of EU risk regulations. Whilst the possibilities for decentralised decision-making differ greatly in the regulatory regimes for pesticides and GM crops, they will be discussed separately in this section, although linkages will be drawn where relevant. For pesticides, this section finds that the EU's curiously tiered approach, where active substances are approved by the EU and commercial plant protection products are approved by Member States, could, in theory, allow for the implementation of an ecosystem approach at national level. Yet, the disconnect between EU and national procedures often lead to diffused responsibilities. Moreover, the absence of EU level incentives and

[238] Regulation 1107/2009, Article 5 and 14(2).
[239] *Consolidated List of Banned Pesticides: Pesticide Action Network releases list of Highly Hazardous Pesticides banned in countries around the world* (Pesticide Action Network, 2015).
[240] See above, §4.3.
[241] Case C-528/16 *Confédération Paysanne and Others v French Minister for Agriculture, the Food Processing Industry and Forestry* [2018] ECLI:EU:C:2018:583. An example of such a new genome editing technique is CRISPR-Cas9. The ruling is subject to much controversy, see, for example, E Gelinsky and A Hilbeck, 'European Court of Justice ruling regarding new genetic engineering methods scientifically justified: a commentary on the biased reporting about the recent ruling' (2018) 30 Environmental sciences Europe 52.
[242] European Commission, 'Study on the status of new genomic techniques under Union law and in light of the Court of Justice ruling in Case C-528/16' SWD(2021) 92 final.
[243] Chapter 3, §3.3.4.
[244] UNEP/CBD/COP/DEC/V/6, Principle 2 of the Ecosystem Approach.
[245] Chapter 3, §3.3.5.

procedures, including those for stakeholder participation, mean that national environmental ambitions are under great pressure of competing objectives to maintain a level playing field. With regard to GMOs, this section finds that Member States' discretion to prioritise ecosystem functions may be restricted by the harmonising effect of EU environmental risk assessment.

4.5.1. Pesticides: Authorisation of PPPs and the Framework for Sustainable Use

The opportunities for Member States to exercise discretion when regulating the environmental risks of pesticides, including potential impacts on ecosystem functioning, are broader under the pesticide regime than under most risk regulations due to the regime's tiered procedure to authorisations. It follows from the above, that active substances of pesticides are approved at EU level. Yet, plant protection products (PPP), or the specific commercial formulants that contains the active substance among other co-formulants, are authorised at national level.[246] For example, the neonicotinoid clothianidin is sold in formulation by Bayer CropScience under the names Poncho and VOTiVO and Monsanto's glyphosate is better known to consumers as Roundup. It is these commercial products, in light of specific uses that are foreseen at national level, that require a second risk 'evaluation'. Article 29 of the Pesticides Regulation holds that Member States can only authorise a PPP if the product, "in the light of current scientific and technical knowledge", complies with the same requirements that applied to the active substance at EU level.[247] These include, as discussed above, no unacceptable environmental effects on biodiversity and the ecosystem.[248] Impacts are, moreover, to be evaluated in light of the uniform principles that are set out in Regulation 546/2011 and that aim to ensure a high level of protection of human and animal health and the environment.[249] The Regulation demands that the risk evaluation gives regard "to all aspects of the environment",[250] but it only refers to environmental elements (e.g. soil and groundwater) rather than agroecosystem functions.

The regime thus leaves scope, but little guidance, for the evaluation of the product's impacts on ecological functions and resilience. Regulation 546/2011's focus on environmental and climate conditions in the areas of envisaged use,[251] does suggest an opportunity to better target and adapt risk evaluations and, consequently, decisions on authorisations, to national, regional and local realities and needs.[252] However, it also disguises inherent tensions that result from restricting the harmonising effect of the EU's regime to assessment of active substances, which will, inevitably, be applied in Member States as a PPP in formulation.[253] Although it follows from the above that the risk assessment of the active substance at EU level implies a level of comprehensiveness that takes account of local conditions and uses, EFSA itself admits that a crude selection of representative uses by the applicant leads to an incompleteness that is not rectified when Member States have decided on the specific conditions of use in their countries

[246] Regulation 1107/2009, Chapter III.
[247] Regulation 1107/2009, Article 29(1)(e) with reference to Article 4(3).
[248] Regulation 1107/2009, Article 4(3)(e)(iii).
[249] Regulation 546/2011, Annex, par A.1; Regulation 1107/2009, Article 29(6) and 84.
[250] Regulation 546/2011, Annex, par 2.5.1.
[251] See, for example, Regulation 546/2001, Annex, par 2.5.1. on Evaluation and par 1.2 on Decision-Making.
[252] See Chapter 3, §3.4.4 on the significance in the context of the ecosystem approach and also, above, §4.4 on the lack of consideration of national diversity in the context of the EU's risk assessment of active substances.
[253] Storck et al 2017, p 1031.

and appropriate risk mitigation options.[254] EFSA's admissions also mean that Member States are often required to undertake a large number of new assessments to provide for adequate protection levels,[255] which can be constrained by limited resources and inefficient processes.[256]

Moreover, the sharing of responsibility may also lead to diffusion of responsibility. This is best illustrated by an example outside of the environmental realm, notably EFSA's conclusion that glyphosate is unlikely to pose a carcinogenic hazard,[257] contrary to conclusions by the International Agency for Research on Cancer.[258] EFSA's has explained this difference against the backdrop of the EU's dual system, by highlighting that, whereas glyphosate may be safe in isolation, its toxicity lies in its use in formulation, urging Member States to consider this at Member States level.[259] Yet, even an opponent of the renewal of the glyphosate authorisation at EU level like Greece has been hesitant to restrict the use of glyphosate-based products.[260] Moreover, in cases where EFSA has recognised the existence of (potential) environmental or health risks at EU level, the European Commission has been criticised for dodging its own responsibility to provide for a high level of environmental protection by leaving final decisions to national authorities.[261] The above emphasises the conflict between the internal-market and environmental dimensions of product regulations. Notably, it signals tensions between the fact that agroecosystems may be better protected at national (or regional or local levels), where the voices of local ecosystem stewards can be more easily captured, but that national risk governors may not wish to provide for high levels of protection to maintain a level-playing field.

Indeed, even when national evaluations identify impacts on ecosystem functions, such conclusions may not necessarily lead to an informed discussion at national, regional, or local

[254] *Scientific risk assessment of pesticides: EFSA contribution to on-going reflections by the EC* (EFSA, 2018), p 8. EFSA refers to the example of the neonicotinoid imidacloprid which assessment listed in a broad range of uses, but only a few 'representative uses' were taken into account in the EU's conclusions. It also notes that "Technically, it could be possible to address regional variability within a single but spatially explicit assessment at EU level, if this option is considered feasible by EU policy makers".
[255] Ibid, p 8.
[256] European Commission, 'Overview Report on a Series of Audits Carried out in EU Member States in 2016 and 2017 in order to Evaluate the Systems in Place for the Authorisation of Plant Protection Products' DG(SANTE) 2017-6250 - MR, p 5. Problematic in this regard is also that assessments are often duplicated in Member States, despite the option of 'mutual recognition' within three geographical zones, Regulation 1107.2009, Article 40 and Annex I. This, due to a lack of harmonised methodologies making Member States reluctant to accept outcomes of other Member States, also in light of national requirements specific to local environmental conditions (p. 8).
[257] EFSA 2015a, concluding that glyphosate "is unlikely to pose a carcinogenic hazard to humans".
[258] *Some organophosphate insecticides and herbicides: Diazinon, glyphosate, malathion, parathion, and tetrachlorvinphos* (WHO, 2017), p 398, concluding that glyphosate "is probably carcinogenic to humans".
[259] Bozzini 2017, p 86; see for other reasons why EFSA's conclusion was different from other institutions, also highlighting the legislative and methodological choices that determine the outcome of risk assessments: D Rimkutė, *Mapping the practices of scientific (risk assessment) evaluation of active substances used in plant protection products* (European Parliamentary Research Service, 2018).
[260] S Michalopoulos, 'Greece authorises Monsanto's Roundup for five years' (7 March 2018) <https://www.euractiv.com/section/agriculture-food/news/greece-authorises-monsantos-roundup-for-five-years/> accessed May 2022.
[261] 12/2013/MDC, for example, notes that "[the Commission] is competent to approve active substances and to define conditions and requirements that are needed to ensure that there are no harmful effects for human and animal health or to the environment. […], the Ombudsman considered that the Commission may sometimes be too lenient when it approves active substances for which EFSA indicates data gaps or even risks, and at the same time leaves the exact definition of mitigation measures to Member States".

level on the societal implications of such findings and their meaning for food system change. Similar to risk governance of pesticides at EU level, the language of the Pesticides Regulation and Regulation 546/2011 suggests that Member States are to primarily base decisions on scientific findings regarding risks. It refers to uncertainty only as an element to consider when interpreting scientific results, rather than an important basis for broader risk management decisions.[262] Moreover, although it requires Member States, when possible, to take account of "principles of integrated pest control", it uses this framework primarily to potentially justify product authorisation despite adverse impacts.[263] Strikingly, it fails to make clear links with the Sustainable Use of Pesticides Framework and the National Action Plans developed thereunder that should include quantitative objectives, targets, measures and timetables to (1) reduce environmental risks and impact *and* (2) encourage and promote the development of integrated pest management and alternative approaches for pest control.[264] With regard to the latter, it has been found that the implementation of the Framework and the uptake of alternative techniques in Member States has been poor.[265] Member States have been criticised for their short-term thinking reflected in a failure to investigate agroecological control, not only when authorising PPPs, but even when granting emergency authorisations for banned substances.[266]

It follows from the above that the tiered approach to pesticides leaves Member States with some leeway to pursue an ecosystem approach when deciding on the authorisation of PPPs. However, the disconnect between EFSA's risk assessment on active substances and national evaluations of PPPs, the lack of specific instructions on the protection of ecosystem functions, combined with the absence of normative guidance on how narrow findings on risk are to be used as a basis for decisions that reflect a broad understanding of the need for system change, make it doubtful that an ecosystem approach will be implemented at national level for each product.[267] Much will depend on the procedures for and practices of risk governance at Member State level, including the independency of decision-makers, access to information and opportunities for stakeholder participation, as prerequisites for the consideration of all available knowledge. However, there is limited information available on this as it has been held that

[262] Regulation 546/2011, Annex, par 1.3. In particular, it asks for uncertainties in data to be identified to avoid "a false classification of risk". Note, however, that Article Regulation 1107/2009, 1(4) does allow Member States to apply the precautionary principle more generously where there is scientific uncertainty regarding the environmental risks posed by PPPs to be authorised in their territory.
[263] Regulation 546/2011, Annex, par 1.4 and 1.8.
[264] Directive 2009/128/EC, Preamble 5 and Article 1.
[265] European Parliament, 'Report on the implementation of Directive 2009/128/EC on the sustainable use of pesticides' (2017/2284(INI)), Explanatory Statement – Summary of Facts and Findings.
[266] European Commission, 'Report on Member State National Action Plans and on progress in the implementation of Directive 2009/128/EC on the sustainable use of pesticides' COM(2017) 587 final, p 14 on Romania and its failure to investigate the potential of crop rotation as an alternative to the emergency authorisation of the use of neonicotinoids as seed treatment in an undefined area of maize. See, more generally on the issue of the wide adoption of emergency authorisations under Article 53 Regulation 1107/2009: F Pelsy et al, *Evaluation of the implementation of Regulation (EC) No 1107/2009 and its impacts. Mapping the usage made by Member States of the derogations laid down by Article 53 of the Regulation* (Milieu and IIEP, 2018).
[267] Consistency is key. Whereas, for example, a country like France has opted for ambitious protection levels with regard to highly contentious pesticides that are glyphosate- or neonicotinoid-based, to profile itself as a leader, at the same time, it was also branded the 'European backdoor champion' when in 2010 it granted 74 derogations for the use of EU-banned substances. See, Storck et al 2017, p 1030.

levels of transparency among competent authorities are low and consultation activities are extremely limited,[268] which underlines the need for clearer requirements to guide action.

4.5.2. GM Cultivation: Ecological Concerns under the Opt-Out Clause

Contrary to the pesticides' regime, under the GMO framework national discretion to regulate environmental risks is more clearly restricted by deeply rooted internal market objectives. It follows from the previous section, that it was the necessity to protect the functioning of the internal market, reflected in the legislations' legal basis,[269] that underpinned the progressive centralisation of the regime.[270] Centralisation was, however, accompanied by the creation of procedures for continuous involvement of national authorities, thereby moving to a system of multilevel governance.[271] This means that national concerns for ecological diversity and related social considerations are, in principle, meant to be part of risks assessment and management at EU level. Yet, EFSA's failure to acknowledge and effectively account for such national concerns and,[272] consequently, Member States' inability to mediate their concerns in comitology,[273] mean that, in practice, the concentration of power within EFSA and the European Commission is much higher than the Deliberate Release Directive and Food and Feed Regulations lead one to believe.[274] As a result, Member States have looked for alternative ways to protect their national, regional or local interests by restricting the cultivation of GMOs. Whereas until 2015 the regime was generally believed to provide for exhaustive harmonisation,[275] such options were limited to temporary bans for specific GMOs under the safeguard clauses,[276] or more general territorial bans under Article 114(5) TFEU. Under the latter, post-authorisation restrictions could only be based on *new* scientific evidence relating to

[268] O Hamlyn, *Assessing Member States' capacity for reliable 'authorisation of PPPs', and its uniformity* (European Parliamentary Research Service, 2018). Currently, such opportunities for public participation will mainly follow from provisions of general or specific administrative law at Member State level, under the wider framework of the Aarhus Convention, see also, hereafter, Chapter 6, §6.2.4.
[269] *Ex* 100a TEEC, *ex* 95 TEC, now 114 TFEU.
[270] Above, §4.2.1 and 4.3.1. Note also that further centralisation under Directive 2001/18/EC and Regulation 1829/2003 also meant to address external (international) pressures from trade partners, notably under the WTO. See, Lee 2010, p 121.
[271] See, above §4.3.1 on possibilities for such involvement and Lee 2010.
[272] §4.4.1.
[273] §4.4.2.
[274] L Petetin, 'Managing Novel Food Technologies and Member States' Interests. Shifting More Powers Towards the Member States?' in M Varju (ed), *Between Compliance and Particularism: Member State Interests and European Union Law* (SpringerLink 2019), p 237.
[275] Note, however, that it has been argued that the regulation of concerns raised by GMO that are not related to environmental safety were never harmonised at EU level: European Parliament ENVI Committee, 'Opinion on Legal Basis of COM(2010) 375' PE462.539v01-00. In this regard, the "added value" of the opt-out clause, which is discussed in this section, has been questioned. Ethical concerns were already prior to the adoption of the opt-out clause explicitly considered to fall out of the scope of EU harmonisation, see Directive 2001/18/EC, Preamble 57 and Article 29 and Case C-165/08 *Commission v Poland* [2009] ECR 2009 I-06843, par 50.
[276] Directive 2001/18/EC, Article 23 and Regulation 1829/2003, Article 34. It follows from Case C-58/10 to C-68/10 *Monsanto SAS and Others v French Ministry of Agriculture and Fisheries and Others* [2011] ECR I-07763, par 76 that Article 34 takes precedence when cultivations bans concern GMO's that are authorised under Regulation 1829/2003, which gives more authority to the Commission (over Member States) to decide on safeguard bans. See about this case also: M Weimer, 'The Right to Adopt Post-Market Restrictions of Genetically Modified Crops in the EU – A Shift from De-Centralised Multi-Level to Centralised Governance in the Case of GM Foods' (2017b) 3 European Journal of Risk Regulation 445.

an environmental problem *specific* to the Member State.[277] The CJEU's strict interpretation that this requires "the existence of unusual or unique ecosystems"[278] makes it doubtful that this option for derogation could justify a more general national ecosystem approach to GM crops.

Against the backdrop of continuous use by Member States of derogation clauses to justify bans on GM crops,[279] often despite questionable legality,[280] the European Commission tabled a proposal to allow Member States to restrict cultivation within their territories.[281] In 2015, after five years of intense negotiations, Directive 2015/412 was finally adopted, adding an opt-out (Article 26b) to Directive 2001/18/EC. The sudden breakthrough in negotiations followed when the Commission threatened to proceed with the authorisation for cultivation of Bt-Maize 1507, despite a lack of Member States' backing in comitology. The Commission itself had been under pressure from the General Court who had condemned procedural delays resulting in a failure to act regarding Pioneer Hi-Bred's application during a period of twelve years.[282] The opt-out clause can be understood to be based on similar beliefs as those that underpin the tiered approach under the Pesticides Regulation, to the extent that the *use* of inputs in Member States' territories may raise issues or concerns that are better addressed at national (or regional or local) levels.[283] However, there are important differences. Firstly, the procedures are different, as the Pesticides Regulation requires a separate national authorisation of a commercial PPP, based on an active substance that has already been approved at EU level, before it can be placed on the market and used.[284] Contrarily, the opt-out clause presumes that authorisations for GM crops at EU level are automatically valid in all Member States, unless the applicant agreed during the authorisation procedure to exclude the Member State from the application's geographical

[277] See, more extensively, on opportunities for and limitations to national derogations prior to the adoption of the Opt-Out Directive: M Geelhoed, 'A Growing Impasse: The Future of the EU's GMO Regime' (Edinburgh School of Law Research Paper 2014), p 10.
[278] Case C-439/05 P and C-454/05 *Land Oberösterreich and Austria v Commission* [2007] ECR I-07141, par 54-55. Note also that Austria's emphasised impacts on small-scale and organic farming in Upper Austria, but that this information was largely considered irrelevant under the derogation option of Article 114(5).
[279] In addition to bans under the safeguard clauses and Article 114(5), GMO-free regions were also installed through (over)extensive interpretation of coexistence competences under Article 26a Directive 2001/18/EC, see M Dobbs, 'Excluding Coexistence of GMOs? The Impact of the EU Commission's 2010 Recommendation on Coexistence' (2011) 20 Review of European Community & International Environmental Law 180, p 186.
[280] Notably, many safeguard measures were able to remain in place, despite the opinion of the EFSA in each case that no new scientific evidence was presented that would invalidate the previous risk assessments, as draft decisions by the European Commission to lift the ban have in all but two cases were dismissed by Member States in comitology: G Skogstad, 'Contested Accountability Claims and GMO Regulation in the European Union' (2011) 49 Journal of Common Market Studies 895.
[281] European Commission, 'Proposal for a Regulation amending Directive 2001/18/EC as regards the possibility for the Member States to restrict or prohibit the cultivation of GMOs in their territory' COM(2010) 375. In 2015, the Commission also tabled a proposal which would have created a possibility for Member States to restrict the import of GM food and feed, under strict conditions, but this was voted down by a large majority of European MPs, European Commission, 'Proposal for a Regulation regards the possibility for the Member States to restrict or prohibit the use of genetically modified food and feed on their territory' COM(2015) 177. See also, European Commission, 'Reviewing the decision-making process on genetically modified organisms (GMOs)' COM(2015) 176 and Petetin 2019, p 240.
[282] *Pioneer Hi-Bred International Inc v Commission* (Case T-164/10).
[283] See, for example, Regulation 1107/2009, Preamble 23 and Directive (EU) 2015/412 of the European Parliament and of the Council of 11 March 2015 amending Directive 2001/18/EC as regards the possibility for the Member States to restrict or prohibit the cultivation of genetically modified organisms (GMOs) in their territory [2015] OJ L 68/1, Preamble 6.
[284] Regulation 1107/2009, Article 28 and above §4.5.1.

scope,[285] or, in absence of such consent, the Member State has adopted a ban on compelling grounds.[286] Secondly, and more importantly, whereas the Pesticides Regulation provides that approval of a PPP could be denied at national level on the basis of assessed environmental risks, taking into account areas of envisaged use, the opt-out clause primarily foresees in bans on grounds that are not directly linked to environmental safety. Although the Directive's wording is not as strong as the original proposal,[287] and it does refer to (general) environmental policy objectives as an example of a compelling grounds, it also holds that national measures "shall, in no case, conflict with the environmental risk assessment carried out" by EFSA.[288]

Many Member States have indicated that their opposition to GM cultivation is based on (potential) environmental and notably ecological impacts in their territory.[289] Yet, the scope of the opt-out clause's 'no-conflict requirement' ultimately determines whether they can rely on the new article to protect these interests, which could include the protection of crucial ecosystem functions that underpins a national ecosystem approach to the regulation of GM crops. With very few authorisations having passed through the EU authorisation procedure, and with applicants so far having been receptive of requests to restrict the geographical scope of applications that are currently still in the pipeline,[290] a discussion of the legal validity of such bans is speculative. Firstly, Directive 2015/412 does seem to aim to grant possibilities for national protection of local landscapes, biodiversity and specific ecosystem functions and services.[291] Yet, it follows from the previous sections, that EFSA's lack of consideration of impacts on a broad range of local ecological realities in the centralised risk assessment is a persistent problem of implementation rather than of law. Directive 2015/412 is inconclusive on whether the 'no-conflict requirement' restricts national discretion to regulate environmental risks altogether or only to the extent that EFSA has failed to assess local risks.[292] In the context of the latter, a distinction also needs to be made between receiving environments that were overlooked and those that were not considered to be unique enough by EFSA to grant a separate

[285] For a critical note on this granting of powers to the biotech industry, see Petetin 2019, p 242.
[286] Directive 2015/412 providing for a new Article 26b Directive 2001/18/EC.
[287] COM(2010) 375 provided that national measures needed to be "based on grounds other than those related to the assessment of the adverse effect on health and environment" with the Explanatory Memorandum, p 7 holding that Member States "cannot invoke protection of health and environment to justify a national ban".
[288] Directive 2001/18/EC, Article 26c(3).
[289] See, for example, the reference of Germany's Environment Ministry to risks for nature and the environment and the emphasis on the 'risques environnementaux' by the complete French ban on GM corn: D Sarmadi, 'German Environment Ministry seeks unconditional GMO ban' *EurActiv* (14 January 2015) <https://www.euractiv.com/section/agriculture-food/news/german-environment-ministry-seeks-unconditional-gmo-ban/> accessed May 2022 and *Loi No 567 Relative À L'interdiction De La Mise En Culture Du Des Variétés De Maïs Génétiquement Modifié (Law relating to the ban on the cultivation of genetically modified maize varieties)* (France, 2014).
[290] See the database at: 'Restrictions of geographical scope of GMO applications/authorisations: EU countries demands and outcomes' (*European Commission*, 2019) <https://ec.europa.eu/food/plant/gmo/authorisation/cultivation/geographical_scope_en> accessed May 2022.
[291] Directive 2015/412, Preamble 14.
[292] See, more extensively on the question of whether the 'no-conflict requirement' limits national discretion to the extent of the hypothetical or concrete assessment: Geelhoed 2016, p 17, with reference to the fact that, on the one hand side, Article 26(b) Directive 2015/412 refers to the assessment "carried out" whereas, on the other hand, Preamble 13 holds that grounds have to be "distinct from and complementary to those assessed according to the harmonized set of Union rules".

(and stricter) risk assessment.[293] Even more so than under the pesticides regime, which makes a distinction – albeit rather artificially –between the EU assessment of active substances and national assessments of commercial PPPs, risks of conflict are exacerbated under the GMO opt-out due to the fact that both levels would ultimately assess the same product: the crop.[294]

Secondly, Directive 2015/412's mentions "the maintenance and development of agricultural practices which offer a better potential to reconcile production with ecosystem sustainability" as an example of an environmental policy objective that could justify a national GMO ban.[295] This is particularly relevant for an ecosystem approach to foster agroecological transitions at national level. In essence, it touches upon what Winter calls the "weighing of risk":[296] the option for management decisions at national level to weigh the agroecological benefits of a GMO against risks, and to value risks in the context of wider food policies that prioritise ecosystem functions, and, overall, require a more cautious take on uncertainty.[297] Although this interpretation of environmental objectives under the opt-out clause seems to be supportive of agroecological ambitions, national competences to decide on the acceptability of (uncertain) risks – similar to that of EU risk managers – is restricted by the fact that EFSA does not at all recognise the potential risks of GMO cultivation for ecosystem functions.[298] As EFSA's assessment is supposed to consider relative safety within the context of a wide range of production systems,[299] bans to maintain or develop sustainable food systems, despite firm conclusions of safety, would effectively challenge EFSA's choice of (industrial) comparator.

In essence, this extensive interpretation challenges the tiered structure of risk governance, by exposing the political choices that characterise seemingly firm scientific conclusions.[300] Although its value for an ecosystem approach to risk regulation cannot be denied, its judicial merit from a teleological perspective is questionable, as Directive 2015/412 aims to maintain "a uniform high level of protection of health, the environment and consumers […] throughout the territory of the Union".[301] Yet, the way the opt-out clause aims to create an even wider distinction between scientific risk assessment and 'non-scientific' risk management, fails to acknowledge that it is often very difficult if not impossible to isolate other public concerns

[293] See examples above fn 162, where national requests for additional information regarding the representativeness of studies for the EU's risk assessment were dismissed by EFSA by simply stating that field trials allow for conclusions for other European environments.
[294] This may lead to the juxtaposed situation where some Members may rely on environmental justifications, if their regional or local conditions were not at all considered in the EU's risk assessment, and others may not do so if their environmental heterogeneity was assessed, either because a study was conducted in the area or because EFSA explicitly considered it to be covered by other representative studies, for example, relying on geographical zoning, see EFSA 2010b, p 102 with reference, among others, to the zones that have been identified for PPPs under Regulation 1107/2009.
[295] Directive 2015/412, Preamble 14.
[296] G Winter, 'Cultivation Restrictions for Genetically Modified Plants' (2017) 7 European Journal of Risk Regulation 120, p 126.
[297] Ibid, p 126.
[298] §4.4.2.
[299] §4.3.
[300] See, notably, G Winter, *Nationale Anbaubeschränkungen und -verbote für gentechnisch veränderte Pflanzen und ihre Vereinbarkeit mit Verfassungs-, Unions- und Völkerrecht* (German Federal Agency for Nature Conservation, 2015). Also, Geelhoed 2016, p 39.
[301] Directive 2015/412, Preamble 2.

from environmental considerations.[302] For example, questions of equity in the context of an ecosystem approach are often directly linked to risk of impact on ecological functions and resilience. If those risks are taken out of the equation, a ban that uses arguments of equity, distribution of benefits or empowerment to limit corporate influence, may be misunderstood as national protectionism.[303] At the same time, although diversification through decentralisation can be key to an ecosystem approach, dispersal of responsibility through decentralisation, as already illustrated by the pesticides regime,[304] can be detrimental. For risk assessment, and only in so far opportunities for national bans on environmental grounds can be identified under the opt-out clause, there are problems associated with the limited ability and capacity of Member States to produce the scientific evidence necessary to substantiate risks in their local contexts.[305] Due to the regime's retrospective nature,[306] such problems may not surface until bans are subjected to judicial review, with no uniform principles or methodologies in place. For risk management, moreover, there is little known about the processes behind decisions on national bans, including the possibility to involve stakeholders to ensure that bans at national level reflect local knowledge and ecological needs, with full consideration of alternatives.[307]

4.6 Conclusion

For those coming from an agroecological perspective, it may seem straightforward to conclude that most pesticides and GMOs do not belong in a long-term EU vision on the future of food production. However, increases in the uptake and use of pesticides across the EU, as well as continuous threats from the Commission to start unilaterally authorising GMOs for cultivation, signal the lack of a comprehensive discussion on the place of synthetic or industrial inputs in the EU. This Chapter has sought to shed light on the reasons why the legislation, policies and institutional frameworks that underpin the EU's systems for the authorisation on pesticides and GMOs have generally contributed to the dominance of industrial practices. Notably, it has

[302] See, similarly, H Gaßner et al, *Rechtsfragen einer nationalen Umsetzung der Opt-out-Änderungsrichtlinie* (German Federal Agency for Nature Conservation, 2015), p 26. So far, the CJEU has emphasised Member States' evidentiary burden to prove that a non-scientific concern is invoked as "a separate justification, [not] as an aspect of the justification relating to protection of human health and the environment", see *Commission v Poland* (C-165/08), par 55. See also Case C-1/96 *Compassion in World Farming* [1998] ECR I-1251, par 66.

[303] In this regard it is important to note that Article 26b is unlikely to provide Member States with an enforceable right to ban GMOs, but only reallocates competences, the exercise of which is still subject to EU law on the free movement of goods: Articles 34–36 TFEU, see Geelhoed 2016, p 29; see for a different view: Winter 2017, p 132. Restrictions thus need to be justified under Article 36 TFEU or the Cassis de Dijon-doctrine: Case C-120/78 *Rewe-Zentral v Bundesmonopolverwaltung für Branntwein ('Cassis de Dijon')* [1979] ECR 1979 -00649. Whereas environmental objectives have been accepted as mandatory requirements the CJEU has systematically held that purely economic aims cannot be considered as such: Case C-120/95 *Decker* [1998] ECR I-01831, par 39.

[304] §4.5.1.

[305] See, in this regard, also M Dobbs, 'Attaining Subsidiarity-Based Multilevel Governance of Genetically Modified Cultivation?' (2016) 28 Journal of Environmental Law 245, p 256 who emphasises that although lower level authorities will hold greater knowledge and expertise regarding local environmental, geographical and local conditions, higher territorial levels have access to broader scientific knowledge and expertise, through the pooling of financial and human resources that enable specialisation and more in-depth studies.

[306] Directive 2001/18/EC, Article 26b(4) does require Member States to communicate a draft of the restrictive measures and the corresponding grounds invoked to the Commission prior to their adoption, yet it does not require Member States to consider the legality of their measures and the Commission's comments are non-binding.

[307] See in this regard, for example, the facts that underpin Case C-111/16 *Fidenato and Others* [2017] ECLI:EU:C:2017:676 where a local farmer tried to argue that the Italian ban failed to weigh the potential benefits of the MON810 maize against the risks of alternative farming methods, notably the use of pesticides.

found that promising language to provide a high level of environmental protection, even in combination with specific protection goals that could see the prioritisation of the protection of ecosystem functioning, are undermined by procedures and the implementation thereof that put authority with technocratic experts, at the detriment of local, and traditional knowledge. In addition, this Chapter found that risk-governance procedures and their implementation do not assess and manage ecological sustainability in a holistic way, as they separate environmental impacts from other legitimate considerations, working under an assumption that agricultural inputs, in principle, have a societal benefit, and neglecting to provide protection against wider systemic and fundamental failings of inequity and injustice, as further analysed in Chapter 6.

Chapter 3 has highlighted the potential for the ecosystem approach as developed under the CBD to guide regulatory reform in an agroecological direction. It put forward the idea that in order to ensure that ecosystems are managed with respect to the limits of their functioning, all relevant information, and in particular the knowledge held by local, indigenous and traditional communities, should be considered. It also considered that humans are an integral part of (agro)ecosystems with management not only having to be respectful of the limits of ecosystem functioning but also having to be done "in a fair and equitable way",[308] which required the accommodation of different values in decision-making. Where EU systems fail to integrate diverse knowledges in risk-assessment conclusions and risk-management decisions, it is unsurprising that risk governance only very rarely reflects (agro)ecological thinking. And even in limited cases where impacts on ecosystem functioning were an important part of decision-making, for example impacts on pollinators in the case of neonicotinoids, policy makers did not use the opportunity to create a forum for comprehensive debate on how these decisions fit into a wider EU vision; their influence limited by the fact that they are treated as isolated cases.

Following a similar structure, and drawing similar conclusions, the next Chapter, looks at the regulation of organic production to see how protection of ecosystem functions features in the objectives and principles of old and new regulations. It analyses the limited uptake of relevant considerations in operative rules, and the distribution of authority in favour of external actors, thereby marking a significant shift away from a more bottom-up approach to organic production. Whilst, procedurally, the analysis provides another example of the failure of EU regulatory regimes to integrate local agroecological knowledge, substantively, the next Chapter will show that the EU's organic certification regime is driving or allowing for industrialisation of the organic sector and market, thereby excluding some agroecological farmers from the benefits of certification and reducing the relative benefits for others; inequities that will be further analysed and addressed in Chapter 6 on the potential of a human rights-based approach.

[308] UNEP/CBD/COP/DEC/V/6, Principle 1 of the Ecosystem Approach.

5 The Certification of Organic Production in the EU

Shortcomings of EU regulations for the promotion of ecosystem stewardship

5.1 Introduction

Sustainable agricultural practices, such as those that prioritise the protection of ecosystem functioning as discussed in this thesis, are not of recent date but have been around for thousands of years. Ultimately, such practices were key to the ability of historical agroecosystem stewards to nurture and sustain themselves and the society that relied on them, with many examples available where failure to respect natural limits – notably of soil health – led to displacement or the fall of "great civilisations".[1] This brief reflection is important as it clarifies why capsulation of principles and practices that have instructed farming since time immemorable in contemporary notions of 'agroecology' or 'organic' only occurred when ideas of industrial farming became more prevalent since the 1920s and when related practices became increasingly widespread during and after World War II, as discussed in Chapter 2. It also helps explain why important similarities can be found when comparing core values of agroecological and organic thinking and production as alternatives to industrial ideals,[2] despite foundational differences related to spiritual bases,[3] geographical origins and foci,[4] and subtle practical divergences that have been identified through scientific review.[5] Notably, for the purpose of this Chapter, the principle of ecology as formulated by the International Federation of Organic Agriculture Movements (IFOAM) holds that organic agriculture should "be based on living ecological systems and cycles, work with them, emulate them and help sustain them"[6] – a value that finds strong resonance with agroecology's emphasis on ecological processes and the idea that true sustainability lies in the mimicking and conservation of such natural systems.[7]

Nonetheless, an important difference exists between agroecological and organic production, which reveals why the two are sometimes depicted to be on opposite rather than the same side of a spectrum of agricultural sustainability. Namely, contrary to agroecology as analysed in Chapter 3, the organic concept has progressively been institutionalised within the EU since the 1960s, through private and, subsequently, public standards for certification. This means that whilst any producer can adhere to principles of organic farming, a specialist market – with a

* I would like to thank Dr Susanne Padel for her incredibly helpful input and comments to this Chapter. Please note that the views expressed in this Chapter, and any remaining mistakes, are my own.

[1] M Scholes and R Scholes, 'Dust Unto Dust' (2013) 342 Science 565; C May, *Petit Guide des SPG. Ou comment développer et faire fonctionner les systèmes participatifs de garantie* (IFOAM, 2019).

[2] *Position paper on agroecology, Organic and agroecology: working to transform our food system* (IFOAM EU, 2019).

[3] See, for example, P Conford, *The Origin of the Organic Farming Movement* (Floris Books 2001), Chapter 11 on the Christian context of the organic farming movement.

[4] In this regard, organic agriculture is often held to have a more Eurocentric focus, whereas discussions on agroecology in Europe are of more recent date, with the movement initially having been linked to Latin America.

[5] S Bellon et al, 'The relationships between organic farming and agroecology' (3rd Conference of the International Society of Organic Agriculture Research, Namyangju (Korea), 2011).

[6] *Principles of Organic Agriculture* (IFOAM, 2005).

[7] Chapter 2, §2.5.1.

value of $39.6 billion in the EU[8] – has been created for those that choose to follow production rules for organic labelling, which allow for the use of the organic logo and provides access to premium prices and (CAP) support measures which are reserved for organic producers.

Whereas the previous Chapter showed that EU risk regulation, which prohibits or restricts the use of potentially harmful, industrial inputs, fails to provide adequate levels of protection for ecosystem functioning in accordance with an ecosystem approach, this Chapter reveals that third-party organic certification, as a regulatory framework which, contrarily, focuses on and aims to support good practices, exhibits similar problems that limit its potential to promote and prioritise the conservation of ecosystem functioning and resilience. Fundamentally, this relates to the characterisation of EU organic farming as a voluntary, quality food scheme which subjects the drive towards agroecological sustainability to the forces of a niche market. Yet, whereas branding sustainable produce as a more expensive exception to the rule of industrial production is a problematic starting point, to be further explored in the next Chapter,[9] the adequacy of organic certification as a support mechanism for ecosystem stewardship is further undermined by a lack of regard for ecological thinking within EU standards. Indeed, although the regulations on organic certification that have been adopted since the turn of the millennium support agroecological ideas and include explicit references to ecological principles (§5.2), in practice, however, the EU's top-down approach to the formulation and compliance control of production rules marginalises the role and input of farmers as ecosystem stewards (§5.3). Consequently, such detailed rules often do not comprehensively reflect ecological values and, whilst implemented through a system of third-party certification, are often irresponsive to local ecological realities and the needs of farmers and smallholders, in particular (§5.4). Lastly, while the above has created risks of 'conventionalisation' of the organic sector, this Chapter, briefly, considers whether national public or private standards could bring organic agriculture back to its ecological origins (§5.5). In this regard, it finds that the EU provides minimum standards, yet this Chapter concludes that the practical value of possibilities for national bodies to adopt more stringent conditions that reflect an ecosystem approach to agriculture is restricted by the reality of market competition and a drive to maintain a level playing field for organic producers.

