Factsheet
2022 | No. 1471

Ecological approach to organic farming in the Tropics

Introducing the active system approach

Interest in ecological organic agriculture is increasing across Africa due to the need for more sustainable options to agricultural production, food and nutrition security, and concerns about the negative effects of synthetic agrochemicals on human and environmental health. Organic farming requires not only renouncing synthetic agrochemicals, but a shift in approach and focus – moving to a holistic system view. Some key points must be considered in order to successfully transition to a truly ecological organic approach.

This factsheet introduces the ecological approach to organic farming, changes that are necessary to implement the approach, expected benefits, and provides a few examples of recommended systems for the tropics. The information is based on long-term experiments and on-farm research conducted in the scope of three projects across different countries in Africa, as well as Bolivia and India. Further products in the series, e.g., posters, videos and more, are linked in the 'Further information' section on the last page of this factsheet.

Key findings from the research

- In the **ecological approach to organic farming,** farmers work with nature and help to sustain living ecological systems and cycles – this includes: soil, plants, animals, wildlife, community, society and environment.
- This approach requires a focus on the **productivity of the whole farm system** over the longterm using organic best practices, e.g., crop rotations, local crops, agroforestry, etc. instead of focusing on short-term income.
- Ecological organic farming systems are **knowledge intensive** – farmers and advisors should learn, experiment and share knowledge with one another.

Ecological organic agricultural systems aims to sustain the health of ecosystems and people. The use of synthetic agrochemicals is prohibited and replaced by active, system-oriented farm management, e.g., diversified cropping systems, integrated pest and disease management, closed nutrient cycles. Ecological approaches are knowledge-intensive and depend on combining tradition, innovation and science to benefit the environment and promote fair relationships and a good quality of life for all involved.

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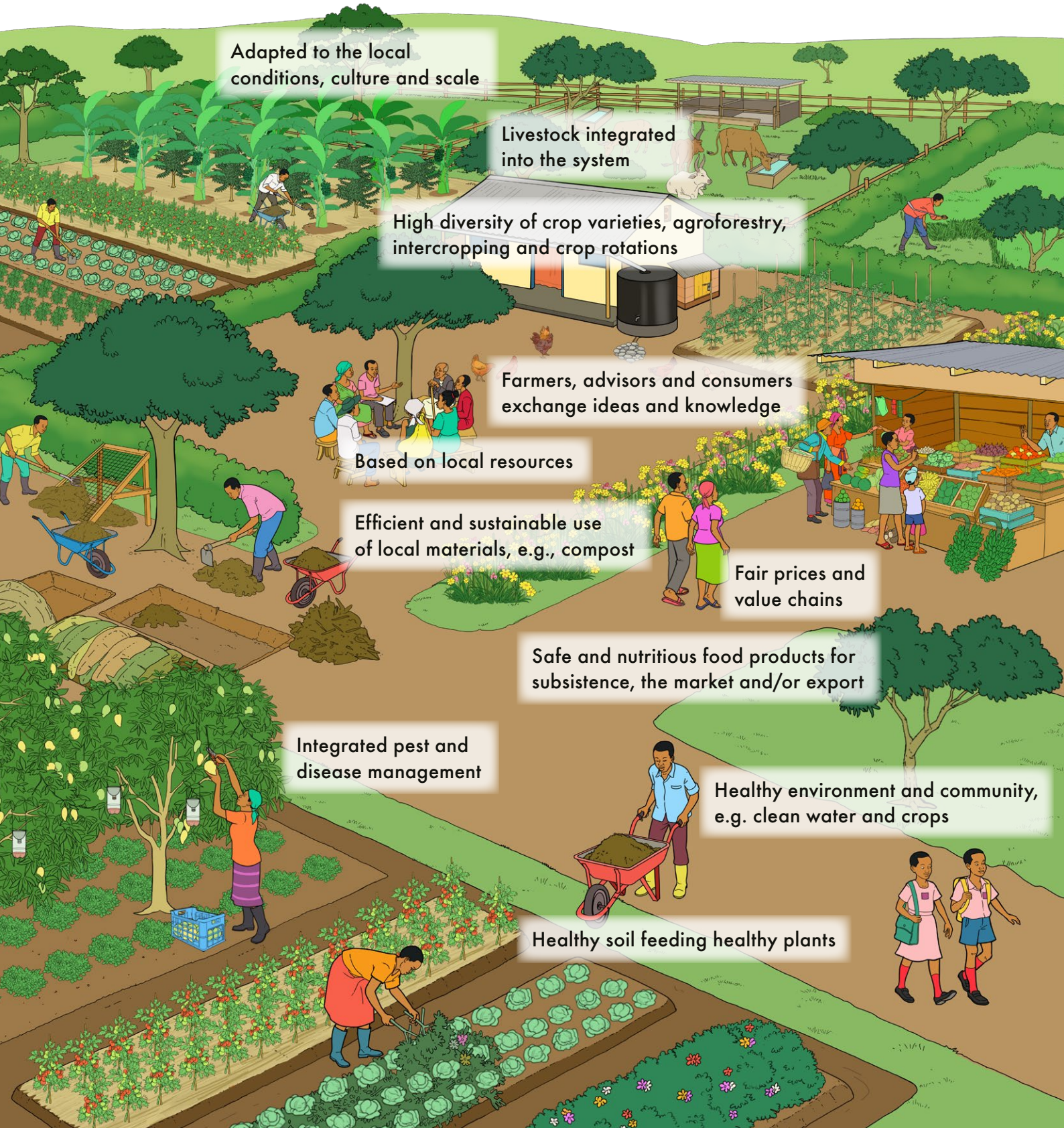
What does an ecological approach to farming look like?

