german cooperation
DEUTSCHE ZUSAMMENARBEIT

Co-funded by the European Union

Implemented by

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Policy Brief

Economic benefits through agroecological soil practices

Evidence by the Global Programme "Soil Protection and Rehabilitation for Food Security" (ProSoil)

Soils worldwide are degrading at an accelerating rate with devastating effects on agricultural productivity and thus food security. Farmers can directly address this challenge by adopting agroecological practices that help maintain or enhance soil fertility over the long term. Evidence from 10 years of implementation of ProSoil shows that these measures not only improve soil fertility but also have a positive economic impact for both farmers and society as a whole. Case studies from ProSoil have been analysed, and the complete report is available *here*.

The current state of the world's soils:

- Soil provides the basis for 95% of global food production.
- It is estimated, that around one third of the world's soil is degraded, which affects roughly 3.2 billion people.
- It is estimated that by 2050, 90% of the Earth's topsoil will be at risk of degradation.
- Erosion, one of the most widespread forms of soil degradation, causes financial losses of about USD 400 billion every year.

ProSoil addresses soil degradation

Soil degradation and climate change are two major interconnected challenges threatening food security of a growing population, with those who live of their land suffering the most from declining productivity. ProSoil aims to address this issue by working together with smallholder farmers in protecting their land through the implementation of climate-smart, agroecological practices in seven countries in Africa and India.

As part of the German special initiative "Transformation of Agricultural and Food Systems", the Global Programme "Soil Protection and Rehabilitation for Food Security" (ProSoil) supports and advises smallholder farmers in Ethiopia, Benin, Burkina Faso, India, Kenya, Madagascar and Tunisia on agroecological and climate-smart agricultural practices and transformation processes focusing on sustainable land management. Alongside the respective government agencies of each country, stakeholders from the scientific community, civil society and the private sector are also actively involved in the measures. The Global Programme is commissioned by Germany's Federal Ministry for Economic Cooperation and Development (BMZ) and co-funded by the European Union (EU) and the Gates Foundation.

Since the beginning of the Global Programme in 2014, soil degradation has been reversed on more than 980.000 hectares of land. This results in an average yield increase of 44 per cent, directly benefitting the lives of 2.6 million people.

Do agroecological practices have financial benefits?

To illustrate that the implementation of agroecological practices not only reduces soil degradation and improves soil fertility, but can also have positive financial effects, a review was conducted of selected ProSoil activities carried out between 2014 and 2023. This review aimed to address following questions:

I) **Are agroecological practices economically viable for smallholder farmers?**

II) **What are the broader economic and social benefits of agroecological practices?**

The investigated agroecological practices encompass a diverse range of measures under the following categories[1]:

Soil and water conservation (SWC), including water-spreading weirs, dams and dry-stone measures, stone bunds, vegetative stripes, embankments, and other earthworks, as well as cover crops, mulching, residue management, improved or zero tillage, zaï and, half-moon structures,

Integrated Soil Fertility Management (ISFM), including the application of manure, organic fertiliser, biochar, and the integrated application of mineral fertiliser, and

Sustainable Land Management (SLM) including organic farming, agroforestry, inter- and, mixed cropping as well as management approaches like fire management.

