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## Agroecological approaches and other innovations

In June 2019, the HLPE report on “Agroecological approaches and other innovations for sustainable agriculture and food systems that enhance food security and nutrition”<sup>1</sup> was released. This report is the first FAO report dealing prominently with agroecology. It suggests a concise set of 13 agroecological principles and points out that there has been much less investment in research on agroecological approaches than on other innovative approaches.

The High Level Panel of Experts for Food Security and Nutrition (HLPE) is the global level science-policy interface of the Committee on World Food Security (CFS) and the foremost evidence-based, inclusive, international and intergovernmental platform for food security and nutrition (FSN). The HLPE provides a comprehensive overview of the topics selected by the CFS, based on the best available scientific evidence and considers different forms of knowledge. HLPE strives to clarify contradictory information and knowledge, to elicit the backgrounds and rationales of controversies, and to identify emerging issues.



The HLPE (2019) report is based on extensive research about the current situation of agriculture and food systems, describes the fundamentals and principles of agroecology, and details to what degree agroecological approaches can provide solutions for future challenges. The report also provides a comparison between different criteria for agroecological and related approaches (including organic agriculture, agroforestry and permaculture) and sustainable intensification approaches (including climate-smart agriculture, nutri-

tion-sensitive agriculture and sustainable food value chains). The report also presents controversial debates about how to reach food security. These include the deployment of biotechnology and digital technology, the use of synthetic fertilizer, conservation of biodiversity in agricultural landscapes, need of size of agricultural enterprises, and if agroecology can feed the world. In this essay the contents, findings and several recommendations of the report are presented.

Agroecology is a dynamic concept that has gained prominence in scientific, agricultural and political discourse in recent years. It is increasingly promoted as being able to contribute to transforming food systems by applying ecological principles to agriculture. These principles allow for the regenerative use of natural resources and ecosystem services while also addressing the need for socially equitable food systems within which people can exercise choice over what they eat and how and where it is produced. Agroecology embraces a science, a set of practices and a social movement and has evolved over recent decades to expand in scope from a focus on fields and farms to encompass whole agriculture and food systems.

Agroecology is a transdisciplinary science, combining different scientific disciplines to seek solutions to real world problems. It works in partnership with multiple stakeholders, considering local knowledge and cultural values in a reflective and iterative way that fosters co-learning among researchers and practitioners. Agroecology also allows for the horizontal spread of knowledge from farmer to farmer or among other actors along the food chain. Initially the science of agroecology was focused on understanding field-level farming practices that use few external inputs but high agrobiodiversity, emphasizing recycling and maintenance of soil and animal health, including managing interactions among components and economic diversification. The focus has since expanded to include landscape-scale processes, encompassing landscape ecology and, more recently, social science and political ecology related to the development of equitable and sustainable food systems.

**Agroecology encompasses a science, a set of practices and a social movement.**

Agroecological practices harness, maintain and enhance biological and ecological processes in agricultural production in order to both reduce the use of purchased inputs that include fossil fuels and agrochemicals and to create more diverse, resilient and productive agroecosystems. These practices include, for example, diversification in rotations and production; intercropping; cultivar mixtures; habitat management techniques for crop-associated biodiversity; biological pest control; improvement of soil structure and health; biological nitrogen fixation; and recycling of nutrients, energy and waste. There is no definitive set of practices that could be labelled as agroecological. But agricultural practices can be classified along a spectrum and qualified as more or less agroecological, depending on the extent to which agroecological principles are locally applied. In practice this comes down to the extent to which: (i) they rely on ecological processes as opposed to purchased inputs; (ii) they are equitable, environmentally friendly, locally adapted and controlled; and (iii) they adopt a systems approach embracing management of the interactions among components rather than focusing only on specific technologies.