» An active, system-oriented ecological approach to organic farm management is required for success – this is knowledge intensive and should focus on practices that use local resources to care for the soils and boost biodiversity.

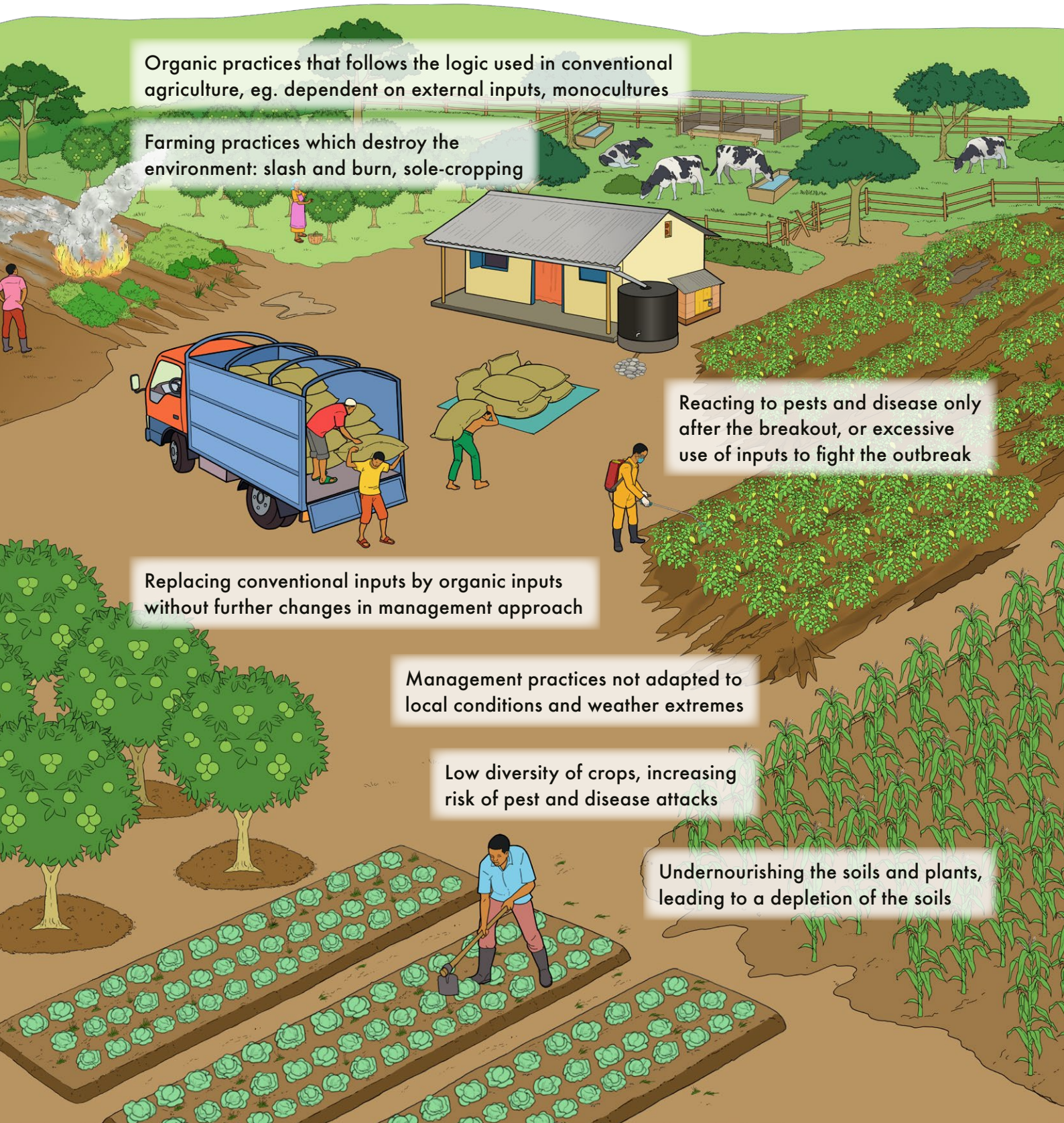
Key finding from the research



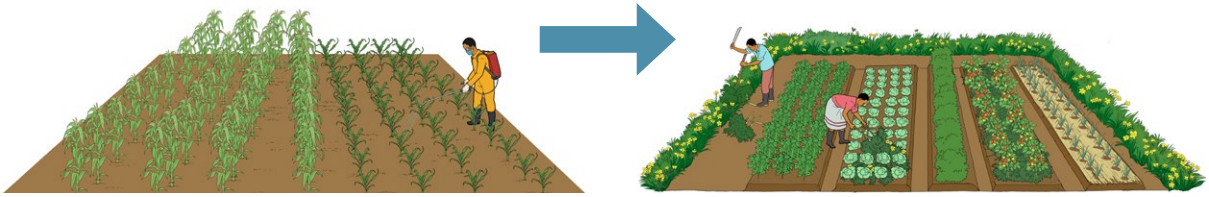
What does an ecological approach to farming *NOT* look like?

» Passive, non-active farm management, i.e., farms which do not provide the sufficient amounts of high-quality organic inputs, as well as, lacking a system oriented approach, will be less successful.

Key finding from the research



