



Agroecology TPP

Agroecologically-conducive policies

A review of recent advances and remaining challenges

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1 Introduction

Even before the current global COVID-19 health crisis — whose potential long-term impacts on food systems are still unclear (Béné et al. 2020; Knill and Steinebach 2022) — experts from several areas have pointed to a ‘global syndemic’ characterized by the confluence of environmental degradation, climate change and the triple burden of malnutrition (Swinburn et al. 2019; Willet et al. 2019). According to numerous studies, the behaviour of some private sector actors and the eating habits of a significant part of the world’s population, combined with insufficient government action, is leading to significant loss of biodiversity and ecosystem function (Wagner et al. 2021; Rampino and Shen 2019). Hence, there are increasing demands for concerted actions or initiatives that will simultaneously tackle the many dimensions of this complex problem. The argument is that solutions focused on single issues will be insufficient and may even worsen other aspects of the global syndemic. Historically, single-issue agricultural policies that favoured industrial approaches, while contributing to reducing hunger, also generated externalities that contributed to environmental degradation, climate change (IPCC 2019) and — when associated with the concentration of a few commodities and ultra-processed food consumption — negative impacts on public health (Monteiro et al. 2019; Vandevijvere et al. 2019). These facts have generated a vigorous discourse among governments and other stakeholders on how innovative farming practices and the development of food value chains could promote healthy, sustainable and inclusive food systems (HLPE 2020; FAO et al. 2020; IFOAM-Organics International 2017; Blay-Palmer et al. 2019; Lamine et al. 2019).

This discourse has boosted ‘agroecology’ as an approach, and it now appears in the lexicon of many organizations (Loconto and Fouilleux 2019; HLPE 2019). Agroecology has become an important reference for public policies in several countries, mainly in contexts where grassroots movements actively participate in designing food-policy instruments. Unlike other current concepts such as ‘climate-smart agriculture’ and ‘nutrition-sensitive agriculture’ (Burlingame and Dernini 2018), agroecology is supported by a global network of social organizations (Canfield, Anderson and McMichael 2021; Pimbert, 2015). These organizations have engaged with policy processes led by the UN Committee on World Food Security (CFS) and have developed a basis for two-way ‘policy transfer’ between international and national actions. Some of Brazil’s public policies are linked to such engagement, for example (Niederle 2020). These policy transfers lead to the development of public policy instruments designed to favour agroecology and adapt to new contexts (Sabourin et al. 2018).

The development, implementation and scaling up of agroecological practices requires an appropriate enabling environment. In fact, favouring agroecological practices often requires overcoming structural constraints that lock in conventional models of agricultural improvement, necessitating fundamental shifts in the ways food systems function and are organized (HLPE 2019). One of the principal bottlenecks constraining agroecological transitions beyond the availability of context appropriate technical solutions is whether the right policies can be put in place to enable their adoption at scale and in a transformational way (Sinclair et al. 2019). The purpose of this paper is to provide a review of recent advances in policy developments that might be conducive to agroecological transitions and to explore the associated challenges to their implementation.

In recent years, policies specifically designed to support agroecology have emerged in a few countries such as Argentina (Patrouilleau et al. 2017), Brazil (Niederle et al. 2019), France (Hubert and Couvet 2021), India (Dorin 2021), Nicaragua (Fréguin-Gresh and Sabourin 2019) and Senegal (Boillat et al. 2021; Bottazzi and Boillat, 2021). There are other examples of policies that — despite not mentioning agroecology specifically — incorporate instruments to support agroecological principles or practices and therefore are supportive of agroecological transitions. These policy instruments have different natures, scales, and objectives; they are either oriented towards production or consumption, commercial activity or environmental protection, value chains or territorial dynamics (IFOAM-Organics International 2017). Nevertheless, it is still rare to find a concerted set of policies that address systemic challenges with food production, the environment and public health. It is even more rare to find studies analysing the effects of these policies or their performance (e.g. World Future Council 2018).

By reviewing the global literature — along with a few deeper insights from Brazil, India, Senegal, France and Nicaragua — this paper aims to fill an important knowledge gap related to advancing policies in support of agroecology.¹ By public policies, we mean laws, decrees and regulations, as well as strategies, plans or investment programs with specific policy measures or instruments that are implemented by or with support from state actors. These implementations may occur at the regional, national or sub-national levels. This definition does not aim to hide the importance that private actors and civil society organizations have in the different phases of policy design, implementation, and monitoring, but emphasizes a concept of public policy that requires the presence of the State (Mény and Thoenig 1989). Agroecological transitions must be context specific and address the whole food system from production to consumption. Because of this, we identify and classify conducive policies as one of five types: (1) **consumer-oriented**, (2) **producer-oriented**, (3) **market- and food-environment-oriented**, (4) **macro and trade-oriented** and (5) **cross-cutting**. Each of these are considered to the extent that they are aligned with a set of principles that guide agroecological transitions, hereafter referred to as ‘AE principles’ (HLPE 2019).

In recent years, there have been international efforts to build a consolidated concept of agroecology. Two major initiatives were the FAO Global Dialogue on Agroecology and the High-Level Panel of Experts (HLPE) on Food Security and Nutrition. Both of these brought together social organizations, experts and policymakers from different countries and resulted in two reports with complementary lists of agroecological elements and principles (FAO 2018; HLPE 2019). The AE principles, incorporate the AE elements but are more explicit and so can be used to guide the development of agroecological practices adapted to local contexts through co-creation of knowledge with local stakeholders (Wezel et al. 2020). Therefore, without limiting our attention to farmers and organizations that identify themselves as ‘agroecologists,’ this paper aims to understand how public policies induce context-specific transition pathways for actors who are still predominantly engaged in other practices but are willing to engage with an agroecological vision of healthier and more sustainable food systems (HLPE 2019).

¹ These are countries that, according to the literature, have some of the most experience developing public policies that support agroecological principles. Moreover, we have been conducting case studies in these nations for several years across different initiatives.

2 The current problems with food and agricultural systems that agroecology seeks to overcome

For the last 40 years, civil society organizations and academics have been pointing out a series of problems created by so-called ‘industrial agrifood’ (also known as ‘modern agriculture’, ‘high-external input agriculture’ and ‘resource-intensive agriculture’). Industrial agriculture was promoted by public policies after WWII — first in the US and Europe and then, with the Green Revolution, in low- and middle-income countries. In general terms, industrial agriculture is characterized by a high dependence on external industrially derived inputs, including seeds, fertilizers, pesticides and machinery. These inputs are meant to increase agricultural productivity and limit the increase of food prices over time, while allowing income gains for producers. However, both food prices and income gains for producers have been challenged by rising costs of production associated with the high dependency on fossil fuel energy and other external inputs (Van der Ploeg et al. 2019).

As a social movement, agroecology embraces a three-pronged critique of industrial agriculture, first because of its environmental consequences, then its social effects in terms of marginalizing smallholders, and more recently, concern over its wide-spread impacts on nutrition. The first and the most consensual critique of industrial agriculture is ecological. This critique gained momentum with Rachel Carson’s book, *Silent Spring* (Carson 1962). Since then, the list of negative impacts associated with industrial agriculture has grown vast. They are no longer focused only on how industrial agriculture is exhausting the productive capacity of local ecosystems (e.g. degradation of soil and natural resources) but also on its global effects in terms of climate change (Rockström et al. 2009; Dale 2020; Altieri et al. 2015; Aguilera et al. 2020; Gliessman 2017) and biodiversity loss (Wagner et al. 2021; Rampino and Shen 2019). While the identification of these problems does not provoke serious disagreements within the scientific community, the debate about solutions is a long way from reaching consensus and is often distracted by ideologies and terminology debates. Rather than support a transition to agroecology, these debates often result in public policies that are orientated to promote a ‘Doubly Green Revolution’ (Conway 2019; Ruttan and Conway 1998) that promises “food for all in the twenty-first century” through intensified industrial agriculture. Such a plan, it is argued, could allow industrial agriculture to solve its own problems by means of a new wave of technological innovation. For example, new technologies could allow for hyper productive, enriched and resistant crop varieties and livestock breeds, lab-grown and plant-based meats, an increase in nutraceutical and functional food components and more.

Even if supporters of this new revolution are open to some agroecological practices, some social organizations argue that the Doubly Green Revolution’s promise of a food system that no longer depends on massive quantities of land, water, fertilizers and pesticides, only repeats the old Green Revolution’s pledge of agricultural modernization policies. Such a pledge does not address the multidimensional challenges facing food and agricultural systems in an integrated way. For example, the development of new varieties of seeds often comes at the expense of traditional

ones and contributes to agrobiodiversity loss worldwide (Zimmerer et al. 2019; Ficiciyan et al. 2018). Technological solutions such as plant-based meat have also been questioned because their greenhouse gas emissions could be higher than those of livestock systems, for example (Van Vliet et al. 2020; Chriki and Hocquette 2020). Conversely, supporters of these technologies argue that these developments are needed to prevent a significant expansion of cultivated area to feed a growing global population (Stevenson et al. 2013). Proponents of different approaches are often talking at cross-purposes with diverging perspectives on what the future demand for food will be, the environmental footprint of agriculture and food systems and equity issues concerning livelihoods from farming or in food consumption (Fouilleux, Bricas and Alpha 2017; Holt-Giménez et al. 2012; Paillard et al. 2014).

The second main critique of industrial agriculture relates to its marginalization of smallholders and indigenous farmers. During the 1970s a UN Research Institute for Social Development project² pointed out the polarizing social effects of agricultural technologies. It showed how, in situations of sharp social inequality, the introduction of high-yielding crop varieties tended to marginalize smallholders and undermine their livelihoods (UNRISD 1980). This study and its critique sparked many initiatives for redesigning technologies to be compatible with local social and ecological conditions, and this also gave rise to more participatory research methods. In Brazil, for instance, several NGOs were created in the late 1970s and 80s with the clear objective of offering agricultural services that supported smallholders to design alternative technologies (Lamine, Niederle and Olivier 2020; Petersen et al. 2020). However, in Brazil and more generally throughout Latin America, these localized initiatives only partly alleviated the marginalization process and its consequences in terms of rural poverty, famine and exodus (Altieri 2018).

Even farmers, countries and regions that are able to adapt agricultural systems in response to the new industrial demands of the Doubly Green Revolution are concerned about their loss of autonomy and subordination to outside agencies (Holt-Giménez, Shattuk and Van Lammeren 2021). Many of the tasks that make up agricultural labour have been increasingly prescribed by banks, providers of technical inputs, certifiers, extension services, accountancy bureaus, traders and cooperatives. This process occurred particularly early in chicken contract farming in the US and Europe. Beginning in the 1970s, farmers raising chickens gradually lost control of their activities, production methods and the types of inputs used. Their calendars are now commonly decided by the input provider and/or by the end-product buyer — often part of the same enterprise. From the start, farmers' organizations like the 'paysans-travailleurs' in France have been fighting against this (Lambert 1970) because, for them, autonomy is as important as environmental protection — the latter being a condition for the first.

Social organizations and academics concerned about the effects of industrial agriculture on social marginalization perceive agroecology as a way for farmers and communities to regain control. In an agroecological system, these groups have agency over their labour and the means to shape and share knowledge about how to design sustainable ways of farming in harmony with nature (Van der Ploeg 2021; González de Molina and Lopez-Garcia 2021; Anderson et al. 2020; Rosset and Martinez-Torres 2012). This fight for autonomy is also translated at the collective and territorial levels as a claim for food sovereignty; these social organizations consider international trade as another way to impose production norms and standards that favour the interests of the industry and retail corporations over those of the producers (McMichael 2016). Similarly, standardized organic certification schemes can disempower small producers, only benefiting more powerful interests with the ability to meet certification requirements. These observations have stimulated agroecological movements to create locally established participatory guarantee systems (Loconto and Hatanaka 2017; Niederle et al. 2020).

² The research project, "The social implications of large-scale introduction of new varieties of foodgrain," lasted from 1970 to 1979 with field locations in Colombia, Indonesia, Malaysia, Mali, Mexico, Morocco, Pakistan, the Philippines, Sri Lanka, Tunisia and Zambia.

The rapid expansion in the consumption of industrially produced food in urban and rural areas has also motivated agroecological organizations to pay more attention to dynamics beyond agricultural production. The need for nutrition-sensitive agriculture has become an additional argument in the discourse on sustainable food systems. The evidence indicates that it is no longer possible to call for agroecologically-informed public policies without encompassing the whole arrangement of practices, “from farm to fork.” This understanding was noted in the European Green Deal, which aims to make food systems fair, healthy and environmentally friendly. In this sense, agroecology is presented, not only as a way to offer adequate food for all, but as a way to generate healthy food that is adapted to local cultures (Altieri and Nicholls 2020). One of the effects of this thought evolution to encompass consumption dynamics under the agroecology umbrella is the attention recent studies have given to how agroecology is connected to new urban food movements. These movements, when paired with ideas of food democracy, equity, inclusion and citizenship, have been identified as potential drivers of important changes to food systems (Bornemann and Weiland, 2019). HLPE (2019) therefore recommends including ‘agency’ as a fifth pillar of food and nutrition security alongside availability, access, utilization and stability. Agency relates to the extent to which all actors within a food system are able to influence how food is produced, processed, stored, transported, sold and consumed.

