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FOOD 4 TRANSFORMATION
PARTNERS FOR CHANGE

# Whitepaper

## Soil First: Advancing Food System Transformation from the Ground Up

### Lessons Learned and Recommendations from a Decade of Protecting and Rehabilitating Soils in Africa and Asia

# Executive Summary

Soil is the foundation of our existence and plays a critical role in nutrition, climate, biodiversity and livelihoods. Yet, the world is losing fertile soil at an alarming rate.

This paper is the outcome of the **"Partners for Change – SOILutions for a Food Secure, Resilient, and Sustainable Future"** (short **SOILutions**) conference held in Berlin, Germany, from 20th to 22nd May 2025. It is based on the experience and lessons learned from over a decade of on-the-ground implementation through a major investment in soil protection and rehabilitation. Since 2015, the **Federal Ministry for Economic Cooperation and Development (BMZ)** together with the **European Union (EU) and the Gates Foundation (GF)** have provided over EUR 240 million through the **programme "Soil Protection and Rehabilitation for Food Security" (**short **ProSoil)** This programme has been successfully implemented in several African countries and India using a multi-partnership approach. To date, nearly 1 million hectares of agricultural land have been protected and rehabilitated, achieving an average yield increase of 44 per cent and providing more food and better nutrition for 2.6 million people in seven countries.

This whitepaper, initiated by **Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH**, the lead implementing agency for ProSoil, is based on a series of interviews conducted with experts and practitioners. The draft paper has been consolidated based on the collective knowledge gained during the SOILutions conference. It has been finalised through an extensive review by the **Partners for Change (P4C) Network**. The paper offers its readers guidance and recommendations, as well as a comprehensive reflection on lessons learned. It articulates the best practices and scalable solutions emerging from local soil protection and rehabilitation efforts, and links these to global agendas. The paper aims to inspire concrete action amongst multiple stakeholders:

- For **decision-makers in politics or local authorities** seeking effective soil protection and rehabilitation strategies, the paper provides concrete guidance and policy recommendations, and scalable solutions grounded in field experience and aligned with national and global priorities for transitioning to agricultural and food systems that are more climate-resilient, biodiversity-rich, and socially equitable.
- For **donors and financial institutions** seeking impactful, scalable investments in sustainable soil and land management, as well as the transformation of agricultural and food systems, the paper provides evidence-based insights, strategic entry points, and recommendations for coordinated, long-term support across sectors and stakeholders.
- For **private sector actors, including farmers**, seeking viable business opportunities and practical solutions for sustainable soil management, the paper offers tried-and-tested innovations (including markets, subsidies, and standards), scalable models, and guidance on balancing profitability with environmental and social impact.
- For **civil society actors** seeking to drive inclusive change and amplify community voices in soil protection and rehabilitation, the paper provides practical recommendations, advocacy tools, and approaches to strengthen participation, equity, and accountability in policy and implementation processes.

# Content

# List of Abbreviations

| | |
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| BMZ | Federal Ministry for Economic Cooperation and Development |
| CFS-HLPE | UN Committee on World Food Security's High-Level Panel of Experts on Food Security and Nutrition |
| CO2 e | Carbon Dioxide Equivalent |
| DST | Decision support tool |
| EU | European Union |
| FAO | Food and Agriculture Organization of the United Nations |
| GF | Gates Foundation |
| GIZ | Deutsche Gesellschaft für Internationale Zusammenarbeit |
| GRAF | Research and Action Group on Land Tenure, Groupe de Recherche et d'Action sur le Foncier |
| ISFM | Integrated Soil Fertility Management |
| LDN | Land Degradation Neutrality |
| MANAGE | National Institute of Agricultural Extension Management, India |
| MEL | Monitoring, evaluation and learning |
| MSME | Micro, small and medium enterprises |
| NABARD | National Bank for Agriculture and Rural Development |
| NAPs | National Strategies and Action Plans |
| NBSAPs | National Biodiversity Strategies and Action Plans |
| NDCs | Nationally Determined Contributions (under UNFCCC) |
| ODA | Official Development Assistance |
| P4C | Partners for Change |
| ProSilience | Enhancing Soils and Agroecology for Resilient Agri-Food Systems in Sub-Saharan Africa |
| ProSoil | Global Programme "Soil Protection and Rehabilitation for Food Security |
| SDG | Sustainable Development Goal |
| SLM | sustainable land management |
| SOILutions | Partners for Change – SOILutions for a Food Secure, Resilient, and Sustainable Future |
| SPR | Soil protection and rehabilitation |
| UNCCD | United Nations Convention to Combat Desertification |
| UNFCCC | United Nations Framework Convention on Climate Change |
| UNFSS | UN Food Systems Summit |

# Foreword

When we talk about transforming our agricultural and food systems, we need to start from the ground up. Soil is more than a production factor; it is critical to climate resilience, biodiversity conservation, food security, and ensuring people have a dignified livelihood. **Soil protection and rehabilitation are strategic levers in achieving multiple Sustainable Development Goals (SDGs).**

As part of my ministry's **Special Initiative "Transformation of Agricultural and Food Systems", the programme "Soil Protection and Rehabilitation for Food Security"**, which is co-funded by the European Union and the Gates Foundation, has clearly demonstrated over the past decade how soil protection and rehabilitation can enhance food security and rural resilience in Africa and India through cooperation at local, national, regional, and global levels.

This partnership will continue with the new programme **"Soil Matters – Innovations for Soil Health and Agroecology"**. By focusing on the private sector, the programme will promote locally-owned, scalable, sustainable climate-resilient agricultural practices. It will also address regional processes, such as the follow-up to the African Fertilizer and Soil Health Summit.

Many countries have already taken on a leadership role – a clear sign that protecting and rehabilitating soils is a strategic development decision and an ecological imperative. However, the scale of land degradation demands **broad international partnerships** and sustained political commitment.

That is why Germany is working closely with the **United Nations Convention to Combat Desertification (UNCCD) and in May 2025 we launched a joint Flagship Initiative, "SOILutions – A Global Initiative for Soil Health and Food Security"**, to encourage systemic change. **This initiative sends a strong signal of international commitment and a call to action for healthy soils and global food security.** It aims to elevate the political importance of soil health and to scale up effective technical, institutional and financial solutions.

This paper shares key lessons and recommendations from our collective efforts to secure healthy soils. It feeds into a policy brief from the Partners for Change (P4C) Network and a broader P4C position paper that is to be published in 2026. The aim is to inform joint priority-setting and strategic advocacy in support of functional agricultural and food systems structures – particularly for shaping the global agenda beyond the SDGs. As a first step, it will feed into decision-making during the upcoming UN Food Systems Summit + 4 Stocktake in Ethiopia.

**Together, we must act – so that soil can remain the foundation of our life and the lives of future generations.**

Niels Annen
State Secretary
Federal Ministry for Economic Cooperation and Development
Germany

# 1 Introduction

**The global agricultural and food system is currently facing a severe crisis.** The food security of a quarter of the world's growing population is at risk, while another quarter is struggling with unhealthy overconsumption. At the same time, climate change and industrial agriculture are jeopardizing vital natural life-support systems. Moreover, meeting the climate goals established in the Paris Agreement may require the use of additional for carbon dioxide extraction — a strategy with both advantages and significant risks. Meanwhile, biodiversity, including agrobiodiversity, is experiencing a dramatic global decline, amounting to a mass extinction event (WGBU 2020).

Soil is essential for agricultural and food systems and our very existence. However, as a finite resource, **fertile soil is being lost at an alarming rate** around the world. Soil degradation primarily involves the decline of soil fertility and productivity, but it also compromises critical environmental functions such as carbon sequestration and water retention. It is the long-term deterioration of soil structure and function, which can ultimately result in the complete loss of soil capacity.

