POSITION PAPER

Policies for agroecology in Europe, building on experiences in France, Germany and the United Kingdom

Nicolas Lampkin[1], Gerald Schwarz[1], and Stéphane Bellon[2]

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Nicolas Lampkin

Gerald Schwarz

Stéphane Bellon

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1 Introduction

Agroecology, first conceptualised in the mid-1920s, has recently been attracting increasing interest as an alternative to more industrialised forms of agriculture. However, there is a lack of consistency in definitions of agroecology, ranging from an academic discipline to a movement for the socio-economic as well as ecological transformation of agriculture. There is also a lack of clarity as to its relationship with other alternative agricultural approaches that have many principles in common, such as conservation agriculture and organic farming. This conceptual fluidity creates tensions in debates, but also makes agroecology attractive to policy makers and scientists who may be less comfortable with more rigidly defined approaches.

In this position paper, we explore some of the underlying issues and tensions, to see if it is possible to reach a common conceptualisation that can serve as basis for policy making. The authors have several decades of research experience in the development of organic farming and agroecology, and their integration into agricultural policy, both in their home countries and at the European level. Building on this, we explore how policy needs might be addressed within current proposed and planned European and national policy frameworks, with a focus primarily on the situation in France, Germany and the United Kingdom.

The choice of the three case studies reflects the knowledge and experience of the authors, as well as contrasting approaches to policy, with France recently promoting agroecology as such (Wezel and David, 2020), Germany strongly focused on organic farming, and the United Kingdom engaging with both on a more limited basis. A comparative analysis of agroecology in France and Germany has previously been undertaken by Wezel et al. (2009), although the policy and research landscape in both countries has changed since then. Policies for agroecology in the United Kingdom and France have previously been compared by Ajates Gonzalez et al. (2018). These three countries have also recorded the highest number of research publications on agroecology in a European context (Ollivier and Bellon, 2021).

Building on the case studies, this paper provides an updated, comparative analysis of the status of agroecology in the frame of agricultural policy in Europe. It is divided into three parts: first, it identifies multiple challenges regarding the concept of agroecology itself, including multiple and competing understandings of the concept. Second, it traces

[1] Thünen Institute of Farm Economics, Braunschweig, Germany
[2] National Research Institute for Agriculture, Food and Environment (INRAE), Department of Science for Action and Development, Paris, France
CONTACT: nicolas.lampkin@thuenen.de

recent policy changes in the three case study counties and asks what these mean for agroecology in Europe. Thirdly, it makes a number of recommendations on what the status quo means for future agroecology policies and transformative potential, including mentioning new policies and their potential impact.

2 Development of agroecology – concepts and practice

2.1 Definitions of agroecology

Agroecology has come a long way since it was coined as an academic term almost a century ago (e.g. Azzi, 1928). It now crosses a variety of social contexts (Wezel et al., 2009), while being internationalised and institutionalised (Doré and Bellon, 2019), and used by FAO, IFOAM and dedicated professional associations, including Agroecology Europe[3]. Legal and political frameworks for agroecology now exist in several countries, in particular Central and Latin America and the Caribbean, whereas in Europe only France has a specific policy programme.

The debate around agroecology is influenced by a number of contrasting definitions (Lampkin et al., 2015; Loconto and Fouilleux, 2019). From an academic perspective, the term can be interpreted as a research discipline, with a focus on the ecology of agricultural systems considered as agroecosystems. From a practitioner perspective, it can be interpreted in a more applied sense as the application of ecological principles and processes to the design and management of agricultural systems (agroecosystem management). But it can also be interpreted in the context of a social movement, including the transformation of socio-economic as well as technical processes in agricultural and food systems. For some, the transformative social movement definition may be seen as a strong vision, with the more agronomic focus seen as a weak vision (López-i-Gelats et al., 2016). HLPE (2019) and Wezel et al. (2020) identify a consolidated set of 13 related agroecological principles and recognise the diversity of actors (scientists, practitioners) and social activities involved in the transformation of food and farming systems. For the purposes of this paper, with its focus on policy perspectives, we have adopted this broader definition of the term.

