Global Gateway

Operational Guide on Agroecology

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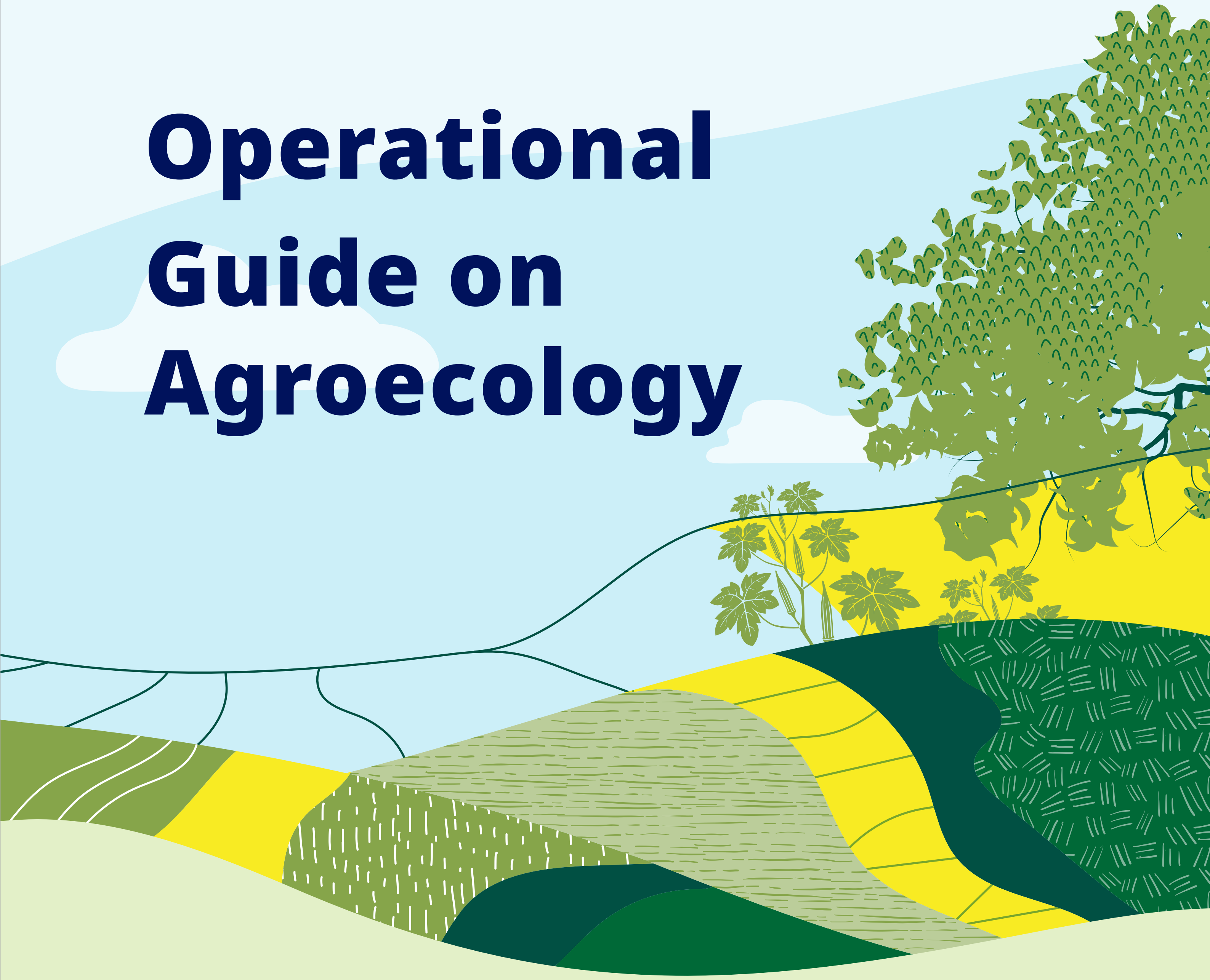

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List of acronyms

ACT	Agroecology Criteria Tool
ADB	African Development Bank
AE	Agroecology
AE4EU	Agroecology for Europe
AFD	Agence française de développement
AVFS	Agronomists and Veterinarians Without Borders
B-ACT	Business Agroecology Criteria Tool
BMZ	Germany's Federal Ministry for Economic Cooperation and Development
CAET	Characterisation of the Agroecological Transition
CARI	Centre for International Actions and Achievements
CC	Climate Change
CFS	Committee on World Food Security
CIDSE	International Cooperation for Development and Solidarity
CIRAD	French Agricultural Research Centre for International Development
CSA	Climate-smart agriculture
CSO	Civil society organisation
DG INTPA	Directorate-General for International Partnerships
DeSIRA	Development Smart Innovation Through Research in Agriculture
EC	European Commission
ECLAC	Economic Commission for Latin America and the Caribbean
EFA+	Economic and Financial Analysis Tool+
EU	European Union
F-ACT	Farm Level Agroecology Criteria Tool
FAO	Food and Agriculture Organization of the United Nations
GERF	Global Europe Results Framework
GHG	Greenhouse Gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GMO	Genetically Modified Organism
GP-SAEP	Global Programme for Small-Scale Agroecology Producers and Sustainable Food Systems Transformation

GRET	Group for Research and Technological Exchange
GTAE	Working Group on Agroecological Transitions
HLPE	High Level Panel of Experts
IAASTD	International Assessment of Agricultural Knowledge, Science and Technology for Development
IFAD	International Fund for Agricultural Development
IFOAM	International Federation of Organic Agriculture Movements
IFPRI	International Food Policy Research Institute
INRAE	French National Research Institute for Agriculture, Food and Environment
INSERM	French National Institute of Health and Medical Research
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPCC	Intergouvernemental Panel on Climate Change
IPES-Food	International Panel of Experts on Sustainable Food Systems
IUCN	International Union for Conservation of Nature
MIP	Multi-annual Indicative Programme
NATAE	North African Transition to Agroecology
NbS	Nature-Based Solutions
NDICI	Neighbourhood, Development and International Cooperation Instrument
NGO	Non-Governmental Organisation
PGS	Participatory Guarantee System
R&I	Research and innovation
RA	Regenerative Agriculture
ROPPA	Network of Farmers' and Producers' Organizations of West Africa
SDC	Swiss Agency for Development and Cooperation
SDG	Sustainable Development Goal
SME	Small and Medium-sized Enterprise
TAPE	Tool for Agroecology Performance Evaluation
UN	United Nations
UNCBD	United Nations Convention on Biological Diversity
UNEP	United Nations Environment Programme
UNFSS	United Nations Food Systems Summit
WHO	World Health Organization

FIRST PART

Theoretical framework

CHAPTER 1

Agroecology: definitions and guidelines

1.1. Introduction

Standard agricultural and food systems inherited from the Green Revolution and agricultural intensification, based on mechanisation, the development of irrigation, large-scale use of high yielding cereal varieties and synthetic inputs, associated with ambitious public policies, have undeniably succeeded in the challenge of an unprecedented increase in the production of certain crops (notably rice, maize, wheat and more recently soya). It is recognised that between 1961 and 2001, regional per capita food production doubled in South and South-East Asia, the Pacific, Latin America and the Caribbean, leading to a decline in poverty for many producers and an increase in total calorie availability (IFPRI, 2002). Although growth was less uniform and generally more modest in Africa during this same period, some African regions nevertheless experienced a notable increase in per capita food production. Similar increases in livestock productivity have also taken place.

This model has encountered limitations with areas which have benefited little from the Green Revolution and yields per hectare that are stabilising or even decreasing in others. The agricultural and food systems they support are also associated with significant negative impacts. With nearly 828 million people suffering from hunger worldwide, they are unable to meet the world's food needs. Nearly a third of the world's population (compared to 25.4% before the COVID-19 pandemic), concentrated in the least developed countries, was in moderate or severe food insecurity in 2021. Economic and trade policy developments towards greater openness, progress in a largely export-oriented industrial agriculture, and the rapid changes in competitiveness they have brought about between different types of agriculture, have contributed to a massive overhaul and destabilisation of food supply patterns, including in countries where small family production systems still dominate. For example, after being a net exporter of agricultural products until the 1980s, Africa became a net importer with a deficit in the agricultural trade balance of USD 36.3 billion in 2021 (ADB, 2022).

Malnutrition in its various forms now affects all countries. Undernutrition and micronutrients persist at unacceptable levels, notably in Africa and Asia. The emphasis on increasing the productivity of a limited number of livestock breeds and varieties of food crops sensitive to chemical inputs has come to the detriment of many traditional crops, leading to a significant erosion of food diversity for all those who do not have the means to compensate for it through a diversified, but costly, food offer available on the markets. At the same time, diets continue to fall short of the minimum standards required for healthy and balanced diets, in particular due to the growing consumption of highly processed foods with a higher level of calories, sugars and fats and low nutritional density. This translates globally into a sharp increase in obesity and associated non-communicable diseases (cardiovascular diseases, cancers and diabetes) that reach epidemic levels. If current trends continue, one in two people worldwide will suffer from malnutrition in 2030[1].

Standard agricultural and food systems are struggling to ensure decent incomes and living standards for many small producers who still produce more than a third of the food consumed worldwide. These systems, in their current forms, promote concentration around a limited number of actors, thereby strengthening their economic and political dominance and their ability to influence. For example, three companies controlled almost half of the world seed trade in 2007, while seven dominated almost all the supply of synthetic fertilisers and five accounted for 68% of the global agrochemical market[2]. Similarly, four companies control more than 75% of world grain trade. This concentration has of course resulted in a drastic reduction in the number of small and medium-sized seed enterprises and a significant reduction in the range of commercial varieties available to the detriment of native crops and species. For example, only fifteen cultivated plants provide 90% of the world's food energy supply, of which three – rice, maize and wheat – account for two thirds, thus providing the basis for food for more than 4 billion people. These systems in which uniform crops are grown and marketed on a large scale serve the economic interests of four large groups of operators, perfectly aligned in terms of the desired political and commercial dynamics: breeders, pesticide manufacturers, grain traders and supermarket managers, to the detriment of those of smaller and incomparably more numerous players[3].

Finally, in a context of strong population growth, particularly in Africa, where the population is expected to almost double by 2050, current agricultural and food systems have a particularly damaging impact on the environment. Cropland is increasingly used to produce, in addition to food, feed, fibre and fuel, creating additional and unsustainable competition for scarce and already depleted natural resources (soil, water). Agri-food systems are responsible for almost one third of greenhouse gas (GHG) emissions related to crop and livestock farming activities, land use changes (massive deforestation and peatland drainage), production and use of chemical inputs, as well as pre- and post-production processes, such as food manufacturing, retail, household consumption and disposal of waste and losses. They also contribute to soil depletion and degradation, an unprecedented loss of biodiversity due to the destruction of habitats and ecosystems, and high levels of air, water and soil pollution in the most intensive regions (including Africa). These negative externalities are in turn important drivers of climate change and food and nutrition insecurity. They will continue to feed from the worsening of other contemporary challenges such as global population growth, urbanisation, conflict and migration, climate change, poverty and growing inequalities.

These trends are increasingly attributed, including through scientific research, to the so-called "conventional agriculture", which takes different forms across countries but often promotes monoculture, heavy use of synthetic inputs and intensive livestock farming practices disconnected from agriculture. They have led to territorial specialisation with a high economic dependence on a limited number of sectors and negative effects on soil, water and biodiversity, including in Europe. Although it is still underdeveloped in its ultimate form in Africa, it is widely encouraged by current agricultural and trade policies. Because the negative externalities generated are not mere exogenous side-effects but constituent and therefore systematic impacts, a 'profound transformation of what is produced and how it is produced, processed, transported and consumed is therefore necessary at all scales to ensure appropriate food production and reduce losses and

1 According to FAO Director-General José Graziano da Silva at a G7 meeting of Health ministers in Milan on 5 November 2017.

2 IPES-Food (2016).

3 On the growing influence of corporations on the governance of food systems, and how to counter it, see IPES-Food (2023).

waste, while preserving human and environmental health, political stability and better livelihoods with less environmental impacts'. This is the very broad consensus reached by the High Level Panel of Experts (HLPE) on Food Security and Nutrition of the Committee on World Food Security (CFS) in July 2019.

There are growing societal voices calling for different approaches, based on an agriculture that values a diversification of farming systems and agricultural landscapes, that minimises or eliminates dependence on marketed inputs through integrated management methods of soil fertility and the fight against pests and diseases, that optimises biodiversity and stimulates interactions between different species, as part of holistic strategies, to ensure long-term soil fertility, healthy agroecosystems and similar or increased yields. It is also about working towards a new distribution of power relations by addressing power imbalances and conflicts of interest, in order to generate local knowledge, promote social justice, nurture community identity and culture and to strengthen the economic viability of rural areas, notably through decent incomes for small producers and their organisations. Among the many possible alternatives, and on the basis of growing scientific production, observation of agrarian realities in the world and lessons learned from more and more numerous development interventions, agroecology is increasingly seen as a credible and effective response to building sustainable and resilient agri-food systems. Validated by several UN agencies, and by the Food and Agriculture Organization (FAO), which defined its 10 elements in 2019, it is now the subject of national policies in more than 40 countries. If its implementation in practice, and in particular the research devoted to it, still remains limited, the results for which it is credited justify redoubled support and investments.

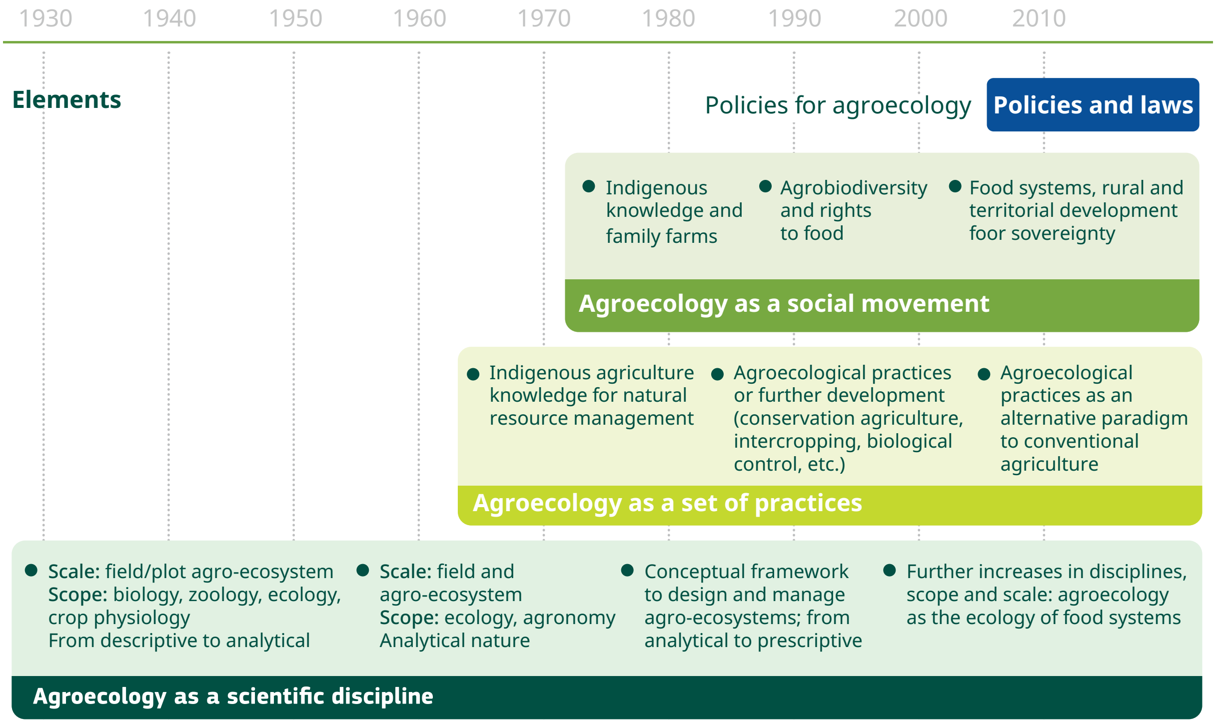
This guide is based on this growing interest in agroecology, both within the European Union (EU) and in partner countries. Its main aim is to provide its users, and first and foremost EU Delegation staff, with a theoretical framework (part 1) and methodological tools (part 2) to enable them to better understand what the concept covers and how it can be put into practice. They will thus be better equipped to promote, more broadly, within their programmes, the transformation of agri-food systems in line with the 13 agroecological principles defined by the High Level Panel of Experts (HLPE) on Food Security and Nutrition and fully compatible with the Sustainable Development Goals (SDGs), the Paris Climate Agreement, the post-2020 objectives of the Convention on Biological Diversity (CBD) and those of the United Nations Convention to Combat Desertification (UNCCD).

1.2. Definitions of agroecology: The origins of the concept and its evolution

Agroecology is a polysemic concept whose contours have evolved over almost a century. There is not a single definition but a large number that reflect the concerns and commitments of the different authors and practitioners. Thus, the scientific and technical perspective adopted by the High Level Panel of Experts (HLPE) in 2016 when it described agroecology as 'the application of ecological concepts and principles to agricultural systems, focusing on the interactions between plants, animals, humans and the environment, to foster sustainable agricultural development in order to ensure food and nutrition security for all today and tomorrow' has become too restrictive. Indeed, the concept has become more complex as it addresses agri-food systems as a whole, and not just agricultural systems, by overcoming the divide between the scientific and technical dimensions of agroecology and its social and political dimensions, and by adopting a holistic perspective. The resulting concept of agroecology, which is widely shared today, is that of a transdisciplinary, participatory and action-oriented approach, relating at the same time to a **transdisciplinary science, a set of practices and a social movement**[4].

4 Altieri, 1995; Francis et al., 2003; Wezel et al., 2009; Gliessman, 2015.

FIGURE 1: HISTORICAL EVOLUTION OF AGROECOLOGY



Source: adapted from HLPE (2019)

1.2.1. Agroecology as a science

Agroecology appeared in scientific literature in the 1930s. It was introduced and developed by Basil Bensin (1881-1973), an agronomist of Russian origin, which laid the foundations for an interdisciplinary approach combining the ecology of cultivated plants, agricultural technology and knowledge of the natural, economic and social environment. Bensin already sees agroecology as an 'engaged science serving more equitable production systems, offering farmers accessible and inexpensive solutions to increase their production, and referring to local'[5]. However, it was not until the 1980s that the concept of agroecology was structured. Its originality is that it is built on a dual parentage, both in North American scientific work and in the commitment of social movements in several Latin American countries. Agroecology is thus able to bring science closer to political, social and societal concerns. The observations made by several agronomists and ecologists during their Latin American field research prompted them to build an alternative development model on the basis of a critical assessment of the impact of the Green Revolution. Among the best known of them is Miguel Altieri, an agronomist of Chilean origin, lecturer at the University of Berkeley (California), who, in a formula that has made history, defined agroecology as 'the application of ecological concepts and principles to the design and management of sustainable agroecosystems'[6]. In other words, it is a question of relying on the natural regulations of the agroecosystem rather than on inputs, to ensure agricultural production without wasting resources, in particular those that are not renewable[7]. The theoretical framework developed by these scientists will offer various social actors already engaged in agroecological practices a reference framework to think about an alternative to conventional agriculture.

5 Doré, T., Bellon, S. (2019).

6 Altieri, M. (1983) and Altieri, M. (1995).

7 Meynard, J.M. (2017).

European research and innovation for agroecology

In recognition of the contribution that agroecology and organic farming can make to accelerating the transition to sustainable agricultural and food systems in line with the commitments made under the European Green Deal, its underlying strategies—Farm to Fork and the EU Biodiversity Strategy 2030—and the Common Agricultural Policy, among others, significant resources are allocated to these disciplines under European research programmes.

For example, Horizon 2020 (2014-2020) dedicated EUR 316M on research activities addressing different aspects of the agroecological transition. Its successor Horizon Europe (2021-2027) launched 55 calls for proposals on topics related to agroecology and organic farming with a budget of EUR 420M for the period 2021-2024. Among these, a call on 'Agro-ecological approaches in African agriculture systems' was published in 2022, for a total budget of EUR 28M. Four running projects—NATAE, CIRAWA, PrAEctiCe and CANALLS—are increasing knowledge on the potential of agroecology to address challenges of agricultural and food systems in various African pedo-climatic regions.

In 2024, a Horizon Europe Partnership dedicated to agroecology was launched. The Partnership was co-developed between the European Commission, EU Member States, countries associated to Horizon Europe and several other stakeholders. It is expected to last for 7 to 10 years, with a provisional total budget of EUR 300M, half of which provided by the European Commission. It is the biggest such initiative devoted to agroecological research worldwide, a joint endeavour of the EU and 72 partners from 26 countries so far. The Partnership is pooling their efforts and resources to lift lock-ins, enable and steer agroecology transition by integrating all relevant actors. The Partnership will contribute to filling existing knowledge gaps on agroecology, promoting open innovation and user-driven research on agroecology, addressing the wide geographical/territorial specificities in the EU through place-based approaches with long-term perspectives, and improving the sharing of knowledge within and across EU countries and beyond. The Agroecology Partnership is also putting in place mechanisms for science-policy dialogue in support of the establishment, implementation, and evaluation of evidence-based policies (research and sectoral) endorsing agroecology transition, including long-term funding for agroecology R&I. Among its activities, the Partnership foresees to launch 7 calls for research and innovation projects. The first and second calls were launched in 2024 and 2025, respectively. The list of projects funded under the first call is already published.

The EU Mission: A Soil Deal for Europe, that aims to establish 100 living labs and lighthouses to lead the transition towards healthy soils by 2030, also contributes to EU efforts to promote agroecological R&I by developing solutions to restore soil health and functions.

AGROECOLOGY PARTNERSHIP

1.2.2. Agroecology as a set of practices

In the 1960s, the discovery of the unexpected impacts of the intensive use of synthetic inputs in agriculture on the environment, and in particular of the concentration of pesticide residues in food chains on birds of prey aroused strong concerns. Partly in response to this awareness, a set of agroecological practices emerged over the following decades that sought to move away from an industrial agriculture model towards more environmentally friendly and more sustainable farming systems where the use of biological processes and ecosystem functions is optimised. As Altieri (2002) will write, agroecology, thus conceived, aims to design complex and resilient agroecosystems, which, by 'assembling crops, animals, trees, soils and other factors into spatially and time-diverse patterns, favour natural processes and biological interactions that optimise synergies so that diversified farms are able to ensure the fertility of their soils, the protection of their crops and their own productivity'.

Despite recent attempts to define specific practices that can be qualified as agroecological, there is no defined set, nor clear and consensual demarcations of what is agroecological and what is not[8]. More precisely, agricultural practices can be described as more or less 'agroecological' depending on the extent to which: (i) they rely on ecological processes as opposed to the use of agrochemical inputs; (ii) they are fair, environmentally friendly and locally adapted; and (iii) they adopt a systemic approach, rather than focusing solely on specific technical measures.

However, it is worth keeping in mind that agroecological practices involve processes such as: nutrient cycle management; biological nitrogen fixation; improving soil structure and health; water conservation; biodiversity conservation and habitat management techniques for crop associated biodiversity; carbon sequestration; biological pest control and natural disease regulation; diversification, mixed and intercropping, mixtures of cultivars; as well as the management, reuse and recycling of waste as inputs in the production process, such as the use of manure and compost[9].

8 Wezel, A. (2017).

9 Reijntjes et al., 1992; Altieri, 1995; Nicholls et al., 2016; Wezel et al., 2014; Wezel, 2017.

FIGURE 2: CONCEPTUAL FRAMEWORK OF AGROECOLOGICAL PRACTICES

MANAGEMENT CATEGORY	AGROECOLOGICAL PRACTICES
Crop fertilisation management	Split fertilisation. Mixed organic fertilisation, balanced fertilisation. Biofertiliser, mycorrhizae inoculation, beneficial microbials and microorganisms. Organic fertilisation: manure, compost, zai/planting pit, biochar, biodigestate, biodynamic preparation, biofermentation.
Water management	Drip irrigation, micro-irrigation/drip irrigation/variable rate irrigation.
Weed management	Ecological weed management, allelopathic plants.
Pest and disease management	Natural pesticides/botanical pesticides, pesticide reduction, antibiotic reduction. Beneficial arthropods/natural enemies, beneficial microbials and microoranisms. Push-pull strategies, allelopathic plants.
Crop choice, crop spatial distribution, and crop temporal successions	Crop residue application, coppice management. Multistorey cropping/syntropic agriculture. Stress-tolerant, disease-resistant crop/cultivar. Cover crop and mulching: green manure, cover crops, mulching, catch crop. Cropping system diversification: variety/cultivar mixture, crop diversification, diversified crop rotation, improved fallow, crop-livestock integration (i.e. pasture, grassland, grass-feeding, permanent grassland, rotational/controlled grazing, forest grazing, rice-fish system/rice-duck system, aquaculture/fish farming). Intercropping, alley cropping, living mulch, mixed cropping Agroforestry: silvoarable, silvopastoral, agro-silvo-pastoral, homegarden.
Tillage management	No tillage, reduced tillage, direct seeding, conversation tillage, controlled traffic.
Management of landscape elements	Integration of semi-natural landscape elements at field or farm scale: hedgerows, windbreaks, and living fences, flower strips, field-margins and semi-natural patches, buffer/vegetative strips. Planting or managing landscape elements: stone wall/terracing, paludiculture/wetland management, semi-natural areas, conservation headland. Dune stabilisation, erosion control, soil/land rehabilitation/restoration, afforestaion.
Other-package of practices	Sustainable rice intensification, organic farming, climate change adaptation practices (e.g. adjusting planting dates), agroecological farming, biodynamic farming.

Source: Mouratiadou I., and Wezel, A., 2024

Some of these practices have been applied to varying degrees in different parts of the world for decades, while others have emerged more recently with still limited levels of adoption. Certain agrarian systems based on farmers' practices of mobilising ecosystem functionalities could be described as agroecological. Polyculture models operating in a circular environment (crops-livestock, agroforestry, recycling, short distribution/supply chains, etc.) comply with certain principles of agroecology. However, a set of practices does not constitute a system capable of responding to all the issues of climate change, ecological challenges or the deterioration of the global food and nutrition situation, to which agroecology can provide solutions.

1.2.3. Agroecology as a social movement

Agroecology has also evolved in response to agrarian crises, driven by the broader efforts of social movements keen to initiate far-reaching changes. Civil society organisations (CSOs) defending farmers' rights have played a central and historical role in this regard[10] by advocating for a strong link between agroecology, the right to adequate food and food sovereignty. This concept was introduced for the first time in international discussions by Via Campesina, an international farmer movement, during the 1996 Food Summit in Rome[11]. It was then defined by CSOs and social movements gathered in Nyeleni, Mali, on the occasion of the First International Forum for Food Sovereignty as 'the right of peoples to healthy and culturally appropriate food, produced by environmentally friendly and sustainable methods, and their right to define their own food and agricultural systems'[12].

In February 2015, the same players met in Nyeleni around an International Forum on Agroecology. In their Final Declaration, they presented 'agroecology as a key element in the construction of food sovereignty'. For them, agroecology is not only 'a narrow set of technologies' but also, and above all, a political struggle, requiring people to 'question and transform power structures in society', by addressing power imbalances and conflicts of interest, in order to 'generate local knowledge, promote social justice, nurture identity and culture, and enhance the economic viability of rural areas'. They emphasize the relationships of domination, notably denouncing the control over resources exercised by certain actors to the detriment of small producers.

Agroecology has thus become the policy framework within which many social movements and farmers' organisations around the world defend their collective rights and advocate for a diversity of locally adapted agriculture and food systems where small producers, their communities and their organisations, rather than agri-food businesses, play a central role.

1.2.4. Agroecology for a transition to sustainable food systems

The 2000s mark a decisive step in the evolution of agroecology, reflecting the growing awareness of climatic and ecological threats and agricultural and food issues. The concept then goes beyond the farm to focus on food systems[13]. This has led to a new definition of agroecology, presented as 'the ecology of food systems' or 'the integrated study of the food system, taking into account ecological, economic and social dimensions'[14]. The 2000s were also marked by the report on the International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD), drafted by a team of 400 researchers from different disciplines under the auspices of the FAO[15]. This document, published in the aftermath of the 2007-08 food crisis, is not specific to agroecology, but marks a turning point in the conception of rural and agricultural development. By demonstrating that the agricultural model advocated by the Green Revolution as the sole solution to world hunger is a stalemate, the report paves the way to a profound rethink of agricultural and food systems.

The definitions of agroecology from the multi-stakeholder symposia organised by the FAO between 2014 and 2018 endorse the idea of an **agroecological transition**: '...Through an integrative approach, agroecology is an area where science, practice and social movements converge to seek **a transition to**

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10 Loconto, A., Fouilleux, E. (2019).

11 Via Campesina Rome Declaration on Food Sovereignty (1996).

12 In 2007, several civil society organisations (Friends of the Earth International, Via Campesina, the Marche des Femmes, ROPPA, etc.) created a collective to organise the World Forum on Food Sovereignty in Nyeleni (Mali). At the end of this meeting, more than 500 representatives of farmers' organisations, indigenous peoples, traditional fishermen, migrants, environmental movements, landless farmers, livestock keepers, etc. from more than 80 countries adopted the so-called Nyeleni Declaration on Food Sovereignty.

13 A food system represents all actors and activities involved in food production, processing and distribution.

14 Francis et al. (2003).

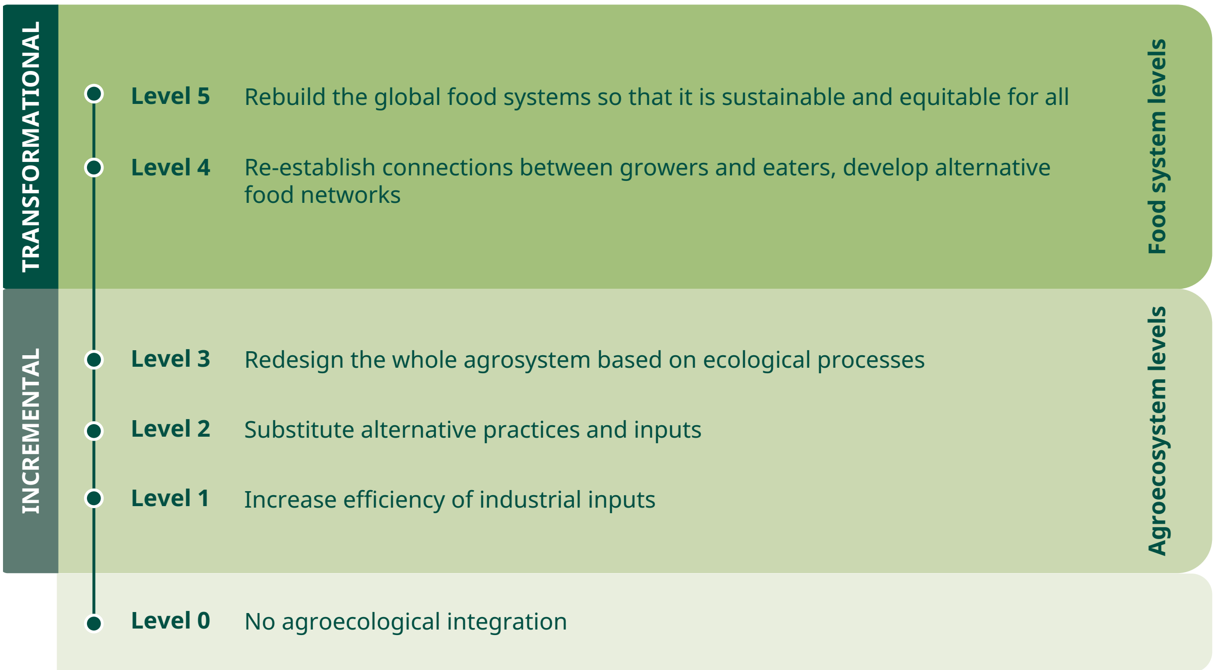
15 IAASTD (2016).

sustainable food systems based on equity, participation and justice'[16]. This notion of agroecological transition was then theorised by numerous authors[17,18,19,20] to establish itself in the debate for around ten years. It reflects the multifaceted challenges facing agricultural and food systems in countries of both the North and the South: environmental emergencies, climate disruption, social inequalities, artificialization and development of land and water, to name but a few.

Agroecological transitions are strategic processes of collective action aimed at achieving more socially equitable and ecologically healthier food systems[21].

The most commonly used model to illustrate the concept of agroecological transition is the one developed by Stephen Gliessman (2005), which identifies five transition levels of the food system, introducing the notion of scale (plot/landscape/territory/food systems) and process.

FIGURE 3: THE 5 LEVELS OF AGROECOLOGY ACCORDING TO S. GLIESSMAN



Source: Gliessman, revisited by Sourisseau

If certain models such as climate-smart agriculture or sustainable intensification rely on technology to respond to current agricultural and food challenges, it is now widely recognised that agroecological transitions must occur beyond just farming practices and that they also require social, political and cultural change processes[22]. Over the last decade, the concept of a transformative agroecology bringing a paradigm shift to revamp environmentally, politically and socially sustainable agricultural and food systems has become increasingly prevalent in the international political arena[23,24].

16 FAO, 2015, original version: [...] Through an integrative approach, agroecology is a realm where science, practice and social developments converge to seek a transition to sustainable food systems, built upon the foundations of equity, participation and justice.

17 Gliessman, S. (2016).

18 CIRAD (2019).

19 IAASTD (2019).

20 Wezel, A. (2020).

21 University of Vermont (2022).

22 Giraldo, O.F., Rosset, P. (2017); FAO (2018); HLPE (2019).

23 Anderson et al. (2019).

24 Anderson, C., Pimbert, M. (2020).

1.3. Position of actors on agroecology

As it intervenes at each of the scales of agricultural and food systems through a systemic approach, agroecology involves a plurality of actors driven by specific visions, priorities and fields of action with varying degrees of interdependence.

1.3.1. Agroecology, a multi-stakeholder approach at local level

Producers are of course the key players in the agroecological approach to the extent that it is ultimately up to them to choose crops, farming practices, the use of production and marketing channels. However, depending on the context, these choices are made more or less autonomously. Decisions taken at plot or larger-scale farms level can indeed be influenced by public policies, the legal framework, the technical support available, the organisation of markets, the social structure or the economic model. The orientations, therefore, mobilise a set of actors whose interests, strengths, weaknesses, alliances and oppositions must be understood. Women are often the most involved in agroecological practices, which can be explained by their culturally assigned feeding role in most societies or by their low access to productive resources (inputs, water, land, etc.). Having access to often less fertile land and smaller plots forces them to further amend and intensify using natural methods. Their feeding and caretaking role implies a greater diversity of food and medicinal plant cultures. However, it is not uncommon that practices differ depending on the destination of production. For example, peri-urban market gardening for markets is often less diversified (choice of production based on their market value rather than on their nutritional quality) and more intensive in chemical inputs than food gardens intended for own consumption. In the first case, the proceeds from the sale of produce also allow for the purchase of inputs. Interest in agroecological practices, therefore, sometimes depends on the production systems and their destination (own consumption vs. selling), which determine the choice of crops and access to inputs.

Producers' organisations (POs) can be an important relay for sharing knowledge on agroecological practices, for structuring producers and for defending their rights. Farmers' organisations or trade unions defending peasant agriculture are often promoters of agroecology, which makes it possible to reduce variable costs (inputs) by encouraging sustainable agricultural practices and promoting interactions between producers and **consumers**, ultimately resulting in increased yields and resilience of agricultural systems, then less dependent on costly one-off solutions. Peasant agriculture defends an agricultural model based on the autonomy of producers, the territorialisation of agricultural and food systems and on diversity. However, this commitment cannot be extrapolated to all producers' organisations, some of them being structured around a monoculture or a unique production system.

Local and regional authorities have an essential role to play in fostering the development of agroecological farming and food systems. They can act, by virtue of their skills, in different ways:

- Mobilising the territory's stakeholders in their plurality to develop a common vision of food, taking into account the environmental, social, economic and health dimensions associated with it.

- Developing territorial planning that facilitates the development of agroecology, for example through favourable land policies, measures to preserve ecosystems, governance structures for equitable water sharing, etc.

- Promoting the territorialisation of food, through support to facilitate the marketing of production on local markets and the enhancement of local production.

Agroecology therefore places the relationships between the various actors in the territory at the heart of its approach, and in particular the links between producers and consumers (short distribution/supply chains, direct sales). They indeed share common interests in terms of the preservation of landscapes and ecosystems, the quality and diversity of products and even of the proximity of places of sale. However, their interests may differ when it comes to pricing. The challenge is therefore to determine a price which is sufficiently remunerative for producers and accessible to all. By promoting an approach that limits intermediaries, agroecology contributes to reducing costs and promoting local production. However, agroecological principles also apply to long supply chains.

The **private sector** including micro, small and medium enterprises (MSMEs), farmers' organisations, professional and/or trade associations, etc. is one of the key players in the agroecological transition which, far from being just a constraint in terms of respecting environmental, climatic and/or gender requirements, offers significant economic opportunities. Without private actors, the possibilities for scaling agroecological innovations would be considerably reduced. To this end, companies must seriously set objectives in terms of social and environmental responsibility (circular economy, sustainable labels, inclusion, equity, etc.) or if they contribute to local dynamics by participating in the relocation of productive systems and the marketing of agricultural production. The private sector can also oppose agroecology to develop its markets (e.g. chemical inputs) or also influence public policies in line with its particular interests. This is the case with lobbies linked to agro-industry interested in the privatisation and commodification of living organisms or in the development and commercialisation of technologies in favour of agricultural intensification.

1.3.2. Agroecology, a political issue

State actors can play a determining role in promoting agroecology or, conversely, hamper its development. By proposing a 'comprehensive vision that combines social, environmental, economic and cultural aspects, defining a new model for rural development'[25], the agroecological transition covers a wide range of public policies. This may include incentive measures such as payments to producers for the ecosystem services provided by their farming practices (e.g. preservation of natural resources, crops promoting biodiversity, anti-erosive techniques, etc.), considering that they benefit society as a whole—or conversely, dissuasive measures such as the taxation of polluting practices, given the fact that their cost (health, environment) is generally borne by the community. States, usually grouped into regional associations, can also intervene in trade policies, for example through customs tariffs to limit the risks of market distortion created by the competition between local production and heavily subsidised imported products. Public policies can promote the integration of agroecology into school and university curricula and in the training of ministerial staff (at central level and decentralised services). Public authorities can steer their agricultural policies and strategies towards an agroecological approach or create a regulatory framework favourable to smallholder farming (e.g. land rights, sharing water resources according to usage, regulations on seeds and on the use of synthetic products, etc.), biodiversity and social justice (e.g. equality between women and men). Public policies are fundamental to support the large-scale development of the agroecological transition.

The pioneering countries in the promotion of agroecology in public policies are located on the American continent. Cuba, in response to the US embargo, is the emblematic figure. Brazil, under Lula presidency, and under the impetus of civil society (landless movement), is one of the countries where the institutionalisation of agroecology was the most advanced in the 2010s[26]. However, these examples are not isolated as around 30 countries refer to agroecology in their policies and/or legal framework[27]. However, ambitions are disparate, with some countries having developed a national policy on agroecology, while others simply mention it as one measure among others in sectoral policies. The state of Andhra Pradesh in India is a recognised illustration of the scaling of agroecology thanks to public policy support since 2015. In West Africa, Burkina Faso has developed a national strategy for agroecology for the period 2023-2027, while Senegal has declared agroecology as a national priority[28]. In Eastern and Southern Africa, unprecedented momentum has recently emerged for agroecological national action. In November 2023, Tanzania launched its National Ecological Organic Agriculture Strategy (NEOAS), 2023–2030, which attracted the attention of the donor community, including the philanthropic community[29]. Kenya followed a year later with the launch of its National Agroecology for Food System Transformation Strategy 2024–2033. Uganda and Zambia have embarked in developing their own National Agroecology Strategies while Rwanda, Zimbabwe and South Africa are interested in doing so. These promising policy developments should not mask the fact that in most countries, if not all, national strategies in favour of agroecology coexist with policies supporting conventional models.

The integration of agroecology into public policies is often the result of the mobilisation of **civil societies in the South and the North** (farmers' organisations, feminist associations, human rights organisations, indigenous peoples' groups, etc.). As stated in Section 1.2 (Definitions of agroecology), they have contributed to the definition and acceptance of a more holistic and inclusive concept of agroecology incorporating the values of social justice, food sovereignty, recognition of local

25 Le Coq et al. (2020).

26 National policy on agroecology and organic production of 2012, converted into a national plan for agroecology and organic production in 2013 and renewed in 2016.

27 Argentina, Bolivia, Brazil, Colombia, Ecuador, Uruguay, Guatemala, Peru, Paraguay, Nicaragua, Mexico, Algeria, Burkina Faso, Senegal, Ghana, Kenya, Uganda, Bangladesh, Nepal...

28 Place, F. et al. (2022).

29 https://kilimokwanza.org/tanzania-launches-groundbreaking-national-strategy-for-ecological-organic-agriculture-2023-2030/

knowledge, respect for local cultures, dignity. Agroecology has thus become the policy framework in which many social movements and farmers' organisations defend their collective rights and advocate for diverse agricultural and food systems adapted to local conditions and practised by small food producers in different territories [30].

1.3.3. Agroecology, an international challenge

Agroecology was brought to the international stage in the 2010s. Certain UN agencies, in particular the FAO[31], subsequently played an extremely important role in conceptualising the agroecological approach and disseminating it to governments, development agencies and non-governmental organisations. Agroecology is then presented, in the light of the Sustainable Development Goals for 2030, as being '**the key to transforming agricultural and food systems**'. The symposia on agroecology organised by the FAO from 2014 onwards contributed to the formulation of the 10 constituent elements of agroecology adopted by 197 FAO members in December 2019 (see section 2.2). The report of the High Level Panel of Experts (HLPE) of 2019, entitled 'Agroecology and other innovative approaches', is another major contribution to the discussions around agroecology on the international stage. However, these commitments are not always reflected in the positions of the UN agencies, which may be crossed by contradictions and internal debates linked to the positions of their members. The United Nations Food Systems Summit (UNFSS), held in New York on 23 September 2021, focused attention on the need for concerted action to rethink food systems. The Coalition for Food Systems Transformation Through Agroecology was set up in this context with the objective of accelerating the transformation of food systems through agroecology, guided by the 13 principles of agroecology defined by the **High Level Panel of Experts (HLPE) of the Food Security Committee (CFS)**, which are aligned with the 10 elements of agroecology adopted by the FAO[32]. It is important to note that the international dimension of agroecology has been affirmed in the light of a growing realization of its multiple co-benefits in a wide range of fields. Therefore, on the basis of convergent scientific evidence documenting the positive impact of agroecological practices on biodiversity, adaptation to climate change and the fight against land degradation, agroecology appears more and more commonly as an unprecedented opportunity to capitalise on the synergies between the three Rio Conventions with a view to achieving the objectives not only of the Convention on Biological Diversity (CBD) but also those of the United Nations Framework Convention on Climate Change (UNFCCC) and of the United Nations Framework Convention on Combating Desertification (UNCCD)[33].

30 HLPE, 2019.

31 The 2014 agroecology symposium was followed by three regional meetings in Latin America, Africa and Asia in 2015, three regional meetings in Latin America, China and Europe in 2016, one meeting in North Africa in 2017 and a new symposium in 2018.

32 https://agroecology-coalition.org/wp-content/uploads/2024/06/flyer_EN.pdf

33 See Recognition of agroecology in Rio Conventions: potential for scaling up, Summary report, CARI, Humundi and Iles de Paix with the support of Minka International, June 2024.

What is the Coalition for food systems transformation through agroecology?

The Agroecology Coalition was set up in 2021 to provide a mechanism for countries and organisations to collaborate on food systems transformation through agroecology while addressing multiple crises simultaneously. Its work is guided by the Principles and Elements of Agroecology as defined by the High Level Panel of Experts for Food Security and Nutrition (HLPE-FSN) of the Committee on World Food Security (CFS) and FAO, respectively. Building on and amplifying the work of its members both from government and non-state actors, the Coalition facilitates co-creation and exchange of knowledge, fosters increased investments, advocates for supportive policies, and promotes market pathways for agroecology.

The Agroecology Coalition has six working groups, gathering representatives from different member organisations and countries. These are spaces of connection and exchange, where new collaborations kickstart:

- Policies
- Financing and investments
- Communications
- Implementation
- Markets
- Research, Innovation and Education

Members

As of September 2024, Coalition members comprise around 50 governments, 3 regional commissions, a few sub-national administrations and more than 250 organisations, including from different stakeholder groups (i.e. farmers' associations, research institutions, indigenous peoples' organisations, UN and other international organisations, donors and philanthropic foundations, civil society/non-governmental organisations, and small and medium enterprises).

Donor partners

The work of the Agroecology Coalition is also made possible thanks to the support provided by the following donor partners: Biovision Foundation, GIZ, IFAD-EU, McKnight Foundation, the Swiss Federal Office for Agriculture and the Swiss Development Cooperation Agency (SDC).

Milestones

- Development of the Agroecology Coalition 2024-2030 Strategy to accelerate food systems transformation, after a year-long consultation process with members.
- Regular interaction among members through the various working groups and other spaces created.
- Repository of case studies and initiatives implementing agroecology, analysing their successes and challenges.
- Enhanced visibility of agroecology and of the Coalition through various high-level side events in international spaces (COP28, CFS, UNFSS) and webinars to advocate for agroecology.
- Co-convening of donors to facilitate coordination and advocacy for increased funding towards agroecology.
- Development of Agroecology Finance Tracking Tool based on a framework developed by a community of practice on tracking agroecology finance flows.
- Repository on agroecology resources for whoever wishes to delve into the topic further (with courses, videos, websites, policy reports and infographics).
- New tools and assets (e.g. websites, social media, newsletters, brochures, videos) to communicate agroecology and its benefits.

