

Agroecology – From Principles to Transformative Pathways

Introduction

Agroecology is an integrated approach to increase the sustainability of agriculture and food systems. The approach goes well beyond agricultural production and covers the journey of food all the way to consumption. It therefore encompasses ecological, socio-cultural, technological, economic, and political dimensions. Originating from science, agroecology also stands for agricultural practices and smallholder-focused social movements. Building on these different histories, the international High-Level Panel of Experts on Food Security and Nutrition (HLPE) defined 13 agroecological principles that provide a framework for the transformation of agricultural and food systems (Figure 1).

These principles can be applied in different combinations tailored to local contexts and needs, resulting in a variety of agroecological approaches on different scales. They are used as systemic building blocks to outline transformative pathways towards sustainable food systems (Figure 2). While some principles are applied at farm or agroecosystem level, others address and alter the framework of entire food systems, leading to broader systemic change. Agroecology is therefore consistent with overarching frameworks relevant to agriculture and food systems, such as the Global Biodiversity Framework, the United Nations Convention on Climate Change, and the United Nations Convention to Combat Desertification.

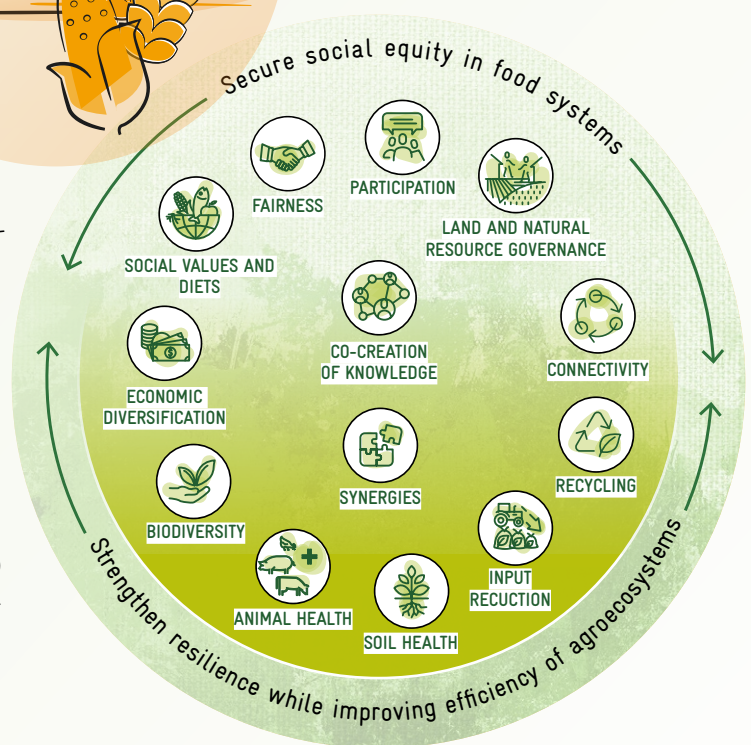
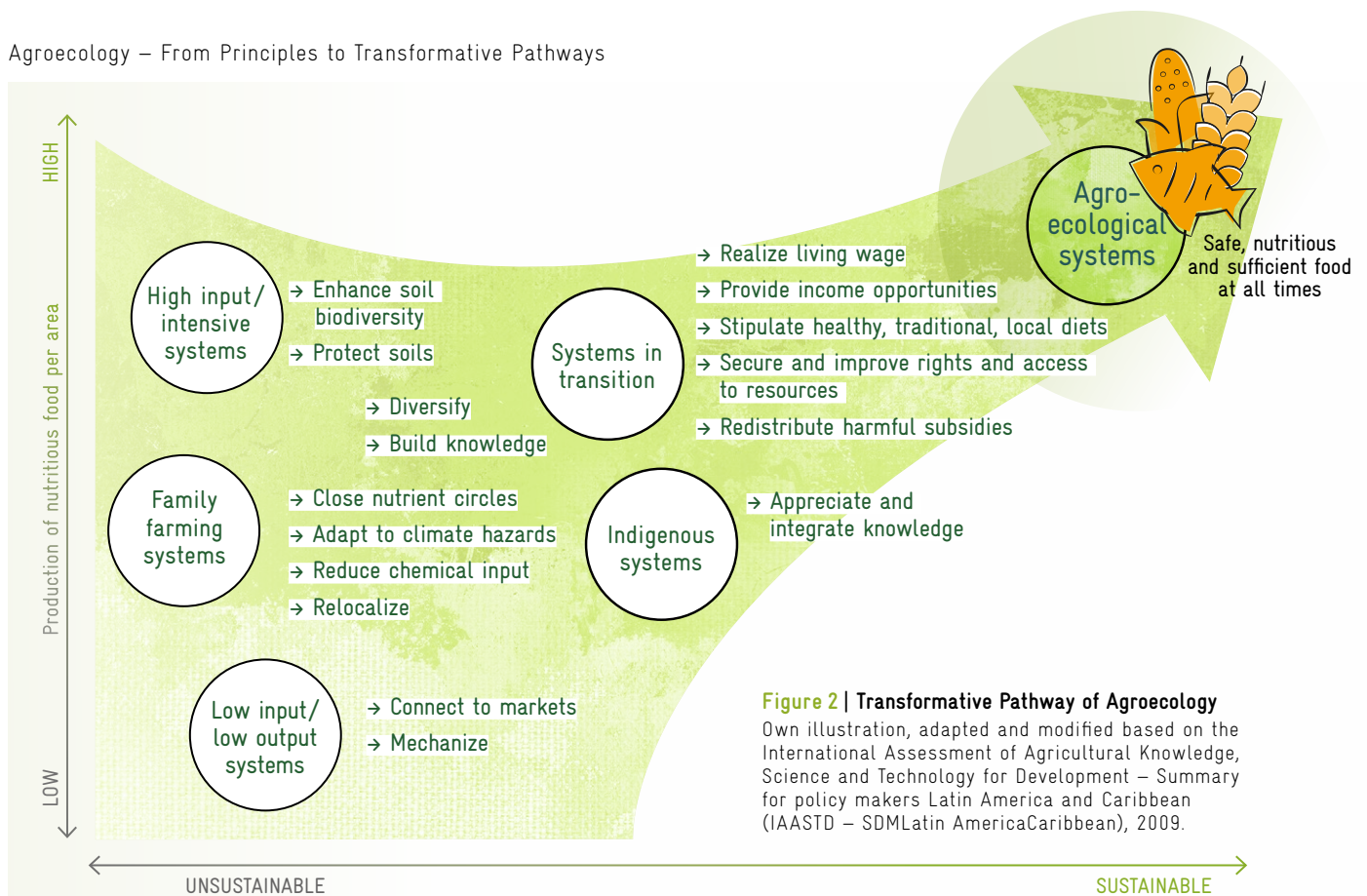