5.2 Regulating the EU Organic Market: From Pragmatism to Principles

The origins of the organic farming movement have been traced back to the 1920s, when awareness regarding the interconnectedness of things grew, notably of human, animal, plant and soil health.[10] Indeed, organic thinking initially centred primarily around soil fertility as the foundation of physical, social and mental health of all living beings,[11] and compliance with the 'Rule of Return' was advocated, which encouraged the presence of organic matter or humus in

[8] A Sahota, 'Global Market' in H Willer and J Lernoud (eds), *The World of Organic Agriculture and Statistics and Emerging Trends 2019* (IFOAM 2019).
[9] Chapter 6, §6.4.
[10] Conford 2001, p 21. See in this regard also A Howard, *An Agricultural Testament* (Oxford University Press 1940) and E Balfour, *The Living Soil* (Faber & Faber 1943). See, nowadays, also the IFOAM Principle of Health: "Organic Agriculture should sustain and enhance the health of soil, plant, animal, human and planet as one and indivisible" (IFOAM 2005).
[11] Bellon et al 2011, p 4.

the soil.[12] Relevant practices in this regard include the use of fertility building crops in balanced rotations and mixed farming practices that integrate arable and livestock farming.[13] The implication of such practices, as well as, for example, choices regarding sowing arrangements, species and varieties and active habitat management, is that there is no need for the use of off-farm, chemical inputs, notably mineral nitrogen fertilisers, synthetic herbicides and pesticides. Yet, systematic transitions from philosophy to practice, to build an evidence-base to support the merit of organic thinking from an ecological perspective, and for the achievement of social objectives like self-sufficiency and equity, as will be further discussed in the next Chapter, did not occur until the 1940s and beyond.[14] Moreover, research efforts were greatly underfunded when compared to industrial trials,[15] and practices lacked policy support. Many agricultural policies,[16] reflected a bias towards industrial agriculture, which primarily aimed to increase production and efficiency, measured as output per labour unit rather than output per hectare.[17]

The above, together with the short-term productivity and competitive advantages of industrial agriculture, notably due to yield gains, reduced labour costs due to use of chemical fertilisers, pesticides and herbicides, machinery and through specialisation,[18] and the absence of internalisation of negative externalities of such practices, put organic farmers in a difficult financial position. Markets developed as a "means to an end",[19] namely, to secure the financial viability of farmers whose primary aim was to produce in accordance with organic principles. Having also been referred to as "the grandfather" of voluntary sustainability standards,[20] certified production rules became *the* instrument to capture the added value of organic products. Through historical reflections and analysis of the normative foundations of the EU's subsequent regulations on organic production, this section seeks to unravel the EU's approach to the organic sector, its contribution to market development, and the extent to which ecological considerations have shaped the organic concept as captured in EU legislation. It finds that, historically, the EU's standards have taken a more pragmatic rather than principled approach to the regulation of organic production, as they have – contrary to their international and

[12] P Conford and P Holden, 'The Soil Association' in W Lockeretz (ed), *Organic Farming An International History* (CABI 2007), p 189.
[13] N Lampkin, 'Organic farming ' in R Soffe (ed), *The Agricultural Notebook* (Wiley-Blackwell 2021).
[14] Noteworthy in this regard is the 'Haughley Experiment' at a Suffolk farm by Lady Eve Balfour, which was the first experimental comparison of organic and industrial practices, 'The Haughley Experiment' (1957) 179 Nature 514. Although the experiment was taken over by the Soil Association, it had been held back from the start due to severe shortage of money and it was eventually abandoned, see Conford 2001, p 211.
[15] See, for example, in the UK the continuous public funding of trials at Rothamsted since the 1910s, such as the Broadbalk experiment which has run since 1843 and aimed to prove that crops could be grown indefinitely with artificial fertilisers, without injuring the soil. See Conford 2001, p 39 and A E Johnston and P R Poulton, 'The importance of long-term experiments in agriculture: their management to ensure continued crop production and soil fertility. The Rothamsted experience' (2018) 69 European Journal of Soil Science 113.
[16] Chapter 3, §3.2.2.
[17] See, for example, Article 39(1) of the Treaty of Rome: "The objectives of the common agricultural policy shall be (a) to increase agricultural productivity by promoting technical progress and by ensuring the rational development of agricultural production and the optimum utilisation of the factors of production, in particular labour". See in the UK context also Conford 2001, p 33 on the Agricultural Act 1947.
[18] See also §2.2 and 2.3.
[19] Lampkin 2021, p 27.
[20] D Giovannucci et al, 'Corporate Social Responsibility and the Role of Voluntary Sustainability Standards' in C Schmitz-Hoffmann et al (eds), *Voluntary Standard Systems A Contribution to Sustainable Development* (SpringerLink 2014), p 371.

national predecessors – lacked reflection on the ecological foundations of the organic sector. Continuous legislative efforts since the turn of the millennium have, however, seen better integration of organic values in the EU's regulatory regime through explicit objectives that aim to respects nature's systems and cycles and principles that manage agroecosystems in line with the requirements of ecological processes. Nonetheless, this promising language has not been accompanied by better recognition of the environmental merit of organic production in the legal basis of the legislation or, as discussed in the next section,[21] the production rules for organic certification which determine the standards' value for shaping ecosystem management.

5.2.1. Historical Reflections: Loss of Ecological Values as Pragmatism Prevails

The first EU Regulation for organic production of agricultural products was adopted in June 1991,[22] and can be held to have served a dual purpose: firstly, to provide uniform standards for certification and, secondly, to contribute to the achievement of new agricultural policy priorities, notably environmental protection. Regarding the former, the Regulation can be seen as a response to the disperse development of pioneering private and, subsequently, public certification standards. This had started as early as 1928, when German farmers, on a very local scale, agreed to stop using artificial fertilisers and to adopt a few 'biodynamic practices' to justify use of the Demeter name and, from 1931, the Demeter logo.[23] More significant and rapid steps were, however, taken from the late 1960s and onward, when standards were first introduced by the UK's Soil Association (1967) and the French Nature et Progrès (1972).[24] As illustrated by the former, these standards were published "as a general guide to producers, retailers and consumers, in the hope that these will lead to greater understanding of organic food production".[25] At the same time, the IFOAM, a non-governmental, umbrella organisation with private members, was set up at international level and published its first "Basic Standards" in 1980.[26] The Standards' overarching fundamentals demonstrate the importance of systems thinking in the context of organic production, as the first principle holds that organic farmers must "work as much as possible within a closed system, and draw upon local resources".[27]

The continuous growth of private standards, together with the increasing distance between consumers and producers,[28] however, raised problems for both the demand and supply side of the organic market. Notably, the lack of harmonised terminology, combined with a tendency to redefine and expand concepts like 'natural' and 'organic', was believed to lead to confusion among consumers,[29] and, together with fraudulent practices, would undermine consumer

[21] §5.4.1.
[22] Council Regulation 2092/91 of 24 June 1991 on organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs [1991] OJ L 198/1.
[23] O Schmid, 'Development of Standards for Organic Farming' in W Lockeretz (ed), *Organic Farming An International History* (CABI 2007), p 153.
[24] Ibid, p 154.
[25] 'Standards for organically grown food' (1967) 17 Journal of the Soil Association Mother Earth (personal copy obtained through the Soil Association) 537, p 537.
[26] Reference to the text of the IFOAM 1980 Basic Standards in Schmid 2007, p 165.
[27] Ibid, p 165.
[28] Ibid, p 152.
[29] *Organic Farming. A Guide to Community Rules* (European Commission, 2001), p 5.

confidence.[30] At the same time, the above also meant that *bona fide* organic producers were exposed to competition from unfair practices.[31] Initially, Member States had sought to address these issues at national level, through a variety of public measures. For example, the United Kingdom, in 1987, set up a 'UK Register of Organic Food Standards' – an independent body managed by persons closely related to the organic foods industry[32] – which purpose was to establish unified, private standards.[33] In France, the aforementioned Nature et Progrès standards were transposed into national legislation on official organic specification in 1986.[34] And in 1987, in Denmark, a Law on Organic Farming was passed which not only introduced public certification and control, but also provided for a range of other measures on institutional and policy support,[35] and has been interpreted as the first example of an organic action plan.[36]

EU Regulation 2092/91 has been interpreted to reflect the accumulation of national processes:[37] a Community-wide framework to ensure "conditions of fair competition between the producers of products [and to] improve the credibility of such products in consumers' eyes".[38] Yet, whilst the draft legislation was already tabled in 1989, its adoption in 1991 should be understood in light of its other purpose, namely to aid the reorientation of the EU's CAP as an accompanying measure to the 1992 MacSharry Reform.[39] Indeed, the single legal basis of the Commission's proposal and the 1991 Regulation reflects the perceived potential for the implementation of the new CAP.[40] In years prior, the European Commission had recognised the creation of structural agricultural surpluses and environmental damage as key problems of European agriculture, in particular the deterioration of terrestrial habitats, extinction of flora and fauna, water quality problems, soil degradation and landscape changes.[41] Addressing such environmental issues required proposals "aimed at reducing the damage caused by agriculture to the ecological infrastructure",[42] through regulation and control of harmful farming practices and, notably, through the "promotion of practices friendly to the environment".[43] In this regard, both the

[30] S Padel et al, 'Organic farming policy in the European Union' in N H Lampkin et al (eds), *Economics of Pesticides, Sustainable Food Production, and Organic Food Markets* (Emerald Group Publishing 2002), p 179.
[31] European Parliament, 'Report on the proposal for a regulation or organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs (COM(89)0552 final)' A3-0311/90, p 35.
[32] 'Advisory Committee on Organic Standards. Previously The UK Register of Organic Food Standards (UKROFS)' (*UK Department for Environment Food and Rural Affairs*, 2011) <http://adlib.everysite.co.uk/adlib/defra/content.aspx?id=000IL3890W.16NTBYOVG641Y4> accessed May 2022.
[33] K Lynggaard, *The Common Agricultural Policy and Organic Farming. An Institutional Perspective on Continuity and Change* (CABI Publishing 2006), p 133.
[34] 'L'histoire de Nature & Progrès' (*Nature & Progrès*, N.D.) <https://www.natureetprogres.org/lhistoire-2-2/> accessed May 2022.
[35] N Lampkin et al, *The Policy and Regulatory Environment for Organic Farming in Europe: Country Reports* (Universität Hohenheim, 1999), p 139.
[36] C Eichert et al, 'Examples of National Action Plan Evaluations' (6 April 2008) <http://orgapet.orgap.org/MainFrameD2.htm> accessed May 2022.
[37] European Commission 2001, p 10.
[38] Preamble European Commission, 'Proposal for a Council Regulation (EEC) on organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs' COM(89) 552 final.
[39] Lynggaard 2006, p 135.
[40] Treaty of Rome, Article 43.
[41] European Commission, 'Environment and Agriculture' COM(88) 338 final, pp. 6-7.
[42] Ibid, p 3.
[43] European Commission, 'Perspectives for the Common Agricultural Policy' COM(85) 333 final, p 51.

Commission and the European Parliament had increasingly recognised the potential of organic agriculture. However, the institutions' divergent approaches to the organic sector are indicative of a bias towards an industrial versus an agroecological model and are determinative of the role of the organic concept and market for furthering agricultural reform.

Of particular relevance for the implementation of an ecosystem approach in the context of organic certification, is the lack of reflection of the organic movement's ecological foundations in the Commission's initial proposal and the 1991 Organic Regulation. In this regard, it is significant that the regulation defined organic farming primarily through practices rather than values,[44] with no provisions on overarching objectives or principles. It thereby departed from many predating schemes, including the first IFOAM standards,[45] and the 1987 Danish Law on Organic Agricultural Production, which held that "organic farming is based on the objective of establishing stable and harmonious operating systems in which the individual types of production can be integrated in a natural biological cycle".[46] Moreover, contrary to the Commission, the European Parliament had tried to integrate ecosystems thinking into the EU's regulatory regime, even suggesting to change the English terminology from organic to "ecological" – an adjective used in Member States such as Spain, Denmark and Germany[47] – "since it is the term which suggests most clearly that the method used to produce the foodstuffs is intended to be in harmony with nature".[48] The final text, however, does not make any reference to ecology or the agro(eco)system and the contribution of the production rules to the protection of ecosystem functioning was therefore more incidental than systematic – an issue that, as we will see hereafter in §5.4, persists to this day. Indeed, the lack of consideration of livestock production until a 1999 amendment,[49] despite mixed farming practices often being an integral part of sustainable organic systems,[50] and observations that adherence to some of the rules may contradict core, ecological values of organic farming,[51] are symptomatic of the absence of a principle-based approach to EU regulation of organic production at its inception.

5.2.2. The 2007 Organic Reform: Towards a More Principled Approach?

For EU organic farming, the new millennium was marked by the launch of the first European Action Plan for Organic Food and Farming, which provides an overall strategic vision for the

[44] S Padel et al, 'The implementation of organic principles and values in the European Regulation for organic food' (2009) 34 Food Policy 245, p 245.
[45] See above and Schmid 2007, p 165. Note, however, that by 1989 the key principle of closed systems cited above (fn 27) had been reformulated and now referred only to organic matter and nutrients, see L W H Vogtmann, 'IFOAM's organic principles' (2004) 36 Ecology and Farming 24.
[46] *Lov om økologisk jordbrugsproduktion (Act on Organic Agricultural Production)* (Denmark, 1987), §1(2).
[47] Regulation 2092/91, Article 2.
[48] A3-0311/90, p 41.
[49] Council Regulation (EC) No 1804/1999 of 19 July 1999 supplementing Regulation (EEC) No 2092/91 on organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs to include livestock production [1999] OJ L 222/1. Compare in this regard, for example, the Danish Regulation from 1987 (*Lov Om Økologisk Jordbrugsproduktion*) which recognised the keeping of livestock on the farms, as far as possible, as part of its overarching objectives (§1(2)).
[50] See, for example, A3-0311/90, p 41. Also, C D Haan et al, *Livestock & the environment: finding a balance* (European Commission and FAO, 1997), Chapter 3.
[51] Padel et al 2009, p 249.

contribution of organic farming to EU agricultural policy.[52] Extensive consultations with experts and the wider public held in the lead-up to its adoption had, however, pinpointed to the absence of objectives and principles of organic farming in the 1991 Regulation as a major concern,[53] and an action point was formulated to address the matter.[54] Subsequent research to support the revision of the regulation, observed that, whereas efforts had until then primarily focused on harmonisation of production rules (practices), for such measures to increase the acceptance of the EU Regulation and protect the integrity of organic farming, they should "be based on harmonisation of the ethical values behind the rules"[55] (principles). Importantly, such harmonisation should be seen against the backdrop of simultaneous efforts at international level for achieving clarity on the normative basis of organic farming and regulation through the formulation of the four IFOAM Principles of Organic Agriculture.[56] The principles, adopted by IFOAM's General Assembly in 2005 by large majority, were the result of a deliberative approach.[57] Their formulation was coordinated by a small task force but involved rounds of consultations with a larger group, which aimed to capture the breadth of the organic sector (from farmers to certifiers) and achieve diverse representation across regions and genders.[58]

In the context of an ecosystem approach, the IFOAM's principle of 'ecology' is the most obviously relevant and it holds that organic farming "should be based on living ecological systems and cycles, work with them, emulate them and help sustain them".[59] It prescribes that practices should "fit the cycles and ecological balances in nature" and should, therefore, be adapted to "local conditions, ecology and scale",[60] which corresponds with the focus of the CBD's ecosystem approach on the maintenance of natural processes and the need for adaptive management, as discussed in Chapter 3.[61] The potential of the IFOAM Principles for the implementation of an ecosystem approach to agriculture, however, is also reflected in the three other principles of health, fairness and care.[62] The latter emphasises the need for precautionary and responsible management, which requires consideration of science, "practical experience, accumulated wisdom and traditional and indigenous knowledge",[63] through transparent and participatory processes. Moreover, integrative values which define the interconnectedness of

[52] European Commission, 'Communication on a European Action Plan for Organic Food and Farming' COM(2004) 415, p 2.
[53] European Commission, 'Proposal for a Council Regulation on organic production and labelling of organic products' COM(2005) 671 final, p 2.
[54] COM(2004) 415, Action 8: "Making the regulation more transparent by defining the basic principles of organic agriculture".
[55] S Padel et al, *Research to support the revision of the EU Regulation on organic agriculture. Final project report* (Danish Research Centre for Organic Food and Farming (for the European Commission), 2007), p 15.
[56] IFOAM 2005.
[57] S Padel et al, *Balancing and integrating basic values in the development of organic regulations and standards: proposal for a procedure using case studies of conflicting areas* (Danish Research Centre for Organic Food and Farming, for the European Commission, 2007), p 78.
[58] L W M Luttikholt, 'Principles of organic agriculture as formulated by the International Federation of Organic Agriculture Movements' (2007) 54 Wageningen Journal of Life Sciences 347, p 350.
[59] IFOAM 2005.
[60] Ibid.
[61] Chapter 3, §3.4.4.
[62] IFOAM 2005. See also, hereafter, Chapter 6, §6.2 and 6.4 on the IFOAM principle of fairness and the ecosystem approach's element of equity.
[63] Ibid.

the principles have been identified in a study conducted for the European Commission. Such values include sustainability with its environmental, social, and economic elements,[64] and systems thinking, notably the need to protect the functional integrity of the agroecosystem.[65]

Whereas the 1991 Regulation only made sporadic reference to core values of organic farming, the normative underpinnings of the 2007 Organic Regulation,[66] which entered into force on 1 January 2009, and the legislative drafts that had preceded the final text, had been enhanced by introduction of a hierarchical structure that stated aims, objectives and general principles, before general and specific production rules.[67] Furthermore, the preliminary findings of the above-mentioned research project that sought to inform the drafting of the new regulation, was conducted by researchers some of whom had been directly involved in formulating the IFOAM Principles at international level.[68] Although no explicit references were made, analogies have been drawn with the IFOAM's principle of ecology and the new regulation's provisions that organic production shall aim to "establish a sustainable management system for agriculture that respects nature's systems and cycles [and] contributes to a high level of biological diversity"[69] and that it shall be based on "the appropriate design and management of biological processes based on ecological systems using natural resources which are internal to the system".[70]

Whilst these references to ecosystem functioning in the EU legislation's objectives and principles should be considered a significant and welcome change, it must, however, be noted that these value-based reforms were not accompanied by more explicit recognition of the environmental and harmonising nature of the EU's regulatory regime on organic production in its foundations, notably its legal basis. Like its predecessor, the 2007 Organic Regulation was based on the EU's competence to implement the CAP and would require the balancing of the CAP's objectives.[71] The European Commission had, in this regard, put particular focus on the market-orientation of the recently reformed CAP,[72] the development of agricultural markets and the demand for quality products.[73] This seems to reflect a narrow understanding on the role of organic production in agricultural reform and the Parliament had, contrarily, sought to prioritise the relevance of organic production for environmentally sustainable production.[74] Also, its Committee on Legal Affairs had advocated for the regulation to be jointly based on the EU's internal market competence, *ex* Article 95 EC,[75] in light of a shift of focus to the

[64] Padel et al 2007, p 19.
[65] Ibid, p 21.
[66] Council Regulation (EC) No 834/2007 of 28 June 2007 on organic production and labelling of organic products and repealing Regulation (EEC) No 2092/91 [2007] OJ L 189/1.
[67] Regulation 834/2007, Article 1 (aim and scope), Article 3 (objectives, Article 4 (overall principles), Article 5-7 (specific principles), Article 8 and onward (general and specific production rules). Padel et al 2009, p 250.
[68] Padel, Jespersen and Schmid 2007, p 8.
[69] Regulation 834/2007, Article 3(a)(i) and (ii).
[70] Regulation 834/2007, Article 4(a) and Padel et al 2007.
[71] Article 37 TEC.
[72] Preamble 2 COM(2005) 671 final and Preamble 2 Regulation 834/2007.
[73] COM(2005) 671 final, Explanatory Memorandum, par 11.
[74] European Parliament, 'Report on the proposal for a Council regulation on organic production and labelling of organic products ' A6-0061/2007. See, for example, Amendment 2, 3 and 40 (Committee on Agriculture and Rural Development) and Amendment 27 (Committee on the Environment, Public Health and Food Safety).
[75] Ibid, p 65.

establishment and functioning of the internal market, and the need to provide for a "high level of environmental protection" in this context.[76] Furthermore, whilst the regulation holds that agroecosystem management should be based on "risk assessment, and the use of precautionary and preventive measures",[77] no explicit reference is made to the precautionary principle in relation to the overall implementation of the Organic Regulation and formulation of production rules, despite its inclusion in the Treaty as a general principle of EU law.[78]

5.2.3. The New Organic Regulation and the Post-2020 EU Agricultural Regime

In 2018, a new regulation on organic production and labelling of organic products was adopted, which replaces the 2007 Organic Regulation as of 1 January 2022.[79] Yet, compared to the 2007 Regulation, no further significant changes as regards to the normative foundations of EU organic certification are reflected in the new legislation. In slightly more general and elaborate wording, the 2018 Organic Regulation restates its aims to contribute to biodiversity, climate and environmental protection,[80] and maintain the long-term fertility of soils.[81] It holds that, as a sustainable management system, organic farming shall be based on "respect for nature's systems and cycles" and shall adopt "the appropriate design and management of biological processes, based on ecological systems and using natural resources which are internal to the management system".[82] The Commission's original proposal, despite its focus on the link between high environmental standards and high quality as a private attribute,[83] also recognised the public value of organic production as being key to achieving the sustainable management of the EU's land-based natural resources, for the implementation of the CAP 2013-2020.[84]

Yet, it could be questioned whether the changes brought by the new Organic Regulation are substantial enough to justify a new regulatory instrument. The impact assessment that accompanied the proposal reveals that the 2018 reform did not aim to reinvent the normative structure of EU organic certification, but aimed to better reflect its value-basis in its operational

[76] Ibid, p 63.
[77] Regulation 834/2007, Article 4(a)(iv). For a more permissive interpretation: J Lassen and M Oelofse, 'Knowledge and Precaution. On Organic Farmers Assessment of New Technology' (2018) 58 Sociologia Ruralis 351.
[78] *Ex* Article 130R Treaty of Maastricht and *ex* Article 174 TEC. See on the relevance of the precautionary principle in the implementation of the CAP through the principle of environmental integration (Article 11 TFEU) also Z Horváth, 'The Principles of Integration and Precaution in the European Legal Regimes' in M Cordonier Segger and J C G Weeramantry (eds), *Sustainable Development Principles in the Decisions of International Courts and Tribunals: 1992-2012* (Taylor and Francis 2017), p 647.
[79] Regulation (EU) 2018/848 of the European Parliament and of the Council of 30 May 2018 on organic production and labelling of organic products and repealing Council Regulation (EC) No 834/2007 [2018] OJ L 150/1 and Regulation (EU) 2020/1693 of the European Parliament and of the Council of 11 November 2020 amending Regulation (EU) 2018/848 on organic production and labelling of organic products as regards its date of application and certain other dates referred to in that Regulation [2020] OJ L 381/1.
[80] Regulation 2018/848, Article 4(a) and (c).
[81] Regulation 2018/848, Article 4(b). See also the relevant sub-paragraphs (d) on "contributing to a non-toxic environment" and (g) on "encouraging the preservation of rare and native breeds in danger of extinction".
[82] Regulation 2018/848, Article 5(f).
[83] European Commission, 'Proposal for a regulation on organic production and labelling of organic products' COM(2014) 180 final, p 4. See also Preamble 2 of the proposal.
[84] Ibid, Explanatory Memorandum, pp 3-4.

clauses, notably the production rules.[85] Despite the integration of ecologically inspired objectives and principles since the 2007 Organic Regulation, their legal value is compromised by a lack of translation into organically certified practices,[86] and the impact assessment, thus, recommended for the 2018 reform to "re-focus[…] organic farming on its principles".[87]

The next sections will, however, illustrate the challenges of translating promising, value-based objectives that can support implementation of an ecosystem approach, into operational rules. Looking at the 2007 and 2018 Organic Regulations and their implementing measures, it finds that standards for certification largely reflect an industrial rather than an ecological world view on food production that comes with risks of intensification and conventionalisation of organic production. Furthermore, it is considered why principle-driven reform of the process-based requirements have not been welcomed by producers. In this regard, this Chapter identifies more fundamental issues associated with the EU's system of third-party certification which marginalises and restricts the potential of notably small-scale farmers as ecosystem stewards, by supporting technocratic understandings formulated and enforced by top-down authorities.

5.3 EU Organic Certification: Standard Setting and Compliance Control

The integration of core organic principles into the preambles and objectives of the Organic Regulation of 2007, including those that reflect ecological systems-thinking, meant that early reviewers expressed cautious optimism regarding its potential to reshape the EU's regulatory framework to ensure better alignment with the normative underpinnings of the organic sector.[88] Nonetheless, they also recognised that much would be ultimately dependent on the details of implementing legislation,[89] and subsequent evaluations and reform of the 2007 EU Organic Regulation have tried primarily to assess the adequacy of such production rules.[90] Prescriptive, minimum standards or requirements for certification of organic production set at EU level, indeed, ultimately, determine to what extent the EU's regulatory regime fosters management of the agroecosystem that supports closed cycles, in accordance with organic principles, and prioritises the protection of ecosystem functioning, in line with an ecosystem approach. In this regard it must be reiterated that whilst the EU rules are of public origin, they inform the content and boundaries of private relationships between producers and consumers of organic food stuffs, who choose to engage through the market on a voluntary basis.[91] Some scholars have drawn analogies with contracts, as the standards represent a predetermined agreement between a producer and consumer on the practices to be followed under organic labels.[92] Such a basic

[85] European Commission, 'Impact Assessment Accompanying the Document 'Proposal for a Regulation on organic production and labelling of organic products" SWD(2014) 65 final – Part 1/3.
[86] S Padel, 'Setting and reviewing standards for organic farming' in U Köpke (ed), *Improving organic crop cultivation* (Burleigh Dodds 2018).
[87] SWD(2014) 65 final – Part 1/3, p iv.
[88] Padel et al 2007, p 47.
[89] Ibid.
[90] See, for example, J Sanders et al, *Evaluation of the EU legislation on organic farming. Study Report* (Thünen Institute, 2013); SWD(2014) 65 final – Part 1.
[91] See on the difficulties in applying public-private distinctions in the context of EU voluntary food schemes like the EU Organic Regulation: H Schebesta, 'Control in the Label: Self-Declared, Certified, Accredited?' in P Rott (ed), *Certification - Trust, Accountability, Liability* (SpringerLink 2019).
[92] Padel 2018, p 1.

characterisation should, however, within the context of the EU's organic regime, be sharpened by taking into account the strong linkages between adherence to public requirements for organic certification and access to measures of public financial support.[93] Furthermore, and often contrary to private counterparts, it discounts the marginalised role of ecosystem stewards in the formulation of production rules and the operationalisation of the control system.

Despite repeated calls for principle- or value-based EU organic labelling,[94] it is the specifics of the regime's underlying cognitive-normative and organisational-structural complexes and their interactions which makes the adoption of an approach – which centres around ecosystem functioning and which places authority with ecosystem stewards – far from straightforward. This section outlines how organic standard-setting takes place within the EU and how compliance with such standards is assured through a system of third-party compliance control or certification. In this regard, it considers how the EU's institutionalisation of the organic label has marked a shift from a bottom-up to a top-down approach to the formulation of standards and the verification of compliance. This shift, from farmers as primary organic standard-setters and controllers to stakeholders (consultees, advisors, lobbyists, auditees) within EU processes for law-making, has meant marginalisation of their views and competition from other interests (e.g., consumers, conventional farmers, certification bodies, retailers, public authorities etc.).

5.3.1. From a Bottom-Up to a Top-Down Approach to Organic Standardisation

The EU's framework of organic production rules consists of the general rules that are provided in the main regulation,[95] together with its overarching objectives and principles as discussed above,[96] and more specific and detailed rules for particular enterprises such as livestock and arable production laid down in the annexes to the regulation or in implementing legislation.[97] The 1991 and 2007 Organic Regulations were adopted following the consultation procedure, within which the Council acted as the primary legislator who was only obliged to consult and consider but not to integrate the opinion of the European Parliament.[98] Contrarily, the 2018 Regulation was adopted under the ordinary legislative procedure (formerly: the co-decision procedure) as a joint legislative effort between the Council and the Parliament.[99] Importantly, however, the power to adopt implementing and delegated acts – the latter category introduced by the Treaty of Lisbon – lies with the Commission.[100] Delegating acts with more detailed organic production rules are adopted through the framework of comitology; a decision-making procedure that also has been discussed in the previous Chapter in the context of the

[93] Above §5.2; Regulation 2021/2115 .
[94] Padel et al 2009; Padel et al 2007; SWD(2014) 65 final – Part 1.
[95] Rules laid down in Regulation 2018/848; previously Regulation 834/2007.
[96] Above §5.2.2. For example, 2018/848, Articles 4-6 Regulation.
[97] For example, Regulation 2018/848, Annex II and Commission Delegated Regulation 2020/427 amending Annex II to Regulation (EU) 2018/848 of the European Parliament and of the Council as regards certain detailed production rules for organic products [2020] OJ L 87/1. Previously also, Commission Regulation 889/2008 laying down detailed rules for the implementation of Regulation 834/2007 on organic production and labelling of organic products with regard to organic production, labelling and control [2008] OJ L 250/1.
[98] The Council did, however, have to wait for the opinion from the European Parliament: Case 138/79 *SA Roquette Frères v Council* [1980] ECR 1980-03333.
[99] Article 294 TFEU.
[100] Article 290 TFEU.

authorisation of pesticides and GMOs.[101] Accordingly, for implementing acts, the Commission submits a draft regulation to a Committee on Organic Production which "represents the view of EU countries",[102] seeking endorsement by qualified majority.[103] Its members are often also represented in the Expert Group on Organic Production,[104] which is consulted before the adoption of delegated acts – with the possibility for European Parliament and the Council to raise objections regarding the content of the acts before they enter into force.[105] Following the adoption of the Commission's Better Regulation Guidelines,[106] both draft implementing and delegated acts are open to comments from stakeholders during a four-week period. It must be noted, however, that this shift from specific, technical rules in an annex to the main regulation to implementing and delegated acts, following the Commission's own belief that "implementing rules are purely technical",[107] has been questioned by the European Parliament. Indeed, comparison of the 2007 and 2018 Organic Regulations indicates a tendency to revert to more detailed secondary legislation – albeit subject to potential Commission amendments.[108]

Whereas the above might seem to be nothing new under the horizon to the EU lawyer, the process of EU institutionalisation should be considered a significant change when it comes to the distribution of authority and the role of ecosystem stewards in organic standard-setting. It is recalled that standards for organic certification originated in the national and private realm,[109] and in this regard they were the result of a bottom-up approach which sought to capture local knowledge on traditional agricultural practices.[110] Rooted in the organisational frameworks of producers' organisations with private memberships, decision-making was mostly done through democratic procedures.[111] For example, in Austria, the first standards for organic crop productions were drafted in 1980 by farmers associations, in cooperation with the Ludwig Boltzmann Institute to elaborate on their scientific foundations.[112] The private standards were transferred into the Austrian Codex Alimentarius in 1989,[113] which had originally been the outcome of voluntary efforts by university and food industry experts and which provided the foundations for the FAO and WHO Codex Alimentarius.[114] The most relevant body for drafting and revision of production standards was and is the subsidiary commission, Codex-UK Bio,

[101] Chapter 4, §4.3.1.
[102] 'Organic Farming - Co-operation and Expert Advice' (*European Commission*, N.D.) <https://ec.europa.eu/info/food-farming-fisheries/farming/organic-farming/co-operation-and-expert-advice_en> accessed May 2022.
[103] Regulation 182/2011, Article 5.
[104] 'Organic Farming - Co-operation and Expert Advice' (*European Commission*, N.D.).
[105] Article 290(2) TFEU. The period for raising objections is set by the legislative act.
[106] European Commission, 'Better Regulation Guidelines' SWD (2017) 350, p 41.
[107] A6-0061/2007, p 58.
[108] See, for example, Regulation 2018/848, Articles 12(2) and 14(2).
[109] Above §5.2.1.
[110] C R Vogl et al, 'Are Standards and Regulations of Organic Farming Moving Away from Small Farmers' Knowledge?' (2005) 26 Journal of Sustainable Agriculture 5, pp 8-9.
[111] Ibid, p 19.
[112] C Vogl and I Darnhofer, 'Organic Agriculture in Austria' (2004) 34 the Organic Standard 2.
[113] L J Maurer, 'An Ecological Approach to Agriculture - the Austrian Example' (1989) 27 Agriculture, Ecosystems & Environment 573.
[114] A Randell, 'Codex Alimentarius: How it all Began' in J L Albert et al (eds), *Food Nutrition and Agriculture* (FAO 1995).

which was initiated by certification bodies and producers' organisations.[115] In the Netherlands, improved organisation of the organic sector through establishment of the Dutch Association for Organic Farming in the mid-80s, coincided with development of the first standard, the EKO-quality label, as a joint initiative of farmers and alternative food shops.[116] Whilst the absence of political support meant that human and financial resources were scarce and that reliance was placed on work done elsewhere in Europe for inspiration, such as the Swiss standards adopted by organic farmer organisations,[117] the Dutch normative documents were published for in-depth written and oral discussion with local stakeholders.[118] Lastly, in Sweden, pioneering farmers launched the National Association of Alternative Growers and founded the first certification body: KRAV.[119] Farmers influenced standard-setting within KRAV through membership of the overarching association for organic farmers, and by shaping its goals.[120]

At international level, a bottom-up approach to the development of standards is still the norm today, within the institutional framework of the IFOAM which is a democratic federation.[121] The IFOAM's Standard for Organic Production and Processing (formerly known as the 'Basic Standard') provides, similarly to the EU's regulatory rules, for minimum requirements which are further developed into operational standards by accredited certification bodies, taking into account local conditions.[122] As exemplified by their 2018-2020 revision, the fundamental participatory nature of the IFOAM process means that even the revision plan, which outlines opportunities for stakeholder involvement such as the consultation of specific interest groups and various rounds of feedback, is made publicly available for stakeholders to comment on.[123]

The examples above are only illustrative of the widespread ownership by farmers as ecosystem stewards of organic standard-setting when such processes have been initiated at various levels. There are arguably benefits associated with the transfer of standards from the private to the public, including transparency, controllability, perceived legitimacy, and the easing of trade relations within the EU's single market through more commonality.[124] Nonetheless, their institutionalisation at national and EU level has led to a shift of power to authorities which may be detached from agriculture "and in many cases [may] not be 'true believers' in the organic system".[125] For EU legislative procedures, it means that the role of the organic sector and

[115] L Maurer, 'Hintergründe bei der Erstellung der Regelungen für Bio-Produkte: Rückblick 1978 bis 1994' in E Schübl (ed), *Biologische Landwirtschaft 35 Jahre Bio-Regelungen in Österreich* (Austrian Federal Ministery of Social Affairs, Health, Care and Consumer Protection 2020).
[116] A Hollander, *'Tegen beter weten in' - De geschiedenis van de biologische landbouw en voeding in Nederland (1880-2001)* (University of Utrecht 2012), pp 168-169.
[117] Ibid, pp 168-169.
[118] Ibid.
[119] I Källander, 'Ecological Farmers Association and the Success of Swedish Organic Agriculture' in W Lockeretz (ed), *Organic Farming An International History* (CABI 2007), p 205.
[120] Ibid, p 207.
[121] Luttikholt 2007, p 350.
[122] *The IFOAM Norms for Organic Production and Processing* (IFOAM, 2014).
[123] *Public Revision Plan for the IFOAM Standard for Organic Production and Processing in 2018-2020* (IFOAM, 2018a).
[124] Challenging these arguments and, notably, the idea of enhanced legitimacy, see T Lytton, 'Competitive Third-Party Regulation: How Private Certification Can Overcome Constraints That Frustrate Government Regulation' (2014) 15 Theoretical Inquiries in Law 539.
[125] S Dabbert et al, *Organic farming: policies and prospects* (Zed Books 2003), p 49.

farmers in particular, is, firstly, limited by the availability of participatory channels to influence the position of the EU's institutional triangle: the Commission, the Council and the Parliament. Moreover, where there are such routes available, the impact of stakeholder engagement is, ultimately, dependent on the willingness of legislators to take their positions into account. By moving from a bottom-up to a top-down approach, the ability of farmers to provide meaningful and effective contributions to organic standard-setting, therefore, is put in competition with other lobbying interests, including consumer interests, and is shaped by political tides.[126] The lobbying process may, moreover, not always be straightforward or transparent as exemplified by the accounts of stakeholders and academics that have been closely involved over the years.