While factors such as soil age and mineral composition influence fertility, the main drivers of soil degradation are human activities like monoculture farming, the excessive use of agrochemicals, and the overexploitation of resources driven by population growth. This is particularly the case where enabling policies and conducive frameworks are lacking. These pressures are further intensified by **global challenges** like climate change. Soil degradation often begins with nutrient mining, a reversible process, but it can progress to the complete loss of fertile topsoil, where recovery becomes extremely difficult and slow, demanding substantial intervention. According to the Food and Agriculture Organization of the United Nations (FAO), 20 to 25 per cent of the world's soils are already degraded, significantly reducing their functionality (FAO 2021). Approximately 24 billion tons of fertile soil are lost each year, directly affecting the food security of about 1.3 billion people today (UNCCD 2022). Estimates of soil degradation can vary according to the definition used. For example, if nutrient mining is included, then it is estimated that most agricultural soils in Africa are undergoing degradation.

**Soil protection and rehabilitation (SPR) are fundamental to resilient agricultural and food systems.** They are relevant to all types of agriculture, whether conventional or organic, small-scale or industrial, and whether subsistence or market oriented. Their close relationship with agroecology highlights their transformative potential for changing agricultural and food systems. At least six of the 13 agroecology principles identified by the UN Committee on World Food Security's High-Level Panel of Experts on Food Security and Nutrition (CFS-HLPE) in 2019 are directly or indirectly linked to soil health. This creates a dynamic whereby agroecological measures protect soils and SPR promotes agroecological transitions.

SPR is recognised as an essential component of measures to combat land degradation and ensure global food security. The global community has made numerous binding commitments to this end. Agenda 2030's Sustainable Development Goal (SDG) 15 on **Land Degradation Neutrality (LDN)** aims to promote sustainable land use. The UN Food Systems Summit (UNFSS) has emphasised the importance of protecting and restoring soils in order to produce healthy food, promote biodiversity and addressing climate change. The United Nations Framework Convention on Climate Change (UNFCCC) regularly addresses issues related to land use and soil health as part of climate change mitigation and adaptation. The main objective of the United Nations Convention to Combat Desertification (UNCCD) as the only legally binding international agreement on land issues is to achieve LDN by 2030.

This international commitment has attracted significant support from the donor community. According to the UNCCD, 2 billion USD of bilateral Official Development Assistance (ODA) was allocated for its

implementation in 2022. As one of the largest international donors, Germany plays an active role in promoting SPR worldwide. BMZ's special initiative "Transformation of Agricultural and Food Systems" of BMZ supports long-term programmes that promote sustainable land management (SLM) and agroecological approaches in its partner countries. Through this initiative, Germany is making an important contribution to stabilising global food production and encouraging the transition to sustainable land use, while also fulfilling its international legal obligations. Germany is a strong partner of the UNCCD, supporting the implementation of the Convention through direct contributions and its development cooperation in partner countries. From 2014 to 2021, **Germany funded over 200 soil protection projects worldwide**. A total of 1.4 billion EUR was specifically invested in SPR measures in agriculture during this period. Additionally, the EU is supporting global efforts to promote sustainable land use and food system transformation through its Green Deal and Global Gateway initiatives. Through the EU-Africa Global Gateway Investment Package, the EU is supporting initiatives such as the Great Green Wall Initiative, which aims to restore and preserve land and build resilience in the Sahel region.

Other multilateral and bilateral donors, global funds, civil society organisations and foundations that **mobilise private capital** play a key role by funding research, innovation or large-scale programmes for SPR and SLM as well.

## Restoring Soils, Securing Futures: The Legacy of ProSoil

Since its inception as an initially three-year project (from 2015 to 2017), the international cooperation programme ProSoil has been a **pioneering effort in addressing soil degradation** – an issue that was not part of the mainstream in 2014. Commissioned by BMZ as part of its special initiative "Transformation of Agricultural and Food Systems" (formerly "One World – No Hunger") and implemented by GIZ in seven countries (Benin, Burkina Faso, Ethiopia, Kenya, Madagascar, Tunisia, and India), ProSoil has used its **early-mover advantage to promote field-tested, agroecological approaches** to soil conservation, sustainable land management, and climate-smart practices.

Over the past decade, the programme has helped reverse land degradation on more than 980,000 hectares, increase yields by 44 per cent in rehabilitated areas and improve food and income security for 2.6 million people. Co-funded by the EU and the GF, ProSoil has not only broadened its financial base, but has also adapted to global disruptions including the COVID-19 pandemic and funding reallocations related to the Ukraine crisis to ensure the continuity and scale-up of its innovative approaches.

Embedded in ProSoil is the **multi-donor action** "Enhancing Soils and Agroecology for Resilient Agri-Food Systems in Sub-Saharan Africa" (ProSilience). It is co-funded by the EU and BMZ and implemented by GIZ as a contribution to the EU initiative "Development of Smart Innovation through Research in Agriculture" (DeSIRA). Running from 2021 to 2025 in four partner countries (Benin, Ethiopia, Kenya, and Madagascar), ProSilience reinforced the programme's commitment to advancing resilient agricultural and food systems by integrating sustainable, climate-smart solutions.

Now in its 11th year of implementation and scheduled to run until April 2027, ProSoil is a model for transformative change in agricultural and food systems, demonstrating how innovative practices, robust partnerships, and adaptive strategies can be combined to protect soils, secure food production, and build climate resilience around the world.

**Learn more about ProSoil**

# 2 Soil Protection and Rehabilitation as a Lever for Agricultural and Food System Transformation

**The transformation of agricultural and food systems involves profound and systemic changes** that reshape existing structures and behaviours to achieve more sustainable and resilient food security. This transformation requires multiple pathways as strategic routes to navigate this change and guide various stakeholders towards innovative solutions and practices that align with long-term sustainability goals. SPR is one of these essential pathways of change. Emerging as a multi-benefit approach that addresses sometimes conflicting global challenges and contributes to several international goals including the SDGs, international conventions (e.g. land degradation, climate change and biodiversity) and national sustainability goals. However, SPR needs incentive structures to facilitate change, whether these are externally facilitated (e.g. payment for services) or internally generated (e.g. increased productivity with access to markets for selling surplus produce).

**Evidence showed that broad-based SPR and SLM practices improve soil health**, water availability and biodiversity, as well as enhance the economic sustainability and climate adaptation and mitigation of agricultural and food systems, thereby improving their overall resilience. In Ethiopia and India Integrated Soil Fertility Management (ISFM) has played a key role in bolstering farmers' resilience in times of crisis, including the armed conflict in Tigray and the COVID-19 pandemic. The approach involved a more efficient use of mineral fertilisers and organic inputs, combined with other improved agricultural practices. For example, shortages of mineral fertiliser could be effectively compensated for by using locally produced organic fertiliser.

### Zooming In

**Ethiopia, Benin, India and Tunisia**

The application of ISFM in Ethiopia increased yields by ≈ 60 per cent and net income by ≈ 80 per cent, compared to current farming practices. Yield increases through ISFM have an enormous potential for food security by feeding an additional 36 million people (220 kg wheat/yr/person). Regarding greenhouse gas emissions, evidence from Benin and India showed that the use of biochar-based biofertilisers contributed to the sequestration of up to 175 kg $CO_2$ e/t fertiliser. In Tunisia, the introduction of agroforestry, legumes, and other organic soil improvement practices led to the sequestration of nearly 2.4 metric tons of $CO_2$ e/ha between 2022 and 2024.

### Zooming In

**Benin**

In Benin, agroecological solutions for SPR have been adopted by up to 90 per cent of villagers in some areas. This widespread uptake was driven by two main factors: first, agroecology responded directly to pressing local needs, such as improving food production and income; second, the solutions were readily accessible and did not depend on external inputs. Moreover, the cultural concept of social debt in Benin —the shared moral responsibility to support the well-being of others in the community—has played a key role in promoting the exchange of SPR knowledge and practices among villagers.

