FRONTIERS OF CHANGE

GLF CLIMATE HYBRID CONFERENCE | #GLFClimate

STANDING ON CLIMATE-RESILIENT GROUND

ADAPTATION, EFFECTIVE SOIL PROTECTION AND REHABILITATION

11–12 NOVEMBER 2022

german cooperation
DEUTSCHE ZUSAMMENARBEIT

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

WHITE PAPER

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Check dam construction in India.

Message 1 – Healthy soils are fundamental for climate-resilient agricultural and pastoral livelihoods

Climate change directly and indirectly impacts food production and access, undermining food security and nutrition in many parts of the world. Further increases in the frequency and severity of droughts, floods, heatwaves and other extreme events will thus also increase the risks to food security. Smallholder farmers and agro-pastoralists are particularly affected by climate change, as crop and livestock production directly depend on seasonal climate conditions and can be impacted strongly by extreme events. At the same time, smallholders and agro-pastoralists also face a range of barriers to carrying out effective adaptation such as limited access to finance and lack of alternative income sources.

Many of the climate impacts on agricultural and pastoral production manifest themselves at the intersection of soils and water. The impacts of droughts and floods are related to the conditions of the soil, especially its ability to hold and absorb water. Soil organic carbon is a key factor in this. It is associated with soil fertility and quality. Organic matter improves soils' water infiltration and retention capacities. Fertile and healthy soils support more robust and stable crop yields.

Diminishing soil quality can cause land degradation that is interwoven with climate change and the basis of agricultural and pastoral livelihoods. Extreme weather events and changing climatic conditions drive land degradation such as desertification, while reduced soil and land quality increases the vulnerability to climate change and causes greenhouse gas emissions. Hence, land degradation and climate change mutually reinforce each other.

Message 2 – Soil protection and rehabilitation are effective adaptation options with a multitude of co-benefits for people and the environment

Soil protection and rehabilitation (SPR) focus on maintaining and improving soils as a productive resource. They can also prevent and reverse land degradation. Implementing SPR measures both decreases the vulnerability driven by land degradation and also improves ecosystem services and natural capital. Ultimately, SPR measures support rural households in increasing their adaptive capacity while improving food security and livelihoods.

The role of SPR measures in adaptation to climate change is multifaceted. Measures focusing on soil fertility such as the application of compost or green manure cover crops increase the resilience of soils to adverse climate impacts. Further, measures for soil and water conservation, which include physical and vegetative erosion control, counter direct impacts from heavy rainfall events by reducing water erosion. Vegetative measures such as agroforestry bring additional benefits including diversification of income and on-farm production, better microclimates and shade for animals. Research by the Potsdam Institute for Climate Impact Research demonstrates that integrated soil fertility management and agroforestry represent cost-effective adaptation options under future climate scenarios in Burkina Faso and Ethiopia, respectively.

But beyond adaptation and the countering of land degradation, SPR measures yield wider benefits. Increasing and maintaining carbon stocks in soils and vegetation contribute to the mitigation of greenhouse gas emissions. Soils are also major habitats that house more than one quarter of the world's biodiversity. Practices such as residual mulching or compost application can increase the biodiversity in soils and hence create a biodiversity co-benefit.

The global programme Soil Protection and Rehabilitation for Food Security (ProSoil) is implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ). It supports the implementation of agroecological approaches for sustainable, climate-smart SPR at scale in seven partner countries. The programme aims to directly benefit over 1.4 million people. To learn more about how ProSoil's work on urban compost for example helps farmers in India to adapt to climate change, please watch our short film.

Message 3 – Effective adaptation requires that adaptation actions are feasible in the local context

Adaptation is context specific because climate risks, vulnerabilities and also local conditions such as the agricultural system vary. What might be a priority in one region might be secondary in another region. Experts and the scientific community can generate information and data to understand the risk context, develop scenarios on how the climate will evolve and identify technical adaptation options. This is an important basis for designing and implementing effective SPR measures as climate change adaptation starts with a risk perspective. Therefore, it is important to ask what the climate risks are, how they develop in the future and what impacts can be expected.

Nevertheless, it is crucial that adaptation measures are locally feasible. Of equal importance to expert knowledge is the perspective of rural populations, farmers and pastoralist regarding the local feasibility of adaptation options and possible barriers they face in implementing them. Enabling a dialogue between research, extension officers, farmers and other stakeholders on this topic allows for feedback and the identification of action points. In this manner, barriers can be addressed and adaptation innovations can be tailored to the local context . See the box following rephrarsing for how this is addressed within ProSoil.