2.2 Historical development of agroecology perspectives

From an academic perspective, three main periods in the development of agroecology can be identified:

1. The first period (1920–1970) is that of pioneers rooted in the scientific world (e.g. Azzi (1928) and Bensin (1940), with a focus on ecology applied to agriculture and the science of soil conservation; and Tischler (1965), with a focus on the biological regulation of pests). These researchers were relatively isolated and with limited audience despite their international perspective and their enrolment in various institutions.
2. The following period (1970–1990), from which the Californian (Gliessman, 2015), Latin American (Altieri, 1987) and Andalusian (Sevilla Guzman and Woodgate, 1997) currents of agroecology emerged, began with a social and political orientation together with its inclusion in dedicated curricula (Nicot et al., 2018) and a broader focus on the entire food system (Francis et al., 2003).
3. Finally, since the mid-1990s, agroecology has changed, in particular with the inception of numerous dedicated scientific institutions that produce an increasingly large and diversified volume of work (Ollivier and Bellon, 2021). However, its development is highly differentiated from one country to another, both in terms of interpretation and in the social areas where the concept is deployed. Flexibility in interpretation also allows agroecological approaches to develop in locally adapted patterns.

This historical development of the concept also illustrates the different conceptual definitions of the term, from agroecology as an academic discipline, to an agroecosystem management approach to farming and, more recently, a focal point for the development of a transnational coalition of actors promoting radically different agricultural and food systems, that involve a transformative approach also in the socio-economic arena.

As we explore further in this paper, these developments were not unique, but often parallel and intertwined with debates about other agricultural alternatives, including integrated pest management, conservation agriculture, organic farming, bio-dynamic agriculture, regenerative agriculture, agroforestry and permaculture. These have all developed over similar time-scales since the early 1900s as responses to the same challenges (e.g. dust bowls and soil conservation, pesticides and biodiversity conservation, global warming, animal welfare and social justice issues in food systems) and share many common perspectives. The development of agroecology also displays common features with the three-stage trajectory of the organic movement: first with pioneers, then with institutionalisation, and currently with the broadening of organic food and farming to address a wider range of challenges alongside other alternative agricultural approaches.

At the same time, the development of the concept and the emergence of a coalition of actors should not, however, mask the existence of tensions around agroecology, as illustrated for example by Ajates Gonzalez et al. (2018). Even if it is already old, its meaning is the object of a continuous work of redefinition, particularly during its implementation in politics. We are thus witnessing, in different contexts, dynamics of appropriation, re-signification (Rivera-Ferre, 2018) or re-differentiation of the actors around the concept.

In the next sections we examine the development of agroecology and its policy relevance in three European countries, in order to understand how some of these tensions within agroecology, and between agroecology and external interests, have been addressed.

2.3 Development of a national policy for agroecology in France

In policy terms, France has taken a lead in the development of agroecology, both nationally and internationally, including as the lead sponsor of the first FAO Agroecology Symposium in Rome in 2014. Between 2012 and 2017, the socialist

[3] https://www.agroecology-europe.org

Minister of Agriculture Stéphane le Foll, steadily pursued a public policy aimed at significantly changing the way agricultural production is carried out in France. The "Produire autrement" (produce otherwise) plan (MAAF, 2014a), launched in June 2012, carried the "agro-ecology" banner. Its main thrust was to organise collective changes in farmers' practices that would combine economic profitability and environmental performance. Social aspects were added later. The use of "agro-ecology" by the Minister was partly opportunistic, influenced by two professional agricultural groups that both use the term: that of ecologically intensive agriculture (Griffon 2014), and that of conservation agriculture (no-till techniques with permanent soil cover and crop diversification); overlooking the fact that social movements had previously used the term (Bellon and Ollivier 2012; Bellon and Ollivier 2018). France's national research institute, INRAE, designed a research agenda on agroecology in 2010, as well as other research institutions (e.g. CIRAD) (Caquet et al., 2020; Soussana and Côte, 2016), making France a European and global leader in agroecology research.