In this regard, the analysis below focuses on the ability of smallholders to influence the position of the Commission. With regard to the first EU legal framework for the certification of organic production, EU Regulation 2092/91, formal consultation opportunities were limited. Instead, Vogl and others observed the pivotal role of expert committees with Member State representatives for the making of amendments to the early production standards.[127] Some of these national representatives had clear links to national farming bodies, such as the Austrian representatives which were also members of the aforementioned Committee of the Austrian Codex and which included farmers' associations.[128] However, it was held that such direct relations between grass roots levels and EU standard-setting were very rare.[129] This deficit was not effectively remedied by the 2007 reform of the Organic Regulation. The reform was to be informed by a research project on 'organic revision' and included case studies, focus group discussions with organic producers and stakeholder workshops.[130] Yet, one of the lead researchers on the project noted that, in reality, the Commission "kept the file very close to its chest" and proceeded with a proposal before the results of the study has been made available, resulting in strong protests from the organic sector due to a perceived lack of involvement.[131]

The preparatory phase of the Commission's proposal for the new organic regulation may be even more illustrative of the challenges that farmers' face in influencing EU standard-setting. The process in 2012-2014 involved an evaluation, impact assessment and consultation,[132] pre-empting what has now been made common practice through the 2017 Better Regulation Guidelines.[133] Although the thorough expert evaluation included case studies, interviews with stakeholders and web surveys, the findings of which were verified through bibliographical research,[134] those involved in the drafting of the study believed that it received little to no regard from the Commission.[135] Instead, great emphasis was placed by the Commission on its own web-based consultation which received a total of 45.000 replies, but less than 2% of those

[126] Ibid.
[127] Vogl et al 2005, p 18.
[128] Ibid, p 19. See more extensively on the workings of the Australian Committee, also Vogl and Darnhofer 2004.
[129] Vogl et al 2005, p 19.
[130] Padel, Jespersen and Schmid 2007.
[131] Personal interview Susanne Padel – 27 March 2020.
[132] Sanders et al 2013; SWD(2014) 65 final – Part 1 and 2.
[133] SWD (2017) 350.
[134] Sanders et al 2013, p iv.
[135] Personal interview Susanne Padel – 27 March 2020.

responses had been submitted by farmers.[136] Representatives of the latter had, furthermore, strictly opposed the introduction of a new regulation, expressing great concern for the burden on the organic sector if it had to adapt to a different regulatory framework relatively shortly after the implementation of the reform of 2007.[137] However, not only did the Commission press ahead with the new standards for organic production, it has been observed that it took much more interest in the views expressed by consumers than the potential impacts on producers.[138] And whilst the Advisory Group on Organic Farming ('AGOF' – nowadays known as the Civil Dialogue Group) provided another forum for dialogue with the Commission, and continues to do so for implementing measures relevant to organic farming,[139] it has been found that smallholders are underrepresented in the Commission's advisory and expert groups.[140]

5.3.2. From Participatory to Third-Party Certification and Control

The characterisation of the EU regime for organic production as a top-down approach with restricted channels for stakeholder participation, is not limited to the matter of standard-setting. Rules and procedures for standard setting are, in any typical – public or private – governance model, complemented by rules and procedures for control, which aim to ensure compliance with agreed standards by private entities. Again, to understand the normative decisions that underpin the EU's system of top-down or 'third-party control', it is helpful to briefly reflect on alternative mechanisms that were used by some of the pioneers of the organic movement.[141] Such systems are nowadays often referred to as 'Participatory Guarantee Systems' ('PGS'),[142] and they find their origins in the 1970s.[143] PGS have been described as "locally oriented quality assurance systems" […] which certify on the basis of "active participation of stakeholders and are built on a foundation of trust, networks and knowledge exchange".[144] The most striking example is provided by the French organisation 'Nature et Progrès', previously mentioned as being one of the first in Europe to publish standards for certification.[145] Nature et Progrès has been characterised as being similar to a 'trade union' which, since its institution in 1964, has operated as a network based on close relations and shared visions.[146] Where production norms

[136] SWD(2014) 65 final – Part 2, p 20.
[137] *Sector Briefing on Commission Review of the Organic Regulation* (IFOAM EU, 2014), p 3.
[138] S Padel and L Woodward, 'New EU Organic Regulation: fine words and good intentions are likely to create uncertainty for years to come' (2014) 115 ORC Bulletin 15, p 16.
[139] 'Organic Farming - Co-operation and Expert Advice' (*European Commission*, N.D.).
[140] SWD(2014) 65 final – Part 2, p 88. Another group that is significant for EU organic standard-setting is the expert group for technical advice on organic production ('EGTOP'). EGTOP provides reports on technical aspects of organic production and responds to requests from Member States to amend technical annexes.
[141] Note, however, that not all the early national standards relied on PGS for control and certification. In the Netherlands, for example, the EKO-label sought to distinguish itself from the Dutch Demeter label by opting for independent, third-party certification: Hollander 2012, p 184.
[142] See, also, hereafter Chapter 6, §6.4.3
[143] M López Cifuentes et al, 'Participatory Guarantee Systems in Spain: Motivations, Achievements, Challenges and Opportunities for Improvement Based on Three Case Studies' (*Sustainability* 2018) <https://www.mdpi.com/2071-1050/10/11/4081> accessed May 2022, p 3.
[144] May 2019, p 3. Original text: *"Les systèmes participatifs de garantie (SPG) sont des systèmes d'assurance qualité avec une orientation locale. Ils certifient les producteurs en s'appuyant sur la participation active des acteurs et sont basés sur la confiance, les réseaux sociaux et l'échange de connaissances*."
[145] Above §5.2.1.
[146] B Sylvander, 'Le rôle de la certification dans les changements de régime de coordination: l'agriculture biologique, du réseau à l'industrie' (1997) 80 Revue d'économie industrielle 47, p 51.

reflected the ideal practices of the union's members, it was the sense of belonging to the group and the strong interpersonal connections that were believed to ensure compliance rather than the exercise of technical oversight and control.[147] To this day, Nature et Progrès uses PGS, based on associative values such as participation, horizontality, community vision, mutual learning, transparency and trust, to guarantee adherence to production rules.[148] Participatory certification is exercised through an initial audit by members of Nature et Progrès: producers who are obliged to dedicate 2.5 days per year to peer review of new or existing members.[149] These auditors report back to the local 'Commission Mixte d'Agrément et de Contrôle' ('COMAC'). The local COMAC is made up of at least 5 to 6 Nature et Progrès members, but its structure and workings are flexible and should be adapted to local needs.[150] Whilst the local COMAC gives an authoritative opinion, the final decision on accreditation is taken by the Federal COMAC, which includes representatives of the local COMACs.[151] Relations between the auditors and auditee are, however, not to be of a controlling and punitive nature, but should be based on equality, learning and knowledge exchange.[152] Indeed, if a producer requires assistance to make himself compliant with the production rules, such assistance should be given in the spirit of collective learning, for example, through more farm visits.[153] Sanctions, to be used sparingly, are of a gradual nature and thus dependent on the severity of non-compliance.[154]

Contrary to the PGS outlined above, the EU has opted for a system of third-party certification, which distinguishes itself from PGS by placing the power to assess, evaluate and certify compliance with standards with parties which are independent from the food and agricultural supply chain.[155] The legitimacy of this authority is grounded upon the concept of 'objectivity';[156] a notion that was also highlighted in the previous Chapter in the context of the use of regulatory science and which is closely related to impartiality and neutrality.[157] Indeed, a choice for third-party certification has been interpreted as an institutional expression of a governance system that prioritises science and technical knowledge to define the contents and boundaries of inherently normative concepts like sustainability.[158] With regard to the EU's regulatory regime for organic production, the 2007 Organic Regulation stipulates that Member States designate one or more competent authorities, who may confer its/their competences to one or more control authorities or bodies.[159] Control authorities, like the Danish Agricultural

[147] Ibid, p 53.
[148] 'Le SPG' (*Nature et Progrès*, N.D.) <https://www.natureetprogres.org/le-spg/> accessed May 2022.
[149] May 2019, p 33.
[150] E Torremocha, *Le Manuel Pratique des Systèmes Participatifs de Garantie - Nature & Progrès* (Fédération Nature & Progrès, 2015), Section IV.C.
[151] S Lemeilleur and G Allaire, 'Système participatif de garantie dans les labels du mouvement de l'agriculture biologique: Une réappropriation des communs intellectuels' (2018) 365 Economie Rurale 7, p 21.
[152] Torremocha 2015, p 15.
[153] Lemeilleur and Allaire 2018, p 21.
[154] Ibid, p 23.
[155] M Hatanaka and L Busch, 'Third-Party Certification in the Global Agrifood System: An Objective or Socially Mediated Governance Mechanism?' (2008) 48 Sociologia Ruralis 73, p 73.
[156] Ibid, p 75.
[157] Chapter 4, §4.4.1.
[158] A Loconto and M Hatanaka, 'Participatory Guarantee Systems: Alternative Ways of Defining, Measuring, and Assessing 'Sustainability'' (2018) 58 Sociologia Ruralis 412.
[159] Regulation 834/2007, Article 27(1) and (4).

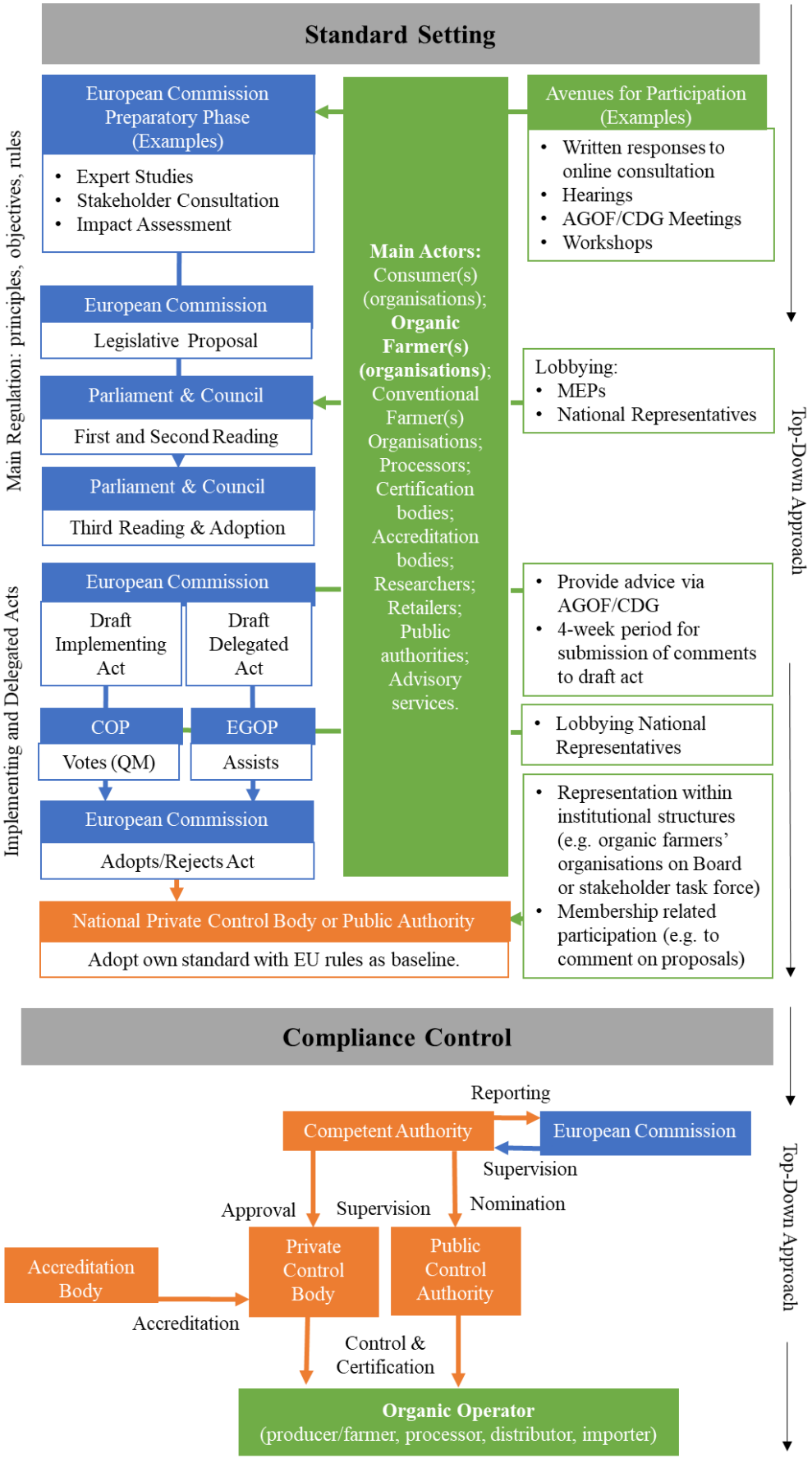
Agency and the Estonian Veterinary and Food Board, are of a public nature, whereas control bodies are private entities, which often operate at smaller scales.[160] For example, a total of nineteen private control bodies are responsible for organic control and certification in Italy.[161] Some Member States, like Spain and Poland, operate a mixed system of public authorities and private bodies.[162] Importantly, control bodies require accreditation by an accreditation body in accordance with the private international standard ISO/IEC 17065:2012, which checks its technical competence, independence, impartiality and professional integrity.[163] The control bodies report to the competent authorities, which are, in turn, supervised by the Commission.[164]

The approach of the 2018 Organic Regulation will be similar, although rules and procedures for official controls have seen further streamlining across the EU's regulatory regime for food and feed under Regulation 2017/625.[165] Of significance, however, for small-scale farmers is the new possibility to obtain group certification;[166] an option previously reserved for producers from developing countries.[167] In some respects, group certification combines features of the PGS will third-party certification with a view to lowering administrative and financial barriers, which may prevent smallholders from obtaining organic certification.[168] Accordingly, a group of operators with separate legal personality,[169] like a farmers' cooperative or organisation,[170] establishes a system for internal control ('ICS') which involves a documented set of control activities and procedures to verify whether members comply with the production rules.[171] Such documented activities and procedures need to include those for registration of members, annual internal inspections of members, annual training of inspectors, measures in case of non-compliance and internal traceability of products within the joint marketing system.[172] The eligibility of farmers to benefit from group certification is assessed upon the basis of the ratio between individual certification costs and earnings (more than 2% of standard output), turnover

[160] For an overview of control bodies and authorities, see the 'Organic Farming Information System' (*European Commission*, N.D.) <https://ec.europa.eu/agriculture/ofis_public/index.cfm> accessed May 2022.
[161] Ibid.
[162] Ibid.
[163] *The control system for organic products has improved, but some challenges remain* (European Court of Auditors, 2019), p 9. See also Regulation (EU) 2017/625 of the European Parliament and of the Council of 15 March 2017 on official controls and other official activities performed to ensure the application of food and feed law, rules on animal health and welfare, plant health and plant protection products [2017] OJ L 95/1, Article 29(b)(iv).
[164] Previously Regulation (EC) No 882/2004 of the European Parliament and of the Council of 29 April 2004 on official controls performed to ensure the verification of compliance with feed and food law, animal health and animal welfare rules [2004] OJ L 165/1, Article 44-45; replaced by Regulation (EU) 2017/625, Articles 113-114.
[165] Regulation 2017/625, Articles 1(2)(i), 4(3), 5 and also, Article 25 for specific rules for organic production.
[166] Regulation 2018/848, Article 34.
[167] European Commission, 'Guidelines on imports of organic products into the European Union ' Rev. 1 – Chapter 8 'Guidelines for the evaluation of the equivalence of organic producer group certification schemes applied in developing countries'.
[168] F Meinshausen et al, *Group Certification. Internal Control Systems in Organic Agriculture: Significance, Opportunities and Challenges* (Research Institute of Organic Agriculture (FiBL), 2019), p 12.
[169] Regulation 2018/848, Article 36(1)(d).
[170] *Regulatory changes for organic small farmers in Developing Countries. Updated Briefing* (IFOAM Europe, 2020), p 1.
[171] Regulation 2018/848, Article 36(1)(g).
[172] Commission Delegated Regulation (EU) 2021/715 of 20 January 2021 amending Regulation (EU) 2018/848 of the European Parliament and of the Council as regards the requirements for groups of operators [2021] OJ L 151/1Article 1.

(not more than 15.000 euro) or size (maximum 5 ha for standard holdings, 0.5 for greenhouses and 15 ha for permanent grassland).[173] Importantly, benefits obtained from the use of internal control systems for quality assurance exceed efficiency gains that are related to economies of scale. Often understudied advantages include the empowerment of producers and fostering of organisational development, improvement of on-farm practices through knowledge exchange and capacity building and the better traceability of products within a single marketing unit.[174]

[173] Article 36(b) Regulation 2018/848.
[174] Meinshausen et al 2019, p 13 and p 72.



5-1 Overview of EU framework for organic standardisation and control and opportunities for participation

5.4 Certification in Practice: Ecologically Ineffective Rules and Procedures

The transition from standard-setting at local and national level by those often directly involved in food production to legal production rules formulated by EU institutions, which rely on the contributions of a wide range of actors to decide on the baseline for organic producers across Member States, marks a significant shift of authority. The allocation of authority, to help shape and decide on the content of standards and interpret and apply them,[175] is, however, crucial for the direction of the organic project: for the achievement of societal benefits through adoption of organic production norms by private actors. Standards have, in this regard, been interpreted as "recipes for reality".[176] They help us translate complex normative visions for the future, such as those for sustainability, into simplified, workable rules. Paradoxically, the repetition of rules may also create and shape the vision:[177] e.g., organic practices that follow the standards come to define what we believe to be agricultural sustainability. Problems may, however, arise when the standards have moved away from the values upon which true sustainability relies, such as the principles of health, ecology, fairness, and care as identified by IFOAM,[178] which have to various degrees been captured by the objectives and principles of the EU organic regulations.[179]

A persistent disconnect between production rules and the principle-basis of organic farming and certification has been recognised in the literature and by EU institutions,[180] and was given as a primary reason for the launch of negotiations of a new organic framework which was then adopted in 2018.[181] This section analyses the content of the EU production rules and the extent to which they reflect the bold environmental aspirations of the 2007 and 2018 Organic Regulations and, notably, the establishment of sustainable management systems which are based on ecological cycles and system-functioning.[182] It concludes that the operational rules do not comprehensively reflect an approach that protects ecosystem functioning and that the standards, consequently, may, in a best-case scenario, fail to support good practices, and, in a worst-case scenario, may encourage the conventionalisation or industrialisation of the certified sector. Whilst this signals a need for normative change, many organic producers opposed what has been described as 'principle-driven' reform in the context of the negotiations of the most recent regulation. Such opposition to stricter or more prescriptive operational rules should not be ignored under a simple notion that producers naturally favour relaxation of requirements but should be understood in light of the institutional structures described in the previous section, which may marginalise the input of (small-scale) farmers as agroecosystem stewards. In this regard, this section, lastly, discusses some more fundamental, structural issues that undermine the effectiveness of third-party certification as a tool for the delivery of public goods.

[175] Loconto and Hatanaka 2018, p 4.
[176] L Busch, *Standards : recipes for reality* (MIT Press 2011).
[177] Ibid, p 74.
[178] Above §5.2.2 and IFOAM 2005.
[179] Above §5.2.2 and 5.2.3 and Padel et al 2007.
[180] Padel et al 2009; Padel 2018; V Seufert et al, 'What is this thing called organic? – How organic farming is codified in regulations' (2017) 68 Food Policy 10; J De Wit and H Verhoog, 'Organic values and the conventionalization of organic agriculture' (2007) 54 Wageningen Journal of Life Sciences 449.
[181] SWD(2014) 65 final (Part 1 – Impact Assessment).
[182] Above §5.2.2-5.2.3.

5.4.1. EU Organic Production Rules: A Gateway to Industrialisation?

Whilst the focus of this Chapter is on the agricultural aspects of the regulatory framework, it is noted that the scope of the EU organic regulations is much broader and involves all stages of production, preparation, and distribution, with the exception of mass catering.[183] Some standards relating to agriculture are of a general nature and thus apply to the holding in a broad sense, as is the case, for example, for general prohibitions on the use of GMOs, animal cloning and ionising radiation for the treatment of food and feed, rules on co-existence between organic and industrial units and on requirements for conversion.[184] Other standards are more specific, relating to certain practices or enterprises, and can be categorised as prohibitions or restrictions on the use of inputs, as preferences for the use of inputs of certain origin or as obligations to apply good practices.[185] The emphasis is, however, very much placed on the 'don'ts' rather than the 'do's' of organic farming. For example, farmers are banned from using mineral nitrogen fertiliser,[186] or herbicides.[187] How fertility and pest control is to be achieved in practice is to a large degree left to the discretion of the farmer, although the framing of the regulations leads to an emphasis on substitution (the use of allowed, off-farm inputs) rather than the use of natural processes.[188] For example, the regulations include long lists of permitted substances, such as rock phosphate, seaweed or potassium sulphate for fertilisation, and gelatine, sulphur or paraffin oil as pesticides.[189] Whilst some provisions do highlight alternative practices, like the use of crop rotations or livestock manure,[190] they are not well-defined to guarantee public benefits that would follow from such a closed agroecosystem.[191] Similar observations can be made for livestock production. The production rules that sought to implement the 2007 Organic Regulation encouraged land-based livestock, meaning that a share of feed should come from the farm itself.[192] However, low percentages and wide interpretations of an exemption to allow co-operation between regions where on-farm production is not possible, with the concept of 'regions' having been understood to include the entire EU or world in countries like Spain, the Netherlands and Austria, have made the requirement meaningless.[193] These shortcomings have, furthermore, not been effectively remedied by the adoption of the 2018 Organic Regulation.[194] The new regulation provides some improvements that seek to reduce reliance on derogations (e.g. the use of non-organic feed or seeds),[195] and it provides recognition of practices that are

[183] Regulation 2018/848, Article 2; see also Regulation 834/2007, Article 1(2) and (3).
[184] Regulation 2018/848, Articles 9-11; see also Regulation 834/2007, Articles 9-10 and 17.
[185] Padel 2018.
[186] Regulation 2018/848, Annex II, par 1.9.8; see also Regulation 834/2007, Article 12(1)(e).
[187] Whilst the ban is not explicitly stated, it follows from the exclusion of herbicides from the list of permitted substances in the Annexes to Commission Implementing Regulation (EU) 2018/1584 amending Regulation (EC) No 889/2008 laying down detailed rules for the implementation of Council Regulation (EC) No 834/2007 on organic production and labelling of organic products with regard to organic production, labelling and control [2018] OJ L 264/1 and Regulation 889/2008. See also, Padel 2018.
[188] Seufert et al 2017, p 14.
[189] Regulation 2018/1584, Annex I and II; see also Regulation 889/2008, Annex I and II.
[190] Regulation 2018/848, Article 6(d) and Annex II, par 1.9.2.
[191] S Padel, 'Adequacy of the production rules' in J Sanders et al (eds), *Evaluation of the EU Legislation on Organic Farming – Study Report* (Thünen Institute 2013), p 82.
[192] Regulation 889/2008, Article 19.
[193] Padel 2013, p 81.
[194] See also Padel and Woodward 2014.
[195] Regulation 2018/848, Annex II, Part I, 1.8.5. and Part II, 1.9.3.1. and Article 53.

suited to the organic sector (e.g. the marketing of heterogeneous plant reproductive material),[196] but does very little to challenge the narrow characterisation of organic as 'chemical free'.

This interpretation could be explained by taking a closer look at the dominant powers within the EU's standardisation process. The emphasis on an absence of chemicals has been linked to consumers' interests, who tend to prioritise health considerations,[197] in contrast to organic farmers themselves who mostly value the ecological benefits of organic production.[198] The rather peculiar focus on the character of the organic end-product – perceived to be of healthier thus superior quality due to a lack of inputs[199] – is also reflected in the fact that EU level oversight for control falls largely within the remit of the Commission's Directorate-General for Health and Food Safety (SANTE).[200] Additionally, restrictions on inputs are requirements that are easy to monitor and that would, therefore, likely receive support from control bodies.[201]

The EU's targets under the Biodiversity Strategy aim to have at least 25% of agricultural land under organic farming management by 2030, in recognition of its potential for biodiversity protection and the ecological restoration and transition.[202] However, realisation of this potential does not automatically follow from a reductionist approach to the organic standard which limits the use of external inputs. The absence of details on good organic practices, as described above, as well as the lack of comprehensive, biodiversity-specific instructions in the EU regulations, for example, on habitat management – identified as one of the key attributes of organic production to biodiversity[203] – are important omissions. That many certified organic farmers have put in place management systems that do "respect […] nature's systems and cycles"[204] in accordance with the ecological principles that underpin the EU's organic regime,[205] and, in fact, often provide more biodiversity than their industrial counterparts,[206] can, therefore, not be attributed to the EU rules alone. Indeed, positive impacts may rather stem from the existence of higher national standards,[207] or farmers' intrinsic motivations to practice sustainability.[208]

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[196] Regulation 2018/848, Article 13; Delegated Regulation (EU) 2021/1189 of 7 May 2021 as regards the production and marketing of plant reproductive material of organic heterogeneous material of particular genera or species [2021] OJ L 258/18.
[197] Seufert et al 2017, p 16; R S Hughner et al, 'Who are organic food consumers? A compilation and review of why people purchase organic food' (2007) 6 Journal of Consumer Behaviour 94.
[198] Seufert et al 2017, p 16; see, for example, case studies conducted in Austria: C Leitner and C R Vogl, 'Farmers' Perceptions of the Organic Control and Certification Process in Tyrol, Austria' (*Sustainability* 2020) <https://doi.org/10.3390/su12219160> accessed May 2022.
[199] Seufert et al 2017, p 17.
[200] S Padel, 'Challenges for Organic Control Systems and Ideas for Improvement' in S Padel (ed), *The European Regulatory Framework and its Implementation in Influencing Organic Inspection and Certification Systems in the EU* (Organic Research Centre 2010), p 80; Padel and Woodward 2014, p 16.
[201] Lampkin 2021.
[202] COM/2020/380 final.
[203] K Mondelaers et al, 'A meta-analysis of the differences in environmental impacts between organic and conventional farming' (2009) 111 British Food Journal 1098, p 1110.
[204] Regulation 2018/848, Article 5(a).
[205] Above §5.2.2-5.2.3.
[206] D G Hole et al, 'Does organic farming benefit biodiversity?' (2005) 122 Biological Conservation 113; J Smith et al, *Organic Farming and Biodiversity: A review of the literature* (Organic Centre Wales, 2011).
[207] See, hereafter, §5.5.
[208] Leitner and Vogl 2020, p 13.

The above does, however, signal significant risks that arise when organic production rules and their interpretation depart from organic principles, which could greatly undermine the overall effectiveness of standards for the delivery of public goods and the protection of ecosystem functioning. Firstly, it can mean that implementation has unintended, adverse impacts. For example, rules on multiannual crop rotation have been held to potentially discourage good practices like multi- or intercropping, and they can harm biodiversity if interpreted to require the ploughing up of permanent grassland.[209] Secondly, divergence between production rules and principles could unintentionally lead to what has been called the 'conventionalisation' of organic production.[210] This occurs when standards leave leeway for the adoption of practices that are contrary to principles, which are "sidelined in favour of economic profitability".[211] For example, rules on crop rotation rules can still justify intensive rotations or monocultures,[212] or they allow for inputs to be replaced by permissible, off-farm substitutes, rather than sustainable practices.[213] Various manifestations of conventionalisation have been identified by researchers, with the ultimate test being whether farm structures and practices conflict with underlying (e.g., ecological) principles.[214] Indicators include size (farms becoming larger), specialisation (farms moving away from "the ideal of a mixed [arable and livestock] farm"[215]), intensification (the higher use of externally sourced inputs) and, closely related to the latter, delocalisation or a lack of 'nearness' (e.g., longer supply chains and distances between producer and consumer).[216]

Case studies have identified signs of conventionalisation with regard to organic farms or sectors in specific Member States. For example, certified farms in Poland were observed to be twice the size of an average farm,[217] and Spanish agricultural workers on crop farms manage many more hectares than those on conventional counterparts which has been linked to the need to use extensive methods to support larger organic holdings, where land productivity is low.[218] Large-scale farms specialising in pig and poultry production also dominate organic animal production in the Netherlands.[219] As standards fail to implement land-based production, these sectors have become characterised by dependencies on permitted feed sourced from distant countries, whilst by-products (notably organic manure) are also not efficiently used by Dutch

[209] Padel 2018.
[210] This terminology has been attributed to D Buck et al, 'From Farm to Table: The Organic Vegetable Commodity Chain of Nothern California' (1997) 37 Sociologia Ruralis 3.
[211] I Darnhofer et al, 'Conventionalisation of organic farming practices: from structural criteria towards an assessment based on organic principles. A review' (2010) 30 Agronomy for Sustainable Development 67, p 72. Note also that this risk was already recognised very early on in the negotiations for the adoption of an EU framework for organic certification: A3-0311/90 (Explanatory Statement by European Parliament), p 38.
[212] Padel 2013, p 82.
[213] Seufert et al 2017; De Wit and Verhoog 2007.
[214] Darnhofer et al 2010, p 73.
[215] Padel et al 2007, p 31.
[216] Ibid; Darnhofer et al 2010; see more extensive on the concept of localness also: Kjeldsen and Alroe 2006 and hereafter Chapter 6.
[217] B Mickiewicz and S Lisiak, 'Polish organic farming on the background of the European Union in light of new regulations' (2017) 43 Journal of Agribusiness and Rural Development 125.
[218] *Organic versus conventional farming, which performs better financially? An overview of organic field crop and milk production in selected Member States* (European Commission, 2013), p 2.
[219] De Wit and Verhoog 2007, p 451; Padel et al 2007, p 36.

organic arable farmers which often use conventional inputs to foresee in nutritional needs.[220] Similar observations have been made with regard to Danish and Spanish organic livestock farmers.[221] Analysis of big data in Germany, lastly, shows signs of conventionalisation at the individual farm level, which conflict with ecological principles, for example, high usage of fertilisers, large shares of cereals in crop rotations and high livestock stocking density.[222]

The German case study could also be considered to provide evidence for what has become known as the 'bifurcation theory':[223] by which conventionalisation affect only a portion of the organic sector, which coexists with other farmers that are more principle-based and locally oriented.[224] It should also be noted that indicators of conventionalisation are not undisputed as they may reflect idealistic views on what farms *should* look like rather than their value for ecological aims, and may also fail to recognise that conversions are a process over time.[225] For the purpose of this Chapter, however, the question to what degree the organic sector is currently marked by conventionalisation is less relevant. What can be concluded is that the current EU standards for organic production leave significant scope for farmers to deviate from the ecological principles that underpin the organic concept. Such unprincipled practices may not only fail to prioritise the protection of ecosystem functioning and resilience. By allowing 'conventionalised' farms to certify and receive premiums, the system puts 'true' organic or agroecological farmers at a competitive disadvantage, thereby discouraging good practices and undermining the overall potential of organic certification as a tool to support good ecosystem stewardship. Problems in this regard may, furthermore, be exacerbated by the pressures on Member States that follow from the target of the EU Biodiversity Strategy to have at least 25% of agricultural land under organic farming management by 2030.[226] Indeed, whilst (conversion of) large-scale producers may contribute to the quick achievement of this quantitative, short-term aim, the intensive operations of such certified farms may frustrate the realisation of more substantive, long-term objectives for the conservation and restoration of (agro)biodiversity.

5.4.2. EU Organic Certification: Bureaucratic, Complex and Punitive

It follows from the previous section that the extent to which organic certification can contribute to the prioritisation of the protection of ecosystem functioning is at least partly contingent on the degree to which underlying ecological principles are reflected in the standard's objectives,

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[220] U Prins, *Intersectorale samenwerking in de biologische landbouw: Verzelfstandiging van de biologische landbouw op het gebied van mest, voer en stro. Studie naar de haalbaarheid van het terugdringen van importen uit de gangbare landbouw en het buitenland.* (Louis Bolk Instituut, 2005).
[221] Padel et al 2007, p 44; M Ramos García et al, 'Dynamics of organic agriculture in Andalusia: Moving toward conventionalization?' (2017) 42 Agroecology and Sustainable Food Systems 328, p 339.
[222] C Seidel et al, 'Conventionalization of Organic Farms in Germany: An Empirical Investigation Based on a Composite Indicator Approach' (*Sustainability* 2019) <https://www.mdpi.com/2071-1050/11/10/2934> accessed May 2022.
[223] Ramos García et al 2017, p 332.
[224] Seidel et al 2019; Darnhofer et al 2010, p 69. See, however, S Lockie et al, *Going Organic: Mobilising Networks for Environmentally Responsible Food Production* (Cambridge University Press 2006), p 14 and Chapter 2 for a more pessimistic view on bifurcation, which they see as causing polarisation and, ultimately, a less and less significant role for small-scale, 'true' organic farmers.
[225] Feedback Susanne Padel – 26 February 2021.
[226] COM/2020/380 final.

operational rules and their interpretation.[227] Certification can support agroecological transitions by channelling private and public financial support to those farmers that adopt practices which respect ecological principles. However, better synergies between such desirable outcomes and the EU regulations are needed to increase the effectiveness of the latter by pushing producers towards coherent approaches and by discouraging 'short-cuts' that mimic industrial methods. A solution that has been offered to enhance the principled nature of standards, is reform of the EU's process-based rules to include (more detailed) stipulations on organic best practices.[228] They could include minimum requirements for legumes in rotations for fertilisation, rules on conservation tillage for soil health, further increasing links between livestock and land to form closed systems, and diversification schemes to increase biodiversity and natural pest control, etcetera.[229] Yet, calls for more precise and principle-driven standards were met with caution by organic producers and farmer organisations in the negotiations for the new EU Regulation,[230] despite earlier observations that many organic farmers are intrinsically principle driven.[231]

This highlights more complex, institutional issues related to third-party certification, which may compromise the system's ability to effectively support those farmers who are well-willing. Namely, whereas, on the one hand, certification can provide financial (market and policy) support to stimulate best practices, the workings of the system may, on the other hand, mean that access for many farmers to such benefits is constraint. This follows, firstly, from regulatory burdens associated with certification, such as the costs and complexities that follow from requirements for documentation and control, which have been cited as important reasons for a lack of registration with – or deregistration from the organic label.[232] Administrative strains impact more severely on small- or medium-sized farms,[233] despite the significant potential that such farms have for enhancement of biodiversity and protection of ecosystem functioning.[234] Particularly problematic is the tension between the need for better, more-principled rules, as analysed in the previous section, and risks that prescriptive, overcomplex or suddenly changing rules may stifle (agroecological) innovation, [235] may make compliance difficult or expensive,[236]

[227] See, similarly, Padel et al 2009.
[228] Seufert et al 2017, p 17.
[229] Ibid, p 17; see also on the benefits for ecosystem functioning, for example, T E Crews and M B Peoples, 'Legume versus fertilizer sources of nitrogen: ecological tradeoffs and human needs' (2004) 102 Agriculture, Ecosystems & Environment 279; D K Letourneau et al, 'Does plant diversity benefit agroecosystems? A synthetic review' (2011) 21 Ecological applications 9; N Rosamond et al, 'Losing the Links between Livestock and Land' (2005) 310 Science 1621.
[230] H Greenfield, 'Balancing interests in EU regulation of organic farming' *Sustainable Food Trust - Food Policy* (May 2015) <https://sustainablefoodtrust.org/articles/balancing-interests-in-eu-regulation-of-organic-farming/> accessed May 2022; also SWD(2014) 65 final (Part 2), p 22.
[231] See, above, §5.4.1 and Leitner and Vogl 2020.
[232] Notably, H Sahm et al, 'Reversion from organic to conventional agriculture: A review' (2012) 28 Renewable Agriculture and Food Systems 263; Padel 2018; Leitner and Vogl 2020. For detailed case studies conducted in the Norwegian context (which is closely related to the EU system), see also: O Flaten et al, 'Norwegian farmers ceasing certified organic production: characteristics and reasons' (2010) 91 Journal of Environmental Management 2717.
[233] M Cuéllar-Padilla and Á Calle-Collado, 'Can we find solutions with people? Participatory action research with small organic producers in Andalusia' (2011) 27 Journal of Rural Studies 372; also Sahm et al 2012, p 271.
[234] K Belfrage et al, 'The effects of farm size and organic farming on diversity of birds, pollinators, and plants in a Swedish landscape' (2005) 34 Ambio 582.
[235] Vogl et al 2005.
[236] M Koesling et al, 'Farmers' reasons for deregistering from organic farming' (2012) 2 Organic Agriculture 103.

or may have unintended consequences (including deregistration).[237] Illustrative in this regard were discussions on new production rules for poultry. Regulation 2020/464 prescribes that multi-tiered chicken houses shall not exceed three levels including the ground floor.[238] Existing organic farmers, standardisation- and farmers' organisation, however, have responded negatively to these restrictions, emphasising that farmers would be capable of making their own decisions on this hen housing topic and referencing investments that had been made for (leasing of) houses with more tiers in accordance with the previous organic regulation.[239]

This single example is only indicative of a regulatory system the complexity of which – marked by an increasingly large number of production rules spread out over several legal acts, which micro-manage farmers' everyday lives – has distanced itself from the collaborative approach of the early organic pioneers and from those smallholders that seek to farm with nature and in accordance with the localised needs of the ecosystem.[240] A lack of recognition for the needs of those that seek to practice adaptive, agroecological management does, however, not only follow from increasingly complicated rules and bureaucratic procedures. The top-down nature of the EU's system of third-party certification also involves the passing of judgement over "non-polluters",[241] in a black-or white, pass-or-fail manner, whereas true sustainability and the implementation of organic ecosystem thinking is likely to require a more subtle approach.[242] Farmers interviewed in the Austrian region of Tyrol complained about some inspectors being "motivated by the detection of irregularities" and "compelled to find something [wrong]",[243] as well as being unwilling to distinguish between deliberate violations and honest mistakes.[244] This is at odds with the approach of PGS described in §5.3.2, which is based on values such as horizontality and trust.[245] A view of inspection and control being negative or punitive and a burden on private and public resources, rather than an important opportunity for mutual learning and feedback, especially for smallholders, is also confirmed by the decision under the 2018 Organic Regulation to reduce the frequency of physical on-the-spot inspections from annually to biannually for fully certified farms which are deemed to be at low-risk.[246]

It must be noted that some of the issues described above may be addressed through the new system of group certification. This extension of the option of group certification to high-income

[237] Padel 2018, p 6; O Schmid, *New ways of regulating organic food and farming in Europe - 4th European Organic Congress* (IFOAM EU, 2010).
[238]Commission Implementing Regulation (EU) 2020/464 of 26 March 2020 laying down certain rules for the application of Regulation (EU) 2018/848 of the European Parliament and of the Council as regards the documents needed for the retroactive recognition of periods for the purpose of conversion, the production of organic products and information to be provided by Member States [2020] OJ L 98/2, Articles 15(4)(b).
[239] See responses to the online consultation (from 5 November 2019 until 3 December 2019) available at: 'Organic food — production rules' (*European Commission*, 2019) <https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12055-Organic-food-production-rules_en> accessed May 2022.
[240] N H Lampkin et al, *Agroecology and Organic Farming as Approaches to Reducing the Environmental Impacts of Agricultural Chemicals* (Organic Research Centre, 2016), p 7.
[241] M Cuéllar-Padilla and E Ganuza-Fernandez, 'We Don't Want to Be Officially Certified! Reasons and Implications of the Participatory Guarantee Systems' (2018) 10 Sustainability 1, p 1.
[242] Lampkin 2021.
[243] Leitner and Vogl 2020, p 11.
[244] Ibid, p 15.
[245] See also, hereafter, Chapter 6, §6.4.3.
[246] Regulation 2018/848, Article 39(3).

countries within the EU,[247] has been considered a fundamental change.[248] Whilst group certification may not tackle problems that are related to the content of the EU's standards, the Internal Control System ('ICS') may, as discussed above,[249] reduce audit costs for small-scale farmers,[250] and could, depending on the institutional structures and procedures, allow for more engagement of farmers with the certification process and for the sharing of knowledge and skills.[251] Nonetheless, experiences with group certification around the world also highlight some potential challenges, in relation to getting capable and qualified ICS staff and potential high levels of bureaucracy and documentation which are required for the running of an ICS.[252] In this regard, due regard will need to be given to the obligations that fall on the ICS in relation to external oversight, balancing the easing of administrative burdens with continuous and adequate compliance control.[253] Effective operation of the ICS within the EU's system of third-party certification may also require training for private control bodies and public control authorities to improve their understanding of the concept and workings of group certification, whilst they previously only had to deal with specific farms.[254] Despite its potential benefits, group certification may come with risks for smallholders if used to create monopolies or "force farms into dependency relationships",[255] which mimic those between farmers and businesses for inputs in an industrial model.[256] Careful consideration will, therefore, have to be given to restrictions on the group structures and size and the homogeneity and proximity of members.