Agroecology Coalition
Coalition pour l'Agroécologie
Coalición por la Agroecología

Development agencies[34] have been supporting the agroecological transition for several years through supporting various axes of intervention[35]. They have an important role to play in promoting agroecology, both among governments and partner organisations (NGOs, UN agencies, private sector, etc.). However, commitments to agroecology vary widely from one donor to another. The Swiss Cooperation, for example, has an ambitious target through its comprehensive food security strategy for 2021-2024, which aims to devote 50% of its agriculture and food systems portfolio to agroecology[36]. The International Fund for Agricultural Development (IFAD) has also significantly increased its contributions to agroecology since 2018 (almost 60% of IFAD projects completed between 2018 and 2023 implement some agroecological practices)[37]. The UN agency is part of the 'scaling-up Agroecology Initiative' launched at the Second International Symposium on Agroecology in 2018 in Rome. IFAD presents agroecology as a solution to the dysfunctions of food systems. Other donors, on the contrary, favour models such as 'sustainable agriculture' or 'climate-smart agriculture' and identify less with an agroecological approach. However, most development agencies fall between the two, i.e. they finance agroecological transition programmes at the same time as they support other agricultural models, including agro-industry. The share devoted to the latter is generally substantially higher, although commitments for agroecology tend to grow.

Many **International Non-Governmental Organisations (INGOs)**[38] working in the field of food security have supported agroecology in recent years. They contribute to advocacy in favour of agroecology (Grain, Slow Food, International Cooperation for Development and Solidarity (CIDSE), the Catholic Committee Against Hunger and for Development (CCFD-Terres Solidaires), Oxfam, etc.), to scientific knowledge generation through research and action programmes (The Group for Research and Technological Exchange (GRET), the Centre for International Actions and Achievements (CARI); the development of methodological tools (Biovision, the Working Group on Agroecological Transitions (GTAE), etc.), implementation (Agronomists and Veterinarians Without Borders (AVFS), APDRA Farmer Fish Farming, etc.), and the provision of support for civil societies (ActionAid, etc.). INGOs have varying degrees of perspective as regards agroecology—ranging from what may be perceived as 'restrictive', often limited to a few agricultural practices, to a more 'inclusive' vision, encompassing the entire food systems. This brings to the fore the importance of the 13 agroecology principles defined by the HLPE which serve as a guide in defining what is agroecological and what is not.

The field of research is closely associated with agroecology, in its conceptualisation, the production of evidence and knowledge and its dissemination. The relevance and effectiveness of agroecology in the face of the main challenges of the 21st century are thus documented by a growing number of scientific publications and empirical studies. These relate in particular to the contribution of agroecology to addressing climate and environmental challenges. Research also contributes to innovation and experimentation. Participatory, transdisciplinary action-research is in fact constitutive of agroecology, in the sense that it accompanies change through a participatory approach combining practice with knowledge generation. Action-research projects carried out by consortia of actors made up of research centres, universities, civil society organisations and practitioners are funded by various donors (e.g. Development Smart Innovation Through Research in Agriculture (DeSIRA) and the Horizon 2020 programme, funded by the European Union). However, agroecological research is a relatively recent area where funding remains marginal compared to research in conventional agriculture.

34 Bilateral or multilateral agencies such as development banks or cooperation agencies.

35 E.g. support for agroecological practices, strengthening civil societies to defend citizens' rights in relation to food systems (land rights, food sovereignty), research and action to promote environmentally and socially viable alternatives, implementation of projects and platforms for exchange and capitalisation on agroecology, studies, etc.

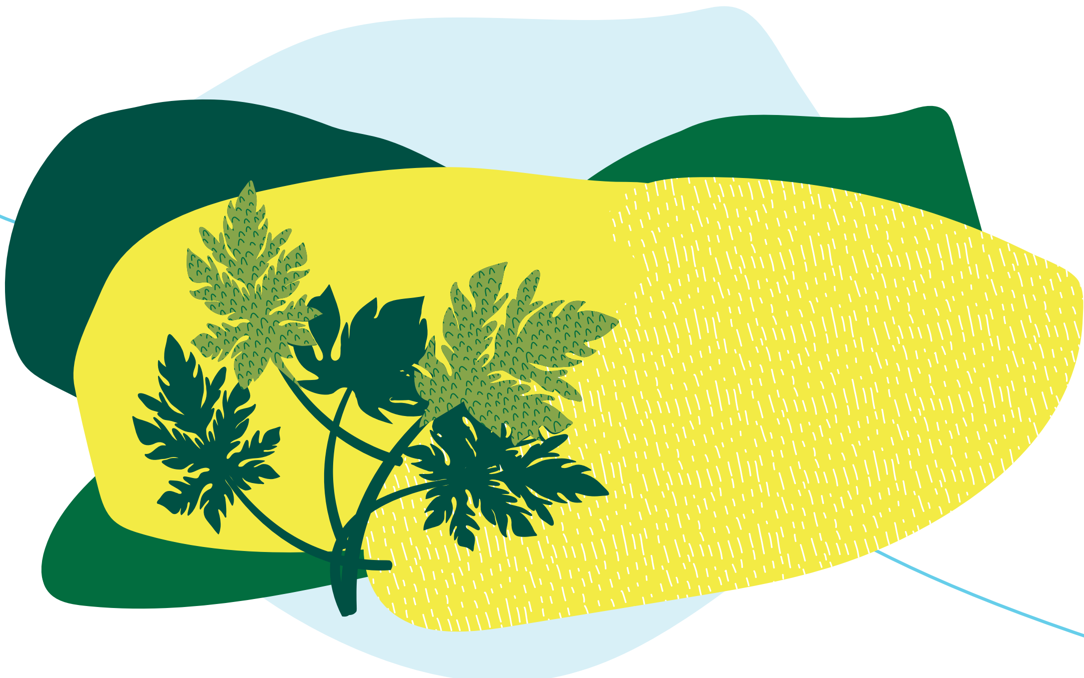
36 SDC (2021).

37 IFAD (2021).

38 It is important, in the field of agroecology, to distinguish between organisations/groups/associations resulting from social movements or producers' groups from international organisations (even if they are also considered to be civil society organisations).

Several **collaborative platforms** at regional or international levels (e.g. the Alliance for Agroecology in West Africa (3AO), the Agroecology Learning Alliance in Southeast Asia (ALiSEA) and the FAO Agroecology Knowledge Hub, etc.) contribute to the sharing of knowledge to accompany the agroecological transition. By bringing together communities of practice, they aim to promote agroecology by sharing field experiences or the results of action-research, by proposing evaluation or advocacy tools, by communicating on positions taken (e.g. policy notes), etc. with a wide range of stakeholders involved in agroecology. They may differ in terms of the geographical areas covered, the topics addressed, the actors involved or even their purposes. We can mention as examples:

- The Community of Practice (CoP) for Family Farming and Agroecology is a web-based platform promoted by the FAO whose aim is to present and exchange knowledge and information on agroecology.
- The Alliance for Agroecology in West Africa (3AO), established in 2018 at a multi-stakeholder meeting in Dakar, is a platform for coordination and information sharing on agroecology composed of farmers' organisations, research institutes/universities, international NGOs and social movements. Its objective is to promote and support the agroecological transition in West Africa.
- The Multi-actor network on agroecology in the Mediterranean (MEDAE) set up in the framework of the EU-funded NATAE project (2022-2026) to promote the agroecological transition in North Africa.
- Living Labs to promote agroecology through in-situ experiments are also funded by the European Union (e.g. ALL-Ready which brings together 15 initiatives across Europe or the Agroecology for Europe (AE4EU) project that started in 2021.



The Agroecology Learning Alliance in Southeast Asia (ALiSEA)

Initiated in 2015, ALiSEA is a regional platform covering five countries: Cambodia, Laos, Myanmar, Thailand, and Vietnam. It resulted from the first innovative attempt to form an open coalition of stakeholders engaged into agroecology at regional and national levels. With over 204 member organisations from different backgrounds and approaches to agroecology, ALiSEA is quite unique by its diversity of stakeholders including CSOs and NGOs, farmers' organisations, research & academia, private sector actors, government organisations and networks, and its governance model based on member-driven network.

ALiSEA aims to support knowledge exchanges by leveraging on the expertise of local and regional agroecology stakeholders to produce evidence-based studies and to share them broadly to promote a regional transition towards agroecology. Through fostering a wide dissemination and understanding of the principles of agroecology, it aims to facilitate their effective incorporation in the practices of farmers and companies as well as in public policy.

The platform's main achievements so far have included:

- the creation of an online agroecology regional platform, giving access to a large number of online resources documenting agroecological practices, experiences and networks across the Mekong Region, and of dynamic, regularly updated, Facebook pages in English, Khmer, Lao and Vietnamese: AgroecologyLearningAlliance, ALiSEA_Laos, ALiSEA_Cambodia, ALiSEA_Vietnam;
- the engagement in facilitating the co-construction of agroecological transition pathways at national level in Cambodia, Laos, and Vietnam;
- the development of enabling mechanisms to support and boost the implementation of agroecological innovations through the setting up of a **Small Grant Facility** for actors engaged in agroecology. Since 2022, **18 small grants totalling EUR 300,000 have been awarded** to farmers' organisations, local and national CSOs, universities;
- the development of **training programmes** that benefitted **313 people across 3 countries in the past 3 years** in addition to **16 exchange visits** of outstanding farms and initiatives and to **11 online thematic webinars**;
- the development of a strategy and approach on how to engage with and train local and national journalists.

ALiSEA is currently part of the project 'Agroecology and Safe Food System Transitions (ASSET)' (2020-2025), funded by the AFD, the EU and the French Facility for Global Environment (FFEM), and coordinated by the French NGO GRET in collaboration with CIRAD.

Relevant publication from ALiSEA: Agroecology Futures: Inspiring and innovating stories from the Agroecology Learning Alliance in Southeast Asia.

CHAPTER 2

Reference framework on agroecology

2.1. A paradigm shift: Towards a systemic approach to food systems

The agroecological approach consists of finding a satisfactory balance of agroecosystems between several dimensions, recognising the multiplicity and complexity of their interdependencies. Thus, the challenges associated with agricultural production are closely linked to the preservation of ecosystems, the health and nutritional quality of food, social justice, power relations and public policies. According to IPES-Food[39], for an agroecological transition to materialise, it is necessary to act on four dimensions: production practices; the production and dissemination of knowledge; economic and social relations; and the institutional framework.

This agroecological approach requires a shift from a linear, sectoral and specialised approach[40] to a **systemic** approach to agricultural and food systems and, therefore, constitutes a profound paradigm shift. It is no longer a question of maximising results in a single dimension (e.g. yields or harvests of a single crop) by using standardised 'technical packages' as is the case for conventional agriculture. On the contrary, agroecology offers locally adapted solutions identified by following an adaptive approach, i.e. based on observation, sharing of experience and co-construction between a plurality of actors and knowledge systems. One of the foundations of agroecology is to grant a central place to actors and their interactions, in an approach favouring the collective over the individual. Environmentally sound farming practices create positive externalities that benefit the entire community. Conversely, practices contributing to ecosystem degradation will generate negative externalities for the whole community.

39 IPES-Food (2018).

40 IPES-Food (2016).

Should we intensify agriculture in the name of the environment?

The growing demand for food, feed, textile fibres, and bioenergy, linked to global population growth, as well as an increase in consumption in developed and emerging countries, place considerable pressure on land. Surfaces converted into agricultural areas lead to unprecedented biodiversity loss. In this context, the concept of 'land sparing' was developed with a view to reconciling biodiversity, the environment, and agricultural production. According to this model, it is preferable to concentrate highly intensive agricultural production, even if it has negative effects on the environment, in limited spaces to keep larger natural areas intact.

Many scientists have reacted to this model, advocating for nature-friendly agricultural practices that are essential for preserving the numerous species living in agricultural environments and for safeguarding and enhancing the ecosystem services that biodiversity provides to agriculture and society, such as pollination and biological pest control. This movement has been given the name 'land sharing' although many of its members do not recognise themselves in this dual approach. It carries certain fundamental criticisms of the first model.

Primarily, 'land sparing' promotes intensification of industrial agriculture and gives it strong environmental legitimacy. It does not question the necessity of producing more through efficient resource use (one-third of produced food is lost or wasted) or the structure of demand (certain highly meat-based diets are not sustainable). It limits food security to mere production, ignoring accessibility, poverty, or inequality issues that are, however, essential.

'Land sparing' also reflects a conception of biodiversity that prioritises natural habitats and specialist species at the expense of biodiversity in agroecosystems. It is simplistic to think one can divide the world into natural zones and zones unfavourable to nature, as neither species nor environmental impacts recognise the boundaries of conservation areas. Finally, this model ignores the notions of sustainability and resilience, as well as the necessity to promote a pace of production compatible with ecological balances and processes.

While 'land sparing' has had the merit of drawing attention to the biodiversity crisis, the interactions between the environment and food systems, the diversity of land uses, etc., the numerous shortcuts on which it relies to defend intensive agriculture and condemn sustainable alternatives like agroecology, are scientifically questionable.

For more information, see (in French): Les atouts et limites du « land sparing » pour nourrir le monde et préserver la biodiversité, Phosphore Collection #1, SIA Collective (SOS Faim, Iles de Paix, Autre Terre), November 2022.

A systemic approach based on the search for a satisfactory balance for actors and ecosystems involves respecting and fostering **diversity**, an essential pillar of agroecology. This emphasis on diversity is a significant difference with the agro-industrial model based on the specialisation of farms and territories under the Ricardian theory of comparative advantages[41]. The issue of diversity is probably the tipping point between the two models. It indeed affects agricultural practices (crops on living soil[42], crop association, natural vegetation associated with crops, crop-livestock mixed farming, agroforestry, pollination, etc.), landscapes (bocages, integration of trees into the agrarian system, pastures, etc.), environments (preservation of ecosystems such as wetlands, herbaceous savannahs, forests, etc.), diets (locally adapted, seasonal, diversified

41 Ricardo's comparative advantage assumes that one country will benefit from specialising in the area where it is comparatively more effective than others. The agro-induced model has supported this specialisation at the level of parcels and territories.

42 Cultivation on living soil means no longer working the soil and providing it with organic matter to stimulate natural cycles.

products, etc.) or even social and economic organisation (multiple actors and activities, diversity of markets, including local ones, control of land or water resources limiting concentration risks and encouraging consultation between stakeholders). It is therefore not compatible with sectoral and mono-disciplinary approaches. This diversity is a widely demonstrated source of resilience in the face of climate change, attacks by pests or diseases, economic shocks and crises of various kinds. This diversity also contributes to the provision of ecosystem services (water storage and quality, pollination, etc.).

FIGURE 4: COMPARISON BETWEEN TWO AGRICULTURAL MODELS

SPECIALISED INDUSTRIAL AGRICULTURE	DIVERSIFIED AGROECOLOGICAL FARMING
DEFINITIONS	
Specialisation refers to a socio-economic paradigm whereby producers specialise in the production of a single item (or few items) that they are most efficient at producing, or of a single stage of that item's production. **Industrial agriculture refers** to modes of farming that are analogous to industrial processes in their scale and task segregation and seek to derive productivity gains through specialisation (see above) and intensification of production.	**Diversification refers** to maintaining multiple sources of production, and varying what is produced across farming landscapes and over time. **Agroecology means** 'the science of applying ecological concepts and principles to the design and management of sustainable food systems' (Gliessman, 2007). It encompasses various approaches to maximise biodiversity and stimulate interactions between different plants and species, as part of holistic strategies to build long-term fertility, healthy agroecosystems and secure livelihoods. It is also a social movement.
KEY CHARACTERISTICS	
• **Crop monocultures** (or production of a handful of select crops) at the levels of farms or landscapes. **Concentrated Animal Feeding Operations (CA-FOs)**. • Use of **genetically uniform varieties or breeds** selected mainly for their **high productivity**, **wide adaptability** to favourable environments, and **ability to respond to chemical inputs**. • Vertical and horizontal **segregation** of product chains, e.g. animal feed production and animal rearing in separate farms, value chains and regions. • **Highly mechanised, labour-saving** production systems. • Maximisation of yield/economic returns from **a single product** or limited number of products. • Intensive use of **external inputs**, e.g. fossil fuel, chemical fertiliser, pesticides and antibiotics. • Production of large volumes of homogeneous products to national and international markets, typically within **long value chains**.	• Temporal diversification (e.g. crop rotation) and spatial diversification (e.g. intercropping, mixed farming); diversification employed at various levels, including plot, farm and landscape. • Use of wide range of species and **less uniform, locally adapted varieties/breeds,** based on multiple uses (including traditional uses), cultural preferences, taste, productivity and other criteria. • **Natural synergies** emphasized and production types integrated (e.g. mixed crop-livestock-tree farming systems and landscapes). • More **labour-intensive systems**. • Maximisation of **multiple outputs**. • **Low external inputs**; recycling of waste within **full nutrient cycling** and circular economy approaches. • Production of a wide range of less homogeneous products often destined for **short value chains**; multiple sources of production, income and livelihoods.

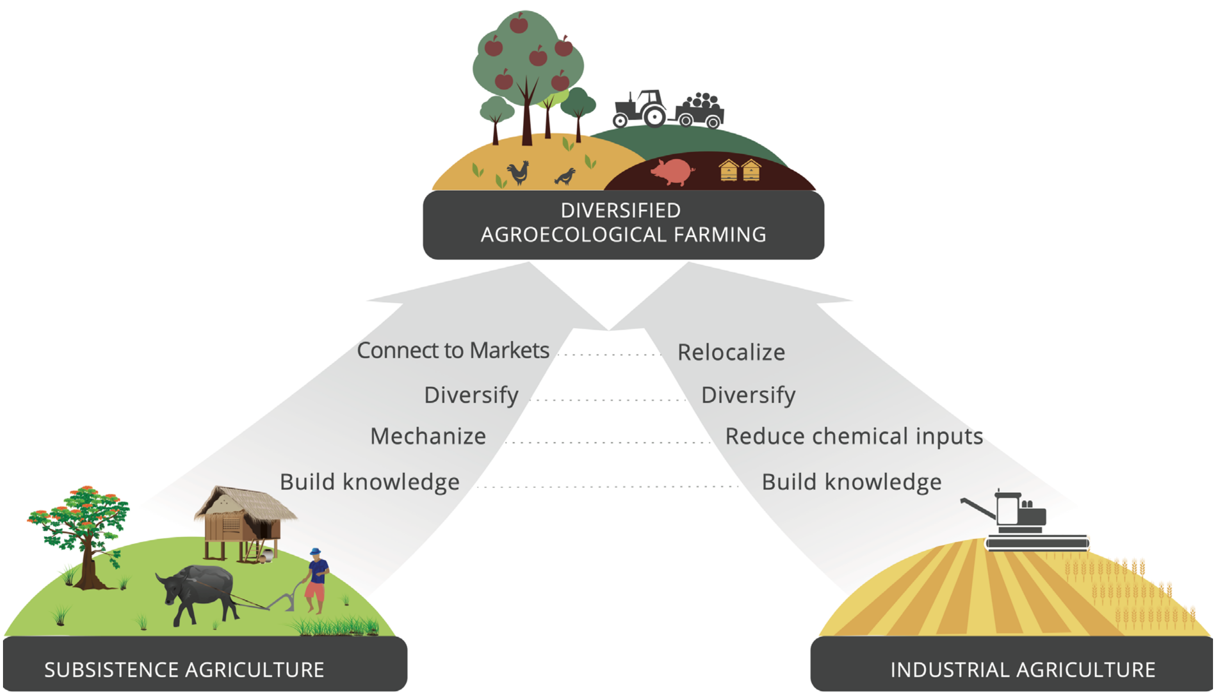
Source: IPES-Food (2016)

A review of several thousands of agronomic studies worldwide shows that crop diversification has positive effects on agricultural production, associated biodiversity (i.e. biodiversity naturally occurring in a cultivated ecosystem: insects, soil micro-organisms, etc.) and on many ecosystem services, such as soil quality, the fight against pests (habitat diversification) and diseases, water use and quality and greenhouse gas emissions. Some of the key figures in this meta-analysis show that, compared to conventional intensification and monoculture, crop diversification has led to a median increase of 14% in agricultural production and 24% in associated biodiversity. Water quality improved by 50%, pest and disease control by more than 60% and soil quality by 10% [43 44].

Agroecology is part of an approach to territorialisation of agricultural and food systems. The choice of farming practices by stakeholders has strong implications on the organisation of society, and vice versa. They structure and reflect the division of work between men and women, the patterns of land tenure, the calendar of activities, social relations, including mutual assistance, and shape landscapes. A sectoral approach, as opposed to a systemic approach, presents the risk of concealing the fact that agricultural activity is an integral part of a wider production system whose activities are closely dependent on the surrounding ecosystems. Forest ecosystems, for example, can contribute to food diversification (harvesting, hunting, fishing) while at the same time providing a favourable environment for crops and livestock farming (ecosystem services). The invisibility of these activities is all the more frequent when they are not integrated into a market system.

Agriculture and food systems, especially in the South, are extremely diverse. The concept of territorialisation therefore implies taking into account different agroecological transition paths depending on the situation. The transitions from an agro-industrial model or from subsistence agriculture to agroecology must therefore reflect the diversity of initial situations (see Figure 5).

FIGURE 5: TRANSITIONING FROM DIFFERENT STARTING POINTS



Source: IPES-Food (2016)

43 Beillouin et al. (2021).

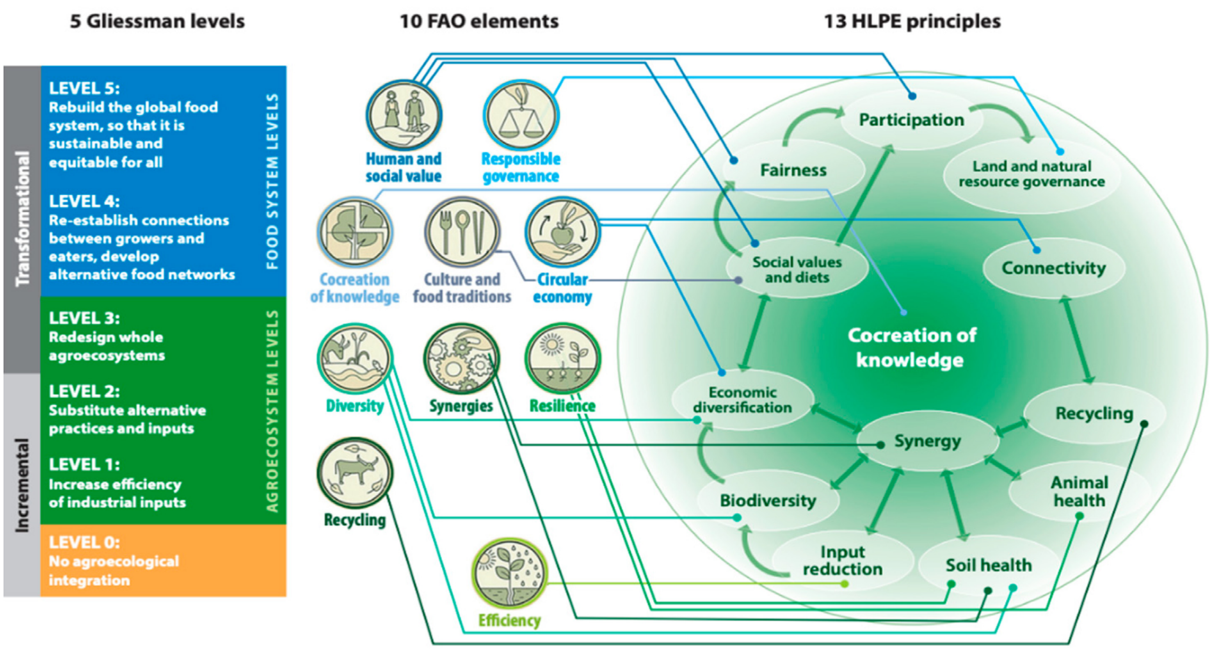
44 INRAE (2022).

Agroecology stimulates **the collective dynamics of knowledge creation and sharing**. By looking at farmland and indigenous knowledge and intermingling it with scientific research, it tends, according to Miguel Altieri, to a 'dialogue of knowledge'[45]. The approach differs from agricultural extension by its horizontal nature, the type of actors it mobilises and the roles it attributes to them. **Farm advisors** are no longer the holders of knowledge they pass on to farmers but position themselves in a process of collective experimentation and co-innovation. **Exchange groups between farmers** play a central role in learning innovative solutions and the dissemination of peer-to-peer knowledge takes place through networks **of relay farmers and/or farmers' organisations**. Transdisciplinary action-research is, thus, constitutive of agroecology, in the sense that it supports change through a participatory approach combining practice with knowledge generation. It thus mobilises **civil society organisations, international NGOs, research institutes/centres and universities from different disciplines alongside producers.**

2.2. Presentation of the 13 principles of agroecology

Based on a consultation process carried out between 2015 and 2017 and culminating in an international symposium in 2018, the FAO proposed 10 elements to characterise agroecology and thus underlined its deeply systemic nature[46]. In 2019, the HLPE on Food Security and Nutrition emanating from the Committee on Food Security drew up a list of 13 principles characterising agroecology[47]. The 13 principles of the HLPE are aligned with the 10 elements of the FAO endorsed by 197 of its Member States and guide the agroecological transition approaches from the plot to the food system as illustrated by the Gliessman scale (see Figure 3).

FIGURE 6: LINKS BETWEEN THE 10 FAO COMPONENTS, THE 13 HLPE PRINCIPLES AND THE 5 LEVELS OF THE GLIESSMAN SCALE



Source: UNFSS (2021)

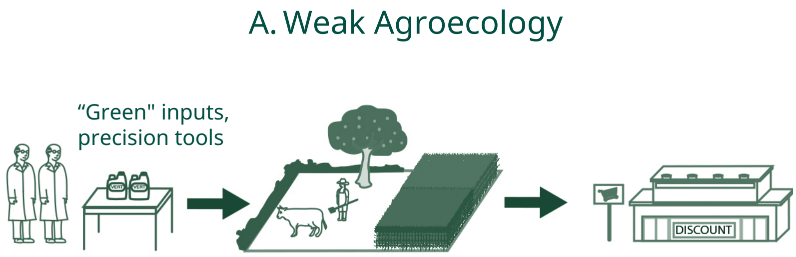
45 Altieri, M. (2009).

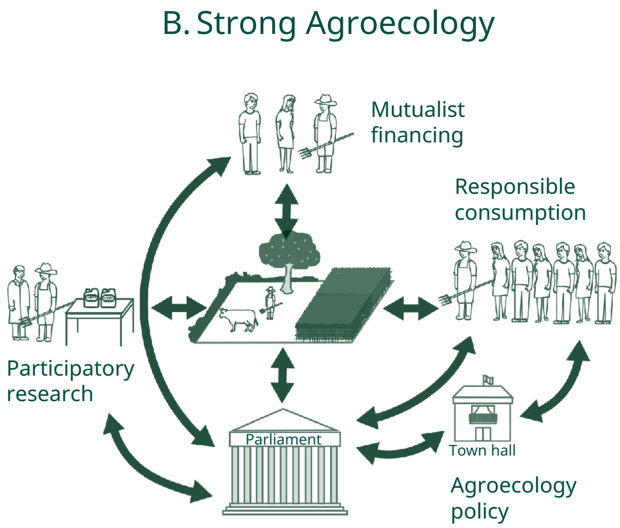
46 FAO (2019).

47 HLPE (2019).

The 13 principles are part of three operational axes of transition towards sustainable food systems, namely (i) improving resource efficiency [Principles 1 and 2]; (ii) strengthening resilience [Principles 3 to 7]; and (iii) ensuring fairness/social responsibility [Principles 8-13]. These axes make it possible to distinguish what is sometimes referred to as 'weak agroecology' from 'strong agroecology'[48]. The first focuses on the first axis, i.e. the adoption of practices that reduce the ecological impact of agricultural production. So-called strong or deep agroecology integrates the three axes, i.e. the social and political dimensions are inextricably linked to it.

FIGURE 7: 'WEAK AGROECOLOGY' (A) AND 'STRONG AGROECOLOGY' (B)





Source: Calame, 2016, revisited by Doré/Bellon

48 Calame, M. (2016).

The tables below present the 13 agroecological principles in a detailed and structured way (issues corresponding to the definition of the HLPE, observations, contributions, examples, etc.), articulated and clustered around the three operational axes of transition to sustainable food systems, to which each agroecological principle contributes the most. Links, of course, exists between these operational axes (e.g. the principle of 'soil health' contributes not only to resilience but also to resource efficiency). Furthermore, the principles described below should not be considered as independent solutions but as interconnected elements of the same system whose cumulative benefits are greater than those obtained by the isolated application of each of them. On this basis, it becomes possible to develop resilient and sustainable strategies, adapted to local realities and capable of responding to current and future challenges in agriculture. The numbering of the agroecological principles mentioned in the tables below aims at clarifying their reading and does not include any hierarchical link between them.

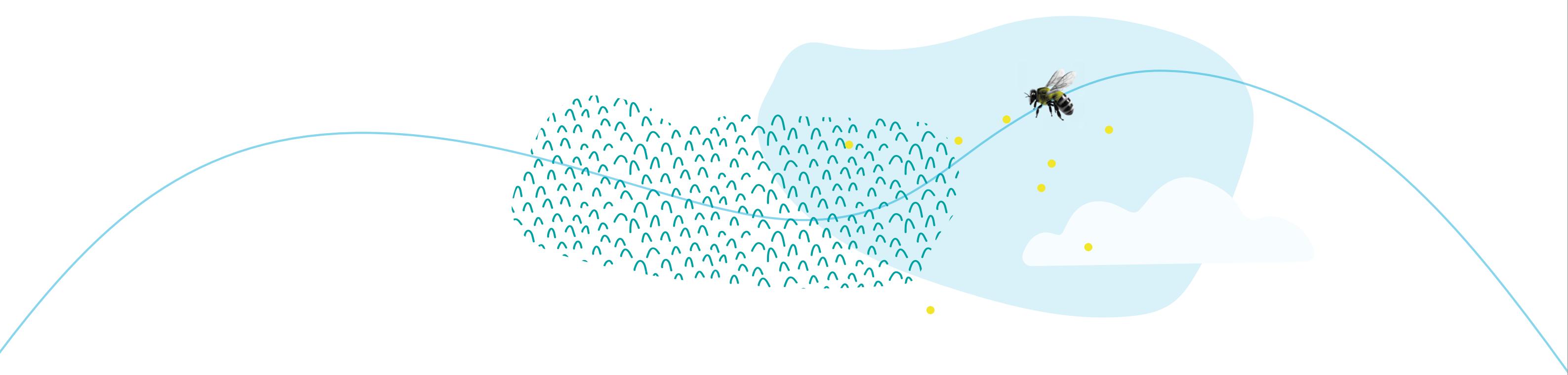
OPERATIONAL AXIS 1 – INCREASING EFFICIENCY IN THE USE OF RESOURCES

The first of the three operational axes towards sustainable food systems brings together agroecological principles 1 and 2, which contribute the most to improving resource efficiency by promoting practices geared to reducing the use of external inputs and promoting resource recycling from a circular economy perspective.

PRINCIPLE 1	RECYCLING
Stakes	Preferentially use local renewable resources and close as far as possible resource cycles of nutrients and biomass.
Scale	Plot / Farm / Landscape / Food system.
Observations	• Losses and waste of almost one third of all food produced globally at one stage or another in the food supply chain, from farm to fork (EU, 2022), representing economic losses estimated at USD 1,000 billion per year[49]. • Under-utilisation of organic matter and renewable resources from farm to fork.
Contributions of agroecology	• Reduces input dependency through biomass recycling. • Proposes techniques to significantly reduce water and energy consumption. • Helps reduce the ecological footprint of agricultural and food systems.
Examples of possible interventions	• Recycling of organic matter with a view to: > protecting soils (e.g. recycling of crop residues to mulch soils) > amending soils (e.g. use of animal manure) > producing energy (e.g. biogas production) > constructing buildings (e.g. straw insulation). • Water recycling (e.g. rainwater recovery). • Development of SMEs or cooperatives for the production of organic fertilisers or the development of a circular economy.
FAO elements	Recycling: Helps reduce the economic and environmental costs of agricultural production.

49 Vilariño, M.V. et al. (2017).

PRINCIPLE 2	REDUCING INPUT DEPENDENCY
Stakes	To reduce or eliminate dependence on purchased inputs and increase self-sufficiency.
Scale	Plot / Agroecosystem / Landscape / Food system.
Observations	• Soil, water and air pollution by nitrates, phosphate and pesticides in high use areas[50]. • Depletion of certain resources necessary for the production of synthetic inputs (phosphorus, fossil fuels). • Fluctuation in prices of synthetic inputs and dependence on suppliers. • Increased resistance of human and animal populations to antibiotics. • Decline in soil, surface and aerial biodiversity (e.g. decline in seed-eating birds and insect pollinators such as bees, butterflies and flies due to pesticides). • Diseases linked to the use of pesticides.
Contributions of agroecology	• Limits the risks of pollution associated with the use of synthetic inputs. • Reduces the health and ecological impacts associated with the use of synthetic inputs. • Reduces producers' dependence on synthetic inputs (pesticides, herbicides, fungicides, veterinary products) and promotes their financial and decision-making autonomy, making them less dependent on price fluctuations and credit[51].
Examples of possible interventions	• Stimulation of the natural fertility of soils and their water retention capacity (e.g. addition of organic matter, mulching, etc.). • Optimisation in seed use and conservation (e.g. improves seed storage efficiency) and valorisation of local seeds (e.g. promotes farmer seed networks). • Sustainable water management (e.g. collection, storage, effective monitoring, micro-irrigation). • Management of bio-aggressors by preventive methods (by acting on the health of soils, plants, animals and ecosystems) rather than curative (by acting on diseases as practiced under conventional farming). • Production of bio-inputs on the farm or in the territories by SMEs or cooperatives.
FAO elements	Efficiency: Innovative agroecological practices make it possible to produce more with fewer external resources.



50 64% of agricultural land, or approximately 24.5 million km², is estimated to be at risk of pesticide pollution causing negative impacts on water and soil quality, biodiversity and human health [Tang et al., 2021].

51 Meynard, J.M. (2017).

Weaver ant: An innovative biocontrol agent

For decades, in the context of the Green Revolution, crop protection has relied almost exclusively on agrochemicals. Their heavy use has resulted in challenges that include issues of access, cost and inefficiency in many situations, resistance to pesticides, soil, water and air pollution, hazards to human health and loss in biodiversity. Those have become more frequent and acute leaving farmers with no alternative but to look for more sustainable pest prevention approaches. Agroecological Crop Protection (ACP) is one of them that aims at 'replacing' chemicals by the services offered by functional biodiversity above and below soil surface. By focusing on preventive measures, it aims at establishing a bioecological balance between plant and animal communities within an agroecosystem to prevent or reduce the risk of infections or outbreaks of pests. It involves managing plant communities (crops and uncultivated plants in the agroecosystem as a whole) and animal populations such as pests and various beneficial arthropods (e.g. ladybugs, earwigs, or dragonflies).

Several EU-funded initiatives including the SyRIMAO, ACP-ACTAE and ASSET Projects have promoted the integration of weaver ants as biocontrol agents in mango fields in Western Africa, citrus orchards in Vietnam or cashew nuts plantations in Cambodia, demonstrating the feasibility of the technology and its benefits in real-world settings. Weaver ants are predators that feed on a wide range of insects, in particular on crop pests such as fruit fly larvae. Through a repulsing mechanism or chemical reaction (pheromones), they also prevent the females of fly larvae from laying eggs. By controlling pest populations, weaver ants help minimise damage to crops leading to higher yields and better-quality of products for the economic benefit of farmers. Moreover, relying on this natural pest control reduces the need for expensive chemical pesticides, lowering production costs while preserving the health of both farmers and the environment and fostering a more sustainable agricultural ecosystem.

Asian growers have used weaver ants to protect their citrus crops for over 2,000 years. It is the most ancient record of biological control. However, nowadays, to be able to apply this technology successfully and to adapt it to their local contexts, farmers need new skills and knowledge regarding, for example, the identification, protection, dissemination and management of the ants' populations.

Watch the full videos for deeper insights into the topic:

- Using weaver ants as biocontrol agents in Vietnamese citrus orchards: a traditional application of the concept of Agroecological Crop Protection.
- The role of weaver ants in sustainable cashew nuts production in Cambodia

OPERATIONAL AXIS 2 – STRENGTHENING RESILIENCE

This second operational axis of transition brings together agroecological principles 3 to 7, which contribute the most to fostering ecological processes, in order to improve the nutrient supply of plants and the quality of food and animal welfare, the defence against pests and diseases, the capacity to adapt to the effects of climate change, building resilience more generally, in particular of systems and farms through integrated approaches (soil, animal health, biodiversity) and fostering synergies and diversification.

PRINCIPLE 3	SOIL HEALTH
Stakes	Secure and enhance soil health and functioning for improved plant growth, particularly by managing organic matter and enhancing soil biological activity[52].
Scale	Plot / Agroecosystem / Landscape.
Observations	• Loss of air diversity, pollution and nutrient overload, overgrazing, intensive agriculture, fires, soil erosion, desertification and climate change are the risks affecting soil health[53] and leading to losses of fertility and biodiversity (25% of the world's species – insects, mites, fungi, bacteria, etc. – live in the soil or bedding)[54]. • Reduction in yields of up to 50% in some parts of the world due to soil degradation and climate change[55]. • Loss of soil capacity to retain water and to absorb carbon[56].
Contributions of agroecology	• Stimulates biodiversity in and on soils in accordance with the principles of a living soil (addition of organic matter, mulching, permanent soil cover, etc.) by avoiding certain practices such as deep ploughing that are factors of disturbance, destructuring and erosion. • Promotes the capacity of soils to retain water and to capture carbon through appropriate management of organic matter. • Increases soil resilience to climate change.
Examples of possible interventions	• Increase in the organic matter content of the soils and thus in carbon (e.g. presence of permanent or temporary meadows, permanent soil cover e.g. in arable land). • Reduction in soil erosion (e.g. mulching techniques, planting or preservation of hedges, agroforestry). • Valorisation of the nutrient cycle (e.g. return to the soil of part of the crop residues, nitrogen-fixing legume crops). • Development of services for soil management (including digital advice, production of organic or bio-fertilisers, etc.)
FAO elements	• Diversity: Diversification is essential for the agroecological transition as it improves food security and nutrition while conserving, protecting and enhancing natural resources. • Synergy: Creating synergies improves essential functions within food systems as it contributes to production and multiple ecosystem services. • Resilience: Improved resilience of people, communities and ecosystems is key to sustainable food and farming systems.

52 HLPE (2019).

53 INRAE (2020a).

54 Ibid.

55 IPBES (2016).

56 Lugato et al. (2018), recent studies have suggested that soil could become a net emitter of carbon due to climate change.

PRINCIPLE 4	ANIMAL HEALTH
Stakes	Ensure animal health and welfare.
Scale	Plot / Agroecosystem / Landscape.
Observations	• Interdependencies between human, animal and plant health = One Health[57]. • Intensive livestock farming that emits GHG, including methane (inputs, transport, production) and pollution from excreta and through the production of animal feed (deforestation, monocultures of soya, maize, etc.). • Ethical issues of respect for animal welfare. • Increased resistance to antibiotics of human and animal populations. • Increased risks of zoonoses.
Contributions of agroecology	• Promotes the use of organic matter from livestock farms contributing to soil fertility and the preservation of ecosystems. • Valorises the diversity of locally adapted breeds and species and thus preserve the genetic heritage. • Respects the diversity of pastoral and agro-pastoral systems and contributes to maintaining open and resilient landscapes. • Fosters grass and fodder use in livestock feeding (reduction in the dependency on other resources such as cereals and soya). • Proposes a holistic view of animal health (housing, food and veterinary care when necessary).
Examples of possible interventions	• Promotion of resilient species and breeds adapted to the local context. • Development of ethical behaviours (e.g. no mother-child separation whenever possible, no overcrowding, exceptional castration, ethical killing). • Healthy diets and reduced medication (e.g. free-range animals, sufficient water and food, preference for natural remedies). • Integration agriculture-livestock-trees.
FAO elements	Resilience: Improved resilience of people, communities and ecosystems is key to sustainable food and farming systems.

57 According to the World Health Organization (WHO), 60% of the pathogens causing human diseases come from domestic or wild animals, and 75% of emerging human infectious diseases are of animal origin.

PRINCIPLE 5	BIODIVERSITY
Stakes	Maintain and enhance diversity of species, functional diversity and genetic resources and thereby maintain overall agroecosystem biodiversity in time and space at field, farm and landscape scales.
Scale	Plot / Agroecosystem / Landscape / Food system.
Observations	• Significant degradation of biodiversity in general and agriculture biodiversity (agrobiodiversity) in particular in recent decades[58]. • Risks of increased food insecurity in quantity and quality linked to biodiversity loss[59]. • Links between biodiversity, food and climate change proven by major bodies such as the IPCC and IPBES (land use change caused by agriculture, primarily at the expense of forests, wetlands and grasslands is the main contributor to biodiversity collapse according to IPBES and contributes to climate change according to IPCC). • High vulnerability of monoculture systems to diseases, pest attacks and climate change[60]. • Dramatic alteration of plant and animal genetic heritage and increased dependence of global food production on a very low diversity of products[61]. • Considerable loss of nutritional value of food[62].
Contributions of agroecology	• Promotes diversity, whether genetic (association of varieties, search for rusticity, etc.), specific (crop association, species diversity) or functional (agroforestry, crop-livestock association) that makes it possible to increase the performance and resilience of production systems and territories (FAO). • Strengthens ecosystem services for production (pollination, decomposition of organic matter, natural biomass production, etc.), for farms (diversification of resources), and for landscapes (fight against run-off and wind erosion). • Stimulates biodiversity as a preventive method against pest attacks and diseases[63]. • Improves carbon sequestration capacities in soils, for example through agroforestry. • Promotes balanced diets, notably less dependent on intensive livestock farming, thus reducing the risk of biodiversity degradation[64].
Examples of possible interventions	• Diversification of agricultural production systems, including through agroforestry. • Diversification of natural and cultivated species, varieties and breeds (e.g. local, traditional, orphan, biological, plant and animal species). • Support for formal and informal seed systems for forgotten crops. • Crop rotation and associations. • Preservation or restoration of natural or semi-natural habitats (e.g. in wetlands, forests, hedges, meadows, floral areas, etc.) and ecological corridors.
FAO elements	Diversity: Diversification is essential for the agroecological transition as it improves food security and nutrition while conserving, protecting and enhancing natural resources.

58 IPBES (2016).

59 Food crops that depend at least partly on pollinators contribute 35% of global production. A total loss of pollinators would lead to a decrease in production of more than 90% for 12% of the world's main crops (IPBES, 2016).

60 Altieri, M. (2015).

61 80% of arable land is occupied by a handful of agricultural products (soya, maize, wheat, rice, potatoes, etc.) causing a loss of genetic diversity and 14 animal species provide 90% of animal proteins (Altieri, 2015).

62 An apple from the 1950s had 100 times as many vitamins as the current commercial varieties [Worldwatch Institute].

63 INRAE (2022).

64 Maize accounts for 41% of world cereal production. More than 70% of this production is intended for animal consumption (source: French Biodiversity Office).

Neglected and underutilised crops to support resilient and sustainable agricultural systems

Neglected and underutilised species (NUS), such as millets, Bambara groundnut, moringa, breadfruit and quinoa, are traditional crops that have been historically important for local food security, nutrition and livelihoods but have fallen out of mainstream commercial agriculture after receiving too little attention, if any, from agricultural research institutions, development agencies and policymakers resulting in a lack of improved varieties, farming techniques, and market access.

Often native to specific regions and cultivated for generations, they have deep cultural significance, are well adapted to local environments such as drylands and mountainous regions and are usually highly resilient to harsh ecological conditions including drought, poor soil quality, and extreme temperatures, which makes them particularly important in the face of rising climate change.

These crops are typically rich in essential nutrients, such as vitamins, minerals, and proteins, that are often lacking in more widely grown staple crops like rice, wheat, and maize. They can therefore provide food security in marginal environments where other crops struggle, significantly contribute to diversifying diets and combatting malnutrition, and maintain agricultural biodiversity, which is crucial for ecosystem resilience, pest and disease control, while bringing significant economic benefits to smallholder farmers by diversifying their income sources.

In recognition of these benefits, the International Centre for Advanced Mediterranean Agronomic Studies (CIHEAM-Bari) and other partners, with European and Italian financial support, have promoted increased research and innovation capacities on NUS under the 'SUSTaining and improving local crop patrimony for better LIVes and EcoSystem' SUSTLIVES Project in Burkina Faso and Niger. Likewise, SWISSAID, in collaboration with the Research Institute of Organic Agriculture (FiBL) and the Alliance for Food Sovereignty in Africa (AFSA), is carrying out the 'Consumption of Resilient Orphan Crops & Products for Healthier Diets' (CROPS4HD) Project that seeks to 1) facilitate production through participatory trials and farmer training; 2) create market opportunities by developing new value chains and raising consumer awareness; and 3) advocate for a supportive policy environment.

Both initiatives wish to demonstrate that the promotion of NUS through research, policy support, and market development can play a vital role in supporting resilient and sustainable agricultural systems.

PRINCIPLE 6	SYNERGY
Stakes	Enhance positive ecological interaction, synergy, integration and complementarity among the elements of agroecosystems (animals, crops, trees, soil, and water).
Scale	Plot / Agroecosystem / Landscape.
Observations	• Hyper specialisation of agrosystems altering ecological interactions. • Significant losses of biodiversity on a planetary scale. • Soil and water degradation. • Degradation and homogenisation of landscapes.
Contributions of agroecology	• Preserves natural resources, especially those that are not renewable by promoting ecosystem services. • Improves production by relying on the natural regulations of the agroecosystem rather than inputs. • Maintains a diversity of production and fosters a mosaic of landscapes.
Examples of possible interventions	• Mixed farming systems (e.g. agroforestry, silvopastoralism, rice-duck-fish system; intercropping) for optimisation of ecosystem services at farm level. • Territorial planning promoting multi-species reforestation and diversified land use to optimise ecosystem services on a territorial scale. • Development of advisory systems capable of developing a holistic approach to the farm and the territory with ecological foundations.
FAO elements	Synergy: Creating synergies improves essential functions within food systems as it contributes to production and multiple ecosystem services.