**A continuous supply of services and resources is essential for both scaling up and ensuring the sustainability of SPR and agroecological approaches.** To improve soil health on a large scale, it is necessary to provide adequate nutrients (ideally from organic sources, supplemented with the targeted use of mineral fertilisers where necessary) to address specific deficiencies. The appropriate

use of crop residues and adoption of suitable land preparation and management practices are equally important. To meet this challenge, private sector actors such as farmers' organisations, cooperatives and start-ups must be engaged and trained. Furthermore, **economically, environmentally and socially viable business models** for micro, small and medium-sized enterprises must be developed. Experience has shown that the commercial production of soil-improving farm inputs (e.g. compost, biochar and liquid fertilisers made from organic waste that would otherwise be discarded) and small-scale equipment (e.g. for ploughless tillage), innovative mechanisation schemes on a scale and the provision of related services, training and agricultural advice (extension) have reduced the need for public funding and created new income opportunities in the private sector. At the same time, it is of utmost importance to have a comprehensive governance framework that maximises the contribution of farmers and their organisations, governments and their institutions, as well as the private sector, for operational service systems for soil health that can propel the transformation of agricultural and food systems from the ground up (Rauch and Kersting 2016).

### Zooming In

**India and Ethiopia**

In India, a business model for the commercial production and sale of liquid fertilisers (locally known as *Drava Jeevamrit)* was developed, including automated production units and decentralized bio-input resource centres run by community-based organisations. In Ethiopia, the increasing demand for lime led to the development of supply chains supported by either the public or the private sector. Governmental support for lime spreaders, soil pH testing, policy advice on tax relief and the involvement of microfinance institutions further supports the long-term distribution and use of lime.

In its role as neutral partner and honest broker, ProSoil also **supported research to address gaps in the evidence on the effectiveness of agroecological inputs** and promoted the development of standards and certification schemes.

### Zooming In

**Benin**

In Benin, visibility not only meant that 255,000 ha of productive soils were rehabilitated across the country, accounting for around 13 per cent of the total degraded area, but also that the adoption rate of improved practices in local communities was over 90 per cent. This was far more convincing for the government to change its policy on soil than research results alone could have done.

Although it is difficult to measure systemic change in hectares, **demonstrating visible and scalable results at field level** was crucial for influencing policy decisions.

As pathways to transformative change (see Figure 1) vary from country to country, **strategies need to be tailored to local needs, priorities and contexts**. This, in turn, requires dedicated management and leadership capacity building for development partners. Further, cross-sectoral approaches are key for leveraging synergies among allied sectors (e.g. livestock, forestry, climate, environment, urban sector) and maximising impact in terms of effective soil protection and rehabilitation.

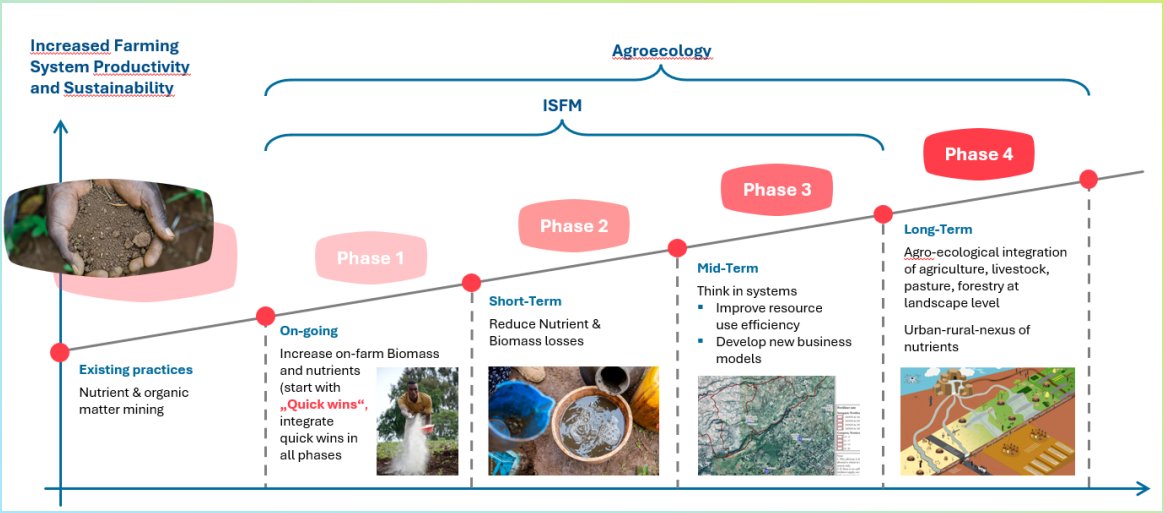


***Figure 1**: Stepwise approach for investment in soil health: A pathway for transformation of agricultural and food systems (ProSoil 2025)*

## 2.1 Key Recommendations for Unleashing the Transformative Potential of SPR

### Key Recommendation 1

**Governance and Institutions**

- **"Address the why":** Identify and address key local or national issues to anchor SPR politically and institutionally (in the public, private or civil sectors) to drive systemic change.
- Avoid a sectoral focus that is too narrow by favouring a transparent and balanced **multi-stakeholder approach** with a governance focus. This also means aligning ongoing policy processes (e.g. the Comprehensive Africa Agriculture Development Programme, CAADP) rather than introducing new ones.
- Identify the relevant **architects of change** and develop policies for scaling up soil health together with them that yield tangible results. This might include:
    - effective governance structures, simplification of administrative procedures or for agricultural finance;
    - adapting laws and regulations e.g. regulatory frameworks for organic and auxiliary inputs and certification to ensure quality and build trust;
    - backing policies with concrete investment plans and budget allocations for the relevant actors and levels, including revising subsidies and aligning donor funding (see also Recommendation 7);
    - initiatives aimed at securing access to land and land rights, addressing land fragmentation and challenges of leasehold law and customs;

- building the capacity of decentralised governance structures and civil society leadership to increase ownership, political participation and connection between sub-national and national levels thus enhancing their capacity to act as drivers for change.

## Key Recommendation 2

### Derive Solutions Fit to Context

- Allocate sufficient time and resources to develop the most appropriate SPR solutions and practices in a **participatory, inclusive and co-creative** manner that is tailored to the environmental, social, economic and political context of the target area.
- Favour **learning by doing** over blueprinting to ensure relevance and buy-in from the outset.
- **Prioritise "quick wins",** i.e. simple, low-cost measures with visible short-term benefits to build trust and commitment, especially in the early stages of transition. These can trigger broader, systemic change over the time. However, do not compromise on the sustainability of these measures to avoid disadoption at a later stage.
- **Validate solutions and practices** against both scientific standards and farmer values, knowledge and experience to ensure credibility, ownership and scalability.

## Key Recommendation 3

### Harness the social capital of Women and Youth

- **Analyse the role of men and women** of all ages in SPR and the desired transformation in order to depict gender roles holistically, including the influences that block or promote them.
- Recognise and support women and youth as drivers of innovation and transformation by **addressing structural barriers** such as the exclusion from decent work and the predominance of low-paid or unpaid labour on family or communal farms.
- **Support transformational initiatives** that address structural barriers faced by women and youth, e.g. knowledge packages and finance models, access to digital information and devices, access to land and other productive assets that are tailored to the needs of women and youth.
- Recognise men and the elderly as potential gatekeepers to the desired transformation and identify **allies** among them in a given social context, if required, to advance rethinking of social norms and the transformation of land use and agricultural and food systems.
- Demonstrate that improved access to land and other productive assets, knowledge, finance and decision-making power benefits not only women and youth but also their **families and communities**.
- Use these demonstrations to create and disseminate **success stories** that motivate women and youth to engage in SPR and to reduce societal resistance to their economic empowerment.