At the technical level, the agroecology plan has been built progressively along two tracks. The first was the inclusion of various support programmes for agricultural transformations that seemed compatible with the course set and with the term (MAAF, 2014b). This is the case, for example, of support for organic farming and agroforestry, or support for the reduction in the use of phytosanitary products with the 'Ecophyto' plan. New, or already in the process of being developed, elements have been added to this plan in relation to agricultural mechanisation, reducing the use of antibiotics in animal husbandry, and sustainable beekeeping. The second way, which allowed the Ministry to promote collective action, consisted in the establishment of economic and environmental interest groups (GIEE). The recognition of these groupings of farms facilitates access to French or European support schemes. 527 GIEE have been recognised since 2015, of which 492 were still active in 2019. They bring together around 8,000 farms and 9,500 farmers, or nearly 2 % of French farms.

France has bet on a "pacifying political rhetoric" (Arrignon and Bosc, 2020) aimed at embracing the widest possible range of actors. Although the concrete effects of this policy remain difficult to evaluate, or even rather inconclusive (e.g increased pesticide use despite Ecophyto's pest reduction objectives), the discursive work has borne fruit; for example, in legitimising agroecology in France and helping put it on the global agenda at FAO level (Loconto and Fouilleux, 2019). The various components of the Ministry's action have gradually been deployed to contribute to enhancing the threefold (productive, environmental and social) performance of agriculture: training (including trainers), research (and, more broadly, capitalisation of knowledge), and financial incentives (support to collective actions). However, in terms of the more radical, transformative visions of agroecology such as those from Terre et Humanism or Confédération Paysanne (Bellon and Ollivier, 2012; Calame, 2016), the policies still fall far short of what is hoped for, and represent a forced adaptation of the concept to fit existing policy programmes and priorities (Ajates Gonzalez et al., 2018). Within this national framework, situations differ among organisations. Some territories are considered as pioneer in transitions to more sustainable food systems, such as the south eastern organic 'Vallée de la Drôme-Diois' (HLPE, 2019). Some authors consider the performative indeterminacy of policy instruments as an asset for agroecological transitions (Lamine et al., 2020). These instruments enable supported farmers groups to build their own trajectory of change, which also entails difficulties in terms of implementation and evaluation.

2.4 Policies focusing on organic farming as an agroecological approach in Germany

In Germany, at the policy level, the focus of supporting transitions to sustainable farming and food systems is on organic farming and the term agroecology is not used in the existing strategies and schemes that promote sustainable farming. Policies in Germany indirectly support agroecological systems and promote agroecological transition (FAO, 2018). Building on the revised German Sustainability Strategy (Federal Government, 2016), a new "Organic Farming – Looking Forwards" Strategy has been developed involving the Federal States, the organic food industry and science (BMEL, 2019). The strategies aim to increase the share of federal agricultural land farmed organically towards the target of "20 % by 2030" and to facilitate the development of an appropriate policy framework and integration of a wide range of different support activities for organic farming and food.

Complementing the financial support provided to organic farming directly through the CAP's organic farming measure in the Rural Development Programmes, the Federal Scheme for Organic Farming and Other Forms of Sustainable Agriculture deals with the coordination of research on organic and other forms of sustainable farming and food production. Since its start in 2002, more than 1,100 research projects have been supported with a funding volume of some 170 million Euro. In addition, measures for knowledge transfer and advanced training programmes for value chain actors were implemented (BMEL, 2020).

Beyond the promotion of organic farming, the acknowledgement of the importance of agroecology is increasing in Germany as evidenced in discussion groups and conferences on the contributions of agroecology to sustainable farming organised by ministerial departments as well as a number of position papers published by non-governmental and civil society organisations. One prominent example is a position paper published by 59 organisations (INKOTA, 2019) calling for a transformation from industrial agriculture to agroecological farming and a commitment of the Federal Government to implement step-by-step agroecological principles in agricultural policy. In addition, a range of territorially-based initiatives support traditional and extensive farming practices and promote the implementation of agroecological practices. Examples include the Flowering Meadows scheme in Swabian Alb and the Landcare Association (Zilans et al., 2019).