PRINCIPLE 7	ECONOMIC DIVERSIFICATION
Stakes	Diversify on-farm incomes by ensuring that small-scale farmers have greater financial independence and value addition opportunities while enabling them to respond to demand from consumers.
Scale	Agroecosystem / Food system.
Observations	• Increased tendency towards specialisation weakens the economies and increases the vulnerability of households and territories by increasing their dependence on a limited number of productions. • Reduced share of added value accruing to farmers/breeders to the benefit of downstream actors in the sector (processing, distribution)[65].
Contributions of agroecology	• Increases resilience and strengthens the diversification of agricultural and food systems to better cope with economic, environmental and climate crises. • Improves the diversity of economic opportunities and the creation of local jobs. • Responds to territorial issues and household needs as a matter of priority. • Maintains the creation of added value at local level by thinking in terms of productivity of the system as a whole and not of returns from a specific speculation.
Examples of possible interventions	• Diversification of agricultural and non-agricultural production (e.g. non-timber forest products, wild plants, fisheries, crafts, trade). • Processing and storage of agricultural and non-agricultural products in territories (agroecosystems, SMEs) to increase and diversify sources of income and employment. • Support for entrepreneurship, especially for women and young people, from an agroecological perspective.
FAO elements	Diversity: Diversification is essential for the agroecological transition as it improves food security and nutrition while conserving, protecting and enhancing natural resources.

65 Mahe, L.P. et al. (2003).

OPERATIONAL AXIS 3 – ENSURING SOCIAL EQUITY/RESPONSIBILITY

This third operational axis brings together agroecological principles 8 to 13, which give a central place to social dimensions in sustainable food systems.

PRINCIPLE 8	CONNECTIVITY
Stakes	Ensure proximity and confidence between producers and consumers through promotion of fair and short distribution networks and by re-embedding food systems into local economies.
Scale	Agroecosystem / Food system.
Observations	• Dominant agricultural and food systems are built on global trade and characterised by a high concentration of sectors, long supply chains and remoteness of decision-making bodies. • Weak influence of producers on setting prices of agricultural products, leading to often inadequate remuneration. • Competition of local productions with highly subsidised imported products or with lower production costs. • Asymmetry of information between the various actors in the sectors leading to inequalities.
Contributions of agroecology	• Promotes short distribution/supply chains, encourages exchanges between different actors and improves the circulation of market information. • Attaches importance to local stakeholders (producers, consumers, small processors, etc.) by promoting consultation and strengthening their decision-making power over technical choices (production, processing, marketing) and over trade rules. • Reduces intermediaries who do not provide proven services and stimulate links between producers and consumers, strengthening their role as citizens. • Ensures that a ‘fair price’ is set that guarantees sufficient remuneration for producers and quality products accessible to all. • Promotes local production and empowers consumers in purchasing diversified, nutritious and seasonal foods.
Examples of possible interventions	• Awareness-raising campaigns in favour of local and seasonal consumption. • Support the diversification of outlets at territorial level (different processing chains, multiprocessor or multi activities in the same company). • Support for short distribution/supply chains to relocate food production and markets (e.g. improved access to markets, creation of points of sale). • Support for community restaurants, school meals, soup kitchens/food aid, based on local, diverse, and healthy products. • Support for the structuring of farmers’ organisations to strengthen their decision-making power and for inter-professional organisations to improve coordination. • Support to local food governance. • Support for the development of national policies, programmes and regulations promoting the link between consumers and producers.
FAO elements	Circular and solidarity-based economy: Restores the link between producers and consumers, provides innovative solutions to live within the limits of our planet, while at the same time establishing the social foundations for inclusive and sustainable development.

PRINCIPLE 9	CO-CREATION AND SHARING OF KNOWLEDGE
Stakes	Enhance co-creation and horizontal sharing of knowledge including local and scientific innovation, especially through farmer-to-farmer exchange.
Scale	Plot / Agroecosystem / Landscape / Food system.
Observations	• Low effectiveness of 'extension', based on the transmission from advisors to producers of single solutions based on standardised 'technical packages'. • Low capacity to produce new knowledge to innovate in the territories in the face of current challenges by mobilising all knowledge (local/indigenous and scientific). • Acceleration of the loss of knowledge of indigenous peoples despite the fact that they are the custodians of 80% of the world's remaining biodiversity[66].
Contributions of agroecology	• Strengthens the collective dimension of horizontal knowledge sharing and the co-creation of new knowledge to adapt solutions to the local context by mobilising all types of knowledge. • Emphasises the recognition and revaluation of local and indigenous knowledge, based on practices respectful of biodiversity, and its synergy with scientific knowledge. • Values women's often specific knowledge of medicinal plants, seeds, organoleptic qualities of food, etc. • Stimulates, through its systemic approach, the decompartmentalisation of scientific disciplines and the dynamics of individual and collective learning, a source of innovation and adaptation to local situations[67]. • Encourages consultation between stakeholders, which are essential at local level.
Examples of possible interventions	• Sharing of experience and expertise among peers (e.g. farmer to farmer exchanges, farmer field schools, creation of communities of practices on agroecology, platforms, including digital, for sharing knowledge and good practices). • Creation of platforms or networks with diversified stakeholders involved in innovation and knowledge generation (e.g. transdisciplinary research, experiments with farmers and local organisations, local and indigenous knowledge, co-innovation between farmers and researchers, living labs). • Development of advisory services based on participatory approaches and favouring co-construction (knowledge and solutions).
FAO elements	Co-creation and knowledge sharing: Agricultural innovations are more likely to solve local problems if they are developed jointly and in a participatory manner.

66 FAO (2020).
67 Meynard, J.M. (2017).

An innovative practice of participatory rainfed rice breeding in the Malagasy Highlands

Rainfed rice, grown without being submerged, does not require any special infrastructure or irrigation for its development. As early as the 1990s, the introduction of new varieties of rainfed rice adapted to the high-altitude conditions of the Malagasy Highlands complemented and diversified the rice supply in a region where traditional irrigated rice was no longer sufficient to meet the growing food needs of local populations.

The DINAAMICC ('Integrated Approaches and Support for Innovative and Climate-Resilient Family Farming in Madagascar') and MAKIS (Malagasy Agricultural Knowledge and Innovation Systems) projects, funded by the EU as part of the DeSIRA Initiative and coordinated by CIRAD, have deepened and shared knowledge on farmers' needs for rainfed rice and the behaviour of different varieties, and worked on increased access to suitable varieties. A collaboration has been structured between French (CIRAD) and Malagasy (FOFIFA) research centres, development agencies (Agrisud and GSDM-Agroecology Professionals), farmers' organisations (FIFATA group) and local producers to encourage consideration of multiple viewpoints and selection preferences.

To this end, more than 200 producers, united within a vast network of experiments, are testing different varieties of rainfed rice on their plots to evaluate their response to different climatic, soil and management conditions. Placed at the centre of this process, they indicate their selection criteria. While some favour early varieties that are slightly less productive but offer more flexibility in the face of climatic hazards, others value varieties capable of providing satisfactory yields with few inputs, in line with local practices. Evaluations can differ by gender, with women favouring earlier varieties that are easier to thresh. The information collected in this way makes it possible to define the varietal panels to be proposed in different zones. Some producers are also trained and supported to be able to produce quality seeds for themselves and local farmers' networks.

The DINAAMICC project is not limited to the evaluation and dissemination of existing varieties but also aims to create new varieties to improve the productivity and resilience of Malagasy agricultural systems. Varieties with a higher nutritional quality, or resistant to emerging pests (bacterial wilt, blast) and more tolerant to climatic hazards, are therefore being developed.

PRINCIPLE 10	SOCIAL VALUES AND DIETS
Stakes	Build food systems based on the culture, identity, tradition, social and gender equity of local communities that provide healthy, diversified, seasonally and culturally appropriate diets.
Scale	Plot / Agroecosystem / Landscape / Food system.
Observations	• Deterioration of social relations and disappearance of local cultures in many rural areas. • High prevalence of acute and chronic malnutrition, particularly in rural areas. • Changes in eating habits, particularly in urban areas, as a result of imports of cereals (rice, wheat, etc.) and, more recently, agro-industrial products (processed products rich in salt, sugar and fat). • Explosion of non-communicable diseases (obesity, cardiovascular diseases, cancers, diabetes) linked to an overconsumption of processed food in northern and southern countries[68]. • Impoverishment of dietary diversity, standardisation of diets.
Contributions of agroecology	• Prioritises the diversification of food production and diets based on healthy and nutritious local products and respecting the food preferences of consumers. • Seeks to prevent all forms of discrimination and promotes gender equality, inclusion and empowerment of young people. • Respects people's choices regarding agricultural and food systems.
Examples of possible interventions	• Awareness raising and training on nutrition among children and adults by promoting the diversity of agricultural production and consumption patterns. • Awareness raising and training of urban consumers on seasonal and local products and prepared meals from local territories. • Support for food diversification (e.g. promotion of mixed and intercropping, neglected and under-utilised crops, valorising the knowledge of the nutritional and medicinal benefits of wild plants and berries, and promotion of off-season crops). • Promotion of local varieties (e.g. support for their production, selection, conservation and circulation of farmer seeds).
FAO elements	Human and social values: Protecting and improving rural livelihoods, equity and social well-being is essential for sustainable food and farming systems. Food cultures and traditions: By promoting healthy, diverse and culturally appropriate diets, agroecology contributes to food security and nutrition, while preserving the health of ecosystems.

68 Willett, W. et al. (2019).

PRINCIPLE 11	FAIRNESS
Stakes	Support dignified and robust livelihoods for all actors engaged in food systems, especially small-scale food producers, based on fair trade, fair employment and fair treatment of intellectual property rights.
Scale	Plot / Agroecosystem / Landscape / Food system.
Observations	• High inequalities inherent to dominant agricultural and food systems leading to a reduction in the added value accrued at the farm level. • Problems related to working conditions in the agro-industry sector (e.g. illnesses caused by the use of chemicals, renal diseases due to dehydration of agricultural workers, etc.)[69]. • Patenting of seeds leading to a risk of privatisation of life forms.
Contributions of agroecology	• Promotes systems based on social justice, including gender equality. • Aims to ensure a fair price for agricultural products. • Seeks to ensure decent working conditions that do not expose female workers to health risks[70]. • Promotes the principles of transparency and inclusion within producer organisations, territories, value chains.
Examples of possible interventions	• Support for the development of policies, programmes, approaches enhancing farmers' autonomy, promoting socially and economically just systems (e.g. fair trade). • Strengthening of the organisational capacity of stakeholder communities (e.g. defence of labour rights, strengthening self-organisation and autonomy, interprofessional organisations with fair representation of all actors). • Introduction, in particular for urban products, of participatory guarantee systems (PGS) or other forms of sustainable and/or equitable certification. • Promotion of the rights of women and vulnerable groups. • Support to the development of national policies, programmes, regulations supporting sustainable and equitable agricultural and food systems.
FAO elements	Human and social values: Protecting and improving rural livelihoods, equity and social well-being is essential for sustainable food and farming systems.

69 UNA site: Serie Salud, trabajo y ambiente. https://www.saltra.una.ac.cr/index.php/es/publicaciones/serie-salud-trabajo-y-ambiente.

70 INSERM (2021).

The Network of Fair-Trade Cooperatives in Madagascar, an organisational innovation

The NGO Agronomists and Veterinarians Without Borders (AVSF) has designed a Participatory Diagnosis of Producer Organisations (PD-PO) tool that allows POs to identify by themselves the real situation of their structure in terms of productive, organisational, entrepreneurial and socio-political capacities. An action plan is then co-constructed with the producers at the end of an approach that makes them the actors in the development of their organisation. The utilisation of this tool in the Atsinanana region of Madagascar has led 5 POs, specialised in the production of organic and fair-trade products with high added value (spices, fruits, whole sugar and essential oils), to join forces within the Network of Fair-Trade Cooperatives (NFTC). The creation of this network, supported by the French Development Agency as part of the AGRICOOP 2.0 project implemented by AVSF, was an important step in the structuring of the 5 POs concerned with pooling certain services for the management of agricultural production and the development of commercial opportunities and with collectively developing others according to a value chain approach that was until recently still little visible as a driver of the economic and social development of producers on the Malagasy East Coast.

To support the NFTC more specifically in strengthening its capacity to innovate, the 'Malagasy Agricultural Knowledge and Innovation Systems (MAKIS)' project, funded by the EU as part of the DeSIRA Initiative, has developed a tool for analysing and strengthening organisational capacities to support innovation. These capacities (including strategic flexibility, development of services tailored to the needs of innovators, organisational learning and the ability to manage a network of organisations) are essential for an organisation or network of cooperatives to be able to effectively conduct its innovation project. Through surveys and questionnaires for the various POs, an initial diagnosis of their capacities was presented and discussed during a workshop with the members of the NFTC. It resulted in an action plan, aimed at achieving the objectives of change set out by the participants, which is scheduled to be implemented in 2024-2026 and whose progress in capacity building will be regularly measured in a participatory manner.

PRINCIPLE 12	LAND AND NATURAL RESOURCES GOVERNANCE
Stakes	Strengthen institutional arrangements to improve among others the recognition and support of family farmers, smallholders and peasant food producers as sustainable managers of natural and genetic resources.
Scale	Plot / Agroecosystem / Landscape / Food system.
Observations	• Surge in appropriations and concentration (grabbing) of land following the food crisis of 2007/08[71]. • Grabbing of water reserves (54% of land transactions recorded in the Land Matrix's database concern water-intensive crops such as oil palm, sugar cane, cotton and rubber)[72]. • Accelerated dispossession of natural resources.
Contributions of agroecology	• Recognises the rights of small producers and indigenous communities against the grabbing of land and natural resources. • Encourages and facilitates land access for generation renewal. • Promotes the participation of farmers and food system workers in land and natural resource governance.
Examples of possible interventions	• Support for fundamental rights related to land and natural resources (e.g. land tenure ensuring equitable access to land, respect for equitable rights around natural resources, rights of small producers, customary rights). • Support for the construction of a model of shared and inclusive governance of land and resources at territorial level (e.g. water, forests). • Support for national institutions to develop policies, legislation, programmes in favour of the governance of land and natural resources.
FAO elements	Responsible governance: Sustainable food and agriculture requires accountable and effective governance mechanisms at different levels (local, national and global).

PRINCIPLE 13	PARTICIPATION
Stakes	Encourage social organisation and greater participation in decision-making by food producers and consumers to support decentralised governance and local adaptive management of agricultural and food systems.
Scale	Agroecosystem / Landscape / Food system.
Observations	• Decisions on agricultural and food choices are very non-transparent and lack democratic oversight. • Centralised and vertical approaches with little respect for farmer or indigenous farming and food systems. • Low participation of populations in territorial development choices or in international cooperation projects.
Contributions of agroecology	• Promotes the rights of people, notably of the most marginalised, to define their own agricultural and food systems. • Recognises farmers' organisations and village or indigenous communities. • Promotes local democracy and supports mechanisms for consultation, coordination or information sharing.
Examples of possible interventions	• Support for decentralised governance. • Support for the participation of food system actors in decision-making processes in different fields (e.g. management of natural resources, agricultural and food systems, preservation of biodiversity), in different development bodies (development organisations projects, etc.) and at different levels (local, country, continental, global). • Support for the integration of women, youth, indigenous peoples, local communities, marginalised groups committed to agroecology, in participatory decision-making processes and in the development of national policies, programmes and regulations.
FAO elements	Human and social values: Protecting and improving rural livelihoods, equity and social well-being is essential for sustainable food and farming systems.

71 Lay, J. et al. (2021).

72 CIRAD (2022).

2.3. Controversial approaches and practices in agroecology

Those approaches and practices are the subject of heated discussions in scientific, academic and other communities working on agroecology to determine the boundaries of what is acceptable or not when implementing interventions on agroecology. For instance, mono-cropping often brings to mind endless fields. However, some argue that crop rotations or the presence of hedges make it less of a mono-crop system. Similarly, plantations with interspersed trees raise the debate as to whether it is agroforestry or not.

Certain practices have nevertheless been defined and recognised, in the methodological framework for the evaluation of agroecology (see below section 9.4.1.1)[73], as 'red flags' for practices that run counter to agroecological values. Those 'red flags' are therefore useful to examine the degree of compliance of interventions with the agroecological approach.

Practices not compatible with agroecology according to the above-mentioned methodological framework are presented in the table below. Some refer to intensive conventional farming practices recognised as having a negative impact on biodiversity, soil health, climate change (e.g. introduction of first generations of GMOs, productivity oriented monocultures, exclusive and excessive use of chemical inputs, seed systems monopolised by a few players, industrial livestock farming); others relate to practices that contravene respect for fundamental social values (e.g. discrimination against women and marginalised groups, non-respect for human rights, lack of consent and participation of local communities, displacement of populations); others refer to the agricultural and food system more broadly (e.g. promotion of industrially processed food, production of agricultural raw material without local added value).

FIGURE 8: APPROACHES AND PRACTICES INCOMPATIBLE WITH AGROECOLOGY IN THE AGROECOLOGY ASSESSMENT FRAMEWORK

GMOS	The project focuses on the introduction of GMOs and associated genome-editing technologies.
CHEMICAL INPUT	The project focuses on the promotion of synthetic fertilisers and pesticides.
MONOCULTURE	The project focuses exclusively on promoting large-scale single cash crop production at the expense of diversified strategies.
PRODUCTIVITY	The project focuses exclusively on productivity resulting in avoidable destruction of vital ecosystems and their functions and services.
SEED SYSTEMS	The project actively promotes regulations and/or actions that hamper and/or destroy local and farmer-managed seed systems.
INDUSTRIAL LIFTING	The project focuses on large-scale intensification of animal production.
WOMEN AND MARGINALISED GROUPS	The project excludes or actively discriminates against women and other marginalised groups.
HUMAN RIGHTS	The project promotes approaches that violate rights, including customary rights, ignores prior consent or results in population displacement and/or land grabbing.
PROCESSED FOODS	The project focuses exclusively on promoting highly processed, industrially produced foods (with low nutrient value).
EXTRACTIVISM	The project promotes extractive raw material production that depletes local resources over time.

73 The innovative methodological framework used was based in an initial proposal by the Centre for Agroecology, Water and Resilience at Coventry University and was further developed by a community of practice on tracking finance flows to agro-ecology. This was further pursued and was subsequently spearheaded by the Finance and Investment Working Group of the Agroecology Coalition, uniting a diverse cohort of 20 experts in a workshop in Berlin in June 2022 from various organisations and backgrounds, encompassing research (University of Coventry), donors development cooperation agencies (GIZ, BMZ, SDC, EC, ECLAC), and civil society (Agroecology Fund, Asian Farmers Association, Biodiversity and Biosafety Association of Kenya, Biovision Foundation, Center for Agroecology, Water and Resilience, CIDSE, IPES-Food, Statistics for Sustainable Devel-opment, Voluntary Services Organisation), and UN agencies (IFAD, FAO, UNEP). The workshop aimed at developing a common methodological framework to assess agroecology funding in project portfolios, monitor funding and investment flows and inform/influence project design and selection. It was agreed that this framework would be based on the 13 principles defined by the HLPE and that it should introduce 'red lines' to exclude projects deemed incompatible with an agroecological approach.

2.4. DG INTPA's approach

In the context of growing awareness of the global impacts of climate change and biodiversity loss, fuelled by the increasingly alarming findings of the Intergovernmental Panel on Climate Change (IPCC) and other scientific bodies, the European Commission took concrete steps to accelerate and deepen the transformative power of agriculture and food systems as a necessary step towards achieving EU's climate neutrality. In December 2020, it adopted the European Green Deal as a new growth model based on a clean and circular economy aiming to 'transform Europe into a modern, resource-efficient and competitive economy, ensuring the end of net greenhouse gas emissions by 2050'.

Several developments followed[74] including the Farm to Fork and Biodiversity strategies that both gave a prominent place to agricultural and food issues to support and encourage the transition to sustainable farming practices, including agroecology. Similar objectives were being pursued under the Common Agricultural Policy (CAP), notably through the promotion of eco-schemes and in some cases result-based payment schemes.

The communication on 'A Vision for Agriculture and Food' (February 2025) builds upon the report of the Strategic Dialogue on the Future of EU Agriculture. It sets the stage for an 'attractive, competitive, resilient, future-oriented and fair agri-food system (...) that is functioning within planetary boundaries (...) and where farming and the food sector contribute together to the EU's climate objectives, while preserving healthy soils, clean water and air, and protecting and restoring Europe's biodiversity'. It refers *inter alia* to 'the growing organic sector and agroecological farming practices which prove to be attractive options for younger farmers, combining economic possibilities with environmental results and social responsibility'.

The INTPA approach is consistent with the 13 principles of agroecology as defined by the HLPE on Food Security and Nutrition of the Committee on World Food Security (CFS), aligned with the 10 elements of agroecology adopted by the FAO.

In particular:

- Given that there is no 'one-size-fits-all' solution, agroecology promotes locally adapted solutions by placing participation and context-specific knowledge at the centre. Involving all stakeholders (including farmers and researchers) in the design of transformation pathways adapted to each agrarian situation (extensive or intensive production systems, small- and larger-scale agriculture) and addressing different components of agricultural and food systems (production, processing, distribution, consumption), at different levels (local, national, global) are central. This approach is aware of the implications on the organisation of research, education, vocational training and agricultural extension, on the structuring of innovation systems at all levels and on the development of public policies.

- Agroecology is recognised as being knowledge-intensive. It draws on a growing body of scientific evidence and recognises the need to evolve through responsible innovations adapted to local contexts and based on a hybridisation of local and scientific knowledge. It is therefore compatible with the progress of science and the new technologies on which it builds. For example, it values genetic progress provided that the methods and objectives of selection remain compatible with its principles, notably in terms of in situ conservation and the protection of farmers' rights over seeds. Digital tools are also promoted provided that, inter alia, they allow better connections between producers and consumers, are co-designed with local stakeholders and promote balanced digital governance in line with the agroecological approach.

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74 A very comprehensive mapping of all cross-cutting EU initiatives related to food system transformation, at European and international levels, is presented in the EU Pathway towards sustainable food systems transformation, developed by the European Union, like many UN Member States, in the context of the momentum initiated in September 2021 by the UN Food Systems Summit.

- It does not necessarily prohibit the use of synthetic inputs, in particular fertilisers, which must be adapted to existing farming systems and consumption levels (less fertilisers in intensive systems, more in certain systems in Africa, for example) within the levels recommended by international standards such as the FAO's International Code of Conduct for the sustainable use and management of fertilisers. Fertilisers are an important production factor among others (other inputs, mechanisation), bearing in mind that services and infrastructure, as well as a favourable policy environment, are essential for agricultural development. To make mineral fertilisers more useful and effective, it is necessary to support soil fertility management approaches in which (i) soil health is the entry point to increase production (erosion control, increased carbon sequestration and biological life); (ii) inorganic fertilisers complement other sources of nutrients (organic fertilisers, legumes, trees, nitrogen-sequestering plants and bacteria, etc.) where necessary; (iii) water management is properly taken into account; and (iv) decent incomes for farmers and secure markets are encouraged. The use of synthetic fertilisers must therefore be seen as a complement to agroecological practices and be part of a broader objective of managing and reducing farmers' dependence on purchased inputs through the intensification of ecological processes.

- The technical and social dimensions of agroecology can be applied to industrial agriculture and large farms. Large-scale transformation requires the promotion and/or support of agroecologically compatible value chains, capable of marketing the diversity of the resulting productions and concerned that trade is fair, primarily meets the needs of the territory and does not create power asymmetries. Well-informed and educated consumers are essential to drive the market. A change of scale requires the dissemination of intervention methods based on participatory approaches, the strengthening of the capacities of actors, the mobilisation of the private sector and the creation of an enabling environment including new financing mechanisms and rules. Such changes also require a new metric reference framework that would no longer focus solely on production and productivity measures, but would include performance indicators (technical, economic, social) and the positive (or negative) externalities of activities (environmental footprint).

This is therefore in line with the EU Global Gateway agenda that aims at addressing investment needs and enhancing opportunities for the European private sector in strengthening the resilience, sustainability and autonomy of agri-food systems in partner countries, while ensuring the highest environmental and labour standards, both in the areas of export and on local and regional markets.

2.5. Other common approaches and practices and their relationship with agroecology

Many innovative approaches and practices exist that aim to contribute to a sustainable transformation of agricultural and food systems. None of them, however, integrates all aspects. There are many overlaps as well as differences between them. The HLPE in its 2019 report identified the main ones which it classified into two main categories depending on whether they relate to agroecology or sustainable intensification.

The former, according to the HLPE, seeks to strengthen the ecosystem services supporting agricultural production in order to substitute ecological processes for chemical inputs and fossil fuels. They are not necessarily based on an attempt to increase yield and are intended to be transformative. Their aim, in their most ambitious form, is to rethink the entire agricultural and food system towards greater sustainability (Gliessman's highest level of transitions, see Figure 3, Section 1.2.4). They are concerned not only with the ecological and health impacts of food systems, but also give a central place to the social, cultural and political dimensions of transitions to sustainable food systems, power dynamics and governance issues.

The latter, on the other hand, aims to improve the efficiency of resource use (first level of the Gliessman scale) by prioritising the development and use of technological innovations (genetics, digital, robotics) to increase production and yields while striving to control negative environmental effects. They focus on the plot and farm scale without calling into question the characteristics of the dominant simplified agricultural systems. They can be considered as part of an agroecological transition depending on whether they include other key agroecological principles, such as the co-creation of knowledge, minimisation of the use of toxic inputs or maintenance of agrobiodiversity. Social and political aspects (participation, co-creation, equity, etc.) are limited, or often completely absent.

Without repeating the HLPE's classification, nor all the approaches favoured by it, we instead wanted to focus below on those which recur most often in the literature and project documents to highlight their common elements and possible divergences with agroecology.

2.5.1. Permaculture

Characteristics: Permaculture is the conscious design and maintenance of productive agricultural ecosystems that have the diversity, stability and resilience of natural ecosystems. It is the harmonious integration of the landscape and the people who provide food, energy, habitat and other material and intangible needs in a sustainable manner [75]. Permaculture has a unique approach to system design. Permaculture research has long been a marginal sector, but it is developing.

Points of convergence with AE: Permaculture is very close to agroecology, particularly in its proposals for soil management and cultivated biodiversity. Both share the ideas of resilient ecosystems, an integrated approach, valorisation and measured use of local resources for the benefit of the people living there. Both are associated with a movement made up of a variety of actors.

Possible divergences with AE: Although it is also based on the interactions of plants with their environments, permaculture is often associated with smaller scales of cultivation than those of agroecology. Likewise, if it promotes short supply chains and the notion of fair prices for producers and consumers, it does not offer as holistic a vision of food systems as that of agroecology. Agroecology can integrate the principles of permaculture, but it therefore corresponds to a broader concept both in its territorial approach and in the global food system. On the other hand, permaculture integrates the areas of human habitat, energy and cities into its landscape structuring, which is not provided for by agroecology.

75 Mollison, B., Holmgren, D. (1978) .

2.5.2. Agroforestry

Characteristics: Agroforestry covers all agricultural practices which combine, on the same plot, farm or agricultural territory, trees (in all their forms: isolated trees, aligned, forming a continuous cover, hedges, groves, etc.) with agricultural crops and/or livestock systems. From the farm to the water catchment area, from the open field to the domestic forest or pastured wood, a good integration of trees and shrubs into agriculture makes it possible to increase production, diversify income and ecosystem services and to ensure the preservation and renewal of natural resources: water, soils and their fertility, biodiversity, etc[76].

Points of convergence with AE: Agroforestry is a practice widely promoted by agroecology, from the scale of the plot to that of the landscape.

Possible divergences with AE: Agroforestry does not take into account the scale of the food system, and does not always consider the principles of equity and social responsibility (e.g. diets, social values, governance, participation) although it is increasingly becoming participatory, mobilising local communities and building on local practices and tree species. Such is the case for example in India, the Philippines, Korea and Peru.

76 French Association of Agroforestry. https://www.agroforesterie.fr/agroforesterie-definition/

Agroforestry transition of cocoa systems in Côte d'Ivoire

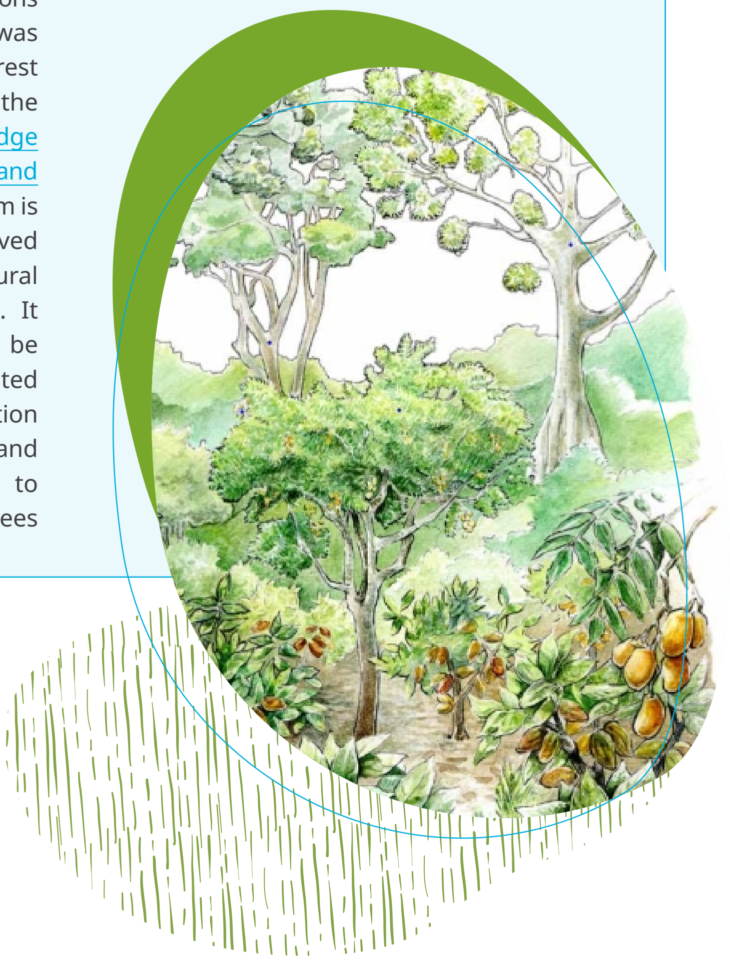
The agronomic and environmental potential of agroforestry is well established. Yet agroforestry models are still slow to gain a foothold in agricultural landscapes, partly because of the risk-taking that a change in practices entails for producers. Few can expose themselves to the risk of lower returns or increased workload in a context where economic incentives from private actors or public policies remain limited.

Supporting and accompanying producers in taking risks is one of the levers for adopting agroforestry carried out by the Nitidæ association in the Cocoa4Future project, funded by the EU and implemented by CIRAD in Côte d'Ivoire. This approach involves community-based agricultural advice, based on co-construction processes of technical itineraries to initiate a transition from unsustainable cocoa monocultures to agroforestry systems.

Some producers have maintained cocoa plantations with a large gradient of density and diversity of forest trees, which are the companions of cocoa trees. This farmer knowledge was capitalised on through surveys and forest inventories, then disseminated through the production of a 'collection of farmer knowledge on the interactions between companion trees and cocoa trees in Côte d'Ivoire'. This compendium is designed as a support tool for all actors involved in the promotion of agroforestry (agricultural technicians, cooperatives, producers, etc.). It allows them to choose the tree species to be introduced, via nursery seedlings or assisted natural regeneration, into a cocoa plantation knowing its effects on the environment and production of cocoa trees. In addition to supporting the conservation of existing trees on cocoa plantations, this work to identify complementarities between forest species and cocoa production makes it possible to promote the interest of a diversity of tree species in the practices of cocoa producers.

Thus, the introduction of trees in the cocoa system is recommended above all as an agronomic lever. The advisors are trained and equipped with a technical guide to help producers identify and locate each species of trees to be introduced into their plantation by cross-referencing the development needs of the plant (light, fertility, humidity, etc.) and the agronomic constraints identified in the plantation (lack of organic matter, phytosanitary pressure, flooded soil, etc.).

Taking into account the costs of preserving and producing biodiversity through mechanisms for paying producers is essential for the dissemination of this agroecological practice in agricultural landscapes.



2.5.3. Organic farming

Characteristics: 'Organic farming is an integrated production management system which (...) emphasises the use of natural inputs (minerals and products derived from plants) and the renunciation of synthetic fertilisers and pesticides'[77]. The use of natural inputs, the improvement of soil structure and fertility and the use of a crop rotation plan are the three basic rules[78]. It is usually accompanied by certification mechanisms that support sales prices but also represent a cost for farmers.

Points of convergence with AE: Organic farming excludes synthetic agrochemical products. Agroecology, on the other hand, aims at reducing or replacing synthetic inputs, while some of its currents advocate the total non-use of chemical inputs. A current of organic farming approaches agroecology by seeking to enhance biodiversity, combat erosion, increase synergies between systems, use natural ecosystems as models, etc.

Possible divergences with AE: Another current of so-called industrial organic farming develops intensive practices, such as monoculture, heavy mechanisation and non-covering of soil. It does not seek to increase biodiversity, combat erosion, optimise water use in a sustainable way. It simply replaces chemical inputs with biological inputs in the existing production system. In this context, it does not bring certain benefits such as mitigating the effects of climate change (reduction of greenhouse gas emissions and improved carbon sequestration in soil)[79]. Within the framework of such industrial organic farming, without a revision of the production system, the costs of purchased organic inputs can severely limit agricultural income, unless the prices of organic products can compensate for these costs. As reflected in the regulations of organic agriculture in many countries, it is not concerned with social fairness or rights notably when implemented by large companies.

2.5.4. Regenerative agriculture

Characteristics: Regenerative agriculture (RA) was initiated in Anglo-Saxon countries and is often mobilised by private sector actors. It is presented as an alternative way of producing food while reducing environmental and/or social impacts compared to conventional agriculture. There is little scientific debate on the RA concept, and its development is mostly extra-academic[80]. No regulatory definition of RA exists, and no widely accepted definition has emerged in common use[81]. The main objectives of the RA are to regenerate soils; increase biodiversity, soil atmospheric carbon sequestration, and soil resilience to climate fluctuations; optimise the water cycle and improve the provision of ecosystem services.

Points of convergence with AE: RA is a form of agriculture which refers to agroecology, as well as soil conservation and organic farming. It highlights the fact of contributing to the maintenance and restoration of common goods (air, soil, water, biodiversity) and sequestration of carbon through a regenerative approach to natural resources.

Possible divergences with AE: The RA literature is mainly oriented towards changes in agricultural practices with little reference to the food system[82] in its more global dimension as well as to economic, equity and social responsibility issues. Some agri-food players use this terminology to develop alternatives without considering changes in the food system (in particular as regards the organisation of value chains, power asymmetries, etc.)[83].

77 FAO and IFOAM (2015).

78 Ibid.

79 Leifeld et al. (2013).

80 Dachelet, R. (2020).

81 Schreefel, L. et al. (2020).

82 Davies, A.R. (2020)

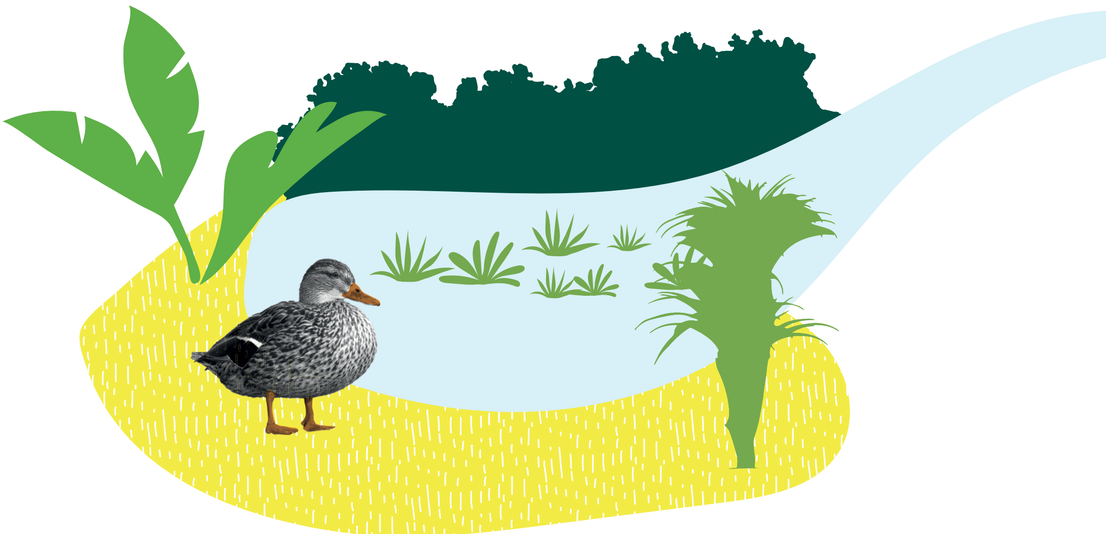
83 Duru, M. et al. (2021).

2.5.5. Nature-based solutions (NbS)

Characteristics: The European Commission defines them as follows: 'Solutions inspired and supported by nature that are cost-effective, simultaneously delivering environmental, social and economic benefits and contributing to building resilience. These solutions bring more nature and diverse natural characteristics and processes in cities, landscapes and marine areas, through adapted, resource-efficient and systemic local interventions' [84]. The definition of the International Union for Nature Conservation (IUCN) is more geared towards protective measures: 'Nature-based solutions are actions aimed at protecting, sustainably managing and restoring natural and modified ecosystems, which respond to societal challenges in an effective and adaptive manner while benefiting people and nature' [85]. It further stresses that 'nature-based solutions must benefit biodiversity and support the provision of a range of ecosystem services'. This concept therefore encompasses a variety of elements of understanding and use. It has its roots in work on biomimicry carried out in the 1990s and in the search for solutions to mitigate the negative consequences of industrial agriculture in the early 2000s. Nature-based solutions are clearly embedded in the international environmental policy agendas as an approach to address climate and biodiversity loss crises. The term does not refer specifically to agriculture and food systems but covers also other sectors.

Points of convergence with AE: Like agroecology, NbS integrate technical and social dimensions and ensure short- and longer-term economic viability. They seek to address societal challenges more narrowly, through the protection and restoration of natural and modified ecosystems for the benefit of biodiversity and human well-being. They tackle major issues such as climate change, biodiversity loss, food and water insecurity. They also seek to integrate public policies and meet objectives at national and international levels. NbS are also wary of the use of chemical inputs[86].

Possible divergences with AE: NbS have a much broader scope than the agricultural territory and apply both in urban and peri-urban contexts. They also cover poorly anthropogenic spaces. It is noted that the still varied orientations of the NbS concept generate interpretations and implementations that are often disparate depending on the actors and their specific interests[87 88].



84 European Commission (n.d).

85 International Union for Nature Conservation, IUCN Global Standard for NbS https://www.iucn.org/our-work/nature-based-solutions.

86 Ibid.

87 Wynberg, R. et al. (2023).

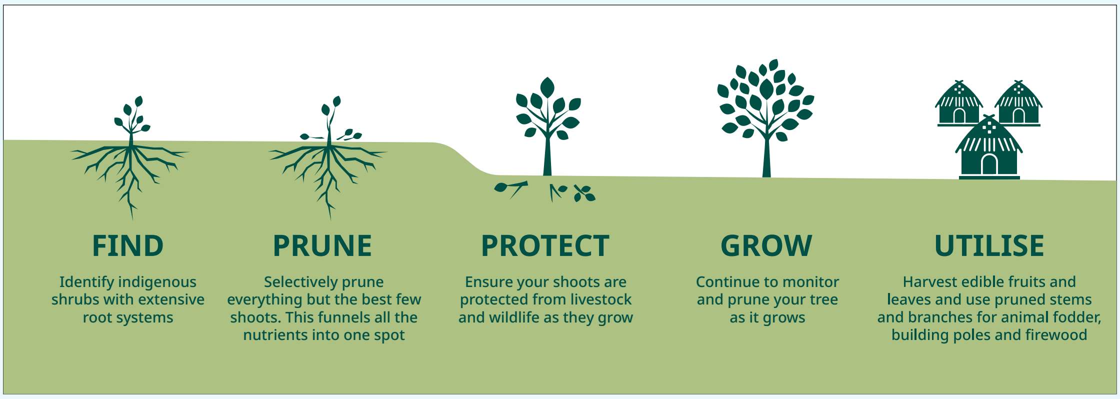
88 IPES-Food (2022).

Farmer Managed Natural Regeneration (FMNR): Community driven, low cost and scalable reforestation approach for climate change mitigation and adaptation

Farmer Managed Natural Regeneration (FMNR) is both a technical practice and community development approach for mobilising and empowering local communities to restore their natural environment through the systematic regrowth and management of remnant vegetation, such as trees and shrubs from felled tree stumps, sprouting root systems or seeds, on diverse landscapes. The regrown trees and shrubs, integrated into crops and grazing pastures, help restore soil structure and fertility, inhibit erosion and soil moisture evaporation, rehabilitate springs and the water table, and increase biodiversity while having climate change mitigation and adaptation benefits.

FMNR was developed as a distinct approach in 1983 in the Republic of Niger. Over the ensuing 20 years, FMNR spread to over five million hectares of farmland, lifting tree density from four trees per hectare to over forty, restoring some 200 million trees into a formerly barren landscape. Of note, this feat was achieved primarily through a bottom-up movement, passing from farmer to farmer and with minimal external input of resources or expertise. This in turn has resulted in sequestration of between 5 and 10 million tons of carbon dioxide (CO_2) per year, a doubling of crop yields, increased incomes and diversification of income streams and greater resilience through buffering of extremes in heat, wind and rainfall. There is no consolidated figure on the total extent of FMNR globally. However, in 2016, the US Geological survey conducted a study across seven West African countries (Senegal, Mali, Ghana, Burkina Faso, Niger, Chad, Nigeria) and found 15 million hectares of FMNR (both indigenous and promoted). 6 million were found in Niger where FMNR enabled farmers to produce an additional 500,000 tons of cereal annually compared to the 1970s and 1980s, benefiting 2.5 million people. A recent study in Malawi uncovered over 3.2 million hectares of FMNR with no apparent links to any government or NGO initiative (Reij, 2019, personal communication).

FMNR in 5 steps



For more on FMNR, click here.

2.5.6. Conservation agriculture

Characteristics: 'Conservation agriculture is an agricultural system that helps prevent the loss of arable land while regenerating degraded land. It promotes minimal mechanical disturbance of the soil (without tillage), the maintenance of permanent cover and the diversification of plant species. (...) External inputs, such as agrochemicals and plant nutrients of mineral or organic origin, are applied optimally and in ways and quantities that do not interfere with or disrupt biological processes'[89].

Points of convergence with AE: It supports the recycling of crop residues, the rational use of chemical inputs, soil health, in particular by emphasising soil physics and biology, synergies between components of agricultural systems at plot level and the diversification of agricultural species. Knowledge sharing between farmers is at the heart of conservation agriculture in many countries (Latin America, USA, Europe).

Possible divergences with AE: Its scope is limited to the points highlighted above rather than food systems. It is compatible with intensive and highly mechanised agriculture but is partly committed to the principles of synergy (it does not include synergies at territorial level) and biodiversity (it does not seek to preserve the biodiversity of natural species—beyond that of soil—through the conservation of natural areas). Equity and social fairness are not within its scope.

2.5.7. Climate-smart agriculture

Characteristics: Climate-smart agriculture (CSA) aims to address three main objectives: sustainable increase in agricultural productivity and income (food security); adaptation and building resilience to climate change impacts (adaptation); and the reduction and/or removal of greenhouse gas emissions (mitigation), where applicable[90].

Points of convergence with AE: Many agricultural practices promoted by CSA are compatible with AE (rotation, cover plant, organic fertiliser, etc.). In fact, agroecology is necessarily climate-smart (although the opposite is not true[91]) as many AE practices promote climate change adaptation by enabling production systems to be more resilient and to promote carbon capture from the soil (mitigation).

Possible divergences with AE: CSA is strongly involved in the integration of (often advanced and costly) technologies. Moreover, it does not incorporate a comprehensive vision on food systems and has little involvement in the social dimension. CSA does not propose a specific criterion to clarify what it is or is not[92]. CSA is criticised by scientists[93] and civil society organisations as it includes all agricultural production models, including large-scale industrial agriculture (which is widely recognised as contributing to climate change)[94]. CSA is, therefore, supported by a wide range of private sector actors, including synthetic input companies and agro-food multinationals.

89 https://www.fao.org/conservation-agriculture/overview/what-is-conservation-agriculture/en/

90 https://www.fao.org/climate-smart-agriculture/en

91 Tittonell, P. (2015).

92 Saj, S. et al. (2017).

93 Wise, T. (2020).

94 https://www.climatesmartagconcerns.info/cop21-statement.html

CHAPTER 3

What does agroecology say about major global challenges?

Practice and scientific research demonstrate that agroecology is a credible response to major global challenges such as climate change, social and gender inequalities, biodiversity loss, the worsening of food insecurity and health and nutrition crises. The following sections illustrate, through each principle, what agroecology can provide to limit each of these challenges by focusing on the key messages, the main issues at stake and the possible contribution of each AE principle.

3.1. Agroecology and climate change

KEY MESSAGES

- Agroecology, by increasing the vegetation and tree cover of agricultural land, by increasing the production of pasture biomass, by restoring degraded land, by helping to protect forests in rural areas, by strengthening water and nutrient cycles, by promoting pollination and natural management of bio-aggressors (pests and diseases), promotes the development of ecosystem services, recognised as being particularly effective in better adapting to the effects of climate change (CC).

- Agroecology allows both an increase in carbon sequestration in soils (through agricultural practices such as agroforestry or organic fertilisation) and a reduction in greenhouse gas (GHG) emissions (through limiting tillage, reducing the use of synthetic inputs and limiting transport). It therefore contributes to mitigating the effects of climate change[95]. 'Biological approaches to carbon sequestration are the most promising prospects in terms of negative emissions' (IPCC)[96].

- Agroecology, by intervening at different scales: plot/farm/territory/food system, contributes to reducing the vulnerability of populations to climate risks at each of these levels.