## Key Recommendation 4

### "Seeing is Believing" When Introducing Innovation

- Work with **farmer organisations and networks** to scale up the SPR programme.
- Realistic **demonstrations** close to farmers' fields, along with **accompanying studies**, are essential to encourage smallholder farmers, who are typically risk- averse, to engage with the programme.
- Networks of **living labs** can provide valuable insights that go beyond a single pilot and help refine the model before it is fully rolled out and institutionalised.
- Introducing **multiple new practices at once**, with a combined effect, helps clearly demonstrate higher yields, better crop quality and greater profits, ideally from the first season onwards. This also allows farmers to choose the practices that best suit their business goals and opportunities.
- SPR programmes require a **large-scale implementation component** demonstrating feasible scaling to effect successful policy change; successful pilot schemes are insufficient.
- Together with demonstrations, consider offering appropriate **incentives**, derisking mechanisms, and access to capital to support farmers in transitioning to new practices.

## Key Recommendation 5

### Invest in Inclusive and Adaptive Extension Systems

- Move beyond traditional top-down extension by promoting **participatory and inclusive advisory models**, such as farmer field schools, model farmers, innovation platforms, peer-to-peer learning and farmer-researcher-extension exchange mechanisms.
- Integrate SPR content and methods into **formal education curricula** to support knowledge continuity.
- Develop training-of-trainers programmes that **include informal extension agents** (e.g., community advisors, liaison farmers and other resource persons), ensuring they and ensure that they receive adequate support, recognition, and incentives.
- **Targeted training materials and advisory formats** for specific groups, including farmer-to-farmer approaches, serve as effective multiplier mechanisms that facilitate peer-to-peer knowledge exchange, build trust, and promote the dissemination of locally adapted innovations among smallholder farmers and their wider communities.
- Develop **income-generating opportunities** for these informal extension agents, i.e. resource persons, to sustain their commitment beyond the project lifecycle. Work with national institutions to formalise and certify local (informal) extension workers and integrate them into public systems and private funding mechanisms where possible.
- Support the development and use of **digital tools for extension** purposes, including artificial intelligence to deliver real-time farming information and advisory services and reduce extension costs. Ensure that this approach is inclusive and user-centred, providing equal benefits to smaller farmers and women. Digital tools are not a magic solution. They must be combined with face-to-face and participatory extension methods and provide reliable advice.

## Key Recommendation 6

### Embrace Innovations

- Be open to introducing **new technologies** that help improve efficiency, including digital solutions. Explore opportunities for leapfrogging to advanced stages of agricultural and food system transformation should be explored based on stakeholder interest and demand, provided the necessary capacity and infrastructure can be realistically strengthened or built.
- Use acquisitions and co-funding to **pilot, scale up and mainstream** innovative approaches strategically.
- **Dare to fail**, but fail fast and move on, when innovations do not promise impact in the given context.
- Some technological or institutional innovations require **intensive partnership building** and may only realise their full potential beyond the project duration. Support promising start-ups, incubators, innovation hubs, multi-stakeholder platforms and financial instruments even though it may take them a decade to prove their effectiveness.

## Key Recommendation 7

### Mobilise Investment for Soil Health

- Recognise **farmers as actors in the private economic sector**: For SPR practices to be adopted on a large scale, they must be economically viable and profitable at the farm level.
- **Value soil health economically** and provide evidence for action: Internalise the economic value of healthy soils by generating and disseminating evidence on the costs of degradation and the returns on investment in soil restoration.
- Make use of public support for agriculture to promote soil health: The **ecosystem services** provided by healthy soils, such as carbon sequestration, erosion control, and biodiversity conservation, are not adequately valued by the market. To ensure these services are provided, targeted public agricultural support measures that reward them are needed.
- Engage the private sector across the value chains: To reach impact at scale, **engage with the private sector** at all stages of the agricultural production process and create an enabling environment that strengthens markets for agricultural produce and supports viable and competitive business models for soil health inputs and services.
- **Leverage climate and blended finance**: Increase the share of climate and biodiversity finance allocated to smallholder agriculture. Use blended finance models that combine public and private capital with technical assistance to reduce the risk of investing in soil health.

## Key Recommendation 8

### Act Multi-Level, Multi-Sector and Multi-Stakeholder

- Operate across **multiple levels**, linking policy, research and practice to bring concrete learning and strong evidence from the field directly into policy and decision-making. Align initiatives with international, regional, national and subnational frameworks, agendas and policies to promote greater coherence and ownership and ensure long-term impact.
- **Use cross-sectoral approaches** to capitalise on synergies and co-benefits between related sectors.

- Build **strategic alliances** and cooperate with key stakeholders already engaged in agricultural and food system transformation, including civil society, research institutions, think tanks, governments, international and regional organisations, the private sector and donors, to drive sustainable change. Promote, and where feasible institutionalise, multi-stakeholder platforms within national systems to foster cross-sectoral dialogue, co-creation and networking.
- Encourage government actors to **coordinate donors** and allocate funding for complementary interventions strategically. This reduces the fragmentation of interventions and maximises synergies and impact.

## 2.2 Lessons and Experiences Underlying the Key Recommendations on Transformative Potential of SPR

### 2.2.1 Enhancing an Enabling Environment for SPR

Field implementation is important for providing evidence and visible impact, but anchoring SPR with the right partner structures is indispensable for achieving widespread and sustainable adoption.

**Integrating SPR into national and decentralised policies, strategies and plans** is important for reducing barriers to scaling up and creating or reinforcing positive incentives for the sustainable anchoring of SPR. Clearly, there was no one-size-fits-all solution. Some countries (e.g. Kenya) opted for stand-alone soil policies, while others (e.g. Benin and Madagascar) chose to incorporate SPR and soil health into relevant sector policies (e.g. climate, agriculture, rural development, land use) or environmental regulations (e.g. on land use, deforestation and pollution control). In addition, sub-national anchoring was more effective in counteracting general political volatility and more successful in implementation than national-level policy advice and cooperation. Intervention at the level of the most binding instruments of the partner system (e.g. bills, regulations and budget plans) is also advisable, as opposed to policy and strategy documents.

**Capable governance structures and effective implementation mechanisms** are crucial for the adoption of SPR. Without effective implementation mechanisms – the missing middle – and good governance, even the best SPR solutions risk failing due to weak enforcement, a lack of stakeholder buy-in, or poor coordination. This goes hand in hand with securing land rights frameworks to ensure equitable access to and management of resources. Governance was found to be most conducive to effective SPR when policies were well designed, inclusive, science-based, and enforceable. Equally important was the provision of sustained financial and institutional support, particularly through decentralized structures. This goes along with a clear definition of roles and mandates in implementation, including human and financial resource allocation.

**Strengthening the capacity of agricultural advisory services** and land users is essential. Investment in extension services is necessary to sustain soil management initiatives, whether it is public, private or a combination of the two.

**A holistic approach to SPR requires up-front investment and additional costs.** Initial investments often represent an insurmountable hurdle for farmers or other private sector actors, even if the investments have a positive rate of return for the state, farms and private business in the long term. Therefore, it is necessary to support the reorientation of existing financial mechanisms (e.g. agricultural finance, subsidies, incentive schemes, certification and standards) and to mobilise

additional funding sources through cooperation with the private sector (e.g. banks, companies, foundations and business organisations) to promote sustainable agricultural practices and markets, and encourage the widespread adoption of SPR practices. The private sector has significant potential, offering a range of technologies and market know-how while acting fast and flexibly.

### 2.2.2 Scaling Solutions and Innovations in SPR

**The "best practice" concept is often misunderstood** as an approach that identifies the single best way to achieve desired programme outcomes. Furthermore, the abundance of numerous methodological manuals and repositories of tried-and-tested practices may encourage implementers to adopt existing solutions rather than develop new ones.

**In contrast, ProSoil pursued an approach whereby practices are considered the best when they are most appropriate for a given context**. These practices are the result of collaborative learning and selection processes involving specific partners and stakeholders and are based on credible monitoring, evaluation and learning (MEL) systems.

**"Good" practices are subject to continuous review** and adjustment and may differ between regions and settings depending on the social, economic or environmental context.

