FOOD FORWARD NDCs

Mainstreaming agroecology principles for food governance

Overview

A third of global greenhouse gas emissions come from food systems. Most food produced today uses significant amounts of chemicals and resources (e.g., fertiliser, pesticides, energy, land and water) and is produced via unsustainable practices (e.g., mono-cropping and heavy tilling), driving the destruction of vital ecosystems like forests and peatlands. Simultaneously, more than 780 million people still suffer from hunger. Two billion have micronutrient deficiencies, while the same number are overweight or obese. Additionally, as much as 40% of all food produced is lost or wasted.

Meanwhile, climate change impacts – including extreme temperatures, floods, droughts and changing rainfall patterns – are already reducing the capacity of our food systems, particularly in climate vulnerable regions. The hidden environmental, health and economic costs of current food systems are estimated at nearly USD 12 trillion per year and are expected to rise to USD 16 trillion per year by 2050.

As defined by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), "agroecology is the science and practice of applying ecological concepts, principles and knowledge (i.e. the interactions of, and explanations for, the diversity, abundance and activities of organisms) to the study, design and management of sustainable agroecosystems. It includes the roles of human beings as a central organism in agroecology by way of social and economic processes in farming systems. Agroecology examines the roles and interactions among all relevant biophysical, technical and socioeconomic components of farming systems and their surrounding landscapes."

Transitioning to sustainable and resilient food systems can help address climate change, biodiversity loss, food insecurity and insufficient nutrition. To successfully make this transformative shift in our food systems, policymakers, practitioners and other stakeholders must consider key agroecology principles to mainstream agroecology in planning, managing and evaluating food system policies.

Concrete measures to implement

While agroecology is founded on principles that are implemented in diverse ways depending on local contexts, UN Food and Agriculture Organization's **10 Elements of Agroecology** and the High Level Panel on Experts on Food Security and Nutrition's 13 **Principles of Agroecology** both provide guidance on how governments can operationalise agroecology at the policy and farm level. These principles relate to agricultural and ecological management of agriculture and food systems, as well as some wider ranging socio-economic, cultural and political principles. Based on local policy contexts, the following measures, among others, can be implemented to operationalise and mainstream these agroecological principles:

- Mainstream and strengthen knowledge on agroecology:
    - Integrate and mainstream agroecology values, knowledge and skills across educational institutions (i.e., in teaching, research incentives and curricula). Transformation of food systems through agroecology requires changing the approaches used to study, measure and assess agricultural performance, and shifting from uniformity of indicators (often narrowly based on "yield" and "productivity") to a diversity of multi-dimensional indicators to address at least three core dimensions of sustainability: the sociocultural, economic and ecological.
    - Collaborate across disciplines – drawing on ecological and social sciences, including rural development studies, sociology, gender research, community health, political science and other fields – to better understand and empower smallholders and farmer organisations, and to encourage genuine inclusive partnerships with Indigenous Peoples. **Breaking down institutional silos and enhancing system thinking** in research and training is crucial. Interdisciplinary courses at the graduate and undergraduate levels should include non-

academic actors. Knowledge on agroecological innovations requires research that combines “know-how” and “do-how”.

- **Provide support to further develop agroecological curricula** at colleges and universities and facilitate exchange between experienced and interested stakeholders (from research, civil society, donor organisations and the private sector). Establishing decentralized networks for studies in agroecology would further reinforce system thinking and enhance exchanges between different knowledge holders.
- **Align extension services with agroecological principles**. Reform knowledge and extension systems to place greater emphasis on participation and social learning (e.g., farmer-to-farmer learning and on-farm demonstrations). Expand the use of low-cost information and communication technology (e.g., interactive radio, social media, other apps and videos) to reach large numbers of people, including youth. Innovative delivery of information can strengthen partnerships with the private sector, farmer groups, volunteers, social workers and youth entrepreneurs in extension and advisory systems. Focus should be placed on the inclusive participation, central role and leadership of women, Indigenous Peoples, youth and local communities.
- Promote the synthesis of, enhance accessibility to, and encourage the utilisation of findings from studies that provide multidisciplinary empirical evidence on the various sociocultural, economic, environmental, agronomic and production benefits of agroecology on national and local levels. Promote stand-out projects and individuals that successfully combine academia, inclusive approaches and practical research components to provide benefits to society.
- Support the development of holistic performance measurements for agroecology and metrics for capturing policy alignment with the SDGs, building on **FAO’s Tool for Agroecology Performance Evaluation (TAPE)**, the growing body of work on ‘true cost accounting’ and other metrics.
- Use assessment methodologies to inform evidence-based policymaking for agroecology and demonstrate how agroecology can enhance ecosystem and climate resilience while also contributing to food security and nutrition. For more information, see ***Food system assessments***. These research efforts should be paired with

promotional campaigns to spread awareness of the research results and findings among policymakers and the public.