Figure 1 | Agroecological principles modified after HLPE, 2019.

Examples of Transformative Pathways

In recent years, agroecology has become increasingly important in the international development discourse about sustainable agriculture and food systems. Agroecology offers specific, tried-and-tested, and scalable solutions to transition challenges. This is reflected in the momentum built by the UN Food Systems Summit and the Agroecology Coalition. As a member of the Coalition since June 2023, Germany and its partners are committed to



providing support for agroecology both in the international political debate as well as in development projects in partner countries. In the core area strategy “Sustainable Agri-Food Systems” (2021) of the German Federal Ministry for Economic Cooperation and Development (BMZ), agroecological transformation is one of four activities in the area of rural development. This translates into numerous commitments to financial and technical cooperation projects involving agroecological approaches.

On behalf of BMZ, GIZ implements projects related to agroecology, among others, as part of BMZ’s Special Initiative “Transformation of Agricultural and Food Systems“. The following examples of rural development projects illustrate how transformative pathways are shaped differently by different sets of agroecological principles.

	Case study	From principles to pathways
→ India	Agents of Change – Women Self-Help Groups in India	To design a systemic approach for food systems transformation and to tailor a strategy which supports rural women to create community benefits.
→ Mali	Uniting Multiple Stakeholders for Agroecological Transitions in Mali	To support multi-stakeholder dialogue and foster change processes and politics.
→ Global	Integrating Aquaculture into Smallholder Farming Systems	To harness synergies among different productions systems in rural areas and to design approaches to integrated aquaculture.
→ Regional in Sub-Saharan Africa	Agroecology – a Pathway for Rural Youth Employment	To ensure that business models meet sustainability goals while promoting fair employment.
→ Mexico	Strengthening Rural Livelihoods in Mexico	To design cross-sectoral approaches to integrate biodiversity protection and its sustainable use into agriculture systems.



Agents of Change – Women Self-Help Groups in India

Challenge



India has been very successful in raising its food production and reducing hunger and malnutrition through agricultural intensification. However, the Green Revolution has taken its toll in terms of accelerated land degradation and farmers' entrenched dependency on external inputs, subsidies, and markets. Moreover, mainstream conventional agriculture is presently not fit for climate change, which puts the livelihoods of millions of farmers at risk.

Approach



To turn the tide, India has embarked on a transformative journey towards more sustainable food systems. Under the umbrella of the Indo-German Green and Sustainable Development Partnership, the project **"Support to Agroecological Transformation Processes in India" (SuATI)** accompanies this journey.

Agroecological transitions require cross-policy, society-wide engagement for innovation and change, as well as tangible benefits to farming communities and consumers. SuATI therefore puts a strong focus on fostering knowledge exchange and stakeholder dialogue across sectors and scales, and on forging alliances from local to global level. Locally, Women Self-Help Groups (WSHG) have become pivotal change agents in agro-

ecological transformation processes. Their role is increasingly recognised and reflected in a new campaign under the National Rural Livelihood Mission of the Ministry of Rural Development which aims to scale natural farming at the level of farming clusters managed by WSHG. SuATI supports this campaign through capacity development and facilitation of agro-ecological transitions in productive sub-sectors such as moringa, beekeeping or aquaculture.



