



Food and Agriculture
Organization of the
United Nations

Global Forum on Food Security and Nutrition

FSN Forum

Report
of activity
N°149

from 26.04.2018
to 01.06.2018



Mainstreaming biodiversity in agriculture, fisheries and forestry for improved food security and better nutrition

About this document

This document summarizes the online consultation *Mainstreaming biodiversity in agriculture, fisheries and forestry for improved food security and better nutrition* held on the FAO Global Forum on Food Security and Nutrition (FSN Forum) from 7 May to 1 June 2018.

The online consultation aimed at gathering experiences and examples from practitioners to define further the objectives and partnerships of the FAO Biodiversity Mainstreaming Platform and to advance the development of its work programme. Technical facilitation was provided by the following FAO staff: Irene Hoffmann, Secretary of the Commission on Genetic Resources for Food and Agriculture and Paulo Augusto Lourenço Dias Nunes, Natural Resources Officer in the Climate, Biodiversity, Land and Water Department with support by Clelia Puzzo, Programme Specialists, Globally Important Heritage Sites and Patrick P. Kalas, Natural Resources Officer Capacity and Institutional Development, Climate, Biodiversity, Land and Water Department.

This report presents a selection of the main points emerging from 74 contributions shared by participants from 29 countries, whom we thank very much for their time and valuable input.

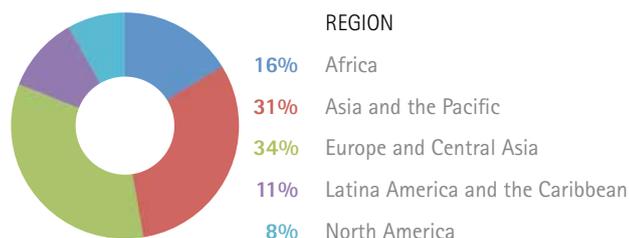
The outcomes of this online consultation were presented for discussion at the Multi-stakeholder Dialogue on Biodiversity Mainstreaming across Agricultural Sectors which took place in Rome on the 29th-31th May 2018. Further information on the conference can be accessed here:

www.fao.org/about/meetings/multi-stakeholder-dialogue-on-biodiversity

The full comments are available on the FSN Forum Web site (www.fao.org/fsnforum) and in the proceedings document www.fao.org/fsnforum/sites/default/files/files/149_Biodiversity-mainstreaming/PROCEEDINGS_EN_Biodiversity_Mainstreaming.docx

Statistical overview

The online forum attracted comments from the following regions and professional fields.



Introduction

Participants reached consensus that we cannot advance the Sustainable Development Goals (SDGs) without biodiversity. In particular, biodiversity is a necessary and critical element to achieve the sustainable production of sufficient and nutritious food responding to the challenges posed by climate change, environmental degradation, demographic shifts and changing diets. In addition, biodiversity is important the conservation of the ecological foundations necessary to sustain rural livelihoods and animal and plant life.

The agricultural sectors (crop and livestock production, fisheries and aquaculture, forestry) together manage the largest terrestrial, freshwater and marine areas on Earth.

All agricultural sectors (crop and livestock agriculture, forestry, fisheries and aquaculture) rely on biodiversity and on the ecosystem functions and services they underpin, and hence also indispensable for their sustainable use and conservation. Unsustainable farming practices, such as deforestation,

overfishing, and the destruction of wetlands and aquatic environments, are key threats to biodiversity. Farming is also a major driver of agrobiodiversity loss; indeed, the intensification of food production is narrowing the genetic diversity of the plants and animals on which we rely for food and nutrition.

However, if managed sustainably, agriculture can contribute to important ecosystem functions such as maintenance of water quality, soil fertility and pest control.

Participants felt that at a macro level, promoting diversity entails a paradigm shift from industrial agriculture – which relies on a small number of crops and animal breeds – to diversified sustainable farming systems. At a national and local scale, this entails the development and implementation of coherent multisectoral policies that can stimulate demand for diverse foods, support the market for these crops and animal products, and guarantee the necessary knowledge transfers.

Participatory multi-stakeholder approaches

The inclusion of local actors in policy-making and implementation is critical for the creation of sustainable food systems and for the protection of biodiversity. Communities need to be meaningfully involved at all stages.

Existing local knowledge and experience also needs to be considered before a larger set of actors becomes involved in negotiation processes. This is holds true also when it comes to the development of legal frameworks aimed at protecting existing biodiversity. These need to be developed in a participatory manner in order to benefit from local acceptance, buy-in and maximize broad ownership and commitment.

- ▶ In Madagascar, Locally Managed Marine Areas (LMMAs) have successfully been set up with the active participation of the villages involved. This political set-up allows different interest groups to be taken into consideration,

thus benefitting the fishery sector and tourism as well as protecting the environment.