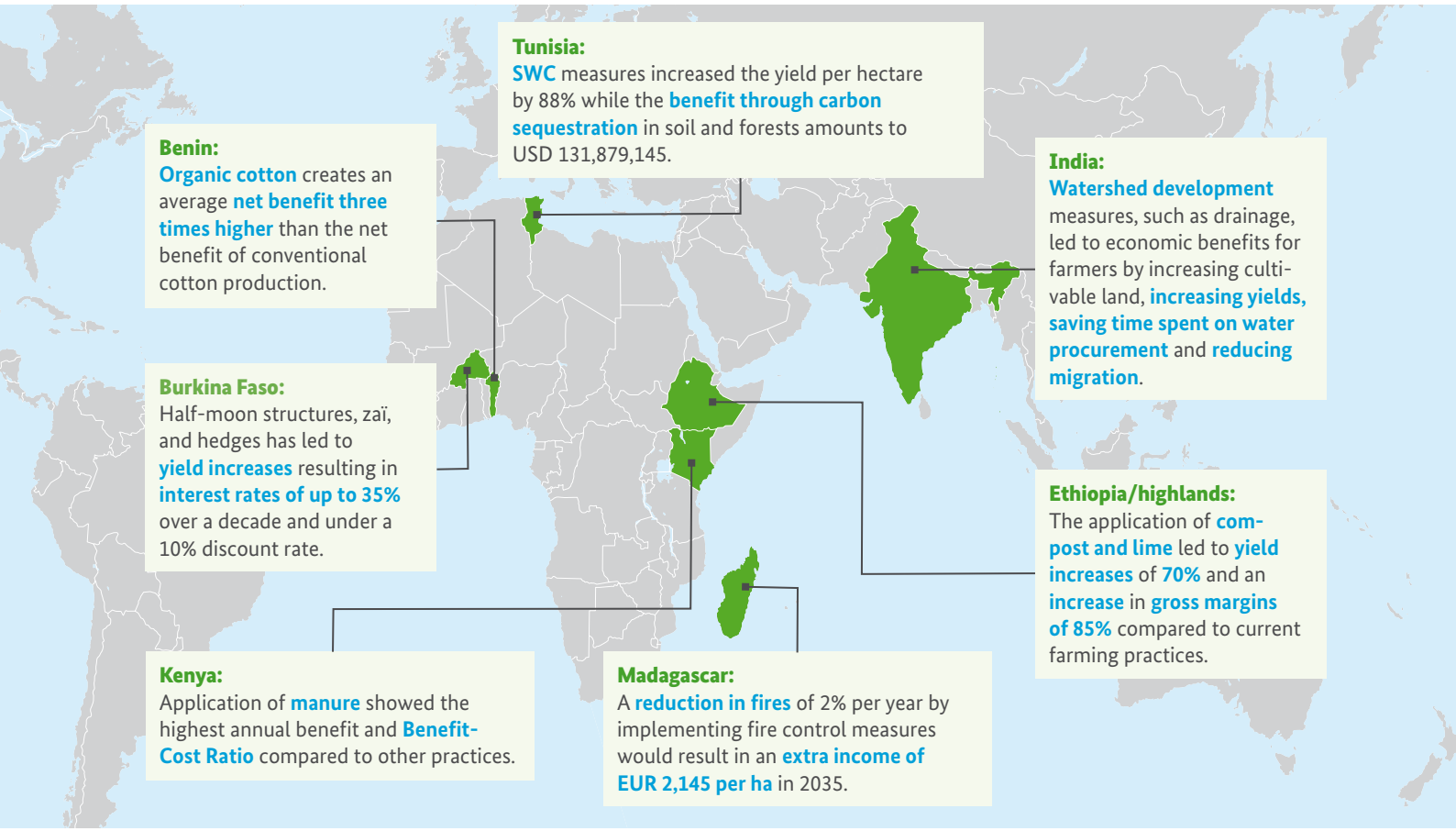
[1] ProSoil implemented additional practices, particularly under the Sustainable Land Management category, including governance aspects and management planning, such as landscape planning, integrated watershed, and grazing management. However, not all were economically assessed and are therefore not listed here.

I. Are agroecological practices economically viable for smallholder farmers?

The review indicated that **SWC** measures almost always provide benefits for famers. In Ethiopia, the combination of water-spreading weirs and hand dug wells has resulted in increased advantages for farmers. Conversely, another study suggested that without soil conservation structures, crop yields are expected to decline in the coming decades. In Tunisia, SWC measures have led to an expansion of production area and increased yields, similar to findings in Burkina Faso, which also resulted in economic benefits for farmers. In India, watershed development has contributed to higher incomes and improved water availability.

In India, the use of **ISFM** practices has positively impacted farmers financial situations, particularly through the application of manure, biochar, and biofertilisers. The use of manure has also resulted in the highest yield increases in Kenya compared to other methods, especially when combined with cover crops. In Ethiopia, the application of compost and lime has led to yield increases and improved gross margins.