Although agroecology movements have often been organized in response to problems with industrial agriculture and food systems, principles of agroecology can provide benefits for all farming systems. For example, while agroecologically-conducive policies can help to transition from the industrial agriculture model — and its associated forms of food consumption, distribution and processing — they can also help transform ‘traditional’ (or non-industrialized) forms of farming to more environmentally, socially and economically sustainable and inclusive production systems.

However, key policy questions remain. What policy instruments could facilitate widespread agroecological transitions? Would they be the same types of instruments created for the Green Revolution? If not, how would they differ? Even if these questions sound simple, finding answers to them demands careful attention of the ‘grey areas.’ Food and agricultural systems are not really divided between industrial and agroecological practices. In reality, countries, sub-regions and landscapes (or territories) exhibit different underlying conditions and farming systems. Indeed, there is generally a mosaic of practices from farm to fork. Furthermore, aspirations for a ‘better’ future, including the degree to which agroecological principles are embraced, will differ from place to place. Thus, it is important that policies are created by considering different starting points of agricultural and food systems, different target visions, multiple voices and, hence, a diversity of context-specific transition pathways for reaching target visions. As previously mentioned, making industrial or traditional systems more sustainable would hardly demand the same sort of policy instruments and designs as an agroecological transition would.

3 How public policies affect agroecology: Current practices and promising reforms

Having discussed the potential for agroecology to address many of the ecological, nutritional and social problems associated with current agrifood systems, we now turn to specific policies that have been or could be used to promote transitions towards agroecology. The section is organized into (1) types of policies that are expected to have a significant effect, both positive and negative, on agroecological transitions, (2) examples of such policies taken by national or local governments from around the world and (3) a review of the policies' effectiveness, given the current state of knowledge.

3.1 Typology of policies that shape agroecological transitions

Since policies have different dimensions (e.g. thematic area and type of instrument), there are multiple ways to develop a framework for analysis. We have chosen to begin with a well-used classification in the food and agricultural policy domain, the FAO Food and Agricultural Policy Decision Analysis (FAPDA), as a starting point. FAPDA consists of four hierarchical and nested levels of policy measures under the broad themes of 'producer-oriented policies,' 'consumer-oriented policies' and 'trade-oriented policies,' which include macro-economic policies. These themes cover a wide breadth of topical areas and policy measures. For example, producer-oriented policies are disaggregated into four lower levels, one of which is called 'production support'; production support is in turn disaggregated into eight lower levels including 'agricultural input measures' and 'finance and credit facilities.' While the three high-level categories are relevant for agroecology, we also added a fourth category — 'market- and food-environment-oriented policies' — which was adapted from the FAO food systems framework (HLPE 2017) to capture policies that focus mainly on food system actors between producers and consumers (e.g. food processors) in the middle of the value chain. This additional category further explores instruments for strengthening markets and governing the broader food environment. Finally, we added a fifth category termed 'cross-cutting policies' to account for policies that speak to multiple principles of agroecology and may span the previous categories, such as research or more comprehensive national agroecology policies.³

Using these five categories as headers, Table 1 unpacks several policy types that are important for agroecological transitions and provides some concrete examples.

³ Other policy guidelines or toolkits are also useful for consideration in the search for policy actions to foster an agroecology transition. A closely allied tool is the Guidelines for Public Support to Organic Agriculture (IFOAM-Organic International 2017).

Table 1. Important thematic areas for policies affecting agroecological transitions

Policy theme and measure	Examples of policies and policy measures that support agroecological transitions
Consumer-oriented policies	
Taxes	<ul style="list-style-type: none"> • Implement consumption taxes on highly processed, non-nutritious foods. • Grant tax exemptions on healthy, nutritious and sustainable foods.
Social protection/safety nets	<ul style="list-style-type: none"> • Implement food subsidy programs that purchase sustainably produced healthy, fresh, nutritionally dense, seasonal and locally sourced foods. • Manage employment programs that contribute to environmental objectives. • Incentivise food banks, soup kitchens and public restaurants that use healthy, fresh, nutritionally dense, seasonal and locally sourced foods.
Nutritional and health assistance	<ul style="list-style-type: none"> • Manage information campaigns to guide consumers towards healthy and sustainable foods. • Develop and implement educational programs for all ages on the importance and consequences of healthy diets and food environments. • Develop sustainable dietary guidelines. • Implement food composition tables for raw and processed foods. • Encourage food retailers to feature safe and nutritionally dense foods in their displays and marketing communications. • Support the development of labels to facilitate consumer choice. • Promote the most nutritionally dense and healthy food items (e.g. Nutri-score). • Regulate the food environments around vulnerable populations (e.g. zoning to ban access to junk foods next to schools).
Producer-oriented policies	
Production support	<ul style="list-style-type: none"> • Reduce input subsidies that favour the use of agricultural and harmful chemicals and the production of less nutritious crops. • Develop pesticide reduction and regulation policies and promote integrated pest management. • Balance government development programs that are mainly oriented to major staple or export crops/livestock so that they capture a broader set of commodities. • Train public extension officers in agroecology principles and practices. • Enable long-term, low cost-financing for environmentally friendly farming practices (including for minorities, women and small-scale farmers), particularly during transition periods to agroecological practices. • Develop technologies that reduce the cost of biomass recycling on farms. • Develop technologies adapted to complex and diversified crop production systems. • Grant tax incentives to farmers with sustainable production systems that contribute nutritious and diversified foods. • Recognize and support farmers' rights and autonomy regarding traditional, local and indigenous seeds and breeds. • Implement standards that promote animal health and welfare. • Foster and facilitate farmer-to-farmer exchange for knowledge, experience and technology transfer.

Continue on next page

Table 1. Continued

Policy theme and measure	Examples of policies and policy measures that support agroecological transitions
Natural resource management	<ul style="list-style-type: none"> Develop long-term public programs that support the maintenance or improvement of soil health and (agro) biodiversity through multiple agroecological practices at the farm and landscape level. Improve tenure security of land, trees and other resources (e.g. water) for male and female smallholder farmers. This includes encouraging long-term over short-term land-renting arrangements. Increase incentives (e.g. cross-compliance programs) so that farmers can generate ecosystem services from farming and through agroecological practices.
Market- and food-environment-oriented policies	
Direct market participation	<ul style="list-style-type: none"> Procurement of foods for public institutions that include sustainably produced healthy, locally sourced foods. Revisit food price controls and remove biases that favour the consumption of staple or nutritionally 'empty' foods. Embed negative and positive externalities from agricultural and food systems into pricing schemes.
Regulation of markets and actors	<ul style="list-style-type: none"> Implement food safety regulations to reduce harmful chemical residues in foods in and across countries. Create standards and labelling for food contents, sources and farming practices that align with environmental, nutritional, health or other social and equity principles throughout the value chain.
Catalyzing new markets	<ul style="list-style-type: none"> Promote the development of markets for agroecologically produced outputs. Promote the development of markets for organic nutrient inputs. Create markets for investing in ecosystem services from agriculture. Create technology hubs to foster innovation and facilitate the adoption and monitoring of agroecological practices and principles. Promote shorter value chains to better connect producers and consumers.
Macro and trade-oriented policies	
Trade-related measures	<ul style="list-style-type: none"> Implement import restrictions related to food safety as well as environmental, social and equity certification standards.
Macroeconomic policy decisions	<ul style="list-style-type: none"> Pursue steady, balanced economic growth that will reduce poverty and enable more consumers to desire and afford healthier, more nutritious foods. Provide sufficient public funds for the needed agricultural and food sector transitions. Commit to diversifying fields, landscapes and diets with more crop and livestock species and varieties.
Cross-cutting-oriented policies	
National agroecology policies	<ul style="list-style-type: none"> Draft sectoral and cross-sectoral policies, strategies and laws that address agroecology in an explicit and comprehensive way.
Institutional and organizational measures	<ul style="list-style-type: none"> Broaden agricultural research and development to agroecological topics, collect relevant national data and disseminate knowledge on agroecology. Enhance agricultural innovation systems to become more participatory and inclusive. Create or strengthen exposure to agroecology in university under- and post-graduate courses and curricula.

Consumer-oriented policies could include tax policies that steer consumers away from non-nutritious foods, information campaigns to extol the virtues of healthy, nutritious and sustainably produced foods — including those free from harmful chemical residues — and social protection programs that support consumption by subsidizing food costs for whole or targeted populations or that provide supplementary income. An increasingly common feature of social protection programs is to include nutrition-sensitive programming interventions (e.g. training on achieving balanced diets). Policy measures aimed at consumers would also affect the demand for certain types of foods and production processes and ideally would send signals of increased willingness to pay for healthier foods through food markets down to producers. Although food and product labelling are relevant for the entire value chain, labels directed at consumers can help them discern which products are healthy and which are not (Temple 2020).

Producer-oriented policies may be disaggregated into production support policies and natural resource management. As with consumer-oriented policies, taxes and subsidies can and do play an important role across all continents. These measures may help or hinder agroecological transitions. For example, input subsidies that favour the use of agricultural chemicals run counter to one of the principles of agroecology. On the flipside, government support for technologies that reduce the costs of recycling of biomass in agriculture would help to spur trialling and adoption by farmers or rural businesses.

Public investment in agricultural development programs, including extension, is another producer-oriented tool to shape the type of farming that is practiced. How these investments are oriented — for example, towards smallholder systems or larger-scale farming and towards different crops — will influence incentives for agroecology or more conventional chemically reliant agriculture. A major challenge for agriculture as a whole and especially for smallholder farmers is access to long-term financing that is compatible with longer-term investments in agroecology-aligned practices such as building soil health through agroforestry or implementing rotations with cover crops. A range of different agricultural policies or programs may focus on the natural resources underpinning production. Paying producers to take land out of production is a more extreme form of public investment, and there are a number of other schemes designed to increase farmer adoption of practices that contribute to improved environmental outcomes, especially related to soil management. Cross-compliance programs are popular schemes in high-income countries in which payments to farmers are triggered either by uptake of environmentally friendly practices or evidence of environmental results.

Tenure rights over seeds, land, water, trees and other natural resources that are vital to farming is another key policy area for producers. Strengthening individual and/or community rights and autonomy over these resources remains an important agenda item for many countries. In more commercial farming areas where renting land is common, incentives to promote longer-term rentals may encourage producers to take up agroecological investments.

Market- and food-environment-oriented policy measures are aimed directly at actors that connect producers to consumers; these include retailers, wholesalers, processors and buyers. Measures may include investments in developing new markets, direct participation of the public sector in markets or rules that actors must abide by. Food safety regulations and standards are commonly deployed mechanisms by governments to private sector actors at various stages of the value chain. Such regulations can simultaneously give quality assurance to consumers while signalling producers as to what the market will demand. Organic and territorial or landscape labelling are two growing phenomena that may promote the use of agroecological practices. While markets for seasonal manufactured inputs like crop seed, fertilizer and pesticides are well developed in most locations, markets for cover crop seed, nitrogen-fixing woody and herbaceous plants, live fences, hedgerows, compost and other inputs useful for nature friendly farming are much less developed. There may be a role for governments to help catalyse the early formation of these markets. In addition, markets for ecosystem services or the benefits from sustainable management — whether from agriculture or

another source— are still uncommon; the result is that adoption of environmentally friendly practices in agriculture are undervalued and consequently under-invested in. Similarly, the hidden social and environmental costs of unsustainable or conventional farming remain invisible in market prices. Incentive payments for more sustainable agricultural systems could operate independently (e.g. a price for carbon sequestration) or be embedded into the prices of agricultural inputs and outputs.

Governments are also direct participants in food markets through procurement programs for public institutions as well as social protection and humanitarian relief programs. Their participation can be fairly important in determining which foods are available in some locations. Thus, the types of foods purchased can influence value chains and producer and consumer behaviour. The government may also offer programs to support family farms or small and medium-sized enterprises in food value chains to reduce inequality. For example, a policy to purchase only organic produce and/or from family farms would send strong signals to the food system.

Macro- and trade-related policies can also affect which incentives are in place to practice agroecology in several ways. First, trade and macro policies establish relative prices across commodities and between domestic and international outlets. Second, agricultural chemical inputs are sourced almost exclusively from abroad for most countries. The overall economic health of a country and its citizens is typically associated with an increasing interest in food safety and food quality (Ortega and Tschirley 2017), creating the demand for agroecological approaches to food production. Governments that recognize the importance of the food and agricultural sectors in their budgeting processes can provide needed public investments that facilitate desirable food system transformations. Trade policies will include evidence-based standards on acceptable chemical residues on food imports. They will also ensure that certain production processes have met environmental (or other) certification standards and that higher tariffs are in place for items that the country wishes to discourage citizens from using (e.g. less nutritious foods, certain agro chemicals etc).