In the academic discourse of the concept and importance of agroecology, recent studies (e.g. Wezel and Bellon, 2018;

Gallardo-López et al., 2018) argue that in Germany agroecology is mainly conceived as a science and largely operates within the realms of plant sciences, ecology and zoology. However, an increasing number of scientific studies and position papers highlight the need for a "greener" agricultural policy that promotes the implementation of agroecological principles and organic farming, aligned with contributions to the Sustainability Development Goals and based on smart, result-based indicators (e.g. Pe'er et al., 2020; SAB, 2019). Synergies between agroecology and organic farming need to be further utilised, converging their principles and practices to an approach that fundamentally transforms conventional agro-food systems (Migliorini and Wezel, 2017).

2.5 Contrasting approaches, but limited policy recognition in the United Kingdom

Agroecology in the United Kingdom has been promoted in different forms since the 1980s. From a natural science research perspective, the 'academic discipline' approach to agroecology is perhaps best represented by Rothamsted Research Institute's former Department of Agroecology[4], which was restructured in 2018 into Departments of Sustainable Agriculture and of Biointeractions and Crop Protection[5]. In 2011, Coventry University together with Garden Organic established what became the Centre for Agroecology, Water and Resilience (CAWR) in 2015[6]. Unlike Rothamsted, this academic Centre also had a high representation of social scientists, with a strong focus on the potential for the socio-economic transformation of agriculture, reflected in CAWR's 'Mainstreaming agroecology' paper (Wibbelmann et al., 2013). At the farm level, the agroecology concept is promoted most actively by the Landworkers' Alliance (LWA)[7], representing the more radical vision of international organisations such as La Via Campesina, as well as by the Oxford Real Farming Conference[8] and related initiatives.

These initiatives have developed in parallel, and sometimes in close association, with organisations for organic farming and research, like the Soil Association and the Henry Doubleday Research Association dating back to the 1940s, or the Progressive Farming Trust founded in 1980, as well as initiatives for Permaculture, Agroforestry, Conservation Agriculture (Allerton Trust) and Integrated Farming (LEAF). Reflecting this diversity of approaches, the Agricology website[9] was established in 2015, to help farmers access practical information on ecological approaches to sustainable farming, regardless of labels.

In 2014, the Land Use Policy Group of the UK nature conservation agencies commissioned a report (Lampkin et al., 2015) on the role that agroecology might play in sustainable intensification[10]. While acknowledging the social context, the report focused more on agroecosystem management concepts, consistent with the efficiency, substitution, redesign framework proposed by Hill (1985) (see also Pretty et al., 2018). In this concept, agricultural and associated environmental problems need ecological solutions, achieved by redesigning and managing agricultural ecosystems in preference to input reduction (efficiency) approaches, or replacing problem inputs with more benign alternatives (substitution). Building on this concept, the report argued that agroecology could be considered to be an inclusive framework for the range of alternative agricultural approaches that use at least some agroecological practices, though not all involve the complete rejection of agrochemicals. A subsequent report (Padel et al., 2018) looked into the process of transition at the farm level to these different agroecological alternatives. However, these reports were seen by others to be a weakening of the agroecology concept, at the expense of the social transformation agenda (Ajates Gonzalez et al., 2018).

From a policy perspective, there has been increasing discussion of agroecological perspectives as part of the debate over the UK's future agricultural and environmental policies following the 2016 referendum vote in favour of leaving the European Union. The All Party Parliamentary Group (APPG) on Agroecology has supported debates within Parliament and the LWA has produced detailed policy proposals (e.g. LWA, 2017), leading to some limited recognition in the Agriculture Bill debated in the UK Parliament in 2020[11]. However, there is some way to go in terms of institutional or financial support for farming, advice, training or research before agroecology or organic farming receive similar governmental policy recognition to that elsewhere in Europe (Lampkin and Sanders, 2021, in press).