Furthermore, **SLM approaches** have shown positive effects for implementers. For example, in Benin, the net benefit from organic cotton production was three times higher than that from conventional cotton production. In Kenya, a study on agro-forestry has provided mixed results, ranging from highly profitable in medium-scaled commercial farms to unprofitable despite higher yields on small scale farms, primarily due to high initial investment costs. Additionally, a study from Madagascar found that implementing SLM approaches can lead to increased yields, resulting in financial returns for farmers.



Further evidence of the economic benefits of the agroecological practices promoted by ProSoil comes from the project 'Measuring Agroecology and its Performance' (MAP). This project, conducted by CIFOR-ICRAF in collaboration with FAO, Stats4SD, CIRAD, and GIZ, was carried out under the Agroecology Transformative Partnership Platform (TPP) from May 2023 to September 2024. Utilising FAO's participatory **Tool for Agroecology Performance Evaluation (TAPE),** the project assessed the agroecological transformation of farms and its socio-economic and environmental impacts, comparing farms that received support through ProSoil activities with a reference group.

The assessment results indicate a positive correlation between the level of agroecological transformation and economic performance. Farms participating in ProSoil activities across Kenya, Ethiopia, Benin, and Madagascar consistently achieved higher agroecology scores, and this advancement in agroecology often resulted in improved financial outcomes.

Early transition success as shown by TAPE

In Kenya, for instance, farms supported by ProSoil exhibited an average productivity increase of 52 per cent compared to farms of the comparison group. Additionally, nearly all farms receiving support from ProSoil reported an increase in income over a three-year period, although they also experienced greater income instability. In contrast, the comparison group did not see any increase in income.

However, while the difference in average agroecology transition scores between the ProSoil and comparison groups is more pronounced in Kenya than in the other three countries, Kenyan farms generally had lower agroecology scores compared to farms in the other countries. This may suggest that agroecological transformation projects are more effective for participants who are at earlier stages of transition processes.

In conclusion, almost all the studies analysed showed positive effects for farmers with local variations in the positive effects.

II. What are the broader economic and social benefits of agroecological practices?

In addition to providing increased financial returns for farmers, SWC measures in India, Ethiopia, Tunisia, and Benin have had indirect **positive effects on agricultural production by mitigating the impacts of floods and droughts and reducing water scarcity.** This is particularly beneficial to women, who have saved significant time in fetching water. The increased incomes generated by agroecological practices have also **improved the overall economic situation of women, enabling them** to save money and invest it in their children's education. Projections from Burkina Faso indicate that with increased production volumes at the farm level, substantial production surpluses could eventually

contribute to enhanced food security in these regions. Furthermore, the **quality of the food can improve,** as agroecology often promotes crop diversification, leading to better nutrition.

This is supported by the MAP project, which found that farms with higher levels of agroecological transformation reported **greater food security.** Additionally, farms participating in ProSoil activities showed a strong positive correlation between agroecology scores and **dietary diversity.**

Moreover, agroecology, particularly in the context of organic farming, has indirectly contributed to **improving farmers' health** and **reducing overall health costs** by reducing the negative effects of pesticide use in cotton cultivation in Benin.

Finally, agroecological practices have demonstrated **positive effects on climate resilience and biodiversity.** In Madagascar, it was estimated that investments in agricultural fire prevention would strongly reduce soil organic carbon loss in the coming decades. Evidence from Kenya also showed that agroforestry not only provides economic benefits but also reduces air pollution and enhances biodiversity.

These findings are further corroborated by the TAPE assessment, which revealed improvements in biodiversity and soil health with increasing levels of agroecological transformation.

Although not all the benefits can be calculated or translated in monetary outputs, it becomes clear, that agroecological practices benefit the society and therefore need further consideration in the coming decades.

The limits of (economic) evidence – beneficial but context dependent and the role of externalities

Economic analyses of smallholder farms face unique challenges, including specific cost structures and the complexities of valuing subsistence farming. Furthermore, the use of different economic indicators can lead to varied outcomes, complicating comparisons or the transfer of results between regions.

It is also essential to consider the trade-offs associated with agroecological practices. For instance, while reducing input use may increase labour requirements, some interventions can actually decrease labour demand, which lowers costs for farmers but may also result in fewer employment opportunities. Additionally, the advantages of agroecology are likely underestimated, as positive effects such as carbon sequestration, enhanced biodiversity, and social improvements are challenging to quantify and are often not reflected in economic analyses.