What changes are necessary when I want to take the ecological approach to organic farming?

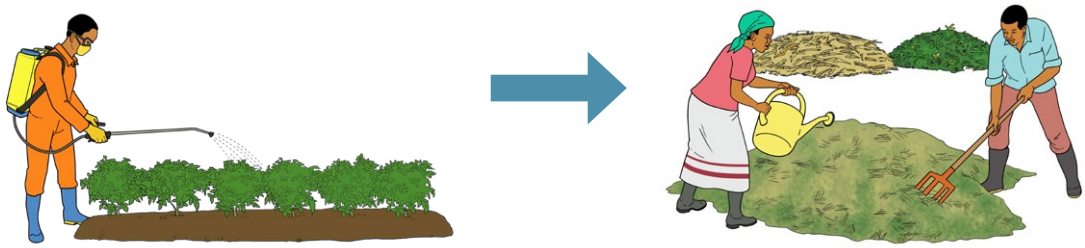


Standard approach

- Short-term focus on efficiency, yields and profitability.
- Treating problems instead of preventing them.

Holistic system approach

- Focus on: long-term farm sustainability, diversity, quality, health and livelihood.
- Preventing problems with best practices.

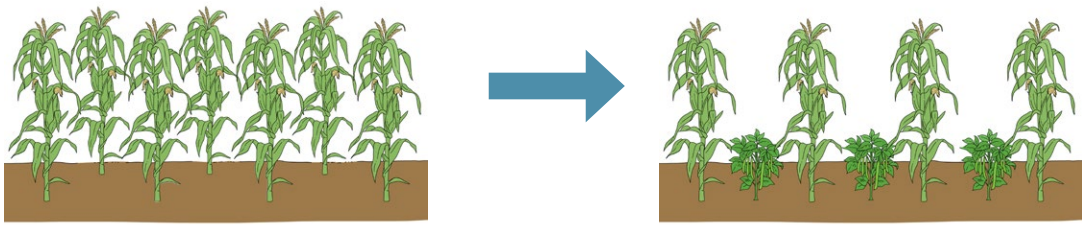


Low quality commercial inputs

- Synthetic agrochemicals, e.g., pesticides, herbicides and fertilisers, used.
- Threaten human and environmental health.
- Expensive for small-scale farmers in the tropics.

