



# THE POTENTIAL OF AGROECOLOGY TO BUILD CLIMATE-RESILIENT LIVELIHOODS AND FOOD SYSTEMS



## THE STUDY AT A GLANCE

- Robust scientific evidence demonstrates that agroecology increases climate resilience. Success factors for this are that agroecology builds on:
  - a) ecological principles, in particular on biodiversity, overall diversity and healthy soils (*meta-analysis and case studies results*)
  - b) social aspects, in particular on the co-creation and sharing of knowledge and fostering traditions (*case study results*)
- The interdisciplinary and systemic nature of agroecology is key for its true transformational power. However these characteristics are also the main challenges for both, conducting comprehensive research and policy revisions: typically research concepts and policy processes focus on the productive dimension with selective sectorial views (*meta-analysis and policy analysis results*).
- More than ten percent of the nationally determined contributions (NDCs) by UNFCCC member states mention agroecology and consider it a valid approach to address climate change. The climate potential of agroecology is furthermore backed by

the IPCC Special Report on Climate Change and Land and the 2019 High Level Panel of Experts on food Security and nutrition (HLPE) report of the Committee on World Food Security (CFS) (*int. policy analysis result*).

## Recommendations

- Given the sound knowledge base, fostering agroecology to build resilience should be recognized as a viable climate change adaptation strategy.
- Further comparative research on the multidimensional impacts of agroecology is needed.
- Barriers to the scaling-up of agroecology need to be addressed: amongst others, improved access to knowledge and understanding of systemic approaches should be fostered across sectors, stakeholders and scales.
- Agroecology's transformative resilience building potential depends on its holistic and systemic nature, which goes beyond a set of practices and includes: a social movement, for producers' empowerment and a multidisciplinary scientific paradigm.



The transformation of agriculture and food systems to address the challenges of a changing climate will only happen through collaboration between various disciplines and across all levels, bringing together technical and policy-related evidence as well as the different actors of the food system. Following this logic, the study on **“the potential of agroecology to build climate-resilient livelihoods and food systems”** was designed as a multi-stakeholder collaboration between research institutions (Research Institute of Organic Agriculture - FIBL, Institut Senegalais de Recherches Agricoles-

ISRA, Bioversity International Kenya), civil society organizations (Biovision - Foundation for ecological development, Enda Pronat, Institute for Culture and Ecology – Institute for culture and ecology-ICE), and the Food and Agriculture Organization of the United Nations (FAO).

This brochure summarises the key findings of this study, which is available at [www.fao.org/climate-change/programmes-and-projects/detail/en/c/1199897](http://www.fao.org/climate-change/programmes-and-projects/detail/en/c/1199897)

Three different analysis were carried out, focusing on:

- 1) The international policy arenas, in particular in the United Nations Framework Convention on Climate Change (UNFCCC) and the Koronivia Joint Work on Agriculture (KJWA);
- 2) Peer-reviewed scientific studies on agroecology applying a meta-analysis;
- 3) Two case studies in Kenya and Senegal that assess:
  - the policy potential of agroecology in respective national settings; and
  - the technical potential of agroecology to foster climate resilience on farm-level.

## AGROECOLOGY IS GAINING MOMENTUM

A systemic assessment of the potential of agroecology (according to FAO's 10 elements definition<sup>1</sup>) to be considered and recommended as a relevant approach in the international agriculture-climate discussions, in particular in the UNFCCC process and the Koronivia Joint Work on Agriculture (KJWA) revealed that:

- An increasing number of countries and stakeholders from different backgrounds see agroecology and related approaches as a promising mean for reaching adaptation and mitigation targets and to achieve an effective transformational change.
- 12,5 percent of the NDCs (17 out of the 136 analyzed) explicitly mention “agroecology”, as either an adaptation strategy (11 percent) or as mitigation to climate change (4 percent) (13 are from sub-Saharan Africa, 2 from Latin America and Caribbean, 1 from Near East and North Africa and 1 from Asia Pacific).

- Without addressing agroecology specifically, isolated agroecological approaches are mentioned in additional NDCs, in particular selected agroecological elements such as “efficiency”, “recycling”, “diversity” and “co-creating of knowledge”.
- Agroecology has also seen considerable attention in 2019 at the Committee on World Food Security (CFS) and the Convention on Biodiversity (CBD) discussions.