A few other important policies have been grouped in a cross-cutting category. These include strategies, policies or laws that are explicitly designed to promote agroecology principles and to monitor systemic change. Cross-cutting measures recognize the multifaceted nature of agroecology and will often provide mechanisms for coordination of actions across several pertinent sectors. For such policies to be effective, they must typically be accompanied by enabling investments such as human capacity building across sectors and spatial levels (e.g. county, state, national and global). Policies and investments in higher level education and in research for agroecology is another cross-cutting theme that supports capacity building and also grants the ability to undertake research to support the adaptation of agroecology principles into practices. Public research to improve farming principles and practices that contribute to a healthy environment is critical as it not necessarily high priority for private research. Moreover, such research needs to be decentralized and devolved in order to respond to different local conditions and mobilize local knowledge. Finally, national strategies, plans and investments are increasingly oriented to meet targets that were agreed on by national governments. It is important to include environmental, nutritional, social and equity indicators among those used to assess performance.

In addition to classifying policies by thematic area, they can also be grouped by how they are intended to function. Three major functions are:

- Persuasion/sensitization through information and educational campaigns (e.g. enhancing agroecology messaging in extension systems);
- Incentives including taxes, subsidies, tradeable permits and liability for externalities which can be based on actions or results such as payments for ecosystem services schemes (e.g. improving availability of affordable organic nutrient sources);
- Command and control through regulations, standards and procurements, which can be based on actions or results (e.g. requirement for schools to serve foods produced using agroecological methods).

As one moves down this list — from sermons to carrots to sticks — the level of public heavy-handedness increases, as do the implications on society for non-acceptance or non-compliance with set policies. In the case of information campaigns there is no cost to the individual consumer, producer or business whose behaviour doesn't change. In the case of incentives, the same actors would likely forego some benefit that would accompany the change in behaviour, though it may not offset the perceived costs of the change. Under regulations, non-compliance is usually met with a penalty. Each of these policy functions can be effective depending on the context, but the devil is often in the details. Incentives may only work if they are sufficiently high, and regulations only work if there is a good monitoring system and significant fines. Governments will utilize each of these methods to drive behaviour towards desirable outcomes. See section 3.3 for more information about policy effectiveness.

3.2 Policies enacted by governments that facilitate agroecological transitions

In this section, we highlight examples of strategies, policies, rules and laws — as well as policy measures and instruments — that governments (mainly) have enacted at the national level with the specific intent to facilitate transitions that are aligned with one or more of the production-related principles of agroecology⁴. The reason for the focus on agroecological production is, firstly, that policies related to other principles — such as local and bottom-up participation and land and resource governance — already have well-established policy processes that began and continue to thrive without direct linkage to an agroecology agenda. Secondly, policy advances in those areas alone (e.g. improved land tenure security) may not necessarily induce greater uptake of agroecological practices. Nonetheless, we do mention a few of these types of policies where the intended link to agroecology was more apparent.

As will be seen below, there are numerous policies which have been enacted by national and local governments as well as by regional bodies such as the European Commission. The classification of examples given below draws from the intent of the policy rather than the actual effect of the policy; this is mainly because most policies are recent and have not been well analysed or monitored. It should also be noted that any given policy may affect the behaviours of different actors including farmers, consumers and businesses. Therefore, some policy examples could be mapped to multiple rows in Table 1. For instance, a government food procurement program aimed at incentivizing healthy eating could simultaneously stimulate production and consumption in desirable ways as well as provide opportunities for food service companies and cooperatives while changing consumers preferences. To avoid repetition, we have mapped examples into just one of the possible policy typology classifications.

3.2.1 Broad national agroecology policies and plans

Among countries that have enacted the most explicit and ambitious agroecology policies are Brazil, France, Nicaragua, Senegal and India. Brazil passed the National Policy on Agroecology and Organic Production (Pnapo) in 2012, which aims to integrate, articulate and adapt policies, programs and actions from different ministries. The main mechanism for implementation was the National Plans on Agroecology and Organic Production (Planapo), which advanced 125 actions in its first edition (2013–2015) and 194 in its second (2016–2019). One of the more successful components of Planapo was the Ecoforte program which galvanized funding for agroecological-oriented projects that were conceived at local levels (Box 1). In addition, several Brazilian states have passed their own policies and plans on agroecology and organic production that reinforce the aims of Pnapo at the regional level (Guéneau et al. 2019).

⁴ These production related principles are associated with the use of external inputs, recycling, diversification, biodiversity, soil health, animal health and synergies of ecological elements.

Box 1. The Ecoforte Program (Programa de Fortalecimento e Ampliação das Redes de Agroecologia, Extrativismo e Produção Orgânica) in Brazil

In Brazil, the National Policy of Agroecology and Organic Production (Pnapo) was approved in 2012 and, one year later, launched phase I (2013–2015) of the National Plan of Agroecology and Organic Production (Planapo), articulating 125 actions from different ministries. The vast majority of these actions already existed as specific policy instruments that were not primarily focused on agroecological transition.

Created in 2013, the Ecoforte Program was among the few new policies of the Planapo that was specifically orientated towards agroecological transition. Then and now, its objective is to support territorially based projects for agroecological transitions by transferring resources to social organizations that support the development of sustainable farming and gathering practices. The Program was the result of the confluence between social movements' proposal and the initiative of the General Secretariat of the Presidency of the Republic, which was responsible for coordinating the Plan and the actions of the different ministries. Since it came from this Secretariat, the Program was not included in the budget of any particular Ministry. The resources came from the public bank's social foundations (Banco do Brasil and the Brazilian Development Bank (BNDES)), which assured flexibility to use the funds for different actions. However, relying on these foundations also came at the cost of being very fragile in terms of the Program's institutional basis.

The main instruments of the Ecoforte Program were calls for projects supporting territorial networks related to agroecological transition. To be considered for the Program, these projects must be based on an integrated network of 'reference units'— locations that demonstrate techniques, processes, methodologies or productive systems which are aimed at intensifying sustainable management practices. Through these units, it became possible for the supporting foundations to finance investments in tangible assets — including machinery, equipment, vehicles and facilities — and services such as technical assistance, education and training. Most projects within Ecoforte have focused on practices related to agricultural production, commercialization, food processing, production of ecological seeds and other inputs, certification, water security technologies and animal husbandry.

Source: **Paulo Niederle** (UFRGS), based on Schmitt et al. (2020).

France passed “*La loi d'avenir pour l'agriculture, l'alimentation et la forêt*” (the Future Law for Agriculture, Food and Forest) in 2014. A key objective of the law is to promote and perpetuate agroecological production systems through public policies. In this sense, the country had already started a national strategy called Projet Agro-écologique (Agro-ecology Project) — previously Produisons Autrement (Let's Produce Differently) — in 2012, which included the Mobilisations Collectives pour l'Agroécologie (MCAE) Program (Collective Mobilisation for Agroecology). As described in Box 2, this program provided funding to build knowledge on agroecology through multiple actors.

In 2011, Nicaragua passed Law 765 on Agroecological and Organic Production. The law called for the establishment of various institutions to support agroecology, including a public certification process (Fréguin-Gresh 2017). The Nicaraguan Technical Mandatory Standard 11 037-12 followed in 2013 to create technical, financial, marketing and institutional guidelines for agroecological production (Le coq et al. 2019). In addition, among instruments created to support agroecological transitions, the Nicaraguan Institute of Agricultural Technology (INTA) started the Sustainable Agricultural and Livestock Productivity Development Program (PASOS). This program promotes 'innovation farms' to disseminate knowledge of agroecology and to generate support for its own law on agroecology and organic farming (Box 3).

Over the past four decades, several policies, projects, programs and action plans have been carried out by the government of Senegal to make agriculture more sustainable and to protect the environment and its natural resources. While the term 'agroecology' appears late in these initiatives, the principles and practices of agroecology are present and prioritized throughout (Belmin 2020). The Ecovillages

Box 2. The Mobilisations Collectives pour l'Agroécologie (MCAE) Program in France

The MCAE Program is aimed at supporting farmers or multi-actor groups at the territorial scale in their efforts to promote forms of agriculture with high economic and environmental performance. Created in 2013, this was one of the new policy instruments articulated by the national strategy known as Projet Agro-écologique (previously Produisons Autrement), which was launched in December 2012 and followed by a law in 2014. Despite its status as a national program, its governance structure privileges the regions, where multi-actor committees formed by state representatives and social organizations are in charge of choosing which projects and organizations will be supported. The MCAE Program funded collective experimentation of agroecological practices, training, facilitation and dissemination of techniques and knowledge. It dispersed a maximum of EUR 100,000 per project for a total of EUR 6.5 million). Among the 103 beneficiaries and in addition to traditional agricultural development actors (e.g. chambers of agriculture and cooperatives), the program supported diverse and ‘alternative’ agricultural and rural development organizations. Beneficiaries ranged from organic farming and conservation agriculture groups to specialized consulting firms and innovative partnerships between city governments and farmers. When compared to more typical producer-oriented policy instruments, MCAE’s approach stands out for three main reasons. First, it targets groups rather than farmers by using a multi-actor and systemic approach. Second, it employs territorial governance mechanisms. Third, it allows actors to set their own trajectories for agroecological transitions.

Source: **Claire Lamine (INRAE, Ecodev, Avignon)**, based on Lamine, Barbier and Derbez (2020).

Box 3. The Sustainable Agricultural and Livestock Productivity Development Program (PASOS) in Nicaragua

In 2012, Nicaragua passed Law 765 for the Promotion of Agroecology and Organic Agriculture. The Ministry of Agriculture (MAG) was supposed to implement it, but, at that moment, there were neither instruments nor specific budget available. As one of the new instruments that was created to support the law, the PASOS Program was launched by the Nicaraguan Institute of Agricultural Technology (INTA) in order to support small and medium scale farmers with technologies aimed at forest restoration, soil regeneration, water reservoirs and biodiversity conservation. By means of this project, INTA supported 600 Research and Technological Innovation Farms (FIIT). These units have become a place for exchanges and knowledge dissemination, embracing a ‘campesino-a-campesino’ (farmer-to-farmer) approach to knowledge exchange rather than a “diffusion of technologies” approach. At FIIT centres, the farmers have constant interactions with technicians. Even though PASOS was ended in 2018, awareness-raising and practical training activities are still carried out by the FIITs with the support of INTA technicians who use their own human and financial resources. In terms of its main effects to promote agroecological transition, the program helped consolidate the bases of recovery, preservation and renewable valorization of the farms’ natural resources. In particular it worked to (1) recover highly degraded land, (2) diversify food production for own-consumption and for the sale of surplus healthy and quality food, (3) reduce chemical inputs and (4) conserve and manage locally adapted seeds through community seed banks.

Source: **Sandrine Fréguin-Gresh (CIRAD)**, based on Fréguin-Gresh and Sabourin (2019)

Program (Box 4) is a good example of agroecological initiatives led by the government of Senegal. In May 2019, the president, Macky Sall, declared agroecological transition a government priority and created the Senegal Emerging Green Plan. Although ambitious from an environmental point of view, the plan embraced only a few measures directly related to agroecology such as reforestation, recycling initiatives and policies to reduce food waste. However, following the government statement in favour of agroecology, several social organizations, movements and networks came together in an alliance called Dynamics for an Agro-Ecological Transition in Senegal (DyTAES), which has been organizing advocacy efforts to improve the Green Plan ever since (Bottazzi and Boillat 2021).

Box 4. The Ecovillages Program in Senegal

The Ecovillages Program provides aid for the development of agroecological villages characterized by low carbon footprints and climate change resilience. This program was created in 2008 and is still active to this day. It is carried out under the supervision of the Ministry of the Environment and Sustainable Development (MEDD). The Ecovillages Program supports (1) access to solar-powered hydro-agricultural infrastructure (pumps, etc.), (2) access to improved energy efficient stoves using biofuels and solar energy (3) construction of thermoregulatory habitats made with durable materials (e.g. compressed soil) (4) land development for agriculture (anti-salt dikes, retaining dikes, micro-irrigation and wells) and (5) training of villagers in agroecology and agroforestry. In 2019, 400 ecovillages were transformed or undergoing transformation in Senegal. There are an average of 500 inhabitants per village. The Ecovillages Program is supported by the Global Ecovillages Network (GEN) in Africa, and it relies on different types of funding such as subsidies, donations and self-funding. The Senegalese State has injected FCFA 600 million (or USD 1.1 million) per year into this program since 2009. Other financial partners include the United Nations Development Programme (UNDP), which has given around USD 16 million dollars, and the Japanese government via the Japan International Cooperation Agency (JICA) (USD 5 million). Some private sector actors are also involved.

Source: **Raphael Belmin** (CIRAD – ISRA), based on Vincennes (2019).