Pathway

The principle of **co-creation of knowledge** is a key entry point. It involves identifying commonalities of India's manifold approaches to sustainable agriculture and translating them into tailored agroecological messages for policy and practice. On the ground, WSHG networks enable the sharing of experiences and knowledge. **Land and natural resource governance** is reflected as a cross-cutting principle guiding the integration of agroecology into policies and funding schemes at central and state level.

This also involves convergence of conducive policy instruments for agroecological change. By promoting agroecological business models and producer-consumer interactions at regional level and integrating **social values and diets**, SuATI also delivers on the principles of **economic diversification** and **connectivity**. **Soil health** and **input reduction** are key concerns of farming communities. They are addressed by supporting agroecological practices at farm level that satisfy these concerns (Figure 3).

Outcome

SuATI harnesses India's plethora of approaches to sustainable agriculture (e.g., sustainable intensification, natural farming, agroforestry) under the paradigm of agroecology, thereby enabling the main-streaming of agroecology into policies and funding schemes at large and creating momentum for the transformation of

agriculture and food systems at multiple levels. Adaptive capacities of rural women are enhanced by supporting agroecology-based livelihood opportunities. Under the Indo-German Lighthouse Initiative on Agroecology and Sustainable Management of Natural Resources, with SuATI serving as anchor project, the agroecological momentum is carried forth to international platforms, underlining India's growing leadership in global agricultural and food system change. Outcomes at national level will materialise over time, including adoption of agroecological practices by hundreds of WSHG and Farmer Producer Organisations.

Learnings

› Benefiting from women's social capital

Empowered women are key drivers and multipliers of innovations. At grass root level, they are the ones to decide which agroecological practices best meet community needs.

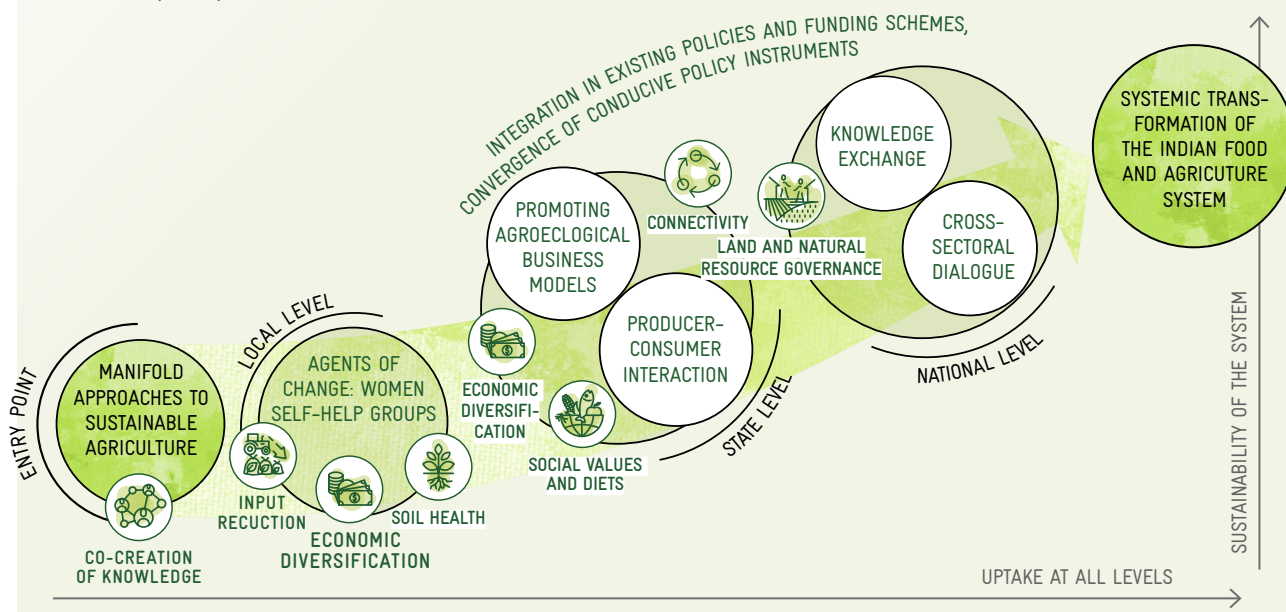
› Acknowledging knowledge identities

Agroecology borrows from a diversity of knowledge systems. Honouring their identities yields greater acceptance of agroecology as a unifying paradigm for shared sustainability goals.

› Demonstrating co-benefits through convergence

Integrating agroecological solutions into other policy domains such as biodiversity or climate change creates additional momentum for agriculture and food systems change.

Figure 3 | Transformative pathway of the bilateral project "Support to Agroecological Transformation Processes in India" (SuATI)





Uniting Multiple Stakeholders for Agroecological Transitions in Mali

Challenge

Agriculture is Mali's economic engine and a mainstay of its stabilisation and peace-building efforts. With the ultimate goal of reducing poverty and enhancing food security and climate resilience, agroecological and climate-intelligent practices are being promoted for a transition towards sustainable agricultural and food systems. The country builds on its long-standing experience and tradition in area-wide, agroecological food production. The challenge lies with how to translate traditional knowledge into visionary yet practical policies. Dedicated, partner-driven multi-stakeholder platforms are critical to addressing this challenge.