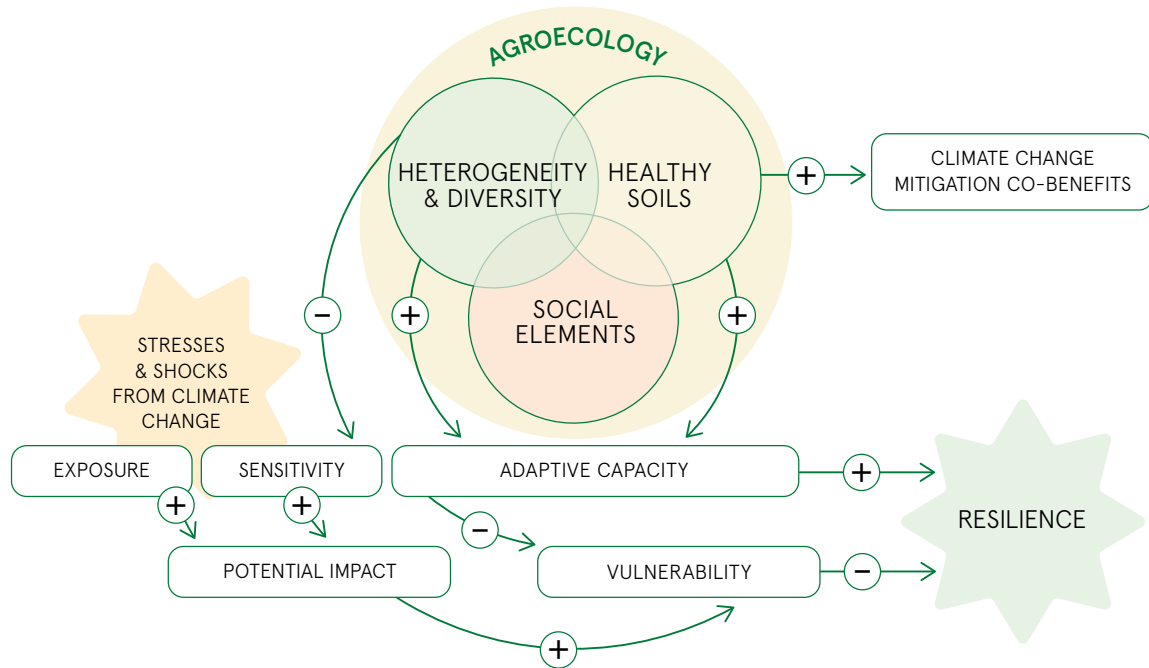
## SOLID EVIDENCE DEMONSTRATES THAT AGROECOLOGY INCREASES CLIMATE RESILIENCE

The meta-analysis of peer reviewed studies on agroecology clearly shows that:

- Agroecology builds on key characteristics which have a strong positive correlation with climate resilience.

- Agroecology increases the adaptive capacity and reduces the vulnerability of agroecosystems, mainly through improved soil health, biodiversity and high diversification of species and genetic resources within agricultural production systems.
- Mitigation co-benefits are also achieved, mainly related to increased soil organic matter (carbon sequestration) and the reduced use of synthetic fertilizers.
- Institutional aspects, such as knowledge co-creation and dissemination via advisory services and farmer-to-farmer approaches have a key role to support the development, strengthening and uptake of agroecology.
- When supporting agroecology and fostering climate resilience, it is key to establish and strengthen functional context specific knowledge and participatory innovation systems.

<sup>1</sup> For the purpose of this study, agroecology has been analyzed following the FAO Ten Elements of Agroecology <http://www.fao.org/documents/card/en/c/I9037EN>



## POLICY POTENTIAL

The national case studies assessed each country's institutional frameworks in terms of the potential to incorporate agroecology to hedge against climate change. This provides a deep understanding of the current national context, the enabling environment as well as the opportunities and challenges for scaling-up agroecology to be considered in the decision-making process and to scale it up.