- ▶ In Palau, traditional leaders sit in a special advisory council to the Office of the President to ensure that laws and regulations are aligned with traditional practices and grassroots needs, such as enforcing seasonal fishing bans to prevent the depletion of fish stocks.



Incentives

Agricultural practices that benefit biodiversity require initial investments, and do not yield immediate results. Incentives might hence be needed to help increase adoption. At the same time, it is important to review existing incentives that subsidize practices that harm biodiversity.

- ▶ The EU's Common Agriculture Policy (CAP) provides a range of instruments to support biodiversity. Farmers who receive income support in the form of direct payments are obliged to comply with greening requirements, which include the establishment of ecological focus areas on five percent of their arable land.



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Supporting biodiversity-friendly investments

A key enabling factor for biodiversity are investments that conserve biodiversity, use biological resources sustainably and share benefits equitably. In 2014, the Committee on World Food Security adopted the Principles for Responsible Investments in Agriculture and Food Systems (CFS RAI), which includes a call for investments "supporting and conserving biodiversity" and "contributing to the restoration of ecosystem functions and services". To support the operationalization of the CFS RAI, FAO has

developed a multiyear Umbrella Programme Supporting Responsible Investments in Agriculture and Food Systems. Under this programme, the Organisation for Economic Co-operation and Development (OECD), together with FAO, has launched a pilot project with 30 leading enterprises to implement the OECD-FAO Guidance for Responsible Agricultural Supply Chains, which builds on the CFS RAI and calls for support in the conservation of biodiversity.

Importance of good governance, coordinated actions and capacity enhancement for more sustainable results

Good governance (such as institutional coordination, transparency, accountability and stakeholder involvement) and policy coherence are crucial for the implementation of measures that benefit biodiversity. This is especially true when it comes to coordinated action, as biodiversity cannot be tackled successfully using a geographically isolated and single-sector approach. Above all, this requires a system-wide, comprehensive capacity enhancement approach rooted in empowerment to strengthen people, organizations, institutions and the enabling policy environment to achieve more sustainable results.

- ▶ The strong link between agriculture and conservation efforts must be acknowledged. In the EU, for instance, agricultural activities are present in 86 percent of the sites belonging to the European Network of Areas for Nature Conservation.
- ▶ Legal frameworks give force to policy by creating legal obligations and enforceability of requirements. Legislation can drive changes in approach, planning, decision-making, management and behaviour.

No one-size-fits-all approach

There are substantial differences between agricultural sectors that need to be taken into consideration when looking at their implications for biodiversity.

- ▶ It is necessary to meticulously assess the local contexts through research and surveys.

- ▶ While fisheries and forestry tend to be more dependent on species that exist also in the wild, agriculture is dominated by crops and animals that have been bred – and have become highly specialized – by centuries of human selection.
- ▶ Biodiversity protection is highly dependent on natural resources such as water availability and soil quality, as well as other natural factors.

The Wine, Climate Change and Biodiversity Programme

The Wine, Climate Change and Biodiversity Programme is an initiative of the Institute of Ecology and Biodiversity (IEB) and the Austral University of Chile, which aims to show that biodiversity conservation and the development of the Chilean wine industry are compatible endeavours.

The programme began in 2008 with the specific goal of promoting the protection of biodiversity in the Chilean Mediterranean ecosystem, which is underrepresented in

the National System of Protected Areas. These central Chilean ecosystems contain over 50 percent of Chilean vertebrate and plant species, and have been severely affected by human activity.

Research focuses on understanding how natural landscapes can continue to provide environmental services to both industry and local communities, under a scenario of increasing human impact and future climate change.

The importance of biodiversity for soil fertility

Soil biodiversity heavily influences agricultural productivity and is a critical contributor to food security and nutrition. However, certain soil-dwelling animals, bacteria and fungi that are important in ensuring soil quality are currently being threatened by intensive and unsustainable agriculture practices.

- ▶ A reduction of soil biodiversity can be observed wherever cultivation relies on the wholesale and indiscriminate replacement of vegetation.
- ▶ Earthworms, which play a very important role as "ecosystem engineers" by modifying the physical, chemical and biological properties of the soil profile, are particularly sensitive to plant cover changes and to invasive farming techniques such as tillage.

SoilBio

The Global Soil Biodiversity Initiative is developing a national scale project (SoilBio, funded by Innovate UK) involving industry partners which seeks to develop a tool that can be deployed on-farm to assess soil health, thereby informing farmers of potential positive management interventions to maximize yields in a sustainable manner. The project engages directly with farmers and national associations through workshops and meetings in order to raise awareness of issues related to soil biodiversity.