Approach

For many years, the project **Strengthening the National Agricultural Extension and Training System in Mali** (known under the predecessor acronym **PASSIP**) has been supporting the Malian government to formulate and implement its agricultural sector policies and strategies. Examples are the National Programme for Small-Scale Irrigation (SSI) and the National Agricultural Extension System. Under its present assignment, PASSIP assists in aligning these policies with traditional and current day agroecological principles and approaches, and in putting them into practice.

At national level, agroecological transition processes are facilitated by supporting the establishment of an independent, cross-sectoral multi-stakeholder platform. Interventions at local level entail Integrated Water Resources Management for the restoration and management of watersheds containing SSI schemes. Such landscape approaches not only unfold greater transformative spin than farm-level interventions, but also offer numerous opportunities for green jobs. Farmer organisations and water user committees are advised on implementing inclusive development plans resulting from participatory cartography. Agroecological practices are introduced in collaboration with advisory and extension actors, and are disseminated using the Farmer Field School (FFS) approach.

Pathway

The key entry point of **land and natural resource governance** is reflected in PASSIP's multi-level policy advice. A multi-stakeholder platform creates space for **co-creation of knowledge** and stock-taking of Mali's rich experience in area-wide agroecological approaches. It also enables **participation** in the design of policies and transition pathways, with the co-benefit of building trust into governmental structures. Transformations at farm level are reinforced by **input reduction** and **recycling** which are strong incentives of farmers to reduce dependency on external inputs. PASSIP's attention to gender equality and nutrition satisfies the principle of **social values and diets** (Figure 7).

Outcome

A cross-sectoral multi-stakeholder platform has been established to act as a formalised steering body for agroecological transition processes. The platform involves public, private and civil society stakeholders from the agricultural, environmental and health sectors. The government has entrusted PASSIP with the leadership in facilitating the formulation of a participatory and inclusive National Agroecological Transition Strategy. The modes of operation are formulated in a procedural

manual, thereby creating transparency and trust for potential investors. In the meantime, thousands of farmers and hundreds of FFS trainers and extensionists have been trained in agroecological practices and approaches.

Learnings

› Building on trusted partnerships

PASSIP builds on a trustful, multiple-cycle development partnership with Mali. This pays off in terms of being invited to support the design of a National Agroecological Transition Strategy.

› Creating ownership and continuity

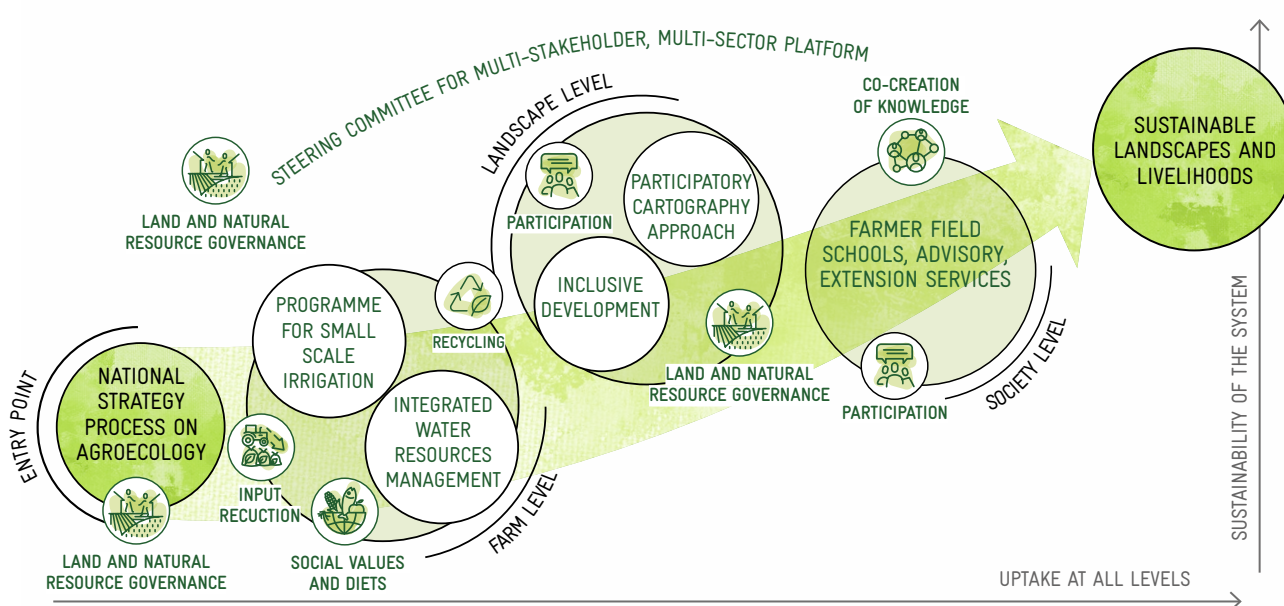
Multi-stakeholder platforms create ownership and ensure ongoing support for agroecological change. They provide space to reconcile traditional and modern-day agroecological principles.