Recommendations:

Institutional support is needed to sustain and restore soil fertility – Call to action for policy makers

Soil protection and rehabilitation are essential for ensuring food security, and this responsibility extends beyond farmers to encompass society as a whole. It is vital to allocate the necessary resources to raise awareness about the importance of soil health and disseminate knowledge about its importance, to facilitate the initial investments required for various measures, and to monitor the condition and progress of soils. In cases where soils are already degraded, it may take considerable time for the financial benefits of rehabilitation measures to become apparent, which can diminish farmers' motivation to continue these efforts. This gap must be addressed through government support for the benefit of society. Therefore, investing in quick wins is just as critical as funding long-term initiatives.

Promising investment opportunities to sustain and restore soil fertility – Call to action for donors

Many agroecological practices, such as the construction of dams or the implementation of agroforestry, require massive financial resources that farmers often cannot afford without external funding. It is essential to provide these necessary investments, which not only benefit the farmers but also have positive effects on society as a whole. In addition, payments for ecosystem services could serve as extra incentives for practitioners, increasing their motivation to adopt agroecological practices.

Streamlined approaches to sustain and restore soil fertility – Call to action for practitioners in development cooperation

Agroecological practices have proven effective, but their success varies depending on the specific context, which should be carefully considered when selecting activities for implementation. What works well in one location may yield different results in another. To enhance comparability of outcomes a standardised research design is recommended, along with a robust monitoring system to improve understanding and identify the most effective interventions in the future.

ProSoil has shown that agroecological practices can generate financial gains, even though many positive impacts are not yet monetised. Furthermore, continuing with conventional practices often results in yield losses and unnecessary costs, whereas agroecological practices offer economic benefits for both farmers and society. Addressing soil degradation and its associated challenges requires collective action, as it is a societal issue that cannot be resolved by individual efforts alone.

Further readings and sources

GIZ (2024) ***Economic benefits through agroecological soil practices: Evidence by ProSoil*** (accessed 24 February 2025)

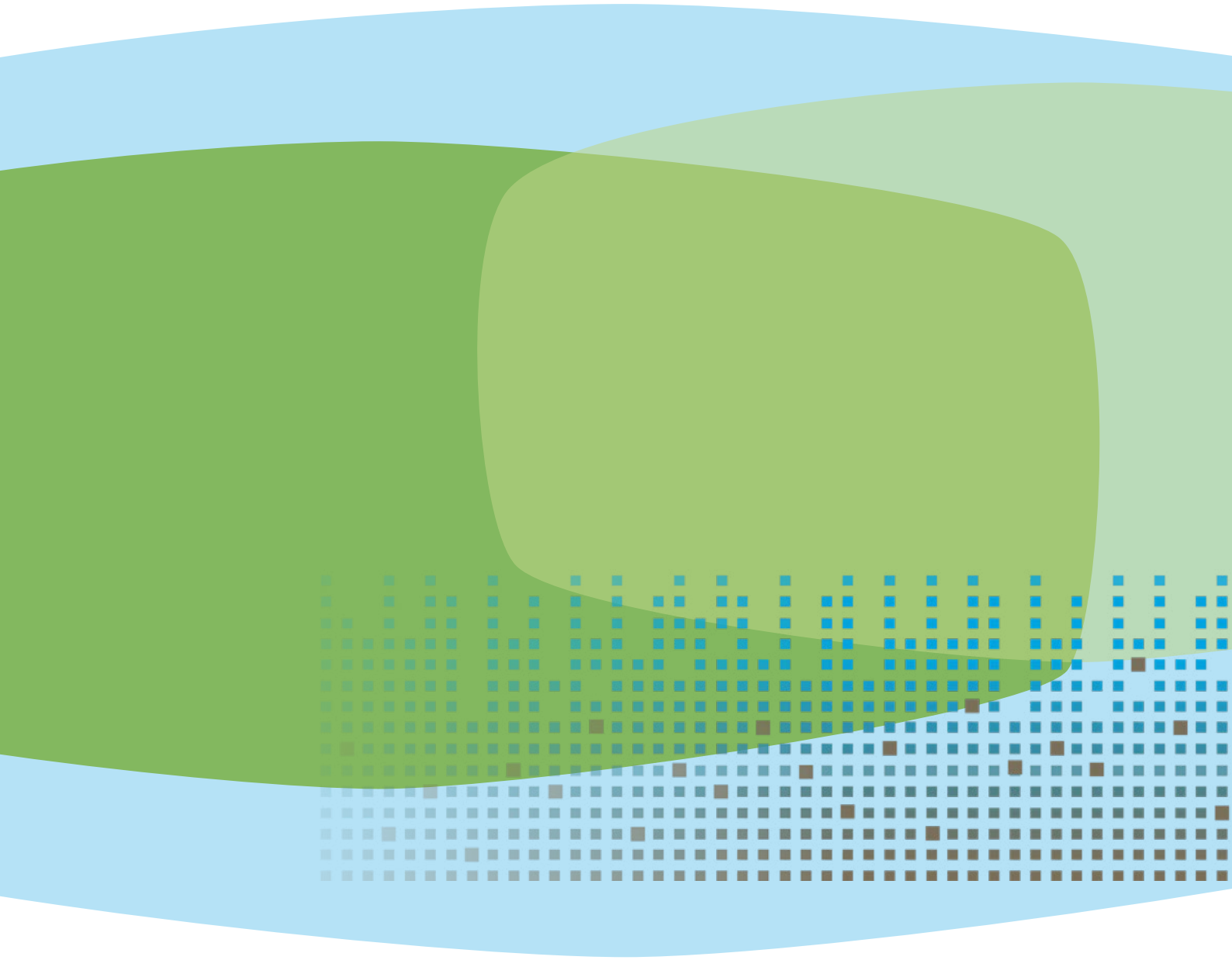
GIZ (2023) Analyses of socio-economic and environmental effects of agroecological practices, available in ***English*** and ***French*** (accessed 24 February 2025)