5.5 National Organic Certification: Restricted Scope to Go Above and Beyond

The harmonisation of organic standards in national and EU regulations has been highlighted as an effort to address the scattered development of private standards, which was believed to confuse consumers, allow for fraudulent practices, and disrupt trade.[257] However, the previous sections have analysed how transitions from the private to the regulatory realm has led to depreciation of the knowledge and input of organic smallholders as stewards of the ecosystem. Such high-level institutionalisation and a focus on market- and trade-considerations, could be seen to work against a local organic focus, which aims to support and foster functional integrity, basing management decisions primarily on *local* ecological systems and cycles.[258] Expanding the size of the organic market available to producers through use of widely recognised and applicable logos like the EU logo may help to promote organic principles through market forces, but may also put pressures on aspects of organic production – such as power relations

[247] Note that some other developed countries have preceded the EU in taking this step, notably the United States.
[248] Meinshausen et al 2019, p 12.
[249] §5.3.2.
[250] L F G Pinto et al, 'Group certification supports an increase in the diversity of sustainable agriculture network–rainforest alliance certified coffee producers in Brazil' (2014) 107 Ecological economics 59.
[251] Ibid; Meinshausen et al 2019, p 95.
[252] Meinshausen et al 2019, section 5.3.
[253] Ibid, section 5.3. See, also, responses to the online consultation (from 29 July until 26 August 2020) available at: 'Organic farming - new rules on official checks of organic production' (*European Commission*, 2020) <https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/11716-Organic-farming-new-rules-on-official-checks-of-organic-production_en> accessed May 2022.
[254] Meinshausen et al 2019, p 80.
[255] Ibid, p 96.
[256] Chapter 2, §2.3; also, Chapter 6, §6.4.1.
[257] Above §5.2.1.
[258] Kjeldsen and Alroe 2006, p 1; see, hereafter, Chapter 6, on considerations of ecological equity.

and, notably, the influence of organic smallholders – which are not adequately secured through the certification process.[259] The question that, therefore, remains is whether it still is possible for regulators in Member States, certification bodies and control authorities to integrate local considerations and the contributions of local organic farmers into private standards and control.

The answer to this question is, firstly, conditioned on the level of harmonisation that is provided by the EU's organic regulation. Requirements that follow from the EU regulations provide a minimum standard, which allow for the formulation of supplementary or higher conditions for certification at national level.[260] Many if not most organic standardisation entities within Member States hold that their norms provide more environmental, social, and animal welfare benefits compared to those that follow from the EU's production rules. Yet, the nature and rigorousness of more stringent or additional rules in relation to biodiversity and protection of ecosystem functioning vary greatly among standardisation bodies. For example, the Demeter Guidelines demand that at least 10% of the total farm area is used as biodiversity reserves,[261] such as fallow land, forested fields or hedges, whereas similar conditions elsewhere are set at much lower percentages, e.g., 5% under the Dutch EKO-label,[262] or only include very broadly formulated guidelines for nature conservation.[263] With regard to soil maintenance and fertility building through closed ecological cycles, the Swedish KRAV Standards stipulate that ley or green manure make up at least 20% of main crops in rotation,[264] whereas other standards repeat the EU's more vague norms.[265] Lastly, illustrative of discrepancies between national norms for the purpose of this Chapter are the detailed requirements for a Biodiversity and Conservation Plan under the UK's Organic Farmers and Growers' Standards, with such a plan only being optional under the 'Ecological Sustainability Charter' of the Belgian Biogarantie Label.[266]

It follows from the above that the extent to which national norms reflect ecological principles that underpin the EU organic regulation and make contributions to the protection of ecosystem functioning beyond the EU's production rules, is dependent on the organic standard in question. When efforts have been made for integration of relevant considerations, it is possibly that this could be attributed to better recognition of farmers' perspectives. Whereas the analysis in §5.3.1 has shown that the position of organic farmers in EU standard-setting is rather limited, national organic standardisation bodies often have close sectoral links. For example, organic

[259] Similarly, ibid, p 2.
[260] Dabbert et al 2003, p 6.
[261] *Richtlinien 2021. Erzeugung und Verarbeitung Richtlinien für die Zertifizierung 'Demeter' und 'Biodynamisch'* (Demeter, 2021), p 51; see also *Production, Processing and Labelling. International Standard for the use and certification of Demeter, Biodynamic and related trademarks* (Demeter, 2020), p 61. Compare also the German BIOLAND Standards who operate a point system, requiring farms to obtain at least a 100 'biodiversity points' a year, based on a choice of measures from an online catalogue: *BIOLAND Standards* (BIOLAND, 2019)
[262] *Inhoudelijke Voorwaarden voor EKO-licentiehouders en voor het gebruik van het EKO-keurmerk* (EKO-Keurmerk, 2021), p 9.
[263] *Bio of volle kracht. Biogarantie Lastenboek* (Biogarantie, 2019), p 11.
[264] *Standards for KRAV-Certified Production 2021* (KRAV, 2021), p 95.
[265] See, for example, *Organic Food and Farming Standards in Ireland* (Irish Organic Association, 2012) , p 62; see also in the French context the regulations for the AB Logo which is owned by the Ministry for Agriculture and Food and which simply refer to the EU regulations: *Règles d'usage de la marque "AB": précisions sur le champ d'application de la marque à des fins de certification* (French Ministry for Agriculture and Food, 2010).
[266] Biogarantie 2019, Annex 3.

producers (farmers, gardeners and beekeepers) make up half of a total of 60 representatives in the 'Assembly of Delegates' which is responsible for the formulation of the mission statement of the German Demeter logo and the approval of the Demeter production guidelines.[267] The Dutch EKO-Keurmerk has at least one representative of the 'Biohuis' – the association for the primary organic sector – on its Board.[268] And, similarly, in Sweden, the Ecological Farmers Association is one of the key members of organic certification body KRAV and is represented on KRAV's Board, which takes the final decision on the content of new or revised standards.[269]

Yet, despite laudable efforts, the normative and organisational structures that underpin the EU's regime on organic production dictate that scope for national public authorities or private bodies to prioritise the protection of ecosystem functioning and resilience, is limited. Whilst the EU's regulations allow for more stringent or elaborate production standards, the example of the implementing rules on multi-tiered chicken houses, cited above,[270] illustrates that it is not necessarily stricter and more prescriptive process-based rules that reflect the perspectives of agroecological farmers. Those farmers may be better served by adaptive rules that focus on progress and outcomes,[271] allowing for continuous improvement of farming practices and a more balanced assessment of their value for agricultural sustainability.[272] Indeed, in the aforementioned study on the perceptions of Austrian farmers on organic control, the farmers complained more about additional requirements set by national certification organisations than the bureaucracy that follows from EU rules, as they held that differences between standards were problematic and that obligations were hard to fulfil.[273] For example, a new requirement by one Austrian standardisation organisation to increase the number of grazing days for cattle was – despite potential environmental and animal welfare benefits – especially difficult to meet for smallholders, due to infrastructural issues and limitations on the availability of land.[274]

In addition to the restrictions on meaningful differentiation among certification bodies related to the nature of the EU's minimum, process-based standards, such scope for national or local ambition is also often restricted by market realities. As analysed above,[275] many Member States operate a certification system which relies (in full or in part) on private entities for its execution. In practice, this means that farmers are customers of the certification body and pay application and annual inspection charges in return for accreditation. For example, a small 5ha farm would

[267] *Satzung* (Demeter, 2019), p 11; Demeter 2021, p 17.
[268] *Huishoudelijk Reglement* (Stiching EKO Keurmerk, 2019).
[269] 'Organisationen KRAV' (*KRAV*, N.D.) <https://www.krav.se/om-oss/organisationen/> accessed May 2022. Note, however, that the influence of organic farmers within the organisational structures of KRAV was much more prominent in the early days – see above §5.3.1 – and that the Ecological Farmers Association (EFA) now face competition from other interests represented within KRAV, including conventional farmers, leading to many EFA members feeling marginalised in the standardisation process: Källander 2007, p 213.
[270] Above §5.4.2.
[271] Schmid 2010; Padel 2010, p 85.
[272] For example, F Marchand et al, 'Key characteristics for tool choice in indicator-based sustainability assessment at farm level' (2014) 19 Ecology and Society 46; C L Gerrard et al, 'Public Goods and Farming' in E Lichtfouse (ed), *Farming for Food and Water Security* (Springer Link 2012).
[273] Leitner and Vogl 2020, p 8-9.
[274] Ibid.
[275] Above §5.3.2.

pay a total of £798, - in its first year for the UK Soil Association certification,[276] compared to €250, - under the Dutch EKO-label,[277] and no costs under the Danish government-run scheme for certification.[278] Where multiple private labels with similar fee structures operate within a Member State, the content of production rules may be an important point of competitive distinction. Only private standards with marketing worth separate from public (EU or national) organic logos – for example Demeter Biodynamic – will be able to justify significantly stricter ecological obligations for their licensees.[279] Research has shown that consumers' motivations to buy organic are most often linked to their perceived health benefits,[280] and knowledge about underlying environmental requirements of specific schemes is limited.[281] In this regard, added costs and bureaucracy of more stringent or additional private conditions may not be worth the hassle to the (small-scale) organic farmer, if they provide for little differentiational value within the organic market. In a similar way, regulations in countries with public schemes like France, Bulgaria and Denmark, often mimic EU production rules to maintain a level playing field.[282] The above has meant that some labels have sought ways to provide meaningful contributions to the protection of ecosystem functioning outside of their certification schemes. For example, the 'EKO-Code' under the Dutch EKO-Label is a voluntary policy that has been developed together with organic farmers and aims to assist those farmers with the achievement of broad ambitions related to, for example, recycling, soil- and water management and biodiversity.[283]

Lastly, it must be noted that any scope for national differentiation is limited to the formulation of production standards. It is not possible for national authorities to adopt a system of control that is distinct from third-party certification under the EU framework. Strikingly, this means that the aforementioned French organisation Nature et Progrès, one of the pioneers of organic standardisation in Europe and a founding member of IFOAM,[284] whose standards provided the foundations for the first French organic regulations,[285] nowadays operates outside of the EU's regulatory framework.[286] This means that producers that are Nature et Progrès certified cannot make use of the label 'organic' – as protected under the EU organic regulations[287] – but instead use terms like agroecological. Similar examples exist across notably the Southern European

[276] *Certification fees for farming & growing to Soil Association or EU organic standards* (Soil Association, 2020).
[277] *Overzicht Tarieven 2020 per Programma* (Stichting EKO-Keurmerk, 2020).
[278] M Wales, 'Four Countries Supporting Organic Agriculture the Most' (28 February 2019) <https://www.naturespath.com/en-us/blog/four-countries-supporting-organic-agriculture/> accessed May 2022.
[279] See, also, K Zander et al, 'EU organic logo and its perception by consumers' (2015) 117 British Food Journal 1506 more generally about consumer perceptions around different (public and private) organic logos.
[280] Hughner et al 2007.
[281] M Janssen and U Hamm, 'Consumer perception of different organic certification schemes in five European countries' (2011) 1 Organic Agriculture 31; A M Aldanondo-Ochoa and C Almansa-Sáez, 'The private provision of public environment: Consumer preferences for organic production systems' (2009) 26 Land Use Policy 669 Zander et al 2015, p 1516.
[282] French Ministry for Agriculture and Food 2010; *Ordinance No 5 on the application of the rules of organic production, labelling and control, and on the issuance of a permit for control activities for compliance with the rules of organic production,* (Bulgarian Miniser of Agriculture, Food and Forestry, 2018); *Bekendtgørelse af økologiloven* (Danish Ministry of the Environment and Food, 2017).
[283] *EKO-Code 1.0 - Agrarische Bedrijven* (EKO Keurmerk, 2014).
[284] Schmid 2007, p 154; B Geier, 'IFOAM and the History of the International Organic Movement' in W Lockeretz (ed), *Organic Farming An International History* (CABI 2007), pp 176-177.
[285] Above §5.2.1.
[286] Above §5.3.2; 'L'histoire de Nature & Progrès' (*Nature & Progrès*, N.D.).
[287] Regulation 834/2007, Article 23; Regulation 2018/848, Article 30.

Member States, for example, in Spain, where studied PGS rejected the EU's system of third-party certification under the believe that it runs contrary to a truly organic or agroecological system which is based on ecological principles and requires a radically democratic approach.[288]

5.6 Conclusion

The EU's latest Action Plan for the Development of the Organic Production, launched by the Commission in March 2021, celebrates a 66% increase in the area under organic farming in the last 10 years, and the doubling of total retail value.[289] However, this Chapter has shown that the sector's potential to contribute to a more sustainable vision for agriculture and food production in the EU, to provide a radical alternative to a model of industrial farming and to deliver on the idea that "organic farmers are the pioneers of the sustainable agriculture of the future"[290] is compromised by a disconnect between overarching ecological aims and principles and the workings of the EU's system for organic standardisation and certification. Specifically, EU production rules on organic farming primarily restrict the use of certain external (chemical) inputs but fail to provide guidance on ecological practices that promote closed cycles, and some rules may leave scope for structural tendencies within some organic sectors/farms that mimic those in an industrial model (e.g., moves towards larger farms, specialisation, and increased reliance on external inputs). Additionally, the control system may exclude smaller and more principled producers from the benefits of labelling, due to administrative burdens and value-based objections against a system of pass-or-fail, punitive control. This Chapter has, also shown that the institutionalisation of 'organic' at EU level marks a shift in authority from a bottom-up to a top-down approach in standard-setting and certification; a move away from a more collaborative approach that could integrate local knowledge of ecosystem functioning.

In this regard, interesting parallels can be drawn with the case study on EU risk regulations in the previous Chapter, in relation to regulations' inability to capture (socio-)ecological values in implementing rules and decisions, the way it places authority with actors that are external to the agroecosystem and the narrow focus on specific interests (health and narrow environmental concerns) in rulemaking, thereby disregarding or worsening inequities within the food system. Building upon these findings, the next Chapter offers a new perspective on how to improve the position of agroecological farmers within law and decision-making, by proposing the use of a human rights-based frame to complement the ecosystem approach under the CBD. Reframing sustainability issues in agroecosystems – ecosystems that are by their very essence managed by people – in substantive and procedural human-rights terms, exposes the fundamental nature of the socioecological interests at stake related to inequities that follow from unsustainability in the food system and from skewed power dynamics in agricultural supply chains. Only a framework that recognises and addresses the environmental and social sides of agroecology in tandem can allow for ecological ambition – in risk regulations, organic regulations and beyond – to be translated into concrete and impactful legal action in support of agroecological reform.

[288] Cuéllar-Padilla and Ganuza-Fernandez 2018, p 8.
[289] European Commission, 'An Action Plan for the Development of Organic Production' COM(2021)141 final.
[290] Ibid.

Part III

The Added Value of a Human Rights Approach to Agroecology

6 A Human Rights-Based Approach to Agroecology

Protecting stewardship through biodiversity law and human rights law

6.1 Introduction

"Humans, with their cultural diversity, are an integral component of many ecosystems",[1] stated the Conference of the Parties to the Convention on Biological Diversity (CBD) in 2000 when it adopted the Malawi Principles on the ecosystem approach. For no other ecosystem may this observation ring truer than for the agroecosystem, as agriculture itself has been recognised as "an integral nexus of society and ecology over time".[2] Even if viewed through a narrow lens, the interactions between farmers and their land, animals and crops, and the wider organic and inorganic elements of the agroecosystem,[3] as well as the communities who they feed cannot be missed. A wider perspective exposes an even more intricate system of human actions and demands, wishes, and visions that define our social relationships with food,[4] within which the essence of food as a converted natural resource which had its origin in farmed plots, is often increasingly obscured. In a best-case, agroecological scenario, a food system meets the needs of both people and the environment, representing "co-evolution of culture and nature".[5] In this case, the agroecosystem provides the ultimate source for nutrition, fuel and fibre, as well as employment and other opportunities for rural/urban connectivity and development and for cultural exploration, without overstepping the carrying capacity of the system and providing a contribution to the protection of (agro)biodiversity, the conservation of soil and water, and the mitigation of climate change. In a worst-case scenario, the need and potential for synergy between social and ecological demands of the system is undervalued and, eventually, it is lost almost completely. In this case, narrow anthropocentric objectives shape the decisions of agroecosystem managers, prioritising production and profits which benefit the few rather than the many and causing grave negative environmental and social impacts. Where agriculture is seen to have become a dominant driving force behind the deterioration and the pollution of the natural world, many environmentalists may, in turn, come to view the farmer as a foe rather than a friend, having lost sight of the great potential of farming in harmony with nature and how agriculture in arguably its truest form can celebrate cultural as well as biological diversity.

As discussed in Chapter 2,[6] agroecology contends that ecological restoration and conservation and social sustainability are not in combat nor merely compatibly – they are interwoven in the quest for food system change.[7] Where redesign of agroecosystem management to support the protection of its long-term ecological functioning is essential, as agricultural practices can only be understood as a sustainable use of biodiversity within the meaning of the CBD "if done in

[1] UNEP/CBD/COP/DEC/V/6, Annex A, Preamble 2 of the Malawi Principles.
[2] C M Bacon et al, 'The Social Dimensions of Sustainability and Change in Diversified Farming Systems' (2012) 17 Ecology and Society 41, p 2.
[3] CBD, Article 2: "Ecosystem" means a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit".
[4] Francis et al 2003, p 102.
[5] Ibid, p 101.
[6] Chapter 2, §2.5.
[7] Gliessman 2015, p 278.

a way and at a rate that does not lead to long-term decline",[8] lasting impacts require better connections between those who produce and consume food at the local level, as well as the overhaul of social and political barriers to the achievement of equity and justice in food governance.[9] In this regard, important synergies can be drawn between agroecology and the CBD's ecosystem approach, which, as analysed in Chapter 3, does not merely require a prioritisation of conservation but also highlights "the need to understand and factor in societal choices".[10] A focus on equity, with fair-and-equitable benefit-sharing as a key element, acknowledges the often precarious position of ecosystem stewards, including agroecological farmers. They will "devote their efforts to, and bear the risks of, the conservation and sustainable use of biodiversity"[11] and, thereby, provide significant public benefits. Yet, powerful – political, economic, institutional, and epistemic – forces dictate that they often receive little appreciation for their stewardship efforts, including an adequate financial return.

The case studies on EU risk regulation and organic certification in Part II found an important common theme: seemingly growing (agro)ecological ambition – as reflected in overarching objectives and principles – is not translated into concrete and effective rules and decisions to sanction negative ecological practices and support systemic change. Both case studies showed that those actors that are most likely and able to deliver on principled, ecological aims – the agroecological stewards – are often excluded from rule- and decision-making, reflecting a bias towards external expertise over local agroecological knowledge. At the same time, the regimes provide few options to flag and address these epistemic biases and injustices, which, as this Chapter will analyse in more detail, mimic wider power imbalances in economic and regulatory spaces for food production, as positive and negative environmental impacts are defined without regard for the systemic and oppressive forces that shape agroecosystem management decisions.

Taking these finding as a starting point, this Chapter will, finally, explore and present opportunities for agroecology that lie at the intersection of international biodiversity and human rights law with a view to not only prioritise the protection of ecosystem functioning but to strengthen the position of stewards in law- and decision-making as a prerequisite for achieving this aim. This thesis adds to the still limited documents and scholarship on interactions between biodiversity and human rights law, bringing clarifications on the relevance of existing obligations for the agroecological transition and movement, whilst also bringing novel insights into what implementation of human rights obligations could mean for specific (EU) regulations, thereby emphasising opportunities for EU leadership. Building upon the analysis of policy paradigms in Chapter 3, which presented normative and institutional elements as being two sides of the same coin of regulatory regime design, this Chapter starts with socio-legal scholarship reflections on (mis)framing to build a case for a human rights-based narrative/frame that could help redistribute authority in favour of agroecological stewards (§6.2). Whilst there are many ways in which such a frame could be used to reform relevant

[8] CBD, Article 2.
[9] S Gliessman, 'Transforming food systems with agroecology' (2016) 40 Agroecology and Sustainable Food Systems 187, p 188.
[10] Morgera 2017, p 73.
[11] Ibid, p 74.

regulations, this Chapter offers two radically different and comprehensive approaches to reimagine the two case studies in this thesis. Firstly, for EU risk regulation, and focusing on GMOs, it draws inspiration from the Norwegian Gene Technology Act to reveal the potential and limitations of a substantively different narrative for the authorisation of GM seeds; one which does not only offer a space for diverse knowledges, but for agroecological knowledge holders to voice their fundamental concerns (§6.3). Secondly, for the EU's regulatory regime on organic production, this Chapter further explores the opportunities provided by Participatory Guarantee Systems (PGS), as alternative certification systems that are more inclusive of local knowledge and ecological knowledge holders, and the potential for legislative support §6.4).

6.2 Framing the Social Side of Food and Farming: The Case for Human Rights

In 1983, the British ecologist Gordon Conway already drew analogies between environmental agroecological processes and the social, cultural and economic functioning of humans in agroecosystems, with "competition, mutualism and predation" defining both natural and socio-economic interactions.[12] Conway considered equity – which he understood primarily as an expression of the distribution of agroecosystem benefits – to be an important property that followed from inclusion of humans into ecology studies.[13] Subsequent scholars have broadened the scope of the analysis of socio-ecological interactions to include the entire food system,[14] taking account of equitable considerations at all – farm, local, national, regional or global – levels and raising questions of (dis)empowerment and allocation of costs and benefits at each stage. In this regard, it is important to emphasise that the 'industrial' character of the nowadays dominant agricultural model is not only reflected in its mechanical, chemical, and biotechnical elements,[15] but also in the increasingly depreciated standing of the farmer. Until the late 1950s-early 1960s, most farmers had been able to maintain a position of relative power compared to industrial workers whilst "the agricultural labour process remained a domain that was fully controlled by the producers themselves [and] organizing and developing the farm was the duty, responsibility, and privilege, of the farmer".[16] Yet, externalisation of many agroecosystem management tasks – from seed production to weed control, and from food processing to training – and reliance on technologies, had standardised and reskilled the agricultural work force in ways that are similar to their industrial counterparts.[17] Farmers were "obliged to follow externally defined scripts"[18] – and wealth was appropriated by external forces of power.[19]

Agroecology provides a holistic vision for change as it holds that sustainability in agriculture can only be achieved if all components of the food system are understood, if issues related to

[12] Conway 1983, p 15.
[13] Ibid. See also G R Conway and E B Barbie, 'After the Green Revolution: Sustainable and equitable agricultural development' (1988) 20 Futures 651.
[14] See, for example, Francis et al 2003 and Gliessman 2015.
[15] Chapter 2, §2.2.
[16] J D Van Der Ploeg, 'The political economy of agroecology' (*The Journal of Peasant Studies* 2020) <https://www.tandfonline.com/doi/full/10.1080/03066150.2020.1725489> accessed May 2022, p 3.
[17] Ibid, p 5.
[18] Ibid, p 5.
[19] Chapter 2, §2.3.2.

globalisation and inequality are considered,[20] and it is accepted that "greater equity in relation to food [is] an ecological imperative in addition to being an ethical necessity".[21] As a bottom-up, countermovement to a neoliberal model which has commodified food production and which has marginalised the farmers that deliver on the conservation of agroecosystem functions, the social side of agroecology has perhaps unsurprisingly been most comprehensively captured by organisations that represents small–scale, medium–scale farmers, peasants and rural workers. This section will start with some brief reflections from socio-legal scholarship to help grasp the significance of (mis)framing for policymaking and the impact on marginalised groups of stakeholders. It then considers the demands of the agroecological movement as captured most comprehensively through the concept of food sovereignty. Finally, it evaluates the great potential that lies at the nexus between international biodiversity and human rights law to foster agroecological management through protection and empowerment of stewards. It builds a case for a human rights-based frame in support of agroecology and considers the relevant rights of agroecological farmers under international law, taking as a starting point for analysis the rights that have been captured by the United Nations Declaration on the Rights of Peasants and Other People Working in Rural Areas ('UNDROP'), as this soft law instrument – that may be seen to clarify existing rights in some cases and help create new rights in others[22] – is the result of a bottom-up formulation of human rights that reflects the demands of agroecological farmers.

6.2.1. Framing and Misframing: Insights from Socio-Legal Scholarship

It follows from Part I to this thesis that agroecology and the CBD's ecosystem approach both treat the management of natural resources and biodiversity – for agriculture and more broadly – as a topic that inherently involves social dimensions. The key to the integrative nature of agroecology and the ecosystem approach might lie in their shared '*eco*' character: by defining agricultural production and its positive and negative impacts as fundamentally an *eco*logical matter, both agro*eco*logy and the *eco*system approach have paved the way for the inclusion of social and equitable concerns. Not all legal scholars may agree with the CBD's words that "humans […] are an integral component of many ecosystems"[23] with Houck, for example, having expressed a fear that the dominance of humans and their desires would demand a definition of ecosystems "apart from people".[24] Yet, the same author has stated that to think that human beings and their impacts are separate from ecosystems "seems ridiculous",[25] and questions of ecosystem management, with agroecosystems being managed *per se*, always highlights the role of individuals, communities and, ultimately, the human-made system. However, the extent to which people are considered when making, informing, or creating an enabling environment for management decisions in line with agroecological principles, and the range and types of people that are considered, depend on the specific lens or frame that is used.

[20] Gliessman 2015, p 31.
[21] Ibid, p 337.
[22] F Francioni, 'The Peasants' Declaration. State obligations and justiciability' in M Alabrese et al (eds), *The United Nations' Declaration on Peasants' Rights* (Routledge 2022), p 10.
[23] UNEP/CBD/COP/DEC/V/6, Annex A, Preamble 2 of the Malawi Principles.
[24] O A Houck, 'Are humans part of ecosystems?' (1998) 28 Environmental Law 1, p 6.
[25] Ibid, p 1.

In Chapter 3, the concept of 'policy paradigms' was introduced, being architectures that are made up of a problem-solving policy complex and an organisational complex.[26] The former includes normative decisions, including problem-conceptualisation and the setting of goals and principles, whereas the organisational complex concerns key roles, relationships and processes for problem-solving.[27] The case studies in this thesis have shown that the framing of questions, problems and opportunities related to agricultural sustainability in a way that comprehensively includes all relevant socio-ecological aspects, and the impacts on all humans and, notably, ecosystem stewards, is neither easy nor common practice.[28] Frames have been described as "perspectives that highlight parts of reality over others",[29] and framing involves selection and salience,[30] to promote a particular understanding of a problem and its causes, and to suggest remedies or alternatives.[31] Key are the discursive processes of articulation and affirmation (or punctuation), which means "the connection and alignment of events and experiences so that they hang together in a relatively unified and compelling fashion",[32] as well as the "accenting and highlighting of some issues, events, or beliefs as being more salient than others".[33]

Framing in complex and often multilevel governance structures can bring two distinct issues. Firstly, the use of a multitude of frames to describe what is (factually) the same issue can lead to the involvement of different stakeholders and institutions at different levels, and the setting of disparate objectives and priorities. In other words, using multiple policy frames causes fragmentation of governance architectures,[34] and, where coordination fails,[35] potential conflict between different legal regimes. Although problems, in this regard, are more apparent and well-studied in relation to international governance,[36] the long-term absence of an EU food policy that has only recently been remedied with the Farm to Fork Strategy,[37] and the sectorisation of

[26] Chapter 3, §3.2.1.
[27] Carson et al 2010, p 143.
[28] See, also, §6.3 and §6.4 below.
[29] A Nollkaemper, 'Framing Elephant Extinction' (*ESIL Reflection* 2014) <https://esil-sedi.eu/wp-content/uploads/2014/07/ESIL-Reflection-Nollkaemper.pdf> accessed May 2022.
[30] R Entman, 'Framing: Toward Clarification on a Fractured Paradigm' (1983) 43 Journal of Communication 51, p 52.
[31] L Park and E Morgera, 'The Need for an Interdisciplinary Approach to Norm Diffusion: The Case of Fair and Equitable Benefit-sharing' (2015) 24 RECIEL 353, p 363.
[32] R D Benford and D A Snow, 'Framing Processes and Social Movements: An Overview and Assessment' (2000) 26 Annual Review of Sociology 611, p 623.
[33] Ibid. Illustrative of the impacts of articulation and affirmation in a specific context is the example of elephant extinction as framed under different international legal regimes: Nollkaemper 2014
[34] F Biermann et al, 'The Fragmentation of Global Governance Architectures: A Framework for Analysis' (2009) 9 Global Environmental Politics 14
[35] On coordination see: M Zürn and B Faude, 'Commentary: On Fragmentation, Differentiation, and Coordination' (2013) 13 Global Environmental Politics 119.
[36] See, for example, F Zelli and H Van Asselt, 'The Institutional Fragmentation of Global Environmental Governance: Causes, Consequences, and Responses' (2013) 13 Global Environmental Politics 1.
[37] §6.2.3.

the Commission's bureaucratic services,[38] means that problems of fragmentation and multi-framing are not uncommon in spaces of shared agri-food related activities and competences.[39]

Yet, a more significant issue for the analysis in this thesis relates to what has been described as 'misframing':[40] a form of misrepresentation which leads to often obscured injustices. It relates to the formulation of problems, or questions of justice, in such a way to exclude some people from consideration and from formulating effective solutions; a way to "block many who are poor and despised from challenging the forces that oppress them".[41] In this case, the frame may sound convincing on the surface, being actively pushed and promoted by those with great (economic) interest in its success, but when analysed more closely it becomes clear that "its grammar is out of synch with the structural causes of many injustices in a globalising world".[42] It is precisely here that the fundamental interests of ecological stewards that find strong resonance in agroecology and the CBD's ecosystem approach, are failing to be considered in the context of EU regulatory regimes relevant to agriculture and food. Where misframing leads to disregard for the views, knowledges and needs of those most crucial for implementation of an ecosystem approach, it raises questions as to who was responsible for frame-setting in the first place, thereby highlighting issues of authority and undemocratic and exclusive processes.[43]

6.2.2. The Agroecological Movement and the Call for Food Sovereignty

Whereas the case studies in previous Chapters identified a regulatory understanding of environmental sustainability in an agricultural context that has been disconnected from social and systemic problems, agroecological movements have put issues of social equity and justice at the very centre of debates on the food system transformation. Fostering an understanding of agroecology as a social movement within the limited space of this thesis demands a focus on the organisation that has been most crucial to its development: the international peasants' lobby and organisation La Vía Campesina ('LVC').[44] Considered by scholars to be one of the most important social movements in the world,[45] LVC was founded in Belgium in 1993.[46] Its inception followed from resistance to global economic policies which forced the restructuring of societal relations, and which marginalised and eliminated support for small, peasant and

[38] S Saurugger, 'A Fragmented Environment: Interest Groups and the Commission's Bureaucratic Sectorisation' (2002) 5 Politique Européenne 43.
[39] See, notably, COM(2020) 381 final, with references to the 'comprehensive' nature of the Strategy, and references to coordinated action throughout the document. For a very concrete example of conflict, see Case C-137/00 *Milk Marque and National Farmers' Union* [2003] ECR 2003 I-07975 on clashes between agricultural and competition policies appliable to EU producers.
[40] N Fraser, *Scales of justice: reimagining political space in a globalizing world* (Columbia University Press 2008), Chapter 2.
[41] Ibid, p 14.
[42] Ibid, p 15.
[43] Ibid, p 17.
[44] Regarding other organisations relevant to agroecology in a human rights context see: P Claeys and M Edelman, 'The United Nations Declaration on the rights of peasants and other people working in rural areas' (2019) 47 The Journal of Peasant Studies 1.
[45] See, for example, S M Borras, *La Vía Campesina. An Evolving Transnational Social Movement* (Transnational Institute, 2004) and M Edelman, 'Bringing the Moral Economy Back in... to the Study of 21st-Century Transnational Peasant Movements' (2005) 107 American anthropologist 331.
[46] M E Martínez-Torres and P M Rosset, 'La Vía Campesina: the birth and evolution of a transnational social movement' (2010) 37 The Journal of Peasant Studies 149, p 157.

family farms.[47] This resistance had built up at national levels, but it had increasingly recognised that problems could not be resolved within the boundaries of weakened nation-states,[48] as transnational organisations dominated economic and regulatory spaces. It was believed that an alliance at the same global level was required and, importantly, LVC developed as a forum and lobby that bridged North-South divides;[49] allowing members to "engage each other as equals".[50] Today, LVC has 182 member organisations in 81 countries, organised into 9 regions and representing an estimated 200 million peasants worldwide.[51] 'The European Coordination Via Campesina' includes 31 national farmers' organisations across 21 European countries.[52]

Intrinsic interlinkages between social and cultural objectives, and environmental and ecological aims, have always been recognised in the work of LVC through a vision that seeks to "reintegrate food production and nature as an alternative culture of modernity".[53] LVC's strength lies in the fact that it does not take a top-down approach to settle questions of prioritisation and the balancing of environmental and social needs, but, instead, speaks for and with marginalised farmers and communities who manage ecosystems in ways that serve social, as well as ecological and wider public interests.[54] This inclusive and participatory approach to building common ground and unity across continents, heterogenous groups and the diverse identities of farmers and rural workers has, however, not been straightforward. As observed by Desmarais, a social researcher and former arable farmer and member of LVC, it has meant that efforts have often been focused on establishing and maintaining internal cohesion rather than external engagement with law- and policymaking processes.[55] Nonetheless, where conceptual agreement – albeit in the abstract – have been found through "peasant to peasant processes"[56] or through what has been called a *diálogo de saberes*: a "dialog among different knowledges and ways of knowing",[57] LVC's efforts have led to important shifts in policy debates.[58]

At the World Food Summit 1996, LVC presented the concept of food sovereignty as an alternative, more comprehensive approach to international food diplomacy than food security.[59] Food sovereignty holds that policies should not only secure that food is available and accessible, but should also address what types of food are produced nationally, how it is

[47] See, more generally, regarding resistance of peasants and small-scale farmers against corporate agriculture: P Mcmichael, 'Peasant prospects in the neoliberal age' (2006) 11 New Political Economy 407.
[48] Martínez-Torres and Rosset 2010, p 153.
[49] J Smith, 'Bridging Global Divides?: Strategic Framing and Solidarity in Transnational Social Movement Organizations' (2002) 17 International Sociology 505.
[50] Martínez-Torres and Rosset 2010, p 150.
[51] 'La Via Campesina. International Peasant's Movement' (*La Via Campesina*, N.D.).
[52] 'About ECVC' (*ECVC*, N.D.) <https://www.eurovia.org/about/> accessed May 2022.
[53] Mcmichael 2006, p 416.
[54] A A Desmarais, *Globalization and the Power of Peasants. La Vía Campesina* (Pluto Press 2007), Chapter 3.
[55] A A Desmarais, 'The power of peasants: Reflections on the meanings of La Vía Campesina' (2008) 24 Journal of Rural Studies 138, p 144.
[56] V Val et al, 'Agroecology and La Via Campesina I. The symbolic and material construction of agroecology through the dispositive of "peasant-to-peasant" processes' (2019) 43 Agroecology and Sustainable Food Systems 872.
[57] M E Martínez-Torres and P M Rosset, 'Diálogo de saberesin La Vía Campesina: food sovereignty and agroecology' (2014) 41 The Journal of Peasant Studies 979.
[58] Desmarais 2008.
[59] P Claeys, *Human Rights and the Food Sovereignty Movement. Reclaiming Control* (Routledge 2015), p 13.

produced, and at what scale.[60] The concept emphasises a "human dimension […] that one should have a say in their relationship with food".[61] To LVC, agroecology's social side follows from a food sovereignty lens, or, as described by a delegate to the 'First Global Agroecology Encounter': "Agroecology without food sovereignty is a mere technicism and food sovereignty without agroecology is hollow discourse."[62] The concept of agroecology is not uncontested or well-defined within LVC, but it stresses the need for autonomy for those that manage the land,[63] as opposed to increased dependence on external forces through credit, long supply chains and reliance on off-farm agricultural inputs. Food sovereignty based on agroecological farming also emphasises the crucial role of farmers as providers of nutrition to *feed people* – a seemingly obvious characterisation which has nevertheless been obscured by an industrialised model that has commodified agricultural markets – and thus ties in with the food justice movement which aspires for everyone to be able to enjoy the benefits of a sustainable food production.[64] And, as highlighted in the previous Chapters, it is, ultimately, the contribution of local practices to tackling global issues – food security, biodiversity protection and climate change mitigation – that underpin food sovereignty and agroecology's relevance for international law making.[65]

Significantly, from its early days, food sovereignty has embraced a strong human rights-based narrative that includes "the right of peoples to define their agricultural and food policy",[66] and which involves equitable demands for redistributive reforms of land, water and markets.[67] LVC was one of the organisers of the Nyéléni gathering on food sovereignty (Mali, 2007) at which representatives of "all sectors of society with an interest in agricultural and food issues"[68] adopted a Declaration which described food sovereignty as a basic human right.[69] From a human-rights perspective, as will be discussed hereafter, food sovereignty distinguishes itself from food security as it goes beyond a narrow understanding of the right to food that focuses around availability, to a broader notion that centres around the way food is produced and where, including questions of sustainability and equity,[70] and linking up the right to food with other rights such as seed, land and environmental rights. The Nyéléni Declaration called for "those who produce, distribute and consume food [to be put] at the heart of food systems and policies"; defending the interests and inclusion of the next generation in policy- and decision-making and offering "a strategy to resist and dismantle the current corporate trade and food regime, and directions for food, farming, pastoral and fisheries systems determined by local producers".[71]

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[60] Desmarais 2007, p 34.
[61] M Polzin, 'Food security vs. food sovereignty' (26 September 2018) <https://wp.nyu.edu/gallatin_human_rights_fellows/2018/09/26/food-security-vs-food-sovereignty/> accessed May 2022.
[62] Cited by Martínez-Torres and Rosset 2014, p 986.
[63] Ibid, p 991.
[64] S Gliessman et al, 'Agroecology and Food Sovereignty' (2019) 50 IDS Bulletin 91.
[65] Chapter 1, §1.2; Chapter 3, §3.3.2.
[66] Desmarais 2007, p 34.
[67] Gliessman et al 2019; Claeys 2015, p 13.
[68] 'Declaration of Nyéléni' (*FAO*, 2007) <https://www.fao.org/agroecology/database/detail/en/c/1253617/> accessed May 2022.
[69] *Declaration of Nyéléni* (La Via Campesina, 2007).
[70] *United Nations Declaration on the Rights of Peasants and Other People Working in Rural Areas. Right to food and to food sovereignty* (CETIM, 2021).
[71] La Via Campesina 2007, p 1.