- Integrate agroecology in public finance:
    - Harness large finance mechanisms for agroecology (e.g., Global Environment Facility funds, the Green Climate Fund and the Adaptation Fund) by developing and submitting funding proposals for research projects and programmes for agroecological transition.
    - Support donors that provide flexibility in programme planning and funding to earmark funding for agroecology projects and programmes, including the removal of obstacles to funds for subsequent phases of the same project or programme.
    - Establish mechanisms to track, measure and ensure transparency in global investment flows and subsidies in food systems, including funding to agroecology.
    - Ensure that financing instruments lead to access to capital (e.g., mobile microfinance, peer-to-peer lending platforms and crowdfunding) that transform their practices based on agroecological principles for farmers – in particular, smallholders, women, Indigenous Peoples and youth – producer organisations, input providers and businesses.
    - Showcase and scale best practices for financing agroecology, including existing innovative funding mechanisms that support both local/grassroots initiatives and government efforts that ensure participatory decision-making and monitoring of projects.
    - Rethink traditional forms of measuring **economic success** in agriculture, instead favouring alternative approaches that account for factors such as reduced risks, cost savings, continuity of yields and income diversification.
    - Remove subsidies that encourage unsustainable use of resources, and particularly resources with known harmful impacts to the environment such as synthetic fertilisers and pesticides. Increase **taxes** on use of finite resources (e.g., water) in agricultural production.
    - Introduce **true pricing** and other related assessment methodologies (e.g., true cost accounting, life cycle assessment) to better account for the externalities associated with agricultural production. For more information, see ***Food system assessments***.

- Reform public procurement policies to incentivise adoption of agroecological practices. For more information, see ***Integrating healthy and sustainable diets in public procurement***.

- **Support local and territorial markets**:

  - Support local, territorial and regional markets, processing hubs and transportation infrastructures that provide greater processing and handling capacities for fresh products from small- and medium-sized farmers who adopt agroecological and other innovative approaches, improving their access to local food markets and supply chains.
  - Enhance direct connection between producers and consumers; provide public facilities and extension workers; support farmer associations and cooperatives in building strong local marketing networks; and create certification of agroecological producers. See ***Improving physical and economic access to healthy and sustainable foods***.
  - Push for fair remuneration for farmers and other food system workers.
  - Amplify successful business models aligned with the elements and principles of agroecology.

- **Build and strengthen multi-stakeholder platforms and initiatives**:

  - Build and coordinate platforms to enable interactions among farmers, other stakeholders and networks, including local governments, investors, donors, knowledge and research institutions and consumers, to develop collective awareness, identity and agency around agroecological management issues.
  - Convene inclusive multi-stakeholder dialogues built on evidence-based arguments to help bring together different perspectives, including from women, youth, Indigenous Peoples and other marginalised groups.
  - Support the development and functioning of bottom-up alliances with the involvement and ownership of farmer groups, researchers, NGOs and social movements, and use these alliances as a key partner in knowledge generation and sharing.
  - Promote South-South collaboration, long-term partnerships and coalitions with a focus on agroecology. Local ownership and the

meaningful involvement of social movements and farmers' organisations is equally important.

Tools and MRV systems to monitor progress:

FAO's Tool for Agroecology Performance Evaluation (TAPE)

A comprehensive tool that aims to measure the multi-dimensional performance of agroecological systems across different dimensions of sustainability. It provides evidence to policymakers and other stakeholders on how agroecology can contribute to sustainable food and agricultural systems. It can also provide a framework for governments and other public actors for the adaptation and re-design of research and development programmes, rural advisory services and extension programmes.

Link: https://www.fao.org/agroecology/tools-tape/en/

Biovision's Agroecology Criteria Tool (ACT) methodology

Based on the analytical framework by Gliessman on the five levels of food system change, the ACT methodology is embedded within the 10 Elements of Agroecology by FAO.

Link: https://www.agroecology-pool.org/methodology/

Biovision's Farm-level agroecology criteria tool (F-ACT)

A digital decision-making tool that enables farmers to identify ways for making their farms more efficient, resilient, equitable and ultimately agroecological. The tool guides users through a series of questions to identify to what extent each of the 13 principles of agroecology are reflected through activities related to relevant components of farm and food systems.