Social movements associated with agroecology have often come about in response to agrarian crises and operated in tandem with broader efforts to initiate

widespread change to agriculture and food systems. Agroecology has become the overarching political framework under which many social movements and peasant organizations around the world assert their collective rights and advocate for a diversity of locally adapted agriculture and food systems mainly practised by small-scale food producers. Social movements highlight the need for a strong connection to be made between agroecology, the right to food and food sovereignty, positioning agroecology as a political struggle, which requires people to challenge and transform the structures of power in society.

The report suggests a set of 13 agroecological principles: recycling; reducing the use of inputs; soil health; animal health and welfare; biodiversity; synergy; economic diversification; co-creation of knowledge; social values and diets; fairness; connectivity; land and natural resource governance; and participation.

In current debates on how sustainable food systems can be developed and food security be reached, based on agroecological approaches, three critical issues are in the forefront:

- (i) How much food needs to be produced to achieve FSN (food security and nutrition); centred on whether FSN is mainly a problem of availability or more an issue of access and utilization?
- (ii) Could agroecological farming systems produce enough food to meet global demand for food?
- (iii) How to measure the performance of food systems, taking into account the many environmental and social externalities that have often been neglected in past assessments of agriculture and food systems?

In relation to i) the report indicates that, in respect of food production, a larger number of people could be fed, but that access to food is not sufficiently guaranteed, that losses are too high in food storage and processing, that changes in animal production and consumer diet (in particular related to meat consumption) would be necessary, that food resources should not be used for biofuel production, and that current policies do not sufficiently support smallholders, which produce 70% of the world's food.

In respect of ii) the answer of many agriculture experts is yes, however contrasting opinions exist amongst other experts, who see conventional agriculture with innovation and biotechnology as more suitable. For both proponents it is valid that the points under i) need to be considered. Here it has to be stated that conventional agriculture in its present form has hitherto not been able to provide sufficient food and FSN. For FSN in developing countries, the report provides different examples - whereby agroecological approaches and practices can positively influence a variety of factors. For example, increased food provision of families in critical phases during the year with food availability shortage, or improved nutrition of small children. Other examples show that increased

diversification in plant production enhanced diversity of diets, and with this different health factors also improved. The diversification in production also increased resilience to climate change impacts. Moreover, positive influences on the economic situation of households can be stated as well as for women empowerment.

In relation to iii), measurement and assessment factors such as ecological footprints and agency need to be taken into account. Agency refers to the capacity of individuals or communities to define their desired food systems and nutritional outcomes, and to take action and make strategic life choices in securing them.

To overcome the challenges, different innovations are required. Conventional views of innovation in agriculture have often focused on the introduction and spread of adoption of new technologies. Recently, greater emphasis has been placed on promoting: (i) inclusive and participatory forms of innovation governance; (ii) information and knowledge co-production and sharing among communities and networks; and (iii) responsible innovation that steers innovation towards social issues.

One example of a highly controversial issue is biotechnology. The report outlines a polarised debate centred on public concerns about safety, environmental impacts, concentration of power within food systems and the ethics of gene modification. Proponents of agroecology see different aspects of modern biotechnology in conflict with core agroecological principles – these are often associated with ecology, democratic governance and sociocultural diversity. Recent calls for a global observatory for gene editing propose increased scrutiny, dialogue and deliberation on the use of biotechnologies. On a global scale, modern biotechnologies are a significant component of the agricultural systems of a number of countries. In contrast, in agri-food systems where input-intensive models have not been adopted, solutions may be found that do not rely on the adoption of biotechnologies used elsewhere.

**Diversification in production also increases resilience to climate change.**

The report provides different recommendations to governments and policy makers. Among these recommendations are the use of relevant performance metrics for food systems that consider all environmental, social and economic impacts of food production and consumption. In particular, the ecological footprint of different food systems needs to be enhanced. States and governments should support diversified and resilient production systems, including mixed livestock, fish, cropping and agroforestry that preserve and enhance both biodiversity as well as the natural resource base. This should be done by i) redirecting subsidies and incentives that at present benefit unsustainable practices, ii) supporting use of participatory and inclusive territorial management planning and management, iii) building adaptation of in-