Together with the 'Declaration of Rights of Peasants – Women and Men' (2008),[72] the Nyéléni Declaration provided the blueprint for UNDROP, adopted by the UN General Assembly in 2018 with 121 votes in favour (including Portugal and Luxembourg), 8 votes against (including Sweden and the United Kingdom) and 54 abstentions (including all other EU Member States).[73] UNDROP recognises food sovereignty "to designate the right to define […] food and agriculture systems and the right to healthy and culturally appropriate food produced through *ecologically sound* and sustainable methods that *respect human rights*" [emphasis added].[74]

6.2.3. Beneficial Relationships Between Biodiversity and Human Rights Law

UNDROP has been described as a "rare case of direct involvement of social movements in international law-making".[75] It builds on and includes language from international treaties, and, crucially, it explicitly references the CBD.[76] As analysed in Chapter 3,[77] the CBD's ecosystem approach provides an important framework for agroecology as it holds that management must be respectful of the ecosystem's carrying capacity, prioritising the conservation of ecosystem functioning and resilience.[78] Yet, it also seeks to integrate environmental and social elements, and it holds that management must be done in a "fair and equitable way";[79] underscoring the importance of an in-depth understanding of the wider context to which the ecosystem approach is applied,[80] and, notably, the influence of social, economic and political processes on decisions made by local managers, such as farmers, that are outside of their own sphere of influence.[81] In this regard, synergies can be drawn with food sovereignty as analysed above, as the CBD's ecosystem approach acknowledges the "inequities of power in society", and demands that decision-making processes ensure that those who are normally marginalised are not excluded.[82] Bringing decision-making processes closer to ecological realities is considered not only key to sustainable environmental management, but also to making sure that community interests are successfully integrated and that local and public interests are mediated.[83] Recognition of the significance of the broader economic setting comes with an understanding that introduction of new ecosystem uses (or reintroduction of old ones), "even where these are less impacting or provide wider benefits to society" such as agroecological practices, may be difficult because of strong, vested interests; a problem which is exacerbated by the absence of incentives and/or the presence of barriers (financial or otherwise) for land users to conserve ecological processes or to support others in doing so.[84] The flip side of this is that ecosystems degradation has been

[72] *Declaration of Rights of Peasants - Women and Men. Peasants of the World need an International Convention on the Rights of Peasants* (La Via Campesina, 2008).
[73] A/RES/73/165 (UNDROP).
[74] Ibid, Preamble and Article 15(4).
[75] Claeys and Edelman 2019.
[76] C Golay, *The Implementation of the United Nations Declaration on the Rights of Peasants and Other People Working in Rural Areas* (The Geneva Academy, 2019); see also reference A/RES/73/165 (UNDROP), Preamble.
[77] Chapter 3, §3.4.
[78] UNEP/CBD/COP/DEC/V/6, Principle 5 of the Ecosystem Approach; see also ibid, Operational Guidance Point 1; Morgera 2017, p 72.
[79] UNEP/CBD/COP/DEC/V/6, Principle 1 of the Ecosystem Approach.
[80] UNEP/CBD/COP/DEC/VII/11, Implementation Guidelines 4.1.
[81] Ibid, Principle 2, Annotations to the Rationale.
[82] Ibid, Implementation Guidelines 1.5. Compare: A/RES/73/165 (UNDROP), Preamble and Article 10.
[83] UNEP/CBD/COP/DEC/VII/11, Principle 2 of the Ecosystem Approach, Annotations to the Rationale.
[84] Ibid, Principle 4, Annotations to the Rationale.

found to be a greater risk for vulnerable groups, including women, children, persons living in poverty, members of indigenous peoples and traditional communities, older persons, persons with disabilities, ethnic, racial or other minorities and displaced persons.[85] Internalising the costs and benefits of (agro)ecosystem management decisions and ensuring "equitable sharing" is, therefore, put forward as a crucial part of the implementation of the ecosystem approach.[86] Equity, as recognised under the CBD, thus includes elements of distributive equity related to the allocation of 'goods and bads', procedural equity related to inclusion and the ability to participate in decision-making, and contextual equity related to recognising and overcoming environmental, social, political and economic barriers that frustrate effective participation.[87]

Whilst the CBD's ecosystem approach itself provides holistic and comprehensive guidance for agroecological thinking, the question can be asked what the added value is for a human rights-based frame. Having observed the continuous marginalisation of agroecological farmers within policy- and decision-making processes, international human rights law may contribute to assess compliance with obligations that follow from the CBD and its guidance in relation to the position of agroecological stewards.[88] Elements of equity under the CBD's ecosystem approach should not be seen as separate from a human rights-based frame, but as an entry point or gateway for the consideration of human rights.[89] A human rights-frame helps to clarify the discretion of States – and the EU – in pursuing the CBD objectives relating to biodiversity conservation and sustainable use, thereby enhancing their justiciability.[90] Yet, there are benefits for human rights law too, as CBD guidance – such as the ecosystem approach's Malawi principles and annotations – provide a level of detail necessary to help interpret rights relevant to biodiversity and ecological stewardship, to adopt a holistic human rights-based approach.[91]

There are a broad range of rights relevant to agroecological stewardship and UNDROP will be used in this section as a starting point for analysis, with more detail on specific rights reserved to the next two case studies on risk regulations for genetically modified ('GM') seeds and regulations for organic certification. It follows from the previous section that the EU and most EU Member States have not been outspokenly supportive of UNDROP as a human rights instrument specific to peasants and their family members – who rely significantly on family or

[85] Human Rights Council, 'Report of the Special Rapporteur (John Knox) on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment' (2018) A/HRC/37/59, Framework Principle 14.
[86] UNEP/CBD/COP/DEC/VII/11, Principle 4 of the Ecosystem Approach, Implementation Guidelines. Compare: UNDROP, Preamble and Articles 17-20.
[87] See on these conceptual notions also M Mcdermott et al, 'Examining equity: A multidimensional framework for assessing equity in payments for ecosystem services' (2013) 33 Environmental Science and Policy 416; referenced also in Conference of the Parties to the CBD, 'Decision 14/8. Protected areas and other effective area-based conservation measures' (2018) CBD/COP/DEC/14/8.
[88] E Morgera, *Biodiversity as a Human Right and its Implications for the EU's External Action* (European Parliament, 2020), p 12.
[89] Ibid, p 11; see, also, Human Rights Council, 'Report of the Special Rapporteur (John Knox) on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment' (2017) A/HRC/34/49.
[90] E Morgera, 'Under the radar: the role of fair and equitable benefit-sharing in protecting and realising human rights connected to natural resources' (2019) 23 The International Journal of Human Rights 1098; also A/HRC/34/49, par 34.
[91] Morgera 2020, p 9.

informal labour and who have a special dependency on and attachment to the land – and other person engaged in artisanal or small-scale agriculture, indigenous people and local communities and hired rural workers.[92] Both the EU and the United States had argued that such an instrument was not necessary as the relevant rights were already protected, whilst also rejecting peasants' rights as collective rights.[93] Now that UNDROP has been adopted, the EU's first argument can be flipped around to highlight the Declaration's relevance, as it largely consolidates rights relevant to peasants and other people working in rural areas; the realisation of which the EU and/or its Member States have already committed to under international hard and soft law instruments.[94] UNDROP holds that its content may not be construed to diminish, impair or nullify the rights that peasants, people working in rural areas and indigenous peoples currently have, or may acquire in the future.[95] However, UNDROP may provide guidance to interpret existing rights in a way that truly reflects the desires and needs of the people most at risk from a failure to protect such rights. It is recalled that UNDROP was the result of a bottom-up approach, led by LVC, which was able to engage very directly with the UN Human Rights Council and which hoped that a declaration could "inspire, legitimate and give bargaining power to future struggles".[96] Lessons can, in this regard, be learned from the implementation of the UN Declaration on the rights of indigenous peoples, which has been supported by the 4 countries that originally voted against its adoption by the UN General Assembly in 2007,[97] and which involves the adoption of national laws, policies and institutions on indigenous peoples' rights and the use of the declaration to shape the work of regional human rights courts.[98]

6.2.4. Substantive and Procedural Rights Relevant to Agroecology

UNDROP includes a preamble and a catalogue of 28 articles, spanning a broad range of rights relevant to peasants and other people working in rural areas. States are being obliged to "respect, protect and fulfil" those rights through prompt legislative or administration action,[99] to engage with peasants and other people working in rural areas before policy decisions are made, to facilitate international cooperation and capacity-building and to eliminate conditions that cause or help to perpetuate discrimination, in particular in relation to older persons, youth,

[92] A/RES/73/165 (UNDROP), Article 1.
[93] UN General Assembly, 'Report of the open-ended intergovernmental working group on a draft United Nations declaration on the rights of peasants and other people working in rural areas' (2016) A/HRC/33/59, p 12; Claeys and Edelman 2019, p 11.
[94] Even maybe more controversial rights such as the right to land, has been interpreted as an explicit and grassroots/bottom-up affirmation of peasants' human rights to land: L Cotula, 'The right to land' in M Alabrese et al (eds), *The United Nations' Declaration on Peasants' Rights* (Routledge 2022). See, however, more conservatively Francioni 2022, in the same edited collection.
[95] A/RES/73/165 (UNDROP), Article 28(1).
[96] R Dunford, 'Peasant activism and the rise of food sovereignty: Decolonising and democratising norm diffusion?' (2016) 23 European Journal of International Relations 145, p 160. See, also, Cotula 2022, footnote 89 for several examples of UNDROP being used by human rights bodies to interpret binding treaty obligations.
[97] UN General Assembly, 'United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP)' (2007) A/RES/61/295; Golay 2019, p 2. It must be noted that political debate around UNDRIP remains, e.g., regarding the definition of indigenous peoples, and many practical constraints remain at national and local levels, including absence of political will to implement UNDRIP: *State of the World's Indigenous Peoples. Implementing the United Nations Declaration on the Rights of Indigenous Peoples* (UN Economic & Social Affairs, 2019), p 60.
[98] Golay 2019, p 2 with reference to the Inter-American Commission on Human Rights, the Inter-American Court on Human Rights, and the African Commission on Human and Peoples' Rights.
[99] A/RES/73/165 (UNDROP), Article 2(1).

children, persons with disabilities and women.[100] Rights that are explicitly covered include the right to life and physical and mental integrity,[101] the right to form and join organisations (such as trade unions and cooperatives),[102] the right to work in safe and healthy working conditions,[103] the right to land and tenure,[104] the right to safe and clean water,[105] the right to social security,[106] and the right to culture.[107] This section focuses on the rights most relevant for the case studies in this thesis: the right to an adequate standard of living including the right to food, the right to a healthy environment, farmers' rights to seeds and procedural rights.

UNDROP holds that "[p]easants and other people working in rural areas have the right to an adequate standard of living for themselves and their families."[108] This fundamental right to a standard of living adequate for health and well-being was first codified in the Universal Declaration of Human Rights, and it has always had food at its core.[109] References in UNDROP to a "right to be free from hunger" and to means of subsistence and integrity more generally,[110] echo early notions of what nowadays is known as the fundamental "right to food";[111] a right belonging to the category of economic, social, and cultural rights as codified in the International Covenant on Economic, Social and Cultural Rights (ICESCR), which has been ratified by all EU Member States.[112] Whilst the right to food has not been explicitly recognised in the European Social Charter or the EU Charter of Fundamental Rights,[113] it has been extensively cited by EU authorities in the context of EU external action.[114] Clarification of the meaning of the right to food at international level has been given by General Comment no. 12 on the right to food, drafted by the Committee on Economic, Social and Cultural Rights (1999) and the Voluntary Right to Food Guidelines by the UN Food and Agriculture Organisation ('FAO') (2004). The CESCR's General Comment made limited reference to the position of farmers and other primary producers, although it did clarify States' obligations to respect, protect and fulfil the right to food, meaning that States' shall not prevent access to adequate

[100] Ibid, Article 2(2) and (6) and Articles 3 and 4.
[101] Ibid, Article 6; also International Covenant on Civil and Political Rights (adopted 16 December 1966, entered into force 23 March 1976) 999 UNTS 171 ('ICCPR'), Article 6; Charter of Fundamental Rights of the European Union [2000] OJ L 364/01 ('EU Charter'), Article 2.
[102] A/RES/73/165 (UNDROP), Article 9; also International Covenant on Economic, Social and Cultural Rights (adopted 16 December 1966, entered into force 3 January 1976) 993 UNTS 3 ('ICESCR'), Article 8.
[103] A/RES/73/165 (UNDROP), Article 14.
[104] Ibid, Article 4(2)(h) and Article 17; Cotula 2022.
[105] A/RES/73/165 (UNDROP), Article 21; also UN General Assembly, 'The human right to water and sanitation' (2010) A/RES/64/292.
[106] A/RES/73/165 (UNDROP), Article 22; also ICESCR, Article 9.
[107] A/RES/73/165 (UNDROP), Article 26; also ICESCR, Article 15.
[108] A/RES/73/165 (UNDROP), Article 16(1).
[109] UN General Assembly, 'Universal Declaration of Human Rights' (1948) A/810 at 71, Article 25.
[110] A/RES/73/165 (UNDROP), Articles 12(5) and 15.
[111] Claeys 2015, p 68.
[112] Through the principle of succession the ICESCR provisions may also directly apply to the EU: T Ahmed and I De Jesús Butler, 'The European Union and Human Rights: An International Law Perspective' (2006) 17 European Journal of International Law 771.
[113] Nor the European Social Charter 1961: M Van Der Bernd and R Ioana, 'Food Prints on Human Rights Law Paradigms' (2014) 9 European Food and Feed Law Review 372. Some aspects of the right to food have been held to be include in Article 34(4) EU Charter on the right to social assistance so as to ensure a decent existence.
[114] J L V Pol and C Schuftan, 'No right to food and nutrition in the SDGs: mistake or success?' (*BMJ Global Health* 2016) <https://gh.bmj.com/content/1/1/e000040.info> accessed May 2022; European Parliament, 'Global goals and EU commitments on nutrition and food security in the world' P8_TA(2016)0375.

food, States must proactively engage in activities to strengthen people's access and utilisation of resources to ensure their livelihood and, whenever an individual or group is unable to enjoy the right to adequate food for reasons beyond their control, States have the obligation to fulfil (provide) it directly.[115] The FAO's Voluntary Guidelines, which have been celebrated for full engagement of governments and international organisations,[116] are primarily focused on food security based on four pillars: availability, stability of supply, access and utilisation.[117] Nonetheless, they are more specific with regard to the position of (small-scale and traditional) farmers, requiring inclusive economic, agricultural, land-use and land-reform policies which permit farmers "to earn a fair return from their labour, capital and management."[118] The FAO Guidelines also require R&D that promotes basic food production that benefits small-scale and female farmers.[119] The negotiations of the guidelines also saw the participation of the UN Special Rapporteur on the Right to Food, which, as noted in previous chapters,[120] was the first international actor to embrace agroecology, by recognising its "strong conceptual connections with the right to food".[121] The work of the Rapporteur has been crucial in placing farming at the core of the right to food, highlighting links between aims to secure food availability, protect farmers' livelihoods – including through on-farm fertility and pest control and a focus on local supply chains that could benefit rural communities – and satisfy future, ecological needs.[122]

Regarding the latter, agriculture connects – for better or worse – the right to food to the right of present and future generations to a healthy environment.[123] Whereas the Rapporteur stressed the responsibility of the agricultural sector to preserve natural resources,[124] UNDROP has also emphasised how peasants and other people working in rural areas' enjoyment of adequate living conditions is dependent on access to and sustainable use of resources, and the need to prevent depletion and ensure conservation of biodiversity to promote and protect peasants' rights.[125] Ultimately, the enjoyment of everyone's rights such as the right to food and rights to life, health, culture, development, housing etcetera., is conditioned on a healthy, clean and safe state of biodiversity, ecosystems and natural resources,[126] and this relationship is particularly

[115] CESCR, 'General Comment No. 12: The Right to Adequate Food (Art. 11)' (1999) E/C.12/1999/5.
[116] I Rae et al, 'History and implications for FAO of the guidelines on the right to adequate food' in A Eide and U Kracht (eds), *Food and Human Rights in Development: Evolving Issues and Emerging Applications* (Intersentia 2007), p 457.
[117] *Voluntary Guidelines to support the progressive realization of the right to adequate food in the context of national food security* (FAO, 2004), p 5.
[118] Ibid, par 2.5.
[119] Ibid, par 8.4.
[120] Chapter 2, §2.5; Chapter 3, §3.3.2.
[121] A/HRC/16/49, Summary.
[122] Ibid, p 4.
[123] On the direct relationship between food/farming and environmental rights: UN General Assembly, 'Report of the Special Rapporteur (David R. Boyd) on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment. Healthy and sustainable food: reducing the environmental impacts of food systems on human rights' (2021) A/76/179.
[124] A/HRC/16/49.
[125] A/RES/73/165 (UNDROP), Articles 5(1) and 20(1). See, also, D R Boyd and S Keene, *Human rights-based approaches to conserving biodiversity: equitable, effective and imperative (Policy Brief No. 1)* (UN Special Rapporteur on Human Rights and the Environment, 2021), p 12 on the contribution of peasants to conservation.
[126] A/HRC/34/49, par 5.

relevant for vulnerable groups.[127] This observation also underscores the significance of local sustainable practices, including agroecological management, for realisation on international human rights and environmental objectives. The previous and current UN Special Rapporteurs on Human Rights and the Environment have advocated for adherence to framework principles to realise a positive exchange between the environment and human rights,[128] the 'greening' of existing human rights obligations,[129] and international recognition of a human right to a healthy environment, which includes biodiversity and ecosystems.[130] The EU Charter does require the integration of a high level of environmental protection across EU policies, but its provision on environmental protection does not amount to a justiciable, substantive environmental right.[131]

Yet, where such a right – which could involve a right to healthy agroecosystems – does not yet explicitly exist, the protection of agrobiodiversity, as a specific (genetic) resource, has already been framed by international law in human rights terms. Notably, benefit sharing – a concept which found its origins in human rights law, but which has been most well-developed in the context of the international biodiversity regime[132] – is one way that the CBD's ecosystem approach seeks to address stewardship-related equity issues. Regarding genetic resources, the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) has introduced a multilateral system of access and benefit-sharing,[133] which implements the CBD's objectives: the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources.[134] The system facilitates access to, and exchange of, 64 plant genetic resources for food and agriculture (PGRFA) which are considered to be vital for international food security.[135] It also institutionalises inter-state sharing of benefits arising from the utilisation of PGRFA, including the sharing of information, technology transfer, capacity building and the sharing of monetary and other benefits of commercialisation through a Benefit-sharing Fund.[136] Important from an agroecological perspective is the ITPGRFA's affirmation of "the past, present and future

[127] Human Rights Council, 'Report of the Independent Expert John H. Knox on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment.' (2013) A/HRC/25/53, paras 69-78; A/HRC/34/49, paras 49-64. Also, Human Rights Council, 'Human rights and the environment (Resolution)' (2021) A/HRC/RES/46/7.
[128] A/HRC/37/59, Annex.
[129] UN General Assembly, 'Report of the Special Rapporteur (John Knox) on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment' (2018) A/73/188, par 12.
[130] Ibid.
[131] E Morgera et al, *Rights protected under EU law concerning the environment* (Scottish Universities Legal Network on Europe, 2016), p 5.
[132] E Morgera, 'Fair and Equitable Benefit-Sharing' in L KräMer and E Orlando (eds), *Principles of environmental law* (Edward Elgar 2018), p 323.
[133] International Treaty on Plant Genetic Resources for Food and Agriculture (adopted 3 November 2001, entered into force 29 June 2004) 2400 UNTS 303 ('ITPGRFA').
[134] CBD, Article 1 and ITPGRFA, Article 1. On the link between both international instruments and why there has been a the need for a specific treaty on plant genetic resources, see also E Tsioumani, *Fair and Equitable Benefit-Sharing in Agriculture. Reinventing Agrarian Justice* (Routledge 2020), p 15-16.
[135] ITPGRFA, Article 11.
[136] ITPGRFA, Article 13. Note that the fund primarily provides project-based grants, and its operation may in itself raise issues of equity as competition between applicants may lead to the exclusion of those with limited capacities, see S Louafi, *Reflections on the resource allocation strategy of the Benefit Sharing Fund* (CIRAD, 2014); see also Morgera, Switzer and Geelhoed 2021 on different ways in which a multilateral fund combined with a multilateral platform for dialogue, can support conservation efforts.

contributions of farmers in all regions of the world, particularly those in centres of origin and diversity, in conserving, improving and making available [genetic] resources".[137] The Treaty acknowledges farmers' rights to seeds, which involve rights to save, use, exchange and sell farm-saved seed and propagating material, to protect traditional knowledge relevant to PGRFA, to equitably participate in sharing of benefits arising from utilisation of PGRFA and to participate in decision-making, at national level, on matters related to the conservation and sustainable use of PGRFA.[138] The ITPGRFA, however, puts a responsibility to protect and promote farmers' rights to seeds on national governments, which involve rights to save, use, exchange and sell farm-saved seed and propagating material, to protect traditional knowledge relevant to PGRFA, to equitably participate in the sharing of benefits arising from utilisation of PGRFA and to participate in decision-making on matters related to the conservation and sustainable use of PGRFA.[139] Whilst this provision may in itself not create international seed-related farmers' rights,[140] such rights are now positively formulated in UNDROP,[141] which has been called "a unique opportunity to fill a gap in international human rights law by recognizing peasants' right to seeds".[142] A legal basis is also emerging from holistic interpretation of other international human rights, including the right to science,[143] and the right to food.[144] Within the EU, much more needs to be done to reflect these significant developments at international level, as farmers' rights to seeds are poorly protected at EU and national levels,[145] benefit-sharing systems are failing to reward farmers' contribution to agrobiodiversity conservation,[146] and only few exceptions to EU rules that favour industrial seed systems apply to small farmers.[147]

The comprehensive nature of UNDROP reflects a belief that specific rights cannot be protected in isolation but require integration. For example, Tsioumani makes the case for the broad 'construction' of farmers' rights, an enabling resource base (including land) is a prerequisite for agrobiodiversity stewardship and should be protected through land and tenure rights.[148] However, in addition to such a holistic approach to human rights' protection, effective implementation of substantive (food, environment, genetic and natural resource-related) rights, ultimately, demands that human rights-holders are able to articulate and claim rights in relevant

[137] ITPGRA, Preamble and Article 9(1).
[138] Ibid, Article 9(2) and Preamble. Note, however, that the Treaty does not define farmers' rights and also falls short in providing an international legal basis for protection against intellectual property and breeders' rights, see Tsioumani 2020, p 73.
[139] ITPGRFA, Article 9(2) and Preamble.
[140] Tsioumani 2020, p 73.
[141] A/RES/73/165 (UNDROP), Article 19; on the negotiation history see H M Haugen, 'The UN Declaration on Peasants' Rights (UNDROP): Is Article 19 on seed rights adequately balancing intellectual property rights and the right to food?' (2020) 23 The Journal of World Intellectual Property 288.
[142] C Golay and A Bessa, *The Right to Seeds in Europe. The United Nations Declaration on the Rights of Peasants and Other People Working in Rural Areas and the Protection of the Right to Seeds in Europe* (Geneva Academy, 2019), p 28. Also, Human Rights Council, 'Final study of the Human Rights Council Advisory Committee on the advancement of the rights of peasants and other people working in rural areas' (2012) A/HRC/19/75.
[143] ICESCR, Article 11(2)(a), 15(1)(b) and 15(2); Haugen 2020, p 294.
[144] Human Rights Council, 'Report of the Special Rapporteur (Olivier de Schutter) on seed policies and the right to food: enhancing agrobiodiversity and encouraging innovation' (2009) A/64/170.
[145] Golay and Bessa 2019, p 45.
[146] A/64/170, par 47.
[147] Golay and Bessa 2019, p 46; Council Regulation (EC) No 2100/94 of 27 July 1994 on Community plant variety rights [1994] OJ L 227/1 and, hereafter, §6.3.1.
[148] Tsioumani 2020, p 86.

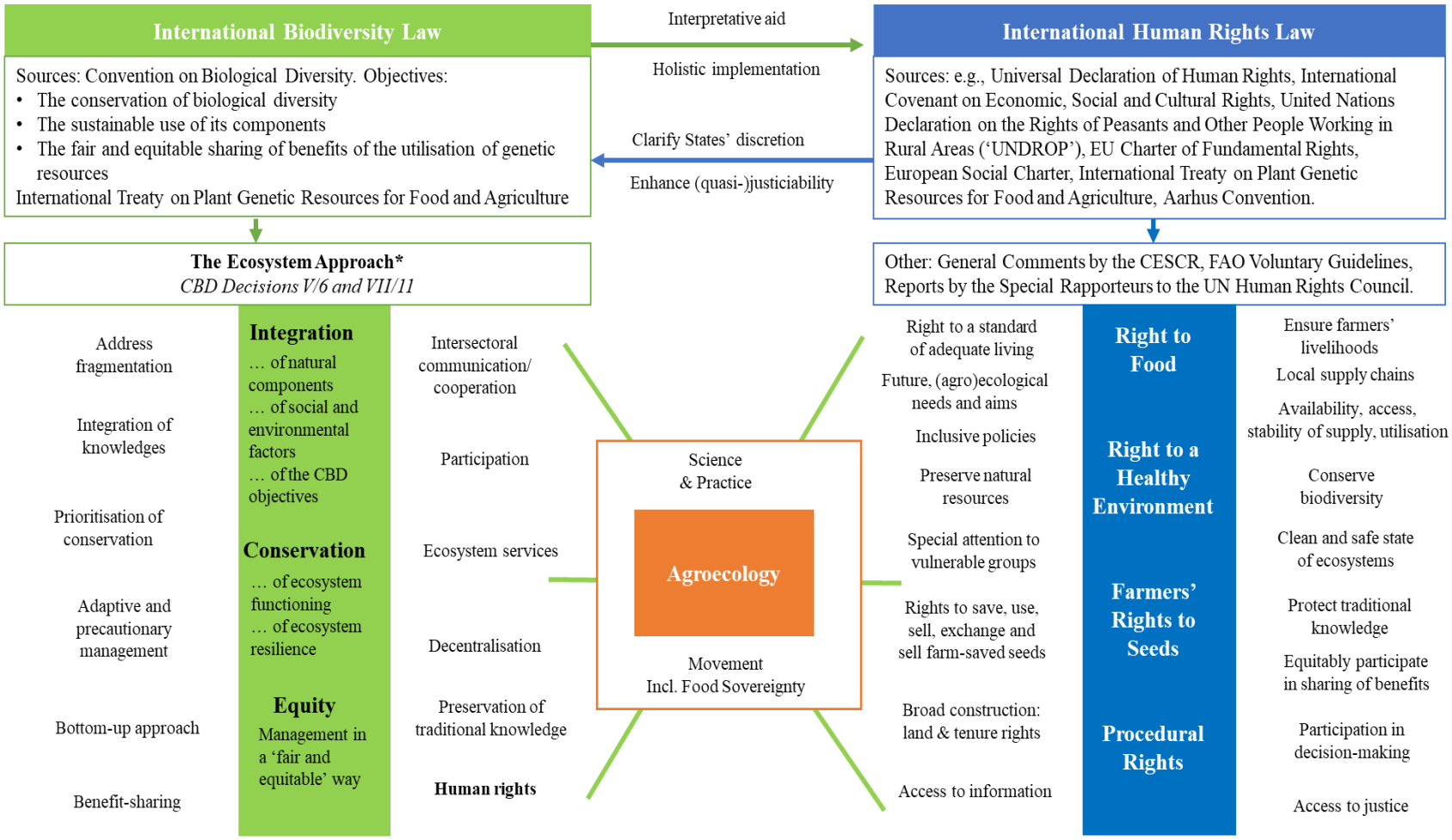
law-, policy- and judicial processes. In this regard, UNDROP provides for wide recognition of procedural rights and responsibilities, including the right to seek, receive, develop and impart information – and the obligation on States to ensure access to relevant, transparent, timely and adequate information,[149] the right to active and free participation, directly and/or through representative organizations, in the preparation and implementation of policies, programmes and projects that may affect lives, land and livelihoods – and the obligation on States to consult and cooperate in good faith before adopting and implementing legislation and policies,[150] and the right to effective and non-discriminatory access to justice – and the obligation on States to provide such access through impartial and competent judicial and administrative bodies.[151]

At the nexus between international human rights-, environmental- and biodiversity law there is a very strong case to be made for strong procedural rights for agroecological stewards, which go beyond mere good governance to include legally binding obligations.[152] These obligations – access to information, participation in environmental decision-making and access to remedies for harm – find their bases in civil and political rights,[153] but have been clarified and extended in an environmental context.[154] The Aarhus Convention of the United Nations Economic Commission for Europe (UNECE) provides for particularly detailed provisions,[155] which have in the EU been primarily implemented through Regulation 1367/2006.[156] Regarding decision-making processes the Aarhus Convention, for example, holds that public participation should take place at an early stage "when all options are open and effective public participation can take place",[157] procedures should allow for submission of relevant comments, information, analyses or opinions and decisions, and any decisions should take due account of the outcome of the participatory process.[158] Although the requirement do not fall upon legislative actors,[159] the Aarhus Convention is very explicit about its provisions on public participation extending to decisions on "whether to permit the deliberate release of genetically modified organisms".[160]

[149] A/RES/73/165 (UNDROP), Article 11(1) and 11(2).
[150] Ibid, Articles 10(1) and 2(3); also, Article 5(2)(b) regarding the management of natural resources.
[151] Ibid, Article 12(1) and 12(2).
[152] L D Silva, 'Public Participation in Biodiversity Conservation' in E Morgera and J Razzaque (eds), *Biodiversity and Nature Protection Law* (Edward Elgar 2017), pp 468-476.
[153] A/810 at 71 (UDHR), Article 21 and ICCPR, Article 25.
[154] A/HRC/25/53, par 29.
[155] Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (adopted 25 June 1998, entered into force 30 October 2001) 2151 UNTS 447 ('Aarhus Convention').
[156] Regulation (EC) No 1367/2006 of the European Parliament and of the Council of 6 September 2006 on the application of the provisions of the Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters to Community institutions and bodies [2006] OJ L 264/13, as amended by Regulation (EU) 2021/1767 of the European Parliament and of the Council of 6 October 2021 amending Regulation (EC) No 1367/2006 on the application of the provisions of the Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters to Community institutions and bodies [2021] OJ L 356/8.
[157] Aarhus Convention, Article 6(4).
[158] Ibid, Article 6(7) and (8).
[159] Ibid, Article 2(2)(d).
[160] Ibid, Article 6(11).

The CBD explicitly provides for a requirement for participation in the context of environmental impact assessments,[161] but it follows from Chapter 3 and the above that its ecosystem approach demands further-reaching actions to ensure a participatory, bottom-up approach to ecosystem management, which seeks to consider all forms of relevant information in decision-making.[162] It is reiterated that the ecosystem approach demands that often marginalised actors are not excluded from decision-making processes,[163] which can be linked to equality and non-discrimination as fundamental principles of human rights law.[164] In this regard, the CESCR has held that it is not sufficient to eliminate formal discrimination, but that substantive discrimination needs to be tackled which reflects historical or persistent prejudice against certain groups or individuals.[165] To move beyond the mere comparison of formal treatment of people in similar situations, equity (as used in the context of the CBD's ecosystem approach)[166] is a useful concept to help understand what is required for equal opportunities for meaningful and effective participation.[167] Equity necessitates that differences between public participants and stakeholders, as human rights' holders, are considered and addressed in (the design of) decision-making procedures to put everyone on equal level and allow for fair opportunities for participation.[168] Differences may, for example, concern culture, social-status, power, capacity, income, language and – of particular relevance for the case studies in this thesis – the types of knowledges that are held, developed and used by different relevant actors and groups. The need for epistemic equity and justice is explicitly accepted in relation to traditional (indigenous and local) knowledge,[169] which shall, as far as possible and appropriate, be respected, preserved and maintained.[170] The ecosystem approach identifies decentralised systems as a way to create greater equity and use of local knowledge.[171] Yet, where (full) decentralisation may seem less appropriate due to objectives that command harmonisation – as in the case of the trade-related case studies in this thesis – epistemic subsidiarity may still be achieved through implementation of democratic principles, for example, through inclusive group representation in advisory committees which ensures that no important perspective has been left out of the deliberative forum,[172] and, more broadly, the design of processes that embrace different "world views".[173]

[161] CBD, Article 14.
[162] Chapter 3, §3.4.5.
[163] UNEP/CBD/COP/DEC/VII/11, Implementation Guidelines 1.5.
[164] CESCR, 'General Comment No. 20 Non-discrimination in economic, social and cultural rights' (2009) E/C.12/GC/20, par 2; ICESCR, Article 2(2).
[165] E/C.12/GC/20, par 8.
[166] Above, §6.2.3 and Chapter 3, §3.4.5; Morgera 2017.
[167] Ibid, p 72.
[168] An image that is helpful to illustrate the difference between equality and equity is a bicycle: handing everyone the same adult-sized bicycle may amount to formally equal treatment, but equity will only be achieved when the provided bicycles are adapted to different heights and mobility requirements. Only then the bicycle as a metaphorical tool will, indeed, ensure that everyone is able to participate. 'Visualizing Health Equity: One Size Does Not Fit All Infographic' (*Robert Wood Johnson Foundation*, N.D.) <https://www.rwjf.org/en/library/infographics/visualizing-health-equity.html> accessed May 2022.
[169] UNEP/CBD/COP/DEC/V/6, Principle 11 of the Ecosystem Approach; see in a human rights' context also A/73/188, par 23 and A/76/179, par 8.
[170] CBD, Article 8(j).
[171] UNEP/CBD/COP/DEC/V/6, Rationale of Principle 2.
[172] S Jasanoff, 'Epistemic Subsidiarity – Coexistence, Cosmopolitanism, Constitutionalism' (2017) 4 European Journal of Risk Regulation 133, p 141 on the ways epistemic subsidiarity can be achieved within risk governance.
[173] UNEP/CBD/COP/DEC/VII/11, Implementation Guidelines 11.4.



* See also Table in Chapter 3, §3.4

6.3 Reframing EU Risk Regulation to Challenge Assumed Social Benefits

It follows from the above that both agroecology, as a concept and movement, and the CBD's ecosystem approach guidance seek to integrate environmental and social considerations, in support of a holistic, ecological approach to farming. Contrarily, EU risk regulation frame the release of agricultural chemical and biotechnological inputs as a potential safety issue. In this regard, the impact of agricultural inputs on humans is primarily defined as a concern for human health, as operational guidance for the assessment of environmental risk have only recently, and in a restricted way, recognised the "dependency of mankind on ecosystems"[174] and the potential effects of ecological degradation on human wellbeing.[175] As analysed in Chapter 4,[176] framing the need for authorisation procedures for inputs in terms of protection against risks, comes with an assumption of public benefit – notably for increased production – which obscures equitable questions regarding how benefits (and costs) are distributed. It has also led to the adoption of technocratic decision-making procedures that depreciate the potential role, knowledges and interests of those farmer-stewards that can make the greatest contribution to stewardship but whose livelihoods are most threatened by the degradation of agroecosystems.