CIFOR-ICRAF (2024) ***Measuring Agroecology and its Performance:*** Key findings from applying the FAO Tool for Agroecology Performance Evaluation (TAPE) in Benin, Ethiopia, Kenya, and Madagascar in the context of the Global Programme Soil Protection and Rehabilitation for Food Security (ProSoil) (accessed 24 February 2025)

EIT Food. (2022) Why is soil health important for food production? Available at: ***Why is soil health important for food production? – EIT Food*** (accessed 21 January 2025)

IPBES (2018) The IPBES assessment report on land degradation and restoration. Available at: ***The IPBES assessment report on land degradation and restoration. | Zenodo***

Warui H. (2024) Soil degradation: the silent global crisis. Heinrich-Böll-Stiftung European Union. Available at: ***Soil degradation: the silent global crisis | Heinrich Böll Stiftung | Brussels office - European Union*** (accessed 21 January 2025)



As a federally owned enterprise, GIZ supports the German Government in achieving its objectives in the field of international cooperation for sustainable development.

Published by:
Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ) GmbH

Registered offices
Bonn and Eschborn, Germany

Friedrich-Ebert-Allee 32+36
53115 Bonn
T +49 228 44 60-0
F +49 228 44 60-17 66
www.giz.de

Programme:
Global Programme "Soil Protection and Rehabilitation for Food Security" (ProSoil)
E soilprotection@giz.de
I https://www.giz.de/en/worldwide/32181.html

Authors:
Alica Nagel, HFFA Research GmbH, Berlin; Juliane Kaufmann, HFFA Research GmbH, Berlin
Responsible/Editor Responsible: Dr Anneke Trux
Editors: Andrea Bender, Oliver Hanschke, Helena Kresimon, Levke Sörensen

Design/Layout:
EYES-OPEN and weissbunt, Berlin

Photo credits:
© GIZ

This publication was produced with the financial support of the European Union and the German Federal Ministry for Economic Cooperation and Development (BMZ). Its contents are the sole responsibility of GIZ and do not necessarily reflect the views of the European Union and the German Federal Ministry for Economic Cooperation and Development (BMZ).

Bonn, March 2025