3 Points of tension impacting on policy making

It is clear from the contrasting experiences even of these three case study countries with different levels of governmental support that the divergent interpretations of agroecology can impact on policy debates. Is agroecology mainly an academic discipline, an agricultural management approach or a social movement? Is it inclusive of a range of approaches advocated as options for improved agricultural sustainability, or a stand-alone alternative in an increasingly crowded space? Does it automatically exclude certain inputs, as many advocates believe, or is it flexible with respect to inputs provided that the underlying ecological principles are maintained? The issues are explored in some detail at a global level by HLPE (2019) and at a European level by Wezel and Bellon (2018). In this section we consider two of them: the social transformation agenda, and the relationship between

4 https://www.researchgate.net/institution/Rothamsted_Research/department/Department_of_Agroecology

5 https://www.rothamsted.ac.uk/science-departments

6 https://www.coventry.ac.uk/research/areas-of-research/agroecology-water-resilience

7 https://landworkersalliance.org.uk/

8 https://orfc.org.uk/about/

9 https://www.agricology.co.uk/)

10 Sustainable intensification is a term originally coined by Pretty (1997) to refer to agroecological approaches, but which subsequently acquired other meanings seen by many to be in opposition to agroecology. In part, this was due to weak conceptualisations of sustainability and concerns that intensification represented continuing with the status quo, rather than intensifying reliance on more sustainable and ecological processes.

11 https://services.parliament.uk/Bills/2019-21/agriculture/stages.html

agroecology and organic farming, which already has a well-developed policy infrastructure in a European context.

3.1 Agroecology and society

One way to question the policy relevance of agroecology is to ask what does it contribute, globally, to society? It is no longer just an issue of questioning the capacity of an agricultural system or practice to achieve a given set of objectives, but of understanding the wider contribution of the existence of agroecology and the debates it provokes. Agroecology, like organic farming and other related approaches, is a powerful driving force for reflection, nourished by its different facets. For agroecology, whatever its form, is a new way of "re-connecting" agriculture, science, the environment and society.

Debates about the conceptualisation and implementation of agroecology are still on-going in research institutions. The contexts of emergence and development of discourses on agroecology are manifold (Wezel et al., 2009), and a study of research institutions shows contrasting implications and internal controversies around different agroecological frameworks (Ollivier et al., 2019). At least two tensions are reflected in the framing of agroecology: firstly around the borders of science with politics, where different conceptions of scientificity are revealed; and secondly around the borders of science with the economic world, particularly when very diverse forms of agriculture coexist in one country (van Hulst et al., 2020). Previous studies on knowledge production regimes (Bonneuil and Thomas, 2009) show that research can be polarised by various players: academic ("excellence"), civic (sometimes consumerist), corporate (or professional), market and/or state actors represent different interests and priorities. Indeed, such categories can be combined. But considering agroecology as an innovative programme encourages us to explore new fields of knowledge, with transdisciplinarity integrating different forms of knowledge (Meynard, 2017) from life, earth, economic and social sciences, politics and practice.

Reality is somehow different. True transdisciplinary approaches in agroecology are scarce in European research (Fernández González et al., 2020). Scholars interact more with practitioners than with social movements, and mostly with work done outside Europe. There is also a strong disconnection and unbalanced participation between academic agroecology and agroecology as a movement (Wezel et al., 2018; Gallardo-López et al., 2018). The debates within the researchers' professional association Agroecology Europe show the difficulties of articulation between social movements and the scientific world, due to their different aims of action and temporalities. The former is focused on advocacy for the political and institutional worlds, while the latter is divided on how to articulate with the social question, which is reflected in the internal cleavage within agroecology between strong and weak visions, identified already in the 1980s (Hecht, 1987). Moreover, social sciences are often less integrated in agricultural research, with agroecology considered as a merger between agronomy and ecology, supposedly conveying a "hard" vision of agroecology (Dalgaard et al., 2003). In France, during the debate on the Law of the Future for Agriculture, Food and Forestry[12], the technicised vision conveyed by the Ministry was challenged by a new "Collective for a Peasant Agroecology"[13]. The Ministry's actions have had little impact on food sovereignty (apart from "territorial food projects") and agricultural markets, despite two attempts (inclusion of agroecology in official quality signs, and coupling of private labels with High Environmental Value certification). Arguably, the institutionalisation of agroecology in France has also impacted on the social movements by stabilising of networks.