In the case of India, while there is no explicit policy for agroecology at national level, the state of Andhra Pradesh — which has about 53 million inhabitants — is advancing its own initiative. The Andhra Pradesh Community-managed Natural Farming (APCNF), formerly known as Andhra Pradesh Zero Budget Natural Farming (AP-ZBNF), is an agroecological movement that was launched by the state government in 2016 with the goal to convert 6 million farmers and 8 million hectares to agroecology farming by 2027. The goal of this initiative is to curb the deep employment, nutritional, ecological and agrarian crisis that prevails in India by (1) reducing the costs and risks of cultivation, (2) increasing yields, (3) producing safe and nutritious food, free of chemicals, (4) reversing emigration of youths from villages (5) enhancing soil health and water conservation and (6) regenerating coastal ecosystems and biodiversity (Box 5). This initiative follows on the heels of a successful transition to organic agriculture in Sikkim state in north-eastern India, which has a relatively small farming sector (World Future Council 2018).

In each of these cases, the main underlying policy has recognized that a transition to agroecology requires actions across multiple domains and accordingly, there is a need to coordinate those actions. Despite these bold policy actions, sustaining implementation has been challenging, especially as political leadership has changed. We discuss policy implementation in section 4.

Box 5. Andhra Pradesh Community-managed Natural Framing (APCNF)

APCNF has pioneered the adoption of technical and organizational innovations whose primary objective is to increase farmer income, health and happiness. Technical innovations are based on four core principles (1) ‘Jeevamrutham’ (elixir of life), an inoculum that stimulates soil micro- and macro-organisms, (2) ‘Beejamrutham’ (ferment of immunity), a coating for seeds to protect them and stimulate their growth, (3) ‘Achhadana’ (gift) or constant coverage of the soil with diverse crops and crop residue mulches and (4) ‘Waaphasa’ (microclimate) or aerated soil humus that harnesses water vapour. Supported by this initiative, the natural farming in Andhra Pradesh has quickly advanced over the last five years. According to the Farmers Empowerment Cooperation (RySS), in April 2020, 695,000 farmers were practicing ‘natural farming’ on 190,000 ha spread over 3,011 villages. The APCNF is supported by two federal funds — the Rashtriya Krishi Vikas Yojana (RKVY), which was initiated in 2007 to stimulate states’ public investments in agriculture and allied services, and the Paramparagat Krishi Vikas Yojana (PKVY), which was launched in 2015 to support organic farming and improve soil health. APCNF has also received a grant from Indian billionaire, Azim Premji, through his APPI foundation.

Source: **Bruno Dorin** (CIRAD, UMR CIRED, Montpellier and CSH, UMIFRE MAE-CNRS, New Delhi), based on Dorin (2021).

3.2.2 Producer-oriented policies

Within Europe, the Common Agricultural Policy (CAP) is the most important piece of legislation governing agriculture. It is a very broad instrument and is frequently amended or updated. One trend over time has been to “green” the CAP which has resulted in around 50% of support payments being conditional on hybrid agri-environmental constraints (e.g. cross-compliance requirements), and another 10% of support has been paid under voluntary agri-environmental schemes in recent years (OECD 2017). The CAP has evolved in other environmentally favourable ways, such as the increasing recognition of agroforestry systems on arable land and their quantification for CAP payments under Pillars 1 and 2 (Augère-Granier 2020). The potentially transformative European Biodiversity Strategy to 2030 was published in 2020. It is very ambitious, establishing results-based climate and environmental indicators and targets. The strategy promotes precision agriculture, organic farming, agroecology, agroforestry, low-intensive permanent grassland and stricter animal welfare standards.⁵ It will aim to transform at least 10% of agricultural land area to high-diversity landscape features. It calls on policy makers to set a target that a minimum of 25% of the EU’s agricultural land must be organically farmed by 2030, which sends a positive signal for an agroecological transition.

In the United States, the 2018 Farm Bill instructed the Department of Agriculture to incentivize farmers to adopt practices that promote soil health. The Environmental Quality Incentives Program (EQIP) and the Conservation Stewardship Program (CSP) serve this purpose. EQIP financially incentivizes farmers to adopt or install cover crops, filter strips, conservation tillage and barriers that keep livestock away from streams on agricultural land. Between 2006 and 2016, the number of acres receiving EQIP payments for cover cropping more than quadrupled, although the starting number was low. The CSP supports farmers for up to 10 years in ongoing and new conservation efforts for producers who meet stewardship requirements on working agricultural and forest lands. As a result, the number of acres that qualified for CSP payments for at least one soil stewardship practice grew from about 7 million to over 30 million acres between 2010 and 2015. The new number represents approximately 7.5% of all crop land. The average incentives per farm in these programs are between USD 14,000 and 17,000 annually (Wallander and Fooks 2019).

Another US program offers 10- to 15-year contracts to pause agricultural production on plots of land. Known as the Conservation Reserve Program (CRP), the 2018 Farm Bill set an acreage cap of 27 million acres that may be enrolled in this program. Prior to the CRP, the majority of this land was planted with crops but, under the program, it has been replanted with grass or trees.

Numerous countries have enacted policies or regulations to influence the use of agricultural chemicals. In general, governments have moved to reduce the use of pesticides and herbicides, or at least certain types of them. The European Commission’s 2020 Farm to Fork Strategy will act to reduce the overall use and risk from pesticides by 50% by 2030. It will facilitate this strategy through a new directive on pesticide use and a nutrient management plan.

Mexico passed a decree in 2020 to phase out the use of glyphosate herbicide over the 2021–24 period. Taking a different approach, several European countries including Denmark, Finland, France and Norway have raised taxes on agricultural chemicals to reduce their use. However, one study found only a weak effect of these tax increases due to a relatively low tax rate and inelasticity of demand (Hardelin and Lankoski 2018).

Countries may also establish maximum levels of chemical residues allowed in foods — domestic and imported — and enforce this through monitoring and testing of foods to influence the

⁵ Many countries have advanced legislation to enhance farm animal health and welfare. The Netherlands, for example, passed the Animals Act 2011 (Wet dieren), which formally recognizes animal sentience and the intrinsic value of animals. Under the Act, animal care must be based on the principles of the Five Freedoms of Animal Welfare.

behaviour of farmers. Other countries have made significant efforts to boost organic agriculture. For example, Denmark has embarked on a series of investments and programs in support of the Organic Action Plan that was established in 2011 and touts significant progress made in production and consumption of organic foods, and Sri Lanka has recently stated its ambition for farming to be 100% organic.

While several of the examples noted above are directed towards natural resource management, others that have arisen outside of a country's major agricultural policy framework include several that relate to agroforestry. For instance, India's National Agroforestry Policy (Government of India 2014) recognizes agroforestry as a viable system that is eligible for financing; this strengthens public investment in agroforestry towards meeting India's green targets. Kenya is also developing a new national agroforestry policy to supersede its 2009 Agriculture and Farm Forestry Rules (Government of Kenya 2009).

Resource tenure policies are also important for incentivizing agroecology because they enshrine clear long-term rights to land, favouring the adoption of many agroecology principles. Insecure long-term access to land has been observed in many countries and for particular groups such as women and migrants. Although there are many sources of land insecurity and ideas for how to overcome those in the literature (Holden et al. 2013; Place et al. 2021), one of the clearest cases of insecure tenure that creates challenges for agroecology is related to short-term land renting for agriculture. In some cases, such as in Ethiopian regional laws, the durations of rentals from one farmer to another are not allowed to exceed three years, while rentals to investment farmers using mechanized practices can be much longer. In the United States, while renting of farmland is very common (almost 40% of land), most of the area rented is under longer-term relationships with landlords. There is one program — the Transition Incentive Program — that encourages longer-term renting of land which is already part of the US Conservation Reserve Program.

3.2.3 Consumer-oriented policies

The main types of consumer-oriented policies that may favour agroecological transitions are those that encourage the consumption of nutritious foods or discourage consumption of unhealthy foods⁶. Among these are information campaigns, taxation policies and various other programs (e.g. those that address nutritional dimensions of social protection programs). Almost all countries invest in raising consumer awareness of nutrition and healthy diets, and some have created more formal strategies. For example, India promulgated the National Nutrition Strategy in 2016 and then supported it financially through a National Nutrition Mission in 2018. South Africa similarly passed a National Food and Nutrition Security Plan in 2017. In terms of taxes and subsidies for providing incentives to consumers, many countries have recently taken actions to increase the price of foods and drinks with high sugar content (Pfinder et al. 2020). These nations include Chile and Mexico who raised and established taxes on sugar-sweetened beverages in 2014.

Social protection programs are being implemented in almost all countries with the aim of helping the poorest populations to maintain a minimum level of food consumption and nutritional attainment through cash or in-kind transfers. A significant number of countries or districts have established standards for foods served at schools. Many of these programs have recently tried to enhance nutritional aspects of school meals over basic hunger needs through nutrition sensitive programming (e.g. in Bangladesh and Mali). For example, community health workers may provide training to program participants.

⁶ Labelling and quality standards are other measures that seem obvious, but those are discussed under market-oriented policies below since they are directed towards multiple actors throughout the value chain.

Another orientation of social protection programs that support agroecology are the public works dimensions of national programs, which often prioritize the rehabilitation of natural resources (e.g. in Ethiopia's Productive Safety Net Program, India's Mahatma Gandhi Rural Employment Guarantee Scheme or South Africa's Public Works Program). These social protection programs tend to focus on common land area rehabilitation, which may then create more opportunities for agroecology practices around integrated pest management or recycling of nutrients.

3.2.4 Market- and food-environment-oriented policies

In this category are policies and other directives that don't always fit neatly into a producer or consumer orientation and may in fact help to create markets where they are under-developed. Governments may try to encourage more production or consumption of foods produced under agroecological methods, but they may also step in to provide a 'market' for such commodities, stimulating both production and consumption sides. Procurement of healthy, organic or even agroecologically-produced foods for public institutions (or programs) such as schools is one example. The Tutto per la Qualità school feeding program in Rome was established in 2001 and now focuses on purchasing locally produced organic foods for over 100,000 meals per day (Messina and Bossi 2015). Rio de Janeiro has a law (n. 6.187/2017) that instructs public institutions to buy local foods, with a focus on family farms using agroecological practices.

Labelling and certification of production processes that have met certain environmental standards (e.g. to be sustainable or organic or to denote the origin of food) have proliferated in the past couple of decades, both publicly and privately. Organic or sustainability labelling is especially common for commodities traded to high income countries where there is a larger consumer market willing to pay for these attributes. These labels are then maintained throughout the value chain by a variety of actors. In 2016, Chile enacted the Food Labelling and Advertising Law which sets requirements on labelling of foods by industry actors so that they are more transparent, contain a maximum number of calories, sugars and fats for certain products and restrict advertising of non-nutritious foods.

Another type of intervention is to catalyse the development of 'missing' markets notably in the area of ecosystem services which may then provide additional rewards to farmers and others who can produce those services. Payments for ecosystem services are thus commonplace, even though they may not be large in size. Costa Rica and Nicaragua provide incentives for farmers to practice coffee agroforestry instead of monoculture coffee to support biodiversity and climate change ecosystem services. On the other hand, New Zealand employed a stick, rather than a carrot, market approach in its 2019 Climate Change Response Bill that will begin pricing emissions from fertilizer use in 2025. In the international arena, as a consequence of the agreements achieved at the United Nations COP26, new policies are expected to regulate the carbon markets in the near future.

Other markets that are underdeveloped which would support agroecological principles revolve around making farmer crop varieties or landraces more available through markets, as well as promoting markets for organic nutrient supplies (e.g. compost or herbaceous legume seed). There have been some developments to recognize farmer landraces in Nepal through the registration of rice and bean varieties and also in Uganda where they have established a quality-declared seed brand for farmer seeds. In European countries, there is already a significant proportion of waste from urban and rural areas which is composted or recycled. However, in developing countries, these markets for waste by-products are still nascent for the most part. India, which is considered to be the largest producer of solid waste in the world, has put in place a number of mechanisms to encourage re-use of manure and food waste, including supporting the supply of these products in pilot villages and enticing fertilizer companies to market the compost.

3.2.5 Macro and trade-oriented policies

Tariff and non-tariff trade measures can further influence the practice of agroecology. Following domestic policies, countries may restrict the importation of certain agricultural inputs it may deem to be toxic or hazardous or may raise the tariffs on such products to reduce their use in the country. In practice, a large proportion of agricultural inputs are imported and in order to boost food production and keep costs lower for farmers, tariffs on agricultural inputs are typically not high. For example, in 2019, average tariffs on fertilizer were a very low 3.8%, according to OEC.⁷ Food imports are more likely to be subject to tariff or non-tariff barriers to protect domestic farmers or to meet quality standards for consumers. In the European Union, United States and other countries, there are set tolerance or maximum residue levels for pesticides on imported foods. These types of regulations are more challenging to implement in practice, as it is costly to test food products coming across the border.