**Against this background, thorough context assessments were conducted** prior to proposing or co-creating innovative SPR solutions to be tested at farm or agroecosystem level. Here, "innovative" means "innovative in the eyes of the farmers". The perspectives of farmers or farming communities were taken into account from the outset to ensure that field trials were planned according to their needs and capacities. Learning by doing was a guiding principle for designing and implementing the collaborative field work and a way to combine practice and learning.

**Zooming In**

**Tunisia**

ProSoil's activities in Tunisia have shown how agroecological practices like agroforests, legumes, and better soil management can increase fertility and sequester 700 kg $CO_2$/ha/year. By working with public players, researchers and producers, models that can be reproduced have been created, especially for areas vulnerable to climate change and desertification. These results will lead to more soil health being included in national policies.

**Zooming In**

**Benin**

ProSoil's activities in Benin have addressed a lack of soil fertility resulting in low maize yields by introducing mucuna (Mucina pruriens), a nitrogen fixing legume, as an alternate crop. Mucuna seeds are easy to multiply. Due to a significant increase in maize yield, the mucuna-maize system has rapidly been adopted all over the project intervention regions.

**"Quick wins" have motivated farmers and other stakeholders in agricultural and food systems** to engage with SPR and its associated value chains in the long term, particularly – but not only – in the initial stages of transition processes (see Figure 1). The focus has therefore been on low-cost and easy-to-adopt SPR measures that provide immediate benefits, i.e. within the same or the next season. Examples include the more efficient use of farm inputs such as water or manure, introducing legumes to provide nitrogen and restoring acid soils through liming, all of which led to rapid

increases in productivity and profits. These early successes helped build confidence and the willingness to engage with and invest in more complex and longer-term profitable innovations.

**Women and youth are often particularly engaged in SPR measures**, as the elderly may lack the ability to contribute labour, and men tend to focus on income-generating activities outside of agriculture or the more commercially attractive parts of agricultural production (e.g. livestock and cash crops). SPR measures therefore have the potential to provide women and youth with opportunities to improve livelihoods and generate income. In some contexts, they are highly motivated to contribute labour and assume roles as change agents in transforming agricultural and food systems. To fully harness this potential, it is important to conduct early market and cost analyses. However, this assessment may be overly optimistic in some contexts. For instance, experiences in Kenya showed that many SPR technologies are relatively knowledge- and labour-intensive and do not always offer a quick return on investment. Consequently, such interventions may not be very appealing to young people. Women are often disproportionately engaged in these activities, not necessarily because they are interested or have the opportunity, but because soil management is generally assigned to them by prevailing socio-cultural norms. When aiming at improving rights, representation and resources for women and young people, it is important to engage the elderly and men as they, according to customary and often formal law, own the land and therefore are the gatekeepers to the transformation of farming systems.

*Female farmers and youth from the Ethiopian highlands applying ISFM practices (©GIZ/Assefa)*

### Zooming In

**Burkina Faso**

In Burkina Faso, women often lack secure access to fertile farmland, limiting their ability to invest in sustainable soil management. To address this, a model was developed together with the Research and Action Group on Land Tenure (Groupe de Recherche et d'Action sur le Foncier, GRAF, Burkina Faso) and TMG Research, where men formally transfer land use rights to women for at least five years through community-endorsed agreements. The process involved household consultations and public ratification by village authorities and witnesses, strengthening local acceptance and transparency. Since 2021, this approach has provided 1,769 women access to 1,500 hectares of land across 15 villages, with strong local support and growing institutional anchoring through municipal land rights offices. This helps for the sustainability of women investments in SPR.

**Viable business models for sustainable SPR were identified for both men and women alike**. Well-managed crop residues, especially from legumes, produce organic matter in situ and are the most viable entry point towards improving soil health and increasing soil organic matter. However, depending on the farming system, this often needs to be complemented by additional, external organic inputs. In many cases, a lack of such inputs, such as manure or compost, was a limiting factor for soil improvement. At the same time this constraint also presented an opportunity to develop business models on the production and supply of organic inputs. These models were eventually supported by micro-financing instruments tailored to the needs of smallholder businesses and micro, small and medium enterprises (MSME). Another important lesson was that women and young people could only be economically empowered if they had better access to resources (e.g. land, inputs and finance) and more autonomy in economic decision-making. ProSoil therefore also worked to improve the rights of women and youth in rural communities, for example by facilitating resource use agreements.

**Effective and methodologically sound MEL systems** were essential to validate and demonstrate the outcomes and impacts of field-tested SPR solutions. Where possible, existing systems were adapted to meet the programme's specific requirements (see also chapter 3.2.2). This included introducing digital tools to facilitate data collection and analysis, which could also later be used to support advisory and extension services. The facts and figures generated in this way were vital for communicating with decision-makers. To communicate with farmers, farmer-focused evaluations were introduced, whereby farmers themselves assessed the results and benefits of innovations at their own discretion, thereby facilitating farmer-to-farmer learning and extension. To make messages accessible regardless of language or literacy barriers, multiple media were used including print, radio and video. Large language models were used to ensure rapid translation into local languages.

### Zooming In
**Ethiopia**

In Ethiopia, the benefit-cost ratio highlighted the financial advantages of ISFM measures, reflecting a strong return on the investment associated with ISFM practices despite higher costs for inputs and labour. In terms of labour, each additional day of labour invested in ISFM resulted in 413 Birr/ha (4 USD/ha) additional net income.

*Improved practice with ISFM (l.) and farmers practice (r.) for wheat in Ethiopia (©GIZ/Assefa)*

### Zooming In
**India**

In Maharashtra, India, a circular economy model was successfully implemented, turning urban organic waste into compost. The viable business model for the public and private sector is benefiting farmers, businesses and the environment. City councils oversee waste collection, while composting plant operators are responsible for processing. State agricultural universities test the compost for quality and harmful heavy metals. Community-run resource centres and local farmer producer organizations distribute and sell the compost, known as urban compost, to farmers. With 396 compost producers and 30 such farmer producer organisations already involved, Maharashtra alone has the potential to produce 350,000 metric tons of compost annually, creating an estimated business value of 20–25 million EUR while supporting climate and land restoration goals.

**Advisory and extension services are crucial for scaling up agricultural innovations and ensuring knowledge transfer at the "last mile".** Ideally, these services would link local government, researchers and farmers. However, they are often ineffective, as traditional government approaches tend to be top-down and focused on maximising yields rather than developing adaptive solutions. Such one-size-fits-all approaches are rarely appropriate due to the diversity of regional conditions. To be accepted, advisory approaches must be sensitive to local knowledge, environmental conditions, and socio-economic contexts. Participatory and inclusive service delivery models, such as farmer field schools and innovation platforms, have been introduced to improve acceptance and uptake. These models foster collaborative learning, enabling farmers, extension agents, local innovators, and researchers to co-create sustainable solutions. Farmers act as both innovators and evaluators, while extension workers act as catalysts for innovation rather than merely transmitting technical knowledge. Farmers also engage in peer learning and become trusted advisors within their communities. Advisory systems can enhance outreach and be more cost efficient, if they are complemented by digital tools, such as mobile apps, SMS, radio and mobile video screenings and social media, and emerging technologies like artificial intelligence. These innovations enable the delivery of advisory services in otherwise inaccessible areas, while improving access to a wide range of information and significantly reducing operational costs. Agro-climate advisory systems can convey relevant information to farmers more quickly and efficiently. This is particularly important in the case of extreme weather events and other shocks.

### Zooming In

**Ethiopia**

In Ethiopia, ProSoil supported the development of the soil health decision support tool (DST), a pioneering resource on the African continent aimed at improving nutrient use efficiency. This innovative tool provides tailored location-specific fertiliser recommendations and yield forecasts, drawing on 50 years of crop response data consolidated through collaboration with farmers, government and research stakeholders. Using advanced machine learning, the DST delivers context-specific advisories, resulting in remarkable outcomes: farmers who employed the DST in the piloting phase experienced an average wheat yield increase of 38 per cent compared to traditional blanket recommendations.