High quality organic inputs

- Plant-based, homemade organic composts and botanicals made from local resources.
- Safe for the farmer and environment.
- Higher labour required, but more affordable.



Sole-/monocropping system

- Growing a single crop on a field during one season or over the years, depletes soil fertility and health.
- Higher risk for erosion in weather extremes.
- Increases risks of pest, disease and weed invasion.

Diversified cropping system

- Intercropping: growing two or more crops on the same plot, at the same time.
- Crop rotations: growing a series of different crops sequentially in the same area.
- Lessen the risk for farmers, increase productivity and food security, suppresses weeds.

Examples of organic systems recommended from research on tropical small scale farming systems

Diversified cropping systems

Push-pull intercropping desmodium, green beans and Bacharia grass between fields: Desmodium is a legume, enriching the soil with nitrogen, it is also a 'push' plant, when planted in between the rows it repels problem pests and suppresses weeds. Bacharia is a 'pull' plant for pests and a forage grass.

Maize and bean row intercropping: the two crops alternate in rows. Beans are legumes which increase soil nitrogen, resulting in higher yields and more efficient resource use. They help to control erosion and reduce weed pressure, as well as pests and diseases.

Companion cropping of cabbage with coriander: cabbage crops can be damaged by pests, coriander can help protect the crop because the crop hosts natural enemies that feed on the pests. Additionally, coriander acts as another marketable product.

Agroforestry systems

Young cacao agroforestry system: there is still enough light reaching the ground to include crops like pineapples, cassava, manioc, pumpkin, maize, etc.

Diverse cacao agroforestry system: with the main crop cocoa. Timber and fruit trees, native palm trees, banana and coffee.

Successional cacao agroforestry system: with cacao, timber and fruit trees, high stem banana varieties as well as coffee, ginger and turmeric.

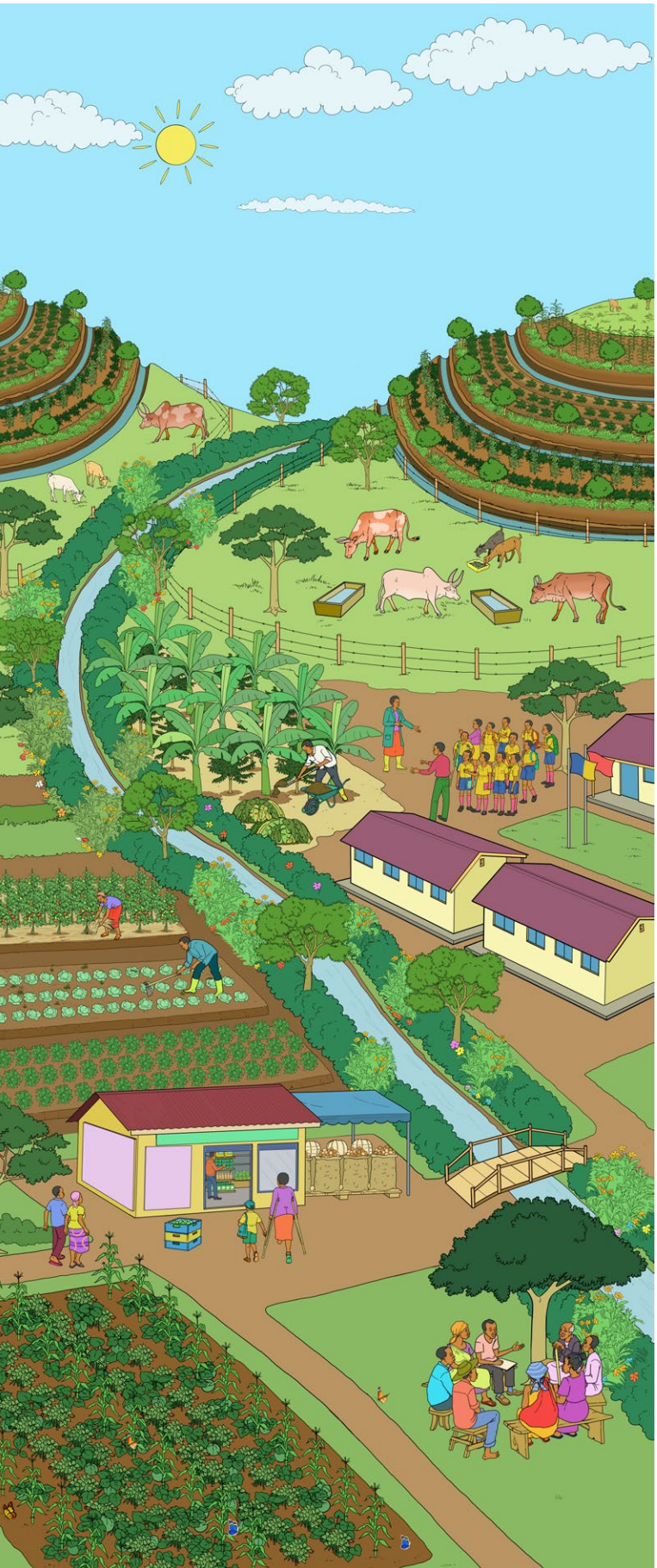
Integrating livestock into cropping systems