95 Snapp, S. et al. (2021).

96 INTPA F3. Agroecology in the Multiannual Financial Framework 2021-2027. The importance of agroecology for sustainable agri-food systems and the objectives of the Green Deal. November 2021.

CHALLENGES

Mitigation issues and adaptation are among the biggest challenges that agriculture faces.

IPCC projections indicate that climate change will exert increasing pressure on agricultural and food production systems, putting food and nutrition security at risk[97]. There is therefore an urgent need to deploy adaptation and mitigation measures to protect these production systems.

Southern countries are particularly vulnerable to climate change, as their agricultural sector remains most often highly dependent on the natural environment (e.g. 94% of African agricultural land is not irrigated[98], increasing their vulnerability to rainfall variations caused by climate change). There is therefore an urgent need to accelerate the deployment of adaptive measures in the agricultural sector in these countries.

CONTRIBUTIONS OF AGROECOLOGY TO CLIMATE CHANGE

PRINCIPLES	ARGUMENTS
Recycling	CC leads to irregularity or even a scarcity of water resources, which means that there is a risk of a decline in agricultural and animal production. Agroecology calls for recycling (e.g. reuse of wastewater, rainwater recovery) and the valorisation of water resources (e.g. irrigation adapted to local conditions). Agroecology increases water use efficiency. It also promotes the increase and recycling of biomass (e.g. cover crops, crop residues), resulting in the accumulation of organic matter and therefore carbon in soils. This helps both to mitigate the effects of CC and to promote the ecosystem services generated by the soil (e.g. greater water retention capacity), making it better able to adapt to rainfall irregularities and maintain production levels.
Reducing inputs	The manufacture and transport of synthetic agrochemical products generate significant amounts of GHG. Agroecology recommends reducing the use of these synthetic products (in high-use situations), which contributes to the mitigation phenomenon. As part of the fight against bio-aggressors, agroecology calls for the substitution of curative agrochemicals with preventive natural methods, reducing GHG emissions and strengthening natural protection mechanisms, thereby increasing the capacity to adapt to the effects of CC on the spread of bio-aggressors.
Soil health	By recommending an increase in organic matter in the soil, the enrichment of the soil biome and the fight against erosion, agroecology improves the properties of the soil (e.g. increase in macro and microfauna, creation of galleries and interstices in the soil) and, therefore, its biological activity, which generates fertility, leading to higher productivity, able to partially offset possible production losses linked to CC. A living soil rich in organic matter plays an essential role as a carbon sink, contributing to mitigation efforts, unlike synthetic fertilisers and erosion phenomena that attempt to reverse this role as carbon sinks and to make the soil carbon emitting.
Animal health	Agroecology calls for the selection of resilient, locally adapted breeds, which reduces the risk of diseases (increased with CC) and makes animals more resistant to climate variations. Furthermore, the consumption by animals of healthy and local feeds (e.g. free grazing) and the reduction of the consumption of veterinary medicines, limit GHG emissions from their manufacturing and transport.
Biodiversity	Agroecology promotes a wide range of natural and cultivated species, increasing the regulatory capacities of the agroecosystem, thus more resilient and better adapted to the effects of CC. Furthermore, the conservation of uncultivated spaces between cultivated areas further promotes the presence of species that play a role in the natural regulation of bio-aggressors (which tend to increase with CC), and also promotes a greater diversity of pollinating insects, both of which are essential to support productivity harmed by the effects of CC, thus enhancing the adaptability of the system. In addition, certain practices such as agroforestry contribute to mitigation by increasing the carbon stock in the soil and to adaptation based on vegetation cover that protects the soil.

97 IPCC (2022).

98 You, L. et al. (2011).

Synergy	The diversification of production systems is the approach that has best demonstrated the excellent adaptability of agroecology. Functional diversity (e.g. crop-livestock association, agroforestry) increases the possibility of a farm to adapt to various climatic conditions: certain crops continue to produce even if others fail due to a disrupted climate. This synergy between production systems, at the scale of a farm or territory, allows for better natural regulation of agroecosystems, and therefore reduces dependence on agrochemical inputs, thus contributing to the mitigation challenges associated with CC. Tropical agroforestry is the approach that has best demonstrated the mitigation capacity of AE, through carbon sequestration in biomass and soil. The latest IPCC report mentions that 'increasing the resilience of the food system through agroecology and diversification is an effective way to adapt to climate change'[99].
Economic diversification	CC results in less rainfall predictability and an increase in extreme weather events, leading to a greater risk of loss of agricultural and food production, food security and income. Agroecology, by promoting the diversification of production systems and sources of income (e.g. through supporting complementary activities, the protection and collection of wild plants for self-consumption and/or sale, etc.), reduces these risks and ensures greater economic stability. In addition, by supporting local markets, agroecology makes greater use of local production, often disturbed by the effects of CC.
Co-creation of knowledge	CC leads to a high degree of geographical and temporal variability in climatic conditions. To adapt as best as possible, it is essential to combine both detailed knowledge based on field observations (by indigenous peoples) and scientific studies to monitor situations and projections (carried out by teams of researchers). AE promotes horizontal knowledge sharing, which integrates (among others) adaptation and mitigation issues, based on the valorisation of indigenous knowledge in research work and vice versa. This horizontal knowledge sharing helps build adaptation and mitigation capacities. For example, warning systems have been developed that integrate the perception and observations of rural populations on climate into the results of scientific analyses and projections.
Social values and diets	Diets driven by the industrial model favour the production of ultra-processed food. They are becoming widespread worldwide (especially in urban areas) and contribute significantly to GHG emissions (e.g. via the use of synthetic agro-chemicals in fields, food processing processes and transport in particular) in addition to causing serious diet-related non-communicable diseases (e.g. cardiovascular diseases, cancer and diabetes). However, agroecology recommends reversing this trend by supporting healthy diets based on culture, identity and quality that are adapted to the seasons.
Connectivity	The agricultural and food system that prevails is a globalised system, in which products are transported over long distances and often packaged, contributing greatly to GHG emissions. Agroecology, on the other hand, recommends that agricultural production systems and food markets be largely relocated to the same territory, through the development of short supply chains, which overall generate less transport and less packaging and significantly reduce GHG emissions compared to the dominant model.
Fairness	CC does not affect everyone in the same way. In addition to geographical inequalities, with the countries of the South generally being the most impacted by climate change of great magnitude[100] while being the least GHG-emitting, small producers and vulnerable groups are also more likely to be affected, in particular because they do not have access to certain expensive infrastructure (e.g. irrigation and pump systems) that would help reduce the effects of climatic variations, nor to insurance systems that would make it possible to cushion the deficits due to production losses caused by CC. Promoting the rights of these vulnerable groups through agroecology makes these populations better adapted and more resilient to climate change.
Governance of land and natural resources	Extreme weather events, increased tenfold by CC, contribute to degrading resources (e.g. soil erosion during heavy rainfalls), hence the need to support the governance models of citizens' organisations and institutions engaged in these issues, as called for by agroecology. This may, for example, take the form of supporting the governance of seed structures managed by communities, which promote farmer seeds (reproducible and, therefore, particularly adaptable to changing climatic conditions) as an alternative to industrial seeds (emitting GHG due to the distances travelled and non-reproducible, thus not able to adapt to developments linked to CC).
Participation	Agroecology promotes the participation of producers and consumers committed to agroecology in the development of climate-related public policies, in order to ensure that agroecology is properly integrated as a factor of adaptation and mitigation to CC.

99 IPCC (2019), Chap5, p. 51.

100 The richest 1% emit more CO2 than the poorest two-thirds of humanity, i.e. 5 billion people, according to the report 'Climate Equality: A planet for the 99%', OXFAM (2023).

3.2. Agroecology and food security

KEY MESSAGES

Numerous studies[101] have documented that agroecology can improve the food security and nutrition of rural and urban populations in different ways:

- By helping to increase production at the level of production systems and not just at the level of a crop, agroecology provides a greater variety of products and thus makes it possible to limit the risks associated with poor harvesting (climatic hazards, pest attacks, diseases, etc.).
- By encouraging agricultural diversification, agroecology contributes to food diversification and better diets. The nutritional quality of food is highly dependent on soil quality (15 out of 18 essential plant nutrients are provided by the soil, according to FAO). Agroecology supports the rights of access to and use of land and natural resources of rural populations, particularly the most marginalised. By doing so, it contributes to their food empowerment. It also promotes, by securing them, investments on land (soil improvers, tree plantations, irrigation systems, etc.).
- By relocating and strengthening the decision-making and action powers of farmers and citizens, agroecology enables them to choose the agricultural and food practices and models that suit them best.

CHALLENGES

- In 2015, the international community, under the auspices of the United Nations, committed to eliminating hunger, ensuring food security, improving nutrition and promoting sustainable agriculture [SDG2] by 2030. This objective will clearly not be achieved. Even more seriously, the global food and nutrition situation has steadily deteriorated since then[102].
- In 2021, nearly 10% of the world's population was undernourished, while 27% was overweight or obese. This form of malnutrition, which also affects the countries of the South and has risen by 30% over the last 30 years, alarms international organisations to the point that the World Health Organization (WHO) speaks of 'a global epidemic of obesity'. It is an important public health issue due to associated pathologies (cardiovascular diseases, cancers, diabetes).
- The global food challenge is therefore to be able to properly and sustainably feed humankind as a whole, without losing biodiversity and polluting water, air and soil. This involves responding to people's immediate needs while preserving the productive potential of agroecosystems for future generations[103].

CONTRIBUTIONS OF AGROECOLOGY TO FOOD SECURITY

Agroecology's contributions to improving food and nutrition security are widely documented in a wide variety of contexts. The definition of food security closest to the principles of agroecology is that which incorporates agency [104] as a fifth pillar, in addition to the other four, which are availability, access, stability and use.

101 Keer et al. (2021); Paracchini, M.L. et al. (2022); HLPE (2019); Mayer, A.M. (2019); Deaconu et al. (2019).

102 See the 2024 State of Food Security and Nutrition in the World (SOFI) report, by FAO; IFAD; UNICEF; WFP; WHO.

103 Dufumier, M. (2015).

104 Definition of HLPE (2019). Agency refers to the ability of people – individually or collectively – to define the food systems and nutritional outcomes they want, and to act and make strategic life choices to obtain them. This requires socio-political systems in which policies and practices can be driven by citizens' will and reflected in governance structures to achieve food security and nutrition for all (according to Ganges, 2006; Chappell, 2018).

PRINCIPLES	ARGUMENTS
Recycling	Recycling, which is inherent to an agroecological approach, increases soil health and thus yields, reduces production costs and strengthens the empowerment of producers and consumers (access).
Reducing inputs	The reduction of synthetic inputs as advocated by agroecology, which aims to minimise as much as possible farmers' dependence on purchased inputs contributes to food security from a health and economic point of view. Reducing inputs reduces costs and increases the autonomy of farmers, making them less dependent on synthetic products subject to strong price fluctuations due to higher energy prices (gas, oil, phosphate).
Animal health	Agroecological breeding seeks autonomy and adaptation to the environment, building on the biological diversity of animals and plants and favouring grassland. It thus reduces the need for health treatments and feed imports. These practices have an impact on the health and nutritional quality of products of animal origin (milk, meat, eggs), on livestock farmers' resources (access) and on the food and nutrition security of producers and consumers (use).
Soil health	Living soils, i.e. rich in biodiversity and subject to as little disturbance as possible, as advocated by agroecology, have a direct impact on the nutrient content of crops and thus on the nutritional value of food (use). Soil health also affects water quality, limiting the risks of pollution and promoting the presence of trace elements. It also improves fertility and thus agricultural yields and, by extension, food availability.
Biodiversity	By diversifying species and protecting ecosystems, agroecology provides complementary sources of supply to households, such as neglected crops, harvesting, hunting or fishing that are an integral part of rural food systems. These practices often play a key role particularly during lean periods (availability). Biodiversity also provides ecosystem services (decomposition of organic matter, pollination), which improves production in quantity (availability) and quality (use).
Synergy	Crop diversification, a practice which is inextricably linked to agroecology, offers a greater diversity of food (use) and allows crops to be spread out, thus ensuring greater food availability throughout the year. It also reduces the risks associated with climatic events, diseases or pest attacks that may affect production (stability).
Economic diversification	Polyculture crop-livestock systems advocated by agroecology are based on a plurality of activities that make it possible to diversify sources of food and income (access). They minimise risks related to climate or other events and improve the resilience of populations and ecosystems (stability). The agroecological approach considers the family farming system and the territory in its integrity and through its interdependencies and not through sectoral logic.
Co-creation of knowledge	The solutions that agroecology proposes are always the result of locally adapted experimentations, enabling them to be easily appropriated by the population and to support more productive and more resilient production systems to ensure food security. Co-creation enhances farmers' empowerment by limiting their dependence on technologies or external inputs and by improving their negotiation power through valorising their knowledge (access, agency).
Social values and diets	Many studies have shown a positive relationship between diversified agricultural systems and household dietary diversity. The promotion of local seeds contributes to food diversity, to the empowerment of farmers and, by extension, to their food security.
Connectivity	The territorialisation of agricultural and food systems, a pillar of agroecology, aims to reduce people's dependence on imports subject to fluctuations in volume and prices on international markets (e.g. 2007-08 crisis, war in Ukraine) (stability). It also strengthens the local economy by preserving or consolidating solidarity and the negotiating power of the various actors in the food system.
Fairness	Agroecology is based on an inclusive approach for healthy and high-quality diets accessible to all and produced under ethically acceptable conditions. It thus contributes to strengthening the right to food.
Governance of land and natural resources	There are strong correlations between land rights (i.e. the rights to access land and natural resources such as water, forests, grazing, hunting or fishing areas) and food security. Agroecology recognises the land rights of minorities and defends the concept of commons, thus respecting the plurality of rights and uses (access, agency).
Participation	Agency refers to the ability of people – individually or collectively – to define the food systems they want (HLPE, 2019). Agroecology strengthens the socio-political conditions for citizens to participate in the choice of their food systems (food sovereignty).

What agroecology brings to food security and ecosystem services: A review of scientific evidence

There is a growing body of scientific evidence regarding the outcomes and impacts of agroecology. A large-scale analysis of scientific articles (including literature review, meta-analysis, models) shows that there is a strong theoretical basis and empirical evidence that food security outcomes (availability, access, utilisation, stability) are as good or sometimes even better for agroecological systems than conventional alternatives. Agroecological systems lead to increased yields in comparison with conventional systems, especially in low-input systems. Without external inputs, agroecological systems could maintain yields or experience a modest yield decrease but with positive externalities.

Four levers for agroecology supporting the positive impacts of agroecology on food security are analysed in the scientific literature, namely crop diversification, legume-based systems, agroforestry and mixed crop-livestock systems.

- Crop diversification is an effective strategy to improve food security by mobilising different biological mechanisms.
- Due to its biological characteristics for nitrogen (N) fixing, legumes are one of the most important levers for improving food security (both availability and food utilisation/nutrition) based on agroecological principles.
- Agroforestry contributes to food availability by recycling nutrients, to food stability by increasing the resilience of the farming systems, and to food utilisation through better diets.
- Mixed crop-livestock systems contribute to food availability by recycling nutrients and to food utilisation through meat and milk consumption.

As agroecology is more than a set of practices, the knowledge brief specifically focuses on two approaches, namely soil health management and agroecological pest management, which have a high potential to increase food security and efficiently address environmental challenges. Beyond production and food security, agroecology brings multiple services. Those services are the main arguments to support agroecological approaches able to adequately address both food security and environmental challenges. Socio-economic evidence is also analysed.

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[DeSIRA-LIFT-Knowledge-brief4-Agroecology.pdf (desiralift.org)](DeSIRA-LIFT-Knowledge-brief4-Agroecology.pdf)

KNOWLEDGE BRIEF

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What agroecology brings to food security and ecosystem services: a review of scientific evidence

DeSIRA LIFT

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Abstract

There is a growing body of scientific evidence regarding the outcomes and impacts of agroecology. This knowledge brief aims to provide a set of evidence, based on a large-scale analysis of scientific articles (literature review, meta-analysis, models).

There is a strong theoretical basis and empirical evidence that food security outcomes (availability, access, utilisation, stability) are as good or sometimes even better for agroecological systems than conventional alternatives. Four levers for agroecology supporting the positive impacts of agroecology on food security are analysed: crop diversification, legume-based systems, agroforestry and mixed crop-livestock systems. Crop diversification is an effective strategy to improve food security by mobilising different biological mechanisms. Due to its biological characteristics for nitrogen (N) fixing, legumes are one of the most important levers for improving food security (both availability and food utilisation/nutrition) based on agroecological principles. Agroforestry contributes to food availability by recycling nutrients, to food stability by increasing the resilience of the farming systems and to food utilisation through better diets. Mixed crop-livestock systems contribute to food availability by recycling nutrients and to food utilisation through meat and milk consumption.

As agroecology is more than a set of practices, this knowledge brief specifically focuses on two approaches with a high potential to increase food security and efficiently address environmental challenges. A set of evidence is analysed for integrated soil health management and agroecological pest management.

Beyond production and food security, agroecology brings multiple services. In fact, such services are the main arguments to support agroecological approaches able to adequately address both food security and environmental challenges. Socio-economic evidence is also analysed.

1 Context and objective

Agroecology is a science, a set of practices and a social movement. It is defined by the Food and Agriculture Organization of the United Nations (FAO) as "an integrated approach that simultaneously applies ecological and social concepts and principles to the design and management of food and agricultural systems" that "aims to optimise the interactions between plants, animals, humans and the environment while taking into account the social aspects that must be addressed for a sustainable and equitable food system". Many actors referring to agroecology prefer to insist on principles that define what agroecology is. The FAO proposes 10 elements to characterise agroecology, identified during a consultation process carried out between 2015 and 2017, and culminating with an international symposium in 2018.[1] The HLPE report (2019) on agroecology presents 13 principles (both technical, social and organisational)

1] Available at http://www.fao.org/about/meetings/second-international-agroecology-symposium/en/, accessed 8 February 2024.

3.3. Agroecology and farmers' income

KEY MESSAGES

- Agroecology reduces production costs by limiting dependence on synthetic inputs, through the use of local renewable resources such as compost and integrated pest management techniques.
- The diversification of production systems offers multiple and stable sources of income, thereby reducing the vulnerability of farmers to economic and climatic fluctuations. On the other hand, being labour-intensive, diversification requires creativity in terms of work organisation, which can be a constraint.
- Local markets and short distribution/supply chains allow farmers to better promote their products, obtaining fairer prices and increasing their profit margins.
- The adoption of agroecological practices improves the economic resilience of farms and increases farmer satisfaction. According to a study by Mouratiadou and Wezel (2024), agroecological farms present better socio-economic performance compared to conventional systems.

CHALLENGES

- Dependence on expensive external inputs represents a significant economic burden for farmers, particularly during price fluctuations on the global market.
- Monocultures expose farmers to increased economic risks in the event of harvest failure due to unfavourable climatic conditions or pest infestations.
- The low valuation of agricultural products in long value chains reduces farmers' income and makes them dependent on intermediaries and large distribution companies.
- Conventional agricultural systems struggle to offer sustainable and economically viable solutions for small farmers, particularly in countries in the South.

Saving banana farms from Tropical Race 4 disease through agroecology in Mindanao, Philippines

Bananas, and particularly the sweet Cavendish variety that is grown on Mindanao Island (Philippines) and sold in supermarkets worldwide, are of huge importance to the economy of the Philippines. In recent years, the country has consistently ranked among the top five banana exporters in the world, and the top ten in production, exporting around 3.5 million tonnes of bananas annually. In addition to being a major source of foreign currency, the national banana export industry directly employs over 300,000 people, 70% of whom work for large corporate growers, and 30% as small-scale farmers. However, in the early 2000s, a virulent soil fungus called the Fusarium oxysporum f.sp. cubense Tropical Race 4 (Foc TR4) heavily damaged banana plantations, causing significant losses. Since then, grown in swathes of perennial, chemicals intensive monocultural systems, bananas have remained highly vulnerable to the fungal disease, known as Fusarium wilt. If left uncontrolled, the latter could potentially wipe out the entire banana industry in the Philippine islands, with devastating effects on local communities.

Against this backdrop, the Foundation for Agrarian Reform Cooperatives in Mindanao (FARMCOOP) and its grassroots farmers' organisations witnessed a stark contrast of Foc TR4 spread between smaller, organic, biodiverse banana farms and large tracts of adjacent non-organic, monocrop conventional plantations. Those observations concurred with a growing but limited body of scientific evidence reporting successful control of Foc TR4 using agroecological and integrated soil management practices such as crop rotation, organic amendments, use of bio-fertilisers and microorganisms, cover crop or green cover.

On this basis, FARMCOOP has implemented the EU-funded 'Saving Bananas Project' meant to reduce incidence of Foc TR4 in Southern Mindanao's banana plantations of small-scale farmers through a shift from monocrop, conventional banana farm systems to bio-diversified banana plantations using agroecological practices. Those practices include integrated pest management strategies and improved cost-efficiency and effectiveness of organic compost. Such an approach is based on an increased capacity among small-scale farmers and others to co-create and scale up appropriate agroecological innovations based on participatory action-research.

The numerous trials on agroecological practices that are co-designed and implemented by the participating FOs differ, based on specific farm contexts. However, all show a significant reduction in fusarium incidence. They also demonstrate increased resilience to climate change and extreme weather patterns (drought, typhoons and flooding), which have been another major threat for future sustainability of small-scale farming and farmers' livelihoods in the Philippines within the last 20 years.

CONTRIBUTIONS OF AGROECOLOGY TO FARMERS' INCOME

PRINCIPLES	ARGUMENTS
Recycling	Recycling resources (e.g. composting, reuse of wastewater) reduces production costs by limiting the purchase of external inputs. It also improves soil fertility, thereby increasing yields and profits.
Reducing inputs	Reducing the use of synthetic agrochemicals reduces farmers' expenses. By replacing chemical inputs with natural methods, farmers reduce their costs while preserving the environment.
Animal health	Agroecological breeding favours resilient local breeds and healthy diets, reducing the need for expensive medicines and food inputs. This improves the quality of animal products and reduces production costs.
Soil health	Healthy soils, rich in organic matter, increase agricultural productivity, reducing the need for expensive chemical fertiliser purchases. Living, well-managed soils are more productive and more resilient to climatic hazards.
Biodiversity	Diversification of crops and species reduces the economic risks associated with monocultures. Greater biodiversity allows for greater resilience to climatic and economic fluctuations, thus stabilising agricultural income.
Synergy	Integrated production systems (e.g. agroforestry, crop-livestock association) make it possible to optimize the use of resources and generate several sources of income, thus increasing the overall profitability of agricultural operations.
Economic diversification	Diversifying sources of income allows farmers to better cope with economic and climatic crises, ensuring greater financial stability and reduced risks (provided related labour and work issues are addressed).
Co-creation of knowledge	Agroecology encourages the sharing of knowledge and local innovations adapted to the realities of the territories. This allows farmers to improve their practices, increase their productivity and strengthen their economic autonomy.
Social values and diets	Promoting local products and healthy, diverse diets increases demand in local markets, providing farmers with better sales opportunities and fairer prices for their products.
Connectivity	Promoting short distribution/supply chains and local markets allows farmers to reduce transport and intermediary costs, thus increasing their profit margins and their direct access to consumers.
Fairness	Agroecology promotes inclusive and equitable agricultural systems, allowing small farmers and vulnerable groups to fully participate in markets and receive a fair return for their work and products.
Governance of land and natural resources	Securing land rights and equitable access to natural resources allows farmers to invest in sustainable and profitable practices, ensuring better productivity and stable income.
Participation	Farmers' participation in decision-making processes strengthens their negotiating power and their ability to influence agricultural policies, thereby improving their economic conditions and development prospects.

3.4. Agroecology and gender

KEY MESSAGES

- The central role of women in agriculture and food systems is recognised and valued by the agroecological approach, through the recognition of their specific knowledge and roles, the principle of social justice, the consideration of their 'invisible' work, and full participation in decision-making in the family and public spheres.

- Women's work overload is a major issue in rural areas. An important challenge for agroecology is therefore not to exacerbate imbalances through interventions, which would increase the duration and burden of women's work.

- Women generally have less access to agricultural extension than men. By providing other forms of knowledge sharing, agroecology contributes to the valorisation of women's often empirical knowledge and to the co-creation of new knowledge adapted to local realities.

- Due to the feeding role often assigned to them, women have access to small plots located in the vicinity of the household and are therefore used to intensifying production by diversifying it through combining food crops and medicinal plants. They are therefore likely to be better prepared for agroecological intensification practices that will improve nutrition.

CHALLENGES

- The evolution of agrarian systems in recent decades in southern countries (agricultural modernisation, commodification of production processes, individualisation of land access, rural exodus, etc.) often tends to weaken the situation of women: work overload, confinement to poorly valued tasks, increasing responsibilities regarding family nutrition without corresponding resources, loss of independent access to land or access to impaired land[105] despite positive developments in some countries such as girls' education or female employment.

- Agriculture and food systems are a source of livelihoods for almost 70% of women in some parts of the world (FAO, 2023). However, they reflect the profound inequalities between men and women in several areas of the domestic and public spheres.

- These inequalities concern the gendered division of labour, access to resources and the organisation of decision-making power over their use, the sharing of information and knowledge, and participation in political and strategic orientations.

- It is therefore a major challenge for agricultural and food systems to recognise and promote the roles, knowledge and rights of women and marginalised minorities.

105 Hillenkamp, I. (2011).

CONTRIBUTIONS OF AGROECOLOGY TO GENDER

PRINCIPLES	ARGUMENTS
Recycling	Market gardening crops, often practiced by women, require regular access to water and nutrients including organic matter. By promoting water infiltration into the soil and by limiting evapotranspiration, agroecological techniques reduce water consumption. They also allow nutrient recycling through biomass management. As a result, these techniques reduce either the workload of women and girls, often responsible for water collection, or to compensate for women's difficult access to expensive inputs.
Reducing inputs	Women generally have less access to synthetic inputs (fertilisers, pesticides/insecticides) than men for economic reasons or crop prioritisation. It will therefore be easier to motivate women to adopt practices that value inputs produced on the farm or natural regulations, to which they have easy access.
Animal health	The distribution of roles according to gender is very marked in the field of livestock farming. Women are often responsible for taking care of poultry and small ruminants and have dedicated tasks (watering, milking, selling milk) in livestock farming just as men do (transhumance). An agroecological approach takes into account the differentiation of roles and must ensure that it does not strip either gender of responsibility or increase the workload for women.
Soil health	It is recognised that women make less use of synthetic products, not necessarily for ecological but economic reasons. An important motivation is also health, as awareness of the harmfulness of chemicals is known. Their work therefore promotes soil health.
Biodiversity	The importance of women's work in preserving agrobiodiversity is widely recognised. They are directly concerned by the choice of cultivated varieties, play a historical role in the selection and perpetuation of local seeds, and enhance ecosystems through the collection of edible and/or medicinal wild plants or roots. This role played by women is therefore to be recognised and promoted.
Synergy	The food activities carried out by women, whether related to crops, livestock farming or picking, are diverse and largely interdependent. This diversity fosters interactions within the ecosystem.
Economic diversification	In most cases, part of the activities carried out by women are invisible as they are not integrated into the market system. However, they belong to the economic sphere (vegetable garden, picking, small livestock farming, preparation of meals, etc.). The systemic approach to agroecology makes it possible to capture all these activities, including those in the domestic sphere, without prioritising them and recognising their complementarity.
Co-creation of knowledge	By placing farmers at the heart of the reflection and innovation process, agroecology values the specific knowledge of women on seeds, traditional varieties, edible wild plants, ecosystem management, climate, etc.

Social values and diets	Women, in addition to their role in cereal production, are often responsible for food gardens, which can contain a wide variety of different seasonal plant species to meet the family's food needs (e.g. Creole garden, box garden). However, diversity is a foundation of agroecology, which also defends healthy food produced locally and meeting people's preferences.
Connectivity	Women often have a direct link with local markets for the purchase of staple food and for the sale of market gardening products and processed foodstuffs. Agroecology promotes short and fair distribution/supply chains by promoting interconnections between different actors and the setting of a fair price for producers and consumers. It implies easy access to information for all and the conditions for free choice.
Fairness	Women play a major role in food systems as: variety breeders, producers, processors, traders and even decision-makers on household food choices. Agroecology reinforces the recognition of these different roles, promotes decent working conditions and a fair distribution of work and its benefits.
Governance of land and natural resources	By strengthening the capacities of women and minorities to defend their rights, agroecology contributes to reducing the gender inequalities that are reflected and perpetuated through issues of access to and control of resources (land, water, forest). Securing land tenure is an important issue in an agroecological approach, which sometimes involves a significant investment in time and energy (provision of organic matter, planting, water management) to improve soil fertility.
Participation	Women are very often excluded from decision-making bodies, either for cultural reasons or due to lack of time. Outside areas exclusively reserved for them, women are little involved in political or strategic choices relating to agricultural and food systems. Agroecology promotes the full participation of women by strengthening their role in decision-making at family level, but also, and above all, in the public sphere, through the concept of food sovereignty.

3.5. Agroecology and biodiversity

KEY MESSAGES

- Biodiversity is a foundation of agroecology. It is defined as a principle in its own right, whereas conventional agriculture is based on uniformity of species and systems.

- By reinforcing the use of organic and bio-fertilisers (e.g. nitrogen-fixing bacteria or facilitating the solubility of phosphorus in the soil) and the place of trees, agroecology protects and restores soil biodiversity, ensuring the proper functioning of regulation services (e.g. increasing the biological life of soils improves the water retention capacity of the soil and reduces the risks of flooding through better aeration) as well as supply services (e.g. biogeochemical cycles – C, N, P, Fe, etc. are more functional, leading to better productivity of cultivated land). Soil biodiversity is therefore essential to the management of the water cycle, to the fertility of cultivated land, and to our food.

- Agroecology enhances the biodiversity of natural and cultivated species in agroecosystems, which promotes biocontrol, i.e. it promotes the natural regulation of diseases and pests by supporting habitat and reproduction conditions of their natural predators (e.g. insects, birds, micro-organisms).

- By improving the productivity of its production systems, and restoring degraded land, agroecology reduces the need to convert wooded areas into agricultural areas, reducing deforestation. In addition, it supports the presence of preserved spaces among cultivated areas, which makes it possible to restore a diversified landscape mosaic.

The development of organic fertiliser production companies in Africa

The production of organic fertilisers is growing in Africa. The main sources of organic waste include biomass from agricultural processing along value chains, households and human excreta. Recycling organic waste can cover 20 to 40% of the nutrient needs of an agricultural system. Organic fertilisers contribute to agroecological production allowing farmers to be less dependent on synthetic fertilisers. However, it is important to ensure that they do not generate economic dependence.

In Africa, a study showed that many players are positioning themselves on this market. These may be farmers united in a cooperative who recycle waste on a village scale. These may be individual entrepreneurs who recycle waste from a sector (e.g. intensive livestock farming) or from a city (e.g. landfills or septic tanks). These small businesses can produce between 1 and 50 t/year of compost. Medium-sized companies produce quantities of up to 3,000 t/year, while large companies exceed this to reach up to 100,000 t/year. The latter category calls for mechanisation and standardisation of operations, while small units work with simple technologies and are poorly mechanised. Various schemes at the municipal level, including public-private partnerships, contribute to this landscape to recycle waste into organic fertilisers.

The success of organic fertiliser production companies relies on an entrepreneurial approach as part of a value chain. Investments are necessary throughout the value chain to support technological progress in the sorting, collection and treatment of waste but also the control of product quality and the improvement of distribution systems. Regulations on waste management and the quality of organic fertilisers are necessary and are developing in almost all countries studied. However, enforcement of these regulations is lacking. Subsidies and incentives along the value chain, including tax reductions, can stimulate investment in technologies, improve production processes and support market development.

Freyer, B., Ellssel, P., Nyakanda, F. and Saussure, S., 2024. *Exploring the off-farm production, marketing and use of organic and biofertilisers in Africa.*

Access to full report and to the knowledge brief: https://www.desiralift.org/resources/

CHALLENGES

- Intensive agriculture and land use change are the main drivers of the unprecedented biodiversity loss we are experiencing[106].
- Biodiversity loss but also land degradation (anthropogenic soil degradation affects 34% of agricultural land, FAO, 2021), reduce the productivity of ecosystems and agroecosystems, and to this extent is a threat to societies' ability to feed themselves.
- Degraded ecosystems with low biodiversity are less functional to cushion shocks related to extreme weather events (e.g. flooding) and any other forms of pressure on the environment (e.g. pollution)[107].
- The integrated territorial approach, also known as 'land sharing'[108], seeks to increase the multifunctionality of agricultural land for the joint purposes of production and conservation purposes and has produced positive results[109].
- Several international commitments have been made by countries (e.g. Strategic Biodiversity Plan 2021-2030/COP15 on Biodiversity which explicitly mentions AE).

CONTRIBUTIONS OF AGROECOLOGY TO BIODIVERSITY

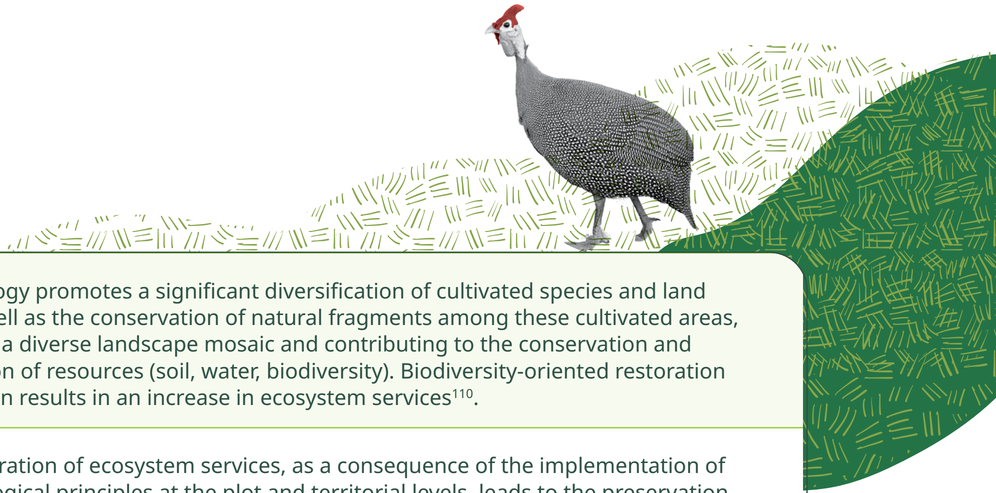
PRINCIPLES	ARGUMENTS
Recycling	The recycling of water resources advocated by agroecology valorises this resource that is essential to life and thus fosters the environment's ability to support living organisms in multiple forms, and thus biodiversity. Recycling organic matter, also promoted by agroecology, enhances the biological life of soils, helping to support their biodiversity and thus restoring them by making them more alive.
Reducing inputs	Agroecology promotes the reduction of the quantity of synthetic inputs used in order to preserve and restore biodiversity in its various forms. It also promotes the diversification of agricultural biodiversity, which reduces the vulnerability of the environment to the threats of bio-aggressors. Production systems are then less dependent on chemical inputs, in a virtuous cycle.
Soil health	By promoting the diversification of production systems and of species (plant and animal), by reducing soil disturbance to a minimum, by promoting permanent plant cover and by supporting the presence of hedges, agroecology reduces erosion, increases nutrient and carbon stocks in the soil, thereby enhancing their biodiversity (micro and macrofauna, mycorrhizae, etc.). Biodiversity-rich soils are better able to generate the associated ecosystem services, namely increased fertility, infiltration and conservation of water in the soil, and therefore increased productivity.
Animal health	Agroecology promotes a wide variety of animal species and breeds (notably local and rustic species and breeds), thus ensuring better conservation and greater genetic diversity in the territory. Moreover, as these breeds are more rustic, they reduce the risk of spreading diseases, hence the need to resort to synthetic products, which are sources of antibiotic resistance and environmental pollution.

106 28% of listed species are threatened with extinction (IUCN, 2022) while 75% of the food system is based on only 12 plant species and 5 livestock breeds, representing the most serious extinction phenomenon in 65 million years.

107 https://www.cbd.int/convention/guide/?id=changing

108 'Land sharing' versus 'land sparing'. Land sharing combines agricultural production with biodiversity conservation, while land sparing promotes the concentration of very intensive farming in a minimum of space in order to reserve more uncultivated areas for wild fauna and flora. The former defends agricultural practices such as agroecology; the second is part of the continuation of the Green Revolution.

109 Estrada-Carmona et al. (2014).



Biodiversity	Agroecology promotes a significant diversification of cultivated species and land use, as well as the conservation of natural fragments among these cultivated areas, restoring a diverse landscape mosaic and contributing to the conservation and restoration of resources (soil, water, biodiversity). Biodiversity-oriented restoration most often results in an increase in ecosystem services[110].
Synergy	The restoration of ecosystem services, as a consequence of the implementation of agroecological principles at the plot and territorial levels, leads to the preservation, restoration and diversification of ecosystems and agroecosystems.
Economic diversification	Economic diversification, beyond the diversification of sources of income, is also achieved through biodiversity, which contributes to the household economy through the development of neglected crops and all gathering, fishing and wood collection activities. Biodiversity plays a key role in diversifying the household economy without necessarily being integrated into the market economy.
Co-creation of knowledge	Rural or forest populations have empirical knowledge of their natural environment (plants, trees, animals, etc.), often much more detailed than that of scientists. Knowledge exchanges also make it possible to break a form of verticality in knowledge sharing, to promote local knowledge and to better integrate the expertise of populations. The post-2020 Convention on Biological Diversity plans to implement measures to facilitate access to traditional knowledge in all countries.
Social values and diets	Support for traditional diets values wild plants and the diversity of cultivated species and varieties. It is therefore fully based on biodiversity.
Connectivity	Agroecology promotes short supply chains for a wide variety of products (in terms of species, varieties or quality) and favours seasonal fruit, which greatly enhances biological diversity.
Fairness	The post-2020 Global Biodiversity Framework project[111] highlights the need to take into account gender equality, women's empowerment, youth and gender-sensitive approaches when implementing this framework. The previous Convention on Biological Diversity[112] set out principles for a fair and equitable sharing of benefits arising from the use of natural resources, in particular those intended for commercial purposes[113], which is in line with this agroecological principle.
Governance of land and natural resources	Support for local governance systems around the management territories and resources, as promoted by agroecology, is essential to achieve the objectives of resource preservation, biodiversity conservation, and agricultural production.
Participation	The post-2020 Global Biodiversity Framework project highlights the need to take into account the full and effective participation of indigenous peoples and local communities in the implementation of the framework. Indeed, dialogue with communities, their involvement in the development and decision-making of rules and restrictions on the management of natural resources, as promoted through the agroecological approach, is essential for the communities to make the efforts expected for their successful implementation.

110 Bullock et al. (2011).

111 Convention on Biological Diversity. First draft post-2020 Global Biodiversity Framework. September 2021. Page 4.

112 United Nations (1992).

113 https://www.cbd.int/convention/guide/?id=action

3.6. Agroecology and value chains

KEY MESSAGES

- Interventions in a value chain must be concerned with the integration of the product into diversified production systems that value the principles of AE (avoiding monoculture).
- Agroecology promotes the territorialisation of the various stages in the value chains (production, processing, consumption) in order to meet the food needs and preferences of the territory, thereby reducing their ecological footprint.
- Agroecology encourages ownership of decision-making on agricultural and food systems by local stakeholders.

CHALLENGES

- This involves diversifying agriculture and giving local stakeholders decision-making power over production, its destination and price formation, in order to reduce the effects of supply disruptions or the volatility of food price on world markets.
- The aim is also to create added value at the local level (socially and economically fair distribution of added value) and thereby contribute to the economic dynamics of the territory.
- The ecological emergency is another key reason for the relocalisation of food systems, in order to reduce the carbon footprint of transport and deforestation for export monocultures (soya, maize, avocado, etc.). It also involves minimising waste generation and food losses and waste.
- It is a challenge to be able to ensure transparency on agricultural practices, product quality and on working conditions throughout the value chain.

CHARACTERISTICS OF AN AGROECOLOGICAL VALUE CHAIN

PRINCIPLES	ARGUMENTS
Recycling	An agroecological value chain adopts the precepts of the circular economy by reducing the consumption and waste of resources (water, energy, raw materials, food) and the production of waste. To this end, it promotes renewable local resources that can be reused or degraded without damage to ecosystems. For example, it will avoid plastic packaging as non-biodegradable and will encourage the reuse of water or waste (e.g. compost) for other uses.
Reducing inputs	An agroecological value chain focuses on production that aims to reduce the use of synthetic inputs and is efficient in terms of natural resources and energy. It will therefore enhance local products resulting from practices that promote the natural cycles of water (infiltration), energy (wind, solar) and biomass and will promote transport with the smallest environmental footprint possible.
Animal health	An agroecological value chain must respect animal welfare by prioritising breeding practices in natural environments, local breeds better adapted to climatic conditions, and preventive veterinary care to limit the use of phytosanitary products. It favours local markets and slaughterhouses to avoid the stress of transport, which in turn has an impact on the quality of the meat.

Soil health	An agroecological value chain ensures the possibility of making sustainable use of agricultural land, preserving or improving natural soil fertility. It also limits land use conversion for non-agricultural use such as storage or transport.
Biodiversity	An agroecological value chain shall ensure that each of its activities minimises its impact on biodiversity and in no way contributes to deforestation or other ecosystem degradation. It guarantees that the products do not come from a monoculture system, even organic, and that they do not generate waste that is harmful to biodiversity. Agroecological fisheries ensure, for example, the selective capture of species, thereby reconciling the preservation of ecosystems and the supply in the value chain.
Synergy	An agroecological value chain enhances ecosystem services to encourage the preservation of ecosystems at landscape level. It addresses food as a whole by measuring the impact of each stage of the chain on water and soil, but also on animal, plant and human health. It also takes into account the contributions of ecosystem inputs (crop pollination, carbon sequestration, etc.) at economic, social, health and climate levels.
Economic diversification	An agroecological value chain promotes the diversity of crops and production systems. It is not prescriptive and can accept a great heterogeneity of products (sizes, shapes, varieties), as they are healthy, nutritious, seasonal and preferably local.
Co-creation of knowledge	An agroecological value chain is based on cooperation models based on the reconnection between agriculture and food, where citizens reclaim what they consume but also the ways of producing, processing and transporting products. These direct links between the various actors in the value chain encourage exchanges on cultural practices and on consumers' expectations from which new forms of sociability and creativity emerge (e.g. numerous forms of connection between producers and consumers).
Social values and diets	An agroecological value chain respects decent and socially acceptable wages and working conditions at each of its stages. It is inclusive and excludes all forms of discrimination and is attentive to differentiated impacts according to gender, ethnic or religious affiliation. It recognises that food not only has a biological function, but also has a social, cultural and hedonic dimension.
Connectivity	An agroecological value chain responds as a priority to the local food needs and preferences of the territory. It promotes exchange and interactions at local level, giving priority to short marketing distribution/supply chains or local processing chains to create and maintain added value in the area.
Fairness	An agroecological chain is based on the concept of fair price, which must reflect the conflicting interests of the different actors, in order to ensure a decent remuneration for producers and to guarantee consumers the accessibility of healthy and high-quality products.
Governance of land and natural resources	An agroecological value chain ensures that products respect individual and collective rights and have not led to the dispossession of land and natural resources.
Participation	An agroecological value chain contributes to relocating decision-making on food, by promoting consultation between the stakeholders concerned and by enabling them to act on production choices and prices. Certain tools such as the Territorial Food Project (TFP) or the Participatory Guarantee System (PGS) may encourage this collective approach.

A Participatory Guarantee System – Agroecology in Morocco

A Participatory Guarantee System (PGS) is an alternative certification mechanism that relies on the active participation of various stakeholders (producers, consumers, and/or local associations) in the product quality verification process.

Unlike third-party certification systems (such as organic agriculture certified by recognised organisations), PGS are built on a foundation of trust, networks, and knowledge exchange and on a collective approach at the local level. They allow direct participation of producers, consumers, distributors, cooperatives, and local associations in the choice and development of specifications, the design and implementation of procedures and certification decisions. They are often more flexible than formal certifications, allowing for faster adaptation to changes in production or new ecological practices, and encouraging the development of solutions tailored to local contexts. Less expensive, they are more accessible to small producers. Finally, they foster close interaction between producers and consumers, enhancing trust, transparency, and mutual commitment, allowing consumers to better understand the agricultural practices of producers. Despite their undeniable strengths, PGS also have limitations, particularly in terms of international recognition, standardisation, and the capacity for large-scale implementation.

Building on these insights, the Moroccan Agroecology Network (RIAM) has committed to developing a Moroccan PGS. Agroecological specifications for plant, poultry, and beekeeping production, along with a charter and regulations intended to evolve and improve over time, were drawn up in 2017 during collective workshops. In 2018, RIAM started a pilot implementation phase in the Rabat region, which continued until 2023 around Marrakech, Casablanca, Fes, Agadir, and Tangier, supported by the project 'Institutional Innovations in Organic Agriculture in Africa' led by the African Organic Network (AFRONET) in partnership with FIMABio (Morocco), the Movement for Organic Agriculture in Tanzania (TOAM), the National Organic Movement of Uganda (NOGAMU), the National Institute for Agronomic Research (INRA, France), and CIRAD (France), in association with the RIAM. A Moroccan private label 'Agroecology Morocco – PGS' has been registered with the Moroccan Office of Industrial and Commercial Property, allowing consumers to recognise products from agroecological agriculture and to be assured of their origin and compliance.

This label aims to promote the practices and shared vision of labelled producers around a human-scale alternative agricultural model capable of ensuring producers' autonomy, respecting the environment, biodiversity, and territorial resources, and of contributing to food security and healthy diets for all in the long term.

For more information, see (in French): [Participatory Guarantee System – PGS - Network of Agroecological Initiatives in Morocco].

3.7. Agroecology and health/nutrition

KEY MESSAGES

- Agroecology contributes to better diets for populations. Actions aimed at strengthening biodiversity at plot and territory levels through agroecological practices are conducive to improving the diets of rural and urban populations, and in particular for children, by promoting underutilised species and the consumption of a wide range of products linked to this biodiversity (fruit, leaves, seeds, roots, products of animal origin).