**Sustaining advisory and extension services beyond the duration of programme intervention** requires significant public funding, which is not always readily available. One promising approach is to integrate informal extension agents, such as model farmers and community advisors, into the public extension system, for example as co-trainers, to support the delivery of sustainable cost-effective services. In addition, creating income-generating activities was vital for ensuring the long-term commitment of these resource individuals. Opportunities such as selling locally sourced input supplies enabled them to balance their responsibilities with financial benefits. Both, the integration of informal extension agents into public extension systems as well as the economic viability of model farmers and community advisors depend on their ability to build effective organizational structures that enhance their bargaining power and lobbying capacity.

**Integrating technical knowledge and teaching methods into educational curricula** has been a key aspect of ProSoil's approach. Integration of SPR, including successfully tested innovations and scalable measures into vocational training and university curricula supports long-term competence development for agricultural advisory services providers as well as for experts and decision makers.

### Zooming In

**Madagascar**

In Madagascar, a national reference model and certification process was supported to ensure the credibility and legitimacy of resource persons. Formalization facilitated the inclusion of resource persons in funding schemes and local partnerships as well as their self-organization, e. g. in the form of associations that can provide soil-related extension services to other farmers and/or demand such from private sector or government. To provide continuous support to resource persons in their activities, regular monitoring by civil society and governmental actors was supported.

### Zooming In

**Benin, India and Madagascar**

In Benin SPR has been integrated systematically into the curricula of agricultural vocational schools. Young people were given the opportunity of a grant and training to realise their own ideas for a start-up after completing vocational school. In Madagascar a Master course focusing on SPR was developed in cooperation with the University of Mahajanga. In India trainings for resource persons and model farmers are scaled via massive open online courses in cooperation with strategic partners such as India's National Institute of Agricultural Extension Management (MANAGE) and State Agricultural Universities.

### 2.2.3 Finances and Economics

**Access to finance and markets is essential to enable smallholder farmers, landless households, women, and youth** to engage in SLM and enhance agricultural productivity. Local production of inputs and services reduces transaction costs, secures supply chains and generates income opportunities within the private sector.

**Finance institutions such as banks, microfinance providers, development finance institutions, and fintech companies can play a catalytic role** in improving financial inclusion and bridging the gap between policy, finance, and implementation. This is particularly effective when facilitated through decentralised platforms and grassroots engagement. Tailored financial products are essential to meet the unique needs and risk profiles of smallholder farmers. Traditional loan structures often fail in rural contexts due to rigid repayment schedules that do not align with seasonal income flows. Therefore, **offering repayment terms synchronized with crop cycles** is crucial. Financial products should also accommodate smaller loan sizes and feature low collateral requirements to make them accessible to farmers who lack formal assets. Furthermore, combining loans with **agricultural insurance products**, such as weather-indexed or crop insurance, can safeguard both farmers and lenders against climate-related shocks. De-risking agriculture enables farmers to reinvest in production, thereby promoting healthy soils. Public-private collaboration can make agricultural insurance tools more affordable, promoting financial inclusion and recovery from climate shocks. The combination of public-private collaboration, training and advisory services, can build long-term resilience.

#### Zooming In

**India**

In India, ProSoil collaborated closely with the National Bank for Agriculture and Rural Development (NABARD). The domestic development bank acts as a catalytic player bridging policy, finance, and implementation through decentralized platforms and grassroots engagement. This example can serve as a scaling up framework with enabling implementation and funding mechanisms for greater outreach and large-scale adoption of sustainable soil health management practices: Based on a landscape-level planning approach (200–1000 ha clusters), tailored interventions are rolled out in rainfed areas, using decentralized convergence models at the district level. NABARD's JIVA agroecology model can be featured as a replicable case study for integrating soil health, value chain access, and livelihoods. This proved effective for institutional coordination while promoting local ownership and leadership among women and youth, e.g. farmer producer organisations lead compost and bio-input marketing which offers viable models for circular rural economies. In Maharashtra and Madhya Pradesh, extension through women self-help groups and certified community resource persons has been institutionalized and is scalable.

**The development of standards and certification schemes can support market development for organic and other soil-enhancing inputs** thus incentivising smallholder farmers and agribusinesses to engage in SPR. As demonstrated above, investments in soil-related inputs and services are profitable, and viable business models exist for soil-improving farm inputs (e.g. compost, biochar, liquid fertilisers, seeds and seedlings), as well as for small-scale equipment (e.g. for minimum or zero tillage) and innovative small-scale mechanisation schemes.

**The benefits of SPR practices accrue to farmers (e.g. increased yields and water storage capacity) and to society (e.g. climate change mitigation and environmental benefits),** but additional costs and the necessary investments are incurred at the farm level. These externalities provide an opportunity to compensate farmers for the societal benefits they deliver (e.g. carbon sequestration and biodiversity enhancement), thereby creating an additional incentive to adopt SPR practices. Integrating the concept of soil health into national legislation can emphasise the crucial role of soils for food security, climate adaptation and mitigation, and protection of biodiversity.

**The voluntary carbon market can leverage private-sector capital through certification mechanisms** to finance agricultural advisory services and agroecological transformation in the long term. However, it is important that this is combined with reforming government subsidy programmes, rather than merely substituting reduced public investment. Increasing the share of climate finance allocated to smallholder agriculture would be a valuable opportunity to improve food security, resilience, and rural development. Although smallholders produce about a third of the world's food, they currently receive only around 1.5 per cent of climate adaptation funding.

*A female farmer in Kenya is mulching her field (©GIZ)*

Better targeting this group could generate multiple co-benefits for climate investments, including healthier soils, improved biodiversity, and stronger rural livelihoods.

**Finance approaches that utilise private resources or blend public and private resources** can effectively unlock investment in climate-smart agriculture, particularly when combined with tailored technical support from local cooperatives or farmer organisations. Public climate funds and guarantee mechanisms can reduce project risks and encourage private sector engagement. Aligning government subsidies with long-term climate resilience and productivity goals can increase their impact.

**As carbon markets grow, creating inclusive mechanisms that reward sustainable land use practices could provide smallholders with additional income.** Governments have a key role to play in establishing regulatory frameworks that ensure environmental integrity and social equity while scaling up innovative private sector models. However, the risk of green washing must also be considered.

**Reliable monitoring and verification systems support performance-based funding**, increase transparency and foster evidence-based decision-making and sustainable results.

### Zooming In

**Kenya**

In Kenya, a carbon offsetting project has successfully piloted long-term financing for SLM. Smallholder farmers in Western Kenya face challenges like degraded soils and food insecurity. The carbon project channels revenues from the voluntary carbon market into 20 years of bi-annual SLM extension services for 60,000 to 100,000 farmers, coordinated by a local non-profit organisation. This initiative boosts yields by around 30 per cent through agroecological practices, sequesters approximately 3.5 t of $CO_2$ e/ha annually, restores soil carbon, and enhances climate resilience. It demonstrates how private carbon finance can serve as a sustainable funding mechanism for agricultural extension, while generating income and food security for farmers through increased yields. However, challenges remain in building effective implementation structures due to high transaction costs for aggregating smallholders and limited upfront financing. Kenya's evolving legal framework also creates uncertainty for long-term carbon project planning. While fluctuating carbon prices complicate income forecasts, the rising global demand for nature-based solutions presents encouraging long-term potential.

### 2.2.4 Sustainability Through Institutional Arrangements, Partnership and Cooperation

**Ensuring sustainability** – in the sense of an impact that lasts beyond the period of programme intervention – should be a key objective of SPR development cooperation programmes.

To support partner countries in continuing and advancing their transition toward more sustainable agricultural and food systems, it is essential to **anchor and institutionalise successful SPR approaches** within the political, institutional and operational frameworks of key stakeholders. Particularly, the involvement of decentralised structures has proven critical for addressing the proximity needs of agricultural advisory services and land users, effectively bridging the "last mile".