The HLPE report is the first FAO report or publication to deal prominently with agroecology. The acceptance of agroecology as one of the pathways and alternatives to develop sustainable agriculture and food systems in the policy arena officially started in 2014, when FAO organized a first International Symposium on Agroecology for Food Security and Nutrition, followed later by 7 regional meetings from 2015 to 2017 in Latin America, Africa, Asia and Europe. A second International Symposium was convened by FAO in 2018 on scaling up agroecology to achieve the Sustainable Development Goals. Here former FAO Director-General José Graziano da Silva called for healthier and more sustainable food systems – stating that agroecology can contribute to such a transformation, and that in addition, it offers multiple benefits, including increasing food security and resilience. This opened up the way or the scaling up of the agroecology initiative of FAO, for the HLPE report, and policy debates.

Although the HLPE report can be seen as an important step forward, the outcomes and recommendations could have been more specific and progressive. It is clear that some messages and recommendations have been diluted for political reasons and to accommodate commonly agreed views and positions of stakeholders in the CFS to not put too much emphasis on agroecology as a solution to change current agriculture and food systems. For example, the wording “agroecological approaches and other innovations” often appear with critical and controversial points in order to not indicate a necessary pathway, solution or recommendation to change present systems and policies. However it should be noted that the expert authors made clear requests as to where and where not to place agroecology in their final draft. But overall this report demonstrates clearly that the potential and contribution of agroecology for the development of sustainable agriculture and food systems, the need for a paradigm change and new policies to support alternative systems can no longer be ignored by policy makers, governments or agribusiness sector stakeholders.

Overall, the most important and urgent policy change that is necessary is a shift from the yield maximising paradigm that ignores its associated negative environmental and social externalities. Policies should support farmers and production systems that make the best use of natural resources, harness ecosystem services and ecological processes sustainably, and are not harmful to environmental and human health. Policies should also be harnessed to counteract concentrations of power in supply chains and agri-food businesses that are a barrier of change and hinder a transition towards more sustainable food systems that deliver a fairer share of economic benefits for both producers and consumers.

ternational agreements and national regulations on genetic resources and intellectual property to better take into account farmers' access to diverse, traditional and locally adapted genetic resources, as well as farmer-to-farmer seed exchange, and iv) strengthening the regulations on the use of chemicals harmful for human health and the environment in agriculture and food systems, pro-

moting alternatives to their use and rewarding practices that produce without them.

Furthermore, more support should be given to food value chain innovation platforms and innovation. One important recommendation is supporting the development of local 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 and improve their access to local food markets.

**Performance metrics must consider all environmental, social and economic impacts.**

And finally, investments in public and private research and development should be increased and support programmes in agroecological and other innovative approaches (the report shows that funding for research in agroecology is very low compared to conventional agriculture). In addition, investment should be increased to develop and support transdisciplinary research conducted through innovation platforms that foster co-learning between practitioners and researchers, and the horizontal dissemination of experience among practitioners (e.g. farmer-to-farmer networks, communities of practice and agroecological lighthouses).

In the IAASTD (2009) report, agroecology is mentioned relatively few times, although many elements of how it is seen today were already in the report. Agroecology was presented as the science of applying ecological concepts and principles to the design and management of sustainable agroecosystems, including the study of the ecological processes in farming systems and processes. Therefore, the report was referring more to practices without calling them agroecological practices. The report did not include the view on agroecology and food systems as detailed in the HLPE (2019) report, and did not link the importance of agroecological movements to the push for transformation of agriculture and food systems.

### Endnote

1 <http://www.fao.org/3/ca5602en/ca5602en.pdf>



Alexander Wezel is an agroecologist and a landscape ecologist, currently working as Research Director of Isara at the AgroSchool for Life in France. At the start of his career he worked on various topics related to land use and resource conservation in the Tropics and Subtropics. Over the past 10 years his research has primarily focussed on analysing world-wide interpretations and definitions of agroecology and agroecological practices. He now also focuses on a variety of topics related to agroecosystems analysis and management.