Ecosystem services

By preserving biodiversity and reducing land degradation, agriculture sectors can provide valuable ecosystem services to the society at large.

- ▶ Evidence suggests that the efforts put in place by pearl farmers in French Polynesia to protect the waters where they carry out their commercial activities have also benefitted the local fish stock.
- ▶ Low-tillage techniques can benefit below-ground biodiversity, which is important for maintaining the resilience of the soil ecosystem and for sustaining above-ground biodiversity and terrestrial ecosystems.



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Biodiversity for improved nutrition

Assessing biodiversity presents an opportunity to review food production and consumption patterns and to reshape local food systems from a nutrition point of view.

- ▶ It might be necessary to transform production of local and/or underutilized crops in order to make them more convenient and appealing for daily consumption.

Commercial agricultural and fishing techniques can be detrimental to biodiversity

There can be a conflict between maintaining the biodiversity that normally exists in naturally functioning ecosystems and implementing any type of intensive agriculture requiring the large-scale application of chemical pesticides and fertilizers.

- ▶ The extensive application of fertilizers used in intensive agriculture can have negative effects on soil biota and long-term fertility.
- ▶ Demographic growth in many developing countries puts pressure on farmers to adopt intensive agricultural techniques that might be ill suited to local climatic and environmental conditions.
- ▶ Trawling and seining are controversial fishing methods, as the lack of selectivity of the trawl net results in the capture of non-target species, juvenile fish, and bottom flora and fauna (including endangered species such as sea turtles).

Traditional agricultural practices

Traditional agricultural practices tend to respect local biodiversity, as they are closely linked to the existing ecosystem. Safeguarding agrobiodiversity is often an intrinsic part of smallholder farming practices. These producers are aware of the need to conserve the different species and varieties of plants and animals present in their plots.

- ▶ For many family farmers, the search for high yields is not the only criterion for choosing crops; they also consider other factors such as family health, income, pesticides, and sanitary issues.
- ▶ There are efforts worldwide to promote the value of biodiversity represented in local and native products, as well as to preserve traditional knowledge, seasonality, and traditional ways of consumption.



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Mud crab farming in mangroves

Mangroves constitute a habitat and breeding ground for a variety of marine organisms. They have developed unique adaptations to the harsh conditions of coastal environments and act as shoreline protectors against violent weather events like tsunamis.

Maharashtra, a west coast province of India, has a mangrove area of 186 sq. km that is currently threatened by changes in climate as well as various developmental activities, like urbanization. Mangroves are important nursery and feeding habitats for many marine and coastal species. A crab species called the mud crab is found in estuaries, backwaters and coastal areas. Being a good source of protein, it is especially in demand during the summer season, when the fish catch decreases. Fisherfolk wade through the mangroves and mud flats searching for crab holes and hunting the crabs with long iron hooks.

During 2011, the UNDP Global Environmental Finance unit initiated a four-year-long mangrove crab-farming project in 17 villages of Sindhudurg district in Maharashtra. The programme helped fisherfolk from these villages to go on aquaculture related-institutional tours, get financial grants, organize self-help groups and set up pens, in addition to providing them with crablets.

With the knowledge that crab habitats are important to the livelihoods of the crab farmers, the local community no longer cuts mangrove branches for fuelwood or other purposes, thus protecting this unique ecosystem.

Communicating the complexity of biodiversity

The difficulty in making progress in protecting biodiversity partially stems from the inherent vagueness embodied in the concept and the lack of a common language spoken by all involved parties. It is important to develop communication strategies in order to create links between farmers, scientists, consumers and decision-makers.

An objective representation of biodiversity, inclusive of its economic implications, is pivotal to achieve measurable impacts on policies and strategies.

- ▶ Communication efforts need to be context-specific. In a project in rural Mexico, for example, theatre and puppet shows are proven to have a much greater impact than conferences, workshops or lectures. Farmers come to the show thinking it will be great for their kids, and leave the show as enriched and filled with ideas as their children.
- ▶ Providing information in local languages through rural radio programmes and other technologies such as mobile phones is key to bridging the knowledge gap.

Sustainable and organic farming systems

Organic farming and ecological agricultural production systems form a technical, social and environmental base that can contribute positively to the enrichment, conservation and sustainable use of biological diversity.

Limiting the use of chemical fertilizers and pesticides can facilitate a quick return of diverse flora and fauna to ecosystems. Traditional agricultural practices can also play an important role in the protection of biodiversity. This is especially the case when they involve local and underutilized crops that have adapted to local environmental conditions.