**Given the inherent complexities and linkages outlined above, an integrated approach to SPR** is crucial for programmes to be impactful, transformational, sustainable, scalable and effective. This requires cross-sectoral engagement that goes beyond SPR itself – encompassing areas such as land rights, climate resilience, employment promotion, agri-finance and market development. However, these aspects cannot be fully addressed by a single project or programme alone.

**Therefore, multi-stakeholder partnerships and collaborations** have been systematically sought to ensure that all voices are represented and to promote ownership and trust. Encouraging participation and co-creation through facilitating cross-sectoral dialogue and networking has been key. While siloed approaches limited effectiveness, cross-sectoral collaboration clearly enhanced the impact of SPR initiatives. Strategic engagement with relevant in the transformation of agricultural and food systems, such as government, the private sector, civil society, research institutions and donors, has strengthened programme outcomes.

**Institutionalise ownership and self-agency** of partners (governments, private sector and civil society) and target groups (farmers, extension agents), e.g. through memorandums of understanding that clearly outline strategic and financial responsibilities of all stakeholders in jointly aspired change processes. In the context of SPR interventions this, for example, can be achieved through cost contributions from farmers for inputs and services provided, or from the political partners for the costs of policy development processes. When collaborating with the private sector to provide soil health inputs and services, it is important that project interventions do not distort the original business case.

### Zooming In

**India and Ethiopia**

In India, landscape-based SPR approaches were scaled through public programmes at national and sub-national (state) level and strategic partnerships with the private sector. The Dry Valley Rehabilitation and Productive Use approach in Ethiopia transforms dry valleys threatened by massive erosion due to heavy annual floods into highly productive areas. It requires substantial investments in erosion control and has been adopted by the Ethiopian Ministry of Agriculture and integrated in the Ministry's investment schemes in order to be implemented sustainably.

At a global level, ProSoil secured joint funding from BMZ, the EU and the GF. This has enabled the **strategic piloting and mainstreaming of innovative approaches** on a large scale, thus ensuring the programme's long-term success.

**ProSoil positioned farmers as central actors and beneficiaries in innovation processes and extension**, addressing the often weak or even non-existent advisory and extension services in partner countries. Based on the agroecological principle of co-creating knowledge, the aim was to create an equal playing field where farmers, researchers and extension workers jointly developed and scaled up solutions tailored to farmers' needs and contexts, usually through on-farm or agro-ecosystem research.

**This approach entails a dynamic shift in perspectives and roles**: researchers adopt the perspective of farmers and agribusinesses; pilot farmers become “agricultural scientists”; and extension workers act as catalysts. Additionally, farmers themselves acted as advisors and extension agents through farmer-to-farmer learning. By valuing traditional practices and knowledge in the development of innovative solutions and best practices, this approach fosters greater ownership, sustainability and scalability.

**SPR initiatives thrive when they are designed and implemented as multi-level** (micro, meso and macro) interventions. Changes at the macro and meso level are necessary to achieve transformative change at the micro level. Multi-stakeholder approaches therein are important to create synergies, strengthen policy coherence, and increase the sustainability and scalability of interventions. Where it is difficult to implement a multi-level approach through a singular project, multi-stakeholder approaches may also result in alliances and division of labour among interventions of different development organisations.

**Involving stakeholders from the local to the global level is key to embedding SPR in broader efforts to transform agricultural and food systems.** Lessons learned from ProSoil at national and local levels inform regional and global policy dialogues, while international expertise and cross-country learning inform local solutions. This two-way exchange increases the effectiveness of SPR implementation, ensuring it is not carried out in isolation, but as part of a dynamic system that is responsive to local realities and informed by global best practice.


*A high-level panel during the P4C SOILutions conference (©GIZ/Photothek)*

# 3 Effective Programme Design for Impact at Scale

**Soils are highly diverse and complex ecosystems** that can be lost in a day but take many years to recover. Not surprisingly, designing effective SPR programmes is equally complex. SPR is not merely about increasing yields or hectares of restored land. Rather, it is the very foundation of sustainable livelihoods and transformational change towards sustainable agricultural and food systems. Several key lessons and recommendations have emerged regarding the design of global or regional programmes, particularly with regard to establishing appropriate project frameworks, partnerships, and monitoring systems.

## 3.1 Key Recommendations for Designing Impact at Scale

Designing successful SPR programmes requires a **holistic, long-term approach** that addresses complexity, engages multiple levels of governance, and integrates robust MEL systems. Experience from many countries highlights the importance of forward-looking programme design to ensure that soil rehabilitation efforts contribute effectively to broader agricultural and food system transformations. Based on this experience, key recommendations for designing effective SPR programmes have been identified:

### Key Recommendation 9

**Think Big**

- **Design long-term SPR programmes** to ensure sustainable impact and enable systemic change. For example, a minimum of five years is recommended to finalise scalable technologies and to build ownership of the necessary change processes among the various stakeholders. This is also because soil eco-systems require time to regenerate, as do the socio-economic systems of small-scale farmers when it comes to embracing and adopting innovations that deviate from the status quo.
- Aim for **adequate funding** in terms of both volume and breadth/scale and go beyond pilot implementation.
- Acknowledge the **complexity**, interdependencies and uncertainties (e.g. regarding funding, political unrest, conflict and crisis) at the design stage, and transform risks into opportunities by considering different scenarios and incorporating **contingencies** into the programme design. It is crucial to strike a balance between maximising short-term impact and ensuring long-term sustainability in the design process.
- Advocate to donors that thinking big means more than merging several small projects across countries to save on administrative costs. In global SPR programmes, **leverage regional cooperation** through strategically designed cross-country activities that help streamline processes, reduce transaction costs and maximise cost efficiency. These activities should either have national relevance in several countries or be relevant to the global agenda. A **bottom-up approach** is recommended to encourage ownership.
- While thinking big requires sufficient financial resources, it is also important to consider **replicability** within the system to which the intervention is a subject. This refers to the affordability of new soil

health inputs and services for farmers as well as the cost of the intervention in relation to the respective partner government's available budget.

## Key Recommendation 10

### Engage with Partner Systems

- **Involve partners from the beginning** when setting up monitoring, evaluation and learning systems as well as knowledge management and continuity concepts to ensure ownership and sustainability.
- Look for opportunities to **integrate indicators into national reporting systems**, e.g., such as Nationally Determined Contributions (NDCs) under the UNFCCC, UNCCD National Strategies and Action Plans (NAPs), and National Biodiversity Strategies and Action Plans (NBSAPs) under the Global Biodiversity Framework.
- Do not create project-specific applications, platforms or devices for knowledge management and sharing. Instead, seek to **embed knowledge products, tools, and processes into the operational frameworks of partner institutions** to ensure knowledge continuity after project completion.
- Select **indicators** based on a clear theory of change that follows long-term outcome trajectories.

## Key Recommendation 11

### Integrate Accompanying Research as a Strategic Pillar

- Position accompanying research as a core element of SPR programmes, ensuring that implementation approaches and strategies are based on **peer-reviewed, scientifically sound evidence**.
- Promote **participatory and transdisciplinary research** to co-develop practical, locally adapted solutions together with partners and farmers.
- Use **scientific data** to inform and influence policy, support evidence-based dialogue at national and international levels and embed SPR in development agendas. Include socio-economic analysis to demonstrate the wider societal benefits of SPR, which contribute not only to soil health but also to public health, food security, economic development, and climate resilience.
- Ensure alignment and **feedback loops** between research, policy and practice.

## Key Recommendation 12

### Talk Out Loud and Talk About Economics

- Develop strong and engaging **narratives** to raise awareness and interest, both within and beyond your stakeholder landscape, about the paramount importance of soil in terrestrial ecosystems ("Soil Uncovered") and in agro-ecosystems ("No Soil, No Food").
- Tailor these narratives for **different audiences** and be aware of the prevailing political economies and vested interests surrounding soil health and the necessary inputs and services. Strategically engage with the media and civil society to address and overcome barriers to transformation.
- **Explain the links** between soil health, land management, biodiversity, climate. and human well-being and resilience.