› Harnessing the momentum for agroecological change

Demand from farmers for agroecological innovations has increased due to multiple crises, including sanctions on farm inputs¹. A great opportunity to advance agroecological transition.

¹ Imposed by the Economic Community of West African States (ECOWAS)

Figure 4 | Transformative pathway of the bilateral project "Strengthening the National Agricultural Extension and Training System in Mali" (PASSIP).





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Integrating Aquaculture into Smallholder Farming Systems



Challenge

Fish is a key animal-source food in developing countries. Yet, per capita consumption has declined with population growth and diminishing supplies from capture fisheries. Smallholder aquaculture holds great potential to reverse this trend but is difficult to unlock due to lack of know-how. Moreover, fish farming requires community collaboration to ensure the sustainable management and equitable distribution of natural resources, like water and wild fish stocks. This is getting ever more demanding because of increasing climate-induced water scarcity and overfishing.

GP Fish enhances capacities of smallholders, fish value chain actors, fish farmer groups and cooperatives, as well as administrations, advisory services and civil society organizations working in the sector. Technical and business abilities of fish farmers and extension services are strengthened through hands-on training, follow-up coaching loops, innovations, model fish farmers and Aquaculture Business Schools. In parallel, colleges and vocational training centres are supported to include fish farming curricula and training programmes into their existing portfolio.

At central level and aligned with international standards, authorities in charge of aquaculture are advised on enabling legislations, regulations, and guidelines for sustainable, smallholder-friendly aquaculture. Multi-stakeholder platforms are employed in all countries to inform aquaculture policy and strategy development, and to enable knowledge exchange.

Approach

The **Global Programme Sustainable Fisheries and Aquaculture (GP Fish)** → supports African and Asian countries to improve the livelihoods and food security of vulnerable populations through artisanal fisheries and sustainable aquaculture. Smallholder fish farmers are supported in Cambodia, India, Madagascar, Malawi and Zambia. Production systems include farm-level pond aquaculture, rice-fish culture and community-managed fisheries in flooded rice fields and small water bodies.



Pathway

GP Fish applies agroecological principles to smallholder aquaculture. **Economic diversification** and **synergies** are achieved by integrating aquaculture into existing farming systems. **Animal health** and **input reduction** are satisfied by enhancing the systems' natural productivity and adhering to moderate stocking densities. Promotion of natural feed and polyculture of different species improves **biodiversity** and makes best use of ecosystem services. Resource cycles of biomass and nutrients are closed by **recycling** agricultural by-products as supplementary feed. Rice-fish farming improves **soil health** and increases yield. Decentralized **land and natural resource governance** and **participation** are prerequisite principles governing the climate-sensitive, community-led management of watersheds. The increased access to sustainably produced fish improves **social values and diets** of smallholders (Figure 5).

Outcome

The number of farms practicing sustainable aquaculture has nearly doubled and thousands of new jobs have been created in the aquaculture sub-sector of the five countries. Moreover, the quantity of farmed fish available to food-insecure populations has increased by at least 50 %. Productivity gains in aquaculture have been reported from all countries. In Madagascar, rice yields

in rice-fish fields have increased by 10 %. In the Indian state of Assam, consumer demand has stimulated the certification of farmed fish under the Participatory Guarantee System of India. All innovations developed with support from GP Fish are low cost and adapted to the local context. They can be scaled via capacitated advisory and extension services as well as farmer-to-farmer exchange.

Learnings

› Disseminating quick-win innovations

Innovations such as intermittent harvesting of fish in Malawi generate short-term income. Timely communication of such benefits motivates more farmers to adopt innovations.