3.2.6 How well do recent policies in support of agroecology align with its principles?

We analysed how well the strategies, policies and plans captured by our global scan addressed the 13 principles of agroecology, recognizing that our scan of policies was not exhaustive. Although we did not restrict the examples to those that explicitly mentioned agroecology, there were a good number that did. We focused on identifying policies addressing agroecology principles at the agroecosystem level (reduced input use, soil health, animal health, recycling, biodiversity, synergy among components and diversification). Thus, it is no surprise that those principles were more often targeted than others. However, it is interesting that apart from measures restricting the use of chemical inputs, most policies had an explicit intention to promote more than one of the principles of agroecology. Despite this positive finding, evidence of multisector coherence and coordination to support agroecology is scant and, overall, the state of development of policies in support of agroecology principles can be described as partial and fragmented. There is a clear need for greater horizontal integration across sectors, which is often very challenging because agriculture, forestry, water, energy, environment and trade are often governed from different ministerial dockets.

Table 2. Examples of actual policies in support of agroecological transitions

Policy theme	Specific examples of enacted policies
Consumer-oriented policies	
Taxes	<ul style="list-style-type: none"> Mexico: implemented a sugar-sweetened beverage tax (2014). Chile: raised taxes on high sugar-sweetened drinks and lowered taxes on drinks with low sugar content (2014).
Social protection and safety nets	<ul style="list-style-type: none"> South Africa: the national Public Works program gives some ongoing priority to environmental objectives. Ethiopia: Productive Safety Net Program (2005 onwards). India: Mahatma Gandhi National Rural Employment Guarantee Scheme (2005 onwards).
Nutritional and health assistance	<ul style="list-style-type: none"> India: the Nourishing India: National Nutrition Strategy (2016); the India National Nutrition Mission (2018). Chile: Food Labelling and Advertising Law (2016).

Continue on next page

7 See <https://oec.world/en/profile/hs92/fertilizers>

Table 2. Continued

Policy theme	Specific examples of enacted policies
Producer-oriented policies	
Production support	<ul style="list-style-type: none"> Mexico: ruling to phase out of glyphosates over the 2021–24 period (2020). EU: Farm to Fork Strategy aims to cut the use of chemical pesticides 50% by 2030; Biodiversity Strategy to 2030 calls for 25% of agricultural land to be under organic farming. Nicaragua: the Technical Mandatory Standard establishes institutions and programs to assist farmers with AE. Indonesia: Law 22 sets environmental goals for agriculture and promotes diversification (2019). Netherlands: the Animal Act provides rules for treatment of farm animals (2011). Uganda: the National Organic Agriculture Policy seeks to promote organic farming for crops that have market potential (2019). Denmark: the Organic Action Plan (2011). It has been supported in subsequent years by many public investments.
Natural resource management	<ul style="list-style-type: none"> EU: the Biodiversity Strategy to 2030 sets environmental results targets. India: the National Agroforestry Policy recognizes agroforestry as a legitimate farming system and enables its upscaling through Indian missions (2014). US: the Transition Incentive Program encourages expiring Conservation Reserve Program farmers to make leases of at least 5 years to others who will continue the conservation methods.
Market- and food-environment-oriented policies	
Direct market participation	<ul style="list-style-type: none"> Italy: the Tutto per la Qualità school feeding program in Rome. Brazil: national policy on acquisition of Family Farm Foodstuff asks public institutions to buy from family farms that use AE practices, from 2003.
Regulation of markets and actors	<ul style="list-style-type: none"> Chile: the Food Labelling and Advertising Law (2016) requires labels, sets rules on advertising of non-nutritious foods and sets maximum levels of calories, sugars, fats, etc.
Catalyzing new markets	<ul style="list-style-type: none"> New Zealand: the Climate Change Response Bill (emissions trading reform) (2019) will begin pricing emissions, including those from fertilizers, by 2025.
Macro and trade-oriented policies	
Trade related measures	<ul style="list-style-type: none"> The EU, US and other countries have tolerance or maximum residue levels for pesticides on imported foods. Actual testing and enforcement is more challenging.
Cross-cutting-oriented policies	
National agroecology policies	<ul style="list-style-type: none"> France: La loi d'avenir pour l'agriculture, l'alimentation et la foret (2014). Nicaragua: Law 765 on Agroecological and Organic Production (2011). Brazil: the National Policy on Agroecology and Organic Production (Política Nacional de Agroecologia e Produção Orgânica – Pnapo) (2012). India: Andhra Pradesh Community-managed Natural Farming (APCNF) (2016 onwards).
Institutional and organizational measures	<ul style="list-style-type: none"> Graduate degrees at university level. A few examples include Wageningen University and Research and the University of Wisconsin.

3.3 Effectiveness of policies in support of agroecological transitions

Although there are many studies on the effects of agroecological practices as they relate to important objectives such as biodiversity, ecosystem services, food security and production (Barral et al. 2015; Dainese et al. 2019; Bezner Kerr et al. 2021), there are no rigorous studies of how the various policies noted above have contributed to any increased use of agroecology practices and principles or the subsequent impacts of those practices and principles. This gap is due primarily to the recent enactment of these policies and, therefore, the limited timeframe that they have had to operate. There are however two strands of literature that are relevant to this question.

The first concerns the extent of implementation of these policies for which some analyses have been made, including for the case studies reported below (see also World Future Council 2018). On the one hand, an assessment of 104 integrated landscape initiatives across Latin America and the Caribbean shows that all these multi-objective efforts (e.g. conservation, livelihoods, governance and sustainable production) invested in agroecological over conventional intensification (Carmenta et al. 2020). On the other hand, Sabourin et al. (2018) note that despite progress towards agroecological investment and enabling policies in Latin America and the Caribbean, implementation of these policies has been blunted by their embedment within programs that largely support conventional agriculture, as has happened in India (Dorin 2021; Dorin and Julien 2004). It has also been observed that various investment plans to support agroecology are sensitive to changes in government, as noted in Brazil (Niederle et al. 2022). These cases are fairly representative globally of small-scale successes that resulted from policy actions. However, agroecology remains on the margins both in terms of policy frameworks and agricultural practice.

The second strand of relevant literature is on the effectiveness of related environmentally friendly agricultural regulations, programs and incentive mechanisms on shifting behaviours and environmental outcomes, as well as economic outcomes. A review of 62 studies (Kleijn et al. 2006) on the effects that agri-environment schemes operating in five European countries during the late 1900s had on biodiversity showed that the schemes supported increases in all the taxa studied including plants, insects and birds. However, a few cases found that biodiversity had decreased in all taxa studied (6%) or some of the species studied (17%). Claassen et al. (2004) found that the US Conservation Reserve Program — which encourages the withdrawal of acreage from production and requires the adoption of conservation systems— reduced wind and water-based soil erosion by hundreds of millions of tons over a 15-year period. A myriad of other programs that have been put into place by governments have not yet been well studied (Brooks and Place 2018).

A study by Deboe (2020) finds that, generally speaking, environmental regulations appear to be more successful in achieving measurable improvement in environmental outcomes than other approaches to induce behavioural change (e.g. payments to influence adoption of environmentally friendly approaches). But even these environmental regulations are not a guarantee for success if they require functional monitoring systems. Such systems are particularly challenging for low- and medium-income countries. Governments also do not wish to put too many regulations in place, as they create cost burdens for producers and therefore may be unpopular.

With respect to voluntary agri-environmental schemes (AES), there are numerous programs in existence. Studies seem to conclude that schemes which are results-oriented (e.g. payment for a valued ecosystem service) attain better environmental outcomes than do schemes which are action-oriented (e.g. payment for adoption of a practice). This is partly due to the greater flexibility of innovation allowed by this approach and partly due to the uncertain relationships between actions and results (e.g. how much biodiversity will occur from tree planting). There are also concerns about the cost-effectiveness of such schemes and there is still much to learn about their effectiveness.

3.4 Key policies that impede agroecological transitions

It is not the intention of this brief to provide a detailed analysis of policies that impede transitions to agroecology, but it is important to acknowledge their existence and importance. In doing so, it is a reminder that despite many examples of policies that support agroecology, there are many other, often more powerful, policies or investments that work against the practice of agroecology (Sinclair et al. 2019).

A first impediment is that there are strong vested interests among actors profiting from current agricultural and food systems who resist disruptive change. In the United States, an average sized farm of about 200 hectares spends over USD 100,000 per year on seeds, fertilizers and other chemicals (Dreibus 2019). Thus, the private sector has a strong interest to maintain current production practices. They also invest considerable funds in making their products as attractive as possible and their share of total agricultural research and development spending is growing rapidly in middle- and high-income countries (Pardey et al. 2016). In the United States, the private sector accounted for 74% of food and agricultural R&D (Heisey 2019).

Governments have supported high input agricultural production through various types of initiatives. A major avenue many have taken is direct subsidization of inputs, mainly fertilizers, especially in Asian and African countries. A study of ten African countries found that they distributed a combined 1,671,000 metric tons of subsidized fertilizer in 2014. That is enough to influence the agricultural practices of millions of farmers (Jayne et al. 2018). Governments have benefited politically from input subsidy programs as seen in Zambia (Mason et al. 2017) and Malawi (Dionne and Horowitz 2016) and have often resisted significant reforms. Likewise, many government programs relating to rural advisory services, for example, have been oriented to provide advice on basic agronomic practices but have often been found to be weak in providing information on natural resource management (e.g. Nkonya et al. 2017 for West Africa and Berhane et al. 2018 for Ethiopia).

The increasing significance of the private sector in agricultural research and development spending also means that technologies embedded in marketed products have advanced significantly. This leaves the public sector to shoulder the responsibility for research on agricultural principles and practices for environment and natural resources, human nutrition and food safety (e.g. Heisey 2019 for the US). Strengthening research in agroecology will require significant commitment, as it depends not only on re-allocation of research funds, but on the development of quality scientists in agroecological disciplines (Caquet et al. 2020; Côte et al. 2019)

4 Implementation and coherence

Studies about agroecological transitions have pointed to three common features of actors' perceptions about "best policies" directly involved with these processes (Sambuichi et al. 2017; Schmitt et al. 2020). The first common feature concerns the active engagement of civil society organizations that represent the concerns of marginalized and underrepresented social groups such as smallholders and rural women at different stages — from policy formulation to evaluation. The second is associated with the idea that decisions about appropriate modalities for policy implementation must be taken in the territories or landscapes where they will be implemented. These landscapes are often delimited by sub-national or local jurisdictions so that policies can be applied in ways appropriate to local conditions.⁸ Finally, the third feature draws from the second; it concerns the institutional flexibility required to adapt policy instruments to the particularities of each social and ecological context. These three elements bring to the fore the importance of facilitating autonomy and subsidiarity decision making for institutions that are responsible for implementing public policy at the local level. This is key to have actionable programs — characterized by instruments, rules, budget, etc., — that are adapted to local contexts.

Besides this institutional flexibility, the capacities of the "street-level bureaucrats" (Lipsky 1969), as well as their interpretations of public problems, need special attention because they can trigger or hamper policy success and effectiveness. These actors may have significant power over local oligarchies, for example. Among these capabilities, the literature on agroecologically-conducive policies draws attention to the importance of "relational capabilities" (Evans 1994), especially to the social skills some actors demonstrate while coordinating social participation processes (Sabourin et al. 2020). Relational capabilities represent a critical issue since the success of a policy depends not only on the existence of efficient bureaucracy, but on attraction and acceptance by stakeholders. Consequently, manufacturing a common interpretation by all actors involved about the public problems to be faced and the best way to achieve policy goals, crucially impact the effectiveness of policy instruments. Furthermore, the long-term and sustained availability of resources for implementing policies at the local level often pose a critical challenge.

Indeed, studies that analyse the dynamics of "exemplary territories" of the agroecological transition (IFOAM-Organics International 2017; Sabourin et al. 2018; van den Berg 2021), usually highlight the social skills of certain actors needed to produce engagement in collective projects. These 'brokers' connect the networks needed to implement AE policies and, in theory, leverage their collective powers. However, there is still much to understand regarding to what extent and how brokers may generate effective agroecological transition pathways. On the one side, even if we know that social participation is critical for policy design and implementation, we need to better understand how different models of participation are linked to diverse policy implementation outcomes. The active participation of women and grassroots women farmer movements have, for instance, played a crucial role in generating engagement among different social movements to support discourses

⁸ There is a missing middle between the intentions and commitments of international conventions, national commitments and action on the ground because it is rare to find either policy instruments or social capital at the local landscape scales (Pagella and Sinclair, 2014). The role of public extension or other non-state organizations to fill this missing middle is not often recognized (MacQueen et al 2006).

and practices that favour of agroecology (Dorin 2021) and, in the Brazilian case, in the national policy institutionalization (Teixeira and Motta 2020).

Another question requiring a better understanding concerns the governance arrangements of public policies. In addition to instruments, norms or budgets, studies must interpret how the different models of territorial organization operate. The MCAE Program in France and the Ecoforte Program in Brazil are two examples of agroecological transition initiatives that transferred some of the policy implementation decisions to the territories. However, there are very significant differences regarding both what the territories historically represent for the socio-political logic in each country and the dynamics of reconstruction of these territories through the action of public policies. There are also challenges facing the persistence of policies over time, such as the CAP in Europe (and its national and sub-national declinations), and political volatility such as in the example of Brazil (Sabourin et al. 2020; Niederle et al. 2022). In general, devolution of responsibility for natural resource management from national to local levels, has often not been accompanied with the requisite authority to make rules and control revenue from their use (Chomba et al. 2016).