Link: https://www.agroecology-pool.org/fact/

Biovision's Business Agroecology Criteria Tool (B-ACT)

A tool to assess and identify inspiring and promising agroecological enterprises that contribute to sustainable food systems. The extent to which an enterprise 'inspires' is reflected in its alignment with the 13 agroecology principles, while the aspect 'promising' is reflected in its business model, value-generating activities and scalability.

Link: https://www.agroecology-pool.org/b-act/

Biovision's Agroecology Check for Enterprises (ACE)

Enables users to conduct a preliminary assessment of an enterprise's alignment with the principles of agroecology. It is for investors, financiers and entrepreneurs seeking to identify agroecological enterprises. Enterprises with passing grades can go through the more extensive B-ACT assessment. The assessment should therefore be understood as an initial screening before an in-depth analysis with the more substantial B-ACT.

Link: https://www.agroecology-pool.org/ae-check-for-enterprises/

Agroecology Finance Tracking Tool

Used to evaluate projects, initiatives, or calls for proposal for their support of agroecological transformations by rating their contribution to the implementation of each of the 13 Principles of Agroecology.

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

SHARP+ (Self-evaluation and Holistic Assessment of Climate Resilience of Farmers and Pastoralists)

A self-evaluation used to build evidence for informed policy- and decision-making.

Link: https://www.fao.org/3/cb7399en/cb7399en.pdf

Climate Risk Planning & Managing Tool for Development Programmes in Agrifood Systems (CRISP)

An interactive tool that supports decision-making about mainstream climate risk considerations for project design and implementation. It specifically addresses practitioners and project managers in agriculture, rural development and food and nutritional security projects.

Link: https://crisp.eurac.edu

Climate change mitigation benefits:

Mainstreaming agroecology in food systems can generate multiple climate change mitigation benefits through a shift in agriculture practices, including:

- Carbon sequestration through agroforestry practices. See ***Agroforestry systems***.
- Agro-silvopastoral and silvopastoral systems can increase carbon sequestration and reduce the emission generated by animal production.

See *Implementing agro-silvo-pastoral systems*.

- Conservation tillage, organic inputs and cover crops can help to sequester carbon in soils. See *Reducing emissions through soil carbon sequestration and soil fertility*.
- **Using organic nutrient sources and organic farming** will likely avoid increased nitrous oxide emissions as compared to the use of synthetic nitrogen fertiliser.

Adaptation benefits

- Reduced risk of **eutrophication** due to reduced agricultural production. Eutrophication is the process by which aquatic systems become over-enriched with nutrients such as nitrogen and phosphorus due to the run-off of agricultural inputs (e.g., fertilisers into water systems). There are several types of emissions associated with eutrophication, including air pollution (e.g., sulphur dioxide and nitrogen oxides) and water pollution (e.g., nitrates, ammonium, nitrogen and phosphorus).
- Reduced **acidification** due to reduced inputs associated with agricultural production (e.g., fertilisers and pesticides). Types of emissions associated with acidification include sulphur dioxide, ammonia and nitrous oxides.
- Positive impacts of diversification on pollination, pest control, nutrient cycling, water regulation and soil fertility.
- Agroforestry has a positive impact on biodiversity, water regulation, soil carbon, nitrogen and fertility and for buffering temperature extremes. See *Agroforestry systems*.
- Resilience to price shocks through reduced dependency on international markets. Agroecological farming systems are more **resilient** to international input scarcity than conventional systems.

Other sustainable development benefits

Agroecological principles relate to all SDGs and can particularly contribute to the following:

- SDG 1 (No poverty) & SDG 8 (Decent work and economic growth): By raising yields while improving soil carbon, and integrating plant nutrient systems with reduced fertiliser application.

- SDG 2 (Zero hunger) & SDG 3 (Good health and well-being): By increasing access to food by increasing the quantity and diversity of foods produced per household, and by maintaining the genetic diversity of seeds, cultivated plants and domesticated animals.
- SDG 12 (Responsible consumption and production), SDG 13 (Climate action), & SDG 15 (Life on land): Agroecological practices use natural resources more sustainably and efficiently and reduce the release of chemicals into air, water and soil. The enhanced proximity between producers and consumers also helps raise awareness and reduces food waste by repurposing urban organic waste as fertiliser.