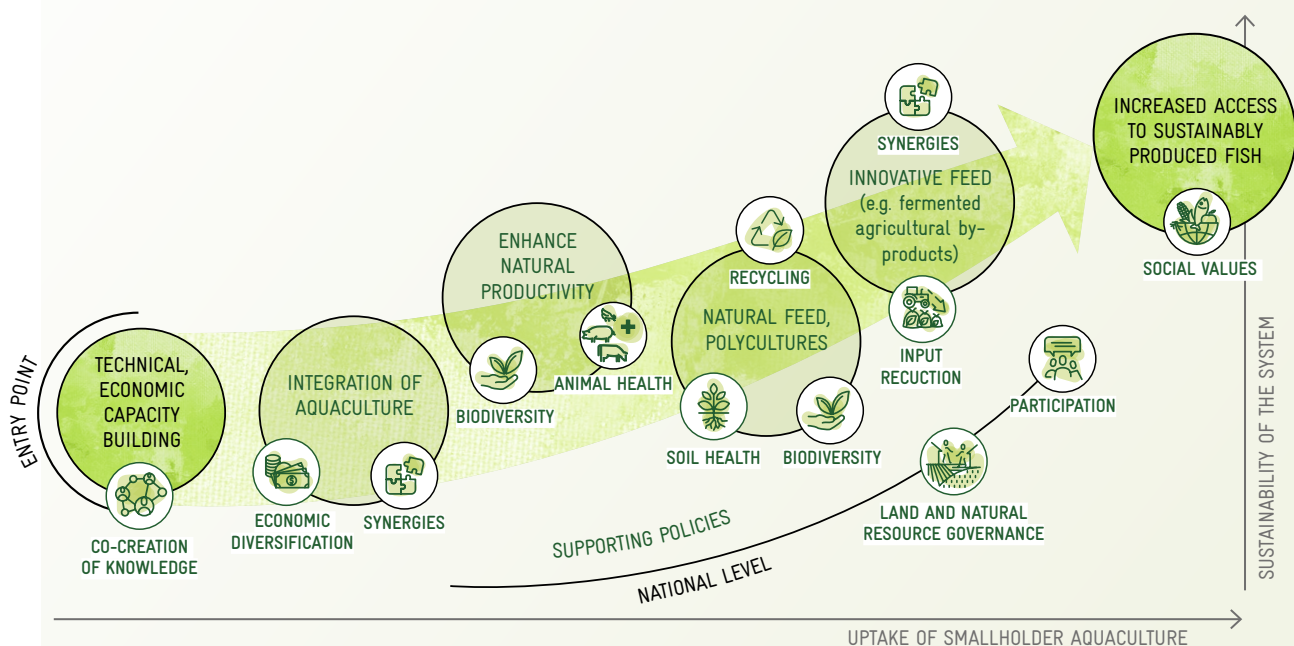
› Gearing aquaculture value chains to local economies

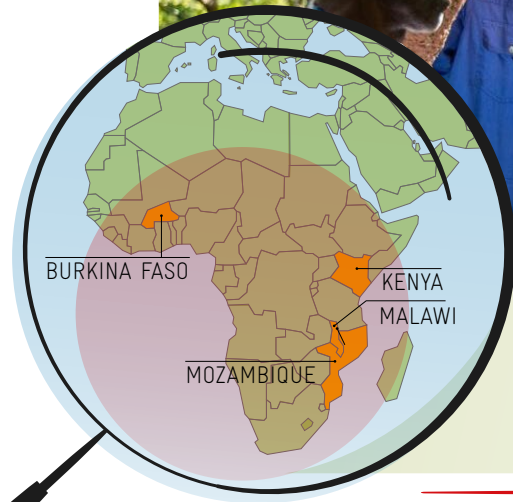
Short supply chains and local markets for farmed fish ensure that populations in rural areas have access to nutritious food as well as employment and business opportunities.

› Enhancing economic literacy of smallholder farmers

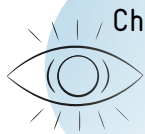
The uptake of sustainable aquaculture is constrained by limited business literacy. Aquaculture Business Schools are a proven and scalable approach to overcome this constraint.

Figure 5 | Transformative pathway of the global programme “Sustainable Fisheries and Aquaculture” (GP Fish).





Agroecology – a Pathway for Rural Youth Employment



Challenge

Agriculture and the agri-food sector are a mainstay of employment in sub-Saharan Africa, accounting for almost three-quarters of jobs in rural areas. However, with about 25 million youths entering job markets every year, prospects for decent work appear limited. On the other hand, there is great employment potential by diversifying and professionalizing rural economies and creating an enabling environment for small businesses and start-ups. To unlock this potential for a just transition towards sustainable agri-food systems, young people's professional and entrepreneurial skills are paramount.

Approach

In partnership with the governments of Burkina Faso, Kenya, Malawi and Mozambique, the **Global Project Rural Youth Employment (GP RYE)** develops scalable models to enhance rural employment, with a focus on youth and women. Concurrently, it provides advisory services to the German Federal Ministry for Economic Cooperation and Development (BMZ).

The models are tailored to the economic characteristics of partner countries and the needs and capacities of youth, taking a so-called 360° Agri-Jobs view. They encompass trainings to enhance technical and business

skills, support to young entrepreneurs, start-ups and micro, small, and medium-sized enterprises, integration into rural labour markets and strengthening of youth organizations and networks. A key feature is the prominent role of the private sector. In the context of BMZ's integrated Development Partnership with the Private Sector, companies support smallholders and start-ups in strengthening their entrepreneurial skills and accessing inputs, trainings and markets. They are integrated in the supply chains of companies via contract farming models.

Demand-oriented training and education are provided e.g. by Agricultural Technical Vocational Education and Training (ATVET) Centres, whose curricula are upgraded to respond to market needs. In Malawi, the *Gender Makes Business Sense* approach leverages women's business skills with co-funding from the Norwegian Embassy. Job fairs and digital job matching platforms anchored in ATVET centres or youth organizations facilitate the integration of youths into local labour markets and economies.



Pathway

Agroecological principles are clustered around a three-dimensional triad. The first dimension relates to youth empowerment. It incorporates the principle of **participation** which is realised by strengthening the role of youth organisations. Adhering to **social values and diets** ensures that employment opportunities are gender-sensitive. **Fairness** is reflected in compliance with criteria for decent work. The second dimension is represented by the principle of **economic diversification** which is not limited to but focuses on sustainable local food value chains. The third dimension refers to business opportunities arising from the implementation of farm-level principles such as **input reduction** and **soil health**, for example the production of compost (Figure 6).