- Dietary diversity brought about by the diversification of agricultural production also contributes to strengthening the immune system of populations and reduces the risk of diseases linked to unhealthy diets (cancers, diabetes, cardiovascular diseases, etc.).

- The negative health impact of pesticides both on the farmers and on the consumers is an increasing problem associated with industrial agriculture.

- The interdependence between human, animal and ecosystem health is increasingly studied and demonstrated such as the emergence of zoonoses linked to intensive animal production systems).

- Nutrition and health are inextricably linked through the vicious circle of malnutrition and infection. Poor health has negative consequences in nutritional terms, and poor nutrition affects health status[114].

CHALLENGES

- As food systems are one of the main drivers of poor health and environmental degradation, there is an urgent need for global efforts to collectively transform diets and food production (Lancet, 2019).

- More than 820 million people lack access to enough food and many others consume products of poor nutritional quality that lead to micronutrient deficiencies and contribute to a substantial increase in the incidence of obesity and of non-communicable diseases, including coronary heart diseases, strokes and diabetes (Lancet, 2019).

- More than 10 million people die each year as a result of poor nutrition, and the associated costs are estimated at USD 11 trillion per year (UNFSS, 2021).

114 Childs, C.E. et al. (2019).

CONTRIBUTIONS OF AGROECOLOGY TO HEALTH AND NUTRITION

PRINCIPLES	ARGUMENTS
Recycling	The management of waste, particularly food waste, is a real public health issue, particularly in urban areas. Household waste is a source of environmental pollution (water, air, soil) which can lead to diarrhoea, respiratory infections or even diseases transmitted by vectors such as mosquitoes or rats. By limiting food waste on the one hand and promoting waste management methods, agroecology can have an impact on people's health.
Reducing inputs	The impact of chemical inputs and in particular pesticides on human health, and primarily direct users, is scientifically proven[115]. It may be due to physical contact or inhalation of chemicals or their ingestion via food or water. Their use therefore also has a very high cost to the community (UNFSS, 2021). It is thus demonstrated that the substitution of chemical inputs with agroecological methods has an impact on human health (producers, consumers, local residents) and ecosystems.
Animal health	The links between intensive livestock farming and the emergence of new epidemics are recognised. Reducing the genetic diversity of farmed animals and their concentration facilitates the spread of infectious diseases within farms and the transmission of viruses to humans[116]. Furthermore, the excessive use of antibiotics in animals has contributed to the emergence of resistance to these medicinal products (WHO). Agroecological breeding practices that focus on strengthening the natural immune defences of animals, their genetic diversity, the preservation of their living space and the most natural diet possible not only help to limit the risks of zoonoses but also lead to healthier and nutritious meat production.
Soil health	There are multiple links between soil health and human health. The biological activity of a soil allows the mineralisation of organic matter, a natural process that provides nutrients to plants. Soil quality in terms of nutrients affects food quality. Eroded soils of poor quality are less fertile and more likely to be flooded, leading to crop failures. Soil pollution through the use of synthetic products has an impact on water quality and can therefore lead to health risks. Vegetated soils allow the filtration of pollutants contained in water and contribute to its purification.
Biodiversity	There is a positive correlation between the erosion of biodiversity and the emergence or increase in the prevalence of infectious diseases[117]. The destruction and fragmentation of natural habitats leads to greater proximity between wildlife and humans and therefore increases the risk of transmission. It is estimated that at least 75% of the pathogens of emerging human infectious diseases (including Ebola, HIV and influenza) are of animal origin. Certain ecosystem services are directly associated with health. Of these, IPBES estimates that around 4 billion people treat themselves mainly with natural remedies and that 70% of medicines used to treat cancers are natural or nature-based synthetic products (IPBES, 2019). It is therefore a health and economic challenge to preserve biodiversity. Biodiversity in farming systems makes it possible to ensure a diversified and thus more balanced and nutritious diet for inhabitants of rural and urban areas.
Synergy	More diverse agricultural systems and landscapes as well as better managed natural resources have positive impacts on the health of ecosystems (including soils), plants, animals and humans. The regulatory effects of vegetation on climate change are recognised. It notably regulates extreme heat that aggravates cardiovascular problems, the risks of hyperthermia and limits the effects of winds that can cause respiratory diseases. By promoting vegetation on a landscape scale, agroecology also limits the risk of flooding or landslides that can have health consequences through water infiltration into the soil and the creation of natural barriers.

115 INSERM (2021), Alliot C. et al. (2022).

116 It is estimated that at least 75% of the pathogens of emerging human infectious diseases (including Ebola, HIV and influenza) are of animal origin.

117 Morand, S. et Lajaunie, C. (2017), IPBES (2020).

Economic diversification	Economic diversification can help generate income that, if used for food and healthcare, especially for women and children, can contribute to improving the diets[118], provided that the availability of healthy, nutritious and diversified products is sufficient. The economic issue associated with the food system must also be addressed from the angle of costs associated with diseases (malnutrition, cancer, diabetes, cardiovascular diseases, etc.), economic damage in the event of epidemics, and the monitoring of zoonoses. These costs generally borne by the community can be significantly reduced by introducing agroecological models.
Co-creation of knowledge	Local and indigenous knowledge is characterised by highly sophisticated empirical knowledge of the medicinal or nutritional properties of plants. In Africa, according to the WHO, this knowledge meets 80% of the health needs of the population. However, often transmitted orally, it is now threatened by the erosion of biodiversity and the disappearance of local languages. By defending the rights of indigenous peoples and biodiversity, agroecology perpetuates this knowledge and contributes to its transmission through its recognition. Agroecology, as a systemic approach, addresses human health no longer as a separate discipline but in interdependence with other disciplines and in close relationship with animal and ecosystem health (One Health approach). It fosters dialogue between a plurality of actors and the meeting between empirical and scientific knowledge.
Social values and diets	Dietary shifts towards a diet rich in ultra-processed industrial products are held responsible for the 'global obesity epidemic' (WHO) and the diseases associated with it. However, there is evidence that healthy and diversified diets as promoted by agroecology reduce the risks of chronic malnutrition, obesity, cardiovascular diseases and diabetes. It also helps strengthen the immune system. Acting on agricultural diversification therefore contributes to improving the health status of populations and reduces the risks of chronic malnutrition[119].
Connectivity	The intensification of the flow of farmed animals and meat products within international trade chains favours the spread of pathogens, possibly transmissible to humans. Encouraging short distribution/supply chains, as called for by agroecology, helps to limit health risks. In urban areas, agroecology promotes access to diversified food based on fresh or processed products by supporting short supply chains and new distribution methods.
Fairness	Nutrition is seen as a determining factor contributing to social health inequalities. Most chronic diet-related pathologies, such as chronic malnutrition, diabetes, obesity, cardiovascular diseases, or cancers generally affect disadvantaged populations more. Access to healthy food is often a privilege, especially in urban settings. Agroecology therefore defends the concept of food justice.
Governance of land and natural resources	The probability of emergence of zoonoses is higher in territories with a strong land use change[120]. These changes concern in particular deforestation, monoculture afforestation and land use conversion for non-agricultural uses such as transport, storage and residential. Decisions on the use of land and natural resources therefore constitute a public health issue. The 'One Health' approach, interconnecting human, animal and ecosystem health, is indeed part of a systemic territorial approach such as agroecology.
Participation	The links between agricultural and food policy choices and people's state of health require consultation between all stakeholders – local and national policymakers, citizens, technical operators, researchers – at territorial and national level. The agroecological approach promotes this decompartmentalised and inclusive mobilisation to act collectively on public policies.

118 Deaconu et al. (2019).

119 Ibid.

120 Gibb, R., et al (2020).

3.8. Agroecology and water

KEY MESSAGES

- By promoting biodiversity at farm and territorial levels and by enhancing soil health, agroecology contributes to the regulation of water quantity and quality (water cycle).
- By prioritising concerted approaches to water use and sharing, agroecology contributes to reducing the risks of conflict related to the resource.
- Sustainable agricultural water management is inherent in agroecology. It consists of optimising the use of resources by managing the soil–water system through an efficient use of water sources, namely rainfall and irrigation. Reducing losses is also essential. Measures such as rainwater harvesting, integrated crop–livestock systems, and agroforestry can enhance water retention and reduce waste. Likewise, cover cropping and crop rotation help retain soil moisture (thus reducing water consumption) and improve soil health. Healthy soil can retain moisture better.

CHALLENGES

- Water is essential for agriculture, ecosystems, human and animal health and many anthropogenic activities. The preservation and equitable sharing of water are therefore a major issue.
- The scarcity and degradation of water quality due to climate change, overconsumption for agricultural or industrial uses and various pollution are extremely serious concerns in most regions of the world. This phenomenon is also a source of conflict at local and international levels.
- The irregularity and unpredictability of precipitation linked to climate change is a major contributor to food insecurity.
- Agriculture accounts for 70% of total water use [121] and is one of the main sources of water pollution. As water is the 'lifeblood' of agriculture, improving soil and water management is critical for sustainable food systems.

CONTRIBUTIONS OF AGROECOLOGY TO WATER ISSUES

PRINCIPLES	ARGUMENTS
Recycling	Agroecological practices are based on the most economical use of natural resources, including water. They consist of limiting waste and losses through rainwater collection techniques, the use of wastewater and micro-irrigation. Recycling household or plant waste by incorporating it into the soil is also a way of retaining water and, by maintaining moisture, of reducing the water needs of plants.
Reducing inputs	Water pollution by chemical inputs has consequences on human and animal health. Input reduction practices such as those advocated by agroecology limit the risk of contamination of groundwater and run-off water and thus contribute to a better quality of the resource. Water is also an input in irrigated systems. Agroecology aims to rationalise its use both to limit the exploitation of the resource and the financial and social costs of its use.
Animal health	Water is often a reservoir of diverse pathogens and pollution from waste or chemicals originating or not from agriculture. Improving or preserving its quality, encouraged by recycling or reducing inputs, is a prerequisite for animal health. By limiting the risk of water pollution, agroecology also contributes to the preservation of aquatic ecosystems.

121 UN-Water (2024).

Soil health	The availability of water for plants and its quality are closely linked to soil health. The addition of organic matter, mulching and minimum tillage as recommended by agroecology promote water infiltration and retention. Healthy soil can retain moisture better. Conversely, degraded soils cause run-off and accelerate erosion, leading to a loss of fertility.
Biodiversity	Evapotranspiration generated by plants is an essential element of the water cycle[122]. Forest and herbaceous vegetation play an important role in evaporation and condensation, which in turn cause precipitation. By promoting practices such as agroforestry or permanent vegetation cover, agroecology contributes to a better water cycle with a positive effect on local rainfall and soil moisture. Vegetation also contributes to the recharge of groundwater by promoting water infiltration.
Synergy	The landscape approach as advocated by agroecology facilitates integrated water management. Indeed, non-agricultural elements of the landscape (hedges, trees, low walls and stone cords following the contours of levels, etc.) contribute to the preservation of the quality and quantity of water resources. Crop associations by combining plants with more or less deep root development or of different sizes to create shade also affect the water needs of the crops.
Economic diversification	Collective management of water resources that takes into account its different uses makes it possible to diversify economic activities. In addition to domestic use, water can thus be shared between irrigated crops or crops requiring regular watering (e.g. market gardening), livestock farming, aquaculture and arboriculture.
Co-creation of knowledge	Water management, at the level of a plot or territory, mobilises a plurality of knowledge, specific to an environment or more generic. By favouring the search for locally designed and adapted solutions, agroecology uses water management techniques that are more easily appropriated by populations.
Social values and diets	The water needs of plants are an important criterion for agroecology in the choice of crops and production systems. Local species generally adapted to local water conditions and eating habits are preferred. It is also recognised that most farmer seeds are more water-efficient and more resistant to climatic hazards, notably water stress.
Connectivity	Marketing distribution/supply chains in an agroecological approach can encourage or enhance, by means of quality labels, the productions or production systems most respectful of water resources and avoid those that would involve water grabbing.
Fairness	The unequal distribution of water resources among users is a source of conflicts and social and economic inequalities. By treating water as a common, agroecology defends the principle of equitable resource sharing.
Governance of land and natural resources	Water is used for many purposes, be it domestic, agricultural, energy or industrial. Territorialized approaches to agroecology promote consultation between stakeholders through collective water management. Agroecology also recognises the plurality of rights over natural resources, including water, and particularly promotes the usage rights of minorities and indigenous peoples.
Participation	The distribution of water within a territory has implications for the population as a whole and requires consultation to promote a common understanding of its uses.

122 'Globally, 40-60% of the rainfall on land comes from the humidity generated by terrestrial evapotranspiration, mainly by the transpiration of trees, and transported by winds.' – UNDP (2021). Foresight notes from the Scientific Division.

3.9. Agroecology and territorial approach

KEY MESSAGES

- By promoting biodiversity at farm and territorial levels, by enhancing soil health, and by limiting the use of chemical inputs, agroecology contributes to the construction of a diversity of landscapes, to better health of cultivated ecosystems and better control of pollution.
- By prioritising concerted approaches to resource use, agroecology contributes to reducing the risks of conflicts arising from the diversity of local resource uses.
- Territorial approaches, in particular those developed by the EU, can benefit from the contributions of agroecological approaches.

CHALLENGES

- Territories with their resources (land, water, biodiversity, minerals, etc.) allow the development of a variety of human activities (agriculture, livestock breeding, forestry production, harvesting, etc.) which require mechanisms (formal and informal rules) for managing resources and their use. Specific mechanisms such as territorial platforms where various territorial actors take part in decision-making are crucial in sustainable management and transformation of food systems through agroecology but also often lacking as are the capacities required to ensure that territorial actors are fully capacitated and that their platforms function properly. Hence the need for related capacity development.
- Increasing pressure on resources, accentuated by climate change, generates tensions between actors which it is important to address democratically by adapting to local conditions.
- Agriculture is one of the main users of the territory's resources and, depending on how production systems are managed, can generate positive or negative effects on ecosystems, which are transforming.

CONTRIBUTIONS OF AGROECOLOGY TO A TERRITORIAL APPROACH

PRINCIPLES	ARGUMENTS
Recycling	Agroecological practices are based on the most economical use possible of natural resources. They therefore limit pressure on natural resources and ecosystems. They seek to limit waste and losses through rainwater collection techniques, wastewater use and micro-irrigation. Recycling household or plant waste by incorporating it into the soil is also a way of retaining water and maintaining moisture, reducing the water needs of plants.
Reducing inputs	Reducing dependence on chemical inputs helps to tackle pollution of water, soil and ecosystems by these chemical inputs. To avoid an extension of areas cultivated into non-cultivated areas, it is necessary to intensify production through agroecological practices.
Animal health	Agroecology valorises the diversity of breeds and of animal husbandry systems (pastoralism, livestock farming integrated with agriculture). This type of livestock farming, if kept within the limits of what specific ecosystems can sustain in terms of cattle heads numbers and provided overgrazing is controlled, contributes to the construction of landscapes as well as to soil health through the production of organic fertilisers.

Soil health	Agroecology is concerned with soil health by developing systemic solutions including erosion control, protection of sensitive areas (watercourses, ponds, etc.) and by promoting a mosaic of landscapes.
Biodiversity	Biodiversity protection is a major objective of programmes with a territorial approach, such as NaturAfrica (EU funding). Agroecology's major contribution to these approaches is through better management of the agrobiodiversity of cultivated plants and animal breeds, as well as of hedges and parcels that are not cultivated (herbaceous species, trees). This agrobiodiversity allows the development of fauna (insects, micro-organisms) useful for plant development.
Synergy	The landscape approach as advocated by agroecology facilitates integrated management of natural resources. Non-agricultural features of the landscape (hedges, trees, low walls, ponds, etc.) contribute to the quality and quantity of natural resources.
Economic diversification	The diversification of economic activities (agricultural and non-agricultural) is an important component of territorial development approaches. Indeed, interventions are intended to promote the development of various sources of employment in the territory through economic activities that generate added value and respect the environment. Local, territorial, national and regional markets offer strong opportunities to become more equitable, alongside enhancing local and indigenous food cultures.
Co-creation of knowledge	The management of natural resources and of areas in a territory requires a plurality of specific knowledge. By favouring the search for solutions designed and adapted locally, agroecology promotes techniques for managing natural resources that can be appropriated by the populations.
Social values and diets	Territorial development approaches aim to strengthen territories based on local identities and cultures. The promotion of a variety of productions, value chains or multi-use spaces contribute to a greater diversity of diets. Agroecology makes a strong contribution to these orientations.
Connectivity	Supporting a variety of value chains and marketing distribution/supply chains in a given territory helps strengthen agroecological approaches.
Fairness	Unequal distribution of resources (land, water, grazing) among users is a source of conflicts and social and economic inequalities. Agroecology defends the principle of fair sharing of resources.
Governance of land and natural resources	Governance is at the heart of territorial approaches. Territorialized approaches to agroecology promote consultation between stakeholders through a concerted management of natural resources. To foster such consultative and inclusive processes there is need for special mechanisms such as territorial platforms where the plurality of views of various territorial actors can emerge and be taken into account. Agroecology also recognises the plurality of rights to natural resources and particularly defends the rights of use of minorities and indigenous peoples. Particular emphasis is placed on land management.
Participation	The distribution of resources within a territory has implications for the population as a whole and requires consultation to promote a common understanding of its uses.

SECOND PART

Methodological guidance

This part aims to provide operational tools to EU Delegations to design and monitor programmes or projects with an agroecological dimension. This involves addressing the following issues:

- How to introduce agroecology interventions into multiannual programming?
- How to foster a political dialogue on the topic and what arguments to use?
- What type of approach to promote with different types of actors (research, advice, public services, private sector, etc.)?
- What activities make sense to address a particular challenge (climate change, biodiversity, etc.) with an agroecological vision?
- How can indicators be identified that will help monitor an intervention and engage with operators and partners to ensure consistency with agroecological approaches?
- What are the useful existing tools to assess the degree of commitment to agroecology of a farm, project or policy?

CHAPTER 4

Integration of agroecology in the various programming stages

4.1. The different stages of programming

The agroecological transition is part of the new Neighbourhood, Development and International Cooperation Instrument (NDICI) – Global Europe, which contributes to the 2030 Agenda for Sustainable Development (SDG 2030), the Paris Climate Agreement, the European Green Deal, the Biodiversity Strategy and the Gender Policy of the European Union. Certain quantified objectives of the NDICI are aligned with some key principles of the agroecological approach.

In the current Multiannual Financial Framework (2021-2027), these objectives are as follows:

- At least 30% of the funding must be dedicated to climate action. In addition, the ban on financing any intervention harmful to the climate and the environment is duly specified.
- 7.5% of annual expenditure in 2024 must contribute to achieving biodiversity objectives compared to 10% in 2026 and 2027.
- 85% of funded actions must contribute to gender equality and women's empowerment.
- 20% of funding must be dedicated to social inclusion and human development.

The agroecological transition must be integrated as soon as the **multiannual indicative programme (MIP)** is drawn up through the identification of a relevant area of intervention (or sector), specific objectives and planned actions. The aim is to allow, in the subsequent more detailed formulation documents, the development of programmes and projects in support of the agroecological transition. While the implementation modalities that will be mobilised must also be mentioned, none are specific to an agroecological approach, be it grants, technical assistance contracts, blending or even budget support.

Despite its limited level of detail, it is however necessary to ensure when drawing up the MIP that none of the red lines described in the theoretical part of this guide (see section 2.3) and considered incompatible with the values and principles of agroecology will be crossed. This would include, for example, actions focusing on intensive production of a single cash crop at the expense of diversification of production systems, on active support for regulations and/or measures that could hinder local seed systems managed by farmers, or on strategies that actively exclude or discriminate against women and other marginalised groups.

It is also important at this stage to ensure the overall coherence of the document and the convergence of the different response strategies developed by the Delegation. For example, in the trade sector, one will avoid encouraging measures in support of the implementation of bilateral free trade agreements promoting competition between production and labour to the detriment of producers and local communities supported through agricultural actions.

At the level of (multi) annual action programmes (MAAP) and even more so of Action Documents (AD) and contracts (Annex 1 Description of the Action), the design of interventions becomes more complex as the degree of detail and accuracy of the information required grows. At each stage, it is important to be clear on the orientations taken in favour of agroecology, while leaving room for manoeuvre in the drafting of the following documents, especially as regards the implementation of the programme or project by the operator, since co-construction and the involvement of stakeholders are key principles of agroecology.

4.2. Specific but complementary implementation arrangements

As mentioned above, different implementation modalities can be mobilised depending on needs to be covered. The most common ones are outlined in broad terms below.

GRANTS

Grant contracts are awarded on a competitive basis to eligible organisations in accordance with the criteria set out in the guidelines of the call for proposals in which they participated. These are mostly non-governmental and civil society organisations from the beneficiary country or one of the 27 EU Member States. They may also be private entities provided that they accept the principle of non-profitability according to which the grant may not have the purpose or effect of generating a profit under the action or programme.

A grant is used to finance an applicant's proposal to promote the achievement of an objective falling within the framework of a European Union policy. The beneficiary of a grant is expected to contribute to the co-financing of the action either through its own resources (self-financing), through the income generated from the action, or through financial or in-kind contributions provided by third parties.

This type of contract is very commonly used to finance rural or agricultural development projects due to the variety of activities it can fund: provision of inputs and credits, purchase of equipment, construction or rehabilitation of infrastructure, training (e.g. demonstration plots, farmer field schools). Moreover, because civil society organisations and other local actors such as farmers' organisations may be among the eligible bidders for calls for proposals, grant contracts are particularly suited for the realisation of the agroecological principles of 'co-construction', 'participation' and 'social justice'.

The 10 projects mentioned as examples of contextualised agroecological interventions (see section 8) are perfect examples of grant contracts.

CONTRIBUTION AGREEMENTS

A diversity of interventions supporting agroecology is also possible through financing agreements concluded between the European Commission and bilateral cooperation agencies of EU Member States such as the Agence française de développement (AFD), the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) or the Belgian Federal Development Agency (ENABEL).

These contribution agreements facilitate so-called 'Team Europe' initiatives and, more generally, the pooling of European financial resources and expertise in support of common objectives for greater efficiency and impact.

Many international organisations, including United Nations agencies, in particular in the agricultural sector the International Fund for Agricultural Development (IFAD) or the Food and Agriculture Organization (FAO), and several public development banks such as the World Bank (WB), the European Investment Bank (EIB) or the European Bank for Reconstruction and Development (EBRD), are eligible for this simplified form of contracting, provided that they have successfully completed a prior screening exercise (known as Pillar Assessment) intended to assess their capacity to manage European funds without risk with regard to the protection of the EU's financial interests.

It is possible under these agreements to organise calls for proposals or to conclude service contracts.

The Global Programme for Small-Scale Agroecology Producers and Sustainable Food Systems Transformation (GP-SAEP) was contracted under a contribution agreement between the EU and IFAD. With a budget of EUR 23.2 million (including EUR 5 million in parallel funding from Belgium), it aims to enable small beneficiary producers to strengthen their practice of agroecology through increased access to knowledge, extension services, improved technologies and markets, thereby improving their resilience to climate, environmental and socio-economic shocks as well as their food and nutrition security. The implementation modality used allowed the GP-SAEP to step up with additional funding for IFAD or EU investments, either under way or in preparation, and to address some of the pre-identified obstacles to the development of an agroecological approach. This leverage effect has made it possible to mainstream agroecology within significant investments in Madagascar, Burkina Faso or Burundi for example.

SERVICE CONTRACTS

Service contracts are used exclusively for the conduct of studies (feasibility, economic and market studies, technical studies, evaluations, audits, etc.) and the provision of technical assistance (consultancy, mediation, project management or supervision, provision of experts, etc.). They are awarded through calls for tenders organised on the basis of detailed specifications (or 'terms of reference') for which technical and financial offers are submitted. The offers are selected within the framework of competitive processes and in different ways depending on the budgets involved. Their beneficiaries are usually private operators specialising in consulting and driven by a logic of profitability. These contracts are essential to support structural reforms and capacity-building initiatives for national or other authorities, when conditions are not met for budget support (see below).

BUDGET SUPPORT

Budget support is part of the commitments of the aid effectiveness agenda described in the Paris Declaration (2005). It involves (i) a dialogue with the partner country to agree on the reforms or development objectives to which it can contribute; (ii) an assessment of the progress made; (iii) financial transfers to the public treasury account of the partner country once these objectives are achieved; and (iv) capacity development support.

Budget support is therefore results-oriented, assessed against progress in the implementation of targeted policies and progress on the macroeconomic framework, public finances and fiscal transparency. Its alignment with national policies and systems is seen as a guarantee of greater ownership by the partner country and greater sustainability. Moreover, it is often linked to a reduction in aid transaction costs because, being an integral part of the State budget, it does not require the setting up of parallel management systems with separate procedures.

Budget support is particularly appropriate to foster political and institutional reform processes and to support sustained political dialogue with national authorities. As such, it has proven added value, but sometimes comes up against the complexities of implementation. It is starting to be used more commonly in promoting agroecological transition processes.

Cameroon: Budget support as a tool for promoting agroecological practices

With its Rural Sector Development Strategy (2020-2030), Cameroon has opted for a 'reasoned and balanced modernisation of production systems', focusing on the development of 'second-generation' agriculture that contributes to 'the good management of natural resources and environmental protection within a green economy perspective.'

Faced with ambitious production goals, the recent context of inflation in fertiliser prices has led to increased government interest in a dialogue with the European Union on agricultural intensification and the agroecological transition. These discussions resulted in 2022 in the formulation of a new budget support programme targeting, as a flagship reform, the establishment of 'Agroecological Transition Windows' (ATW) aimed at supporting small-scale producers in transitioning to productive and sustainable agriculture, respectful of the environment, soil, and forests, while being less reliant on synthetic inputs and more competitive, in line with the European Union's Deforestation Regulation requirements. Coffee and cocoa producers are targeted as they are already beneficiaries of an input subsidy system through electronic vouchers under the 'Producers Window' of the Cocoa-Coffee Sector Development Fund (FODECC), set up under the previous budget support (2017-2021). The underlying idea is to ensure the financial sustainability of the agroecological transition windows, which are expected to be funded by a part of the cocoa and coffee export royalties allocated to the FODECC.

The operational mechanisms of the ATWs were validated in 2023. Based on 'Agroecological Transition Plans' developed by producers, subsidies in the form of electronic vouchers allow them to benefit from the services of dedicated agricultural advisors. Additionally, support and advisory sheets for agroecological transition have been developed for four initial value chains: cocoa and coffee, and two food crops: cassava and plantain, so that the Agroecological Transition Plans can be applied not only to cocoa or coffee plots but across the entire farm. Initially launched in a pilot area, these windows have gradually expanded to other regions, reaching 130,000 producers. While financing the subsidies remains a challenge, the recent rise in cocoa prices could contribute to a more sustainable funding source for this initiative.

Thus, the incentive tool that budget support constitutes has effectively catalysed the implementation of a structural reform in favour of the agroecological transition.

LOAN-GRANT BLENDING

Loan-grant blending or 'blending' finance refers to the combination of EU grants with loans or equity of public and private investors. It is a complementary tool to other aid modalities whose ambition is to use EU grants strategically to attract additional funding through leverage. This EU contribution can take different forms, including providing risk capital to reduce the risks of other investors or financing technical assistance facilities. Blending may involve investors such as the European Investment Bank or the development banks of the EU Member States. This is the strategy pursued by the Global Gateway.

In the agri-food sector, the EU has been active since 2018 through four blending investment vehicles in which it has invested EUR 204 million. This involves financing loans and equity investments tailored to the needs of rural SMEs, farmers' organisations, agro-entrepreneurs and rural financial institutions in developing countries. Each of these four blending funds has its own investment strategy and applies specific eligibility criteria regarding the projects and companies in which it invests.

aatif Africa Agriculture and Trade Investment Fund

The Africa Agriculture and Trade Investment Fund (AATIF) focuses on large banks and companies active in the agri-food sector.

Huruma Fund

The Huruma Fund mainly affects agricultural SMEs and farmers indirectly through the financing of microfinance institutions (MFIs) active in the agri-food sector.

ABC fund Agri-business Capital

EDFI AgriFI

The Agricultural Entrepreneurship Investment Fund (ABC Fund) and the AgriFI Facility finance both financial institutions and agricultural SMEs with mid-sized financing that is rarely available on the financial market.

From January 2019 to December 2023, these four mixed funds contracted the financing of 97 sustainable agri-food projects for a cumulative total signed amount of EUR 438 million.

4.3. Useful analyses to assist in programming

To support, in one way or another, an agroecological transformation of agricultural and food systems, several types of analysis should be used that represent good practices for building a development intervention. However, the intensity of these analyses depends on the information already available at the level of the Delegation and its partners, but also on the time that can be devoted to it.

4.3.1. Analysis and understanding of the partner country's national public policies in favour of agroecology and identification of possible obstacles or impediments to an agroecological transition.

Particular attention should be paid to the following issues:

- What is the dominant agricultural model supported by public policies? Does the country have a policy and/or strategy to promote agroecology? What is the current level of investment in agroecology and other similar approaches?
- What model is taught in existing school and university curricula and agricultural and rural vocational training schemes?
- What is the land policy? What forms of tenure are recognised by legislation? Are there any specific rights recognised for minorities, women, indigenous peoples?
- What is the water policy? What are the rights associated with water use and what are the modes of sharing?
- What is the level of decentralisation? Are local and regional authorities able to develop regional food planning?

This analysis should help determine the country's level of commitment in favour of the agroecological transition and the coherence of its national policies around agroecology for the possible mobilisation of political and financial levers (regulations on synthetic inputs, advisory and training schemes, public support for farmers' income, etc.). It is necessary to determine how the programme that the Delegation is developing fits into national policies and contributes to the achievement of their objectives. In the absence of national policies on agroecology, the programme may aim to support their formulation in a multi-stakeholder and co-construction approach. In this sense, the participatory diagnostics of food systems carried out by INTPA in 2021/2022 with around 50 delegations can be useful in defining the orientations of an agroecology programme.

4.3.2. Analysis and understanding of the strategies of other stakeholders, including technical and financial partners.

It is important for this step to look at a number of central issues, such as:

- Are the strategies of the various technical and financial partners committed to the transformation of agricultural and food systems in line with an agroecological approach? If so, are they coordinated around a common logic and vision?
- Do the priorities (geographical and/or sectoral) coincide? Are there gaps or duplications?
- Have coordination systems or platforms for dialogue between actors and with national authorities been put in place? Are they effective?

- What advocacy actions are needed at national, regional or international level to build consensus on the need for concerted action around the agroecological transition?

This analysis should facilitate the identification of strategic areas of interest and the most effective levers for an agroecological transition of agricultural and food systems in an integrated approach. It is also about determining the contributions of each of the actors involved based on their respective expertise and experience and their own interests. The design of a joint programme with EU Member States contributing to the agroecological transformation of food systems as part of a Team Europe Initiative is entirely feasible.

4.3.3. Analysis of the consistency of the intervention with agroecology

Quality programming must also adhere to certain key principles:

- Ensure that the programme/project is in line with the 13 principles of the High Level Panel of Experts (HLPE) on Food Security and Nutrition of the Committee on World Food Security (CFS), aligned with the 10 elements of agroecology adopted by the FAO, as described in the theoretical part of this guide (see section 2.2). The Agroecology Assessment Framework has been developed by the Agroecology Coalition for this purpose. (https://agroecology-coalition.org/wp-content/uploads/2024/04/Tracking-tool-manual-EN-2024.pdf) – see below sub-section 9.4.1.1.

- Ensure the coherence of the programme/project by means of an informed choice of strategies based on a thorough understanding of the concepts involved and their challenges. Section 2.5 on other common approaches and practices and their relationship with agroecology has been drafted for this purpose, highlighting for each of them the points of convergence and divergence with agroecology.

- Priority should be given to programmes/projects built using a co-creation approach, placing local stakeholders at the heart of the debate. However, the stages and degrees of their involvement may vary. But for ownership by stakeholders, it is necessary that they be involved in the whole process, i.e. from the diagnosis of the situation to the monitoring of the actions implemented including the prioritisation and funds management and decision-making. Too often, CSOs, FOs and indigenous peoples are project 'partners' that receive little resources and are not involved in making decisions in resource allocation.

- Favour partnerships with civil society organisations (CSOs), farmers' groups, NGOs already experienced and competent on the subject of agroecology. This should go hand in hand with engaging relevant CSOs/farmers groups that are not yet fully competent and whose capacities need to be built to form part of a stronger stakeholder base. The public sector must play a role to be defined according to its mandate in order to ensure the sustainability and acceptability of interventions. The private sector must facilitate the marketing of agroecology products.

- Consider the various possible scales of action (plot, farm, agroecosystem, territory, food system) and the different dimensions (technical, social, environmental) in order to ensure the coherence of interventions and the effectiveness of the programme.

CHAPTER 5

Political dialogue and development of a case in support of agroecology

In this section we discuss the importance of political dialogue by providing arguments to feed it.

5.1. Building political dialogue

Sustained and transparent multi-stakeholder policy dialogue with representatives of national, regional or local authorities in partner countries is a key element in advancing the agroecological transition. It offers a privileged space for reflection and exchange on the agricultural model that stakeholders want to support and its economic, social and environmental implications. It makes it possible to contribute to the definition of orientations in favour of more productive, fairer, greener and healthier agriculture and food systems and, in doing so, to discuss the relevance of agroecology. Political dialogue can foster a better understanding by stakeholders of possible alternatives, in particular those linked to the agroecological agenda, or even help remove certain negative prejudices against these alternatives and thus convince decision-makers of the capacity of agroecology to respond to major current challenges. Linking AE and food systems with country's commitment to other multilateral agreements such as the three Rio Conventions offers interesting opportunities to foster synergy and mainstreaming of AE in these existing mechanisms and the relevant policy instruments coming out of these at the country level, i.e. Nationally Determined Contributions (NDCs), National Biodiversity Strategies and Action Plans (NBSAPs), and Land Degradation Neutrality (LDN) targets. It may also be useful to anchor this dialogue in a country's Food Systems Transformation Pathways and/or National Development Plan which often will have an Agriculture, Environment and Natural Resources chapter, if not a Food Systems Chapter.

Political dialogue provides a framework to direct public funding towards an agroecological transition, while jointly identifying priority partnerships. It also provides a forum to take stock of the implementation of partner countries' policies and reforms, as well as donor commitments. It can also be used as a tool to identify policy developments in existing policies and reach a common understanding of the corrective measures needed to achieve the set objectives and refine them, if relevant.

It is organised with the ministries of the partner countries through regular meetings or special events related to national policy or international agenda. Political dialogue also draws on exchanges with civil society and private sector actors. It is possible to take advantage of any existing platforms in the country to animate it.

It must be fed by mobilising research work and field experiences. It is particularly necessary to document and disseminate the results and impacts of the agroecological transition to support the impact of agroecology on the environment (soil health, natural resources), agricultural yields, biodiversity and climate, employment and income, etc.

Recognition of agroecology in the Rio Conventions: Potential for scaling up

In June 1992, the historic Rio Earth Summit led to the adoption of three Conventions: The United Nations Convention on Biological Diversity (UNCBD), the United Nations Framework Convention on Climate Change (UNFCCC) and the United Nations Convention to Combat Desertification (UNCCD). Despite its proven relevance as a solution to mitigate and adapt to climate change, protect and restore biodiversity and combat land degradation, there are no explicit references to agroecology in any of the three founding texts of the Conventions. However, with the exception of the UNFCCC, agroecology increasingly appears in the decisions made by the 'Conferences of the Parties' (COP) with the clearest and most influential occurrence until now to be found in the Kunming-Montreal Global Biodiversity Framework adopted in 2022.

Although still limited, this is a welcome development. Indeed, if non-binding, conventions are powerful instruments for shifting political paradigms at different levels and for breaking down the barriers between environmental and agricultural sector policies. By promoting agroecology as a desirable solution, supported by consensus and political and scientific backing at the highest levels, they can foster the scale up of agroecology through narratives that can influence public opinion and government policies while steering the financial choices of international institutions and other public and private actors towards agroecological approaches.

Through numerous co-benefits, agroecology can also provide structuring solutions to the issues addressed by the three Conventions and strengthen their synergies. It can help bridge the gap between the Conventions and address the issue of agricultural and food systems, through policy guidelines that integrate the challenges of land, climate and biodiversity. The beginnings of this approach can be seen with the UNCBD no longer considering the protection of biodiversity and ecosystems in isolation. Various actors, including civil society organisations, along with the Parties themselves, have called for greater synergy between the three Rio Conventions.

More on the topic in a summary report by Humundi, Cari, Iles de Paix and Minka International: https://www.humundi.org/wp-content/uploads/2024/07/V2_Note_conventions_rio_ENG.pdf

Convention on Biological Diversity

UNFCCC

UNCCD
United Nations Convention to Combat Desertification

5.2. Incentive mechanisms for the agroecological transition

Policy dialogue must lead to the identification of priority interventions and mechanisms that promote the agroecological transition. There are four types of incentive mechanisms that can be used to support the uptake of agroecological practices: (1) market-based incentives; (2) non-market incentives; (3) regulatory measures; and (4) cross-compliance or conditionality-based incentives. It is important to create synergies between different forms of incentives in order to maximize their impact and facilitate the agroecological transition within the framework of integrated policy strategies. Market-based incentives encompass various approaches such as price premiums to recognise a specific product quality, subsidies for inputs and services, subsidies to producers, certification labels and access to specific finance (subsidised loans, carbon credit, etc.)

- Non-market incentives include advice to producers, capacity building to innovate, development of new technologies through research and innovation, support to companies providing services to producers, extension services, etc.
- Regulatory measures are interventions by governments or private entities to impose best practices through laws and standards such as sustainability standards, agroforestry concessions, participatory guarantee systems and land use certification.
- Conditionality incentives encourage compliance with environmental conditions in exchange for government or private sector support, for example through direct income transfers (e.g. payments for ecosystem services, rewards, voluntary carbon markets, agroecological schemes).

The list below presents possible steps for the implementation of incentives towards the agroecological transition at landscape level.

- Identify the main stakeholders (e.g. cooperatives) in the territory. Understand the main challenges affecting the farming system (e.g. access to seeds, organic fertilisers, climate risks, etc.) and explore how agroecology can contribute to a mix of innovative solutions to achieve the intended results (e.g. improving soil productivity and health, increasing incomes, strengthening resilience to climate change, facilitating the decarbonisation of agriculture).
- Assess and prioritise various practices, technologies, services, institutional frameworks and policies to address existing challenges (e.g. facilitating access to bean seeds for intercropping or strengthening the organic-labelled value chain for local vegetables). The establishment of a network of actors (e.g. national research institutes, local cooperatives and input providers) will be crucial to innovate and access the necessary resources. Such networks can be encouraged by a pro-active government policy.
- Design incentive mixes to promote agroecology among stakeholders (e.g. producer cooperatives, extension agents, etc.). For example, it is possible to (i) promote incentive contracts between input suppliers, cooperatives, and agro-industry; (ii) promote prices with premium prices for organic products; or (iii) support labels including agroecology principles for niche products with a more attractive price.
- Develop performance indicators to assess the effectiveness of incentive mechanisms for the adoption and scale up of agroecological practices. Indicators can indicate increased productivity, improved livelihoods, improved soil health, etc.
- Assess progress and adjust interventions to results based on the values of indicators and collective learning.

To ensure the financing of incentive schemes, all financial instruments that can be mobilised by the EU are possible. New financing is increasingly commonly mentioned, of which the funding described below is among the best known.

Green Extension in Lao People's Democratic Republic

Driven by the government's modernisation efforts to meet increasing demands from the industry and consumers, agricultural production systems in Lao PDR have increasingly turned to conventional models, based on intensive monocultures and a heavy use of chemical inputs, improved seed varieties and artificial insemination. While these models have raised production and reduced the incidence of poverty in rural areas, they have resulted in increased economic risks due to higher production costs and had significant detrimental impacts on the environment and human health.

In response to these challenges, the Ministry of Agriculture and Forestry committed to developing clean, safe and sustainable agriculture within the framework of a newly adopted Green Growth Strategy. The Department of Agricultural Extension and Cooperatives (DAEC) was mobilised to develop a new model of extension services, known as 'Green Extension' with the support of the Lao Upland Rural Advisory Service (LURAS) Project funded by the Swiss Agency for Development and Cooperation (SDC) from 2013 until now.

In 2018, 65 extension practitioners, representing farmer groups, local government, NGOs, researchers and development projects, shared their own experience of implementing various forms of sustainable farming such as integrated pest management, the system of rice intensification and organic agriculture. Guidelines for Green Extension and Climate Resilient Agribusiness have been produced and disseminated, field staff have been trained at district and provincial levels' and capacity for implementing Green Extension has been increased and applied in five Northern provinces, articulated around five steps, namely: 1) participatory agroecosystem analysis; 2) community planning; 3) action-research; 4) farmer-to-farmer learning; and 5) organisational development.

Overall, at the Community Learning Centres set up by the LURAS Project, 1,600 farming households, supported through the provision of technical training and community-managed facilities, were directly involved in action-research on topics including alternative methods for maize storage and coffee processing, fall armyworm biocontrol, improved pasture management, and solar-powered irrigation pumps. Fifteen thousand families were reached through 'learning multipliers', such as visits to community learning centres, training and farmer-to-farmer exchanges. Over 800 extension workers received training in the Green Extension concepts and methods, including their role as 'New Extensionists' using the Global Forum for Rural Advisory Services (GFRAS) training materials translated into the Lao language.

The Green Extension approach has become an integral part of the Government's 'Green and Sustainable Agriculture Framework for Lao PDR to 2030', as approved by the Prime Minister, and is widely promoted by the Ministry of Agriculture and Forestry.

CARBON CREDITS (AND CARBON OFFSETS)

A carbon credit represents a reduction of one tonne of greenhouse gas emissions to offset one tonne of emissions produced elsewhere. A credit can be bought, sold or exchanged. There are two types of carbon markets: the compliance and voluntary markets. The compliance market involves a certain level of regulation and supervision, as in the case of the European Union's Emissions Trading System. Voluntary carbon markets are more dynamic, but largely unregulated.

This lack of regulation is sometimes the source of concerns about the credibility and integrity of carbon credits which may be associated with projects devoid of real or long-term environmental benefits. This can compromise the effectiveness of efforts to offset carbon emissions, create a risk of double counting, or, more problematically, provide a 'license to pollute' without contributing to real emissions reductions. Social and ethical questions may also arise in the case of carbon credit projects that pay little attention to, or even harm, the rights and needs of local communities, and are likely to lead to social injustices, particularly in developing countries. The volatility of carbon credit markets, particularly voluntary markets, subject to fluctuations in demand and prices, is another possible concern for projects that rely on them as their main source of financing. Finally, verifying and monitoring carbon offset projects can be difficult and costly, leading to credits being issued for projects that do not fully meet required standards. So, although carbon credits are interesting mechanisms, they should be handled with caution.

GREEN AND CLIMATE BONDS

A green bond is a debt instrument issued to raise capital with the specific objective to support climate-related or environment-related projects (World Bank, 2015). The main difference with ordinary bonds lies in the specific use of the funds raised. In early 2014, a set of voluntary guidelines, the Green Bond Principles (GBP), were developed. Green and climate bonds can be issued by various entities: bilateral trade and development agencies, multilateral and national banks, companies, states and public entities, cities. Over the past 14 years, the growth of green bonds in capital markets has been constant. Green bonds issued by supranational bodies (such as the European Investment Bank (EIB) and the European Commission with the NextGenerationEU Green Bonds programme) have also significantly increased.

This climate finance can, in principle, provide income generating opportunities for farmers, while allowing them to improve their farming practices and enhancing mitigation and adaptation. For example, they can act as an incentive to move faster to agroforestry systems and other low-carbon farming practices. However, small-scale farmers have not yet benefited from climate finance on a large scale, which can be very complex to design and implement for small producers. This is due to several technical, political and economic challenges (e.g. high certification or transaction costs, fragile land systems, lack of regulatory frameworks for climate financial markets). Moreover, they are often criticised for their lack of (i) transparency, (ii) accountability, and (iii) adaptation to local conditions. More fundamentally, they are also criticised for being a techno-financial solution that does not really address the root causes of the climate crisis.

BIODIVERSITY CREDITS (AND BIODIVERSITY OFFSETS)

Biodiversity credits are measurable units of biodiversity that can be purchased. They are slightly different from carbon credits because, unlike them, (i) they are not linked to losses elsewhere; and (ii) their calculation results are much more complex, as biodiversity is a multifaceted concept with many components. Moreover, an important challenge is that there is no standard methodology for assessing and reporting on biodiversity.

PAYMENTS FOR ENVIRONMENTAL SERVICES

Payments for environmental services (PES) in agriculture remunerate farmers for actions that help restore or maintain ecosystems, from which society derives benefits (preservation of water quality, carbon storage, protection of landscape and biodiversity, etc.). These benefits are referred to as ecosystem services. Farmers' actions, on the other hand, are referred to as environmental services. These are therefore not precisely financial instruments, but rather mechanisms that are often combined with other instruments (e.g. carbon credits) and which, in essence, direct farmers towards more environmentally virtuous behaviour and reward them for managing their natural resources (through carbon sequestration, biodiversity conservation, etc.). They are more suitable although many obstacles (specifications adapted to local conditions, control of windfall and carry over effects, design of sustainable financing mechanisms with bonus-malus or transaction taxes) remain. Some countries such as Costa Rica already have such systems in place.

INSURANCE SCHEMES

Insurance schemes can be innovatively integrated into agroecological projects to strengthen farmers' resilience to climate events. An effective approach is to set up prevention savings programmes, where support can be provided to local banks or insurance companies in the form of covering part of the premiums in a conditional and progressive manner, depending on the level of agroecological transition reached by farmers. To the extent that the resilience of farmers increases in proportion to the number of agroecological practices they adopt and which allow them to be less affected by the negative impacts of climatic events, the risks present for insurance companies also decrease. This incentive approach thus creates a virtuous circle in favour of the agroecological transition.