Another drawback is the absence or weakness of frameworks that legitimise agroecological research in the formal regulations and political agendas, and of social recognition that closes the gap between research, policy and farming stakeholders acting at different scales in Europe (Wezel et al., 2018; Gallardo-López et al., 2018; Migliorini and Wezel, 2017; Monteduro et al., 2015). Forthcoming investments in both research infrastructure and science-society-policy partnerships at EU-level should contribute to bridge those gaps, reflecting increasing recognition and policy commitment.

3.2 Agroecology and organic farming

The development of agroecology has been strongly intertwined with that of organic farming and other alternative agricultural movements, including regenerative agriculture (itself a by-product of organic farming), agroforestry and permaculture. The organic movement has also been associated with a century long debate, also with an early focus on the soil, but to an extent with other players, with some key events where the two streams came together, for example the IFOAM Global conference in Santa Cruz in 1986. The different movements have both had a diverse mix of people (practitioners, researchers, other citizens) and issues (pollution, animal welfare, food quality, soil conservation, social justice/fairness) interacting with each other, so that there is considerable common ground between them. There is an argument that organic farming is a transitional stage en route to an agroecological future, or at least somehow less impactful and more constrained by certification and markets (Gliessman, 2015; HLPE, 2019; FAO, 2018), but this is difficult to sustain given the extensive debates in organic farming literature and research and development in several countries since the 1970s. It is also potentially counterproductive in the context of different and still conflicting definitions of agroecology and the challenges that agroecological producers have yet to resolve. FAO (2018) goes so far as to say that : "The deliberate and explicit consideration of the social and economic dimensions of food systems is one of the specific characteristics of agroecology that makes it unique compared to

[12] LOI no 2014-1170 du 13 Octobre 2014 D'avenir pour L'agriculture, L'alimentation et la Forêt (https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000029573022). Following this, agroecology is defined on the Ministry's website (but not defined in the law) as "the integrated use of nature's resources and mechanisms for the purpose of agricultural production. It combines the ecological, economic and social dimensions, and aims to make better use of the interactions between plants, animals, humans and the environment".

[13] https://www.bede-asso.org/wp-content/uploads/2014/10/Communique-agroecologie-paysanne-FR-ES-DE-EN1.pdf

organic agriculture". This ignores the substantial debates on social and economic aspects that have taken place in organic farming periodicals, conferences and standards setting forums over the last 50 years (see for example Lampkin, 1990) as well as the pioneering role of organic farmers in establishing new marketing models, including Community Supported Agriculture and other forms of shorter supply chains between producers and consumers.

One key point of difference is the development of specialist markets for organic products and the associated regulatory issues and corporate engagement. Although the biodynamic movement introduced Demeter certification much earlier, the organic market as such emerged in the 1970s, as a result of farmers needing to ensure the financial viability of their systems (in the absence at that time of any policy support). This was also a response to consumers becoming increasingly concerned about the health and environmental impacts of pesticides and other agricultural practices, with Silent Spring (Carson, 1962) representing one key turning point. However, the development of specialist markets for organic products led to the need to define standards, particularly because of the focus on defining production systems rather than the end product, in order to protect consumers and bona fide producers, and as the markets grew, states intervened with regulations to provide legal definitions. These standards and regulations focused, for understandable auditing and control reasons, more on permitted inputs and practices than on the underlying ecological principles of organic farming or the environmental and other social outcomes. While the focus on 'no chemicals' may have also reflected some consumer concerns and was simple to communicate, it has also adversely coloured the subsequent debate about the nature and role of organic farming. The growth of the market has also undoubtedly led to some commercial interests delivering the bare minimum required to meet organic standards, leading to the critique of the 'conventionalisation' and institutionalisation of organic farming (Darnhofer et al., 2010; Migliorini and Wezel, 2017). While this may be true for some organic farmers and supply chains, it ignores many others that go much further than the regulatory baseline, consistent with agroecological perspectives and the redesign principle. Arguably, the restrictions imposed by organic standards and regulations actually encourage this, as farmers need to be innovative and creative in finding ecological solutions to problems that can no longer be addressed by the use of agrochemical inputs.