Outcome

The 360° Agri-Jobs approach has reached more than 30,000 young people and led to new or additional employment for almost a third of them, of which more than 40 % women. Further employment impacts resulting from innovations of small agri-food businesses and start-ups will emerge over time. Agroecological approaches can unlock sustainable business opportunities. Examples include free-range egg production in Kenya, youth and female-led agro-processing start-ups in Burkina Faso and Mozambique or bio-fertilizer pro-



duction from agricultural waste in Burkina Faso and Malawi.

Learnings

› Empowering youth for agri-food system change

Creating youth organizations and networks is only the first step towards unlocking the productive potential of youth. It is equally important to include their views in actual decision-making.

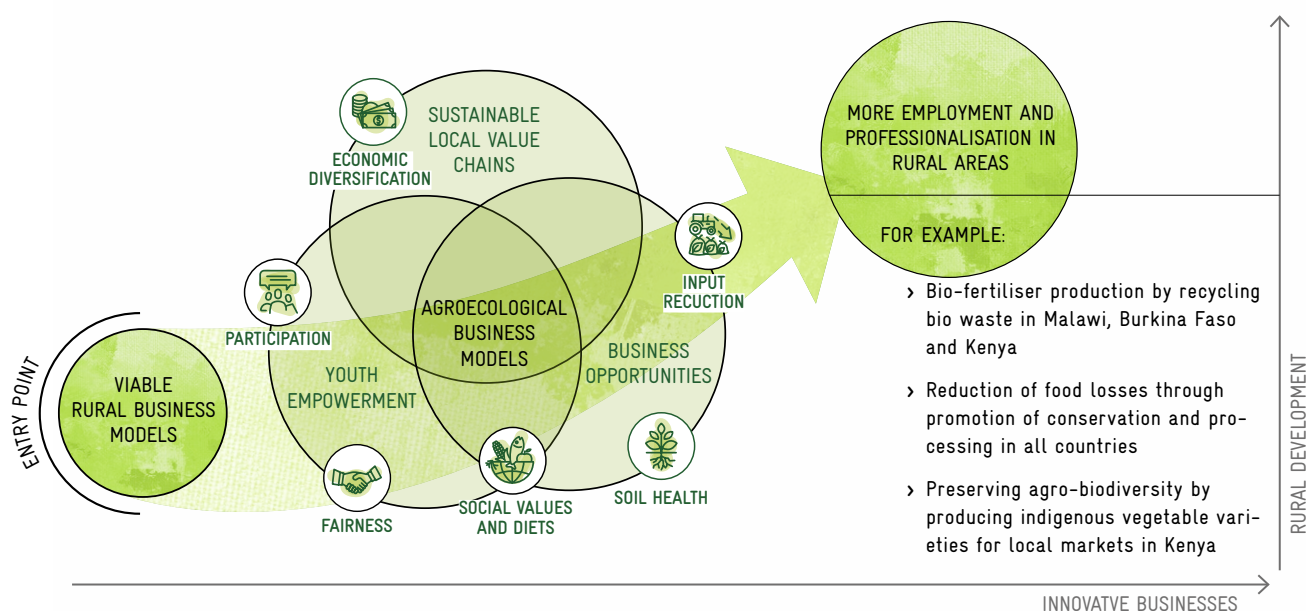
› Economic benchmarking of agroecological business models

Agroecological business models must be checked against economic benchmarks to ensure that returns on investment follow suit.

› Making business sense of green food value chains

Models for green food value chains are often lacking. AgroBootCamps on agroecological farms, as practiced in Burkina Faso, open prospects for green agripreneurship and new jobs.

Figure 6 | Transformative pathway of the global project “Rural Youth Employment” (GP RYE).





Strengthening Rural Livelihoods in Mexico



Challenge

Oaxaca and Puebla rank among Mexico's least developed states. Poverty rates exceed 60 % and are even higher among indigenous populations. Rural communities are increasingly detached from their own traditions and natural heritage while being caught in a vicious cycle of agricultural decline and outmigration, particularly of young working-age males. Global crises, from pandemics to climate change, put further strains on rural livelihoods. Women are responsible for more than 50 % of Mexican food production. However, transitions to sustainable food systems based on culture, identity and gender equity are not sufficiently supported.

Approach

The project **Vida y Campo ("Life and Land" – Sustainable Innovations for Climate-resilient Food Production and Well-being in Rural Areas in Post-COVID-19 Mexico)** → collaborates with rural communities in

Oaxaca and Puebla, with special consideration of women, youth and indigenous groups. In partnership with the Ministry for Agriculture and Rural Development at national and state level, the project develops scalable models for inclusive rural development.

Vida y Campo's policy advice aims to align relevant policies, legislations and strategies with biodiversity, climate change and gender objectives, and to assist in their implementation at federal and local levels. Multi-stakeholder dialogues are supported to inform this process. Examples are the agricultural soil bill or the national strategies for pollinator protection and soil conservation. A novel national certification scheme for biodiversity-friendly products is supported to increase the chances of higher income of farmers who adopt sustainable farming practices.