From fertiliser input subsidies to payments for soil health services

In many countries in sub-Saharan Africa, farmers are incentivised through input subsidies, in particular, to use inorganic fertilisers to increase production. Most of those input subsidy programmes have achieved mixed results in terms of reduction of malnutrition and food insecurity and increase in crop yields. Malawi has faced such challenges, partly because soil health is in decline as a result of years of application of inorganic fertilisers in (often maize) monocropping systems and in the absence of other soil ameliorative measures such as fallowing, crop diversification, intercropping and crop rotations, soil organic matter additions, liming and applications of the appropriate inorganic fertilisers.

The challenge is to find ways to incentivise farmers to enhance soil health, increase productivity and enhance resilience to economic shocks and climate change. A way forward is through compensating farmers for soil health services, which will generate a multitude of private benefits (e.g. improved yields, diversified production, greater climate change adaptation and higher farm incomes) as well as national (e.g. improved national food security and nutrition, a more dynamic agricultural sector, reduced erosion and siltation) and global public goods, including carbon sequestration and biodiversity conservation. In Malawi, with the support of Clim-Eat, the government is trialling a payment for soil health services to incentivise farmers to implement several soil health practices from a menu of options. Some of the inputs for these are included in the subsidy scheme. As tracking actual soil health is complex and costly, farmers are monitored for their compliance with agreed soil health practices, not for the actual soil health. If they comply, they receive a cash incentive payment.

Funding for such schemes can come from 'repurposing' national budgets and from redirecting some of the input fertiliser subsidy to other uses. Increasing soil health usually means that soil carbon is increasing, thereby opening options for at least partial funding through global carbon markets. In all cases, there is a need for low-cost monitoring and reporting. In Malawi, the plan is that the Extension Service do the bulk of it, with a sample being checked by a verification company. Digital technologies, remote sensing and AI are likely to pave the way for such low-cost methods.

For more, see CompensACTION Policy brief, Clim-Eat, November 2023.

5.3. Arguments for agroecology

The following elements can help build arguments and advocacy in favour of agroecology. They are based, for the most part, on the recognition of the essential role that food systems play in achieving the Sustainable Development Goals and of the contribution of agroecology (in all its dimensions) to each of them.

5.3.1. Agroecology improves food security in countries

There is a growing body of scientific evidence on the results and impacts of agroecology on food security. Yields and nutritional results are as good, or sometimes better, with agroecological practices as with conventional alternatives. Four main levers of agroecology explain these positive results: crop diversification, the use of legumes, the development of agroforestry systems and the importance of mixed crop-livestock farming systems. Crop diversification (crop rotation, associated crops) is an effective strategy to improve yields by mobilising different biological mechanisms and to ensure greater dietary diversity. Because of their biological characteristics, legumes, by being able to fix nitrogen from the air, are one of the most important levers to improve production and nutrition. Agroforestry contributes to improving system yields (crops, trees) by promoting nutrient recycling, to food stability by increasing the resilience of farming systems and to improving diets by producing a greater diversity of consumable fruit and leaves, notably. Mixed crop-livestock farming systems help improve yields by recycling nutrients through animals (manure) and greater dietary diversity through meat and milk consumption.

The integrated approaches promoted by agroecology also have positive effects on agricultural production. For example, integrated soil fertility management makes it possible to address the mineral and biological fertility of soils, erosion control and water control. Organic fertilisers that use waste from value chains and cities, as well as bio-stimulants that activate biological processes in soils and plants, offer hope for even greater gains in yields. Agroecological and integrated pest management based on ecological processes (useful entomofauna, bacteriological control, etc.) are very promising ways of reducing dependence on pesticides and improving production.

Beyond production and food security, agroecology improves the provision of multiple ecosystem services, including pollination, habitat preservation and soil health, on which agricultural production depends. These services are the focus of the main arguments according to which agroecological approaches can adequately address the challenges of food security and the environment.

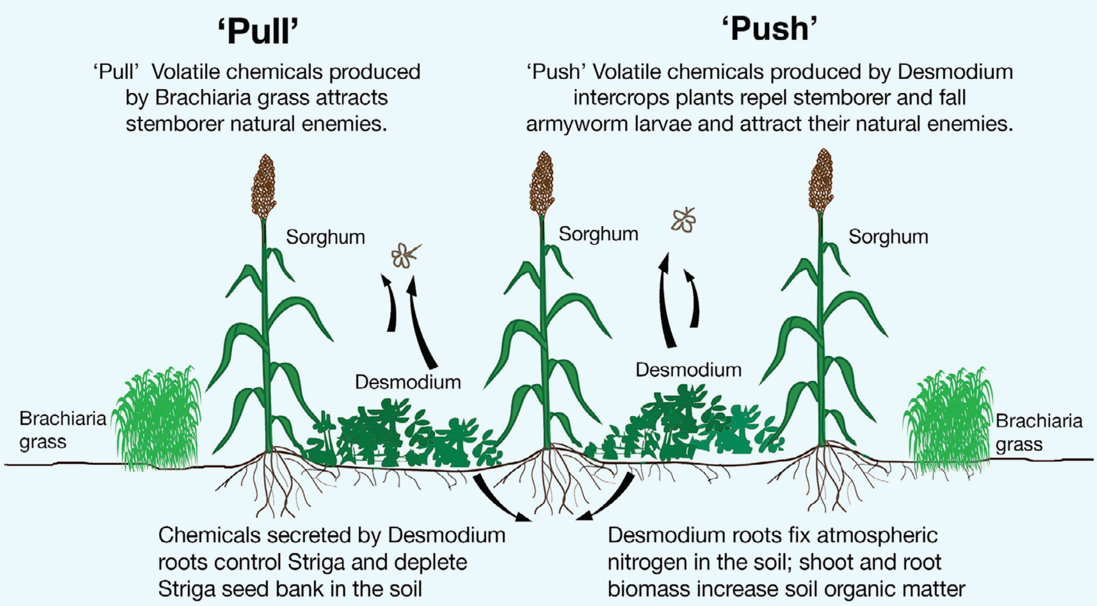
Increasing yields and diversity alone will not solve the concomitant problems of hunger, micronutrients deficiencies and obesity. This requires far-reaching systemic changes that address poverty, inequalities and barriers to accessing food.

Push-pull: An agroecological technology by icipe

The push-pull technology is an [icipe flagship](#) and a novel agroecological cropping system for integrated pest, weed and soil fertility management, based on the complex mechanisms that govern the ecology of plants and insects. It is a biological intensification transformative technology that addresses hunger and poverty in sub-Saharan Africa (SSA) by increasing productivity and incomes through integrated management of parasitic striga weeds, stemborers, fall armyworm infestation, aflatoxin contamination and soil fertility while providing quality fodder in cereal-livestock farming systems. The technology contributes to regenerative, circular, and inclusive agri-food systems as it deploys natural processes and locally adapted bio-resources that are well suited to intensification needs of resource-poor smallholder farmers. This technology mitigates both biotic and abiotic agricultural production constraints, increasing staple cereal yields threefold with measurable impacts on the food security and nutrition of smallholder farm households in SSA.

Push-pull uses carefully selected companion plants — attractive trap plants and repellent intercrops. It repels pests whilst recruiting their natural enemies. Simultaneously, luring the pest away from the crop using peripheral trap plants that have dual utility as forage crops for improving milk yields, as both companion plants are high value fodder for livestock. The repellent intercrop also effectively controls parasitic striga weed and improves soil fertility. Fixing atmospheric nitrogen into soil, increasing soil carbon stocks and soil organic matter as well as enhancing biodiversity are co-benefits from push-pull that also enhances food safety by reducing aflatoxins that seriously harm human health. Diversification of push-pull with micronutrient-rich vegetables has enhanced both farm incomes and the nutritional security for rural households. Preliminary findings on push-pull integrated with tomatoes, kales, black nightshade, cowpeas indicate enhanced productivity of vegetables and effective decrease in infestation of pests such as diamondback moth (~50%), aphids (~60%), flea beetle (~30%) and thrips (~10%) leading to reduced dependence on chemical pesticides. Through these multiple benefits, the push-pull technology has been adopted by more than 350,000 smallholder maize growers in SSA.

Push-pull agroecological intensification with nutrient-dense vegetables



5.3.2. Agroecology helps promote employment and incomes

By contributing to the development of short distribution/supply chains as well as long supply chains compatible with agroecology, by making better use of local resources and adding value through local processing, agroecology can support economic growth and the creation of decent jobs with a concern for equity and social justice. For family farmers who still represent a very large part of the labour force in low-income countries, better control of the costs of external inputs coupled with maintaining, or even increasing, yields, can ensure decent incomes provided that the rules for sharing value added along the supply chains are fair and equitable. Strategies such as diversifying production, reducing external inputs and developing alternative marketing channels have, in some cases, improved farmers' incomes by 30%.

Being intensive in work and knowledge, agroecology requires a larger workforce. However, in order to maintain and attract young people to the agricultural sector, it is important to improve labour productivity and reduce its arduousness by developing appropriate innovations (mechanisation for small farms in the production and processing of products on the farm, digital tools to exchange knowledge on agroecological practices and markets, etc.). Innovations should also be gender-sensitive if not gender-transformative given that global agricultural labour force is made up of 43% women according to FAO[123].

The processing of agroecology products can support a fabric of small and medium-sized enterprises anchored in the territory and respecting environmental and social principles, which have the potential to increase local employment. Finally, agroecology calls for the strengthening of services to producers (advice, provision of bio-inputs, marketing, etc.), which are all attractive sources of employment for young people.

123 FAO (2017).

5.3.3. Agroecology relies on markets but requires responsible commitment from the private sector and value chain actors

It is largely through the development of markets, especially territorial markets, that agroecology can respond to current challenges on a large scale. It is therefore crucial to promote or support value chains compatible with agroecology. These value chains must be able to market the diversity of production derived from agroecology. This is a challenge for territories, which have specialised around a limited number of productions causing lock-in phenomena. In this context, the private sector (producers' organisations, small businesses, international firms, etc.) plays a decisive role. Some companies already support agroecology because of their alignment of values but also to position themselves on new markets. It is essential to convince and expand these business networks through incentives and standards. However, a transparent corporate accountability system is needed to build trust. Consumers also influence production and processing through the choices they make. It is essential to inform and educate consumers. From this point of view, agroecology must be synonymous with attractive prices for producers and reasonable prices for consumers, with trade-offs to be negotiated between the different actors in the value chains and between countries.

5.3.4. Agroecology also offers solutions for large farms

Agroecology aims to protect the human and social values of local communities, to ensure decent living conditions for farmers and their families, to promote the production of sufficient and healthy food. It is sensitive to the respect of transparent, inclusive, and fair governance within value chains and territories, to the participation of all stakeholders and to strengthening the capacity of the most vulnerable actors. As a result, most agroecological movements and development interventions in these areas support family farming in general and small producers in particular who supply one third of the agricultural products consumed worldwide.

However, this in no way means that agroecology cannot be deployed for other types of producers. Its principles, both in their technical and social dimensions, are not incompatible with large farms, which may wish to mobilise ecological processes to their advantage, in particular by promoting biodiversity. These farms must, however, respect the social principles of agroecology, in particular those dealing with workers' rights, access to resources, etc. These principles can also be applied to upstream and downstream businesses claiming strong social and environmental responsibility and their desire to anchor their activities in the territories. For example, some large rubber farms in Southeast Asia develop agroecological approaches around agroforestry systems and establish balanced contractual relationships with small producers to feed their own production. However, a robust and transparent accountability system for monitoring and evaluating commitments and results is needed to ensure the seriousness of the approach.

5.3.5. Agroecology mobilises science and is open to innovations

For centuries, farmers have developed agroecological systems by mobilising local resources to ensure land fertility and pest control. In many regions, this knowledge has often been lost. Moreover, very often, this knowledge referring to ancient times is no longer adapted to the developments—be they demographic (increasing pressure on resources), economic (market development), social (new needs of families) or environmental (climate change, pollution, etc.)—that have taken place.

Innovation is therefore a necessity in order to increase production potential and better manage resources based on agroecological approaches. Agroecology should not be seen as a default option for farmers but as a desirable future. Science contributes to innovation by providing knowledge, methods and by proposing new technologies. These, resulting from research, can be useful for farmers. This is the case, for example, with new varieties resulting from marker-assisted selection or new bacteria able to enrich the soil or to fix nitrogen. It is important that these innovations are responsible, accessible and respond to the problems that farmers need.

The production of new knowledge useful for action and the development of new technologies requires new ways of doing research, based on innovative forms of collaboration between farmers and scientific researchers as implemented within the framework of participatory, transdisciplinary research or action-research. It is essential that farmers participate meaningfully in research by providing their knowledge and co-constructing innovations as well as in research priority-setting and management.

5.3.6. Agroecology aims to reduce dependence on synthetic inputs but is not opposed to their use

While some stakeholders call for a complete phase-out of the use of synthetic inputs in the context of agroecological production systems, the FAO and HLPE report considers that agroecology aims above all at reducing dependence on purchased external inputs, and in particular synthetic ones.

Recognising the scarcity of resources (oil, phosphorus), this position helps limit the negative effects on the environment and strengthens farmers' autonomy. However, it must be acknowledged that farming systems are very diverse. In certain situations, the use of synthetic inputs is excessive and generates health problems for ecosystems and humans. In other situations, inputs, notably fertilisers, are little or not used at all. It is about the judicious use of synthetic inputs according to agricultural systems and current consumption levels. They are complementary to other agricultural practices compatible with agroecology and aimed at reducing their use. However, it is possible to envisage their complete elimination, compatible with healthy soils, plants and animals, as shown by the rise of organic farming.

5.3.7. Genetic improvement can benefit biodiversity

Agroecology chooses to promote the genetic diversity of species, varieties and breeds, as this biodiversity is a source of adaptation to local conditions and of resilience to biotic (pests, climate) and economic (prices and access to markets) shocks. Agrobiodiversity represents a potential pool of innovations that can preserve producers' autonomy of choice for the future. Hence the importance that agroecology attaches to in situ conservation actions, the production of farmer seeds and the defence of the rights of communities to obtain and distribute seeds.

However, agroecology does not overlook the genetic improvements resulting from modern breeding methods, provided that the objectives of such breeding are directed towards obtaining varieties and breeds compatible with a biodiversity cultivation (mixing of varieties in the same plot, associated crops, crops under trees, more hardy breeds) and adapted to an integrated response to climate change. It may also involve selecting and producing living organisms useful for soil life or pest management.

The issue of GMOs (genetically modified organisms) continues to be the subject of lively debates around very diverse positions among Member States but also among the actors of agroecology. Although genetic engineering can open up interesting perspectives, it nevertheless appears that GMOs are currently being developed for intensive monoculture systems with property rights that are not favourable to farmers as they are dependent on the few companies that dominate the market. This state of play makes it difficult for them to be compatible with agroecology (see section 2.3).

5.3.8. Digital technology at the service of local knowledge

Digital technology in agriculture is developing rapidly, especially in the most intensive agricultural systems. It is at the centre of certain models, such as precision agriculture, which uses it to better regulate the use of synthetic inputs, to control irrigation, to plan farmers' activities according to the weather or to the state of crops and animals. While these tools can be useful to farmers, their development by large structures tends to favour a centralisation of data collection and management for advice provided to farmers through algorithms that they do not master, and which do not necessarily take into account local specificities.

This contradicts the agroecological principle of producing localised knowledge needed to adapt practices to the context. For them to have their place in an agroecological approach, digital tools should encourage the production of local references, the exchange of experience between actors, and collaborative learning by also allowing a better connection between producers and consumers. Such digital tools should be designed and developed in a spirit of co-construction to take into account the needs of local stakeholders. It would also be a matter of promoting balanced digital governance, dealing fairly with data management and ownership and the means of financing these services.

Solis: A digital innovation that combines top-down, bottom-up, and peer-to-peer communication modes to support the co-creation and scaling of locally relevant agroecological practices

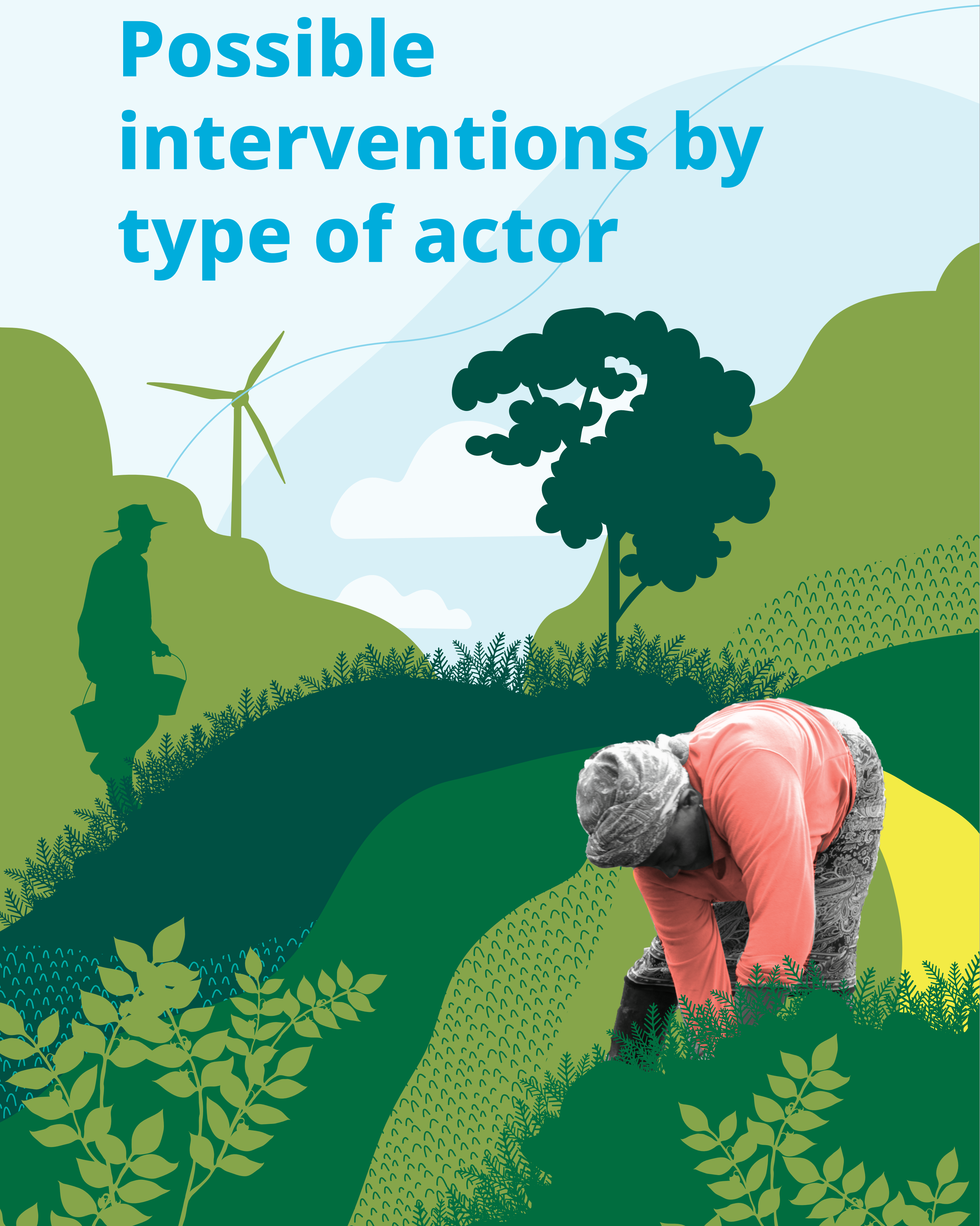
Developed by Solidaridad, it is a user-friendly web application that can be easily accessed via a web browser, without the need to download it from an app store.

Solis provides two key functionalities. First, it provides farmers with a tailored action plan designed to guide the continuous adoption of practices aligned with agroecological principles. Farmers can update their progress status and request validation or technical guidance from an extensionist at any time, without the constraints of physical distance. Additionally, Solis functions as a digital learning community where farmers themselves can create and share videos demonstrating to their peers how they have implemented best practices and adapted technical concepts to their own contexts. Extension agents and experts can also comment on farmers' videos and publish their own audiovisual content. By leveraging social media mechanisms to connect farmers, field advisors, and experts, Solis disrupts the traditional top-down technical assistance model, empowering farmers to co-create and share local knowledge.

Solis is the result of a co-creation process involving over 100 Brazilian farmers, extension agents, and digital tool developers, conducted by Solidaridad in the state of Pará in 2023. This effort was part of the 'Inclusive Digital Tools for Enabling Climate-Informed Agroecological Transitions' project, under the EU-funded TRANSITIONS programme. The deployment strategy combines the use of the digital tool with enabling mechanisms for continuous co-creation and in-person collaboration, such as field days and the training of young farmers to serve as ambassadors for agroecological transition and influencers on Solis. Adaptable to any language and intuitive for farmers with low literacy levels, Solis has the potential to become a farmer-driven digital hub to facilitate the exchange of local expertise and scale the adoption of climate-resilient and agroecological practices.

CHAPTER 6

Possible interventions by type of actor



This part aims to propose interventions to support agroecology. It indicates by large types of actors (producers, researchers, trainers, providers of support services for producers and innovations, value chain actors, policymakers) which interventions are desirable. An agroecology support programme can include one or more of these categories of actors.

6.1. Strengthening farmers' capacity to innovate in the agroecological field

Improving or transforming agricultural practices is essential to support agroecological approaches (organic farming, agroforestry, integrated soil management, biocontrol of pests, landscape approaches, etc.). These farming practices are specific to each territory, even if lessons can be learned from other situations. Biodiversity management (including agrobiodiversity) and nutrient recycling are key elements for agroecology.

The technical dimension of change must be taken into account as well as the strengthening of farmers' capacities to manage their farms (all resources, cash flow, food and nutrition, etc.) and to innovate by experimenting. However, beyond actions aimed at supporting farmer training and at advising them, interventions must also strengthen innovation networks, promote innovation platforms and support innovation niches. For example, the in-situ conservation of species, varieties and breeds and the protection of farmer seeds are important actions to promote through capacity building for farmers, farmers' organisations and certain NGOs, and even private companies.

There are frameworks and intervention methods to support such an innovation dynamic for the large-scale development of agroecological practices meeting the needs of farmers and complying with ethical criteria. Many NGOs, research centres, producers' organisations and some private actors have expertise in this field to contribute to the implementation of such approaches.

6.2. Strengthening producer and innovation support services

Promoting agroecology requires the development of innovation support services and it is important to invest in this area to ensure a scale-up of the agroecological transition.

A first category of services concerns advisory services. The conventional advisory model has long supported the Green Revolution and remains dominant. Such a model is suitable for scaling up simple locally validated solutions. But this model must evolve beyond the transfer of knowledge and technologies from researchers to farmers, as it is not suitable to solve complex problems and to identify with stakeholders' original solutions, tailored to local contexts.

Advisory services can support farmers and breeders by strengthening their capacity to manage their farm (and not just develop new farming practices). They can also support individual entrepreneurs such as start-ups, especially in the field of product processing. Finally, advisory services can support collective actions involving a variety of actors in a participatory manner. They, therefore, aim to help stakeholders clarify their issues and objectives, identify and test agroecological solutions, build partnerships to mobilise resources, act collectively and engage in policy dialogue. In general, through advisory systems, the aim is to strengthen the innovation capacities of stakeholders (technical and functional capacities, at individual, organisational and institutional levels).

These innovative advisory services require the identification of animators (or facilitators, coaches) with diverse skills and of organisations capable of recruiting, training and supporting them. These organisations may be those that are already engaged in the provision of advisory services and that are willing to evolve. They may also be new organisations such as incubators, formal networks dedicated to innovation, NGOs positioning themselves on intermediation, etc. Producer organisations or private companies can also develop this type of advisory services. However, it is important to ensure that these organisations are willing or able to integrate agroecological approaches including their technical and social dimensions.

A second category of agroecology related services concerns the supply of inputs, and of specialised services in technical, commercial or legal matters. Certain services providing biotechnologies are also useful (bio-inputs to activate soil fertility, waste composting, biopesticides, breeding of insects useful for pest control, etc.). Other services may rely on digital tools that must be designed and deployed to provide advice promoting local knowledge management, exchange and learning, or to ensure product traceability, or to facilitate market access for agroecological products.

6.3. Supporting value chain actors for access to inclusive markets

The development of agroecology on a large scale requires access to markets that recognise and valorise agroecological products.

Processors play a key role in ensuring market opportunities for producers but also in providing services to producers to ensure that the agricultural commodities they supply comply with the required quality and quantity. SMEs and large firms can be supported to develop approaches compatible with agroecology, implement waste management from a circular economy perspective or invest in renewable energies. Capacity building and support for a network of small processing and marketing companies should be envisaged. Support to these actors can take the form of financing assistance with all possible tools within the EU and its institutions (loan, grant, blended finance).

Support for actors in short supply chains and territorial markets should be encouraged in particular to promote local products and to ensure diversified, culturally acceptable and high-quality food for consumers. Public procurement to supply public centres (school, prison, army, etc.) represents an important lever to stimulate local value chain development. Longer value chains can also align with agroecology by building on circular economy principles or by promoting a transparent and fair traceability system for all stakeholders. Here too, the management of trade-offs between economic, social and environmental imperatives must be assessed in the light of agroecological principles.

Interventions aimed at promoting product recognition are important. There are numerous experiences including the promotion of Geographical Indications in national frameworks, the development of public or private sector sustainability standards with third-party or participatory certifications, such as participatory guarantee systems, the sharp increase in the number of private labels and brands supporting sustainable approaches, etc. But these qualifications must genuinely take into account the principles of agroecology and balance the economic, social and environmental dimensions of sustainability. In addition, to be effective and ensure real changes in production and marketing practices, they must be combined with other actions (fair and inclusive distribution of added value, support for producers' income, training, fight against fraud, etc.).

6.4. Developing relevant action-research

Little investment has been made in agroecology research compared to past and current investments in promoting the methods of the Green Revolution. Research is needed to analyse and better understand agroecological processes, to study the strengths and weaknesses of agroecological approaches, to analyse their scaling potential, their contribution to the SDGs with clear evidence, to help stakeholders innovate through scientific knowledge, to contribute to academic and professional training, and to strengthen advisory services.

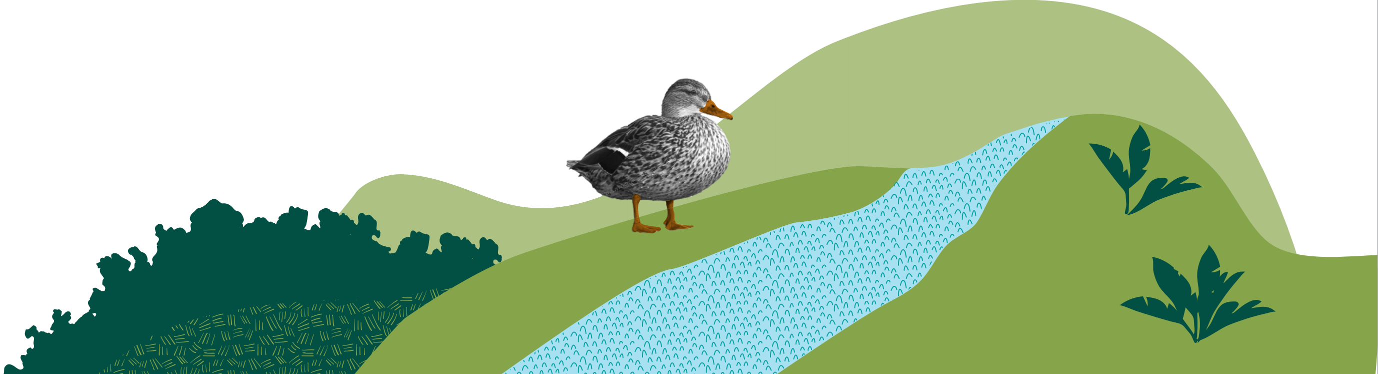
To be useful, usable and used, this research must mobilise transdisciplinary and systemic approaches to resolve complex problems. It must also combine different research methods: analytical methods to better understand agroecological processes but also participatory methods within the framework of multi-stakeholder partnerships to mobilise local knowledge. Action-research must become a driver of co-innovation in the field of agroecology. Partnerships between research organisations of different countries should be strengthened to accelerate the development of agroecology research skills.

Farmers' organisations leading research & innovation on agroecology for sustainable food systems (FO-RI): Looking for new ways of doing research and facilitating innovations

FO-RI is an EU-funded programme, articulated around 13 projects in 17 countries across Latin America, the Caribbean, Africa, Asia and the Pacific region. Managed by the AgriCord Alliance, it brings together farmers and researchers to conduct agroecological action research tailored to the needs of participating farming communities. The interventions are implemented by farmers' organisations (FOs) and facilitated by agri-agencies, which are organisations specialised in strengthening FOs and have structural links with them in their home countries.

The 'Inclusive Action Research for an Agroecological Transition of Market Gardening Crops in Three Highlands Regions of Madagascar' (RAITRA) is a perfect example of how farmers and their FOs are put in the driving seat of the action-research processes. FOs' technicians carried out initial diagnosis through field observations, farmer focus groups, and interviews, identified problems and questions to be researched, and scoped possible solutions. An innovation platform was then set up, allowing researchers and farmers to exchange and identify more specific research needs and priority themes. They also proposed required treatments based on farmers' practices, while defining the research protocols. Farmers were trained by researchers and FO technicians on how to conduct experiments. After an experimentation phase set up at the plots of trained volunteer producers supported by FOs' technicians, farmers were involved in gathering agronomic and economic data according to agreed protocols. Pre-analysed at their level, data was further communicated to and processed by researchers. Awareness-raising activities and training sessions on specific agroecological practices that are the core of the experiments such as vermicomposting were conducted regularly — both by FOs' technicians and by 'relay farmers' within the farmer-to-farmer extension system established by FOs. Throughout the whole process, farmers were given access to agroecological inputs, and some were trained and supported in the production of agroecological inputs.

Farmer-led research is innovative and challenging as it requires a mind shift and rebalancing of the power relationships from distinct agri-food system actors with different interests and expectations. For example, while farmers are primarily concerned with socioeconomical considerations linked to agronomic efficiency and economic viability of farming systems, researchers are driven by the scientific integrity of their research works and the relevance of their contributions to science. The experiences arising from the FO-RI Programme are nevertheless demonstrating the relevance and efficiency of research action-based innovations in terms of context adaptation and increased adoption by farmers.



6.5. Updating academic and professional training courses developed by academic and vocational training organisations

Capacity building is at the heart of the agroecological approach. Significant investments are needed in universities to offer academic training to young people (technicians, engineers, master students, etc.) in order to provide them with the necessary knowledge and skills to rethink production, distribution and consumption models based on agroecological principles.

Vocational training is also an important issue with interventions aimed at strengthening training centres to upgrade the skills of technicians or schools for farmers and rural communities, including various actors in value chains such as small and medium-sized enterprises involved in the collection, processing and marketing of agri-food products, inputs and agricultural equipment. Support should promote education and training models aimed at participatory

FAO Agroecology Knowledge Hub

Aggregating and disseminating knowledge for the global agroecology community

Agroecology being knowledge intensive (with co-creation processes at its core), the Agroecology Knowledge Hub (AKH) was launched by FAO in 2016.

Acting as a valuable **repository of well-documented evidence, policies, practices, innovations, and cutting-edge scientific advancements in the field of agroecology**, the AKH is an international web-based platform dedicated to the support of the global agroecology community. It facilitates vibrant online discussions via specialised forums focused on agroecological approaches and through its collaboration with the Community of Practice on Family Farming and Agroecology.

The AE Knowledge Hub acts as a key vehicle that facilitates **knowledge co-creation**, aggregates and disseminates news and vital perspectives to a highly engaged agroecology community and showcases and amplifies their important work. The **monthly AKH Digest** brings together policy briefs, the latest research and innovation, voices from the ground, and key important upcoming events to inform our worldwide audience.

The AE Knowledge Hub benefits from its unique primary connections to the 197 FAO Member States, and regional and national FAO focal points who are at the forefront of policy, research and programming on sustainable food systems. As an official interlocutor with FAO Member States, the AKH constitutes a **bridge between civil society, farmers' organisations, researchers, academia, and governments**.

Agroecology Knowledge Hub by the numbers (September 2024)

- About **3,000 items available** (about 50 new items uploaded every month):
    - 2,754 items in **AKH database** (articles, books & manuals, policy briefs, case studies, conference proceedings, videos, e-learning materials...);
    - 232 items in the **AELex database** (country legislation, agreements and policies on agroecology).
- **2,860 direct subscribers** to the AKH monthly Digest (average of 50 new subscribers per month);
- Over **16,250 monthly visitors**;
- Top 10 countries: China, Mexico, USA, Colombia, India, France, Argentina, Brazil, Ecuador, Italy.

co-innovation, providing new knowledge, developing know-how and interpersonal skills to support agroecological processes. This involves both strengthening analytical and intervention capacities while promoting local experiences.

Particular efforts should be made to reach out to young people seeking decent and attractive jobs in rural areas and women who play a particular role in specific value chains and in the feeding of families. In this field of education, digital technology can be a source of innovative solutions (access to knowledge, development of new services).

6.6. Supporting ministries for public policies to foster agroecological transitions

The agroecological transition of agricultural and food systems requires interventions to improve or adapt public policies. On the one hand, interventions are needed to strengthen the capacity of public services (governments and ministries, decentralised state departments, local and regional authorities) to support agroecological transitions. The aim is to promote political dialogue, to train public service executives, to encourage the exchange of information and experiences. It also involves fostering the creation of local and national spaces for political and multi-stakeholder dialogue on agroecology to build a shared vision, identify bottlenecks, and define priorities and lines of action. Such democratic and inclusive debates are essential to include agroecology in national and local policies. Diagnostics of food systems are also useful to identify interventions aligned with agroecological principles.

But it is also about facilitating the definition and deployment of policies and measures for an environment favourable to agroecology with (i) new standards and taxes for production, marketing or processing, including a repurposing of current subsidies supporting high synthetic input agricultural systems; (ii) financial incentives for innovation for entrepreneurs and farmers' organisations; (iii) innovative financing for investment in agroecological production systems and value chains, including payments for ecosystem services; (iv) the development of public procurement to encourage local and agroecological production; and (v) support for research and education related to agroecology.

Policy Guidelines on Agroecology Transitions in ASEAN: A toolkit to develop agroecological policies

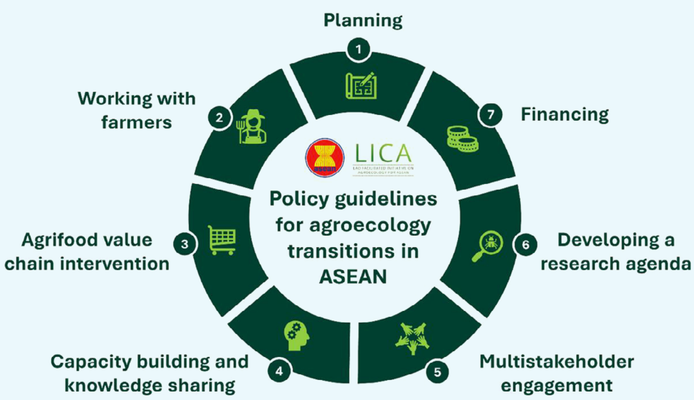
The Policy Guidelines on Agroecology Transitions in ASEAN, approved by the ASEAN Ministries of Agriculture in August 2024, represent a critical step forward in the region's sustainable agriculture development efforts. Designed through an inclusive multi-stakeholder process, they serve as a framework to foster agroecological transformations tailored to Southeast Asia's unique environmental and socioeconomic conditions. While rice-based crop rotations, integrated pest management, agroforestry or conservation agriculture, have long been applied to address land degradation, agrochemical contamination, and food security challenges in the ASEAN region, only recently have agroecological policies been explicitly brought to national and regional agendas.

The Guidelines were developed under the ASEAN secretariat and the Lao-facilitated Initiative on Agroecology (LICA), an intergovernmental initiative tasked with the development of a common position on agroecology for the ASEAN. CIRAD, UN ESCAP and FAO, under the EU- and AFD-funded project Agroecology and Safe Food System Transitions (ASSET), have been instrumental in strengthening LICA's capacity and its engagement with ASEAN Member States and multiple coalitions—including government, research, civil society—such as the Agroecology Learning alliance in South East Asia (ALiSEA) and the Conservation Agriculture and Sustainable Intensification Consortium (CASIC), and regional research platforms (dP ASEA and dP Malica). Based on seven core levers to guide agroecology transitions (planning, working with farmers, value chains intervention, building capacity and sharing knowledge, multistakeholder engagement, advancing research agendas, and securing financing), the guidelines are:

1. **Anchored** in the ASEAN policy framework and broadening awareness on agroecological potential and the region strengths, dispelling common misconceptions about agroecology, and ensuring relevance to different policy change actors through a human-centred design approach;
2. **Promoting processual approach and pathways**, building on the 7 leverages which offer ASEAN countries a flexible, yet structured, toolkit to develop agroecological policies adapted to their specific contexts;
3. **Fed with learning from the ground**: illustrations and resources for further inquiry, incorporating evidence and insights from ASSET's action research and other sources.

The Policy Guidelines highlight the regional commitment to agroecology as a legitimate, sustainable agricultural pathway. They serve as a dynamic vehicle for knowledge sharing, supported by a digital media hub to facilitate continuous learning and adaptation. Moving forward, ASEAN's multistakeholder dialogues and networks will further advance the goals of these guidelines, fostering alliances that can drive policy change and deepen regional agroecological practices.

For more information, see
www.aseanaetguidelines.org



CHAPTER 7

Topics of intervention

The great strength of agroecology is that it addresses at the same time economic, environmental and social objectives. The combination of the various locally adapted agroecology practices addresses the multiple challenges of food insecurity, malnutrition, income insecurity, climate change, biodiversity losses, water crises, ill health and inequity simultaneously. In order to derive the greatest benefits from agroecology, it is important to keep all these aspects and dimensions in mind in the design of food system transformation interventions and/or projects.

The intervention topics presented here refer to section 3 of Part I of the Guide. Based on practical experiences and research lessons, this section analyses, for each of the 13 principles of the HLPE, the possible contribution of agroecology to the main current planetary challenges (e.g. climate change, food and nutrition insecurity, social and gender inequalities, depletion of natural resources and biological diversity) and related EU development priorities.

This section intends to continue this exercise by providing readers with some examples of activities that will allow them to operationalise the transformative potential of an agroecological transition, as described in the theoretical part. The following subsections provide a list of possible activities for the different challenges. They do not mean to be exhaustive or prescriptive, but to give examples of relevant actions that can guide the design of a project or intervention so that it complies with the 13 principles of agroecology. Given the strong interactions and interdependencies between topics, many activities are relevant to several of the challenges. It is then a question of giving them a particular orientation to make the intervention meaningful on the basis of a theory of change including clear objectives and of responding to the issue dealt with in the context of the country of intervention.

7.1. Articulating agroecology and climate change

Diversification of production systems in order to increase their resilience and adaptation to climate change in a context of increasing irregularity of weather events.

- Promote practices, combined with action-research and advisory activities, such as crop rotation and association, fallowing, mixed crop-livestock systems and agroforestry, in order to rely on greater diversity of crops and animals to improve production by mobilising different biological mechanisms.
- Support farmers' organisations or SMEs to promote formal and informal seed systems (indigenous seed banks, storage capacities, etc.) and increase the availability of hardy varieties adapted to climate change.
- Encourage crop/livestock farming that favours local animal feed (fodder crops, open pastures, livestock feed) to significantly reduce GHG emissions from the manufacture, packaging and transport of animal feed produced outside the farm or territory.

Improved water management on farms and territories.

- Develop financial mechanisms to support anti-erosion developments on plots intended to limit water runoff and to encourage its infiltration into the soil, by different water retention practices (half-moons, ridging, etc...) preserving and planting trees in the fields or hedgerows, such as the Sahelian bocage.
- Experiment with farmers and promote water-efficient irrigation facilities (e.g. drip irrigation) by supporting SMEs and service providers.
- Recycle water (waste and rainfall) at farm and territorial level by experimenting with local stakeholders and identifying incentive financing mechanisms for investments.
- Develop and integrate decision support tools, including digital, in advisory services, using meteorological data and local knowledge to better manage production systems in the face of climatic hazards.

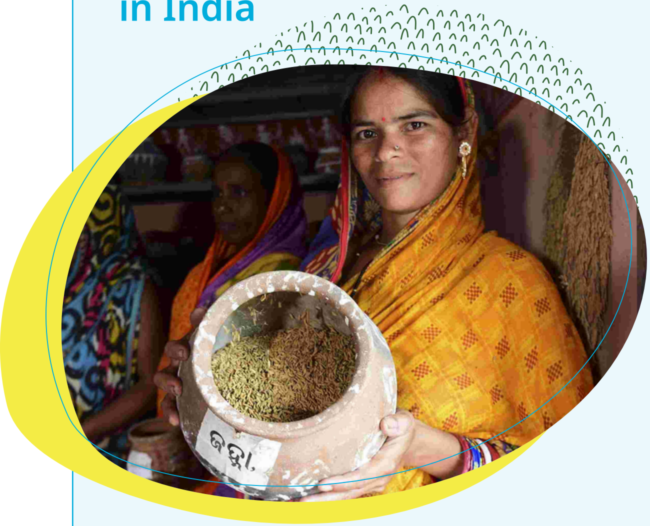
Promotion of practices for integrated soil fertility management.

- Support the co-creation between farmers, technicians and researchers of practices that promote soil carbon sequestration such as mulching, reduced tillage or agroforestry, and experiment with innovative financial incentive mechanisms such as carbon credits.
- Develop training and advice based on participatory methods to recycle organic matter (recycling of harvest residues, crop-livestock integration, agroforestry, etc.) to improve soil health by increasing the soil carbon content and reduce the use of synthetic fertilisers in situations of excessive use.
- Promote the use of nitrogen-fixing legumes (crops, fodder, shrubs and trees) to improve soil fertility and reduce dependence on chemical fertilisers with high greenhouse gas (GHG) emissions by promoting the structuring of different steps in value chains (e.g. processing, marketing) and consumption (consumer education, school meals, etc.).
- Promote the production and use of bio-inputs (organic fertilisers, bio-stimulants and bio-pesticides, waste composting, etc.) to activate soil fertility and health, by supporting farmers' organisations or SMEs and fostering the development of appropriate regulatory frameworks.

Strengthening research and innovation on topics related to CC adaptation and mitigation issues.

- Support the genetic selection of resilient plant species, varieties and animal breeds, locally adapted for better adaptation to the effects of climate change based on selection criteria allowing agroecological production systems (mix of varieties, associated crops) and collaborations with farmers (participatory breeding).
- Develop digital tools (platforms, applications, etc.) that promote the production of local knowledge of local varieties adapted to drought and the management of crop calendars to ensure agricultural production in areas where rainfall is low or irregular.
- Develop action-research with farmers, researchers and private actors (farm machine builders, equipment suppliers, etc.) linked to mechanisation adapted to agroecology in order to increase labour productivity and limit its hardship in a context of climate change.

A successful business model for community seed banks in India



Community Seed Banks (CSBs) are farmer-managed organisations that conserve and manage local crop and tree diversity. They help preserve traditional varieties that are often more suited to specific environmental conditions. This ensures that these varieties, which may be more drought-tolerant, pest-resistant, or nutritionally rich, are not lost.

Community seed banks usually operate on the principles of sharing and exchange. Farmers borrowing seeds from the bank must return them after harvesting, ensuring the community's seed stock is replenished. By providing access to seeds at minimal or no cost, these banks empower small-scale farmers to reduce their dependency on external seed suppliers, thereby reducing their costs and increasing their self-reliance. Community seed banks are also hubs for exchanging agricultural knowledge. They promote sustainable practices by promoting and improving traditional farming techniques, which are often aligned with agroecology.

In the 1990s, India saw a rise of CSBs in response to an urgent need to conserve disappearing traditional crop varieties. Since 2010, the Alliance of Bioversity & CIAT collaborated with public institutions and civil society organisations to incorporate these banks into a broader strategy for farmer-managed seed systems. Under several initiatives, including the Seeds4Needs programme, the Alliance helped establish over 40 CSBs, equipping them with modern technologies to preserve seed viability and longevity, and training hundreds of farmers as 'Champion farmers' to manage the banks and ensure best conservation practices.

The Alliance developed a sustainability strategy focusing on value addition and product development. Over 5,000 native varieties of 20 crops across India's diverse agroecological regions were tested and 300 potentially scalable varieties were identified. Farmers were trained and networks of self-help groups, farmers' organisations, private companies, and local startups were established. Nutrition profiling of selected landraces was conducted, and branding, packaging, and marketing efforts were launched. As a result, varieties and products marked with different brand names were developed by CSBs, which today sell native rice varieties at 30–35% higher market rates compared with commercial varieties.

Over 30,000 farming families benefited from these activities that demonstrated that CSBs can be a powerful tool to preserve agricultural biodiversity and generate effective business opportunities to improve the livelihoods of local communities through innovative strategies.

7.2. Articulating agroecology and food security

Support for the diversification of agricultural and non-agricultural food products towards healthy, balanced and diversified diets.

- Encourage, through advice and the structuring of value chains, a greater diversity of cultivated species, including forgotten crops, in production systems managed in line with agroecological principles by mobilising scientific and local knowledge to ensure greater dietary diversity.

- Foster the development of innovative forms of integrated crop-livestock farming, within the framework of multi-stakeholder innovation platforms, by addressing production, processing and marketing issues, thus contributing to greater dietary diversity for rural and urban populations (meat and derived dairy products where consumption is below recommended levels) and promoting sustainable production through the recycling of livestock effluent, while respecting animal welfare.

- Promote food diversification by establishing plans negotiated between local stakeholders for rational harvesting, in non-cultivated areas, of products such as fruits, roots and tubers, leaves, honey, nuts, mushrooms, eggs, insects, fish and bush meat (non-timber forest products).

Promotion of agronomic practices that mobilise biological processes contributing to the reduction of the use of pesticides harmful to food quality and human health.