In an effort to address this tension between its principles and the marketplace, the organic movement has in recent years put significant effort into refocusing on its agroecological roots, both in terms of the debate around Organic 3.0 (Arbenz et al., 2017), research agendas (Niggli, 2015) and position papers on organic farming and agroecology (IFOAM EU, 2019; INKOTA, 2019).

A challenge for agroecology more generally is exactly the same as that faced by organic farmers 50 years ago – how can the financial viability of agroecological farms be sustained, if the financial benefits of agricultural intensification are less accessible? There is already discussion around the development of markets for agroecological products, in particular in France, but this will face exactly the same dilemmas faced by the organic movement – the need for definitions communicable to consumers, the need for standards and regulations that can be audited, and the challenge of consistency with agroecological principles if premium markets are to be exploited. The same is potentially true for policy support options. Is it necessary to reinvent the wheel for agroecology? Why not recognise the commonality and work to both improve commercial organic farming using agroecological principles, and use the organic market and current policy support frameworks to support agroecological producers?

Despite the separate identities, there is a high degree of commonality between the approaches and their underlying principles (Lampkin et al., 2015; Lampkin et al., 2020). It is questionable whether they should be considered fundamentally different from each other. There is a need for bridge building between concepts, rather than creating hypothetical barriers, and it is important that future policy making takes this on board. However, while organic, regenerative, biodynamic, agroforestry and permaculture may be seen as closely aligned with agroecology, there is more of a debate about conservation agriculture, integrated pest management, climate smart, precision agriculture, circular agriculture and low input sustainable agriculture, where there is greater acceptance of agrochemical inputs. In contrast to Lampkin et al., (2015), who took a more inclusive perspective with respect to this second group, HLPE (2019) makes the distinction between agroecological and sustainable intensification approaches as separate entities. Resolving this debate, and the degree of co-option of the agroecology concept to mainstream policy and institutional perspectives, will be important for the coherence of future policy making.

The debates and tensions not only relate to farming methods, but also to issues of farm scale, corporate involvement and globalism. Many protagonists argue that small farms are in themselves more sustainable, and that agroecology can only be based on small farms, but this is not necessarily the case (Ebel, 2020). There are reasons why small farms may be less well placed to adopt agroecological approaches, not least due to limitations on specialist skills and experience and access to resources which larger farms may find easier to access. Agroecological management and system redesign approaches can also be applied on larger farms – indeed in regions where large farms are the norm, as in parts of the UK and Germany, it can be argued that an agroecological approach needs to engage with a farming structure that reflects the cultural and social characteristics and heritage of the region, rather than to attempt to re-impose a peasant farming system reflecting other human cultures. Similarly, while local, shorter food chains with direct interactions between producers and consumers may generate some benefits in terms of income retention in communities, reduction in food miles, freshness, traceability and communication, these are not necessarily guaranteed and potential impacts of climate on production methods, for example reducing the need for pesticides and energy inputs in drier or sunnier climates, might outweigh benefits from proximity.

4 Implications for future agroecology policies in Europe

Agroecology is currently marginal in the EU's Common Agricultural Policy (CAP) and in the policies of most Member States, including within their agri-environmental schemes. In the European context, the policy infrastructure to support organic farming, initiated in the late 1980s/early 1990s, represents the closest existing equivalent to a possible policy framework for agroecology. This includes regulations defining organic food and farming, financial support for conversion to and maintenance of organic farming, action plans to integrate supply-push (producer-focused) and demand-pull (consumer-focused) policies, and research and information programmes (Lampkin et al., 1999; Stolze and Lampkin, 2009; Meredith et al., 2018). These policies recognise and address the dual role of organic farming delivering both market opportunities meeting consumer needs and public goods for the benefit of wider society.

In order to support the more widespread adoption of agroecology to deliver environmental and social benefits as well as food and fibre, should policy makers focus on developing a completely new policy framework, in parallel to existing ones, or would it make more sense to adapt the existing policies for organic farming to encompass agroecological principles more explicitly? Critically, how important is a clear definition of agroecology to being able to implement any specific policies? The creation of an EU regulation defining organic farming (EC, 1991) was an essential pre-requisite for the inclusion of organic farming as an agri-environmental measure from 1994 (EC, 1992). Possible answers to these questions can be seen from recent European Commission policy proposals.