Assessing the adaptation relevance of soil protection and rehabilitation – A multistakeholder approach

In the context of ProSoil, a series of multistakeholder workshops was conducted across the seven partner countries. The process followed three steps. Based on the presentation of future climate scenarios and projections of climatic impact drivers, participants prioritized which climate risks are most relevant for farmers or agro-pastoralists in their region. Then, the effectiveness of different SPR measures was assessed against these selected risks. In the last step, the practices were evaluated regarding their local feasibility regarding 16 socio-economic indicators such as the costs or accessibility for different groups. In summary, the process asked the following questions: (1) What climate risk do we face? (2) Are the practices effective in light of these risks? and (3) Are they feasible in the local context?

The approach drew on the experience of different stakeholder groups and facilitated an exchange between them. It introduced the participants to a climate risk perspective and invited them to develop and review the adaptation hypothesis behind the practices.

Message 4 – Innovations in input and service delivery as well as legal frameworks are needed to achieve sustained impact at scale

Many efforts to scale up sustainable land management and induce wider transformation of food systems fail. Research accompanying the ProSoil programme that is based on the analysis of various programmes on agricultural development and sustainable land management in Benin, Burkina Faso and Kenia found that scaling up and sustaining the adoption of sustainable land management practices is a challenge for many programmes and projects.

Sustaining and scaling adoption of sustainable soil management requires institutionalizing improved means of input supply, service delivery and innovative legal frameworks (Figure 1). Against this background, projects and programmes need to undertake deliberate efforts to think beyond project periods, intervention areas and indicators and to engage with various stakeholders to bring forward innovation to enable continued service delivery for sustainable soil management.