- Co-create with farmers and researchers innovations promoting the use of crop protection agents to limit the use of phytosanitary products (particularly for fruit and vegetables heavily exposed to pesticides) through ecological monitoring of fields and their peripheries (push-pull system).

- Strengthen the capacity of advisory services (training, access to digital resources) to develop integrated and agroecological crop protection approaches by validating integrated pest management methods with farmers and offering innovative training.

Development of short marketing distribution/supply chains to promote diverse diets for rural and urban consumers, based on local, fresh and seasonal products as opposed to hyper processed products.

- Promote the development of local marketing infrastructure (local/territorial markets, farmers' shops, farm sales, collective points of sales, farm box deliveries, direct sales to supermarkets or communities, through internet, etc.) for the mutual benefit of producers and consumers.

- Promote individual and community storage infrastructures, with appropriate credit mechanisms (e.g. 'warrantage' or inventory credit system) for better conservation of foodstuffs, allowing producers to sell at times when prices are more remunerative.

- Strengthen farmers' organisations, through training and policy dialogue with governments, to promote the pooling of marketing activities (storage, sale, transport, particularly for products grown along the principles of agroecology) in order to reduce transaction costs and obtain better prices.

Strengthening the decision-making power of farmers over the choice of agricultural practices, seeds, the destination of crops (own consumption, exchanges, sales on local or international markets) and the use of land and natural resources.

- Support the structuring of farmers' organisations and develop their capacities to defend the rights of farmers and minorities in the context of value chains.

- Develop participatory and inclusive food diagnostics at territorial level and strengthen spaces for discussions on agricultural and food issues.

- Develop multi-stakeholder, interprofessional bodies for the management of value chains through targeted support to key players in the value chain or through support for the definition of national strategies by value chain.

7.3. Articulating agroecology and gender

Co-creation of solutions with farmers and creation of inclusive spaces for exchanges and sharing of knowledge on agroecological farming practices.

- Organise exchange and learning sessions on topics of interest to women by removing the constraints associated with their participation: diversification of production, seed production (breeding, conservation, exchanges), edible wild plants, pharmacopoeia, diversity of local varieties, etc.
- Organise visits to food gardens usually run by women to foster peer-to-peer learning with adapted intervention methods (e.g. field school).
- Encourage the participation of women as relay farmers or agricultural advisers.

Account of gender aspects in agroecological production systems.

- Co-design with women and craftsmen, and promote with SMEs or farmers' organisations tools adapted to women's physiology for the carrying out of certain tasks traditionally assigned to them (water collection, sowing, etc.), thus reducing drudgery while respecting the principles of agroecology.
- Co-design and promote, through an agricultural advisor dedicated to women, the implementation of ecological farming practices contributing to reducing the intensity and arduousness of agricultural tasks often dedicated to women: techniques limiting evapotranspiration to reduce watering needs, association of crops or permanent soil cover to limit weed control time; minimum tillage, etc.
- Encourage the participation of men in gender sensitisation activities through the mobilisation of 'male champions' or 'model couples' as an effective way to promote gender-friendly practices.

Promotion of improved access for women to decision-making spaces and certain essential productive assets.

- Identify and co-construct with women and relevant actors mechanisms to remove the main obstacles to their access to adapted agricultural advice taking into account their status in society, their level of education, their higher extra-agricultural workload, and their mobility constraints.
- Promote women's increased access to agricultural inputs (improved seeds and local seeds, bio-inputs, adapted tools, etc.) as well as to new technologies allowing them to access and/or share the information they need for their activities.
- Promote increased and secure access for women to land, natural resources and credit, through support for farmers' or civil society organisations defending women's access and control rights, dialogues, training and new regulations.

7.4. Articulating agroecology and biodiversity

Promoting effective management of anthropised spaces and protecting natural species to conserve, protect and stimulate biodiversity.

- Facilitate the establishment of diversified landscape mosaics with natural and cultivated areas (shared use of land called 'land sharing') through the participatory development of territorial planning plans and of rules on the use of resources.

- Support through regulations and incentives for local communities and municipalities, the preservation and reconstruction of natural or semi-natural habitats (wetlands, meadows, wastelands) and ecological corridors (hedges, forests) around, between and inside cultivated areas, to limit the pressure of pests and crop diseases and to combat wind erosion and run-off.

- Promote through innovative forms of payments for ecosystem services, the protection and deployment of wild plants that nourish, pollinate, produce biomass, serve as fodder as well as feeding (through hunting, fishing, harvesting) and productive (firewood and construction wood) spaces.

Support for agro-biodiversity and greater genetic, specific and functional diversity within production systems.

- Promote diversified agricultural systems (crop-livestock integration, including hardy breeds and crop associations, agroforestry, etc.) by strengthening agricultural advice and seeking economic valorisation for this diversity of value chains.

- Foster the development of formal and informal seed systems promoting farmer seeds and breeds, by strengthening farmers' organisations and SMEs, for a variety of hardy crops and varieties.

- Support agricultural practices promoting soil health, through action-research on soil biology (bacteria beneficial for plants, fungi of the rhizosphere, etc.), advice for agroecology, and incentive measures to improve soil biodiversity.

- Promote methods of preventive natural regulation of bio-aggressors, of preservation of pollinators and protection of useful entomofauna, in order to reduce dependence on pesticides by investing in research and innovation programmes, and by renewing training programmes for technicians and students.

Diversification of food systems to support agricultural and natural biodiversity.

- Promote, through the education of women and children, a balanced diet based on a variety of local products, including forgotten species.

- Valorise, including in economic terms, products with high nutritional value from natural and protected areas to stimulate the preservation of these areas by creating adapted and regulated sectors through multi-stakeholder platforms.

Promotion of the participation of stakeholders committed to agroecology (farmers' organisations, village committees) in decision-making processes and in the development of biodiversity policies, programmes, regulations, at local, national and regional levels.

- Technically and financially support organisations involved in biodiversity conservation, particularly indigenous and local communities and farmers' organisations.

- Support transdisciplinary research in the field of agroecology and addressing agricultural biodiversity, to produce evidence and foster knowledge sharing through multi-stakeholder partnerships involving farmers.

7.5. Articulating agroecology and value chains

Development of short marketing distribution/supply chains guaranteeing a fair price to producers, reassuring consumers, contributing to maintaining local employment, creating jobs and reintegrating into society (social economy).

- Support agricultural and food diversification through the promotion of local seasonal products and the development of a circular economy (waste management, renewable energy).
- Promote a direct link between producers and consumers – or limit intermediaries – to maintain attractive prices for producers and consumers by promoting farmers' markets or improving local markets.
- Develop participatory schemes taking into account agroecological principles (e.g. PGS) for recognition of the benefits associated with agroecological products (in terms of quality and health in particular) by supporting local initiatives and taking part in the creation of a favourable legislative framework.
- Support the development of small enterprises processing agroecological products through privileged access to credit, technical assistance, and by contributing to the creation of networks to exchange experiences for better management of SMEs.

Support for long supply chains (national, regional or international) to take better account of agroecology with remunerative prices for producers and healthy products for consumers.

- Develop production systems that allow both production for long supply chains and diversification of crops, trees and animals on the farm by promoting integrated soil fertility management and agroecological protection of crops through adapted extension services.
- Strengthen the structuring of producers within farmers' organisations with a view to pooling purchases of inputs and equipment favourable to agroecology and grouping sales together to negotiate better prices in favour of producers.
- Develop information systems on prices in local and regional markets, building on multi-stakeholder platforms, allowing for more transparent negotiations between producers and buyers and for the identification of market outlets or a better choice of speculations.

Setting up multi-actor debates on value chains at different levels and strengthening the capacity of stakeholders (in particular women and other marginalised groups) to defend their rights and opinions.

- Support the organisation and structuring of farmers' organisations (cooperatives, groups, associations, etc.) and other players in the value chain (processors, traders, etc.) to encourage the emergence or strengthening of interprofessional organisations capable of defining common rules and addressing issues of shared interest for the value chain (research and innovation, training and advice, organisation of markets, etc.).
- Develop legislative frameworks (support for supply chains, protection of markets) and support agreements between operators in the supply chain (local, national, international) to define the operating rules (fixing prices and sharing added value, production techniques and product quality, labour law, environmental protection, etc.).
- Develop labels, standards or charters as part of participatory approaches (public and private authorities, producer organisations, consumers) for food and non-food products that comply with social and environmental standards linked to the principles of agroecology.

Strengthening breadfruit value chains in Tonga: A model for agroecology

Breadfruit is more than just a low-maintenance food source for the Pacific region. Having been grown for thousands of years, it is deeply rooted in local cultures and forms an important part of food security. It is vital to the local economy, supporting the livelihoods of many through farming, processing and sales, and has growing import substitution and export potential particularly in processed forms (e.g. frozen flour, chips). Moreover, often grown in agroforestry systems alongside other crops, and being low external input and organic by default, breadfruit farming holds significant environmental and climate adaptation benefits.

On this basis, the EU-funded Project 'Farmer Innovation for Sustainable Breadfruit Value Chains in the Pacific' seeks to enhance the breadfruit industry by promoting sustainable cultivation practices based on agroecology, optimising processing methods and aligning products with market demand, through the strengthening of the breadfruit value chain focusing on a multistakeholder approach. This is being done through reversing the traditional model of agricultural research and knowledge transfer by putting farmers/processors and farmer/processor innovation at the centre of further development of sustainable breadfruit agroecology and market systems.

The project is active in five Pacific Island countries (Fiji, Tonga, Papua New Guinea, the Cook Islands and the Solomon Islands). In Tonga, the research activities carried out on demonstration plots provide breadfruit farmers with valuable insights into optimal cultivation practices within agroforestry systems (e.g. spacing, intercropping methods, tree management and environmental requirements), allowing them to increase their yields sustainably. The research directly engages processors and exporters through interviews, and sheds light on their current practices, product range, challenges, and market dynamics. This knowledge enables them to align their products with market preferences and demands, leading to enhanced competitiveness and expansion in the breadfruit industry. This comprehensive knowledge-sharing that also involves growers and regulatory bodies fosters collaboration, ensures industry-wide improvements, and boosts the overall sustainability of the breadfruit sector. Consumers in turn are indirectly impacted by those research activities through their access to a wider range of high-quality breadfruit products that cater to their preferences.

The project exemplifies how agroecology can support the structuring and strengthening of a value chain from production to market. By engaging local farmers, exporters, government agencies, and development partners, the project has ensured that each link of the value chain was supported and optimised for success. The structured breadfruit value chain in Tonga provides a scalable model for other Pacific islands and regions with similar environmental and economic challenges.

For more information, click here

7.6. Articulating agroecology and health/nutrition

Promoting the diversification of agricultural production with a view to improving dietary diversity and for a healthier and more balanced diet.

- Strengthen the diversity of farms and territories through adapted agricultural advice and the structuring of supply chains: development of agroforestry systems (vertical diversity), crop associations and intercropping (spatial diversity) and crop rotations (temporal diversity) with a focus on complementarities for both human health and ecosystems.

- Promote integrated crop-livestock-tree systems based on a wide variety of local breeds and varieties adapted to local conditions through exchanges of experience and training focusing on innovative systems such as fish production in rice fields, management of herds in orchards, permaculture with a diversity of species and highly diversified agroforestry.

- Develop new training courses in universities for students and technicians in the field of agroecology, including a strong component on nutrition.

Promotion of consumption of products with high nutritional value.

- Promote nutrition education and disseminate new culinary knowledge in particular among women and girls to enhance knowledge about nutritionally rich endemic foods (including non-timber forest products).

- Support the installation of kitchen gardens, through support to associations, for the cultivation of numerous varieties of vegetables, fruits, food plants, medicinal plants and spices, as well as for small livestock and fish farming.

- Support SMEs, through access to technical assistance, credit or peer-to-peer exchange of experience, to process and market agricultural products of high nutritional value (biofortification, infant food, etc.).

Valorisation of nature-based solutions to reduce or eliminate the use of synthetic phytosanitary products with harmful effects on human health.

- Promote the production and use of bio-inputs (organic fertilisers, bio-stimulants and bio-pesticides, compost, etc.), by supporting SMEs or farmers' organisations to produce them and by developing advisory and training methods to improve soil fertility and health and to limit the risk of chemical contamination of products, producers and consumers.

- Develop action-research and promote integrated management of pests and unwanted diseases of plants through diversification, biocontrol and bioprotection methods that respect the environment and biodiversity.

Economic and social empowerment of women and adolescent girls of childbearing age for better nutrition.

- Promote increased access for women to land, credit and agricultural inputs (improved and local seeds, bio inputs and synthetic fertilisers, if necessary, tools, etc.) favouring agricultural production and the sale of their products based on an agroecological approach.

- Promote through the exchange of experiences the acquisition by women of new skills related to the processing and marketing of foodstuffs to generate income (e.g. by producing shea butter or 'soumbala' from seeds of néré pods).

- Promote through dialogue in villages and awareness campaigns a more equal distribution of roles and responsibilities between men and women in favour of an increase in women's decision-making power regarding the use of income within the household, in particular for healthier diets for children.

7.7. Articulating agroecology and water

Integrated soil management for better water cycle management.

- Promote the recycling of organic matter to increase carbon storage and water infiltration and conservation capacities into the soil and to significantly reduce the risk of erosion, through advisory actions, the provision of support for equipment (e.g. transport) and the mobilisation of innovative financing (e.g. carbon credit).

- Support, as part of participatory spatial planning plans, the installation of anti-erosion structures in plots and the conservation and planting of trees in fields or hedges, such as the Sahelian bocage, in order to prevent rainwater runoff and the risk of flooding while promoting their infiltration into the soil for the benefit of crops.

- Co-develop with producers, technicians and researchers and promote at scale certain agroecological practices that increase the amount of water absorbed by the soil (such as stone cords, zai, etc.) and contribute to reducing evaporation (such as mulching, permanent vegetation cover, etc.).

Development of irrigated systems compatible with agroecology.

- Develop suitable irrigation systems (e.g. micro-irrigation techniques, drip irrigation, etc.) for diversified agricultural systems (no monocultures) in order to reduce water needs and adapt to rainfall irregularities by carrying out multi-stakeholder action-research programmes supporting private irrigation actors.

- Test within the framework of innovation platforms and develop with competent advisory services for agroecology, production systems in irrigated areas that allow a diversity of crops (through crop rotation, associated crops), integrate animals (fish, livestock) and benefit from the presence of trees by limiting competition for water and providing nutrients.

Promotion of collective water management.

- Improve knowledge and management of water uses by carrying out studies, setting up monitoring and management tools, and sharing information between stakeholders.
- Promote consultation and governance including all actors on the equitable sharing of water according to its different uses, by promoting platforms for dialogue, regulatory bodies and legislative frameworks or charters defining how to share and use the resource.

Dissemination of more water-efficient crops and varieties.

- Support research to identify, test and promote, within the framework of laboratory and participatory research, crops adapted to drought by promoting varietal mixtures and a greater diversity of species to adapt to changing climatic conditions impacting the availability of water.
- Promote local seeds adapted to local soils and climatic conditions by relying on SMEs and farmers' organisations and by establishing regulatory frameworks that recognise farmers' rights over these seeds.

7.8. Articulating agroecology and territorial approaches

Balanced management of agricultural, pastoral and forest areas.

- Develop, through participatory approaches, spatial development plans that ensure a biodiversity-friendly landscape mosaic with agricultural and non-agricultural areas that respect protected areas, wetlands, hedges, etc.
- Strengthen local governance bodies by taking into account the different types of space and actors to negotiate access to and use of resources (water, forest, pasture, land, etc.) and by combining economic activities and sustainable management of natural resources.
- Develop local policies for agroecological agriculture promoting a diversity of production and value chains and willing to foster a circular economy by supporting local authorities (capacity development, access to finance, etc.).

Economic development of territories as part of an agroecological approach.

- Support a diversity of value chains allowing a variety of agroecology-friendly productions to find market outlets at remunerative prices thanks to the establishment of multi-stakeholder platforms per sector and/or the involvement of downstream companies wishing to secure their supply by providing services to producers.
- Structure a network of SMEs based on the principles of circular economy and promoting a region's agroecological products, with a particular focus on product processing and bio-input production.

Introduction of environmental measures for agroecological territories.

- Contribute to a support fund for initiatives by local stakeholders aimed at promoting agroecology in the context of actions supported by local actors and the state.
- Define with local authorities and stakeholders agri-environmental measures for agroecological agriculture and experiment with innovative financing mechanisms (payment for ecosystem services, carbon credit, labelling for market recognition, etc.).

Conduct of training programmes for young people to promote their integration into the territories.

- Provide training to young people for jobs in the agricultural sector (provision of services, processing of agricultural products, etc.), through professional establishments and peer-to-peer exchanges while enhancing local knowledge and promoting agroecological approaches.
- Set up incubators for young entrepreneurs developing activities related to agroecology (organic inputs, marketing of agroecology products, support services for farmers and their organisations, agrotourism, etc.).

CHAPTER 8

Examples of contextualised interventions

Ten projects funded by the European Union were analysed in terms of their degree of integration of the 13 principles of agroecology as defined by the HLPE on Food Security and Nutrition of the Committee on World Food Security (CFS) using the Agroecology Assessment Framework developed under the aegis of the Agroecology Coalition (see section 9.4.1.1 below).

While few of these projects explicitly referred to agroecology, all implemented actions in line with one or more of its principles. Through this analysis, the EU aimed to illustrate the diversity of contexts in which these principles operate, their relevance and the way they may be implemented.

The analysis also helps to understand how such projects can contribute to an agroecological transition sometimes even without openly claiming such an objective. By doing so, it may serve as an inspiration to build an intervention more explicitly geared towards an agroecological transformation of agricultural and food systems and better addressing principles that are not sufficiently addressed so far.

Below is the list of projects and the links to the ten analysis sheets.

- Strengthening dialogue networks on land inequalities in Ecuador (EQUITERRA)
- Strengthening the capacities of fish farmers in the Republic of Congo – Phase 2 (RECAFIP-2)
- Concerted local initiative for the sustainable development of oases in Mauritania (PICODEV)
- Pacific Territories Regional Project for the Sustainable Management of Ecosystems (PROTEGE)
- Agroecological transitions towards healthier food systems in Southeast Asia (ASSET)
- Promoting agroecology and eco-restoration in the divisions of the South-Central River and North banks of The Gambia
- Ecological intensification of agriculture through participatory landscape management in Laos (EFICAS)
- Cooperation between the Dominican Republic and Haiti: Environment, CC and risk reduction
- Peri-urban agroecological market gardening in Côte d'Ivoire (MARIGO)
- Improving food security and agricultural incomes in Madagascar (ASARA-HOBA)

CHAPTER 9

Evaluation methodologies

This section aims to explore the reasons why it is necessary to evaluate agroecology, what should be measured, and for what use, and the main metric tools at our disposal[124].

9.1. Why evaluate agroecology?

The performance study of agroecology remains limited. There is a need for a more systematic analysis of the results achieved in order to massively document its positive impacts on, inter alia, household income, decent job creation, biodiversity and the environment, soil and human health, food security and nutrition or social justice. In addition, existing studies remain fragmented due to the heterogeneity of the methods used and the data collected, at different scales and over different durations.

The evaluation of agroecology is necessary to guide financing. While agroecology is the subject of growing interest from policymakers, multilateral organisations or donors, investments in favour of an agroecological transition remain marginal. For comparison, according to a recent FAO study, the annual amount of agricultural subsidies worldwide amounts to USD 635 billion, while funding for regenerative and agroecological approaches does not exceed USD 44 billion each year. Assessing the performance of agroecology is also important to evaluate and pilot agroecology programmes. It is also essential for agroecology actors in order to make their practices known and to make them evolve continuously.

Efforts have been made for several years to develop new metrics and methods for measuring the performance of agroecology to produce evidence and to create solid benchmarks, useful for the farmers themselves as well as for policymakers and programme managers. These evaluation methods can also make it possible to break down the complexity of agroecology into more concrete and tangible indicators, and therefore more easily and strategically usable for advocacy purposes, political dialogue on the challenges of the agroecological transition or to evaluate and pilot development programmes.

124 Geck, M. et al. (2023).

9.2. What to measure?

Evaluations can focus on measuring agroecology in different aspects. They can be used to measure the degree of integration of agroecology or the performance of agroecology. These assessments can be developed at the level of plots, farms, interventions (programmes or portfolios) or public policies.

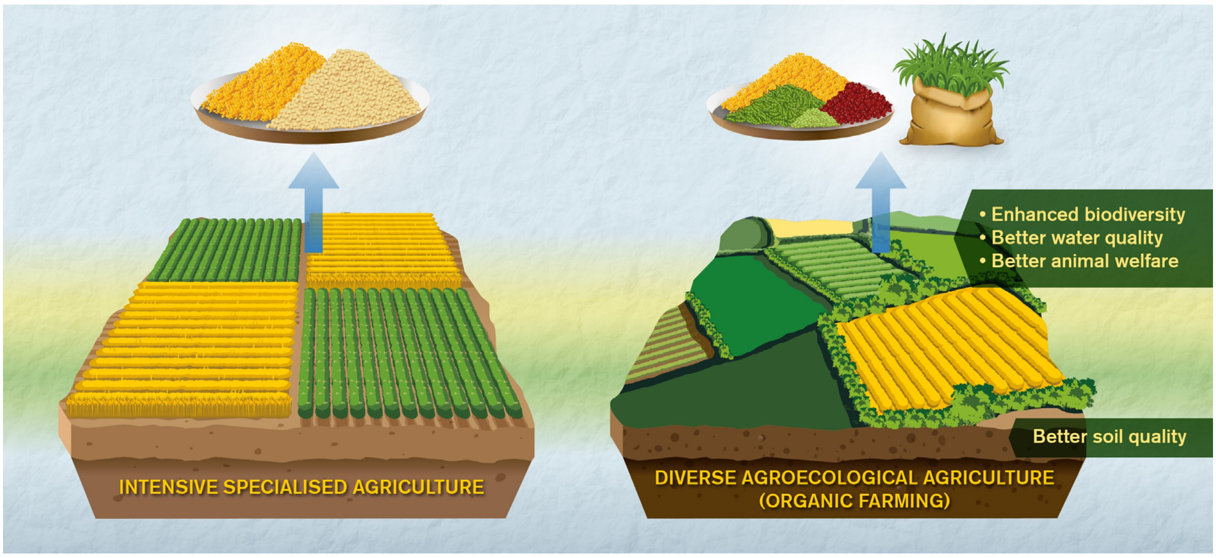
9.2.1. Measuring the degree of agroecological integration and measuring performance

The analysis of the degree of integration of agroecology of an intervention or a situation is carried out by assessing the degree of consideration of each of the 13 principles of agroecology or of the 10 elements of agroecology adopted by the FAO. The aim is to evaluate quantitatively or qualitatively, on the basis of a set of indicators, how each principle has been taken into account. This results in a multi-criteria analysis which highlights strengths and weaknesses, as well as possible improvements. This evaluation shows that each situation or intervention is specific, far from a binary vision seeking to characterise a situation or intervention as agroecological or non-agroecological.

It is also important to measure the performance of agroecology by producing evidence. To this end, and in order to do justice to the agroecological agenda, it is essential to be able to take into account and measure the paradigm shift that it represents. It would not only be inaccurate but also discriminatory to evaluate the performance of agroecology under the sole prism through which conventional farming systems are measured, by reasoning for example only in terms of yield per hectare or income per farm. **The assessment of performance must take into account the different dimensions of sustainability (economic, social, environmental).** It is important to consider the negative externalities of production models in terms of environmental degradation or pollution as well as positive externalities such as biodiversity protection, soil restoration through improved carbon sequestration, water quality improvement, more diversified and healthier diets, etc. Finally, it is important to assess the performance of agroecological systems by integrating social dimensions such as gender, power asymmetry within value chains, etc.

These performance results should be measured through the use of appropriate metrics and methods so that the benefits of the agroecological transition can be documented. Such an assessment may be based on surveys, experiments, or models.

FIGURE 9: METHODS OF EVALUATIONS IN THE FACE OF THE COMPLEXITY OF AGRICULTURAL AND FOOD MODELS



Source: INRAE (2020)

9.2.2. The different levels of agroecology evaluation

Evaluation can intervene at different levels (programme, agricultural farm, public policy)

At the level of a specific project or portfolio of projects or programmes

An EU Delegation or any other organisation may wish to determine the degree of adequacy with the agroecological approach of one or more of its interventions and their potential to contribute to an agroecological transformation of agricultural and food systems. This evaluation may allow the Delegation to assess the level of achievement of specific objectives in the event that it is committed to supporting an agroecological agenda, to determine the amount of its investments in agroecology at a given time or in a particular country, to understand the evolution of its agroecological investments over time, or to compare the scale of its commitment with that of other actors.

For example, in 2021, the International Fund for Agricultural Development (IFAD) wanted to carry out a systematic review[125] of its action in support of the agroecological transition by identifying projects fully or partially implementing an agroecological approach, listing the different agroecological activities and practices highlighted and identifying gaps and opportunities for scaling up. The exercise notably revealed that 60% of the projects under consideration did include some agroecological activities and that 13% fully supported agroecology. A clear positive correlation was also highlighted between the promotion of agroecology and the integration of priority cross-cutting issues concerning nutrition, climate change and youth. It also appeared that activities facilitating the marketing of agroecological products and their introduction into markets were the subject of more limited support and that support for the improvement of policies, services and instruments with a view to replicating agroecology on a larger scale for a transition to sustainable food systems was even more limited.

125 IFAD (2021).

At the level of a farm, household or enterprise

A similar approach can be taken as part of a holistic assessment of the farm or a group of farms to identify activities and behaviours in favour of an agroecological transition as well as possible improvements depending on the specific context and objectives of the farm. Thus, beyond the evaluation itself, and in relation to the principles of agroecology, the evaluation provides a framework for collecting useful data to improve the economic, social and environmental performance of agricultural operations. Agroecology is thus positioned both as a diagnostic tool and as an objective to achieve. The same applies to private companies for which we may wish to determine whether the business model, operations or strategy are aligned with the principles of agroecology and where possible progress can be made. Given the strong focus on the territory or food system, an evaluation of the degree of integration of agroecology at these scales would be of immense value. Operational methods for development actors are developed, in particular by aggregating results at farm level to obtain analyses from a value chain or territory.

At the level of a national or regional policy

It may also be necessary for a government, and a donor wishing to accompany it, to assess the extent to which existing public policies are able to bring about the paradigm shift, which is at the heart of the agroecological agenda, to evaluate their degree of convergence and the modifications required for greater coherence between sectoral policies and the instruments mobilised (subsidies, investments, support for research, etc.). This concern was already part of the recommendations issued by the Committee on World Food Security (CFS) in 2019.

RECOMMENDATION 1:

Ensuring the policy foundations for agroecological and other innovative approaches to contributing to sustainable agriculture and food systems that enhance food security and nutrition: (a) comprehensive assessments of the sustainability of their agriculture and food systems, as the first step to developing context-appropriate transition pathways; (b) in cases where comprehensive assessments show that sustainability can be improved, develop context-appropriate plans to move towards sustainable agriculture and food systems through inclusive and participatory processes based on the results of such assessments.

9.3. Summary table of evaluation tools

	SUBJECT	NAME	AUTHOR	OBJECTIVES	PROJECT CYCLE PHASE
CHARACTERISATION	**Individual projects or project portfolios**	AE Assessment Framework	Agroecology Coalition	- Assess the integration of AE principles into individual projects or project portfolios. - Monitor the investment flow for an AE transition. - Assist in the design of AE programmes or projects and/or calls for proposals.	- Design and evaluation of projects, programmes or calls for proposals
	Farm/ agri-enterprise **Project/ Portfolio/ National**	Economic and financial + Analytical tool (EFA+)	IFAD	- Assess holistically the viability, yields, externalities and co-benefits of AE investments at micro (farm and agri-enterprise) and aggregated (project, portfolio and national) levels.	- Design, implementation, monitoring and adaptive management of AE projects and programmes
	Private company/ enterprise	Business Agroecology Criteria Tool (B-ACT)	Biovision	- Identify an enterprise's alignment with AE, its potential for food system transformation and where possible improvements lie.	- Decision-making on investment, project design and identification of firms to be financed
	Projects/ programmes/ public policies	Agroecology Criteria Tool (ACT)	Biovision	- Evaluate a project, initiative, or policy through the prism of AE.	- Design of a project/policy with integration of AE transformation elements - Analysis of an existing project/ policy to identify its AE character
	Enterprise	Agroecology Check for Enterprises (ACE)	Biovision	- Obtain an initial indication of the agroecological dimension of a given undertaking.	- Analysis of the AE dimension of a given enterprise
	Policy areas	CFS policy recommendations Tracking tool	TPP	- Assess the degree of commitment of national and sub-national governments to the CFS five policy recommendations and monitor their implementation.	Evaluation and monitoring policy and institutional change for agroecological transformation of food systems
PERFORMANCE	**Farms**	Farm Level Agroecology Criteria Tool (F-ACT)	Biovision	- Enable farmers to identify how to make their farms more efficient, resilient, fair and agroecological.	- Analysis of the performance of a farm
	Farms	Tool for Agroecology Performance Evaluation (TAPE)	FAO	- Provide a diagnosis of the performance of agroecological systems according to 5 key dimensions for achieving the SDGs.	- Evaluation and monitoring of projects
	Projects/ programmes/ public policies **Farms**	Guide for Agroecology Evaluation	GTAE	- Help development actors to better design their interventions. - Create references on agri-environmental, economic and social performance of AE. - Assist farmers in analysing and evaluating the results of their practices.	- Project and public policies design - Evaluation of agri-environmental, economic and social performance of AE practices and systems (may be carried out independently of an intervention) - Monitoring of developments in AE practices and systems

	ANALYTICAL BASIS	MAIN FEATURES
	13 HLPE principles aligned with the 10 FAO elements	- Simplicity of use. - Incorporates red flags for practices not compatible with AE values. - Provides guidance for the design of projects and calls for proposals.
	Financial and economic analyses	- Supports investment-related decisions taking account of AE impacts. - Adapts to different contexts. - Helps conduct a political dialogue based on economic benefits of AE transition. - Tool complicated to use. - Depends on data quality and availability for each application.
	Assesses an enterprise's alignment with the 13 principles of agroecology	- Available in a rapid form for an initial estimate and in a more elaborated one for an in-depth assessment. - Facilitates the inclusion of criteria generally neglected by investors when looking at the profiles of companies seeking financial services. - Changes can be made to the tool if necessary.
	10 FAO elements and 5 levels of food system transformation (Gliessman, 2016).	- Provides a structured and graphically intuitive way of identifying the objective and agroecological nature of a project, initiative, or policy.
	Enables users to conduct a preliminary assessment of an enterprise's alignment with the principles of agroecology	- Developed by Biovision as an alternative to B-ACT which is a very comprehensive and relatively time-consuming tool.
	Agroecological and other innovative approaches: Policy Recommendations	- Review and analysis of national or sub-national level policies, laws and institutions in agriculture and related sectors.
	13 HLPE principles	- Designed for participatory on-farm assessments - Intended to support and complement existing local knowledge - Is a reflective tool that supports and empowers farmers
	10 FAO elements	- Step-by-step process - Inclusion of context and production systems analysis - Participatory approach with producers (characterisation surveys + interpretative analysis) - Analyses the contribution to the SDGs
	- Analysis of agri-environmental performance - Analysis of socio-economic performance - Specific indicators defined during the AE analysis in agrarian systems	- Decision support for farmers and development actors - Based on diagnostic study of agrarian systems - Pays special attention to gender equality - Includes a typology of agricultural farms to be used as sampling (surveys) - May be carried out independently of any intervention but may also contribute to the evaluation of an intervention

9.4. A variety of tools for different evaluations

Many methods have been developed over the past five years to meet the needs described above. The following section describes the most important ones or most commonly applied according to their intended use.

9.4.1. Evaluations at project/programme level

In this section we present two methods to assess agroecology at project or programme level.

9.4.1.1. Agroecology Finance Assessment Framework

The Agroecology Assessment Framework measures the degree of integration of agroecology. This method was developed by a community of practice[126] under the aegis of the Coalition for Transforming Food Systems through Agroecology (Agroecology Coalition) building on the previous work of a number of organisations[127].

Objectives

Its objective is to evaluate individual projects or project portfolios in terms of their integration of agroecological principles, and to assess the investment dynamics in favour of an agroecological transition. This tool can also further assist in designing programmes and projects, preparing calls for proposals as well as in selecting and analysing proposals, while shedding light on the activities through which agroecology principles can be embodied.

Principles of use

This tool is based on the 13 consolidated principles of agroecology as defined by the HLPE. For each of them, the project is evaluated qualitatively on the basis of normative statements, indicators and examples. A score is assigned on a scale from 0 to 2. The highest score (2) is an expression of a strong alignment with the principle in question, whereas the lowest score (0) indicates its inadequacy. The criteria proposed to guide the evaluation are only examples of good practice to help assign the score. They can evolve depending on the context of the project, knowledge and/or experience.

It is understood that certain principles may not be relevant for specific projects. In the AE Assessment Manual for Users, the Agroecology Coalition gives the example of the animal health principle that will be excluded from the scope of the evaluation if the project does not take this dimension into account. However, four principles are exceptions and must always be included regardless of the content of the project. These are the co-creation of knowledge, social values and diets, equity and participation principles. They will be assigned a score of 0 if the project does not address them.

Finally, the methodological framework introduces 'red flags' for practices deemed incompatible with an agroecological approach. The first step, therefore, consists of verifying that the project under review does not cross any of them, in which case it is excluded from the process and the evaluation is closed (see section 2.3 above).

126 Moeller, N.I. et al. (2023).

127 These include Coventry University, CIDSE, Biovision, FAO, FIDA and Swiss Development Cooperation.

Application examples

Ten projects funded by the European Union were analysed using this method in order to illustrate the plurality of agroecological approaches according to the targeted contexts and challenges. Links to the details of these analyses are available in section 8.

Strengths and weaknesses

+ Strengths

- The tool, freely accessible online, is easy to use.
- It is useful to assess individual projects or entire portfolios.
- It includes warning signals for practices contrary to agroecological values and provides a guide for the design of projects and calls for proposals.

- Weaknesses

- No performance measurement of agroecology
- Difficulty to take into account the different levels of intervention of a project (local, sector, national, etc.)

For more information, contact: secretariat@agroecology-coalition.org

Access: https://agroecology-coalition.org/agroecology-finance-assessment-tool/

Other complementary tools

Agroecology Criteria Tool (ACT)

This tool aims to evaluate a project, an initiative, or a policy through the prism of agroecology. It is based on the FAO's ten elements of agroecology and on Gliessman's five levels of food system transformation. ACT provides a structured and graphically intuitive way of identifying the objective and agroecological nature of a project, initiative, or policy. It is useful in two ways: (1) for stakeholders designing a project/policy with the aim of integrating the main transformative elements of agroecology; and (2) for stakeholders analysing an existing project/policy with the aim of identifying its agroecological nature or 'agroecologicalness'.

For more information, contact: agroecology@biovision.ch

The IFAD Agroecology Framework

Inspired by the FAO's ten elements of agroecology, the IFAD Agroecology Framework defines interventions relevant for an agroecological transition through 33 groups of activities operating at four levels typical of IFAD co-financed projects, namely: (i) agroecological practices at farm level; (ii) landscape wide natural resource governance, community learning and the uptake of nature-based solutions to maintain and improve ecosystem services and to ensure equitable access to resources for vulnerable groups; (iii) market-level support for added value and innovations aimed at connecting small producers and consumers around common values related to sustainable and healthy diets; and (iv) instruments and services at policy level fostering agroecology and sustainable food systems. This tool was developed and used in 2021 as part of the Stock-take report on agroecology in IFAD operations: An integrated approach to sustainable food systems to determine the place of agroecology within the IFAD portfolio.

9.4.1.2. Economic and Financial Analysis Tool+ (EFA+)

EFA+ is a flexible and tailored approach to assess holistically the viability, returns, externalities and co-benefits of agroecological investments at micro (farm/agri-enterprise) and aggregate (project/portfolio/national) level. It was developed by the International Fund for Agricultural Development (IFAD) with EU financial support to address certain limitations inherent in standard economic and financial analyses when applied to agroecological projects or investments. These limits are as follows:

- The financial models used to estimate ex ante the structure of costs and benefits at farm level are normally constructed by aggregating monoculture models based on values per hectare. This approach does not take into account the potential benefits generated by the interactions between components of an agricultural system and the synergies that take place in diversified agroecological systems.

- Standard sensitivity analyses are based on simple assumptions. However, in order to assess the potential benefits of agroecological transitions, these analyses must take into account the potential for improving ecological and socio-economic resilience linked to the development of agroecology. This involves modelling how agricultural systems in transition can respond to risks, shocks and stressors to which they are likely to be exposed (extreme weather events, adverse climatic trends, price and market disruptions, etc.), compared to the status quo or other relevant alternative scenarios (e.g. conventional monoculture systems).

- Usual analyses rarely quantify the different ecosystem services (pollination, water regulation and supply, reduction in soil erosion rates, biological pest and disease control, GHG reduction) and positive externalities (improved food and nutrition security, reduced health costs through decreased exposure to harmful chemicals, increased social capital and knowledge flows) generated by agroecological interventions at farm, landscape, market or country levels. This results in an underestimation of the social and environmental benefits associated with the agroecological transition compared to alternatives.

Objectives

The objective of EFA+ is to measure the economic and financial performance of agroecology holistically and dynamically at project or programme level. The aim is to provide evidence-based guidance for the design, implementation, monitoring and adaptive management of projects and programmes focusing on agroecology, thereby contributing to policies related to food systems.

Then, it is a matter of making all the benefits of agroecology, translated into monetized terms, visible to donors, policymakers, and national and international financial institutions, in order to influence the flow of investments for agroecology. Finally, it is also about contributing to global efforts aimed at overcoming the lack of data on the hidden costs and benefits of agroecological transitions.

Principles of use

The evaluation process begins at the design phase of a project. At the financial level, the EFA+ approach starts from the analysis of existing data to define a large number of farm typologies and possible agroecological transition pathways for different ecoregions, depending on the theory of change of each project.

After the initial agricultural models have been validated with stakeholders and experts, field data collection takes place on a sample of representative farms to feed into financial models of diversified farms in agroecological transition. By taking into account several production systems and activities (integration of livestock breeding, agroforestry, etc.), EFA+ produces, in addition to standard profitability indicators, estimates for other agroecologically relevant indicators such as labour productivity, income diversification, changing needs for external organic matter, needs and costs of technical assistance, etc.

Farm-scale analysis also makes it possible to identify and model the main services needed for the agroecological transition (e.g. bio-inputs, processing, mechanisation, advice, etc.), thus identifying gaps. Moreover, given that agroecology is a gradual transition process, the agricultural financial models of EFA+ seek to capture dynamically the evolution of the structure of costs and benefits during different stages of transition. Finally, the analysis at farm level can be complemented by a market and consumer survey to characterise the levels and drivers of the demand for agroecological products in rural and urban areas among households with different levels of income and with varying degrees of food insecurity. The survey also identifies the main obstacles to the development of agroecological markets.

The results of the financial models are presented and discussed with the project design team and key stakeholders to analyse and discuss the sustainability of AE transitions and the potential impacts on poverty for different types of agricultural systems and in different ecoregions. Sensitivity analysis is closely linked to risk analysis. It examines the potential effects of interventions aimed at improving resilience on farms and landscapes. In this way, EFA+ helps guide project design and investment decisions, and assists project teams in developing interventions in an appropriate chronology.

For **economic models,** the EFA+ process starts from the early identification of ecosystem services and other externalities potentially generated by the project. As the quantification or ex ante assessment of externalities is demanding, the initial list of externalities is mapped with relevant national frameworks (such as Nationally Determined Contributions (NDCs), National Biodiversity Strategies and Action Plans (NBSAPs), roadmaps towards sustainable national food systems, sectoral strategies and associated monitoring frameworks). The list of externalities is then reduced following consultations with project teams, government and other stakeholders depending on: (i) their relevance to the project's theory of change; (ii) the policy priorities and interests of the government; and (iii) their relevance for the project implementation strategy and political dialogue. Appropriate methodologies are then identified for each selected externality, taking into account the resources and capacities of implementing partners as well as the availability and quality of data.

In terms of process, the role of EFA+ does not stop at the design phase but is fully integrated into the life cycle of the project by creating strong synergies with the latter's monitoring and evaluation system, knowledge management frameworks and policy engagement strategies. Links are systematically established with other data collection tools used by the projects. In this way, EFA+ becomes an evolving tool that can be regularly updated throughout the project lifecycle to support adaptive management and data-driven evaluation.

Application examples

EFA+ is still in the experimental phase. A first EFA+ test was carried out for the design of the Frontera Agroecológica project in Bolivia. Other tests are linked to IFAD investment projects in Argentina, Senegal, Burkina Faso or Madagascar. A first methodological guide, based on the systematisation of the lessons learned and tools developed during the first pilot tests, was being prepared at the time of writing this Guide.

Strengths and weaknesses

+ Strengths

- The tool allows a holistic assessment of agroecology at farm and territorial level and of the transformation of agri-food systems more broadly, by taking into account positive and negative externalities.
- It is integrated into the project cycle and helps with investment decisions by taking into account the multiple effects of agroecology.
- The tool is intended to adapt to different contexts in order to obtain the most precise models possible.
- It is an important instrument for political dialogue as it evidences the economic benefits of the transition/transformation of agri-food systems.

- Weaknesses

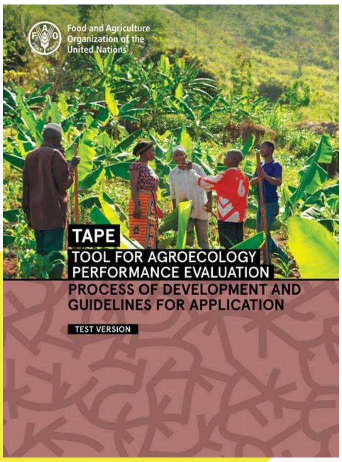
- The tool is complex to apply. Depends on the quality and availability of data for each application.
- Requires models and data for each application and the mobilisation of specific means to collect, process and analyse these data (research- and time-intensive).
- Requires specialised knowledge or training and possibly the participation of experts from FAO, FCI or IFAD.

For more information, contact: the Production, Markets and Sustainable Institutions (PMI) Division, IFAD, via Rikke Grand Olivera (r.olivera@ifad.org) or Ivan Cucco (i.cucco@ifad.org).

9.4.2. Evaluations at farm or enterprise level

In this section we present tools to conduct evaluations of agroecology at farm or enterprise level.

9.4.2.1. Tool for Agroecology Performance Evaluation (TAPE)



The TAPE tool makes it possible to assess both the degree of integration of agroecology and the performance at farm level. It was designed, under the aegis of the FAO, by 70 organisations, to respond to a need for greater harmonisation of data on agroecology.

Objectives

The TAPE tool aims to provide a diagnosis of agricultural performance according to five dimensions considered key to achieving the SDGs: (i) Environment & climate; (ii) Health & nutrition; (iii) Society & culture; (iv) Economy; (v) Governance. The aim is to be able to go beyond standard productivity measures (e.g. yield/ha) and to better reflect the advantages and disadvantages of different farming systems. TAPE can be used to:

- Acquire knowledge and empower producers through a collective process aimed at collecting data and evidence on their practices.
- Support agroecological transition processes at different scales and in different locations by providing a performance diagnosis over time and by identifying the strengths and weaknesses as well as favourable and unfavourable elements of the environment.
- Enlighten policymakers and development organisations in their assessment of the multidimensional impacts of agroecological systems and their capacity to contribute to the SDGs.

Principles of use[128]

The TAPE tool is applicable to any type of production system and agricultural sub-sector: plant and animal production, fish farming, fisheries, forestry. It adopts a stepwise approach (see Figure 10) structured around three diagnostic steps (steps 0, 1 and 2) and a final analysis step and participatory interpretation of the results (step 3).

The preliminary step (**Step 0**) consists of a **description of the context and production systems** based on relevant contextual information (primary and secondary information) at different scales. These include, for example, the socio-economic and demographic characteristics of agricultural and food systems (production systems, household types, agroecological zones, etc.) or of the environment in terms of existing policies (including on climate change), market, socio-cultural and historical factors, etc. A typology of farms is also carried out through the main determining factors such as the agroecological area, size, main orientation and the presence of livestock or irrigation, in order to facilitate representative sampling work.

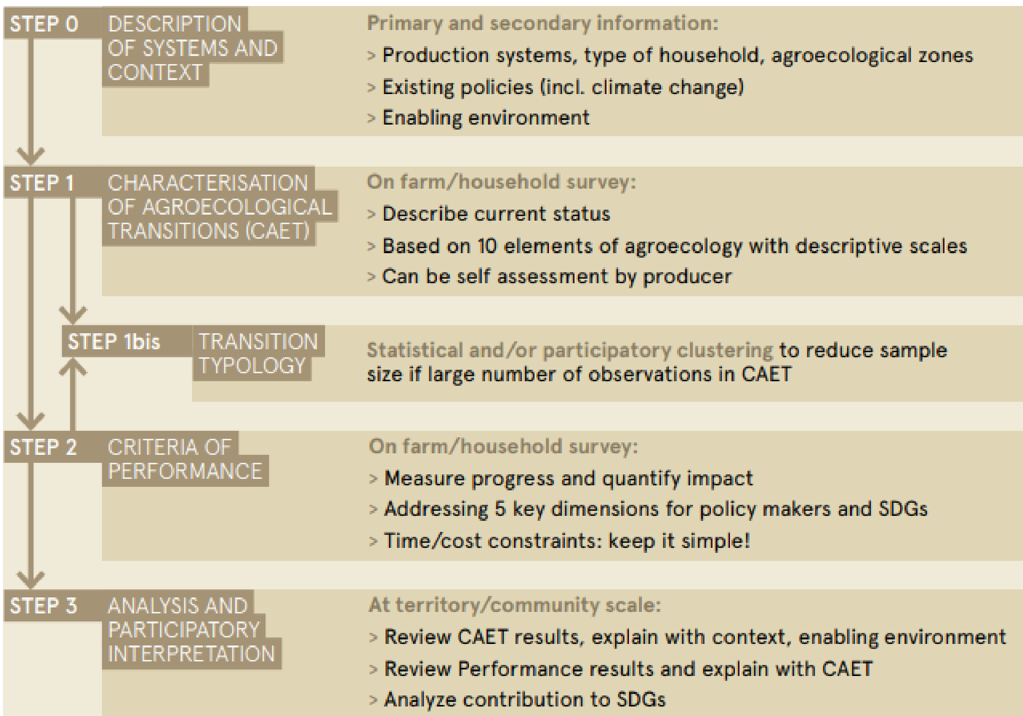
128 FAO (2021).