Briefly, what we are suggesting here is that an analysis of public policies for agroecology must go beyond the formal aspects to understand how the actors who implement the policies translate the initial objectives into working frameworks and instruments. Furthermore, it is essential to pay attention not only to the isolated action and effects of each policy, but to how an array of diverse sectoral policies interact and operate overall in each territory, since one incentive can easily be antagonistic to another one. It will therefore be important to use a systems approach lens for leveraging synergistic effects while mitigating, anticipating and managing the trade-offs. In many territories there is still a misconception that “the more policies the better”. However, the literature on territorial development has already demonstrated the existence of policies whose effects are cancelled by others. This can occur, for example, when rural credit programs encourage the purchase of industrial inputs while other programs stimulate the production of organic inputs — not to mention the contradictory effects in relation to consumer-oriented public health policies.

Overall, for agroecological approaches to be adopted across whole food systems, there is a need for both horizontal (across sector) and vertical (across scale) integration of policy formulation and implementation, which is a major challenge to how the governance of agriculture, natural resources and nutrition is currently structured in most countries.

5 Concluding thoughts

In early June 2021, during its forty-eighth session, the Committee on World Food Security (CFS48) endorsed “Policy recommendations on agroecological and other innovative approaches” (CFS 2021). The aim of the CFS policy document is to orientate all stakeholders in developing different transition pathways towards agroecology and other sustainable and healthy agri-food systems. These recommendations refer to HLPE’s 13 principles of agroecology but, being concise and global by design, fall short of specific, locally adapted policy measures that governments could undertake. This paper aims to be a first attempt to look at this gap by highlighting specific examples of policy measures adopted by a wide range of countries to promote one or more of these principles. There is much we know but there is also much to find out in terms of effectiveness of policies for genuine agroecological transitions. This paper, therefore, also calls for further action-oriented research.

Until now, only a few countries have moved to announce a bold, broad and orchestrated set of policy reforms resulting in specific and significant commitments to enable agroecological transition from inception to adoption of all 13 principles. However, some countries have put in place significant policy measures in support of such transitions that address directly or indirectly one or more of the principles.

For a country that seeks to engage in agroecological transition, the issue of selecting appropriate policies for the range of contexts that pertain in that country is critical. Countries are not only at different starting points but also may (or should) have different visions for their food and agricultural systems. The transition routes for sustainable and healthy food systems can be very diverse. From this paper, it is evident there is a broad array of policy measures available to enable an agroecological transition. Hence, cross-country sharing experiences may accelerate the learning and implementation process by countries through learning what has worked or not, the effectiveness and the failures of the policy and, mainly, the different factors affecting policy outcomes. Creating spaces and platforms to transparently and openly reflect on the conditions for a successful policy — including the elements that made the policy conducive to successful adoption and scaling up of agroecology principles and practices and the underlying elements related to state capacity and social participation — is critical.

This paper also identified critical scientific knowledge gaps —including the absence of consolidated data — that stand in the way of better formulating, implementing, monitoring and assessing the ensemble of enabling policies for agroecological transitions, based on the current and past experiences from different countries. These knowledge gaps undermine policy-makers confidence and certainty on enacting the policies that will better help the transition of the food and agricultural systems. Greater understanding of priority knowledge gaps for different country contexts is needed; larger scale research to better understand the challenges, opportunities and impacts of the wider use of agroecology is likely to be a fruitful direction.

Among these challenges and given the objectives of the United Nations Food Systems Summit (UNFSS) and the Agenda 2030 for sustainable development, it is urgent to produce evidence that can guide transitions in regions where changing from industrial agri-food systems is not the main issue. In much of sub-Saharan Africa the green revolution has had little traction, many farmers use

few inputs and land degradation proceeds because of a lack of investment in regenerative practices. Here, there is a need for agroecological intensification using natural processes and agrobiodiversity as a driver to sustainably increase production. There is a need for robust evidence on the effectiveness of agricultural practices and consumption patterns for AE transitions. There is also a need for evidence about enabling policies, to unlock key constraints to AE transitions which are found in the economic environment around farms and expressed in the way production and value chains are currently organized and regulated. Although the long-term sustainability of these systems is the subject of lively debate, the universe of policy instruments and designs that can support a transition to agroecology in these contexts is still ripe for research and exploration.

As shown by the successful conclusion of the evidence-based and multistakeholder debates in CFS at international level, progress in this domain can be tackled by putting in place new scientific platforms and mechanisms that bring together actors at national and sub-national levels to discuss food and agriculture transformation. These platforms will allow for mutual learning, policy coherence, long-term support and implementation at multiple levels (e.g. from the farm to the national government). Therefore, we hope that this paper can appropriately orient future research at global, regional and national levels on coherent multisectoral policies for agroecological transitions. Such an agenda that is linked to many key global issues — including food security, nutrition, sustainable food systems, climate change, biodiversity, etc. — and is therefore central to the implementation of the United Nations Sustainable Development Goals (SDGs).

6 References

- Aguilera E, Díaz-Gaona C, García-Laureano R, Reyes-Palomo C, Guzmán GI, Ortolani L, Sánchez-Rodríguez M and Rodríguez-Estévez V. 2020. Agroecology for adaptation to climate change and resource depletion in the Mediterranean region. A review. *Agricultural Systems* 181. <https://doi.org/10.1016/j.agsy.2020.102809>
- Altieri M. 2018. *Agroecology: The science of sustainable agriculture*. 2nd ed. Boca Raton, United States: CRC Press.
- Altieri M and Nicholls C. 2020. Agroecology and the reconstruction of a post-COVID-19 agriculture. *Journal of Peasant Studies* 47(5): 881–898. <https://doi.org/10.1080/03066150.2020.1782891>
- Altieri M, Nicholls C, Henao A and Lana M. 2015. Agroecology and the design of climate change-resilient farming systems. *Agronomy for Sustainable Development* 35: 869–890. <https://doi.org/10.1007/s13593-015-0285-2>
- Anderson CR, Pimbert MP, Chappell MJ, Brem-Wilson J, Claeys P, Kiss C, Maughan C, Milgroom J, McAllister G, Moeller N and Singh J. 2020. Agroecology now - connecting the dots to enable agroecology transformations. *Agroecology and Sustainable Food Systems*, 44(5): 561–565. <https://doi.org/10.1080/21683565.2019.1709320>
- Augère-Granier ML. 2020. Agroforestry in the European Union (brief). European Parliamentary Research Service (EPRS). [https://www.europarl.europa.eu/RegData/etudes/BRIE/2020/651982/EPRS_BRI\(2020\)651982_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2020/651982/EPRS_BRI(2020)651982_EN.pdf)
- Barral MP, Rey Benayas JM, Meli P and Maceira N. 2015. Quantifying the impacts of ecological restoration on biodiversity and ecosystem services in agroecosystems: A global meta-analysis. *Agriculture, Ecosystems and Environment* 202: 223–231. <https://doi.org/10.1016/j.agee.2015.01.009>
- Belmin R. ed. 2020. *Contribution aux politiques nationales pour une transition agroécologique au Sénégal*. Dakar, Sénégal : Dynamique pour une Transition Agroécologique au Sénégal (DyTAES). https://www.coordinationsud.org/wp-content/uploads/Contribution_DyTAES.pdf
- Béné C, Bakker D, Chavarro Rodriguez M, Even B, Melo J and Sonneveld A. 2021. *Impacts of COVID-19 on people's food security: Foundations for a more resilient food system*. CGIAR COVID-19 Hub Discussion Paper February 2021. CGIAR COVID-19 Hub Working Group 4: International Food Policy Research Institute (IFPRI). <https://doi.org/10.2499/p15738coll2.134295>
- Berhane G, Ragasa C, Abate G and Assefa T. 2018. The state of agricultural extension services in Ethiopia and their contribution to agricultural productivity. Ethiopia Strategy Support Program Working Paper 118. Addis Ababa, Ethiopia: IFPRI. <https://doi.org/10.2499/1037800843>
- Bezner Kerr R, Madsen S, Stüber M, Liebert J, Enloe S, Borghino N, Parros P, Mutyambai D, Prudhon M and Wezel A. 2021. Can agroecology improve food security and nutrition? A review. *Global Food Security* 29. <https://doi.org/10.1016/j.gfs.2021.100540>
- Blay-Palmer A, Conare D, Meter K, Battista A and Jonston C. 2020. *Sustainable food system assessment. Lessons from global practice*. 1st ed. London: Routledge.
- Bornemann B and Weiland S. 2019. Editorial: New perspectives on food democracy. *Politics and Governance* 7(4): 1–7. <https://doi.org/10.17645/pag.v7i4.2570>
- Boillat S, Belmin R and Bottazzi P. 2021. The agroecological transition in Senegal: Transnational links and uneven empowerment. *Agriculture and Human Values*. <https://doi.org/10.1007/s10460-021-10247-5>

- Bottazzi P and Boillat S. 2021. Political agroecology in Senegal: Historicity and repertoires of collective actions of an emerging social movement. *Sustainability* 13(11). <https://doi.org/10.3390/su13116352>
- Brooks K and Place F. (2018). Global interlinkage of national agricultural and rural policies: Technical change, trade, and the environment. In Meyers W and Johnson T. eds. *Handbook of international food and agricultural policies*. Singapore: World Scientific Publishing. https://doi.org/10.1142/9789813226463_0022
- Burlingame B and Dernini S. eds. 2018. *Sustainable diets: Liking nutrition and food systems*. Centre for Agriculture and Bioscience International (CABI). <https://www.cabi.org/nutrition/ebook/20183377454>
- Canfield M, Anderson M and McMichael P. 2021. UN Food Systems Summit 2021: Dismantling democracy and resetting corporate control of food systems. *Frontiers in Sustainable Food Systems* 5. <https://doi.org/10.3389/fsufs.2021.661552>
- Caquet T, Gascuel C and Tixier-Boichard M. 2020. *Agroecology: Research for the transition of agri-food systems and territories*. Versailles, France: Éditions Quae. <https://www.quae.com/produit/1676/9782759232949/agroecology-research-for-the-transition-of-agri-food-systems-and-territories>
- Carmenta R, Coomes D, DeClerck F, Hart A, Harvey C, Milder J, Reed J, Vira B and Estrada-Carmona N. 2020. Characterizing and evaluating integrated landscape initiatives. *One Earth* 2(2): 174–187. <https://doi.org/10.1016/j.oneear.2020.01.009>
- Carson R. 1962. *Silent Spring*. Boston, United States: Houghton Mifflin Company.
- CFS [Committee on World Food Security]. 2021. CFS policy recommendations on agroecological and other innovative approaches for sustainable agriculture and food systems that enhance food security and nutrition. CFS and FAO. <https://www.fao.org/3/nf777en/nf777en.pdf>
- Chomba SW, Nathan I, Minang PA and Sinclair F. 2015. Illusions of empowerment? Questioning policy and practice of community forestry in Kenya. *Ecology and Society* 20(3): 2. <https://doi.org/10.5751/ES-07741-200302>
- Chriki S and Hocquette JF. 2020. The myth of cultured meat: A review. *Frontiers in Nutrition* 7. <https://doi.org/10.3389/fnut.2020.00007>
- Claassen R, Breneman V, Bucholtz S, Catteano A, Johansson R and Morehart M. 2004. Environmental compliance in US agricultural policy: Past performance and future potential. Agricultural Economic Report 832. Washington, DC: United States Department of Agriculture (USDA). <https://www.ers.usda.gov/publications/pub-details/?pubid=41660>
- Conway G. 1999. *The doubly green revolution: Food for all in the 21st century*. Ithaca: Cornell University Press.
- Côte FX, Poirier-Magona E, Perret S, Roudier P, Rapidel B and Thirion MC. eds. 2019. *The agroecological transition of agricultural systems in the Global South*. Versailles, France: Éditions Quae. <https://doi.org/10.35690/978-2-7592-3057-0>
- Dainese M, Martin EA, Aizen MA, Albrecht M, Bartomeus I, Bommarco R, Carvalheiro L, Chaplin-Kramer R, Gagic V, Garibaldi L et al. 2019. A global synthesis reveals biodiversity-mediated benefits for crop production. *Science Advances* 5(10): 1–13. <https://doi.org/10.1126/sciadv.aax0121>
- Dale B. 2020. Alliances for agroecology: From climate change to food system change. *Agroecology and Sustainable Food Systems* 44(5): 629–652. <https://doi.org/10.1080/21683565.2019.1697787>
- Dawson N, Martin A and Sikor T. 2016. Green revolution in sub-Saharan Africa: Implications of imposed innovation for the wellbeing of rural smallholders. *World Development* 78: 204–218. <https://doi.org/10.1016/j.worlddev.2015.10.008>
- Deboe G. 2020. Economic and environmental sustainability performance of environmental policies in agriculture. Organization for Economic Co-operation and Development (OECD) Food, Agriculture and Fisheries Papers 140. Paris, France: OECD Publishing. <https://doi.org/10.1787/18156797>
- Dionne K and Horowitz J. 2016. The political effects of agricultural subsidies in Africa: Evidence from Malawi. *World Development* 87: 215–226. <https://doi.org/10.1016/j.worlddev.2016.06.011>
- Dorin B. 2021. Theory, practice and challenges of agroecology in India. *International Journal of Agricultural Sustainability*. <https://doi.org/10.1080/14735903.2021.1920760>

