Biovision and FiBL Submission for Koronivia joint work on agriculture: Elements to be included in topics 2(b) and 2(c)

Background

At this Koronivia joint work on agriculture (KJWA) in-session workshop in Bonn (SBI/SBSTA 50), adaptation, adaptation co-benefits and resilience (2(b)), as well as the role of soils and integrated agricultural systems in particular (2(c)), will be at the centre of discussions.

This submission provides first insights on these topics based on an ongoing scientific review of the empirical evidence for agroecology to tackle climate change in agriculture. The rationale for this review is the need for increased evidence on agroecology's potential to build resilience to climate change. Its objective is therefore to assess the state of scientific knowledge on this question. Agroecological agricultural systems, for short, are characterised by following and combining priciples such as closed nutrient cycles, increasing soil fertility and diversity as well as building on natural ecosystem processes and services (e.g. for plant protection). Some examples of agroecological practices are organic fertilisers (compost), biological nitrogen fixation, crop rotations, cover crops, agroforestry, or mixed crop and livestock farms. Agroecology also emphasizes social aspects, focusing on e.g. equity issues, collaborative development, farmers to farmers research and education, and bottom-up organisations of value chains.

The still ongoing review is conducted in a collaborative effort by Biovision Foundation for ecological development, the Research Institute of Organic Agriculture FiBL and the Food and Agriculture Organization of the United Nations FAO. It is based on an encompassing compilation of peer-reviewed literature published in English (number of studies identified: 193), Spanish (23), French (35), Portuguese (3) and Italian (4). The requirement for comparative studies, i.e. to provide data on both agroecological and some baseline farming system restricted the available studies considerably. This review is complemented with results from meta-analyses on the performance of specific agro-ecological practices and related approaches, such as conservation tillage, permaculture, organic agriculture or silvopastoral systems. The full review is planned to be be published for COP25.

Results of the scienitifc review

In the following, we present the key findings of this scientific review to inform workshops to be held at SB50 on the topics of: 2(b) Methods and approaches for assessing adaptation, adaptation co-benefits and resilience) and 2(c) Improved soil carbon, soil health and soil fertility under grassland and cropland as well as integrated systems, including water management:

Agroecological systems show increased resilience (stronger adaptive capacity and decreased vulnerability) towards adverse impacts of climate change, *based on the following findings:*

- Strong evidence that agroecology contributes to improved **soil** organic carbon contents, soil fertility and soil quality. This then results in higher water absorption and retention capacities and better soil structure, making these soils more resilient to droughts and heavy rain events. The increased soil organic carbon levels also have the co-benefit of climate change mitigation by sequestering CO_2 from the atmosphere.
- Strong evidence that agroecology contributes to increased **diversity** (crop, livestock or biodiversity and ecosystem services in general). This results in a diversity of locally adapted varieties, which are able to better cope with the local threats from climate change. Increased crop and biodiversity leads to higher nutrient use efficiency, productivity and stability of the production systems. A more diverse output also results in increased economic resilience as crop failures affect part of the production only. Furthermore, the diversity in ecosystem services provision shows the high multifunctionality of agroecological production systems, delivering food with many parallel benefits in other dimensions (such as soil fertility, support of pollinators, healthy and diversified nutrition, etc.).

- **Less dependency** on external inputs such as mineral fertilisers, seeds, imported concentrate feed or plant protection substances.

Agroecology with its focus on regionally closed nutrient cycles, high nutrient and water use efficiency and low external input use reduces food losses and waste as well as animal source food (milk, meat, eggs), which is produced from feed that competes with cropland for direct food production, such as feed cereals, soy or forage maize. This leads to lower external costs from food production. These measures also reduce the need to achieve ever higher yields and further intensification as the only way to ensure food security, with corresponding adverse environmental impacts including increased greenhouse gas emissions.

Integrated systems require institutional support

Actions on several levels are needed to support agroecology as a promising systemic approach to work towards increased climate change adaptation in agriculture.

- Integrated systems based on agroecological principles are knowledge-intensive, thus support of farmer-to-farmer exchange and collaborative research is pivotal.
- Designated institutions and stakeholders need to provide resources and means for further transfer of non-farm research to on-farm application. They also need to facilitate knowledge transfer services to enable the development of adequate solutions for regionally most pressing challenges of climate change.
- Financial means for supporting research on agroecological production and food systems need to be increased considerably. Currently, only a very marginal share of research investments in agriculture and food systems is targeted to systemic agroecologcial approaches.
- Soil carbon, soil health, soil fertility and water management should be treated in an integrated way, in order to avoid silo thinking and consequently perverse incentives with contradictory effects (e.g. only optimizing soil carbon through “No-till” monocultures while negatively affecting soil health, biodiversity and water.)
- Policies and support systems need to be coherent, for example, parallel subsidies for biodiversity protection or agroecology on the one hand and pesticide or mineral fertiliser use on the other need to be avoided.

The above listed institutional support needs to foster:

- Locally adapted approaches to increase and conserve soil fertility, e.g. by adequate crop rotations with legumes or agroforestry systems, optimal fertilisation strategies with organic fertilisers, and practices to produce good compost and to optimally recycle nutrients on farm and regional levels.
- Reduced nutrient inputs and closed nutrient cycles. This entails a focus on reduction of nutrient imports in mineral fertilisers and concentrate feed, as well as supporting use and recycling of nutrients from municipal waste and sewage for fertilisation and the use of by-products and waste as feed.
- Improved water management, such as through locally adapted water harvest and conservation techniques.
- Diversity in farm operations, e.g. through the integration of crop and livestock systems, e.g. in silvopastoral systems.

To support this, agricultural (climate) policies and finance flows need to be coherent and non contradictory, supporting the common objective of sustainability. They need to build on synergies between SDG 13 (Climate Action) and all other SDGs as well as other internationally agreed targets and conventions, in particular UNCCD and CBD, while minimizing tradeoffs between them.

Biovision Foundation *combats hunger and poverty and is committed to the dissemination and application of ecological methods that sustainably improve living conditions in Africa while also conserving the environment. Biovision renders ‚help for self-help' and promotes ecological thought and action in both North and South.*
In 2012, Biovision became the first Swiss Foundation to be granted General Consultative Status at ECOSOC of the United Nations. Since then Biovision has taken part in UN Conferences, official discussions and has organised side events to argue its case.
In 2013, Biovision and its founder Hans Rudolf Herren won the Right Livelihood Award, also known as the Alternative Nobel Prize.

https://www.biovision.ch/en/home/

FiBL *(the Research Institute of Organic Agriculture) is an independent, non-profit, research institute with the aim of advancing cutting-edge science in the field of organic agriculture. FiBL's research team works together with farmers to develop innovative and cost-effective solutions to boost agricultural productivity while never losing sight of environmental, health and socio-economic impacts. Alongside practical research, FiBL gives high priority to transferring knowledge into agricultural practice through advisory work, training and conferences. FiBL has offices in Switzerland, Germany, Austria, France and Brussels (FiBL Europe) and numerous projects and initiatives in Europe, Asia, Latin America and Africa.*

https://www.fibl.org/en/homepage.html