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“Agroecology Dialogue Series”

Dialogue 3: **Agroecology as a response to agri-input scarcity**

Background paper

Record prices in fertilizers, supply chain interruption, and increasing dependence on synthetic agricultural inputs and a handful of suppliers have underlined the urgency of food system transformation. As a result, a number of countries are committing to reducing their dependence on synthetic inputs. The current crisis creates opportunities to advance food system transformation through agroecology. The third dialogue of our Agroecology Dialogue Series will focus on a better understanding of concrete implementation steps and pathways to increase the resilience of food systems to agricultural inputs scarcity through agroecological approaches, in the areas of policy reform, knowledge creation and investments.

This background paper offers a description of six thematic areas around agroecology as a response to agri-input scarcity that have been identified by a guiding group of expert. They will serve as a guiding thread during the interactive dialogue that will be held on September 2022.

Impact of the current input crisis on food systems

Prices of agri-inputs, in particular fertilizers and energy, are at record highs. The increase in fertilizers price started towards the end of 2021 and has been amplified by the war in Ukraine. Disruptions in fertilizer affordability and availability are creating concerns over future harvests and global agricultural production. The disruption of prices is exacerbated by other climatic and political factors. Agroecological and organic farming systems are low-input-based systems that often promote locally sourced inputs and/or circularity of nutrients at the farm level or between neighbouring farms. Examples and evidence showing differentiated impacts of agri-input scarcity on agroecological and conventional farming systems will be presented and discussed during the dialogue. These examples and evidence will be paramount in challenging existing narratives about the “need to intensify agriculture by using more fertilizer” and showcase the comparative advantage of agroecology for responding to the effect of agri-input scarcity while addressing other environmental and climatic issues.

Current policy incentives that hinder agroecological solutions

The development, implementation and scaling up of agroecological practices require an appropriate enabling policy and institutional environment. In many countries, agriculture subsidy’s main purpose is to enhance agricultural productivity by promoting the use of fertilizers, hybrid seeds, and pesticides. In Africa, most of the agricultural subsidies are targeting staple crops such as maize and wheat production, replacing existing diverse



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farming systems by monocultures, and neglecting the production of nutrition-sensitive crops (AFSA, 2017)¹. Many African countries' agricultural policies reflect expectations of external interferences from multinational seed/fertilizer/pesticide companies and conditional international aid. This led to export-oriented agricultural production, dependencies on the import of cereals to satisfy local food security and increased risk to international energy, agri-input, and food price volatility. In this discussion group, we will discuss specific agri-input policies and explicit how they hinder agroecological solutions. How can we change this trend by acting at national and international levels to prevent those perverse policy incentives?

The supply crisis and the agroecology comparative advantage

Worldwide increased synthetic nitrogen fertilizer use in agriculture led to increased nitrogen losses to the environment, causing multiple severe impacts on ecosystems and human health through air and groundwater pollution, greenhouse gas emissions, and loss of aquatic and terrestrial biodiversity. Agroecological practices are based on ecological processes that promote nutrient cycling at the farm and/or territory level (e.g., diversification with legume grain and cover crops, crop-livestock integration, intercropping with legume crops etc.). Those practices are well researched, and their benefits for increased agricultural production while maintaining and/or restoring ecosystems, adaptation and mitigation of climate change have been largely demonstrated (Snapp et al., 2021)². However, large implementation of those practices requires awareness-raising and a more holistic calculation of the economic return of the implementation of those practices in the medium and long term. The dialogue will look at the benefits, costs and risks of agroecological approaches for different stakeholders in the context of the current agri-input crisis and discuss technical, economic and policy incentives that could foster farming systems that recycle nutrients.

Efficient use of fertilizers

The spike in input prices may lead farmers to reduce input applications or switch to less input-intensive crops. Efficient and effective use of fertilizers aims at matching nutrient supply with crop requirements to optimize yield while minimizing nutrient losses to the environment. While efficiency is one of the FAO 10 elements of agroecology, it is seen only as a first step into an agroecological transition of farming systems. Besides, government policies and market incentives that focus on increasing fertilizers efficiency might simply reinforce the 'Jevon's paradox', increasing the demand for fertilizers and negating reductions in resource use. A long-term agroecology perspective on soil fertility management requires designing and managing diverse agroecosystems that create synergies between different components of the agricultural system to reduce and even eliminate the use of synthetic fertilizers. This perspective goes beyond the optimum input/output vision to create more efficient

¹ AFSA. (2017). A study of Policies, Frameworks and Mechanisms Related to Agroecology and Sustainable Food Systems in Africa. Kampala, Uganda. Available at: <https://afsafrika.org/wp-content/uploads/2018/09/agroecology-policy-eng-online-single-pages.pdf>

² Snapp S, Kebede Y, Wollenberg E, Dittmer KM, Brickman S, Egler C, Shelton S. (2021). Agroecology and climate change rapid evidence review: Performance of agroecological approaches in low- and middle- income countries. Wageningen, the Netherlands: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).



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farms that are based on biological processes, and that recycle biomass, nutrients, and water, which increases the autonomy of the farmer and increases resilience to natural or economic shocks (HLPE, 2019)³. This discussion group will explore the potential short-term yet fundamental changes that should be brought in fertilizer use and application practices, while reflecting on incentives and support to provide to farmers to go beyond the efficient use of fertilizers towards more systemic changes.