Whilst these issues exist across the regulatory regimes for the authorisation of GMOs and pesticides, the impacts of reframing the discussion in human rights terms – notably substantive human rights – may differ between GMOs and pesticides. To allow for a sufficiently detailed analysis this section will focus on GMOs to illustrate the potential of a human rights frame for risk regulation, although parallels with (EU regulations on) pesticides will be drawn if possible. Indeed, as already recognised by some international law instruments,[177] genetic resources are an inherently social matter as they are the beginning of all food to sustain life, as well as the link between the farmer, the land, and the ecosystem through the processes of cultivation and sowing. Historically, agriculture has been founded upon traditional and local plant varieties, which were conserved and bred through different forms of informal and formal, collective, and participatory systems which aim to foster and support the exchange, saving, and use of seeds.[178]

Even when the community of seed savers and exchangers widened in a globalising world, plant genetic resources were initially openly shared in response to and in aid of the adoption of new agricultural practices and technologies, diseases and climate stresses and the adaptation of local diets.[179] In other words, seeds and propagating materials were "conceived of, and treated like, public goods".[180] However, this changed when plant genetic materials became increasingly captured by corporate interests through agronomic, scientific and legal developments: from the early creation of hybrid seeds which ensure uniformity but limited replanting, to biotechnology

[174] EFSA 2010a, p 20.
[175] Ibid, p 20.
[176] See, notably, Chapter 4, §4.2, §4.3.2 and §4.4.1.
[177] Above §6.2.4 on seed-related rights under UNDROP, the CBD and the ITPGRFA.
[178] Tsioumani 2020, p 6; M Halewood et al, *Crop Genetic Resources as a Global Commons. Challenges in International Law and Governance* (Issues in Agricultural Biodiversity 2013).
[179] M Halewood, 'What kind of goods are plant genetic resources for food and agriculture? Towards the identification and development of a new global commons' (2013) 7 International Journal of the Commons 278, p 282.
[180] Ibid.

inventions and the use of intellectual property rights such as plant breeders' rights and patents.[181] Social movements around seed sovereignty and seed rights have fought these trends, by stressing the importance of genetic resources for farmers' autonomy and livelihoods, and often using the seed as a symbol for broader "agrarian struggles for social justice".[182]

The section will, firstly, further explore the socioecological concerns that underpin debates on genetic resources and reliance on industrial agricultural inputs. Notably, it will highlight issues of power in agricultural supply chains and the impacts of complex interactions between market concentration, intellectual property rights (IPRs) and GM technologies on human rights. It will then outline to what extent concerns of a fundamental nature are taken into consideration within the decision-making procedures for the authorisation of GMOs at EU level, thus building upon the preliminary observations in Chapter 4 that the risk regulations understanding of the problem of GMOs has separated environmental from systemic and social aspects of sustainability. This section will, lastly, reflect on one alternative way to frame issues around the use of agricultural inputs, which reflects a human rights-based approach, as it looks at the potential and the limitations of the radically different narrative that is offered the Norwegian Gene Technology Act,[183] as interpreted and implemented by the Norwegian Biotechnology Advisory Board.

6.3.1. Seeds as an Industry: Privatisation and Impacts on Human Rights

The professionalisation of plant breeding, which separates tasks like selection, multiplication and improvement of seeds and propagating materials from other aspects of farming, marks a significant departure from the way agroecosystem were traditionally managed.[184] From an ecological perspective, genetic resources were historically selected to suit specific local environmental characteristics and the individual choices and preferences of the farmer – a focus which is still often reflected in localised, informal or formal participatory breeding practices.[185] Yet, the process of externalisation has demanded for agroecosystem management to adapt to the more generic "requirements of the acquired seeds".[186] From a social viewpoint, reliance on inputs shifts power from farmers to other actors in the value chain with significant financial interests in the way agroecosystems are managed.[187] In 2021, global markets for commercial seed were valued at $63 billion, and they are projected to amount to more than $86 billion by 2026.[188] Power is greatly consolidated as the seed industry has been subject to some of the

[181] Ibid; C Chiarolla, 'Right to Food and Intellectual Property Protection for Plant Genetic Resources' in C Geiger (ed), *Research Handbook on Human Rights and Intellectual Property* (Edward Elgar Publishing 2015); A/64/170, pp 5-6.
[182] Tsioumani 2020, p 79; also K Peschard and S Randeria, ''Keeping seeds in our hands': the rise of seed activism' (2020) 47 The Journal of Peasant Studies 613.
[183] *Genteknologiloven (Gene Technology Act)* (Norway, 1993).
[184] A/64/170.
[185] M Halewood et al, *Participatory plant breeding to promote Farmers' Rights* (Biodiversity International, 2007); E Tsioumani, 'Reimagining agrobiodiversity conservation and agricultural innovation from the grassroots up: the case of the Peliti seed network in Greece' in M Alabrese et al (eds), *The United Nations' Declaration on Peasants' Rights* (Eartscan 2022).
[186] Van Der Ploeg 2020, p 4; also A Bhargava and S Srivastava, *Participatory Plant Breeding: Concept and Applications* (Springer Singapore 2019), p 71.
[187] Similar observations can be made for pesticides, which replace integrated, farm-based management practices.
[188] *Seeds Market by Type, Trait, Crop Type and Region - Global Forecast to 2026* (ReportLinker, 2021).

biggest M&A deals in history,[189] and three recent mega-mergers mean that only four firms now own 60% of the market.[190] For specific markets concentration may be higher, for example, the four biggest companies own 74% of the UK's wheat and barley seed market and 98% of the Danish maize seed market.[191] A market is already no longer deemed competitive if four companies control more than 40%,[192] and a market share of 60% or more is known as a 'tight' oligopoly.[193] This severe concentration greatly impacts on decisions related to agroecosystem management, as it limits seed availability and choice and can lead to higher prices,[194] as markets become prone to parallel behaviours and collusion.[195] Other impacts relate to a lack of new entrants being able to access the market as established firms have competitive advantages due to dominance and economies of scale,[196] and the narrowing and reduction of innovation as dominant firms buy out (start-up) innovators.[197] The public benefit of R&D is further undermined by vertical integration, where consolidation extends across different levels of the value chain and, most notably, the industries for agrochemicals and seeds.[198] As a result, R&D often looks to maximise complementary assets: using innovation in one sector to increase demand in another (e.g. increase seeds' herbicide tolerance, to boost herbicides' sales).[199]

Intellectual property rights ('IPRs') related to genetic resources, notably plant breeders' rights ('PBRs') and patents, exacerbate many of the issues of market concentration outlined above. PBRs were introduced by the 1961 International Convention for the Protection of New Varieties of Plants ('UPOV Convention') and are nowadays protected under its 1991 version,[200] as well as under several pieces of EU legislation.[201] Under international law, PBRs can be granted when the variety is pre-commercialisation, clearly distinguishable, sufficiently uniform and stable, meaning that relevant characteristics must remain unchanged after repeated

[189] Mooney 2017, p 21.
[190] Bayer-Monsanto (2018, purchased for $63 billion), ChemChina-Syngenta (2017, purchased for $43 billion) and Dow-DuPont (2015, total value of $130 billion). P H Howard, 'Global Seed Industry Changes Since 2013' *Philip H Howard Blog* (31 December 2018) <https://philhoward.net/2018/12/31/global-seed-industry-changes-since-2013/> accessed May 2022. Note, that there are other factors that determine market power, such as the ease with which new entrants can enter market and buyers can switch among sellers, see J Mcdonalds, *Mergers and Competition in Seed and Agricultural Chemical Markets* (USDA Economic Research Service, 2017).
[191] *Concentration in Seed Markets. Potential Effects and Policy Responses* (OECD, 2018), Chapter 5.
[192] J Clapp, 'The problem with growing corporate concentration and power in the global food system' (2021) 2 Nature Food 404, p 405.
[193] W G Shepherd and J M Shepherd, *The Economics of Industrial Organization* (Waveland Press 2003), p 79.
[194] OECD 2018, Chapter 4 and 6, noting that impacts differ greatly for different crops; P H Howard, *Concentration and Power in the Food System: Who Controls What We Eat?* (Bloomsbury Collections 2021), p 113.
[195] M Cooper, *Mega-Mergers in the U.S. Seed and Agrochemical Sector. The political economy of a tight oligopoly on steroids and the squeeze on farmers and consumers* (Consumer Federation of America, 2017), p 7; also Mooney 2017, p 16.
[196] Mooney 2017, p 15.
[197] Ibid, p 9; Howard 2021, p 112.
[198] Mooney 2017, pp 22-23.
[199] OECD 2018, Chapter 4.
[200] International Convention for the Protection of New Varieties of Plants (adopted 2 December 1961, entered into force 19 March 1991) 1861 UNTS 281 ('UPOV 91 Covention').
[201] Regulation 2100/94; Commission Regulation (EC) No 874/2009 of 17 September 2009 establishing implementing rules for the application of Council Regulation (EC) No 2100/94 as regards proceedings before the Community Plant Variety Office [2009] OJ L 251/3; Commission Regulation (EC) No 1768/95 of 24 July 1995 implementing rules on the agricultural exemption provided for in Article 14 (3) of Council Regulation (EC) No 2100/94 on Community plant variety rights [1995] OJ L 173/14.

propagation.[202] These conditions protect modern varieties from activities such as reproduction, selling, marketing, exporting and stocking,[203] as farmers' varieties are usually neither uniform nor stable.[204] An exemption related to the on-farm reuse of saved seeds (framed as a 'farmer's privilege' rather than a 'farmer's right'),[205] have been restricted under UPOV 1991,[206] and the exchange of seeds has not been excluded from the scope of protection.[207] The patenting of "plant-derived innovations"[208] is less straightforward than claiming PBRs, but more impactful if applications are successful. The European Patent Convention of 1977 – with 38 Parties including all EU Member States– holds that European patents "shall be granted for any invention, in all fields of technology, provided that they are new, involve an inventive step and are susceptible of industrial application".[209] This can include plants and animals as long as they do not concern "essential biological processes".[210] Once granted, patent holders have the right up to twenty years to prohibit others from exploiting the 'invention' or to charge royalties.[211] With an aim to reward R&D investments, patents give "a temporary grant of a monopoly on the right to make, use, offer for sale, or import an invention",[212] thereby enforcing already skewed power relations in favour of the agri-firms that dominate consolidated markets.[213]

But whilst the patenting of conventionally bred varieties is controversial and not obvious or easy in a European context in light of the requirement of 'an inventive step',[214] such limitations do not exist with regard to the patenting of GMOs.[215] The proprietary nature of GM crops has resulted in a US study estimating that at least 56-75% of monetary benefits from GM traits

[202] UPOV 91 Covention, Articles 5-9.
[203] Ibid, Article 14(1).
[204] Tsioumani 2020, p 8.
[205] Ibid, p 25; see also N C Netnou-Nkoana et al, 'Understanding of the farmers' privilege concept by smallholder farmers in South Africa' (2015) 111 South African Journal of Science 1 on issues in relation to traditional seed saving practices and the lack of consultation of small scale farmers in specific national contexts. The farmers' privilege or 'agricultural exemption' is recognised by EU law, Regulation 2100/94, Article 14(3) and Regulation 1768/95, but is subject to payment of 'equitable renumeration' from the farmer to the breeder.
[206] UPOV 91 Covention, Article 15(2) which now provides Parties the *option* "within reasonable limits and subject to the safeguarding of the legitimate interests of the breeder, [to] restrict the breeder's right in relation to any variety in order to permit farmers to use for propagating purposes, on their own holdings, the product of the harvest which they have obtained by planting, on their own holdings". Other exemptions include the breeders' exemption (Article 15(1)(iii)) and the use for private and non-commercial or experimental purposes (Articles 15(1)(i)(ii)).
[207] Tsioumani 2020, p 25; Netnou-Nkoana et al 2015.
[208] Tsioumani 2020, p 9.
[209] Convention on the Grant of European Patents (adopted 5 October 1973, entered into force 7 October 1977) 1065 UNTS 199 ('EPC'), Article 52.
[210] Ibid, Article 53b and Administrative Council of the EPO, 'Implementing Regulations to the Convention on the Grant of European Patents' (1973 (adopted in 2006, last amended in 2020)) No Number.
[211] EPC, Article 63.
[212] S E Mahoney, 'Owning the World's Seed Supply: How Seed Industry Mergers Threaten Global Food Security' (2019) 31 The Georgetown Environmental Law Review 563, p 654; also B H Hall, 'Patents and patent policy' (2007) 23 Oxford Review Of Economic Policy 568.
[213] P H Howard, 'Intellectual Property and Consolidation in the Seed Industry' (2015) 55 Crop science 2489.
[214] EPC, Article 56.
[215] Even in applications for the patenting of conventionally bred varieties, the use of CRISP/CAS techniques at some point in the selection process is increasingly cited to prove the technical nature of the application: R Tippe et al, *Stop patents on our food plants! Research into patent applications conducted in 2020 shows how the industry is escaping prohibitions in patent law* (No Patents on Seeds, 2021).

(compared to conventional seed varieties) flow to seed companies rather than farmers.[216] Patents mean that farmers are unable to save seeds and risks of financial losses of infringements are evident from the cases Monsanto alone has brought against farmers and small businesses.[217] Tensions between IPRs and seed rights are well-studied and relate to the potentially unintended use of farm-saved seeds from commercial varieties, and, more problematically, the use of genetic resources with patented native characteristics.[218] Many examples exist of wide scopes of protection,[219] for example, a patent on lettuce that can be grown in hot conditions – a trait which also occurs in the wild[220] – covers all seeds and plants with the trait even if achieved coincidentally.[221] But the human rights impacts of the overall workings of the system – the interactions between the economic and legal realities of weak antitrust rules and strong IPR protections – are much broader.[222] They relate to risks of erosion of the genetic pool as the investments required for development of commercial and biotechnological varieties dictate that efforts are focused on the most profitable crops. This means that nowadays 9 crops account for 66% of total production,[223] which has significant implications for environmental rights and the right to food.[224] The restrictive role of patents on R&D and, ultimately, the rights to food and science, can, furthermore, be illustrated with reference to an American utility patent on the Andean 'bean nut popping bean', which led to abandonment of three public research projects that never released their varieties – and neither did the patent owner.[225] Lastly, the systemic impacts of the commercial seed industry on farmers' livelihoods, the right to an adequate living and agroecological conservation efforts follows from increasingly inequitable power dynamics. On-the-ground effects are aptly described by one farmer in response to the Bayer-Monsanto merger: "I have no choice when I purchase inputs, be it seeds, chemicals, whatever. There is no choice. *They own me.* […] A lot of how we farm is being determined by someone far away in a boardroom that has little or no connection to the land and what's happening out here".[226]

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[216] F Ciliberto et al, 'Valuing product innovation: genetically engineered varieties in US corn and soybeans' (2019) 50 The RAND Journal of Economics 615

[217] P Harris, 'Monsanto sued small famers to protect seed patents, report says' *The Guardian* (12 February 2013) <https://www.theguardian.com/environment/2013/feb/12/monsanto-sues-farmers-seed-patents> accessed May 2022.

[218] C Golay and F Batur, *Practical Manual on the Rights to Seeds in Europe* (The Geneva Academy, 2021), p 16.

[219] See, for example, Tsioumani 2020, p 14.

[220] EPO, 'European Patent Specification. High temperature Germinating Lettuce Seeds' (2014) EP 2 966 992 B1.

[221] *Reasons for opposition against European Patent EP 2 966 992 B1* (No Patents on Seeds, 2019).

[222] Note, however, that an argument in favour of IPRs could also be made using a human rights frame, as rights to property include intellectual property, e.g., under Protocol 1 to the European Convention for the Protection of Human Rights and Fundamental Freedoms (adopted 20 March 1952, entered into force 18 May 1954) ETS 9 ('Protocol 1 ECHR'); and, explicitly, EU Charter, Article 17(2).

[223] *The State of the World's Biodiversity for Food and Agriculture* (FAO, 2019).

[224] E K Oke, 'Do Agricultural Companies that Own Intellectual Property Rights on Seeds and Plant Varieties have a Right-to-Food Responsibility?' (2020) 25 Science, Technology and Society 142.

[225] C Mccluskey and K K Hubbard, 'Op-ed: How Patents Threaten Small Seed Companies. The use of wide-ranging utility patents by a few powerful multinational corporations could make it harder for small companies to breed future crops' *Civil Eats* (11 September 2020) <https://civileats.com/2020/09/11/op-ed-how-seed-patents-threaten-small-seed-companies/> accessed May 2022; see also regarding wider impacts of the patent, including impacts on indigenous farmers and communities in the Andes: M Blakeney, 'Intellectual Property Rights and Global Food Security' in D Vaver (ed), *Intellectual Property Rights Criticial Concepts in Law* (Routledge 2006), p 327.

[226] Reference in A Douglas, 'Agribusiness and Antitrust: The Bayer-Monsanto Merger. Its Legality and its Effect on the United States and European Union' (2018) 7 The Global Business Law Review 157, p 169.

6.3.2. EU Risk Regulations: The Marginalisation of "Other Legitimate Concerns"

Despite the manifold impacts on human rights, it is within the complexity of the economic and regulatory environment for GMOs that fundamental social considerations are overlooked or disregarded. Where there are many different regulatory regimes applicable to biotechnological inputs – including the IP laws cited above, labelling, seed marketing and access and benefit sharing legislation and broader agricultural, trade and environmental policies – human rights-based concerns that put GM seeds in a holistic perspective may be best considered before the product enters the market and thus becomes the subject to other legal regimes. The question is, therefore, to what degree such concerns of a fundamental nature, and that often bridge social and environmental aspects, are recognised within the EU's regime for the approval of GMOs.

The EU's framing of GM innovation as an issue of safety and risk to human and environmental health follows a dominant discourse in society, which is primarily concerned with allocation and mitigation of negative impacts (the control of potential modern technological hazards) but fails to comprehensively consider questions of equity regarding how wealth is distributed and who benefits from technological innovation.[227] The EU's internal market basis reflects a belief that invasive external inputs should, in principle, be freely circulated unless, in specific cases, they are held to pose an unacceptable safety risk.[228] This focus on physical safety and harm reflects a reductionist understanding of the question of GMOs and GM cultivation. Moreover, the specifics of risk analysis – which come with "a specialised language and set of practices"[229] and choices regarding the types of risk to be considered[230] – have further implications on people dynamics in risk regulation as "risk-talk implicitly empowers some as experts and excludes others as inarticulate, irrelevant or incompetent".[231] As analysed in Chapter 4,[232] reliance on science – with inherently complex concepts such as rationality, objectivity and impartiality often cited to justify such an approach[233] – has fundamentally placed authority with assessors and experts which are far removed from local agroeco- and food system realities.

Where the regulation of inputs such as GM seeds is framed around the need to protect against safety risks, and safety is defined by technocratic and scientific measures, there has been little scope for an inclusive debate around concerns of a fundamental nature. The EU legislative texts refer to ethical principles or issues, socio-economic advantages, disadvantages or implications, and other legitimate factors, to potentially incorporate these broader considerations,[234] but they

[227] Beck 1992 on the differences between 'class societies', which are concerned with distribution of 'goods', and 'risk societies', which are concerned with distribution of 'bads'. Reference in M Weimer, *Risk Regulation in the Internal Market: Lessons from Agricultural Biotechnology* (Oxford University Press 2019), p 20.
[228] Chapter 4, §4.2 and Article 114 TFEU.
[229] S Jasanoff, 'The Songlines of Risk' (1999) 8 Environmental Values 135, p 137.
[230] Weimer 2019, p 26.
[231] Jasanoff 1999, p 137.
[232] Chapter 4, §4.4.1; see also Weimer 2019, p 32 on the role of science in risk regulation.
[233] See, for example, 'GMO' (*EFSA*, N.D.) <https://www.efsa.europa.eu/en/topics/topic/gmo> accessed May 2022 (reference to objectivity); J Dalli, *Speech by the Commissioner for Health and Consumer Policy on GMOs: towards a better, more informed decision-making process Debate on GMO Risk Assessment and Management* (European Commission, 2011): "It is important that we tone down the debate on GMOs to the rational level".
[234] Directive 2001/18/EC, Preamble 9, 57 and 60 and Article 29 (ethical issues), Preamble 62 and Article 31(7(d) (socioeconomic implications); Regulation 1829/2003, Article 7(1) (other legitimate concerns).

are not included in the overarching objectives,[235] and the use of language, and underlying decision-making procedures reflect their subordinated position.[236] Notably, all these aspects are not considered until after a scientific risk assessment has been submitted by EFSA. If the Commission departs from the exclusively positive scientific opinions, thus taking into account other legitimate factors, it must "provide an explanation for the differences".[237] This hierarchy in decision-making is also reflected in general European case-law regarding the regulation of uncertain risks. In *Pfizer*, a case concerning antibiotics in feed, the Court of First Instance held that science must in principle be fought with science of a "level that at least commensurate with that of the opinion in question",[238] thus marginalising other public concerns against authorisation.[239]

EU efforts over the years to widen the debate– from within a risk- and safety-based framework – have been fragmented and largely ineffective. The Deliberate Release Directive (2001) stipulates that the European Commission should report every three years on socioeconomic impacts, taking into account information provided by Member States,[240] but the Commission indicated soon after adoption that there was insufficient experience to conduct such assessments.[241] As the biotech applicant is not prompted to provide socioeconomic data in the technical dossier that underpins risk analysis, a lack of evidence to inform a balanced debate in specific cases remains an issue to this day. Only in 2010, upon request of the Council,[242] did the European Commission publish for the first time a report that summarised concerns on socioeconomic impacts of GMOs for cultivation.[243] However, the underlying indicative questionnaire, which had to be completed by Member States' within a six-month period, sought to cover the impacts of all types of GM crops on a very diverse range of interest groups (e.g., farmers, seed producers, transport companies, consumers, food and feed industry, research institutes, etcetera)[244] resulting in "rather disparate" answer rates and a lack of "uniform" contributions of stakeholders.[245] The EU questionnaire and report made no mention of relevant human rights, and only Belgium's submission referenced international public rights agreements.[246] The Commission concluded that due to a lack of facts pertinent to the EU context, that the socio-economic impacts of GMOs "are often not analysed in an objective manner".[247]

[235] Compare Directive 2001/18/EC, Article 1 and Regulation 1829/2003, Article 1.
[236] Similarly, C Zetterberg and K E Björnberg, 'Time for a New EU Regulatory Framework for GM Crops?' (2017) 30 Journal of Agricultural and Environmental Ethics 325 and M Kritikos, *EU Policy-Making on GMOs: The False Promise of Proceduralism* (Palgrave Macmillan UK 2018), par 5.2.
[237] Regulation 1829/2003, Article 7(1).
[238] *Pfizer* (T-13/99), par 199; see also Janssen and Asselt 2013.
[239] Similarly, Geelhoed 2016, p 26.
[240] Directive 2001/18/EC, Article 31(7)(d).
[241] Reference to 2004 report in European Commission, 'Report on socio-economic implications of GMO cultivation on the basis of Member States contributions' COM(2011) 214, p 2.
[242] Council of the European Union, 'Genetically Modified Organisms (GMOs) ' 16882/08.
[243] European Commission, 'Report on socio-economic implications of GMO cultivation on the basis of Member States contributions, as requested by the Conclusions of the Environment Council of December 2008' COM(2011) 214.
[244] European Commission, 'Note for the Attention of the Permanent Representations' ENV.B3/YK/GM ARES (Annex 1 – Questionnaire).
[245] COM(2011) 214, p 3.
[246] European Commission, 'Commission Staff Working Paper Accompanying COM(2011) 214 final' SEC(2011) 481 final p 19.
[247] COM(2011) 214, p 8.

Whereas this language suggests an approach that seeks to fit considerations of a fundamental or social nature into risk regulation's science-based mould, the Commissions' exercise did lead to the establishment of the European GMO Socio-Economics Bureau which, in 2015-2016, published topics, methodologies and indicators for a potential general socio-economic impact framework and one specific to the cultivation of Bt Maize GMOs.[248] These findings to better accommodate social considerations at EU level were, however, overshadowed by the fact that by this point the Commission had adopted Directive 2015/14 as regards the possibility for Member States to restrict or prohibit the cultivation of GMOs.[249] The preparatory documents highlighted Member States' voting behaviour in comitology on arguably "non-scientific grounds" as a reason for the Commission to conclude that GMO cultivation was "more thoroughly addressed by Member States".[250] As analysed in Chapter 4, the Directive continues to enforce a model of centralised assessment and management of environmental risks,[251] but a new Article 26b introduces a two-phased procedure to allow Member States to restrict GM crops within their territories. Pre-authorisation, Member States may ask the applicant via the Commission to adjust the geographical scope of its application; a widely used procedure which raises further questions as to the relative power of the biotech industry beyond the economic context outlined above.[252] If the applicant does not consent, post-authorisation restrictions may be adopted for that GMO, or for a group of GMOs defined by crop or trait, based on compelling grounds such as those related to land use, socioeconomic impacts, agricultural objectives and public policy.[253]

On the face of it, the decentralisation put forward by Directive 2015/412 – or at least reiteration of the division of competences in favour of national and regional powers[254] – seems to be a welcome step under an ecosystem approach to bridge the gaps between local realities and top-down decisions on ecosystem management.[255] Equally, from a human rights' perspective, correlations between subsidiarity and human rights – which both seek to protect "the dignity of the human person *and* the diversity of human society"[256] – could mean that a decentralised approach is favourable. Nevertheless, there are physical realities that transcend Member States' boundaries, relating to cross-pollination, the transnational character of the biotech industry and other industries for agricultural inputs, and the EU/international market and regulatory forces (e.g., IP law), outlined in the previous section, that are increasingly shifting power to influence

[248] J Kathage et al, *Framework for the socio-economic analysis of the cultivation of genetically modified crops* (European GMO Socio-Economics Bureau, 2015); J Kathage et al, *Framework for assessing the socio-economic impacts of Bt maize cultivation* (European GMO Socio-Economics Bureau 2016).
[249] Directive 2015/412; see also Chapter 4, §4.5.2.
[250] COM(2010) 375, p 3 and 8; see also European Commission, 'Complementary Considerations on Legal Issues on GMO Cultivation Raised in the Opinions of the Legal Service of the Council of the European Union of 5 November 2010 and of the Legal Service of the European Parliament of 17 November 2010 (Indicative List of Grounds for Member States to Restrict or Prohibit GMO Cultivation)' SEC(2011) 184 on reasons related to the public interest.
[251] Chapter 4, §4.5.2; Directive 2015/412, Preamble 6 and 14, new Directive 2001/18/EC, Article 26b(3).
[252] §6.3.1. Note that at this stage in the regulatory procedure the biotech applicant has also been able to shape the content of risk assessment through the scientific evidence provided in the technical dossier, see Chapter 4, §4.4.1.
[253] Directive 2015/412 providing for a new Directive 2001/18/EC, Article 26b.
[254] PE462.539v01-00 which questioned the "added value" of decentralisation as foreseen in the proposals that preceded Directive 2015/412.
[255] Chapter 3, §3.4.4.
[256] P G Carozza, 'Subsidiarity as a Structural Principle of International Human Rights Law' (2003) 97 American Journal of International Law 38, p 41.

local agroecosystem management away from farmers to agri-industries for inputs. Furthermore, the exercise of national discretionary powers may be curtailed by requirements for legally sound restrictions that follow from EU law on the free movement of goods.[257] Cultivation restrictions that inhibit the use of GM seeds are likely to be "capable of hindering, directly or indirectly, actually or potentially intra-[EU] trade"[258] and, therefore, qualify as a measure having equivalent effect to a quantitative import restriction (MEE).[259] Although bans take immediate effect, they may be subject to infringement procedures or national proceedings brought by the biotech firm behind the specific GMO,[260] in which case Member States would then have to prove that their restrictions are justified and proportionate to the aims pursued.[261]

Whether some of the fundamental concerns outlined above can be framed as a justification of a MEE under Article 36 or the *Cassis de Dijon* doctrine – which recognises broad grounds of mandatory requirements of public interest[262] – it is, ultimately, for the Court of Justice of the European Union (CJEU) to decide on the merits, with no precedent yet. Crucially, purely protectionist aims are always insufficient,[263] but Member States could argue that the pursuit of economic objectives can contribute to the achievement of compelling non-economic aims.[264] Inspiration could be taken from the *Ospelt* case regarding Austrian land ownership restrictions, which justifiable aims to preserve "family farming establishments [and] the broadest possible, socially sustainable distribution of land ownership"[265] resemble some of the equitable reasons against concentration of power in the context of seeds.[266] Fundamental rights have also found recognition in the EU's mandatory requirements' doctrine,[267] and are thus capable of restricting the economic freedoms of the internal market. In practice, however, Member States have only very rarely been able to successful justify national restrictions on market freedoms,[268] with proportionality – as a general principle of EU law which holds that means used must be suitable (effective) and necessary to achieve the aim[269] – imposing the highest hurdle.[270] Overall, the

[257] Articles 34-36 TFEU; The Council of the European Union, 'Opinion COM(2010) 375' 15696/10; PE462.539v01-00.
[258] Case 8-74 *Procureur du Roi v Benoît and Gustave Dassonville* [1974] ECLI:EU:C:1974:82 (*Dassonville)*, par 5.
[259] Ibid, par 1.
[260] M Moore, 'Directive 2015/412 - judicial review of restrictions of cultivation of GMOs based on socioeconomic grounds' (How to maintain GMO-free agriculture in Europe, Budapest (Hungary), 2015).
[261] See also extensively: Geelhoed 2016, pp 29-33.
[262] *Cassis de Dijon* (C-120/78).
[263] *Decker* (C-120/95), par 39; Case C-203/96 *Chemische Afvalstoffen Dusseldorp v Dutch Ministry for Housing and the Environment* [1998] EU:C:1998:316, par 44.
[264] Case C-118/86 *Openbaar Ministerie v Nertsvoerderfabriek Nederland* [1987] EU:C:1987:424, paras 14-15.
[265] Case C-452/01 *Margarethe Ospel and Schlössle Weissenberg Familienstiftung* [2003] ECLI:EU:C:2003:493, par 10, see also paras 39-40 where the CJEU references the role of the CAP in informing these social aims.
[266] §6.3.1; note that the problematic role of IPRs and market concentration have been considered by some Member States in their analyses of socio-economic considerations relevant to GMOs: A Spök, *Assessing Socio-Economic Impacts of GMOs Issues to Consider for Policy Development. Final Report* (Austrian Ministry for Health, 2010).
[267] See on this topic: S A De Vries, 'Balancing Fundamental Rights with Economic Freedoms According to the European Court of Justice' (2013) 9 Utrecht Law Review 169.
[268] A Albors-Llorens, 'EU Competition Law and the Legacy of Cassis de Dijon' in A Albors-Llorens et al (eds), *Cassis de Dijon: 40 Years On* (Hart Publishing 2021), p 140.
[269] Case C-331/88 *Fedesa* [1990] EU:C:1990:391, par 13.
[270] Geelhoed 2016, p 32; M Lee, 'The Ambiguity of Multi-Level Governance and (De-)Harmonisation in EU Environmental Law' (2013) 15 Cambridge Yearbook of European Legal Studies 357; M Dobbs, 'Legalising General Prohibitions on Cultivation of Genetically Modified Organisms' (2010) 11 German Law Journal 1347.

two-tiered system under Directive 2015/412 does not take away from the need and potential for a reframing of the debate around GM seeds at EU level, integrating human rights concerns and, consequently, offering opportunities for meaningful participation for agroecological stewards that are most at risk of the widespread introduction of biotechnological innovations.

6.3.3. Towards a Human Rights Approach: Taking Inspiration from Norway

It is important to note that the framing around protection against safety risks, outlined above, was not undisputed at the inception of the EU's regulatory regime. In the negotiations of the earliest Deliberate Release Directive, the European Parliament had called for an obligation on biotech applicants to justify "the social desirability of the objective of the proposed deliberate release and assessment of possible alternatives to attain the same objectives",[271] and for national competent authorities to only authorise the GMO if "the social desirability of the objective of the release as well as the benefit of the particular release [were] demonstrated".[272] This has been interpreted as a much higher and arguably more politicised standard,[273] but one that would much more likely create a forum for the consideration of human rights in decision making. As the Parliament's amendments were not adopted, this section looks at the Norwegian system for the authorisation of GMOs, which provides for a form of socioeconomic assessment, to evaluate if such an approach could support more holistic integration of human rights.

In accordance with the Agreement on the European Economic Area (EEA),[274] the Norwegian Gene Technology Act follows the broad outline of the EU Deliberate Release Directive. Yet, although the Norwegian Act mirrors the Directive in the sense that it aims to prevent adverse health and environmental effects, a permanent exemption from the EEA Agreement also allows Norway to pursue the objective to ensure "that the production and use of [GMOs] take place in an ethically justifiable and socially acceptable manner, in accordance with the principle of sustainable development".[275] According to the Act, this means that in "deciding whether or not to grant an application, considerable weight shall also be given to whether the deliberate release will be of benefit to society and is likely to promote sustainable development".[276] In order to realise a purpose that is framed around safety *and* societal benefit/sustainable development, a system of parallel and linked environmental and social assessments has been put in place.

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[271] European Parliament, 'Report drawn up on behalf of the Committee on the Environment, Public Health and Consumer Protection on the proposal from the Commission to the Council (COM/88/160 - C2-73/88) for a directive on the deliberate release to the environment of genetically modified organisms ' A2-142/ 89, Amendment 28.

[272] Ibid, Amendment 31.

[273] G C Shaffer and M A Pollack, 'Regulating Between National Fears and Global Disciplines: Agricultural Biotechnology in the EU' (Jean Monnet Working Papers 2004), p 18.

[274] Agreement on the European Economic Area [1994] OJ L 1/3. It means that GMOs that are approved at EU level would be automatically open to commercialisation in Norway, *unless* Norwegian authorities put in place a ban of a breach of the Gene Technology Act, Section 10 *Genteknologiloven (Gene Technology Act)* and G K Rosendal, *Competing Knowledge Claims and GMO Assessment by the Norwegian Biotechnology Advisory Board* (Fridtjof Nansen Institute, 2007), p 4.

[275] *Genteknologiloven (Gene Technology Act)*, Section 1, which reads in full: "The purpose of this Act is to ensure that the production and use of [GMOs] take place in an ethically justifiable and socially acceptable manner, in accordance with the principle of sustainable development and without adverse effects on health and the environment."

[276] Ibid, Section 10.