The next step **of characterisation of the agroecological transition (CAET, step 1)** consists of describing the degree of agroecological transition of the agricultural systems assessed (farm, pastoral breeding, household, community) based on the ten elements of agroecology as defined by the FAO. Each element is described by 3 or 4 indices, with a total number of 36 indices for the entire CAET. A score is assigned for each of them on a scale from 0 to 4. For example, the element relating to 'diversity' is associated with the following four indices: crop diversity; animal diversity; tree diversity; diversity of economic activities. This diagnosis can be carried out in the form of a self-assessment of producers or with the assistance of other intermediaries.

The **multidimensional performance** of the system is then evaluated to measure the progress made and to quantify the impact of the agroecological transition based on a shortlist of **ten performance criteria** (**Step 2**). The data are collected from a survey at farm or household level to inform the criteria that are identified for each of the five dimensions essential to achieving the ODDs. For example, the criterion of 'securing land tenure' makes it possible to measure the 'governance' dimension. Other criteria informing the five dimensions include productivity, income, added value, exposure to pesticides, dietary diversity, women's empowerment, youth employment, biodiversity and soil health. These criteria were chosen to ensure that the data collected were factual, harmonised and consolidated and that the use of the tool was relatively simple. However, other criteria or indicators can be added to shed light on specific sustainability interests.

Steps 0, 1 and 2 can be carried out simultaneously from an online survey form. The agricultural holding or household is the smallest unit of measurement in a particular territory or perimeter. Many units located on the same territory but representing different agroecological production systems must be sampled in such a way as to create representative groups on the relative performance of these systems. If these units are homogeneous and meet other statistical robustness parameters, they can be aggregated to provide a 'snapshot' of the performance of agroecological systems at territorial level.

FIGURE 10: THE GLOBAL ANALYTICAL FRAMEWORK OF AGROECOLOGY STEP BY STEP



Finally, **an analysis of the results of the previous steps and a participatory interpretation of this analysis** are carried out (**step 3**). The results of the CAET and the identification of the strengths and weaknesses of the assessed systems can be examined against the favourable or unfavourable socio-economic environment and the profile or context defined in step 0. Likewise, the performances assessed in step 2 are analysed in the light of the results of the CAET: The links between the strong (or weak) elements of agroecology can be associated with good (or poor) performance. The analysis of the data generated within a systemic and multidimensional framework will be used to identify the way forward with the community and other relevant actors.

Application examples

In 2020, TAPE was used on 233 farms in five districts of the Kayes region, the westernmost part of Mali, in order to assess the status of their agroecological transition and identify its correlations with their economic, social and environmental performance. A study under the auspices of the FAO documented the results showing that the farming systems in the Kayes region were at very different levels of agroecological transition and that the most advanced agroecological farms performed better in the different dimensions of sustainability.

In particular, the study revealed that they:

- Produce more and create more wealth from agropastoral activities using fewer external and industrial inputs;
- Use fewer pesticides, have healthier soils, higher agricultural biodiversity and a greater presence of natural vegetation and pollinators;
- Have more autonomy, young people less likely to emigrate and more family members directly employed on the farm.

There is also a strict correlation between the agroecological transition and the existence of local and territorial markets in Kayes.

Strengths and weaknesses

+ Strengths

- A data collection tool using free software that works online and offline is available, adaptable to different contexts and easily translatable into different languages (23 languages currently available).
- A reasonable duration of investigation (approximately 3 hrs.) in view of all the information gathered on both the assessment of the agroecological transition level and the impacts.
- A wide scope of application, a tool easily used by grassroots organisations for work on agroecology, support for advocacy and policy development and evaluation at different scales (from farm to community/territory levels with a national component planned).
- The data collected through TAPE have common features with various SDG indicators, including 2.4.1 (sustainable agriculture), and feed into a global, harmonised FAO database that will serve as an international benchmark to highlight the benefits of agroecology.

Weaknesses

- The contextualisation component should be further explored in greater depth to facilitate the interpretation of the results, understand the conditions for the development of agroecology and allow for representative sampling of the farms surveyed.

- The connection between the information gathered in the various stages of TAPE, in particular contextualisation, characterisation of the environment and the results of farm surveys, is not automatic. Even if the tool is intuitive and support is provided by FAO, online training on the tool would be necessary to facilitate access to the tool as well as data collection and analysis.

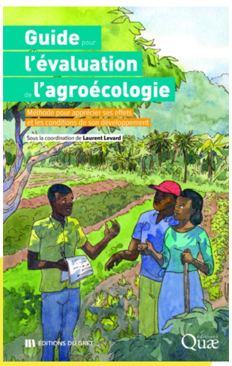
According to the FAO, the tool is evolving in 2024 with the planned implementation of a more educational, open access interface and services to empower users, such as e-learning training, a Community of Practice, automated data analysis, new indicators to facilitate analyses at different scales, particularly at national level, and the integration of new technologies with satellite information.

For more information, go to: https://www.fao.org/agroecology/contact-tape/fr/

Access: https://www.fao.org/agroecology/tools-tape/fr/

Other complementary tools

Guide for the evaluation of agroecology



This guide, developed under the guidance of the Working Group on AgroEcological Transitions (GTAE) and currently available only in French, has three objectives: (i) Help development actors to better design their interventions (projects, programmes, public policies); (ii) Create references on the agro-environmental, economic and social performances of agroecology; and (iii) Support farmers to better analyse and evaluate the results of their practices. It is structured around evaluation sheets. It can be used at different scales (from the plot or breeding unit to the agricultural holding as a whole, up to the territory), for one-off evaluations or in a monitoring-evaluation process. Complementary to TAPE (see above), it proposes an analysis of the conditions for the development of agroecology in a given territory. It devotes significant attention to the impact of the agroecological transition on gender equality and women's empowerment.

Farm Level Agroecology Criteria Tool (F-ACT)

F-ACT is a digital decision-making tool that allows farmers to identify how to make their farms more efficient, resilient, fair and agroecological. It was designed to help carry out on-farm **participatory** assessments with the support of external facilitators (extension providers, NGOs, etc.) or **led by farmers** when literacy levels and access to technology allow it. In both cases, F-ACT aims to support and complement existing local knowledge and not to replace it. It is intended to be a reflection tool that supports and empowers farmers without imposing specific practices and/or decisions on them.

For more information, contact: agroecology@biovision.ch

9.4.2.2. Business Agroecology Criteria Tool (B-ACT)

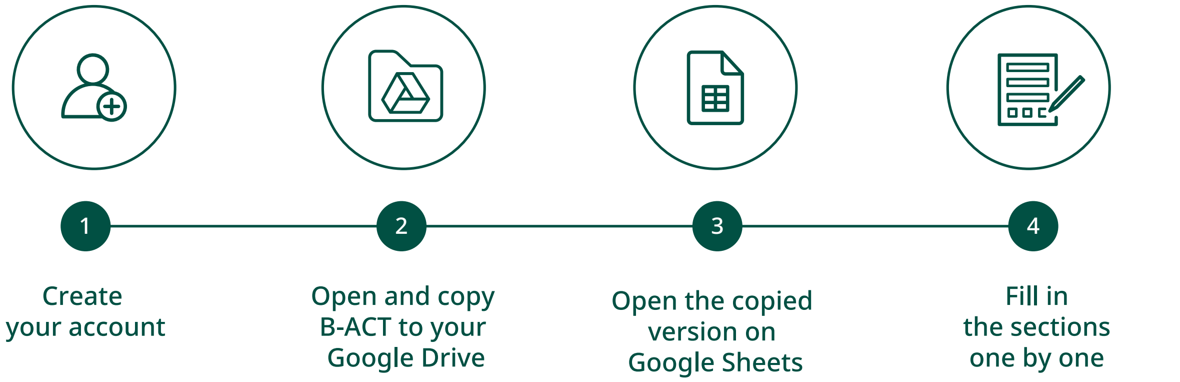
B-ACT, developed under the auspices of Biovision, arises from a double observation. First, agroecological businesses (farms, food processing companies, producers of organic agricultural inputs, etc.) are the backbone of sustainable food systems. Second, these companies are often underfunded because they are not attractive to financial institutions or donors who favour conventional models based on success criteria such as increased productivity and profit.

Objectives

B-ACT provides a holistic assessment of the company that helps identify the extent to which a company is aligned with agroecology, what its potential is to systematically transform food systems and where possible improvements lie. The tool is also useful for investors and donors as it facilitates their investment decision-making, project design and identification of companies to be financed. Finally, it provides stakeholders (civil society and policymakers) interested in the transformation of food systems with an important resource to learn more about business models and the activities of enterprises promoting agroecology.

Principles of use

The B-ACT tool can be used without any prior knowledge of agroecology. Companies can use the tool alone and answer questions or the tool can be administered by third parties (investors, donors, NGOs or other users) who obtain the relevant information from enterprises. Depending on the purpose of the assessment, evidence backing the responses may be requested.



See B-ACT Mode of use

The tool is structured around four types of questions:

The **'About the enterprise'** tab involves entering general information about the enterprise, such as its size, vision, mission, goods and/or services it offers, as well as the type and scale of its activities. This information will then appear in the financial scorecard.

The **'Principles Questions**' must be fully filled for the B-ACT to produce conclusive results. There are 77 questions that assess the enterprise's operations and activities against each of the HLPE's 13 agroecology principles. The tool gauges the direct and indirect impacts of a business on the food system. Each question has three possible answers: Yes, No or NA (not applicable).

The purpose of the '**Screening Questions**' tab is to quickly identify whether the company crosses 'red lines', i.e. whether that its activities are in some way in contradiction with one or more of the principles of agroecology.

The '**Impact Questions**' collect information on the environmental, economic and social impacts of the core business activities and identify the enterprise's potential for systemic impact and scalability. The results of the impact questions present quantifiable impacts (such as carbon sequestration, water use, job creation, etc.) that some investors want to know. It is not necessary to fill in this section to generate a complete Entrepreneur Scorecard, as obtaining the necessary data may be a challenge.

Once the tool has been completed, the results can be viewed in the 'Entrepreneur Scoreboard' and 'Financier Scoreboard' tabs. These results include:

- **an agroecology score**, calculated on the basis of the percentages of 'Yes' and 'No' to the questions of principles.
- a **tree diagram** illustrating the proportion of the total score that each principle represents.
- a **breakdown** indicating the scores (in%) for the 3 pillars of sustainable food systems and the sub-scores for each agroecological principle.
- a **rating of the enterprise's degree of alignment** with each of the Sustainable Development Goals.
- **general suggestions for agroecological improvement** in relation to the three agroecological principles for which the company obtained the lowest score.
- a **measure of the enterprise's potential** to have a **systemic impact**, placing the company on a colour scale ranging from dark red (high negative impact) to dark green (high positive impact).
- a **measure of the enterprise's potential** to increase its positive impact (on a scale from white (no potential **for impact expansion**) to green (high potential).

Application examples

B-ACT is used as part of the Neycha Agri-Ecology Accelerator in Uganda and Kenya to support the selection of growth-oriented agroecological enterprises identified by the programme and to which it provides the capacities, capital and connections they need to develop their impact and activities.

B-ACT is also used by IFAD to identify companies and select business plans for financial support as part of its competitive processes for awarding matching grants. This is the case for example in the context of the Global Programme for Small-Scale Agroecology Producers and Sustainable Food Systems Transformation (GP-SAEP).

Strengths and weaknesses

+ Strengths

- Available in two forms: quick for an initial estimate and elaborate for an in-depth assessment.
- Facilitates the inclusion of criteria generally overlooked by investors and other financial institutions when reviewing the profiles of companies looking for financial services.
- Users can make changes to the tool so that it best fits their purpose, for example by changing the wording of questions.

- Weaknesses

- Questions of principles assess a company's intention and not its actual impact.
- Although a company can score 100% on the principle of governance and land resources, the results will not explain what this means specifically on the ground. Users can follow up with companies to verify the reported information, if any.
- The methodology has not yet been peer reviewed.

For more information, contact: agroecology@biovision.ch

Access: https://docs.google.com/spreadsheets/d/1bVLQ2_ovCcK0QVaLMsHupH1hj0O-tr2Fa3A3XCe8usQ/edit#gid=1128960185

Other complementary tools

Agroecological Check for Enterprises (ACE):

Developed by Biovision as an alternative to B-ACT, a very comprehensive and relatively time-consuming tool, the Agroecological Check allows more superficial assessments to be carried out, reviewing a larger number of enterprises but nevertheless useful for having an initial indication of the agroecological dimension of a given enterprise.

For more information, contact: agroecology@biovision.ch

9.4.3. Evaluations at policy level

In this section we present a single tool developed to monitor agroecological policies.

Tool for monitoring the implementation of the policy recommendations of the Committee on World Food Security (CFS)

The 2019 HLPE report on agroecology was followed by policy recommendations on agroecology endorsed by the CFS[129] in 2021 with the aim of providing its members and stakeholders with guidance to strengthen agroecology and other innovative approaches for sustainable agriculture and food systems. The Transformative Partnership Platform on Agroecology (TPP), in collaboration with the Research and Innovation Working Group of the Agroecology Coalition and other stakeholders, has developed and is currently testing a tracking tool.

Objectives

The aim of this tool is to assess the degree of commitment of governments, national and subnational, to the five policy recommendations of the CFS and to monitor how they implement them.

Principles of use

The 62 specific recommendations detailed in the five 2021 CFS recommendations have been reviewed to define the main areas of intervention (priority action) that best capture the essence of each recommendation in line with the 13 agroecological principles of the HLPE (2019). This resulted in 23 priority action areas related to the five strategic recommendations with associated targets, indicators and responsibilities to facilitate an inclusive and goal-oriented scientific and policy dialogue.

This monitoring tool is a 'baseline assessment' of existing policies, strategies or laws and, therefore, a basis for fostering dialogue and consensus building to support priority actions and, more importantly, to monitor the progress of political and institutional changes towards an agroecological transformation of food systems. The status of the country or relevant policies are assessed to identify the provisions creating perverse incentives for the agroecological transition, those which on the contrary go beyond the policy recommendations of the CFS, and to assess civil society's views on how current provisions of policies, laws or strategies align with global and national commitments such as the rights of farmers, women and indigenous peoples.

Application examples

The tool was tested in Kenya, Uganda and Tanzania, where a set of texts was reviewed including sectoral strategies, action plans, policies, existing laws in the environmental, land, agriculture, health, livestock, finance and trade sectors as well as the Constitution.

This tool is currently under development and will be continuously refined on the basis of experiences and feedback received from a variety of stakeholders.

129 CFS (2021).

Strengths and weaknesses

+ Strengths

- Provides the basis for an effective policy dialogue including on the necessary institutional reforms at national and/or sub-national level, recognising the efforts and progress made to accompany a transformation of agricultural and food systems (in different sectors) and taking into account the national/local context.
- Provides a practical framework through which civil society, government, practitioners and researchers can assess when and where (critical moments or windows of opportunity) advocacy and investments in political integration and reforms are most feasible, taking into account political, economic and institutional contexts.

- Weaknesses

- This tracking tool is potentially resource intensive and requires sustained investments in institutional innovation for effective coordination across multiple government departments and multiple stakeholders in the national food system.
- Effective monitoring, verification and reporting on indicators and progress on policy and institutional change requires trust, which is so often lacking, among key stakeholders, especially among civil society organisations, business and the government.

For more information, contact: Alex O. Awiti, a.awiti@cifor-icraf.org

Access: https://glfx.globallandscapesforum.org/topics/21467/media_center/folder/cb40d0c0-1242-485c-87ed-afdaef8ad9ac

CHAPTER 10

Develop a logical framework compatible with agroecology

In this section, we will briefly recall some elements of the construction of a logical framework and we will focus on the indicators, a certain number of which have been cited in the previous sections of this guide.

10.1. The logical framework

The logical framework is an essential tool in project management. It makes it possible to synthesize all the contributions for the construction of a project on agroecology. It presents the intervention logic in a concise manner, coherently articulating the activities, intervention products, expected results and impacts.

- The impact (general objective) is the long-term result of the intervention in the social, economic and environmental context of the country and involving interventions from other stakeholders. The impacts fall within the sphere of indirect influence of the intervention (contribution).

- The outcomes (specific objectives) are the medium-term results of the intervention that materialize in the form of a change in the behaviour of individuals and/or organisations. Other external factors and actors may also influence this change in behaviour. The results are within the sphere of direct influence of the intervention (contribution).

- The outputs (products) are the direct results of the activities carried out with the resources allocated to the intervention. The results fall within the sphere of control of the project intervention.

There is no specific logical framework for agroecology as projects can take different forms depending on the issues being addressed (climate change, biodiversity loss, etc.) and the objectives sought. However, there are specificities that are important to highlight. These specificities may also apply to other participatory rural development interventions.

- Agroecology in its principles emphasises participation and co-construction. It is therefore important that stakeholders be able to participate in the definition of impacts, outcomes, and outputs. There are a multitude of tools that can be used to conduct participatory approaches. For example, the 'problem and solution tree' is a very effective tool for structuring exchanges between actors and contributing to the construction of a logical framework.

- In an approach of co-construction of knowledge and innovations for agroecology, it is important to build a logical framework that allows sufficient flexibility in the implementation of activities but also in the definition of outcomes to facilitate adaptations over time. It is critical to plan for a revision phase, as it is sometimes difficult to have in-depth exchanges with stakeholders before drafting an action document.

- Two objectives can be pursued with the establishment of a logical framework: An objective of **accountability** via reporting the performance of a project to public authorities and donors and an objective of **learning** from and steering the intervention. A project in agroecology will place particular emphasis on the second objective to comply with the principles of participation and governance. While the two objectives are a priori compatible, the wording of the outputs and outcomes as well as the choice of indicators can point to tensions between the two objectives.

- An agroecological project supports a long-term process of transforming food systems. We must therefore bear in mind what we call the 'project exit strategy' by considering the sustainability of certain activities from the start of the project.

10.2. Logical framework indicators

Indicators play a key role in the evaluation and management of agroecology projects. They provide tangible benchmarks to measure progress in the production of outputs and outcomes, to guide strategic decisions and assess impact. Understanding the nature of indicators and mastering measurement methods are crucial elements for the success and sustainability of agroecological initiatives.

10.2.1. How to identify indicators

There are indicators for impacts, outcomes, and outputs. As with all projects, and in general, indicators must be specific, measurable, achievable, relevant and time-bound (SMART).

- **Specific:** Indicators should be specific and clearly defined, with a clear meaning and scope, ideally one idea per objective.

- **Measurable:** Indicators should be quantifiable and measurable so that progress towards the goal can be tracked over time.

- **Achievable:** Indicators should be achievable and realistic, meaning that they can be realistically measured by project stakeholders given the available resources and data.

- **Relevant:** Indicators should be relevant to the goals and objectives of the programme or project with the human, technical and financial resources available.

- **Time-bound:** Indicators should be time-bound, with a clear timeframe for measurement.

Indicators may be of a different nature: Quantitative or qualitative, providing information on results (e.g. organic matter rate, surface regenerated by the project's action) or processes (e.g. evolution of pesticide consumption, implementation of an agroecological policy), specifying the intensity of the intervention (e.g. incremental or radical transformation of production systems, degree of performance of an organisation involved in agroecology) or its extent (e.g. number of producers or organisations involved in agroecological actions). Certain indicators are difficult to track. They can be replaced by proxies (or proxy indicators) that replace relevant indicators but not easily observable or measurable.

However, there are some specificities for an intervention in agroecology:

- It is important to strike a balance between indicators focusing on economic, social and/or environmental dimensions, as well as according to the 13 principles of agroecology.
- There is a tension to manage between (i) indicators defined generically and useful to compare results with other interventions or to compare them with standards defined by the scientific community; and (ii) indicators defined with participants on the basis of what they think is useful and relevant in their situation or for their territory (principles of participation, co-construction, governance). Both types of indicators must be included in a balanced manner.

There are multiple sources to identify relevant indicators. It may be appropriate to integrate indicators developed by international organisations and/or chosen to monitor national, regional, or continental policies. We can cite a few examples without being exhaustive:

- To report on food insecurity, the FAO and other international networks use several indicators. Two examples are given:
  - The Prevalence of Undernourishment (PoU) measures the percentage of the population whose dietary energy intake is insufficient to meet their basic energy needs for a healthy and active life. It is often expressed as a percentage of the total population suffering from undernourishment.
  - The scale of acute food insecurity in the IPC (Integrated Food Security Phase Classification - Harmonised Framework) classifies acute food insecurity at household and area levels. Each phase of the IPC describes the ability of a household to meet its basic food and non-food needs.
- In the context of monitoring the policy of the Comprehensive African Agricultural Development Programme (CAADP), three indicators have been identified by the African Union for its Ecological Organic Agriculture Initiative (EOA-I):
  - Total arable land under organic fertilisers
  - Status of Farmer Managed Seed Systems integration into policy instruments
  - Share of agricultural land under EOA/Agroecology practices.

In a more operational way, it is useful to draw inspiration from indicators defined by other organisations involved in agroecology.

- The Agroecology Assessment Framework developed by the Agroecology Coalition provides examples of indicators to characterise the adequacy of interventions with agroecology for each principle identified in the 2019 HLPE report (The-Agroecology-Assessment-Framework.pdf(agroecology-coalition.org)).

  For example, for the recycling principle, the following indicators are proposed:
  - Closing nutrient cycles through biomass recycling, at farm or landscape level (e.g. through producing and using compost or manure, recycling food waste);
  - Reuse of wastewater (grey water) and recycling of waste;
  - Rainwater recovery;
  - Use of reusable or recyclable packaging.

- The Tool for Agroecology Performance Evaluation (TAPE) developed by the FAO provides indicators identified by the FAO and its partners in a participatory manner and mainly at farm level (Tools | Agroecology Knowledge Hub | Food and Agriculture Organization of the United Nations (fao.org)). These indicators are of two kinds:

  > Those used to characterise the degree of agroecological transition (CAET, step 1) of farms surveyed on the basis of the 10 elements of agroecology defined by the FAO and broken down into 36 indices rated from 0 to 4.

FIGURE 11: EXAMPLE OF INDICES FOR EVALUATING 4 OF THE 10 ELEMENTS OF AGROECOLOGY

10 ELEMENTS OF AGROECOLOGY	36 CAET (TERMINOLOGY OF THE TAPE)	0	1	2	3	4
Diversity	Crops					
	Animals					
	Trees					
	Diversity of activities generating income					
Synergies	Crop-livestock-aquaculture integration					
	Soil-plants system management					
	Integration with trees (agroforestry, silvopastoralism, agrosilvopastoralism)					
	Connectivity between elements of the agroecosystem and the landscape					
Efficiency	Use of external inputs					
	Management of soil fertility					
	Management of pests & diseases					
	Agricultural production and household's needs					
Recycling	Recycling of biomass and nutrients					
	Waste production and management					
	Water saving					
	Energy reduction and renewable energy					

  > Those used to characterise the **multidimensional performance** of the system to quantify the impact of the agroecological transition on the basis of a shortlist of ten **performance criteria (Step 2)**. The following table (2019) provides the list of minimum indicators used within the framework of TAPE in a harmonised manner in all countries. Several are common to those used for monitoring the Sustainable Development Goals. This minimum list of indicators may be supplemented depending on the context.

FIGURE 12: 10 CORE CRITERIA OF PERFORMANCE OF AGROECOLOGY AND THEIR LINKS TO SDG INDICATORS

MAIN DIMENSION	#	CORE CRITERIA OF PERFORMANCE	PROPOSED METHOD OF ASSESSMENT IN SURVEY	SDG	SDG INDICATORS
Governance	1	Secure land tenure (or mobility for pastoralists)	Type of tenure over land: property, lease + duration, verbal, not explicit (**SDG 1.4.2, 5.a.1 and 2.4.1 sub-indicator 11**) Existence and use of pastoral agreements and mobility corridors	1 2 5	1.4.2 2.4.1 5.a.1
Economy	2	Productivity	Farm output value per hectare (**SDG 2.4.1 sub-indicator 1**) Farm output value per person	2	2.3.1 2.4.1
	3	Income	Outputs - inputs - operating expenses – depreciation + other income (**SDG 2.4.1 sub-indicator 2**)	1 2 10	1.1.1, 1.2.1 and 1.2.2 2.3.2 2.4.1 10.2.1
	4	Added value	Net income +rents +taxes +interests – subsidies	10	10.1.1 10.2.1
Health & nutrition	5	Exposure to pesticides	Quantity applied, area, toxicity and existence of risk mitigation equipment and practices	3	3.9.1 3.9.2 3.9.3
	6	Dietary diversity	Minimum Dietary Diversity for Women (FAO and FHI 360, 2016)	2	2.1.1 2.1.2 2.2.1 2.2.2 2.4.1
Society & Culture	7	Women's empowerment	Abbreviated Women's Empowerment in Agriculture Index, A-WEAI (IFPRI, 2012)	2 5	2.4.1 5.a.1 5.a.2
	8	Youth employment opportunity	Access to jobs, training, education or migration (**SDG 8.6.1**)	8	8.6.1
Environment	9	Agricultural biodiversity	Relative importance of crops varieties, livestock breeds, trees and semi-natural environments on farm (**SDG 2.4.1 sub-indicator 8.1, 8.6 and 8.7**)	2 15	2.4.1 2.5.1
	10	Soil health	Adapted SOCLA rapid and farmer friendly agroecological method to assess soil health (Nicholls *et al.*, 2004)	2 15	2.4.1 15.3.1

- The **Guide for the Evaluation of Agroecology**[130], which was developed by a network of NGOs involved in agroecology, also provides indicators, indicating the scale of analysis, the technicality and the means needed to collect the data. These indicators pertain to a wide range of areas related to the principles of agroecology, such as:
  - agricultural yields (products, harvest residues, biomass, inter-annual variability);
  - soil health (physical properties, biological activity, organic matter, nutrients);
  - the performance of water management on the plot (water productivity, including economic, run-off water);
  - the regulation of bio-aggressors (effectiveness of the fight against pests, farmers' capacities);
  - agricultural biodiversity (in perennial systems, perennial crops or livestock farming);
  - the reduction in exposure to pesticides (level and conditions of use, toxicity, reduction in use);
  - economic performance from farmers' perspective (efficiency and profitability of agricultural and livestock activities, agricultural income, profitability of land use and capital);
  - supply chains and commercial organisation (market outlets, value chain development, job creation);
  - attractiveness of agriculture for the youth (sustainability, liveability, safety);
  - job retention and creation (work intensity, use of labour force);
  - autonomy (decisional, economic, financial, technical);
  - food security (availability, accessibility, quality, regularity);
  - resilience and adaptation to climate change (production and use of resources, economic and health change).

10.2.2. How to measure the indicators

Accurate measurement of indicators is crucial to obtain reliable data. It is necessary to describe the data sources or methods that will be used to collect information on performance indicators. Here are some approaches that can be mobilised to that effect.

- **Field sampling:** collection of soil, crop or insect samples to assess the health of the agroecological system.

- **Conduct of tests:** data collection from experimental trials to characterise a phenomenon or evaluate an agricultural technique.

- **Conduct of qualitative interviews and surveys:** dialogues with local farmers to gather qualitative information on farming practices, challenges encountered or perceived benefits.

- **Conduct of statistical surveys:** use of statistical methods to collect data (sample survey, comparison between groups, etc.), characterise a situation at a given time, evaluate trends over time allowing for in-depth analysis of the results.

- **Continued monitoring to inform indicators:** establishment of regular monitoring systems to capture progressive changes over time.

130 Levard, L. et al. (2023).

In the context of an agroecological project, the participatory dimension is important. It is therefore possible to rely on project stakeholders to collect and analyse data. Participatory evaluation is therefore an approach to be considered. The aim is to actively involve stakeholders in the evaluation process, integrating their perspectives and experiences into the analysis of results.

It is also important to highlight the possibility of mobilising advanced technologies such as satellite data with an increasing effort to integrate environmental monitoring in agricultural areas, or mobile applications to collect real-time data on agricultural practices and results. Mobile applications can also be used in participatory evaluation processes.

In general, the difficulty of collecting and processing data needs to be properly assessed: The time that is possible and reasonable to dedicate, the cost of collecting certain data as well as the skills needed to do so.

10.3. An example of a logical framework and its indicators

We present here an example of a logical framework, developed with substantial changes, on the basis of the RECAFIP-2 project or ‘Strengthening the capacities of actors in the fish farming sector in the Republic of Congo – Phase 2’.

The RECAFIP-2 project (2020-2024) supported extensive family fish farming based on a pond-dam model that makes the use of synthetic inputs unnecessary. External inputs are therefore limited to the introduction of fry at start-up and, if necessary, to the addition of agricultural residues (such as manioc, taro and sweet potato leaves or compost based on plant waste and animal manure) for fertilising the pond and feeding of fish. The project is thus strongly aligned with the principles of ‘recycling’ and ‘input reduction’. The water from the pond can be used for other agricultural activities such as market gardening and extensive pigs or poultry breeding and counterbalance the effects of climate change due to the presence of a perennial water point of good quality.

The purpose of this logical framework is to illustrate some of the above principles and to provide a concrete case for the use of indicators.

RESULTS	RESULTS CHAIN	INDICATORS
IMPACT (OVERALL OBJECTIVE)	**Family agroecological fish farming is becoming one of the 5 main economic activities of small producers.**	1. Rate of local producers supported by the project for which family agroecological fish farming is one of the top 5 income-generating activities (disaggregated by gender).
		2. GERF 1.1 SDG 2.3.2 Average income from small food producers (disaggregated by gender and indigenous status) *
		3. GERF 2.9 Sustainable management freshwater ecosystem areas with EU support (km²) [NDICI-Global Europe].
SPECIFIC OBJECTIVES	**SO1. Increase in family agro-ecological fish production.**	1.1 Annual fish production of the project beneficiaries carrying out family agroecological fish farming (metric tonnes).
		1.2 Number of new applicants for family agroecological fish farming supported by the project (disaggregated by gender).
		1.3 Number of damp ponds based on the model developed by the NGO (comprising a main magnification pond and a service pond for reproduction) allowing adequate management (in quantity and quality) of water resources.
	SO2. Strengthening the func-tioning of the agroecological fish value chain.	2.1 Marketed volumes of fish from family agroecological fish production carried out by local producers supported by the project (metric tonnes).
OUTPUTS (EXPECTED RESULTS)	**1.1 Better skills of fish farmers to carry out sustainable family agroecological fish farming.**	1.1.1 Number of fish farmers supported by the project with the capacity to carry out sustainable and profitable family agroecological fish farming (disaggregated by gender).
		1.1.2 Number of managers (including advisory facilitators and technical coordinators of the Forum for the Promotion of Rural Groups and the technical staff of the departmental directorates) offering high-quality support services to fish farmers in their professional project (disaggregated by gender).
		1.1.3 Number of fish farmers supported by the project that have sustainably adopted at least three agroecological practices (on-farm production of food, preservation of biodiversity around basins, water quality management, etc.).
	1.2 Networks for sponsoring new fish farmers by experi-enced fish farmers.	1.2.1 Number of sponsorship networks for new fish farmers set up and managed by fish farmers' organisations promoting the sharing of experience and good practices.
		1.2.2 Number of visits between fish sites to share information and experience among peers.
	1.3 New pathways to increase fish production adapted tested and validated.	1.3.1 Number of agroecological innovation processes implemented by producers supported by the project identified, tested and scaled.
		1.3.2 Number of technical workshops and events dedicated to sharing experience (including capacity building and valorisation workshops for fish production and steering committee meetings).
	2.1 Better quality of services offered by operators in the chain upstream and down-stream.	2.1.1 Number of actors organised in an operational network offering quality services to fish farmers accompanied by the project (disaggregated by gender).
		2.1.2 Rates of agroecological fish farmers supported by the project, expressing satisfaction with the quantity and quality of the services to which they have access upstream and downstream of the sector.
	2.2 Establishment of structures for representing the profession.	2.2.1 Number of structures representing the profession in the three intervention departments (e.g. federation and local unions).

BASELINE (REFERENCE YEAR VALUE)	TARGET (REFERENCE YEAR VALUE)	SOURCES AND MEANS OF DATA VERIFICATION	ASSUMPTIONS
0	75%	Monitoring of actions database Start-up and final surveys	Not applicable.
20	40	Monitoring of actions database Start-up and final surveys Final evaluation	The political context allows the project to be carried out and the full involvement of stakeholders. The socio-economic context remains conducive to the diversification of production systems. A sufficient number of people are convinced of the viability of family agroecological fish farming.
0	150		
55	155		
18	36	Monitoring of actions database Start-up and final surveys	Consumer demand for agroecological fish production remains high.
55	155	Review of the actions at the end of the project (on a sample basis), taking the initial diagnosis as a reference Monitoring of actions database Start-up and final surveys	Environmental conditions are favourable: There is no major increase in the pressure of diseases and predators of fish or an uncontrollable increase in water flows associated with unusual floods due to climate change. The management of the partner organisations remains motivated by the project's challenges and staff turnover problems are limited and/or controlled. Decentralised technical services and local and regional authorities take ownership of the project and have the necessary resources to fulfil their mandate and contribute to the sustainability of its results.
6	26		
55	155		
0	3	Monitoring of actions database Start-up and final surveys	The project is capable of generating sufficient group dynamics.
0	15		
0	15	Monitoring of actions database Start-up and final surveys	Pilot actions are of sufficient quality to be attractive to local producers. Pilot actions prove to be environmentally, economically and socially viable.
0	8		
15	30	Monitoring of actions database	The quality of the training provided to the various stakeholders is of good quality. Targeted stakeholders actively engage in training. The number of applicants for the various activities and training provided by the project is sufficient.
0%	70%		
1	12	Monitoring of actions database	Fish farmers are ready to work collectively.

CHAPTER 11

Training resources

There are many training tools on agroecology that provide farmers, agricultural professionals, rural communities or any other interested public with the knowledge and skills needed to practice agroecological farming that promotes sustainable, regenerative and socially fair farming practices.

These tools cover a wide range of topics, ranging from organic farming techniques to biodiversity conservation or ecosystem management, for example. They have different formats depending on the objectives and target audiences. These may include manuals, MOOC-type online training courses or academic training programmes.

The websites of several organisations gathers information on different online or academic training programmes. This is the case, for example, for Agroecology Europe or the Coalition for the Transformation of Food Systems through Agroecology.

Below we present a few examples.

11.1. Videos

AccessAgriculture

Access Agriculture is an international non-profit organisation whose aim is to promote agroecological principles and rural entrepreneurship through capacity building and South-South exchange of quality farmer to farmer training videos. Access Agriculture enhances video production capacities and, on request, translates any video hosted on its platform into any local language. The NGO provides multiple stakeholders with access to these videos, including rural advisory services, education systems, media and farmers' organisations. Access Agriculture currently offers over 4,000 videos on agroecology available in more than 100 languages.

AgroecologyNow!

AgroecologyNow! is a research, action and communication project led by the Centre for Agroecology, Water and Resilience that focuses on understanding and supporting the societal transformations needed to enable agroecology to become a model for sustainable and fair food systems. It aims to co-produce and mobilise knowledge with civil society organisations, intergovernmental bodies, policymakers, researchers and food producers to advance societal transformations towards agroecology. Many videos on agroecology are available on its website.

Statistics for Sustainable Development (Stats4SD)

Stats4SD is a non-profit social enterprise established in May 2016 that promotes better use of statistical methods for decision-making for the benefit of society and the environment. The aim is to encourage the production of information materials such as guides, tools, videos, etc. that the organisation uses or recommends to other potential users. Stats4SD's website offers both items produced by their team and selected links to articles from outside sources. Topics covered include research methods, statistical concepts and data processing, as well as specialised areas related to their work with their partners, such as agroecology and farmer-led agricultural research.

11.2. Online courses

GreenAgro

Duration: 7 weeks | **Effort:** 24 hours (3.5 hrs/week) **Language:** EN/FR

Description: This course is offered by the Institut Agro – Montpellier to discover what agroecology is, what the different approaches are, how they translate into farming practices and the agroecological transition. As part of a participatory training dynamic, based on the social and geographical diversity of stakeholders, this MOOC proposes to build an approach to agroecology at the interface between agronomic sciences, ecology and social sciences. It changes the theoretical insights presented by research teachers and a co-construction of knowledge where any participant can enrich the course on the basis of their observations on the ground or from a documentary survey. Each week, individual activities, self-corrected activities and collaborative activities are offered that allow participants to take ownership of content and test their understanding.

Target audience:

- the curious ones who want to discover the world of agroecology: No prerequisites necessary;
- professionals who want to acquire skills: Flexible arrangements and content based on the latest developments in research and development;
- students who want to receive training: From scientific bases to operational implementations;
- enthusiasts who want to share their knowledge and learn from others: A single exchange mechanism with a wide variety of learners.

Agroecology: Transition to sustainable food systems

Duration: 40 hours | **Language:** Spanish

Description: This course is developed through self-learning, with the participant responsible for building their own knowledge. It is structured in four technical-pedagogical units for sequential exploration, i.e. once a unit has been completely revised, it is possible to access the next one.

The aim of the course is to disseminate, promote and strengthen knowledge about agroecology and its contribution to building a sustainable and resilient food system and promoting the development of rural and rural urban territories in Latin America and the Caribbean. At the same time, at the end of the course, the participant must be able to stimulate the exchange and dissemination of good agroecology practices in the context of territorial development, sustainability and resilience, governance and empowerment of communities and individuals.

Target audience: The course is aimed at representatives of the public and private sectors, civil society, universities and international organisations wishing to deepen their knowledge of agroecology and the food system. Extension staff, students, officials, interested in the subject.

Agroecology for Africa

Duration: 3.5 hours | **Language:** English

Description: This course, released in February 2025, introduces how agroecological elements, principles and practices can contribute to the social, economic and ecological transformation of agrifood systems. It also explores ways that governments, civil society and the private sector can support the scale-up and scale-out of agroecology. The course illustrates the uptake and spread of agroecology across Africa through practical examples and case studies. It focuses on:

- The key concepts, principles and practices of agroecology;
- How agroecology can contribute to the social, economic and ecological transformation of agrifood systems;
- How agroecology can contribute to maintaining agroecosystem health, productive capacity and reinforcing farm resilience;
- The enabling environment, obstacles and lock-ins affecting agroecological adoption and transitions to sustainable food systems;
- Ways for scaling up agroecology at community, national and regional levels;
- How the elements and principles of agroecology can be applied in Africa.

Target audience: This course is relevant for a wide audience who wants to quickly grasp the concepts of agroecology, including: i) government officials and staff of the ministries of agriculture, food security, environment, health, trade or economics and rural affairs; ii) policymakers or advisors; and iii) training and capacity development practitioners.

11.3. Academic programmes

Double degree programme in Agroecology

Duration: 2 years | **Language:** English/French

Description: The dual programme teaches a multidisciplinary and peer-to-peer learning approach in which natural sciences are combined with social sciences. It enables students to understand the structure and function of complex agroecosystems and to apply a systemic approach in the study, design and evaluation of agricultural systems and food production chains. At the end, a double diploma is awarded.

The **Master of Science** Agroecology aims to limit the distance between practice and theory by practising action-based learning and research actions through collaboration with farmers, food system professionals and consumers. The Master of Science combines four semesters in three different schools: The first semester takes place in Norway at the **University of Life Sciences (NMBU)**, the second semester at a university of one's choice and the third semester at ISARA (member of **FranceAgro3**) in Lyon, France. The master's thesis (fourth semester) is carried out under the main responsibility of one of the two partners and is co-supervised by the other partner. The dual degree programme is coordinated by a consortium composed of ISARA, France, and NMBU, Norway.

The **Master of Science Agroecology – Resilient Agriculture** covers four semesters in two different universities with an internship in the second semester. The programme combines a strong research approach in the following areas: Resilient agriculture at the University of Wageningen, Netherlands, with the agroecology systemic approach for agroecosystems in Isara. The aim is to develop skills and research projects for the application of agroecological science in real life situations.

Target audience: International students with a strong interest in sustainable agriculture, agroecosystem management and sustainable food systems.

MSC in Agroecology, Water and Food Sovereignty

Duration: 1 year, full time | **Language:** English

Description: Focusing on agroecology, food sovereignty and other unconventional food and agricultural approaches, this course aims to provide students with a thorough understanding of some of the biggest challenges facing contemporary food and agricultural systems, and the solutions needed to address them. It covers a dynamic range of cross-cutting and mutually enriching topics relevant to 21st century food and agriculture, including agroecology and other unconventional food and agricultural practices; the impact of climate change on food and agriculture; gender and food systems; resilience of communities; agricultural ecology; questions of power, voice and position in the governance of food systems; agriculture and fragile environments; indigenous approaches to food and agriculture; water systems; etc.

Target audience: The students of this course are integrated into the Centre for Agroecology, Water and Resilience (CAWR), one of the research centres of the University of Coventry.

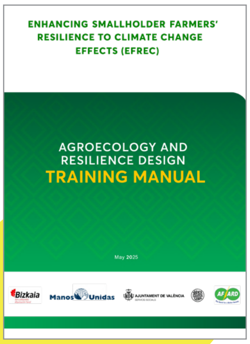
11.4. Manuals

Manual of agroecology, drawn from the experience of the PROTEGE project in New Caledonia

Organisation: Chamber of Agriculture and Fisheries of New Caledonia | **Year of publication:** 2023 | **Geographical coverage:** Asia Pacific | **Language:** French

Description: This manual was developed with the financial support of the European Union in the framework of the Regional Oceanian Territorial Project for Sustainable Ecosystem Management (PROTEGE) implemented by the Pacific Community in New Caledonia, French Polynesia and Wallis and Futuna. This manual provides a compilation of agroecological practices and experiments that have been tested by farmers who benefited from the implementation of the project. It is designed as a practical guide to these different agroecology practices and their specific principles, techniques and strategies to address the needs of farmers considering moving towards sustainable and more resilient agriculture in a context of increasing climate change.

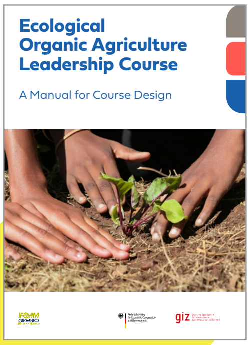
Agroecology and Resilience design – Training Manual



Organisation: AFARD – Agency for Acceleration of Regional Development | **Year of publication:** 2025 | **Geographical coverage:** Africa | **Language:** English

Description: This manual compiles knowledge from various sources on agroecology, sustainable farming, and resilience. It is intended for practitioners, facilitators, and development actors supporting agroecological transitions in smallholder farming systems. The handbook outlines the principles, values, and social dimensions of agroecology, presenting it as a pathway towards sustainable and resilient food systems. It emphasises locally led solutions, the co-creation of knowledge, and participatory learning approaches. Rather than prescribing fixed practices, it encourages adaptation to local realities through reflective engagement and experimentation. To maximise its relevance, users are encouraged to engage with the content through group discussions, community workshops, and hands-on learning that bridges theory and lived experience.

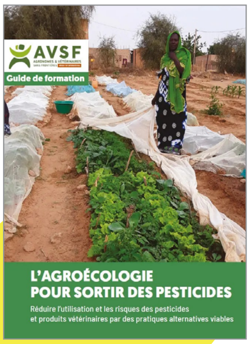
Leadership in Ecological Organic Farming



Authors: Tina Meckel and Alexandra Joseph, with contributions from John Espenido, Gabor Figezky, Joanita Akello and Barbara Zilly | **Organisation:** IFOAM – Organics International | **Year of publication:** 2022 | **Geographical coverage:** Africa | **Language:** French/English

Description: This manual is intended for those who wish to design or run a course or workshop based on the Leadership in Ecological Organic Farming (EOALC) course. It covers a wide range of topics in the field of leadership and ecological organic farming. The intention is to inform and inspire change leaders by providing them with a broad horizon and a basis from which they can further develop the elements that inspire them according to their specific context, pushing the seeds that have fallen on their fertile soil. It is assumed that facilitators and trainers have at least basic facilitation and training skills, acquired through their own experience as well as through other training (training of trainers). From this, the manual can serve as a menu from which to draw on and add ingredients to 'simmer' in a new way.

Training guide: Agroecology to get out of pesticides



Authors: under the leadership of Amélie Bajolet, Valentin Beauval, Dominique Lebreton, Bertrand Mathieu and Manuelle Miller | **Organisation:** Agronomists and Veterinarians Without Borders (AVSF) | **Year of publication:** 2021 | **Geographical coverage:** Global South with a focus on Sub-Saharan Africa | **Language:** French

Description: This training guide was drafted by AVSF members, concerned about the increasing use in the global South, especially in Sub-Saharan Africa, of pesticides and veterinary products, a significant part of which is no longer authorised in developed countries due to their high toxicity and which are likely to cause many worrying impacts on human health, animal health and the environment.

In this context, the aim of this guide is to strengthen the skills of managers of farmers' organisations and field technicians in order to better diagnose and solve plant and animal health problems, building on the diversity of agroecological alternatives, both from proven traditional knowledge and from the latest scientific knowledge.

It provides a toolkit for the development of training materials adapted to the specific context and target audiences, with the aim of helping to eliminate the use of hazardous pesticides and promoting alternative solutions that are part of sustainable agroecological transitions but also economically viable and accessible to farmers' families with few resources.

Annexes

Annex I - Bibliography

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p. 158 ©Nitidæ/Cédric Rabany, Diversified agroforestry system with coffee, timber and banana trees, avocadoes, sweet potatoes and squash in Burundi.

p. 161 ©FAO/Rodger Bosch, A farmer opening an outlet pipe to irrigate the vegetable plots belonging to his farmer's association in Swaziland.

p. 171 ©FAO/Luis Tato, A farmer drives a tractor with a ripping and planting machine in a farm in Kenya.

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