- Dorin B and Jullien T. eds. 2004. *Agricultural incentives in India: Past trends and prospective paths towards sustainable development*. Manohar, New Delhi: French Research Institutes in India.
- Dreibus T. 2019. Ag census: input costs rise, farm income declines amid low commodity prices. *Successful Farming*, 18 April 2019. <https://www.agriculture.com/news/business/ag-census-input-costs-rise-farm-income-declines-amid-low-commodity-prices>.
- Evans PB. 1994. *Embedded autonomy: States and industrial transformation*. Princeton, United States: Princeton University Press.
- FAO [Food and Agriculture Organization of the United Nations]. 2018. *The 10 elements of agroecology: guiding the transition to sustainable food and agricultural systems*. Rome: FAO. <https://www.fao.org/3/i9037en/i9037en.pdf>
- FAO, IFAD, UNICEF, WFP and WHO. 2020. *The state of food security and nutrition in the world 2020. Transforming food systems for affordable healthy diets*. Rome, Italy: FAO. <https://doi.org/10.4060/ca9692en>
- Ficiciyan A, Loos J, Sievers-Glotzbach S and Tscharntke T. 2018. More than yield: Ecosystem services of traditional versus modern crop varieties revisited. *Sustainability* 10(8): 2834. <https://doi.org/10.3390/su10082834>
- Fouilleux E, Bricas N and Alpha A. 2017. 'Feeding 9 billion people': Global food security debates and the productionist trap. *Journal of European Public Policy* 24(11): 1658–1677. <https://doi.org/10.1080/13501763.2017.1334084>
- Fréguin-Gresh S. 2017. Agroecología y agricultura orgánica en Nicaragua. Génesis, institucionalización y desafíos. In Sabourin E, Patrouilleau MM, Le Coq JF, Vásquez L and Niederle P. eds. *Políticas públicas a favor de la agroecología en América Latina y el Caribe*. Porto Alegre, Brazil: Red PP-AL-FAO, 311–350. <https://agritrop.cirad.fr/584709/>
- Fréguin-Gresh S and Sabourin E. 2019. *Análisis de la estrategia institucional del INTA a favor de la agroecología y a la agricultura orgánica en Nicaragua*. Montpellier, France: CIRAD. <https://agritrop.cirad.fr/594694/>
- Gliessman S. 2017. Confronting climate change with agroecology in Mozambique. *Agroecology and Sustainable Food Systems* 41(2): 99–100. <https://doi.org/10.1080/21683565.2016.1266825>
- González De Molina M and Lopez-Garcia D. 2021. Principles for designing agroecology-based local (territorial) agri-food systems: A critical revision. *Agroecology and Sustainable Food Systems*, 45(7): 1050–1082. <https://doi.org/10.1080/21683565.2021.1913690>
- Government of India. 2014. National agroforestry policy. New Delhi: Department of Agriculture and Cooperation, Ministry of Agriculture. https://agricoop.gov.in/sites/default/files/National_agroforestry_policy_2014.pdf
- Government of Kenya. 2009. Agriculture (farm forestry) rules, 2009. FAOLEX Database. <https://www.fao.org/faolex/results/details/en/c/LEX-FAOC101360>
- Guéneau S, Sabourin E, Niederle P, Colonna J, de Freitas ESG, Piraux M, Lamine C, Santos de Assis W, De Avila ML, de Carvalho CF et al. 2019. A construção das políticas estaduais de agroecologia e produção orgânica no Brasil. *Revista Brasileira de Agroecologia* 14(2): 7–21. <https://doi.org/10.33240/rba.v14i2.22957>
- Hardelin J and Lankoski J. 2018. Land use and ecosystem services in agriculture. OECD Food, Agriculture and Fisheries Paper 114. Paris, France: OECD Publishing. <https://doi.org/10.1787/18156797>
- Heisey P. 2019. Agricultural research and development. In Hellerstein D, Vilorio D and Ribaudo M. eds. *Agricultural resources and environmental indicators, 2019*. Economic Information Bulletin 208. Washington, DC: USDA Economic Research Service, 25–29. <https://www.ers.usda.gov/publications/pub-details/?pubid=93025>
- HLPE [High Level Panel of Experts]. 2020. Food security and nutrition: Building a global narrative towards 2030. HLPE on Food Security and Nutrition, Report 15. Rome, Italy: HLPE. <https://www.fao.org/3/ca9731en/ca9731en.pdf>
- HLPE. 2019. Agroecological and other innovative approaches for sustainable agriculture and food systems that enhance food security and nutrition. HLPE on Food Security and Nutrition, Report 14. Rome, Italy: HLPE. <https://www.fao.org/3/ca5602en/ca5602en.pdf>

- HLPE. 2017. Nutrition and food systems. HLPE on Food Security and Nutrition, Report 12. Rome, Italy: HLPE. <https://www.fao.org/3/i7846e/i7846e.pdf>
- Holden S, Otsuka K and Deininger K. 2013. *Land tenure reform in Asia and Africa: Assessing impacts on poverty and natural resource management*. United Kingdom: Palgrave Macmillan.
- Holt-Giménez E, Shattuck A, Altieri M, Herren H and Gliessman S. 2012. We already grow enough food for 10 billion people ... and still can't end hunger. *Journal of Sustainable Agriculture* 36(6): 595–598. <https://doi.org/10.1080/10440046.2012.695331>
- Holt-Giménez E, Shattuck A and Van Lammeren I. 2021. Thresholds of resistance: Agroecology, resilience and the agrarian question. *Journal of Peasant Studies* 48(4): 715–733. <https://doi.org/10.1080/03066150.2020.1847090>
- Hubert B and Couvet D. eds. 2021. *La transition agroécologique. Quelles perspectives en France et ailleurs dans le monde? Tome I*. Paris, France: Presse des Mines and AAF.
- IFOAM-Organics International. 2017. Guidelines for public support to organic agriculture. 1st ed. https://www.ifoam.bio/sites/default/files/policy_toolkit_main_report.pdf
- IPCC [Intergovernmental Panel on Climate Change]. 2019. *Climate change and land: An IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems*. IPCC. <https://www.ipcc.ch/srccl/>
- Jayne T, Mason N, Burke W and Ariga J. 2018. Review: Taking stock of Africa's second-generation agricultural input subsidy programs. *Food Policy* 75: 1–14. <https://doi.org/10.1016/j.foodpol.2018.01.003>
- Kleijn D, Baquero RA, Clough Y, Díaz M, De Esteban J, Fernández F, Gabriel D, Herzog F, Holzschuh R, Jöhl R et al. 2006. Mixed biodiversity benefits of agri-environment schemes in five European countries. *Ecology Letters* 9(3): 243–254. <https://doi.org/10.1111/j.1461-0248.2005.00869.x>
- Knill C and Steinebach Y. 2022. What has happened and what has not happened due to the coronavirus disease pandemic: A systemic perspective on policy change. *Policy and Society* 41(1): 25–39. <https://doi.org/10.1093/polsoc/puab008>
- Lambert B. 1970. *Les paysans dans la lutte des classes*. Paris, France: Le Seuil.
- Lamine C, Barbier M and Derbez F. 2020. L'indétermination performative d'instruments d'action publique pour la transition agroécologique. In Arrignon M and Bosc C. eds. *Les transitions agroécologiques en France: Enjeux, conditions et modalités du changement*. France: Presses Universitaires Blaise Pascal (PUBP).
- Lamine C. 2020. *Sustainable agri-food systems: Case studies in transitions towards sustainability from France and Brazil*. New York, United States: Bloomsbury.
- Lamine C, Niederle P and Ollivier G. 2019. Alliances et controverses dans la mise en politique de l'agroécologie au Brésil et en France. *Nature Sciences Sociétés* 27(1): 6–19. <https://doi.org/10.1051/nss/2019015>
- Lamine C, Magda D, and Amiot MJ. 2019. Crossing sociological, ecological and nutritional perspectives on agrifood systems transitions: Towards a transdisciplinary territorial approach. *Sustainability* 11(5). <https://doi.org/10.3390/su11051284>
- Le Coq JF, Sabourin E, Bonin M, Fréguin-Gresh S, Marzin J, Niederle P, Patrouilleau MM and Vásquez L. 2020. Public policy support for agroecology in Latin America: Lessons and perspectives. *Global Journal of Ecology* 5(1): 129–138. <https://doi.org/10.17352/gje.000032>
- Lipsky M. 1969. *Toward a theory of street-level bureaucracy*. Madison, United States: Institute for Research on Poverty Discussion Papers, University of Wisconsin.
- Loconto A and Hatanaka M. 2017. Participatory guarantee systems: Alternative ways of defining, measuring, and assessing “sustainability”. *Sociologia Ruralis* 58(2): 412–432. <https://doi.org/10.1111/soru.12187>
- Loconto A and Fouilleux E. 2019. Defining agroecology: Exploring the circulation of knowledge in FAO's Global Dialogue. *The International Journal of Sociology of Agriculture and Food* 25(2): 116–137. <https://doi.org/10.48416/ij saf.v25i2.27>
- MacQueen D, Bose S, Bukula S, Kazoora C, Ousman S, Porro N and Weyerhaeuser H. 2006. Working together: Forest-linked small and medium enterprise associations and collective action. International Institute for Environment and Development (IIED) Gatekeeper Series 125. London: IIED. <https://pubs.iied.org/14521iied>

- Mason N, Jayne T and van de Walle N. 2017. The political economy of fertilizer subsidy programs in Africa: Evidence from Zambia. *American Journal of Agricultural Economics* 99 (3): 705–731. <https://doi.org/10.1093/ajae/aaw090>
- McMichael P. 2016. Commentary: Food regime for thought. *The Journal of Peasant Studies* 43(3): 648–670. <https://doi.org/10.1080/03066150.2016.1143816>
- Mény Y and Thoenig JC. 1989. *Politiques publiques*. Paris: Presses Universitaires de France (PUF).
- Messina E and Bossi L. 2015. *Rome: When school canteens become the biggest organic restaurant of the whole country*. City Food Policies, Case Study 6. France: Cities, Territories, Governance (CITEGO). https://www.citego.org/bdf_fiche-document-1329_fr.html
- Monteiro C, Cannon G, Lawrence M, da Costa-Louzada ML and Pereira-Machado P. 2019. *Ultra-processed foods, diet quality, and health using the NOVA classification system*. Rome: FAO. <https://www.fao.org/3/ca5644en/ca5644en.pdf>
- Niederle P. 2020. Agroecologia e compras públicas: diferentes trajetórias da difusão das políticas para a agricultura familiar no Mercosul. *Revisão Brasileira de Planejamento e Desenvolvimento* 9: 866–896. <https://doi.org/10.3895/rbpd.v9n5.13518>
- Niederle P, Petersen P, Coudel E, Grisa C, Schmidt C, Sabourin E, Schneider E, Brandenburg A and Lamine C. 2022. Ruptures in the agroecological transitions: Institutional change and policy dismantling in Brazil. *Journal of Peasant Studies*. <https://doi.org/10.1080/03066150.2022.2055468>
- Niederle P, Sabourin E, Schmidt C, De Avila ML, Petersen P, Santos de Assis W. 2019. A trajetória brasileira de construção de políticas públicas para a agroecologia. *Redes* 24(1): 270–291. <https://doi.org/10.17058/redes.v24i1.13035>
- Niederle P, Loconto A, Lemeilleur S and Dorville C. 2020. Social movements and institutional change in organic food markets: Evidence from participatory guarantee systems in Brazil and France. *Journal of Rural Studies* 78: 282–291. <https://doi.org/10.1016/j.jrurstud.2020.06.011>
- Nkonya E, Koo J, Kato E and Johnson T. 2017. Climate risk management through sustainable land and water management in sub-Saharan Africa. In Lipper L, McCarthy N, Zilberman D, Asfaw S and Branca G. eds. *Climate Smart Agriculture: Building resilience to climate change*. Natural Resource Management and Policy Book Series 52. Cham, Switzerland: Springer International Publishing, 445–446. https://doi.org/10.1007/978-3-319-61194-5_19
- OECD. 2017. European Union. In *Agricultural Policy Monitoring and Evaluation 2017*. Paris: OECD Publishing. https://doi.org/10.1787/agr_pol-2017-13-en
- Ortega D and Tscharley D. 2017. Demand for food safety in emerging and developing countries: A research agenda for Asia and sub-Saharan Africa. *Journal of Agribusiness in Developing and Emerging Economies* 7(1): 21–34. <https://doi.org/10.1108/JADEE-12-2014-0045>
- Pagella TF and Sinclair FL. 2014. Development and use of a new typology of mapping tools to assess their fitness for supporting management of ecosystem service provision. *Landscape Ecology* 29(3): 383–399. <https://doi.org/10.1007/s10980-013-9983-9>
- Paillard S, Tréyer S and Dorin B. eds. 2014. *Agrimonde: Scenarios and challenges for feeding the world in 2050*. New York, London: Springer International Publishing. <https://doi.org/10.1007/978-94-017-8745-1>
- Pardey P, Chan-Kang C, Beddow J and Dehmer S. 2016. Shifting ground: Food and agricultural R&D spending worldwide, 1960–2011. Working Paper. United States: International Science and Technology Practice and Policy (InSTePP) Center at the University of Minnesota. <https://doi.org/10.22004/ag.econ.302410>
- Patrouilleau M, Martínez L, Cittadini E and Cittadini R. 2017. Políticas públicas y desarrollo de la agroecología en Argentina. In Sabourin E, Patrouilleau MM, Le Coq JF, Vásquez L and Niederle P. eds. *Políticas públicas a favor de la agroecología en América Latina y el Caribe*. Porto Alegre, Brazil: Red PP-AL-FAO.
- Petersen P, Silveira L, Fernandes G and Almeida S. 2020. *Lume: a method for the economic-ecological analysis of agroecosystems*. United Kingdom: Centre for Agroecology, Water and Resilience (CAWR) at Coventry University. <https://www.coventry.ac.uk/globalassets/media/global/08-new-research-section/cawr/coventry-brazil-book-aw3.pdf>