While Kenya and Senegal have different policy settings, in both countries there is considerable potential for agroecology to gain momentum. However, it is challenging to translate the interdisciplinary and systemic nature of agroecology into policies, laws, strategies. Both case studies highlight the importance of training and awareness raising activities to ensure common understanding of agroecology and to ensure its translation into appropriate institutional frameworks.

Lessons learned from Senegal and Kenya on agroecology's potential

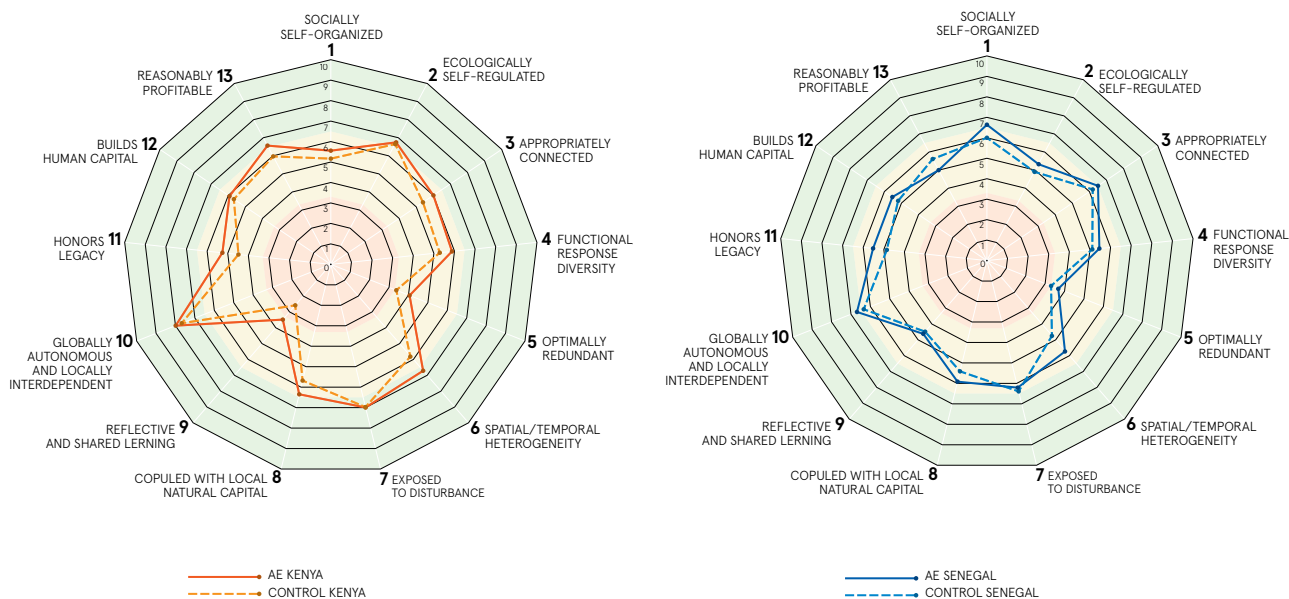
## KENYA POLICY ENVIRONMENT

- Climate related policies do not emphasize systemic, ecologic farming approaches but selectively address agroecology elements such as soil and conservation practices.
- Through increased understanding of agroecology, stakeholders see opportunities of integrating it into sub-national institutional processes.
- Good opportunities to embed agroecological approaches into existing policies.
- Further efforts to provide evidence, training and policy guidance for agroecology would need to be matched with increased levels of public and private investment and financial support.

## SENEGAL POLICY ENVIRONMENT

- Agroecology emerged in the 1980s and many promising initiatives spread out since then that have influenced policies. However, policies and laws do not yet include agroecological approaches, as there is still a strong focus on high external input-dependent agricultural systems.
- Favorable conditions for scaling-up agroecology exist today: 1) an increasing institutional commitment, since agroecology is one of the government's priorities (among the five major initiatives of the Plan Senegal Emergent 2019-2024); 2) the national multi-stakeholder committee *Dynamique sur la Transition Agroécologique au Sénégal* (DyTAES) aspires to develop a harmonized framework on agroecology and related recommendations to transform national policies and work towards an agroecological transition.