- ▶ In Kerala, India, organic farming systems used in domestic farming help protect the diversity of crops as well as soil fertility.
- ▶ In Costa Rica, coffee farmed under shade and without large amounts of inorganic nitrogen fertilizer has been found to host a more diverse fungal community, with

more fungi that can potentially serve as biological checks on coffee plant diseases.

- ▶ The inclusion of broad strips of native plantings around cropping and pasture fields in southeastern Australia benefits biodiversity.
- ▶ In rice ecosystems that limit the use of chemical fertilizers and pesticides, fish are usually the most valuable resource to return, together with shrimp, crabs, snails and diverse wild vegetables (i.e. edible weeds). These resources constitute a valuable secondary source of food that can also be exploited commercially.
- ▶ In countries dominated by small farms, a model of multifunctional small farming that integrates crops, horticulture, livestock and natural vegetation is key to sustainable development.

Biodiversity-sensitive food standards and procurement

The EU-LIFE "Biodiversity in Standards and Labels for the Food Sector" Project aims at improving criteria from food standards and procurement guidelines in order to enhance biodiversity in agricultural production. Both food regulators and food companies from all across the EU participate in this initiative. After a first analysis of 54 regional, national and international food standards and guidelines, a baseline report was published detailing how far the schemes addressed biodiversity.

The report included biodiversity measures for agricultural production, which food regulators and food companies should respect in their procurement guidelines and criteria catalogues. To complete the mainstreaming of biodiversity, an online monitoring system is under development and will soon be available for testing. Additionally, there will soon be a round table to gather input from interested stakeholders on the subject of biodiversity in the food sector.

The potential of local crops and underutilized genetic resources

Focusing on neglected and underutilized genetic resources could help achieve food and nutrition security in many parts of the world. Endemic plants and animals are often better adapted to local conditions and tend to put less strain on natural resources.

- ▶ Endemic crop resources in sub-Saharan Africa have diverse uses, and also have the potential to ameliorate malnutrition and hidden hunger and to strengthen resilience to environmental challenges among resource-poor and rural communities.

Crassulacean Acid Metabolism (CAM) plants in Mexico

Mexico has a very diverse concentration of CAM plants. Local inhabitants have always used them for food and other purposes. Agave and cactus, for instance, are an important part of the xeric grasslands and scrublands ecosystems. They provide nourishment and shelter to a multitude of organisms, help water retention, and can be used as anchors to slow erosion, help soil formation and

sequester carbon in environments that by nature have slow carbon cycles. At the federal and state level, Mexico has had some success in implementing programmes to propagate CAM plants. This experience can be used to guide the design of propagation programmes around the globe and to educate farmers on the food and fodder use of CAM plants, especially in cases of drought.

Need for awareness raising, participatory research and individual capacity enhancement

There is a need for continuous awareness raising to help people understand the importance of sustainable using and conserving existing biodiversity.

Farmers might not be conscious of the impacts of their particular techniques, while agribusiness and consumers might not be aware of the indirect impact of their economic choices. It is hence necessary to provide a full picture of biodiversity including both biological and economic implications.

- ▶ Communication should focus on the nature and severity of the biodiversity crisis, and the multiple ways in which biodiversity underpins the sustainability of the agricultural sector.
- ▶ National and international NGOs can play a significant role in facilitating the dissemination process.
- ▶ Awareness-raising campaigns should promote sustainable consumption and lifestyle choices that are compatible with local conditions and social structures.
- ▶ Farmers should be trained to incorporate indigenous species in their agricultural practices.
- ▶ Agricultural advisory services and farmer-to-farmer learning programmes should be established to scale up and scale out sustainable innovations and demonstrate that biodiversity and increased food production can be compatible.
- ▶ On-site assessment methods need to be developed to help farmers and extension workers assess the local biodiversity situation.
- ▶ Through the Farm Advisory Service under the EU Common Agricultural Policy, farmers can receive training and advice on organic farming and other sustainable farming practices.
- ▶ Rewards, scholarships, networks, mentoring programmes, and social marketing campaigns and events can encourage young people to engage in farming for biodiversity, through strategies that integrate business development, financial inclusion, new technologies, communications, and innovative linkages.



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VIDEOS

"Hailey's Farm": A Fun Life Sharing Endeavor
www.youtube.com/watch?time_continue=392&v=wh70bgPZVYY

Sharing borewells and groundwater
www.youtube.com/watch?v=Aw5BoRKYHRE

Sustainable Pearls
<https://vimeo.com/59023816>

WEBSITES

Desi Poultry
<http://www.wassan.org/desipoultry.htm>

FAO Agroecology Knowledge Hub
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Sustainability Map - Your roadmap to sustainable consumption, production and trade
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