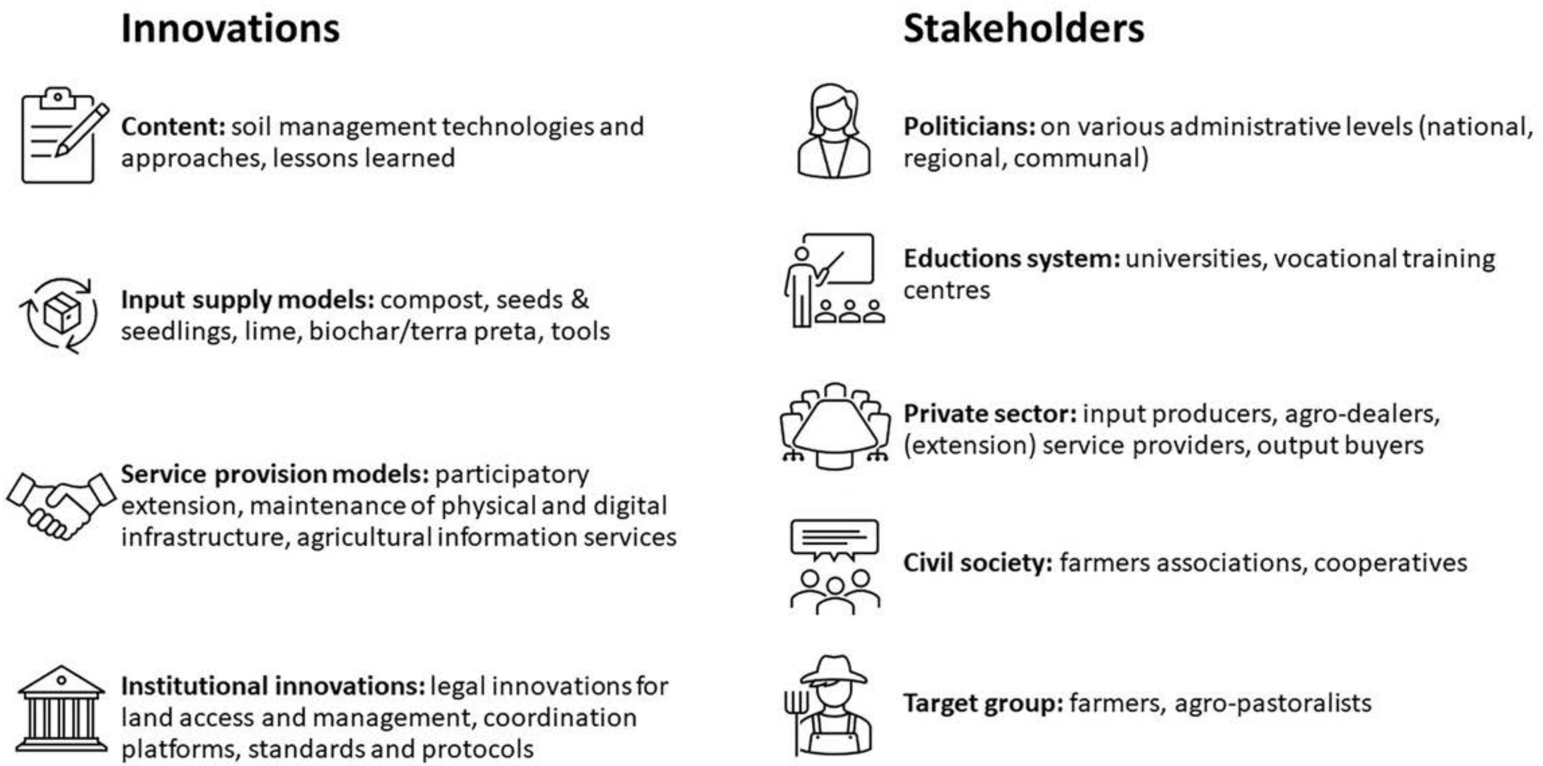

Figure 1. Key elements and stakeholder for scaling and sustaining sustainable land management

Implementation Pathway 1 – Dry valley rehabilitation in the Ethiopian Lowlands

In the Afar region of Ethiopia, the major climate risks are severe drought events and soil erosion by water, which also lead to loss of protective vegetation and heat stress for animals and plants. Regarding the sparse landscape and dependence of the local population on livestock as a source of food and income, the impacts of climate change become substantially destructive in the region. According to a recent analysis of climate models and data by the Potsdam Institute of Climate Impact Research, extreme drought conditions are predicted to further exacerbate conditions in the coming years.

ProSoil is focusing on a dry valley rehabilitation approach to re-green the intervention sites, using soil and water conservation methods such as water-spreading weirs and dry-stone measures, which are technologies promoted within the regional plan for climate change adaptation. Mechanisms for subsequent productive use, such as flood-based-farming and income generating activities, consider the changing livelihood systems of vulnerable pastoralist communities.

Various stakeholders from governmental and scientific bodies in Ethiopia have acknowledged the severity of climatic risks and expressed the need to further increase the political willingness and social acceptance of upscaling adaptation technologies. In this sense, the project has recently transferred the approach to the lowlands of Oromia Region in Ethiopia.

Water Spreading Weirs from above. © GIZ/Klaus Wohlmann

Implementation Pathway 2 – Scaling up sustainable soil management in Benin

Benin is advancing its climate action by establishing governance mechanisms and institutional coordination as well as operationalizing strategies and policies through the implementation of projects and programmes. These measures enable a more climate-resilient agricultural production and assure food security in the face of mounting climate risks. The interventions of ProSoil around sustainable land management and climate change adaptation support this effort.

Among the major climate risks prevalent in the intervention areas are erratic rainfall, droughts, water erosion, wildfires and heat stress for plants and animals. ProSoil promotes a range of practices directly geared towards countering climate impacts such as advocating for drought-tolerant crops, short-cycle varieties and staggered sowing. This is complemented by soil and water conservation techniques and agroforestry. During a participatory workshop with various stakeholder groups, the adaptation effectiveness of these measures was confirmed by the participants. Further, adoption of the measures is high. Up to today, over 80% of the 159,000 farmers trained by ProSoil apply these techniques on their farms.

Major factors for scaling are access to relevant inputs and knowledge. Addressing these requires social innovation beyond technical expertise. The institutionalization of a farmer-led extension approach built around the concept of “social debt” provides an opportunity to assure continued knowledge and skill dissemination. Social debt creates accountability: a community nominates farmer trainers from their members, who will receive training and have the obligation to pass on the knowledge to their peers.

ProSoil also empowers the Federation of Producer Organisations in Benin (FUPRO-Benin) to organize the production of certified seeds of soil-improving plants such as nitrogen fixers. This includes ensuring the production of local seeds of intermediate quality, the seed certification process and establishing a mechanism for multiplication and certification.