Acting under the auspice of the Ministry of the Environment which also takes the final decision, two expert agencies provide advice, and social assessments (also called holistic assessments)[277] are conducted by the Norwegian Biotechnology Advisory Board (NBAB).[278] The latter is an independent body consisting of 15 to 20 Members, which are appointed on a personal basis or by nomination from public sector organisations, including scientists from social, legal and natural disciplines as well as representatives from a wide range of stakeholder interest groups including agricultural, environmental organisations and labour unions,[279] and observers from different government ministries also participate in board meetings.[280] The opinions of the biotech industry have been held to have become less important over the years,[281] and the NBAB's composition reflects "prevalent views within Norwegian public opinion".[282] That being said, the overview of current members on the NBAB's website, does still reflect a strong influence of external experts, albeit from a wide range of academic backgrounds.[283] Beyond participation in meetings, individuals and groups can provide inputs to the NBAB during the assessment period and its opinion is also made available afterwards for public comments.[284]

The NBAB holds that the Gene Technology Act's social criteria "represent prerequisites that alone could carry decisive weight against granting an application",[285] thereby reframing the GMO debate as one that considers safety risks and wider societal concerns on an equal footing. Although human rights are not explicitly referenced in the Act, implicit and explicit scope for inclusion of human rights-based (and agroecological) considerations follow from preparatory documents and the NBAB's interpretative guidelines.[286] Official recommendations submitted to the Norwegian Parliament in the drafting phases cited the need to found legislation "on fundamental norms [i.e.] human rights, the principle of equality and solidarity and on respect for ecological balance and the integrity of nature".[287] Crucially, the NBAB's guidelines apply its assessment not only to the GM product but also to "the production system in a broader sense, which includes the production line – from development and pilot production to processing in a production facility – and thereafter the marketing, sales and distribution of the finished

[277] *Herbicide-resistant genetically modified plants and sustainability* (NBAB, 2014), p 5.
[278] *Genteknologiloven (Gene Technology Act)*, Section 26.
[279] G K Rosendal, 'Interpreting sustainable development and societal utility in Norwegian GMO assessments' (2008) 18 European Environment 243, p 246. See also: 'The Norwegian Biotechnology Advisory Board' (*NBAB*, N.D.) <https://www.bioteknologiradet.no/english/> accessed May 2022.
[280] Rosendal 2008, p 246.
[281] Ibid, p 250.
[282] Ibid, p 251.
[283] 'Members of the Norwegian Biotechnology Advisory Board 2019–2023' (*NBAB*, N.D.) <https://www.bioteknologiradet.no/english/members/> accessed May 2022.
[284] R Binimelis and A Myhr, 'Inclusion and Implementation of Socio-Economic Considerations in GMO Regulations: Needs and Recommendations' (2016) 8 Sustainability 62 and A Roger, 'In the Public Interest? A Comparative Analysis of Norway and EU GMO Regulations' (2015) 24 Review of European, Comparative & International Environmental Law 264, p 268.
[285] *Sustainability, Benefit to the Community and Ethics in the Assessment of Genetically Modified Organisms: Implementation of the Concepts set out in Sections 1 and 10 of the Norwegian Gene Technology Act* (NBAB, 2006), p 7. See on this also Roger 2015, p 269.
[286] *Sustainability, Benefit to the Community and Ethics in the Assessment of Genetically Modified Organisms: Implementation of the Concepts Set Out in Sections 1 and 10 of the Norwegian Gene Technology Act* (NBAB, 2009) (earlier versions published in 2000 and 2006); *Insect-resistant genetically modified plants and sustainability (in Norwegian: Insektresistente genmodifiserte planter og bærekraft)* (NBAB, 2011); NBAB 2014.
[287] NBAB 2009, p 17 reference to (and translation of) 'Recommendation to the Storting No. 155 (1990-91)'.

product".[288] The 'benefit to community' criterium considers a GMO's specific purpose and whether it contributes to solving a societal problem, creates problems for existing production systems "whose existence should otherwise be preserved"[289] and if there are better solutions available.[290] The 'sustainability' criterium considers broader (including global and ecological) implications, including impacts on "basic human needs like food, shelter, health" and "just distribution" of benefit and burdens between generations and rich and poor.[291] Specific guidelines on herbicide-resistant GMOs are more explicit, raising questions regarding impacts on the right to sufficient, safe and healthy food, on farmers' living conditions and profitability, their rights to seeds and democratic rights, as well as ownership rights (including seeds and land).[292] Furthermore, the NBAB's guidelines recognise the crucial linkages between the environmental and social sides of risk, as they recognise that assessment and management of dangers to the environment involve fundamental decisions, e.g., whether evidence is *adequate* and whether risks can *reasonably* be assumed.[293] The exercise of precaution – including the interpretation of scientific evidence – is also recognised as a crucial part of social assessment.[294]

This framing holds real inspirational potential for the EU context and, indeed, social concerns of a fundamental nature have led to refusal of GM applications in Norway.[295] However, it must be noted that even with this innovative national regulatory regime, with an advisory institution that is showing willingness to be inclusive, there is still a need to reference a higher-level human rights frame to protect against misinterpretation, misframing and poor implementation. Notably, within the Norwegian system a risk remains that technocratic expertise trumps local ecological knowledge, as environmental risk assessment is separated from holistic assessment and no explicit reference to diverse knowledges is made in the relevant guidelines. Although it should also be borne in mind that simple inclusion of traditional knowledge within scientific systems that have not been adapted to accommodate different worldviews comes with risks of unfair burdens on knowledge holders and constraints of the further development of knowledge systems that are rooted in local practices and realities.[296] Whilst this supports the adoption of a comprehensive, alternative framing, in absence of evidence gathering and data of all relevant social and fundamental impacts, non-safety considerations that do not spell out the relevant human rights may risk being interpreted in exclusively economic terms. In this regard, recent proposals to reform the Norwegian system for the authorisation of GMOs in light of new gene-

[288] Ibid, p 7.
[289] Ibid, p 16.
[290] Ibid, pp 15-16.
[291] Ibid, p 14.
[292] NBAB 2014, table 2 and Chapter 4, with explicit reference to many international human rights treaties.
[293] NBAB 2009, p 8.
[294] Ibid, p 10.
[295] See, for example, S Kjeldaas et al, 'Public Consultation on Proposed Revisions to Norway's Gene Technology Act: An Analysis of the Consultation Framing, Stakeholder Concerns, and the Integration of Non-Safety Considerations' (*Sustainability* 2021) <https://www.mdpi.com/2071-1050/13/14/7643> accessed May 2022, p 2 with reference to a 2017 ban for maize; Rosendal 2007. Yet, also Spök 2010, p 8, who, similarly to Roger 2015 notes that health and environmental safety considerations remain the most important justification for a ban, with assessments sometimes coming to different conclusions than EU risk analysis.
[296] See, similarly, E Morgera and J Nakamura, 'Shedding a light on the human rights of small-scale fishers. Complementarities and contrasts between the UNDROP and the Small-Scale Fisheries Guidelines' in M Alabrese et al (eds), *The United Nation's Declaration on Peasants' Rights* (Earthscan 2022), p 74.

editing techniques should be mentioned.[297] On the face of it, the proposals seems to go further to elevate non-safety concerns by suggesting a new, tiered approach, which places a 'public moral review' that includes an evaluation of ethical justifiability – based on societal benefit, sustainable development and available alternatives – before environmental risk assessment, with the outcome of the evaluation determining the level of scientific assessment that is, subsequently, conducted.[298] Although this suggests greater opportunities to assess impacts on fundamental rights at an earlier stage in the procedures, scholars have stressed the NBAB's focus on the economic potential of new techniques and on 'naturalness' as a concept to inform social assessment – the idea of scales of genetic changes with on the lower end those GMOs with traits that could, in theory, be found in nature or be achieved through conventional breeding – to marginalise profound objections.[299] Put simply, the approach could allow for economic gains, especially when combined with arguably less invasive genetic changes, to be cited to bypass regulatory scrutiny for protection against ecological risks. In this regard, whilst taking the Norwegian example as inspiration, a human rights approach to risk regulation could be strengthened through recognition of the aim to protect human rights in the main regulation, the adoption of consistent, and clear guidance that spells out in inclusive terms what key issues need to be part of a holistic socio-ecological assessment to guarantee protection of all relevant substantive rights– e.g., right to food, the right to a healthy environment, farmers' rights to seeds – combined with strong procedural safeguards that allow for accessible, effective, and transparent representation of all stakeholders, and that are inclusive of all types of knowledge.

6.4 Reframing EU Organic Certification to Remedy Epistemic Injustices

The example of EU risk regulation for GMOs has highlighted how the use of a specific frame that describes the introduction of GMOs in EU markets and ecosystems as primarily an issue of safety, conceals fundamental concerns of a social nature – related to inequities of power, ownership and the distribution of costs and benefits – and impacts on farmers' ability to provide agroecological stewardship. This framing also means that agroecological farmers are excluded from participatory processes, with technocratic procedures being disrespectful of epistemic differences, and find little support within the regulations to challenge oppressive economic and legal structures that frustrate the holistic and democratic management of agroecosystems.

It was precisely the recognition for a need for wide reconciliation of ecological and social objectives and, conversely, the increasingly problematic power dynamics within an industrialised food system that inspired many organic pioneers. Broad agendas placed organic farming at the core of rural life and communities and highlighted interconnected needs for more public land- and capital ownership, better education, respect for land work and an appreciation of the imperative role of small (family or community) farms, to "encourage an attitude to the

[297] *Proposal for relaxation of Norwegian regulations for deliberate release of genetically modified organisms (GMO), with applicability also for EU legislation.* (NBAB, 2019).
[298] Ibid, Annex 1.
[299] Kjeldaas et al 2021, p 11. See, also, S G Carson et al, 'Public engagement in biotechnology innovation – the need for research and the role of ethics' in H Schübel and I Wallimann-Helmer (eds), *Justice and food security in a changing climate* (Wageningen Academic Publishers 2021), p 304 with regard to issues around the framing of public consultation questions that informed the NBAB's gene-editing proposals.

natural world which would have social implications".[300] Nowadays appreciation for the role of farmers in the organic movement is captured well in the principle of 'fairness' as formulated by the International Federation of Organic Agriculture Movements (IFOAM), which holds that "organic agriculture should build on relationships that ensure fairness with regard to the common environment and life opportunities […] at all levels and to all parties – farmers, workers, processors, distributions, traders and consumers".[301] Fairness, according to IFOAM, is characterised by equity, respect, justice and stewardship of the shared world, and organic agriculture "should provide everyone involved with a good quality of life, and contribute to food sovereignty".[302] Its effectuation is dependent on the "the involvement or representation of all stakeholders and it needs institutions of openness, transparency and participation".[303] Within the EU context, the principle has been translated into a vision for a supply chain in which farmers are paid fairly, value and power are distributed equally and environmental and social costs are internalised.[304] Overall, organic agriculture as a movement and a set of high-level international principles is framed in terms that suggest great potential for the radical countering of food system dynamics that undermine farmers' fundamental rights.[305]

However, it follows from Chapter 5 that, in practice, the position of farmers is paradoxically precarious within the EU regulatory regime for organic production. Contrary to largely private, national systems for organic certification that preceded the EU regulations, farmers only play a limited role in standard-setting – through official channels for stakeholder participation in EU law- and decision-making – and compliance control, marking a crucial shift from a bottom-up to a top-down approach to organics.[306] As a result, EU production rules have not only departed from their ecological foundations, as discussed in Chapter 5,[307] but altogether fail to implement equitable considerations that are relevant to strengthening the position of farmers – as agroecosystem stewards – in the food system. Indeed, as standards may unintendedly aid the adoption of on-farm practices that are contrary to ecological principles, the institutionalised regime for organic certification is also enforcing the disempowerment of many agroecological farmers by creating an exclusionary market which fails to capture the needs and knowledges of local stewards. This section will, firstly, reflect on the workings of the organic market and its implications for the position of agroecological stewards in light of relevant human rights. It will then reflect on the role of EU law, using different dimensions of (in)equity – distributive, contextual and procedural – to evaluate how the regulations are seeking to support farmers and where they are falling short. Lastly, this section will evaluate whether a human rights-based

[300] Conford 2001, p 89 on the philosophy of Lady Eve Balfour (founder of the Soil Association) and other organic pioneers; Chapter 8.
[301] IFOAM 2005.
[302] Ibid.
[303] Ibid, explanation to the Principle of Care.
[304] 'Fairness and transparency. Strengthening the position of more vulnerable actors in the food supply chain' (*IFOAM Organics Europe*, N.D.) <https://www.organicseurope.bio/what-we-do/fairness-transparency/> accessed May 2022.
[305] Similarly M Sligh and T Cierpka, 'Organic Values' in W Lockeretz (ed), *Organic Farming An International History* (CABI 2007), p 38.
[306] Chapter 5, §5.3.
[307] Chapter 5, §5.4.

frame could remedy these shortcomings, in particular, by exploring the advantages and disadvantages of more institutionalised support for Participatory Guarantee Systems (PGS).

6.4.1. Commodification of the Organic Concept: Distance and Disempowerment

To appreciate the framing of current EU regulations of organic production it is, firstly, helpful to recall how farms that use nature-based and -inspired practices and often operate at small-scale to accommodate a great diversity and thus complexity of crops, animals, and ecological conditions, were perceived within EU agricultural and rural policies. It follows from Chapter 3, that the post-war EU Common Agricultural Policy ('CAP') sought to increase outputs to address severe food shortages, and that the need for an EU-wide regime was founded upon notions of productivity, security, and progress.[308] Self-sufficiency ratios (domestic production to consumption) had been low in many nations during World War II,[309] and incentivising the consolidation of farms and the upscaling of practices intended to increase efficiency and provide short-term productivity boosts.[310] However, optimising the factors of production, notably labour, had another objective. The first Commissioner for Agriculture (1958-1972): the Dutchman Sicco Mansholt, believed that EU farmers' main issue was the fact that they were not part of developments for a better "standard of living and […] social life".[311] Where others viewed farmers' relative autonomy in relation to industrial workers as a great good,[312] Mansholt stressed comparatively low incomes and a lack of leisure time, to make the case that farmers needed alternative options.[313] Allowing people to move away from farming through a variety of policy measures, aimed notably at mobilising "many small farmers to release their land to those who want to stay farming and develop", would allow for a "good living" for all.[314]

Framing the social side of agriculture in terms of a lack of labour productivity – which is presented as an issue of (public food) security as well as an issue of (individual) wellbeing – has an impact on the relationship between humans and the agricultural environment. Arguably the message is one of almost physical division: 'a happy farmer is a non-farmer' who has given up his ties to the land to the benefit of someone with arguably bigger aspirations. On the consumer side, this separation has been further enforced by parallel creation of common, and increasingly globalised markets, which stress choice and abundance as wellbeing indicators, but which have little to say about the social implications of longer supply chains and physical distance between end users and agroecosystems. As described in the previous Chapter, certified standards for organic production initially aimed to give the organic farmer a fighting chance as public money and private markets had favoured industrial foods of which the true ecological *and* social costs were not reflected in the consumer price.[315] By accommodating an information

[308] See on the persistence of some of this rhetoric, for example, V Zahrnt, *Food Security and the EU's Common Agricultural Policy: Facts Against Fears* (European Centre for International Political Economy, 2011).
[309] Chapter 3, §3.1.
[310] The first objective of the CAP was and still is: "to increase agricultural productivity by promoting technical progress […] and the optimum utilisation of the factors of production" (Articles 33(a) EC; 39(1)(a) TFEU).
[311] S Mansholt, 'The Mansholt Plan' (1970) 59 Studies: An Irish Quarterly Review 404, p 406-407.
[312] See, above, §6.2 and Van Der Ploeg 2020.
[313] Mansholt 1970, p 407.
[314] Ibid, p 411.
[315] Chapter 5, §5.2.

asymmetry between farmers and consumers,[316] standards and labels allow the latter to make an informed buying decision, whilst it permits the producer to use a distinguishing organic logo, which grants access to premium prices as well as to forms of public funding under the CAP.

From an agroecological and social justice perspective, however, reliance on a niche market to secure widespread delivery of public goods,[317] is contentious. It means that the distinctive market value of organic products is, at least partly, based on scarcity,[318] equating sustainability with a quality available only to privileged, affluent people and conditioning its success on restricted supply and restricted market access. But competition and inequalities extend beyond farmer and consumer relations. As best described by Guthman, a paradox has arisen whilst the system that aimed to create more financial return for the farmer, now "introduces a climate of competition that either erodes the rent or shifts it to other players".[319] Research conducted in the USA has, shown increased concentration along organic supply chains with increasingly big firms appropriating wealth.[320] In this context, for example, the largest wholesaler of natural and organic foods, 'United Natural Foods Inc.' bought the largest conventional wholesaler SUPERVALU ($2.9 billion) in 2018.[321] Perhaps even more strikingly is the acquisition by Amazon, in 2017 ($13.7 billion), of 'Whole Foods Market' – which started as a small natural food store in Texas and which has operated in Europe since 2007 –thereby securing domination of the American organic retail market.[322] Whist EU figures may still be more diverse, large scale retailers now dominate organic markets in most Member States.[323] Recent evidence has found that, in France, supermarkets already account for 52% of the organic market with more mergers between organic brands to be expected,[324] in Spain the concentration of the market in the hands of the four major supermarkets and two large specialist chains have meant that smaller retailers are "struggling for survival",[325] and in Italy a "giant" in the distribution and retail of organic food has created what has been described as a "near-monopoly situation".[326] Added value is also capitalised by other actors in the supply chain, including processors, brokers and wholesalers, although distribution is very case (product, value chain and country) specific. An EU study on organic pasta and milk found that "farmers capture a relatively small

[316] S Padel, 'Introduction to Global Markets and Marketing of Organic Food' in I Karaklas and D Muehling (eds), *Deciphering Organic Foods: A Comprehensive Guide to Organic Food Consumption* (Nova Publishing 2016).
[317] On this characterisation in a regulatory context see also below §6.4.2.
[318] J Guthman, 'The Polanyian Way Voluntary Food Labels as Neoliberal Governance' (2007) 39 Antipode 456.
[319] J Guthman, 'Commodified Meanings, Meaningful Commodities: Re–thinking Production–Consumption Links through the Organic System of Provision' (2002) 42 Sociologia Ruralis 295, p 303.
[320] Howard 2021, Chapter 8.
[321] 'UNFI to Acquire SUPERVALU' (*UNFI*, 2018) <https://ir.unfi.com/unfi-acquires-supervalu/default.aspx> accessed May 2022.
[322] L Debter, 'Amazon Is Buying Whole Foods For $13.7 Billion' (16 June 2017) <https://www.forbes.com/sites/laurengensler/2017/06/16/amazon-to-buy-whole-foods-for-13-7-billion/?sh=300e19661958> accessed May 2022.
[323] *Organic Farming and Market in the European Union* (Agence BIO, 2019), p 15.
[324] S Senet, 'Future of France's organic products may lie in hands of large supermarkets' (8 January 2020) <https://www.euractiv.com/section/agriculture-food/news/future-of-frances-organic-products-may-lie-in-hands-of-large-supermarkets/> accessed May 2022.
[325] J Manson, 'Spanish organic sales stay strong, but indies 'battered' by supermarket competition' (12 January 2021) <https://naturalnewsdesk.co.uk/2021/01/12/spanish-organic-sales-stay-strong-but-indies-battered-by-supermarket-competition/> accessed May 2022
[326] J Sanders et al, *Distribution of the added value of the organic food chain* (European Commission, 2016), p 74.

proportion of added value" that does not differ substantially from conventional farmers, which "can partly be explained by similarities of organic with conventional supply chains".[327]

Power dynamics and the impacts on farmers are more studied and obvious in the upstream organic supply chain – as the organic sector should, at least in theory, be less dependent on off-farm agri-inputs – but issues also exist downstream, as illustrated by the topic of organic seeds. Whilst the EU organic seed market is more diverse than the conventional seed market – with 800 larger and smaller seed businesses and traders[328] – power imbalances follow from a chronic and severe lack of seed,[329] the regional concentration of supply,[330] requirements that farmers should only use seed that is multiplied in organic ways and increasingly restricted derogations from this rule.[331] Although seed-saving is not forbidden, farmers find themselves at the core of complex and often confusing interactions between EU organic regulations (below §6.4.2), general seed marketing legislation and intellectual property law (above §6.3.1), and research has shown that in all sectors – arable, vegetables, forages, fruit – the use of saved seed is far less common than the use of non-organic or organic supplied seed.[332] Whilst some laws have evolved in a direction that is more receptive of traditional seed systems – e.g. the inclusion of heterogeneous material in the new EU Organic Regulation[333] – others seem to create unhospitable environments – e.g. the withdrawn Regulation on Plant Reproductive Materials which threatened the free movement of local, landrace, heritage and unregistered seeds[334] and which may be reintroduced in 2022[335] – leaving many farmers in great uncertainty.

What this means for farmers on the ground can be illustrated with a case study conducted by Aistara on Latvian farmers (shortly after Latvia's accession to the EU), which describes how "farmers' jaws dropped as they listened to the upcoming changes" on the use of organic seeds, during the General Assembly of the Organic Agriculture Association.[336] Farmers' concerns related to the unavailability of organic seed and permits for use of conventional seed, rules on seed-saving and exchange, and overall requirements for double-certification under organic and seed law.[337] But impacts on farmers' rights to seeds and, more broadly, farmers' livelihoods,

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[327] Ibid, Abstract.
[328] S Padel et al, 'Can the Market Deliver 100% Organic Seed and Varieties in Europe?' (*Sustainability* 2021) <https://www.mdpi.com/2071-1050/13/18/10305> accessed May 2022, p 5.
[329] Ibid, p 11.
[330] Ibid.
[331] Regulation 2018/848, Article 53(1) which foresees in a phasing out of derogations on the use of organic seeds by 2036.
[332] Padel et al 2021, p 9, percentage of total seed use: 27% for arable, 10% for vegetables, 10% for forages and 4% for fruit.
[333] Regulation 2018/848, Article 13; see also more broadly Padel et al 2021, p 5 who, however, note that case studies show that breeding initiative are "mostly in their infancy and likely to be small" and that "the need for diversity in the new organic regulation illustrates a lack of alignment between the organic regulation and the general seed regulations".
[334] European Commission, 'Proposal for a Regulation on the production and making available on the market of plant reproductive material (plant reproductive material law)' COM(2013) 262.
[335] G V Essen, 'A New Seed Law for Europe – Or Then Again Not…' *European Seed* (European Seed, 31 August 2021) <https://european-seed.com/2021/08/a-new-seed-law-for-europe-or-then-again-not/> accessed May 2022.
[336] G A Aistara, 'Seeds of kin, kin of seeds: The commodification of organic seeds and social relations in Costa Rica and Latvia' (2011) 12 Ethnography 490, p 499.
[337] Ibid.

go beyond what follows from specific laws, as the whole organic concept – and the actors that dominate relevant legal, administrative and economic spaces – have distanced themselves from farmers and agroecological practices. In the Latvian case, one farmer stated that: "experience shows that the [Latvian] Plant Protection Agency would prefer that we buy foreign seeds, not [grow] our own… we can't even talk about the issue".[338] In other cases, disempowerment *vis-à-vis* other actors have been linked to a loss of farmers' knowledge and confidence.[339] Indeed, by directly engaging with global markets, the organic sector is not only losing links with local economies and communities,[340] but has marginalised the role of small-scale and/or agroecological farmers and their knowledge.[341] Where the previous Chapter showed that the organic concept has, since the 1990s, been framed by EU regulations, questions that remain are how their workings relate to procedural human rights and the integration of diverse local knowledges,[342] and which improvements could follow from a human rights-based approach.

6.4.2. Regulated Meanings: Organic as a Niche Market that Distributes Benefits

An understanding of organic as a market niche and part of the global market system – as opposed to alternative and broader notions of organic as a principled movement or a system that is characterised by a shared world view[343] – followed already from official documents related to the preparation and implementation of the first EU Regulation on organic production.[344] The 'niche market'-characterisation,[345] which was even early on occasionally already being linked to demand for quality products,[346] followed from the Commission's belief that organic farming was "unlikely ever to be as important as conventional farming [and] will develop mainly as part of agricultural diversification".[347] The Economic and Social Committee had also stated that the impact of organic production for the CAP was expected to be small as "organic production is always likely to be attractive and possible to a minority of farmers only".[348] These perceptions stood in stark contrast to the European Parliament's call for broad

[338] Ibid, p 502.
[339] E Tsioumani, 'Reimagining Agrobiodiversity Conservation and Agricultural Innovation from the Grassroots up: the Case of the Peliti Seed Network in Greece' in M Alabrese et al (eds), *The United Nations' Declaration on Peasants' Rights* (Earthscan 2022).
[340] H F Alrøe et al, 'Organic agriculture and ecological justice: ethics and practice' in N Halberg et al (eds), *Global Development of Organic Agriculture: Challenges and Prospects* (CABI 2006), p 79.
[341] See also E N and A Wals, 'Interfacing knowledge systems: introducing certified organic agriculture in a tribal society' (2009) 56 Wageningen Journal of Life Sciences 375 for empirical evidence from outside the EU; see, contrarily, on the workings of 'non-certified organic' systems (or agroecological systems): Alrøe et al 2006.
[342] Above §6.2.4.
[343] On these three meanings of 'organic' see H F Alrøe and E Noe, 'What makes organic agriculture move: protest, meaning or market? A polyocular approach to the dynamics and governance of organic agriculture' (2008) 7 International Journal of Agricultural Resources, Governance and Ecology 5.
[344] Regulation 2092/91. Also, Chapter 5, §5.2.1.
[345] Lynggaard 2006, p 130.
[346] COM(88) 338 final, p 15. Also, P Baillieux and A Scharpe, *Organic Farming* (European Commission, 1994), p 1. Characterisation of organic production methods in the context of demand for quality products was, however, a contentious matter that was not embraced by the European Commission until the mid- to late-nineties: Lynggaard 2006, pp. 130-131 and 152. See, contrarily, the strong wording of the 2007 and 2018 Organic Regulations, for example, Regulation 2018/848, Preamble 2.
[347] Baillieux and Scharpe 1994, p 24.
[348] The Economic and Social Committee, 'Opinion on the proposal for a Council Regulation (EEC) on organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs ' OJ C 182/12, par 1.6.

introduction of ecological farming,[349] based on the idea that "organic farming is not production for a particular niche, but is the most rational form of small-scale farming".[350] However, as a self-fulfilling prophecy, evaluation of the organic regulatory framework by civil society in the mid-1990s revealed that the regulatory framework lacked incentives to move towards organic production and simultaneous calls for complete conversion to organic farming were rejected.[351]

Within the 'niche market' understanding of organic, standards and certification play a crucial role as they *define* the specialised market.[352] Standards' content does not only affect farming practices but they "substantively influence who can participate in the sector".[353] Where the organic movement – like the agroecological movement – may have an idea on which types of farmers are best to deliver on systemic (social and ecological) sustainability and change, the use of standards that are increasingly developed outside of farmers' sphere of influence, creates a false sense of impartiality and openness. One may suggest that anyone could enter the market as long as they put in the effort to adjust to requirements for organic certification, but this fails to recognise economic pressures and power dynamics within the market,[354] as well as issues of a regulatory nature. As described in the previous Chapter,[355] such problems relate to production rules that favour narrowly defined health and environmental interests, reflect a bias for simple and often technocratic solutions rather than complex ones that are grounded in local knowledge and leave leeway for market entry for farms that resemble industrial counterparts, e.g., in size, level of specialisation and heavy reliance on external inputs.[356] Additionally, regulatory burdens related to bureaucracy and overcomplexity will weigh more heavily on those that are less well-resourced or connected, thus imposing a barrier to accessing certification benefits.[357]

Whilst it follows from Chapter 5,[358] that ecological thinking is receiving more recognition in the regulatory principles that underpin the 2007 and 2018 Organic – although translation into effective production rules is still lacking[359] – social values are still only sporadically integrated. The 2007 Organic Regulation refers to the concept of sustainable development and the need to guarantee fair competition, and transparency, but does not cover other once social concerns,[360] and it does not make mention of farmers. The 2018 Organic Regulation partly remedies these oversight by making explicit linkages with the CAP objectives, acknowledging the need for a fair return for organic farmers and the role of short distribution channels and local production in this regard – the encouragement of which is now included as an objective[361] – and the need

[349] A3-0311/90, p 37.
[350] Ibid.
[351] Lynggaard 2006, p 167.
[352] Alrøe and Noe 2008, p 14.
[353] J Guthman, *Agrarian Dreams. The Paradox of Organic Farming in California* (University of California Press 2004), p 142.
[354] Above §6.4.1.
[355] Chapter 5, §5.4.1.
[356] Also J Guthman, 'Regulating meaning, appropriating nature: the codification of California's organic agriculture' (1998) 30 Antipode 135.
[357] Chapter 5, §5.4.2.
[358] Chapter 5, §5.2.2.-5.2.3.
[359] Chapter 5, §5.4.1.
[360] Padel et al 2009, p 248.
[361] Regulation 2018/848, Article 4(f).

for rules and administrative processes that reflect the "resource capacity of small farmers".[362] However, apart from the new possibility of group certification as discussed in Chapter 5,[363] it is largely unclear how the EU seeks to implement social values, notably on the functioning of local economies within the internal market. The new Organic Action (2021-2027) could have provided for holistic thinking on the position of organics within the wider regime for EU agricultural and food policy and should be welcomed for its acknowledgement of the sector's potential to "boost social sustainability […] and support the development of rural areas".[364] Yet, social elements are missing from many actions, with a strong focus on trade agreements and research and innovation (artificial intelligence and blockchain).[365] The Plan also makes no mention of relevant rights, and the rapporteur for the European Committee of Regions raised concerns about a lack of a "local and regional dimension".[366] Although these observations mark striking differences compared to IFOAM's work on organic principles, which were developed through a bottom-up approach and incorporate farmers' interests in a comprehensive way,[367] IFOAM has also struggled to operationalise its ambitions due to the nature of its 'social justice' requirements which primarily define the relation between farmers and their employees.[368]

Where equity provides a bridge between the CBD's ecosystem approach and human rights, it is helpful to reflect on the elements of equity that the EU regime for organic production is delivering and where it is falling short. Providing organic producers access to premium markets and some forms of subsidies, to cover costs and to compensate for ecological and social benefits generated by organic practices,[369] reflect distributive notions. Yet, distributive inequities may follow from appropriation of value by other industries in the organic supply chain,[370] infiltration of the organic market by farmers that do not deliver ecological and social benefits in a holistic manner,[371] absence of a needs-based approach to distribution as rewards are based on total sales or, in the case of most subsidies, total amount of hectares (criteria that favour large-scale and often specialised producers),[372] and the exclusion of many farmers that provide

[362] Regulation 2018/848, Preamble 85.
[363] Chapter 5, §5.3.2.
[364] COM(2021)141 final, p 3.
[365] Ibid, p 10.
[366] F Southey, 'Europe's 'difficult target' of 25% organic by 2030: Is the Organic Action Plan doing enough?' (*Food Navigator* 2021) <https://www.foodnavigator.com/Article/2021/04/12/Europe-s-difficult-target-of-25-organic-by-2030-Is-the-Organic-Action-Plan-doing-enough> accessed May 2022
[367] About which Luttikholt 2007.
[368] IFOAM 2014, par 9. See, alternatively, H Alrøe et al, 'Organic agriculture and ecological justice: ethics and practice' in N Halberg et al (eds), *Global development of organic agriculture: Challenges and prospects* (CABI Publishing 2006), p 100 on the opportunities of and limits to the integration of fair trade and organic certification.
[369] 'FAQ - Why is organic food more expensive than conventional food?' (*FAO*, N.D.) <http://www.fao.org/organicag/oa-faq/oa-faq5/en/> accessed May 2022.
[370] Above, §6.4.1.
[371] Chapter 5, §5.4.1. on a lack of ecological benefits. See, also, on the lack of social benefits (and even basic protection of social rights) within some industrialised organic farms: 'Aldi unterbricht Geschäftsbeziehungen zu Großproduzent BioSabor in Andalusien nach langjährigen Arbeitsrechtsverletzungen' *LabourNet Germany* (18 March 2021) <https://www.labournet.de/internationales/spanien/arbeitsbedingungen-spanien/aldi-unterbricht-geschaeftsbeziehungen-zu-grossproduzent-biosabor-in-andalusien-nach-langjaehrigen-arbeitsrechtsverletzungen/> accessed May 2022.
[372] On a needs-based approach in the context of certification schemes: J S Tjajadi et al, 'Lessons from environmental and social sustainability certification standards for equitable REDD+ benefit-sharing mechanisms' (*CIFOR Infobriefs* 2015) <https://www.cifor.org/knowledge/publication/5587/> accessed May 2022, p 6.

agroecological stewardship, due to legal barriers and administrative burdens.[373] In this regard, it is important to note that UNDROP obliges States to "take appropriate measures to strengthen and support local, national and regional markets in ways that facilitate and ensure that peasants and other people working in rural areas have *full and equitable access and participation in these markets* to sell their products at prices that allow them and their families to attain an adequate standard of living" [emphasis added].[374] Indeed, market access is recognised as a key human rights issue for peasants, and other marginalised groups (e.g., small-scale fishers).[375] Where the dominance of long supply chains and a focus of EU agricultural and food policies on organic for delivering environmental aims means that the regulated organic concept is often used as a synonym for sustainability,[376] the exclusion of many agroecological farmers from the market for organic products impacts directly on their ability to have a decent standard of living.

Where it follows from the above that the content of standards and the specific workings of the certification system play a crucial role in securing market access and the equitable distribution of costs and benefits within food supply chains, the often-overlooked dimensions of procedural and contextual equity come into play. Procedural equity refers to fairness in decision-making processes, involving "recognition, inclusion, representation and participation",[377] whereas contextual equity concerns the wider social setting and questions of access, capabilities and authority.[378] As the previous Chapter shows that the position of farmers in standard-setting and certification has been marginalised as a result of EU institutionalisation,[379] following broader patterns of shifts in power and technocratisation of debates on sustainability that leave little room for local and traditional farmers' knowledge,[380] the question remains what a substantive and procedural human rights-frame could mean for agroecology in an EU organic context: if and how it could help prioritise the needs of agroecological farmers in organic certification.

6.4.3. Towards a Human Rights Approach: Exploring PGS

The relevance of human rights for organics follows from the transfer of standardisation and compliance control from the private to the public realm. Where EU legislation defines private relationships between producers and consumers and has implications for the distribution of private and public resources of a financial or more practical nature related, for example, to the availability of advice and opportunities for research, a human rights frame helps to reveal the fundamental choices – of distribution, recognition, and participation – upon with the regime for organic certification is predicated. In this regard, UNDROP holds that appropriate measures must be taken to promote the access of peasants and other people working in rural areas to a

[373] Chapter 5, §5.4.2.
[374] A/RES/73/165 (UNDROP), Article 16(3).
[375] See, for example, *Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication* (FAO, 2015b), par 7.6; see also D M T Denny, 'Human rights and market access' (2018) 15 Revista de Direito Internacional 203, p 210 on the exclusionary nature of voluntary but regulated sustainability standards and the disproportionate impacts on some (groups of) stakeholders.
[376] Chapter 3, §3.2 and Chapter 5.
[377] Mcdermott et al 2013, p 418.
[378] Ibid, p 420; see also Tjajadi et al 2015.
[379] Chapter 5, §5.4.
[380] Above §6.4.1.

fair, impartial and appropriate system of evaluation and certification of the quality of their products at the local, national, and international levels, and to promote their participation in its formulation.[381] Preparatory documents had made explicit links with the need for fair market systems, and the provision's inclusion followed from the acknowledgement of risks of market exclusion for small farmers and the need for safeguards to protect against the discriminatory impacts of generalised certifications that fail to distinguish between industrial and small-scale producers.[382] With regard to seeds, UNDROP also holds that certification schemes take into account the substantive rights and needs of peasants and other people working in rural areas.[383]

Considering the shortcomings of the EU regime on organic production,[384] this final section will assess the opportunities and challenges of Participatory Guarantee Systems (PGS) and the need for a more supportive role for EU legislation. Earlier versions of UNDROP had explicitly called for promotion and protection of local guarantee systems,[385] which is indicative of their potential for realisation of human rights. As briefly discussed in Chapter 5,[386] PGS are assurance systems that are locally oriented, based on the active participation of farmers and are built on principles of trust, networking, and knowledge exchange.[387] At international level, PGS have been called "one the most promising tools to develop local organic markets".[388] Examples can be found across the globe and have been well-studied in countries such as Spain,[389] France,[390] Japan and Chile,[391] Brazil,[392] and Morocco.[393] The institutional set-up and processes may differ greatly among PGS, reflecting a bottom-up approach that follows the preferences of local stakeholders, but shared elements include a common vision which sets the parameters for the relationship between participants (farmers, consumers and other stakeholders), transparency of procedures and decisions, trust-based compliance mechanisms, mutual learning opportunities, predominantly non-hierarchical/horizontal structures and, crucially, decision-making processes that aim to foster participation.[394] Possible benefits of PGS that are relevant to the implementation of an ecosystem and human rights-based approach include PGS' adaptability

[381] A/RES/73/165 (UNDROP), Article 11(3).
[382] Human Rights Council, 'Report of the open-ended intergovernmental working group on a draft United Nations declaration on the rights of peasants and other people working in rural areas' (2019) A/HRC/39/67.
[383] A/RES/73/165 (UNDROP), Article 19(8).
[384] Above §6.4.2 and Chapter 5, §5.4.
[385] Human Rights Council, 'Declaration on the rights of peasants and other people working in rural areas' (2013) A/HRC/WG.15/1/2, Article 10(4).
[386] Chapter 5, §5.3.2.
[387] May 2019, p 3.
[388] 'PGS. Frequently Asked Questions (FAQs)' (*IFOAM*, N.D.) <https://www.ifoam.bio/our-work/how/standards-certification/participatory-guarantee-systems/pgs-faqs> .
[389] López Cifuentes et al 2018.
[390] Lemeilleur and Allaire 2018.
[391] Loconto and Hatanaka 2018.
[392] F S D Anjos et al, 'The social construction process of food quality: the case of organic certification in Brazil' (Agriculture in an Urbanizing Society, Rome (Italy), 2015).
[393] S Lemeilleur and J Sermage, 'Building a Knowledge Commons: Evidence from the Participatory Guarantee System for an Agroecology Label in Morocco' (2020) 14 International Journal of the Commons 465.
[394] May 2019.

to local realities,[395] the empowerment of small-scale farmers,[396] better integration of diverse knowledges,[397] and, ultimately, access to local markets. Participation as a key characteristic will most often concern the general set-up of the PGS – which may concern itself also with non-certification activities such as lobbying and training – as well as all relevant steps in quality assurance: from standard-setting to certification and monitoring. For example, a study on three Spanish PGS observed that all had monthly general assemblies for priority-setting and the assigning of tasks to committees with rotating compositions which allow every member a chance to participate over time.[398] Unless standards are directly based on the IFOAM norms, participation in standard-setting may take different forms. For example, for the large, French PGS Nature et Progrès,[399] production rules are set by a technical committee with sector and consumer representatives, and they are adopted by the 'Conseil Fédéral' with members of 34 local groups. In the case of a new PGS in Morocco, all 68 participants (farmers, consumers, and retailers) were involved in the initial drafting process, with specific proposals adopted on a 'consensus scale'.[400] Participatory control, sometimes referred to as 'social control',[401] may be achieved through peer-to-peer farm visits for direct knowledge exchange and learning, audit and feedback by farmer-led committees,[402] and more long-term training programmes.[403]

However, it is recalled that PGS are not formally recognised under EU regulations for organic production.[404] Consequently, PGS members cannot use the organic term or logo and, therefore, they are excluded from the organic market and may face competition from certified products despite adherence to potentially higher and/or more locally- (socially- and ecologically) oriented standards. The EU's approach to PGS can be contrasted with the ten countries that recognise PGS as an official organic quality assurance system; equivalent to the third-party systems for organic certification that are regulated through national legislation.[405] Yet, although the absence of legislative recognition has been identified as a stumbling block for the upscaling of PGS in some EU countries,[406] lessons should be taken from the experiences obtained in other

[395] E Nelson et al, 'Participatory guarantee systems and the re-imagining of Mexico's organic sector' (2015) 33 Agriculture and Human Values 373.
[396] N Binder and C R Vogl, 'Participatory guarantee systems in Peru: Two case studies in Lima and Apurímac and the role of capacity building in the food chain' (2018) 10 Sustainability 4644; on other benefits and references to relevant studies see N Hruschka et al, 'The benefits and challenges of participating in Participatory Guarantee Systems (PGS) initiatives following institutional formalization in Chile' (2021) International Journal of Agricultural Sustainability 1, p 2.
[397] For example, Loconto and Hatanaka 2018, p 11 on integration of traditional knowledge of the Mapuche indigenous people in PGS standards.
[398] Cuéllar-Padilla and Ganuza-Fernandez 2018, p 5.
[399] See also Chapter 5, §5.3.2.
[400] Lemeilleur and Sermage 2020, p 471.
[401] Loconto and Hatanaka 2018, p 11.
[402] For example, López Cifuentes et al 2018; Loconto and Hatanaka 2018; Hruschka et al 2021.
[403] 'Participatief Garantie Systeem' (*Voedselteams*, N.D.) <https://www.voedselteams.be/over-pgs> accessed May 2022 referencing a two-year learning cycle with training, farm visits, monitoring and reflections. Yet, in a personal interview a representative from Voedselteams (PGS), Belgium ('Interview Voedselteams') indicated that the continuation of this programme has been frustrated by Covid and financial constraints.
[404] See, also, Chapter 5, §5.3.2.
[405] E Bussaca et al, 'Public Standards and Regulations' in H Willer et al (eds), *The World of Organic Agriculture Statistics and Emerging Trends 2020* (IFOAM 2020), p 152.
[406] M C Padilla, *Hacia un Sistema Participativo de Garantía para la Producción Ecológica en Andalucía* (University of Córdoba 2008).

parts of the world to determine whether integration of PGS into the EU organic regime – as an alternative/complementary but formally integrated system – is commendable. Indeed, some members of EU PGS have raised concerns related to the inability to preserve core principles under legislation, the imposition of formal, hierarchical, and bureaucratic structures,[407] and the great diversity of PGS which may still mean that some cannot fit within a legal framework,[408] particularly when members believe that there is a fine line between guiding and prescribing and that the latter may not fit a truly participatory system.[409] The examples of Chile, Brazil and Mexico – which formerly recognised PGS as 'organic' systems in 2007 (Chile and Brazil) and 2013 (Mexico) respectively – confirm the authenticity of such issues. For example, inclusion of PGS under Mexico's Organic Products Law was pushed by networks of local producers, but the process struggled to translate the ideological, "alternative, or radical elements of PGS into law".[410] In Chile and Brazil, regulatory requirements – for farmers, but also for the set-up and workings of the PGS itself –have been considered restrictive and complex.[411] And in Mexico the decision was made to only recognise PGS for certification of small farms that produce for local markets, but many fail to navigate burdensome conditions due to resource constraints.[412]

Yet, the above does not mean that there is no role for law and policy to play in support of PGS, as alternative, agroecological guarantee schemes that can exist alongside organic certification. There is a need for a broad range of stable resources, including multi-year financial support for the initial set-up phase,[413] and for long-term financial commitments if running-costs of a PGS initiative outweigh the carrying capacity of its members (to avoid duplication of the monetary barriers that mark many of the national public-private organic schemes in Member States).[414] A contextual perspective also emphasises the need for capacity-building, including externally facilitated support (e.g. through advice, training or funded knowledge-exchange programmes), to assist the PGS' organisation (e.g. institutional structures and decision-making processes),[415] and specific activities such as standard-formulation, control and monitoring, marketing and communication and learning programmes. Lastly, there are opportunities for EU policies on food and agriculture to recognise more broadly the value of PGS, thereby widening a vision on agricultural sustainability beyond certified organic, e.g., in the context of rules for basic and conditional payments, rural development (including start-up and conversion grants), food and biodiversity laws/policy (e.g., the current target for organic agricultural land by 2030 under the Biodiversity Strategy),[416] and land-use and reform policies. The fact that one PGS in Belgium interviewed for this Chapter indicated that it only ever received funding from social rather than

[407] López Cifuentes et al 2018, p 15.
[408] Interview representative Toekomstboeren (PGS), Belgium.
[409] I Källander, *Participatory Guarantee Systems - PGS* (Swedish Society for Nature Conservation, 2008), p 23.
[410] Nelson et al 2015.
[411] L E Cavallet et al, 'Participatory guarantee system, equivalence and quality control in a comparative study on organic certifications systems in Europe and Brazil' (*Ambient & Água* 2018) <https://www.scielo.br/j/ambiagua/a/X9KzrgKfvfdj6jpqRKSRP7z/?format=pdf&lang=en> accessed May 2022.
[412] López Cifuentes et al 2018, p 15.
[413] *How Governments Can Recognize and Support Participatory Guarantee Systems (PGS)* (IFOAM 2018b), p 6.
[414] Hruschka et al 2021, p 10; Chapter 5, §5.4.2.
[415] Ibid.
[416] COM/2020/380 final.

agricultural/environmental government departments,[417] signals a need for much better acknowledgement of the value for the agroecological sector for food system change in the EU and the part that PGS initiatives could play in channelling public support in this regard. The creation of an enabling EU regulatory environment, which does not force the integration of a system that is based on local and traditional knowledge and agroecological realities into a more top-down structure, but which recognises the value of PGS, reallocates public benefits and helps create accessible local and regional markets for sustainable food, would be in accordance with an ecosystem and human rights-based approach to EU law, in support of agroecology.