Self-evaluation and Holistic Assessment of climate Resilience of farmers and Pastoralists (SHARP): average scores for the agroecology and control group in both Kenya and Senegal, by resilience indicator



## TECHNICAL POTENTIAL

In both countries a comparative analysis of 40-50 farmers that have been included in agroecological projects supported by Bioversity, Enda Pronat and ICE for more than 5 years versus 40-50 not practicing agroecology (control group), was conducted to gain better understanding of the ecological and socio-economic resilience

performance of agroecology (based on the **FAO SHARP tool**):

- Overall results show that agroecological farmers have significantly higher SHARP resilience scores.
- These agroecological systems have therefore a higher capacity to absorb, cope, adapt to climate change and are therefore more resilient.

- In both countries and despite very different contexts, spatial and temporal heterogeneity as well as integrating and sharing of traditional knowledge (honours legacy) were both significantly higher in the agroecology samples, which indicates they are key aspects in strengthening resilience.

## KENYA

- For 7 out of 13 SHARP indicators, agroecology-based systems perform significantly better.
- The agroecology group scores better in the averages of environmental aspects, economic components and significantly better in agronomic practices.
- Both the agroecological systems and control group identified similar priorities and needs for further support, in particular insurance, animal breeding, non-farm income generating activities, access to water and land.

## SENEGAL

- For 3 out of 13 SHARP indicators, agroecology-based systems perform significantly better.
- The agroecology sample performed significantly higher on social indicators and agronomic practices. Similar performance levels as the control sample were observed for the economic and environmental aspects.
- Barriers for agroecological farmers include access to effective biological products for pest control and weed management, as well as limited access to financial services and insurance.

Agroecological farmers show greater adaptability and resilience in terms of:

KENYA	SENEGAL
3. Appropriately connected (i.e. access to information, forecasts, markets, participatory guarantee schemes) **	
9. Reflective and shared learning indicator (i.e. higher farmer group participation & access to extension) **	
11. Honours legacy indicator (i.e. higher integration of trees for natural remedies, pesticide and fertilization due to the transfer of traditional knowledge) *	11. Honours legacy indicator (i.e. use of local and new varieties and breeds that are adapted to local condition; greater use of tree products as natural remedies) *
5. Redundancy (functional and species diversity i.e. number of crops). **	
5. Optimally redundant (i.e. variety diversity) **	
6. Spatial and temporal heterogeneity (i.e. intercropping; crop mix; terracing, wind breaks, presence of trees on the farm **	6. Spatial and temporal heterogeneity (i.e. intercropping; crop mix; terracing, wind breaks, presence of trees on the farm) *
8. Coupled with local and natural capital (i.e. substitution of external inputs) *	
	1. Socially self-organized (i.e. ability of farmers to organize themselves into networks and basic institutions such as cooperatives, farmers' markets and community sustainability associations)*

\* $p < 0.05$  ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$

## CLIMATE CHANGE CALLS FOR TRANSFORMATIONAL CHANGE BY SCALING-UP AGROECOLOGY AND STRENGTHENING FARMERS' RESILIENCE

### KEY RECOMMENDATIONS

To foster climate resilience in agriculture, donors, decision makers and other stakeholders should:

Embrace complexity, adopt a more systemic understanding of challenges and solutions to hedge against climate change, grasp environmental issues in a holistic way and move towards more policy coherence, by breaking silos and working across agricultural sectors.

Increase investment in research on agroecological approaches, support transdisciplinary and participatory action research, conducted by innovation platforms that foster co-creation and dissemination of knowledge.

Develop comprehensive performance metrics, covering all the impacts of agriculture and food systems, for rational decision-making and efficient resource allocation at all levels.

There are no "one-size fits all" solutions, no silver bullets: consider individual contexts and local knowledge building on the Ten Elements of Agroecology.

## Recommendations in the context of Koronivia

- Seize the opportunity of the next Koronivia workshop on socio-economics related aspects and consider associated submissions to move agroecology forward
- Build on the core aspects of agricultural resilience demonstrated in this study: diversification, biodiversity and healthy soils.
- Science and policy interfaces should be established
- NDC momentum: Seize the 2020/2021 NDC year of revision to further incorporate agroecological approaches as a way forward towards transformational change.



**See full report for detail informations:**

<https://doi.org/10.4060/cb0438en>

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