Agriculture – avoiding risks and seeking opportunities for biodiversity

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Substantial gains in human well-being and economic development have taken place over the past century – at the expense of ecosystem well-being. Report upon report stress the urgent and pressing state of the planet's rapidly degrading natural resources on land, in air and waters.[1] The biggest direct drivers for this degradation and loss are exploitation of land and natural resources through agriculture, forestry and fisheries alongside climate change, pollution and invasive species.[2,3]

Diverse and healthy ecosystems create values that usually are unaccounted for in the price of food, such as air purification, pollination, natural pest control, temperature regulation, regulation of water quality, carbon sequestration, and groundwater recharge, referred to as ecosystem services. Healthy ecosystems underpin a number of sustainable development goals, notably on food security and health. The hidden costs on health, environment and society of current agrifood systems represent 10 per cent of global GDP[4].

The main challenges in implementing sustainable food systems include limited knowledge about the importance of agro-biodiversity; inadequate policies and regulations; dominance of finance favouring monoculture value-chains over incentives for small-scale producers to adopt sustainable practices[5].

HEALTHY AGROECOSYSTEMS PROVIDE MULTIPLE BENEFITS

At the production end of value-chains, several biodiversity-friendly agricultural practices are well-known, e.g. conservation agriculture, agroforestry, and integrated pest management.

By mimicking biodiversity functions, structures, and processes of natural ecosystems, farmers can reverse environmental degradation while also sustaining yields. This can include nature-based solutions in agriculture that make use of:

- agriculture plants as (i) green infrastructures to provide canopy cover, reduce competition for water and nutrients, stabilise slopes and mediate natural disaster impacts; or (ii) green corridors to connect fragmented landscapes;
- natural predators, as biological pest and disease control; and
- plants and microbes to remove pollutants from air, soils or water, so-called bioremediation, or to benefit from nitrogen-fixing roots, in order to reduce chemical contamination in the environment and the food chain[6].

GLOSSARY

Resilience: The capacity of a system – be it a forest, city or economy – to deal with change and continue to develop.

Biodiversity: The variety of all forms of life on earth, including the variability within and between species and within and between ecosystems. Integrating a variety of crops can improve soil health, pest and disease control, and resilience to climate variability, which are important for reaching more stable yields.

Agrobiodiversity: The biological diversity that sustains key functions, structures and processes of agricultural ecosystems. It includes the variety of animals, plants and micro-organisms, at the genetic, species and ecosystem levels.[7]

Ecosystems: All species in a given area, along with the physical environment with which they interact, e.g. a forest or a coral reef.

Ecosystem services: The benefits provided by healthy ecosystems to human societies, such as pollination, soil fertility, and pest control.

Agroecosystems: Agricultural landscapes that encompass diverse agrobiodiversity and are managed by farmers for food production.

Agroecology: Approaches that contribute to transforming food systems by applying ecological principles to agriculture and ensuring a regenerative use of natural resources and ecosystem services while also addressing the need for socially equitable food systems[8].

Nature-based Solutions: Actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems, which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services, resilience and biodiversity benefits.[9]

One Health: a unifying approach that recognises that the health of people, animals and ecosystems are closely linked and interdependent.[10]

Agroforestry: Multifunctional combinations of trees, crops (and animals) that optimise economic, social and/or environmental benefits from their light, moisture and nutrient interactions.

1 E.g. FAO. 2019. The State of the World's Biodiversity for Food and Agriculture; IPCC. 2022. Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report
2 IPBES. 2019. Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
3 Richardson et al. 2023. Earth beyond six of nine planetary boundaries. Science Advances 9, 37
4 FAO 2023. The State of Food and Agriculture
5 IPES-Food 2022. Smoke & Mirrors: Examining competing framings of food system sustainability: agroecology, ...
6 Simelton et al. 2021. NBS Framework for agricultural landscapes. Frontiers
7 IPBES glossary https://ipbes.net/glossary
8 https://www.agroecology-europe.org/the-13-principles-of-agroecology/
9 UNEA-5 2021. The resolution on Nature-based solutions for supporting sustainable development.
10 Editorial 2023. One Health: a call for ecological equity. The Lancet

KEEP IN MIND DURING PROGRAMME DEVELOPMENT

Holistic frameworks, such as the principles for agroecology[11], lend themselves to *simultaneously* achieving multiple development goals. Here, "simultaneously" challenges us to ask: why settle with one benefit, when many are possible?". In contributions management, verify that partners have sought opportunities for further biodiversity interactions from household to landscape and policy levels:

☐ **Build on local and traditional knowledge** about cultivated and wild plants and animals.

☐ **Promote diversification at farm and landscape-level,** i.e., tree-crop-livestock-aquatic systems[12] rather than forest degradation or monoculture "solutions" and with biological inputs that replace highly hazardous pesticides (HHP).

☐ **Promote farmers' rights** to save, select, exchange and sell seeds. Consider legislation to safeguard communities' access to local varieties and land races. This is critical when intellectual property rights are negotiated in trade agreements. Traditional seed systems can be encouraged through on-farm conservation of genetic resources, community seed banks and exchange networks.

☐ **Support locally accepted land tenure and land use rights.** Integrate gender equality and conflict sensitivity in resource governance[13].

☐ **Encourage value-chains that** harness the inherent flexibility in biodiverse farming systems from production, processing, trade, and transport to consumption. This may include support to farmers and their organisations and institutions in certification and quality management, consumer awareness about sustainably produced goods.

☐ **Identify and support data that monitor biodiversity performance and leakage** in the contexts of positive and negative externalities, co-benefits among adaptation, loss and damage, and biodiversity.

☐ **Integrate biodiversity, ecosystem services and food security in policy plans and actions.** Important gains will include demonstrating benefits (and costs) of breaking silos between national action plans for food security and Rio conventions on climate change, biodiversity and desertification. This may require new curricula content for key implementers, from extension service to planners, on regulatory approaches in resource management that encourage e.g., using native species and restoration of degraded and marginal land, substituting harmful subsidies, implementing polluter pays principles, making full use of nature-based solutions or One Health.

Conversation starters with partners. During the preparation phase, use opportunities to start conversations with partners about how biodiversity is addressed in the mandatory environmental assessment and in the subsequent programming. Another opening can be to review how the country has addressed agriculture in its National Biodiversity Strategy and Action Plans (NBSAP), National Adaptation Plans (NAP), Nationally Determined Contributions (NDC), and National pathways from UN Food Systems Summit (UNFSS). Target 10 of Kunming-Montreal Global Biodiversity Framework provides guidance and indicators for implementation related to agriculture (See monitoring and reporting CBD Decision 15/5).

See Sida's Statistical Handbook for policy markers for definitions, classification, and examples of activities within environment, mitigation, adaptation and biodiversity.

RESOURCES

Sida 2022. Biodiversity Marker Guide Agriculture

Sida 2021. Biodiversity Marker Guide Fisheries

Sida 2021. Biodiversity Marker Guide Forestry

Sida 2022. Sida Guide for environmental integration into Sida's operations. Sida Green Tool Box

Dasgupta, P. 2021. The Economics of Biodiversity: The Dasgupta Review.

11 Wezel et al. 2020. Agroecological principles and elements and their implications for transitioning to sustainable food systems. A review

12 IPES-Food 2021. 13 principles for food systems transformation outlined by the High Level Panel of Experts on Food Security and Nutrition (HLPE)

13 Committee on World Food Security (CFS) publications. A series of guidelines on various topics (tenure governance, responsible investments, gender and youth in agriculture) and can serve as a starting point for dialogues.

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