Enabling conditions towards reduced input dependency and for an agroecological transformation

A transformation from the current dominant conventional towards agroecological farming systems requires overcoming several lock-ins such as investment path dependency, export orientation in agricultural policies, compartmentalized thinking, short-term thinking, “feed the world” narratives, the way success is measured, and the concentration of power in agribusiness (IPES-Food, 2016)⁴. This will require a combination of policies and incentives targeting not only food production and farmers but also all existing agricultural value chains. Transitioning toward knowledge-intensive agroecological systems also entails investment in research and capacity building of all actors throughout agricultural value chains. This discussion group will discuss potential mechanisms for introducing and up-scaling agroecological approaches that reduce input dependency and look at knowledge gaps and capacities necessary for a transition towards reducing input dependency.

Enabling conditions towards an equal and just agroecological transition

Beyond political, technical and market enabling conditions, an agroecological transformation from current dominant conventional farming systems needs to put equality and justice considerations at the heart of the transition strategy. This will entail challenging current power structures in agribusiness to move away from dominating food system narratives, valorising and building on farmers’ indigenous knowledge, as well as empowerment and agency of all stakeholders at the territory level. Achieving this requires paying attention to the concerns and constraints of different actors and their current level of dependency on conventional practices. This discussion group will discuss those constraints and propose alternative solutions.

³ HLPE (2019). Agroecological and other innovative approaches for sustainable agriculture and food systems that enhance food security and nutrition. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome.

⁴ IPES-Food (2016). From uniformity to diversity. *International Panel of Experts on Sustainable Food Systems*. Available at: https://www.ipes-food.org/_img/upload/files/UniformityToDiversity_FULLL.pdf



Material on case studies

- **Case study 1: Long-term data on Farming Systems Comparison in the Tropics**
 - Project website <https://systems-comparison.fibl.org/>
 - Synthesis Report: Bhullar G et al. (2021). What is the contribution of organic agriculture to sustainable development? A synthesis of twelve years (2007-2019) of the “long-term farming systems comparisons in the tropics (SysCom)”. Research Institute of Organic Agriculture, Frick, Switzerland. Available at <https://systems-comparison.fibl.org/results/reports.html>
- **Case study 2: Challenges of indigenous peoples towards agroecological transformative responses in Bolivia**
 - Jacobi J et al. (2018). Operationalizing food system resilience: An indicator-based assessment in agroindustrial, smallholder farming, and agroecological contexts in Bolivia and Kenya. *Land use policy* 79 (2018): 433-446. Available at <https://www.sciencedirect.com/science/article/abs/pii/S0264837718301789?via%3Dihub>
- **Case study 3: National response to the crisis in Ethiopia**
 - Gemechu GE, Senbeta G, Pace Ricci JM. (2022, August 19). Getting a head-start: improved seeds and fertilizers in Oromia. *The Water Channel*. Retrieved from <https://thewaterchannel.tv/thewaterblog/getting-a-head-start-improved-seeds-and-fertilizers-in-oromia/>
- **Case study 4: Scaling Up Agroecology Through the Use of Feebates: The Case of Rice in Bhutan**
 - Arquitt S and Pedercini M (2022). *Millennium Institute*. Available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4113770

Other recommended readings on the topic

- Hebebrand C, Laborde D (2022, April 25). High fertilizer prices contribute to rising global food security concerns. *IFPRI*. Retrieve from <https://www.ifpri.org/blog/high-fertilizer-prices-contribute-rising-global-food-security-concerns>
- IPES-Food (2022, May). Another Perfect Storm? How the failure to reform food systems has allowed the war in Ukraine to spark a third global food price crisis in, 15 years and what can be done to prevent the next one. IPES-Food. Available at https://www.ipes-food.org/_img/upload/files/AnotherPerfectStorm.pdf
- FAO (2022). *Food Outlook – Biannual Report on Global Food Markets*. Rome. Available at <https://doi.org/10.4060/cb9427en>
- Benton, T. G., et al. (2022). The Ukraine war and threats to food and energy security. Chatham House—International Affairs Think Tank. Available at https://www.chathamhouse.org/sites/default/files/2022-04/2022-04-12-ukraine-war-threats-food-energy-security-benton-et-al_0.pdf



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Resources on policy support related to chemical inputs and their impact

- FAO, UNDP and UNEP (2021). A multi-billion-dollar opportunity – Repurposing agricultural support to transform food systems. Rome, FAO. Available at <https://doi.org/10.4060/cb6562en>
- UNEP (2020). Study on the effects of taxes and subsidies on pesticides and fertilizers. Background document to UNEA-5 Review Report on the Environmental and Health Effects of Pesticides and Fertilizers. Available at <https://greenfiscalspolicy.org/wp-content/uploads/2020/09/Study-on-the-Effects-of-Pesticide-and-Fertilizer-Subsidies-and-Taxes-Final-17.7.2020.pdf>
- AFSA. (2017). A study of Policies, Frameworks and Mechanisms Related to Agroecology and Sustainable Food Systems in Africa. Kampala, Uganda. Available at: <https://afsafira.org/wp-content/uploads/2018/09/agroecology-policy-eng-online-single-pages.pdf>