European-level agricultural and environmental policies are in a process of change, likely to be given new emphasis by the COVID-19 pandemic as well as the budgetary implications of Brexit. The proposals for a new CAP for the period 2021–2027 (EC, 2018), now due to be implemented in 2023, emphasised the delegation of responsibility for developing and implementing policy measures to Member States, in the context of a common framework of environmental, economic and social goals. The so-called "Green Architecture" of the new CAP comprises, in addition to the familiar Pillar 2 agri-environmental and organic farming policy support, new Pillar 1 initiatives for an enhanced baseline "conditionality" and in particular Eco-schemes that could provide a basis for supporting a range of multi-functional, agroecological system-based approaches (Lampkin et al., 2020). In a recent communication from the Commission to the European Parliament, an Agroecology Eco-scheme, including organic farming, but also more limited farming practice changes going beyond conditionality, was highlighted as one of four flagship Eco-schemes, the others being agroforestry, precision farming and carbon farming (EC, 2020c).

As part of the implementation of the European Commission's Green Deal, the Biodiversity and Farm to Fork Strategies (EC, 2020a, 2020b), are intended to be the starting point of a new debate on formulating a more sustainable and biodiversity friendly food policy, encouraging agroecology and in particular ambitious targets for the further expansion of organic farming to 25 % of EU land area by 2030. These strategies cover most of the key areas identified here and require coordination between agricultural, food, environmental and public health policies and collaboration of stakeholders across those sectors. The key challenge will be how they are realised in practice, and the extent to which member states and their regions are enabled/required to integrate them in their CAP strategic plans.

The ongoing debates over these strategies and the new CAP will offer an important opportunity for European, national and regional institutions and policy-makers to address the systemic flaws of a sectoral CAP and to align the CAP towards with the principles of sustainability, multifunctionality and public payments for public goods (Pe'er et al., 2020; ECA 2020). The potential for a sustainable agroecological transition of the whole food system will not only depend on agricultural policies, but also on other policies supporting the establishment of values-based food chains (Stevenson and Pirog, 2008), a shift in production systems supported by dietary changes (Walls et al., 2016; Poore and Nemecek, 2018) and the protection of natural resources (Wezel et al., 2016). Such a synergistic combination of action and policies to supporting agroecological transitions would address the need to reduce food loss and waste and to improve the resilience and robustness of the food system in particular by diversification (SAM, 2020) and be coherent with the ambitions of the new EU Green Deal.

In summary, a transformative policy for agroecology in Europe should:

- encompass agricultural, environmental, food and public health policy, tackling the whole of the food system in a synergistic approach;
- address technical issues, including reducing the use of problematic inputs and practices, for example by encouraging more use of legumes fixing nitrogen biologically to replace synthetic nitrogen fertiliser use, with a focus on whole farm systems, not just individual practices or commodities;
- foster diversification of production and food systems, as well as farm autonomy and adaptive capability, to improve farm resilience and capacity to absorb shocks;
- integrate biodiversity and habitat conservation within farming systems, as well as the conservation of natural resources, with a land sharing approach to agriculture and the environment (Pe'er et al., 2020; Lampkin et al., 2020; IPBES, 2018);
- tackle questions about the role of livestock in farming systems and human diets (Aubert et al., 2019), with a focus on complementarity and moderation of consumption;
- address issues of economic exploitation and power relations as well as problems of overconsumption and food waste in food chains, with implications for public health, social justice and food security;
- consider shifting the emphasis of support from land area to people employed in agriculture and related food businesses, which would make it possible to favour "job-rich"-

farms, with the capacity to implement environmental and other public good actions;
- support the process of transition, in particular recognising the different stages and the need for both learning new approaches and 'unlearning' previous convictions, requiring a fresh approach to advice, training, education and information services, for practitioners, their support agencies and more widely in society (Padel et al., 2020).

Achieving this will require broader coalitions, recognising the common ground and shared roots of agroecology, organic farming and related ideas, and building on rather than duplicating what has already been achieved. Addressing the green recovery from COVID-19 and implementing the new CAP, Green Deal and related strategies seems a good place to start.

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