- Pfnder M, Heise TL, Hilton-Boon M, Pega F, Fenton C, Griebler U, Gartlehner G, Sommer., Katikireddi SV and Lhachimi SK. 2020. Taxation of unprocessed sugar or sugar-added foods for reducing their consumption and preventing obesity or other adverse health outcomes. *The Cochrane Database of Systematic Reviews* 4(4), CD012333. <https://doi.org/10.1002/14651858.CD012333.pub2>
- Pimbert M. 2015. Agroecology as an alternative vision to conventional development and climate-smart agriculture. *Development* 58(2-3): 286–298. <https://doi.org/10.1057/s41301-016-0013-5>
- Place F, Meinzen-Dick R and Ghebru H. 2021. Natural resource management and resource rights for agriculture. In Fan S and Otsuka K. eds. *Agricultural development: New perspectives in a changing world*. Washington DC: International Food Policy Research Institute (IFPRI). https://doi.org/10.2499/9780896293830_18
- Rampino MR and Shen SZ. 2019. The end-Guadalupian (259.8 Ma) biodiversity crisis: The sixth major mass extinction? *Historical Biology* 33(5): 716–722. <https://doi.org/10.1080/08912963.2019.1658096>
- Rockström J, Steffen W, Noone K, Persson Å, Suart-Chapin F, Lambin E, Lenton T, Scheffer M, Folke C, Joachim-Schellnhuber H et al. 2009. *Planetary boundaries: Exploring the safe operating space for humanity*. *Ecology and Society* 14(2): 32. <https://doi.org/10.1038/461472a>
- Rosset PM and Martínez-Torres ME. 2012. Rural social movements and agroecology: Context, theory, and process. *Ecology and Society* 17(3): 17. <https://doi.org/10.5751/ES-05000-170317>
- Ruttan V and Conway G. 1998. The doubly green revolution: Food for all in the twenty-first century. Book Review. *Population and Development Review* 24(2): 394–395. https://u.demog.berkeley.edu/~jrw/Biblio/Eprints/PDR/pdr24_2.pdf
- Sabourin E, Le Coq JF, Fréguin-Gresh S, Marzin J, Bonin M, Patrouilleau MM, Vásquez L and Niederle P. 2018. Public policies to support agroecology in Latin America and the Caribbean. *Perspective* (EN ed.) 45: 1–4. <https://doi.org/10.19182/agritrop/00020>
- Sabourin E, Grisa C, Niederle P, Pereira-Leite S, Milhorance C, Damasceno-Ferreira A, Sauer S and Andriguetto-Filho JM. 2020. Le démantèlement des politiques publiques rurales et environnementales au Brésil. *Cahiers Agricultures* 29(31). <https://doi.org/10.1051/cagri/2020029>
- Sambuichi RH, Moura I, Mattos L, et al. (2017). *A política nacional de agroecologia e produção orgânica no Brasil: Uma trajetória de luta pelo desenvolvimento rural sustentável*. Brazil: Institute of Applied Economic Research (IPEA). <http://www.alice.cnptia.embrapa.br/alice/handle/doc/1080075>
- Schmitt C, Porto S, Rodrigues-Lopes H, Neto P, Petersen P, Almeida A, Almeida N, Pragana V, Brochardt V, Cortines AC et al. 2020. *Redes de agroecologia para o desenvolvimento dos territórios: Aprendizados do Programa Ecoforte*. Rio de Janeiro: Articulação Nacional de Agroecologia (ANA). <https://agroecologia.org.br/wp-content/uploads/2020/05/Livro-Ecoforte-Web.pdf>
- Sinclair F, Wezel A, Mbow C, Chomba S, Robiglio V and Harrison R. 2019. *The contribution of agroecological approaches to realizing climate-resilient agriculture*. Background Paper. Rotterdam and Washington DC: Global Commission on Adaptation. <https://gca.org/reports/the-contributions-of-agroecological-approaches-to-realizing-climate-resilient-agriculture/>
- Stevenson J, Villoria N, Byerlee D, Kelley T and Maredia M. 2013. Green Revolution research saved an estimated 18 to 27 million hectares from being brought into agricultural production. *Proceedings of the National Academy of Sciences (PNAS)* 21 (110): 8363–8368. <https://doi.org/10.1073/pnas.1208065110>
- Swinburn BA, Kraak VI, Allender S, Atkins V, Baker P, Bogard J, Brinsden H, Calvillo A, De Schutter O, Devarajan R et al. 2019. The global syndemic of obesity, undernutrition, and climate change: *The Lancet* Commission report. *The Lancet* 393(10173): 791–846. [https://doi.org/10.1016/S0140-6736\(18\)32822-8](https://doi.org/10.1016/S0140-6736(18)32822-8)
- Teixeira M and Motta R. 2020. Unionism and feminism: Alliance building in the Brazilian Marcha das Margaridas. *Social Movement Studies* 21(1-2): 135–151. <https://doi.org/10.1080/14742837.2020.1770430>
- Temple N. 2020. Front-of-package food labels: A narrative review. *Appetite* 144(1). <https://doi.org/10.1016/j.appet.2019.104485>
- UNRISD [United Nations Research Institute for Social Development]. 1980. *Seeds of plenty, seeds of want: Social and economic implications of the Green Revolution*. Geneva: UNRISD.

- USDA [United States Department of Agriculture]. 2021. Sri Lanka restricts and bans the import of fertilizers and agrochemicals. USDA Foreign Agricultural Service Report. New Delhi: USDA. https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Sri%20Lanka%20Restricts%20and%20Bans%20the%20Import%20of%20Fertilizers%20and%20Agrochemicals_New%20Delhi_Sri%20Lanka_05-14-2021.pdf
- Van den Berg L, Goris MB, Behagel JH, Verschoor G, Turnhout E, Botelho MIV and Silva-Lopes I. 2021. Agroecological peasant territories: Resistance and existence in the struggle for emancipation in Brazil. *The Journal of Peasant Studies* 48(3): 658–679. <https://doi.org/10.1080/03066150.2019.1683001>
- Van der Ploeg JD. 2021. The political economy of agroecology. *The Journal of Peasant Studies*, 48(2): 274–297. <https://doi.org/10.1080/03066150.2020.1725489>
- Van der Ploeg JD, Barjolle D, Bruil J, Brunori G, Costa-Madureira LM, Dessein J, Drag Z, Fink-Kessler A, Gasselin P, Gonzalez de Molina M et al. 2019. The economic potential of agroecology: Empirical evidence from Europe. *Journal of Rural Studies* 71: 46–61. <https://doi.org/10.1016/j.jrurstud.2019.09.003>
- Van Vliet S, Kronberg S and Provenza F. 2020. Plant-based meats, human health, and climate change. *Frontiers in Sustainable Food Systems* 4(128). <https://doi.org/10.3389/fsufs.2020.00128>
- Vandevijvere S, Jaacks LM, Monteiro CA, Moubarac JC, Girling-Butcher M, Lee AC, Pan A, Bentham J and Swinburn B. 2019. Global trends in ultraprocessed food and drink product sales and their association with adult body mass index trajectories. *Obesity Reviews* 20(S2): 10–19. <https://doi.org/10.1111/obr.12860>
- Vincennes M. 2019. Cartographie des instruments politiques d'adaptation de l'agriculture au changement climatique au Sénégal. Projet Typologie et évaluation des instruments d'adaptation de l'agriculture au changement climatique (TYPOCLIM), Internship Report. Dakar, Senegal: TYPOCLIM. https://www.bameinfopol.info/IMG/pdf/memoire_master_2_gestion_des_risques_dans_les_pays_du_sud_marie_edith_vincennes.pdf
- Wagner DL, Grames EM, Forister ML, Berenbaum MR and Stopak D. 2021. Insect decline in the Anthropocene: Death by a thousand cuts. *PNAS* 118(2): 1–10. <https://doi.org/10.1073/pnas.2023989118>
- Wallander S and Fooks J. 2019. Working-lands conservation programs. In Hellerstein D, Vilorio D and Ribaudo M. eds. *Agricultural resources and environmental indicators*, 2019. Economic Information Bulletin 208. Washington, DC: USDA Economic Research Service, 124–128. <https://www.ers.usda.gov/publications/pub-details/?pubid=93025>
- Wezel A, Gemmill H, Kerr RB, Barrios E, Rodrigues-Gonçalves AL and Sinclair F. 2020. Agroecological principles and elements and their implications for transitioning to sustainable food systems. A review. *Agronomy for Sustainable Development* 40(40). <https://doi.org/10.1007/s13593-020-00646-z>
- Willet W, Rockström J, Loken B, Springmann M, Lang T, Vermeulen S, Garnett T, Tilman D, DeClerck F, Wood A et al. 2019. Food in the Anthropocene: the EAT-Lancet Commission on healthy diets from sustainable food systems. *The Lancet* 393(10170): 447–492. [https://doi.org/10.1016/S0140-6736\(18\)31788-4](https://doi.org/10.1016/S0140-6736(18)31788-4)
- World Future Council. 2018. Future policy award on scaling up agroecology report. IFOAM Organics International, World Future Council and FAO. <https://www.worldfuturecouncil.org/wp-content/uploads/2018/10/FPA-2018-Brochure-for-web.pdf>
- Zimmerer KS, de Haan S, Jones AD, Creed-Kanashiro H, Tello M, Carrasco M, Meza K, Amaya FP, Gruz-Garcia GS, Tubbeh R et al. 2019. The biodiversity of food and agriculture (Agrobiodiversity) in the Anthropocene: Research advances and conceptual framework. *Anthropocene* 25. <https://doi.org/10.1016/j.ancene.2019.100192>

The Agroecology TPP Working Papers contain preliminary or advance research results on agroecology issues that need to be published in a timely manner to inform and promote discussion. This content has been internally reviewed but has not undergone external peer review.

The debate concerning the need for significant transformations towards more nutrition oriented, environmentally sustainable and inclusive food systems has generated increased attention towards agroecology in recent years. Literature on this subject has already demonstrated that transitions to agroecology will be context specific, as countries and regions have distinctive visions for the future of agriculture and food systems, unique starting points, and will therefore define their own transition pathways. This paper assesses how different policies (consumer oriented; producer oriented; market and food environment oriented; macro and trade oriented; and cross-cutting policies) can affect incentives for agroecology. It provides examples of policies and related actions taken by national, regional and city governments that intend to promote one or more agroecological principles. The assessment reveals that, until now, few countries have embarked on a broad set of reforms with sustained commitments. Many of these policies are new, weakly institutionalized and supported by limited budgets, making it difficult to analyze their actual effects. Because of this, there is very little research on how effective they have been in promoting agroecological transitions or the objectives that agroecology aims to achieve. Consequently, the paper's main recommendation is for research to fill this gap so that future policy formulation and implementation can be better informed by experiences from different countries.



About the Agroecology TPP

The [Agroecology TPP](#) convenes a broad group of scientists, practitioners and policymakers working together to accelerate agroecological transitions. Since its [official launch on 3 June 2021](#), the TPP has begun addressing knowledge gaps [across eight domains](#) that will support various institutions and advocacy groups in key decision-making processes. Its online '[Community of Practice](#)' on [GLFx](#) is open to all, providing a space for members to share their insights, knowledge and experience.

This partnership was founded by CIRAD, The Alliance of Bioversity International and CIAT, BioVision, UNEP, FAO and CIFOR-ICRAF.