Diversified system with livestock: Crops and livestock have a synergistic relationship. The animals can feed on fodder, such as desmodium and bana grass, crop residues, etc. Crops benefit from the manure from the livestock. A good balance needs to be found.

Animal manure for composting: Farm animals play an important role in the closed nutrient cycles on organic farms. They increase available biomass for composting. Covering the manure and protecting it from rain and sunlight helps to conserve nutrients.

Additional benefits from livestock: draft power, diversified products (milk, meat, honey, hides and other by products, pollination by bees, etc.), and diversified incomes. Some livestock help to control weeds through grazing, and feed on some pests like insects on the farm.

What benefits can I expect when using the ecological organic approach?



Improved human and environmental health

- Reduced harmful chemicals in soils, crops and water
- Enhanced food security
- Improved soil health and fertility
- Increased biodiversity
- Conservation of rare and native species
- Increase in social capital: skills, education, better collective management of natural resources

Reduced risks

- Lower risk of health problems for farmers and community
- Better adapted to withstand weather extremes
- Higher on-farm diversity – less susceptible to pest and disease outbreaks
- Soil conservation and maintenance of soil fertility, less soil erosion

Less capital intensive and higher income

- Increased autonomy
- Less need to buy expensive external inputs
- Use and recycle affordable local resources
- Better prices for organic products (with premium prices)
- Higher income possible

New opportunities and support

- Access to new markets and innovations
- Growing organic market
- Improvement of farm infrastructure
- Farmer to farmer exchange and support
- Farm advisory, trainings and knowledge exchange

Further information

- Complimentary knowledge products, e.g., a poster, powerpoint, video about the ecological approach to organic > Link
- Further knowledge products, e.g., posters, videos and more, in the series cover topics such as: pest and disease, productivity, soil, profitability and biodiversity > Link
- Organic Africa Manual Module 1: Definition and Benefits, Kilcher L. et al. (2011): The module outlines the key challenges agriculture in Africa faces. It explains similarities, differences and cross-learning opportunities between different systems, e.g., traditional, conventional, sustainable, conservation, organic agriculture etc. It gives a definition of organic agriculture and describes its benefits > Link
- Organic Africa Manual Module 8: Conversion to Organic Farming, Bouagnimbeck, H. et al. (2011): The module explains the key challenges related to conversion to organic farming. It shows how to plan and implement conversion. It furthermore provides ideas for cooperation with other farmers to scale-up organic production and for support during the conversion process > Link
- Infonet Biovision: What is Organic Agriculture: The webpage explains key principles, definitions, certification, conversion, advantages and disadvantages of organic agriculture > Link
- What is the contribution of organic agriculture to sustainable development?, Bhullar et al. (2021): A synthesis of twelve years (2007-2019) of the 'long-term farming systems comparisonsin the tropics (SysCom)'. The SysCom team published a first report which synthesises the scientific findings of SysCom. The report is presented in a form that is easy to understand for an 'educated non-expert' audience > Link
- Push-pull platform developed by scientists at the International Centre of Insect Physiology and Ecology (icipe), Kenya, Rothamsted Research, in the U.K., in collaboration with other national partners. 'Push-pull' is a novel integrated pest preventative practice > Link

Imprint

This factsheet is a part of a series of knowledge products created within the KCOA project, analysing the outcomes of the SysCom and ProEcoAfrica projects. For further information on these projects refer to the corresponding project brief > Link.

The purpose of this series is to educate African farmers and advisors on research results related to organic farming.

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