Main implementation challenges, potential negative externalities, and trade-offs

- Vested political and economic interests in conventional food systems may oppose the mainstreaming of agroecology.
- Applying agroecology principles may result in a temporary decrease in yields and may lead to additional risks and costs, while agroecology's ecological and economic benefits can take time to achieve.

Measures to address challenges and trade-offs

- **Potential trade-offs must also be considered according to each specific context.** For instance, depending on quantity and type of inputs, reduced input use could lead to lower productivity and/or lower income, and thus higher food insecurity. In addition, agroecological methods, if more labour-intensive, could increase women's workload and diminished nutritional status of children, if gender relationships within households are not accounted for.
- Take advantage of highly visible global forums (e.g., UNFCCC COP meetings) to change the narrative around agroecology and spread awareness of agroecology principles, concepts and benefits among policymakers and other relevant food system stakeholders. Use these forums to generate support and awareness for finance, initiatives and capacity-building programmes.

- Reform food system policies to further value the perspectives and interests of marginalised groups (e.g., Indigenous Peoples and Local Communities) who have shown capacity — given they have secure land tenure and other rights — to produce food sustainably while also supporting achievement of government goals (e.g., biodiversity conservation, deforestation reduction). These groups can also form a vital component of agricultural research and monitoring efforts.
- During transition phases, build support by prioritising "**quick-win**" or low-hanging fruit measures that demonstrate the benefits (e.g., cost-effectiveness) of agroecological approaches, such as soil fertility improvement practices like mulching, composting and intercropping with legumes.

Implementation costs

No estimate was found in literature.

Intervention in practice

- The Swiss Research Institute of Organic Agriculture (FiBL), along with other partners, have implemented **four long-term trials** comparing organic and conventional farming in Kenya, India and Bolivia. Results from 2007 to 2019 show that moving away from input substitution to a diversified farming system using an agroecological approach led to similar or higher crop yields than a conventional production system. These agroecological approaches led to reduced incidence/impact of pests, improved soil conditions and an overall improvement in resource efficiency.
- Since 2009, the NGO Partenariat du Developpement Local has been supporting the implementation of agroecological practices in Haiti's Northern Plateau region. The Economics of Land Degradation (ELD) produced **an assessment of how agroecological farming in Haiti** has performed. The analysis found that agroecological farming methods earned higher net-income per hectare even with higher production costs. Moreover, agroecological practices increased carbon sequestration and water retention in the soil, reduced erosion, and bolstered food security.
- In response to a global price increase of chemical fertilisers between 2020 and 2022, the Government of Ethiopia set up a **task force** to assess technical, policy and social measures that could be rapidly implemented to

alleviate **fertiliser scarcity**. Measures included: accelerating the registration/commercialisation of domestically produced alternative organic fertilisers; the mobilisation of extension agents to promote the organic fertilisers and build capacity for their production; the maintenance of subsidies for farmer organizations and cooperatives to help cover transport/distribution costs; and a production safety net for poor farmers, with the government and NGOs supplying free fertiliser and seeds.

- Beginning in 2008, the **Ecovillages Program** in Senegal was established to provide aid for developing low-carbon, climate-resilient agroecology villages. In addition to training villagers in the principles of agroecology/agroforestry and environmental education, the program supports access to solar hydro pumps for irrigation, improved energy efficient cookstoves, land development for agriculture, and other initiatives. It is overseen by the Ministry of the Environment and Sustainable Development, with funding from 14 national and international partners, including the Sengalese government, UNDP, the Japanese government, and private sector actors. In 2019, some 400 ecovilliages had been established or were in the process of being established.
- In 2013, the Brazilian government launched the first phase of the National Plan of Agroecology and Organic Production (PLANAPO), a comprehensive initiative involving 125 distinct actions across various ministries. One part of the iniative, the **Ecoforte Program**, supports territorially-based programs in transitioning to agroecological production and sustainable farming practices by transferring funds to active social organisations in the field. Projects have focused primarily on expanding practices related to agricultural production, food processing, ecological seed production, certification, commercialisation, animal husbandry, water security technologies, and other measures. Through the mechanisms of the program, foundations can direct finance towards assets (e.g., machinery, facilities) and services (e.g., technical assistance, training, education).
- **Tanzania** launched its National Ecological Organic Agriculture Strategy (NEOAS) in late 2023. This is based on the contribution of agroecological approaches to food security, farm incomes, environmental conservation, climate resilience and opportunities for youth and women. It also mainstreams organics and agroecology as a cross-cutting policy initiative in the coming national biodiversity strategy (NBSAP). The strategy was developed with the involvement of a wide group of stakeholders.

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