- Promote SPR as a **diverse economic sector** offering diverse business opportunities at multiple scales, initially focusing on business models and value chains for soil improvement inputs (e.g. manure, compost and seeds for cover crops or intercrops).
- Strengthen the business and entrepreneurship skills of value chain actors, providing spaces for **networking and communication**.

## 3.2 Lessons Learnt and Experiences Underlying the Key Recommendations

### 3.2.1 Vision and Strategic Planning

One of the main challenges encountered was the **uncertainty about programme duration.** This limited the ability to define long-term outcome trajectories and structure the programme design and partnerships accordingly.

**Experience showed that impact increased neither exponentially nor linearly** but rather varied greatly depending on external factors such as security, the economic context, and climate and weather events. Initially, it was hypothesised that areas in which sustainable SPR practices were applied would increase slowly in the first few years, before increasing exponentially through replication and scaling. The initial focus on quickly reaching large numbers of beneficiaries and covering large areas has, in some cases, resulted in missed opportunities to plan intervention partnerships more thoroughly and strategically. The same applies to other key components of programme design, such as the initial monitoring and evaluation frameworks (including proper baseline setting), knowledge management and communication, and strategies for knowledge continuity and sustainable project anchoring and exit. This challenge was addressed by adopting an iterative approach to implementation, i.e. by continuously capitalising on interim results and insights, and emerging opportunities for programme adjustment and redesign. Nevertheless, evidence suggests that spillover effects and uptake of ProSoil solutions by other stakeholders could increase the programme's monitored impact by a factor of between 1.4 and 2.

**Strategically designed and well-aligned cross-country activities helped streamline contradictory procedures and leverage economies of scale.** Furthermore, such activities promoted knowledge sharing and the exchange of learning experiences, providing an opportunity to expand networks and promote regional cooperation. Cross-country learning was also particularly valuable. By combining experiences from different countries and regions, scalable solutions can be created that are adapted to local conditions but based on international knowledge and experience. Additionally, generating and sharing of evidence from various countries for communication purposes with donors and for setting the international agenda has increased the impact of the activities.

**Zooming In**

**Cross-country Activities**

Under the multi-donor action ProSilience, co-funded by the EU and BMZ, several so-called cross-country activities were implemented covering, e.g. i) the development of a methodological guidance on how to conduct economic analyses for assessing the impacts of agroecology and soil protection (GIZ 2023); ii) the generation and compilation of evidence on the multi-dimensional effects of soil protection and agroecology (GIZ 2024), in

particular regarding environmental and economic performance, dietary diversity and food security, which was taken up by political decision makers in some of the partner countries (e.g. in the context of the monitoring system of Kenya's National Agroecology Strategy); and iii) the design and implementation of a leadership development and peer learning program (the "Agroecology Leadership Academy"), which showed leverage effects in the context of the implementation of identified transformation initiatives at national level.

### 3.2.2 Monitoring, Evaluation and Learning

**MEL systems are fundamental in tracking impact and ensuring accountability**. It is important to co-design and embed MEL systems together with partners from the outset. Integrating indicators into mandatory reporting systems, such as NDCs, for example, has improved both alignment with relevant policy frameworks and long-term sustainability.

**Yield was found to be an appropriate proxy for soil** fertility in most country packages but not for livelihoods which were better assessed by measuring productivity.

### 3.2.3 Knowledge Management and Continuity

**SPR and agroecological practices, as well as the multi-level approach itself, are knowledge- intensive.** Knowledge exchange, learning and knowledge continuity are crucial to ensuring that successful approaches not only remain effective locally and can be transferred and scaled up to other regions and contexts.

**Knowledge products, tools and processes were effectively embedded within the operational frameworks of partner institutions** at both national and subnational levels, so that the knowledge and experience gained during implementation remained within the partner system. This approach empowered partners to draw on a variety of knowledge products and develop integrated solutions tailored to their specific contexts independently. The approach involved designing "Knowledge Management and Continuity Concepts", which combined knowledge integration with partners and existing platforms (e.g. WOCAT), capacity building, training and the institutionalisation of tools and approaches. In contexts where this was not possible (e.g. due to a lack of operational frameworks), sustainability concepts must be included when developing new tools, to ensure knowledge continuity.

**The extent to which knowledge and learning systems are locally sustainable in the long term should be evaluated ex-post.** It should be noted that transformations are highly dynamic and require constant adaptation to changing conditions, addressing emerging issues and renewing knowledge at both the farmer and decision-maker levels, even beyond the lifetime of a project.

### Zooming In
**India**

In India, field learnings on sustainable soil management and Natural Farming were integrated with the MANAGE in form of Massively Open Online Courses. Since these topics were not yet covered in the institute's pre-existing course offerings, they filled a gap for the partner. Meanwhile, for the program, the courses helped strategically amplify the reach of the technologies with further multipliers within the Indian agriculture extension ecosystem.

### Zooming In
**Ethiopia**

More efficient use of mineral fertilisers is essential for sustainable farming systems. In Ethiopia, a DST for fertilser application was developed in collaboration with various partners and donors, to integrate scientific knowledge into agricultural decision-making. The tool provides agricultural advisors with site-specific information on the type and amount of fertiliser they should recommend to farmers to increase yields and use fertilisers more efficiently. This maximizes productivity on agricultural land while reducing the costs of agricultural measures. After final validation in 2025, the DST is to be used nationwide in Ethiopia.

### 3.2.4 Accompanying Research for Solutions and Evidence

**Accompanying research in the natural, economic and social sciences is vital for supporting innovation** in development programmes. This in situ research is essential for assessing soil processes and developing evidence-based strategies for sustainable soil protection and management. Collaboration between advanced research institutions (such as academia, national and international research centres) and local partners leads to practical solutions that are tailored to local conditions. This collaboration also expands networks and provides access to insights from different levels of research. Furthermore, these studies help evaluate the outcomes of interventions such as soil fertility management and land rights protection and identify effective and scalable approaches.

**Credible evidence of impact fostered by research can inform policy dialogue and provide decision-makers with solid arguments** for integrating SPR into national and international strategies. For instance, socio-economic studies emphasise the broader advantages of sustainable practices for communities, including enhanced public health through improved nutrition and diminished exposure to agrochemicals. However, the mismatch in timelines between research, policy, and implementation cycles requires efforts to actively navigate and reconcile these differences to ensure alignment.

# 4 Outlook

Over a decade of implementing ProSoil has demonstrated that the rehabilitation of degraded and infertile soils is not only technically but also economically feasible. Under improved framework conditions, the **solutions are scalable** and can make a significant contribution not only increasing agricultural productivity, but also contribute to climate resilience, biodiversity, and sustainable rural development.

The recommendations set out in this whitepaper aim to contribute to the transformation of agricultural and food systems from the ground up, making them more sustainable and fairer. Healthy soils must be **at the centre of action now**, as they serve as the foundation for addressing the **interconnected challenges of climate change, food insecurity, biodiversity loss, and socio-economic inequality**. This requires coordinated efforts from the three key stakeholder groups: the public sector, the private sector, the civil society, and the international community. The recommendations given in this paper are synthesised in a policy brief. The brief will be presented at the UNFSS +4 Stocktaking in Addis Ababa in July 2025 highlighting six priority areas for immediate and collective action to address critical issues around soil health (see Figure 2).


***Figure 2**: Levers for increased soil health in food system transformation*

Furthermore, the new global flagship initiative: "SOILutions – A Global Initiative for Soil Health and Food Security" that was launched by BMZ and UNCCD, and supported by the EU and the GF during the P4C SOILutions Conference will advocate for scaling up successful practices and raising the profile of soil health as a critical lever for the transformation of agricultural and food systems. Guided by the lessons of the past decade and anchored in this partnership, the programme "Soil Matters" supported by BMZ and the EU and implemented by GIZ, aims to effectively utilise these **levers** and contribute to major transformation initiatives in Africa and India until 2029.

Read the full **Policy Brief** here:

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