6.5 Conclusion

Despite calls from the European Parliament and the European Economic and Social Committee to support UNDROP[418] – institutions that have also, as discussed in Chapter 3, increasingly acknowledged the potential of agroecology[419] – most European Member States voted against its adoption in 2018. This Chapter has, however, argued that the rights enshrined in UNDROP as an international soft law instrument that heavily draws on binding international treaties, could have great value for the design of a biodiversity- and human rights frame in support of agroecological practices and transitions in the EU. Notably, it allows for the interpretation of rights that are protected under international and EU instruments that strongly resonates with rights holders (peasants, farmers and other rural workers), as UNDROP is the "result of an iterative, bottom-up, movement-driven process".[420] More broadly, it is at the intersection between biodiversity and human rights law, with the latter increasingly being framed to speak to the needs and struggles of those that have become marginalised within food systems, that there lies a huge potential to reimagine (EU) law on food production to prioritise the protection of ecosystem functioning and empower agroecological stewards to deliver on this objective.

Indeed, an integrated and holistic approach is required to advance agroecology and counter the destructive separation and segregation tendencies of an industrial food system. Such tendencies relate to specialisation on farms and in fields (separating horticulture, arable and livestock, and focusing on a handful of 'cash crops or cows'), externalisation and intensification of practices (replacing holistic management with reliance on off-farm inputs such as pesticides and seeds), separation of primary production from processing activities, and separation of producers from consumers through increasingly long supply chains and physical distances in a globalising market. Divisions also relate to the interpretation of fundamental notions, such as ownership (e.g., the privatisation of previously public seeds), authority (reliance on independent experts to shape management decisions) and knowledge (a bias towards a narrow understanding of science). Whereas law and policy developments could provide for a for comprehensive debate, and the integration of a great complexity of people and perspectives, they have often only

[417] Interview representative Toekomstboeren (PGS), Belgium.
[418] C Golay, *The Right to Land and the UNDROP. How can we use the United Nations Declaration on the Rights of Peasants and Other People Working in Rural Areas to Protect the Right to Land?* (International Land Coalition, 2020), p 17.
[419] Chapter 3, §3.3.1.
[420] S Narula, 'Peasants' Rights and Food Systems' in M Alabrese et al (eds), *The United Nations' Declaration on Peasants' Rights* (Routledge 2022), p 154.

strengthened and exacerbated more divisive trends in food production. Crucially, this Chapter has shown that this also concerns the very meaning of agricultural sustainability. Even though agroecosystems are shaped by humans, questions of environmental sustainability have become more and more disconnected from social questions of power, equity, and justice. Consequently, those farmers that are most well-suited to provide agroecological stewardship are not put in a position to make themselves heard at policy levels, to be recognised, and to reap benefits that could follow from regulatory measures, including better protection against oppressive forces.

Although integration – including integration of environmental and social considerations – is a key element of the CBD's ecosystem approach, this Chapter has argued that the use of human rights could enhance the effectiveness and, ultimately, (quasi-)justiciability of the guidelines, to elevate the position of agroecological stewards and agroecological knowledge. As illustrated by the case studies on EU risk regulations and organic certification in this thesis, reframing regulations in human rights' terms can have positive substantive and procedural implications. Normatively, a human rights-based frame does not only expose the fundamental nature of the interests at stake, but also opens avenues for epistemic diversity, thus allowing for formulation and substantiation of arguments beyond narrowly defined scientific claims. Procedurally, a human rights frame reveals the political decisions that underpin the design of participatory mechanisms (or the absence thereof); demanding a role for agroecological stewards in law- and decision-making and creating opportunities to explore alternative, more inclusive approaches. These findings – which place opportunities for agroecological stewardship and transitions at the nexus between biodiversity and human rights law – can be extended beyond this thesis' case studies, and some areas for further research will be briefly explored hereafter. Ultimately, realising agroecology's potential at local, national and EU levels is of global significance, as sustainable agroecological management and food systems contribute to food security and food sovereignty, environmental protection as well as the protection of everyone's human rights.

7 Conclusion

Six weeks before the official deadline to submit my PhD, in the middle of spring sowing and at a time where the stress of doing updates, revisions and footnotes within limited hours was high, my husband turned up at our front door with a ram lamb. This tiny sheep, only a few hours old, had seen a difficult birth as indicated by the meconium stains on his fleece and he had been rejected by the ewe. It was only the second year of lambing on the farm, which had started to look beyond its highly specialised focus towards the opportunities that could follow from diversification: e.g., the potential (re)introduction of sheep within the arable rotation to graze down winter wheat to avoid the use of chemical plant growth regulators (PGRs), to explore a more natural form of pest and disease control and to add manure to crop fields as a natural fertiliser. Undoubtedly, from a sustainability perspective I could only consider this a win, but on a personal and practical level, the lamb in front of me embodied additional responsibilities and, crucially, the difficulties that can accompany any transition in farming.

At the same time, the animal was also a gift that forced me to step away from my desk and to pause, which, in line with the analogy of a 'do nothing' approach to farming in the introductory Chapter, remains key to understanding the true value of research. Amidst the busyness of research, work, and family, and the final stages before submission when the 'get-it-done' voice inside my head silenced more sensible thoughts, it had become difficult to keep in mind why I started this PhD and why it matters. Yet, when feeding any infant – including this lamb that followed me around with the same persistence as my two-year old – it is impossible to be anything other than in the moment, and through bottle feeding sessions I regained appreciation for my big picture-approach which had not lost sight of the details. This thesis offers unique, high-level reflections on the potential of international biodiversity and human rights law to implement an agroecological approach to EU regulation of food production and agriculture. It also provides detailed analyses of what the suggested approach means in very specific cases, for implementing procedures and technical rules, and for local agroecosystems, communities, and farmers, identifying commonalities in problems and opportunities to distil conclusions and recommendations. In other words, it recognises the need for a normative shift towards a new paradigm: a system or model that puts the protection of ecosystem functions and equity at its core. Yet, it also acknowledges that at every transition stage, it remains crucial to consider the specifics of such an approach: the possibilities and barriers that lie in the nitty-gritty details and, ultimately, the positive or negative impacts of an overhaul on all interconnected ecosystem elements, from soil, and water, to plants, humans, and animals, including this young sheep.

Whilst this thesis recognises that dynamics of the food system are complex and influenced by diverse natural, political, social, and economic forces, it has focused on the role of law, policy, and institutional frameworks in shaping agroecosystem management, posing the question: *if, and if so, how, an ecosystem approach to EU law on food production and agriculture could support agroecology?* Whilst it has answered this question affirmatively, this thesis has argued that a complementary and comprehensive human rights frame is necessary to strengthen the ecosystem approach, to protect and empower agroecological farmers in support of ecologically sound and equitable stewardship. This final Chapter will first summarise how it came to this

conclusion, and how this thesis has made a unique and convincing contribution to existing legal scholarship, as well as a significant academic contribution to help advance the agroecological movement (§7.1). It will then look at how the combined ecosystem- and human rights-based framework that has been put forward in this thesis could expand its impact, exploring potential areas for future research, notably in relation to EU/UK subsidies, risk regulation and anticipated framework laws (§7.2). Lastly, this Chapter will bring the research back to the personal context, thereby coming full circle, by looking ahead to the future and outlining ambitions to continue to work with and for agroecology and a more inclusive regulatory environment (§7.3).

7.1 A Unique, Integrated Approach to Advance Agroecology

This research has taken a three-step approach to answering if, and, if so, how, an ecosystem approach to EU law on food production and agriculture could support agroecology. Part I of this thesis, firstly, examined the concept of agroecology and its meaning in a broad research, agronomic and socio-economic context, as well as in law and policy. It then explored synergies between agroecology and the core elements of the ecosystem approach as developed under the Convention on Biological Diversity (CBD). Part II applied this approach to two case studies: EU risk regulation (pesticides and GMOs) and EU regulations on organic production. Part III, lastly, proposed a complementary human rights-based frame for the reformulation of core considerations and the empowerment of agroecological stewards in law- and decision making.

7.1.1. Part I: 'Agroecology, Law and the Ecosystem Approach'

Chapter 2 first considered how a model of industrial agriculture has been formed by scientific, technological, and economic forces. It also brought together evidence of negative impacts that have followed from the adoption of an industrial food system to substantiate the need for a radically alternative approach. It then introduced agroecology as an interdisciplinary scientific discipline, a set of farming practices and a social movement, identifying as a key characteristic agroecology's reliance on ecological principles and processes – within the field, farm and food system and integrating environmental and social considerations – as a basis for sustainable management decisions. Chapter 3 has translated this succinct overview that is aimed to be accessible for lawyers to an analysis with relevance for law- and policymaking. It, firstly, gave insight into the role of EU law in shaping agricultural and food systems, using socio-legal scholarship on policy paradigms and some first reflections on some key EU food and agriculture policies to explain how the coming together of normative and organisational complexes – from policy values, goals and priorities, principles, problem-conceptualisation and framing, to processes and structures for decision-making and the distribution of authority – has created policy regimes that are supportive of an industrial food system. It then mapped current interactions between agroecology and law. Whilst this exercise is an important contribution to the very limited legal scholarship on agroecology – also using quantitative analysis on 130 explicit references to agro-ecology or agroecology to evaluate the uptake of the concept in EU law – the conclusion, ultimately, was that interactions between law and agroecology have been insufficient so far to be able deduce principles that could guide regulatory reform. Therefore, this thesis' offers legal scholarship and the agroecological movement new insights that go beyond explicit interaction between law and agroecology to

consider the relevance of ecological thinking and ecosystem centrality in law more broadly, focusing on the ecosystem approach under the CBD. Accordingly, it offers a unique, detailed analysis of the principles of the CBD's ecosystem approach and accompanying explanatory documents – categorised under three main elements of integration, conservation, and equity – in relation to principles of agroecology. Where it finds strong parallels, it puts forward the CBD's ecosystem approach as a framework of objectives and principles that could be implemented and mainstreamed across EU law and policy in support of agroecological reform.

7.1.2. Part II: 'Case Studies: Risk Regulation and Organic Certification'

Taking the ecosystem approach's element of conservation – the prioritisation of the protection of ecosystem functions – as the starting point for further analysis, Part II of this thesis looked at case studies on EU risk regulations (Chapter 4) and EU regulations for organic production (Chapter 5) to identify where evidence can be found of (agro)ecological centrality and thinking that could support the implementation of an ecosystem approach, and where the relevant legislation and procedures have been falling short. Despite a shared focus on tradable goods, the case studies are inherently different: risk regulations on pesticides and GMOs are concerned with restrictions of the use of potentially harmful technological inputs and they have from their inception seen a strong focus on science and top-down expertise as a basis for decision-making, whereas laws on organic production are concerned with regulation of sustainable practices and they originated from bottom-up initiatives for the creation of new markets. The use of similar structures for both cases has, however, allowed for the drawing of parallels and thus for the identification of systemic issues, which work has not been done before. Both cases reveal problematic core beliefs – e.g., a presumption of benefit for inputs (risk regulation) and niche market characterisations (organic production) – as well as non-environmental legal bases – e.g., internal market (risk regulation) and agricultural policy (organic production) – that may distract from the regulations' importance for achieving ecological sustainability. Nonetheless, the case studies saw an increased focus in overarching objectives and principles on requirements for high levels of environmental or biodiversity protection, highlighting principles of integrated management or the need to base decisions on ecological systems and cycles, and the obligation to implement the regulations' objectives in accordance with the precautionary principle. The case studies, however, also found that such high-level ambition has not been translated into concrete ecological action. Detailed analyses of technical implementing measures – e.g., guidance on risk assessment and methodologies, risk-management decisions (risk regulation), and production rules (organic) – and procedures, allowed for three key conclusions to be drawn.

Firstly, substantive implementing rules for protection of the environment, often only in very limited ways integrate ecological principles. For example, only in the case of pesticides has the relevant scientific authority recognised the relevance of ecosystem services for the formulation of specific protection goals, with concerns having been raised regarding narrow interpretations, the absence of methodologies that allow for systemic assessments, and the lack of endorsement by political authorities. Similarly, organic production rules have been criticised for a lack of integration of (ecological) values, thereby leaving scope for adoption of practices and farm structures that reflect industrial rather than agroecological approaches to land management.

Secondly, analysis of the case studies identified a heavy reliance on technocratic and external experts to inform rule-, decision-making and control as an impeding factor to the integration of local knowledge to prioritise the protection of ecosystem functioning. Whilst the bias of risk regulations towards certain sources of knowledge is well-studied, this thesis identified key elements of scientific risk assessment (e.g., choice of baseline, acknowledgement of uncertainty and integration of other legitimate concerns) where a lack of recognition for diverse knowledges is particularly problematic; more so because of the (almost undisputable) weight that is given to scientific findings when making political decisions for risk-management on the authorisation or restriction of use or control/monitoring of risks. Organic production has to a much lesser extent been the topic of legal study and this thesis thus provides new insights into a regulatory domain which is becoming increasingly complex. Notably, this thesis has shown that the EU's institutionalisation of the organic concept marks a significant shift from a bottom-up to a top-down approach to standardisation and certification that has made farmers the subject of production rules and control rather than active participants in formulation and effectuation.

Lastly, both case studies reflect an understanding of sustainability in agriculture and food production that separates environmental protection from questions and issues of social equity. EU processes for the authorisation of GMOs and pesticides leave the consideration of social and fundamental concerns to the procedurally and hierarchically second step in risk governance – after safety risks have been assessed – or to the discretion of national authorities. In the case of EU organic regulations, the content of production rules – narrowly defined by health and some environmental interests and missing a wider value base – and the workings of the system of EU organic certification and control have meant that some of the most ambitious agroecological stewards are competitively disadvantaged within or even entirely excluded from organic markets. In both case studies, the systemic marginalisation of agroecological farmers as a key social *and* environmental problem, required further study that was done in Part III.

7.1.3. Part III: 'The Added Value of a Human Rights Approach to Agroecology'

Taking as a starting point for analysis the central findings of the case studies – the absence of concrete action to protect ecosystem functioning, the lack of consideration for agroecological knowledge following the exclusion of knowledge holders, and the separation of questions of environmental sustainability from social inequities – the final part of this thesis explored the potential value of a human rights-based approach to foster agroecological practice and reform in the EU (Chapter 6). Building upon the idea of policy paradigms introduced in Part I, Chapter 6 used socio-legal scholarship on (mis)framing to help understand how a different narrative for sustainability in agriculture and food production – one built around human rights – could help to bring the socioecological interests and concerns of the agroecological movement into law- and decision-making processes and empower farmers to challenge inequities that frustrate best (local) practices and stewardship. In this regard, this thesis makes a significant contribution to the still limited legal work that has been done at the intersection of international biodiversity and human rights law (with in-depth analysis of the relevance of the right to food, the right to a healthy environment, farmers' rights to seeds and procedural rights for agroecology) to make a case for a comprehensive legal framework for agroecology. A human rights frame that builds

upon existing obligations within international and EU human rights instruments but that has been interpreted and elaborated from 'the bottom up' through UNDROP, combined with the guidance provided by the CBD's ecosystem approach, was held to be capable of limiting States' discretion regarding (in)action on the protection of agroecosystem functioning, enhance the justiciability of detailed obligations on biodiversity protection and enhance the position of ecological stewards. This thesis thus presented an innovative, complex but workable approach to strengthen the agroecological movement through law-, policy-, and institutional reform.

In line with the overall approach of this thesis, Chapter 6, moved from the bird's-eye view of international law to a focused analysis of how a human rights frame could be implemented in EU law. In this regard, it discussed two radical opportunities for reform. For EU risk regulation, with a focus on GMOs, this thesis situated local agroecosystem management decisions on the use of agricultural inputs within the context of the wider food system and the inequitable power relations within. It then explored the potential and limits of the Norwegian system for the authorisation of GMOs, which combines the assessment of environmental risks with a holistic assessment which emphasises the political choices that underpin risk management and which gives opportunities for the formulation of arguments in fundamental, human rights terms. At the same time, the section also recommended to look beyond the Norwegian example, to further elevate the position of local knowledge (holders) and provide guarantees against (mis)use and (mis)interpretation of social arguments in favour of short-term economic and productivist interests. In relation to EU regulations on organic production, this thesis showed that both the content and workings of organic regulations have undermined distributive equity – by restricting market access – as well as procedural and contextual equity through the institutionalised shift from a bottom-up to a top-down approach to rule-setting and compliance control. It was put forward that a human rights-based frame, in this context, could allow for better recognition and legal support for Participatory Guarantee Systems. The findings of this section are particularly useful for the agroecological movement and future legal scholarship on law and agroecology because the analysis of the merit of a high-level, framework, based upon biodiversity and human rights law, together with detailed evaluations on what the suggested approach *could* mean in specific cases, provides insights and tools that are useful for other (regional and national contexts) to further regulatory and institutional support for agroecology.

7.2 Opportunities for Future Research

With the adoption of UNDROP – an explicit recognition of the relevance of human rights for peasants as ecological stewards – as well as the increased momentum of agroecology in the EU – which requires us to think deeply about the essential elements of agroecology, so the concept does not lose its meaning – I believe that this thesis has great potential to help shape agendas for future research. It is my hope that the community of (environmental) lawyers and academics that are (getting) interested in agroecology, and food and farming more broadly, are encouraged by this thesis' analyses and findings to consider the opportunities that lie at the nexus between (international) biodiversity and human rights law, and to delve deep into the specifics of relevant laws, policies, and institutional frameworks to offer impactful recommendations for reform. Ultimately, I hope that the agroecological farming community and its representatives

may find that my writings offer new perspectives to further develop emerging legal arguments on human rights and ecological protection, that strengthen their position in legal processes.

This section will offer brief reflections on some specific areas for further work that occurred to me during my research and my practice-based activities, due to their particular and timely relevance for the agroecological movement. It will consider these topics and legal processes both at EU level and within the UK and Scottish contexts, as this broadened scope follows from my own journey as an EU lawyer that has made a home in a post-Brexit UK. This section will start with some reflections on the reform of agricultural subsidies: the CAP 2023-2027 and the divergent post-Brexit agricultural policies that are emerging in the UK's devolved nations. It will then briefly explore other topics of interest, starting with specific risk regulations that were not considered in Chapter 6, before moving towards the regulation of soil, nature, and food.

7.2.1. Agricultural and Rural Payments: The CAP and the Post-Brexit Options

The coming years are anticipated to see significant changes in the way agricultural and rural payments are distributed, as new systems are being designed and implemented in the EU and in the UK. As discussed in Chapter 3, the CAP is underpinned by a Treaty objective to increase agricultural productivity by promoting technical progress and ensure the optimum use of the factors of production; an aim that has not changed for 65 years.[1] Despite efforts to enhance the sustainability of the CAP, the Commission's recent decision to set aside ecological rules to arguably boost productivity in the face of war, emphasises an urgent need for a holistic approach that questions short-term actions in light of long-term aims to protect ecosystem functioning, that sanctions such actions due to the fundamental interests at stake (e.g., impacts on the right to food and the right to a healthy environment), and that allows for a conversation about who ultimately benefits, and who is likely to bear the costs. But beyond the potential of the framework proposed in this thesis to scrutinise specific decisions, it would also allow for analysis and reform of fundamental elements of EU agricultural policy that have frustrated ecological and equitable management. Indeed, inequity is a persistent issue in the context of agri-payments, caused primarily by a reluctance to acknowledge the full extent of impacts of funding policies on land ownership, and, consequently, on the relations between people and natural resources, and the power dynamics within rural spaces. EU subsidies have contributed to land concentration as direct income is calculated based on total farmed-area size in hectares,[2] resulting in a positive feedback loop in which owning more agricultural land results in more public support, creating more possibilities to finance and acquire more land. This also makes agricultural land a particularly lucrative investment opportunity, with many investors having little connection to farming or the rural community, and with local intervention by agroecological producers being frustrated by inflated land prices.[3] With regard to specific rules for payments, and as discussed in Chapter 3, there appears to be a disconnect between the social and environmental sides of farming, despite some promising innovations (e.g., redistributive payments and social conditionality).[4] Most concrete actions are, however, decided on at

[1] Chapter 3, §3.2.2.
[2] Parot et al 2021.
[3] Kay, Peuch and Franco 2015.
[4] Chapter 3, §3.2.2.

national levels through new CAP Strategic Plans, some of which are still under development.[5] As the development of the Strategic Plans has been guided by ten key (policy) objectives, which include those that ensure a fair income for farmers, improve the position of farmers in the food chain and preserve landscapes and biodiversity,[6] a useful exercise would be to evaluate the commitments of Member States in regard of an ecosystem and human rights approach.

Some of the opportunities and obstacles for reform can also be assessed against the backdrop of the design of new agricultural policies in the UK, following the Brexit vote in 2016. As the topics of agriculture and environment are devolved, the nations' departure from the CAP has been met with divergent (law, policy, and institutional) approaches. For example, in England, with regard to agroecology, an All-Party Parliamentary Group (APPG) on Agroecology was set up and it proposed an amendment to the UK's Agricultural Bill which sought to establish and maintain "whole farm agroecological systems".[7] Although this initial amendment was voted down, the Agriculture Act 2020 does seek to support a better understanding of agroecology.[8] Furthermore, the UK's Department for Environment Food and Rural Affairs (DEFRA)'s proposed Environmental Land Management Schemes (ELMS) are promising a move away from area-based payments, and the co-development and trialling of aspects of this new 'public money for public goods' initiative has seen involvement of agroecological farmers, which has allowed for inclusion of payments for agroecological actions on, for example, soil protection and agroforestry.[9] At the same time, in Scotland, progress on a new agricultural policy has been slow, with limited scope to challenge the problematic nature of direct payments that are of EU origin, and, as stated in the introductory Chapter, restricted engagement of agroecological farmers.[10] The examples of the different payment regimes highlight both the timely need to assess reforms comparatively to each other (e.g., within the UK devolved nations and under the new EU CAP system including new Strategic Plans), and in light of the potential of agroecology and the implementation of an ecosystem and human rights-based approach.

7.2.2. Other Areas of Interest: From Risk Regulation to Framework Legislation

Looking beyond the flagship agricultural policies, opportunities for further research, firstly, emerge from this thesis regarding areas of risk regulation that were not analysed in Chapter 6 on a human rights-based approach. Indeed, the (enhanced) example of the Norwegian holistic assessment for the authorisation of GMOs holds potential for EU risk regulations on pesticides, which were examined in Chapter 4, notably in its consideration of the distribution of costs and benefits of use, and the impacts on human rights, with a growing international evidence base

[5] *CAP Strategic Plans and Commission observations. CAP Strategic Plans and Commission observations* (European Commission, 2022).
[6] 'Key policy objectives of the new CAP. The ten key objectives' (*European Commission*, 2022) <https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/new-cap-2023-27/key-policy-objectives-new-cap_en#documents> accessed May 2022.
[7] *The Agriculture HC Bill (2017-2019) [292]* (United Kingdom, 2017), Amendment 41.
[8] *Agriculture Act 2020 (c. 21)* (United Kingdom, 2020), s 1(5).
[9] 'Response to DEFRA's SFI Announcement' (17 December 2021) <https://landworkersalliance.org.uk/response-to-defras-environmental-land-management-schemes-announcement/> accessed May 2022.
[10] Chapter 1, §1.1.3.

on such impacts.[11] There is a need for an approach to pesticides' authorisations that protects ecosystem functioning in a comprehensive manner, integrates all relevant and local knowledge, *and* considers the real-life need for the chemical, the absence of need and the availability of alternatives. For example, disparate discussions and actions at national levels on the use or restriction of Roundup as a desiccation spray (the pre-harvest practice to use cheap chemicals to speed up the aging of crops and to, ultimately, kill plants to allow for easier and earlier harvesting for consistent yields), despite advances in the development of non-chemical options such as 'traditional' but now mechanised swathing, emphasise this point.[12] The promotion and prioritisation of "integrated pest management and of alternative approaches or techniques" is already the subject of the current Sustainable Use of Pesticides Directive,[13] and the anticipated new regulation on this matter – which would aim to bring EU pesticides regulation in line with the goals of the Farm to Fork Strategy – could provide an avenue for further implementation of an ecosystem approach to redirect the EU's authorisation regime on pesticides.[14]

However, just how hard it is to break the cycle of framing issues of agri-input authorisation in narrow scientific terms, thereby excluding key stakeholders and inhibiting a more fundamental debates on the future of our food system, can be illustrated by both EU and UK (England) consultations and reporting on the deregulation of certain GMOs. These discussions aim to assess the adequacy of current regulations in light of speedy technological developments and often include the question whether gene-edited organisms with 'edited' qualities that can also be observed in nature should be exempted from (some forms of) regulatory scrutiny.[15] The focus of analyses has in most instances been on technical issues (to be assessed on a case-by-case basis) regarding the nature of techniques and products but only to a limited extent have they been concerned with impacts on power relations within the system. This is highlighted by the juxtaposed demands of the biotech industry to, on the one hand side, alleviate the regulatory pressures that follow from risk- and process-based authorisation procedures due to the natural character of the gene-edited organisms, whilst, on the other hand, calling for strong protection under (EU) IP law due to the novel character of the product and techniques that are concerned.[16]

Further-reaching impacts could, furthermore, be achieved if a combined ecosystem- and human rights-based approach was implemented in the context of potential future framework legislation that have been promised in recent years. The great benefit of this would be that if key aims on

[11] A/HRC/34/48. See on the relevance of human rights in relation to pesticide use, and explicitly citing UNDROP, also UN Human Rights Committee, 'Portillo Cáceres and Others v. Paraguay' (2019) CCPR/C/126/D/2751/2016.
[12] See, for example, 'Italy Places Important Restrictions on the Use of Glyphosate' (24 August 2016) <https://www.pan-europe.info/press-releases/2016/08/italy-places-important-restrictions-use-glyphosate> accessed May 2022.
[13] Directive 2009/128/EC, Article 1; see also Article 4(1).
[14] Note, however, that the launch of the new proposal has been postponed and leaked plans have been heavily criticised by civil society organisations: N Foote, 'Commission's leaked plans on integrated pest management slammed as too weak' *EurActiv* (8 February 2022) <https://www.euractiv.com/section/agriculture-food/news/commissions-leaked-plans-on-integrated-pest-management-slammed-as-too-weak/> accessed May 2022.
[15] See, for example, SWD(2021) 92 final; *The regulation of genetic technologies. A public consultation on the regulation of genetic technologies* (DEFRA, 2021).
[16] H-G Dederer, 'Patentability of Genome-Edited Plants: A Convoluted Debate' (2022) 51 International Review of Intellectual Property and Competition Law 681.

the prioritisation of the protection of ecosystem functioning and the fostering of equity and the protection of human rights were included in overarching legislation, this could have a trickle-down effect as long as spaces are created for the inclusion of agroecological knowledge (holders) at every implementing step, as the case studies in this thesis have shown. Potentially relevant framework legislation, firstly, concerns the EU Nature Restoration Law proposed by the European Commission in June 2022, following commitments in the EU Biodiversity Strategy,[17] which includes legally binding nature restoration targets.[18] The Commission's proposal holds that "sustainable, resilient and biodiverse agricultural ecosystems are needed to provide safe, sustainable, nutritious and affordable food" and it acknowledges agroecological practices for their multiple and significant benefits on the protection of biodiversity, ecosystem services.[19] The proposed Article 9 obliges Member States to "put in place the restoration measures necessary to enhance biodiversity in agricultural ecosystems",[20] and Member States must "ensure that the preparation of the restoration plan is open, inclusive and effective and that the public is given early and effective opportunities to participate in its elaboration",[21] thus offering entry points for an ecosystem- and human rights-based approach to agroecosystem management in the context of EU environmental law, with explicit links to the new CAP.[22]

Secondly, the recent EU Soil Strategy for 2030 announced a new Soil Health Law that is to be introduced in 2023.[23] The Soil Strategy itself reflects levels of integrated thinking by emphasising the benefits of healthy soils "for people, food, nature and climate",[24] and the impact assessment for the Soil Health Law will "assess requirements for the sustainable use of soil so that its capacity to deliver ecosystem services is not hampered, including the option of setting legal requirements".[25] Lastly, of great relevance for furthering agroecological transitions in the EU, is the anticipated legislative framework for sustainable food systems announced under the Farm to Fork Strategy.[26] The impact assessment that has preceded the proposal's launch, recognises problems related to the lack of legislative objectives and principles to guide regulatory action across the whole food system, and to improve sustainability.[27] It also stresses that problems (regulatory and market failures) are transnational and systemic, and that the legislation has potential both for reversing biodiversity loss, and for the achievement of the objectives of the Charter of Fundamental Rights of the EU.[28] If drafted and implemented holistically, the regulation could be what brings about the necessary shift in

[17] COM/2020/380 final.
[18] European Commission, 'Proposal for a Regulation of the European Parliament and of the Council on nature restoration' COM(2022) 304 final.
[19] Ibid, Preamble 49.
[20] Ibid, Article 9.
[21] Ibid, Article 12.
[22] Ibid, Preamble 53.
[23] European Commission, 'EU Soil Strategy for 2030 Reaping the benefits of healthy soils for people, food, nature and climate' COM/2021/699 final.
[24] Ibid, Title.
[25] Ibid, par 4.1.
[26] COM(2020) 381 final, par 2.
[27] European Commission, 'Inception Impact Assessment. Sustainable food system framework initiative' Ref. Ares(2021)5902055.
[28] Ibid, pp 7-8.

thinking to support agroecological food systems, although, regrettably, the focus on labelling, procurement and governance – albeit all important elements – suggests a narrow approach.

7.3 Playing my Part: Supporting and Facilitating a Bottom-Up Approach

During these six years there have been instances where I have – perhaps wishfully – wondered if the ending of the story would be one of a 'lawyer turned farmer'. As I started with a somewhat naïve understanding and interest in agriculture and food, I am finishing with not only a much deeper and profound passion for the protection of the agro-environment and rural life, but also a new conviction that I *need* to be part of it, to be able to live a fulfilled life. In a basic way, it is difficult not to feel drawn to farming as I have devoted more time than I dare to admit to a laptop. There is something inherently calming about spending a day with your hands in the soil or connecting with and caring for animals; nurturing other life and watching it grow. But my work has also brought to the forefront the hardships of food production, the pressures that come from all sides, e.g., weather, markets, law, and policy, and that are often dealt with in isolation, on top of a workload that see many work 7 days/week, and, at times, 16+ hours/day.

The lamb that occupied our laundry room for a day and night – who I had, against my better judgement, named Jasper to add to the menagerie of dogs and cat in the house – highlighted these tensions. On the one hand, having worked on abstract levels for so long, the experience was heartening. The touch of woollen curls, the strange new-born smell and the clumsiness of new life literally finding its feet, left me with a strong sense of what my work is fundamentally about: the creation of a space to connect with and be part of other life within ecosystems. On the other hand, the situation's physical and emotional demands were also sobering. The lamb required a level of dedication and knowledge that I struggled to deliver alongside other obligations. And as I was in floods of tears when, the following day, I dropped the lamb off at the neighbouring farm, I felt unsure whether I would ever be a good person to work this field.

On a professional level, however, I have come to recognise that to be part of farming and of a movement for change, I do not necessarily have to get my hands dirty in the literal sense. My time at the agroecological farmers' union was a humbling experience, as I worked amidst and with people with not only vast amounts of knowledge of complex and diverse agroecosystems but also an excellent understanding of the broader issues that frustrated their own work and the transformation of the food system more widely. Despite maybe some initial scepticism as to my agenda as an outsider, one of the local, older farmers that I worked closely with boosted my confidence when he said that what I brought – the policy and legal perspective – was exactly what they needed. When I had to leave the position to allow me to focus on this PhD research, I appreciated the sincere messages of thanks that I received, but fundamentally, the relationship was one of true co-creation: let me help you help me. Since us working together to translate practical experiences into messages which resonated with policymakers has, as stated in the introductory Chapter, given somewhat of an observational perspective to this desk-based study.

And this is where I hope to see my own future. I am keen to work on the topics that were highlighted in the previous section, in an academic or consultancy-based context, to help extend the knowledge base that is required to create law-, policy- and institutional environments that

are supportive of agroecology. I believe that there is a need for in-depth, desk-based analyses of relevant regulatory regimes, as offered by this thesis, which allow for identification of opportunities and limitations in high-level and detailed provisions. However, as a researcher, I would also like to evolve in a direction where I would feel better equipped to contextualise law and policy texts, and to understand their practical workings and impact (positive or negative). I believe that more interdisciplinary research achieved through cooperation is necessary, for which research centres such as the Strathclyde Centre for Environmental Law and Governance offer great potential. But I also feel that this area of legal study that sits between social, natural, and legal sciences, would benefit from training and education that integrates interdisciplinary perspectives and tools. Personally, I would like to learn about methodologies that are used in the social sciences, and, specifically, participatory action research which offers opportunities for direct cooperation with interest groups to identify key problems and codesign research questions, with an aim to advance knowledge in a way that directly supports participants' quest for (social, environmental, land or food) justice. Similarly, looking beyond academia, I would love to explore ways in which I can facilitate a true bottom-up approach. This thesis speaks about issues of reliance on technocratic and scientific expertise, but I fear that sometimes those issues are replicated when lawyers are tasked with formulating recommendations – in research, advice, or for evidence – for law- and policymaking and reform, that are far-removed from the most vulnerable. Not every lawyer will aspire to be an activist or lobbyist, but community law projects (such as environmental law clinics and the new Scottish Environmental Rights Centre) signal a need to better link the legal profession with local contexts. And under-tapped potential to make connections remains in areas of law-, policy- and decision-making on land, food, and farming. Let us build strength on strength by combining local, (agro)ecological knowledge with legal knowhow. Indeed, whilst recognition of the need for a combined ecosystem- and human rights-based framework, as analysed in this thesis, is an essential step to advance agroecology, the next step would be to really amplify voices that have for too long been missed or silenced.

A mountain lies ahead. I stand in solidarity with those who are willing to attempt the climb.

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