Farmer and extension officer inspecting cover crop in Benin. © GIZ/Klaus Wohlmann

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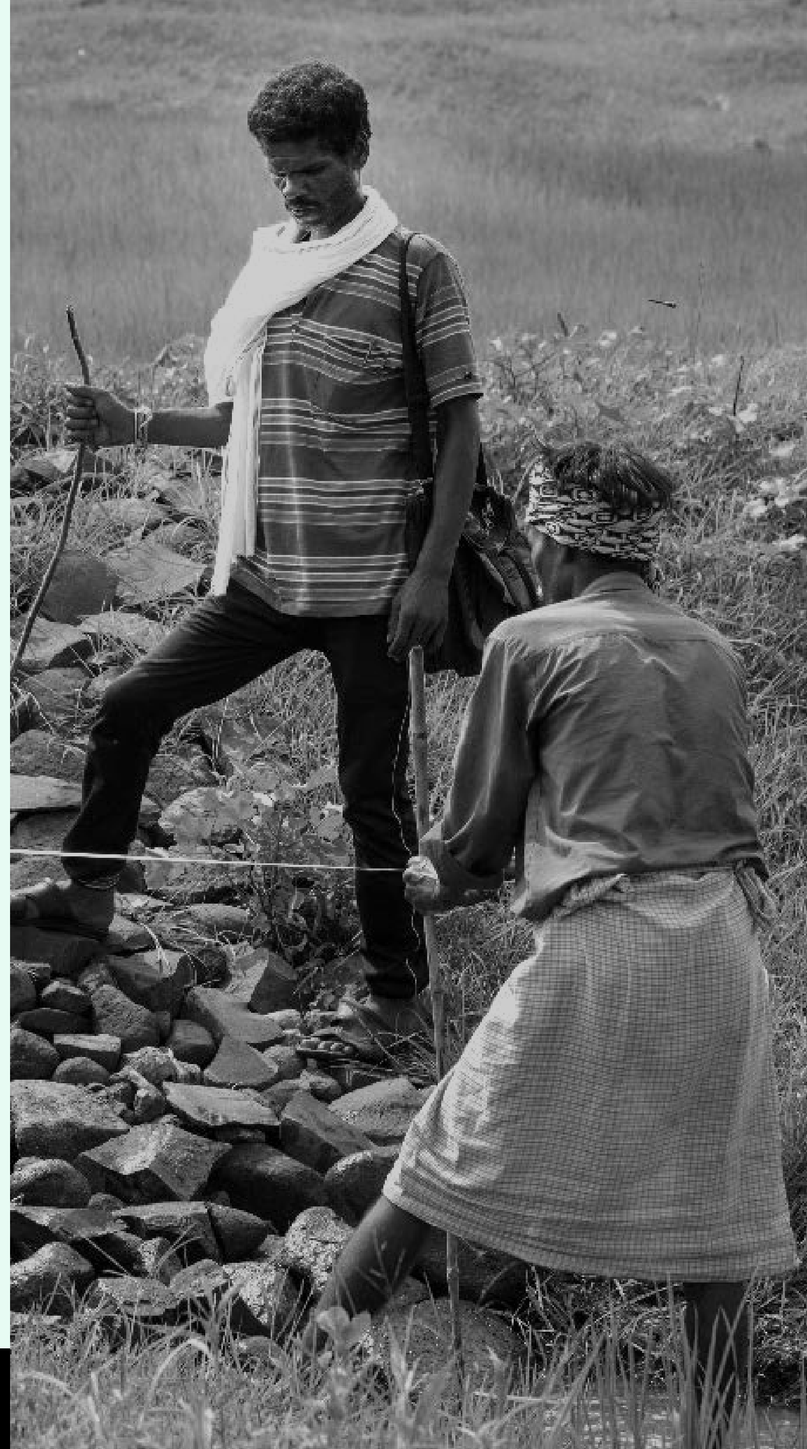

GLOBAL LANDSCAPES FORUM

The Global Landscapes Forum (GLF) is the world's largest knowledge-led platform on integrated land use, dedicated to achieving the Sustainable Development Goals and Paris Climate Agreement. The Forum takes a holistic approach to create sustainable landscapes that are productive, prosperous, equitable and resilient and considers five cohesive themes of food and livelihoods, landscape restoration, rights, finance and measuring progress. It is led by the Center for International Forestry Research (CIFOR), in collaboration with its co-founders UNEP and the World Bank and Charter Members.

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