At state and municipal levels, both farmers and advisory services are trained on sustainable agricultural practices, marketing of value-added produce and preservation of wild and traditional landraces. Integration of the highly fragmented agricultural extension and advisory landscape is pursued by developing common training curricula. Digital tools and the existing network of Farmer Schools in Puebla are used to increase the outreach of advisory services.



Pathway

With food production as its central theme, *Vida y Campo* touches on all agroecological principles. **Biodiversity** and **economic diversification** are expressed at field and agroecosystem levels by promoting sustainable agricultural and pastoral practices as well as landscape restoration. These practices, along with **soil health** measures and improved **connectivity** to regional markets, lead to greater diversification and higher income. The principle of **social values and diets** is reflected in the valorisation of agrobiodiversity for enhanced economic and climate resilience. It also guides *Vida y Campo*'s commitment to gender and social justice. **Land and natural resource governance** is strengthened by supporting community-based decision-making processes (Figure 4).

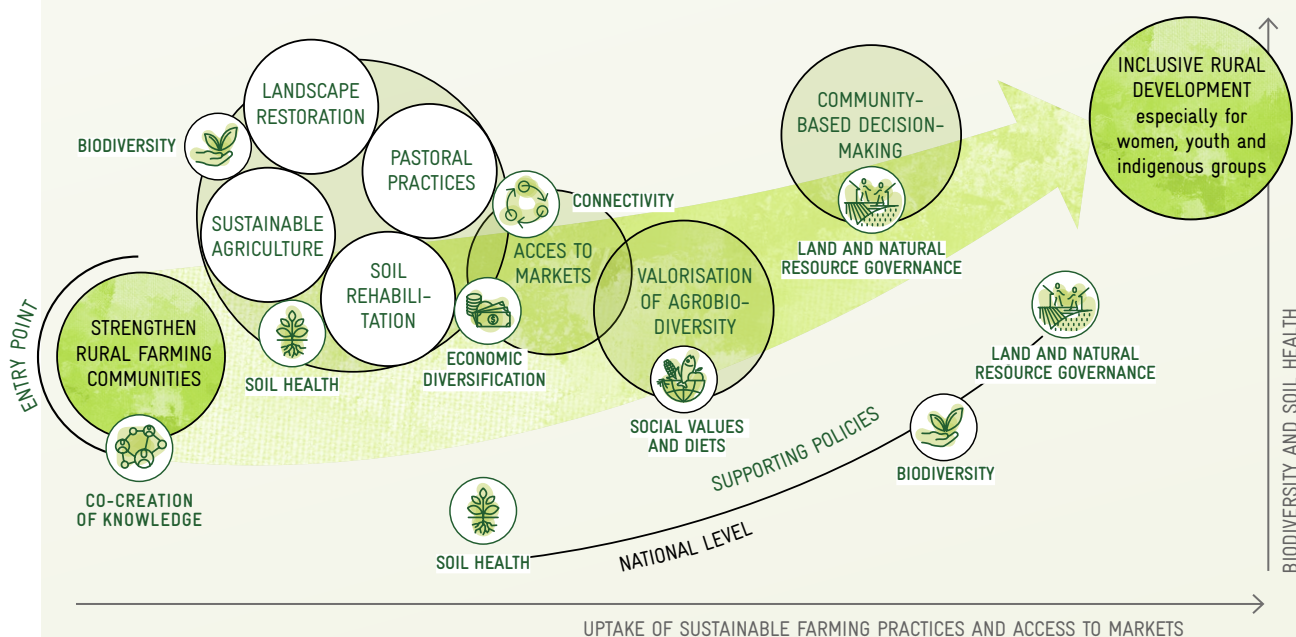
Outcome

The enabling environment for an incremental, non-disruptive transformation of smallholder-based agriculture has improved. This includes, for example, improved integration of traditional knowledge and agroecological approaches into farming practices, farmer-to-farmer knowledge exchange and farmer-consumer interaction. Innovative digital tools supporting farm management and laying the foundation for

the traceability of certified products are embraced especially by young farmers. Agroecological innovations have been adopted in crop production and processing, as well as in animal husbandry. For example, residues from the mezcal industry are transformed into animal feed, fuel briquettes or substrates for mushroom cultivation.



Figure 7 | Transformative pathway of the bilateral project “Vida y Campo – Sustainable Innovations for Climate-resilient Food Production and Well-being in Rural Areas in Post-COVID-19 Mexico”.





Learnings

› Blending tradition and innovation

Traditional agriculture is often perceived as backwards and its modern alternative as unsustainable. Agroecology blends best traditional and modern practices for better livelihood outcomes.

› Containing the drain of youth

Many young people dismiss agriculture as a viable livelihood and emigrate. Digitally supported networking, knowledge ex-change and agripreneurship training may help turn the tide.

› Working side-by-side with decision makers

Development projects are short-lived. A trusting collaboration with ministries ensures that actions are implemented swiftly, and effects are sustainably anchored in political frameworks.



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