

Improving the integration of agroecology into education and training in North Africa

Agroecology: a holistic approach to agricultural issues in North Africa

Agroecology is increasingly recognised as a global approach [BOX 1] to meet the environmental, social and economic challenges faced by North African agriculture [BOX 2], and to propose a sustainable and resilient agricultural model.

The success of the agroecological transition depends on the training of professionals capable of supporting this change: it is vital to equip future actors in the agricultural sector with skills adapted to contemporary and future agricultural issues and with an in-depth understanding, not only of agroecological practices, but also of their territorial, social and economic dimensions.

Education, training and farm advisory services are essential levers to support the agroecological transition.

BOX 1

Agroecology : a holistic approach for sustainable food systems

Agroecology offers an integrated approach to meet the environmental, social, economic and political challenges of food systems, from production to consumption. By combining scientific knowledge and local knowledge, the principles of agroecology promote the sustainable management of agricultural ecosystems, make it possible to strengthen the resilience of agricultural systems in the face of climate change, preserve biodiversity while improving profitability for producers and the health of consumers (Amoak *et al.*, 2022¹ ; Debray *et al.*, 2019²). The FAO (2018)³ identifies 10 principles of agroecology for a transition to sustainable food systems.



BOX 2

Main challenges faced by agriculture in North Africa (Jalkh *et al.*, 2024)⁴

- Strong demographic growth, urbanisation and increased demand for agricultural products
- Heavy dependence on agricultural imports
- Nutrition and public health issues
- Climate change and increasing drought
- Soil degradation and loss of biodiversity
- Overexploitation of groundwater and renewable resources

¹ Amoak, D., Lignaah, I. & McBean, G. (2022). Climate Change, Food Security, and Health: Harnessing Agroecology to Build Climate-Resilient Communities. *Sustainability*, 14. <https://doi.org/10.3390/sui42113954>

² Debray, V., Wezel, A., Lambert-Derkimba, A., Roesch, K., Lieblein, G. & Francis, C.A. (2019). Agroecological Practices for Climate Change Adaptation in Semiarid and Subhumid Africa. *Agroecology and Sustainable Food Systems*, 43, 429–456. <https://doi.org/10.1080/21683565.2018.1509166>

³ FAO. (2018). *The 10 Elements of Agroecology: Guiding the Transition to Sustainable Food and Farming Systems*. <https://www.fao.org/agroecology/overview/the-10-elements-of-agroecology/fr>

⁴ Jalkh, R., Bouzid, A. *et al.* (2024). Analysis of Agroecological Perspectives in North African Intersectoral Public Policies: A Review of Trends, Strengths and Weaknesses. NATAE Project Report. <https://doi.org/10.5281/zenodo.12770882>

Training for change: integrate agroecology more and better into education and training

A number of schemes and actions can be implemented to increase and improve the integration of agroecology into agricultural training courses.

Our recommendations are as follows⁵ :

Strengthen the training on offer in academic training courses

To train future researchers, engineers, decision-makers, development project coordinators and managers working in the agricultural sector in the current and future challenges of food systems, and give them the skills needed to meet these challenges, in particular by integrating the social and economic dimensions of agroecology into teaching programmes

Today, agroecology is still only partially taught in university courses in North Africa (Baraket *et al.*, 2024)⁶. The urgent need to increase the supply of training in agroecology is recognised by many stakeholders (Mar *et al.*, 2025)⁷.

For the ministries responsible of higher education:

Create training modules and courses specifically geared towards understanding agroecology
Incorporate the 10 principles of agroecology into existing training courses (biology, ecology, regional development, agricultural engineering, etc.)

Strengthen training provision for farmers

To build farmers' capacity to adopt agroecological production methods and market their produce through appropriate value chains.

Develop professional training courses to boost farmers' ability to make the transition to agroecology

For public training agencies and institutes⁸ :

Build the capacity of trainers and integrate the concepts of agroecology into agricultural vocational training courses.

For donors:

Boost private training provision by subsidising NGOs and private training bodies and by supporting the integration of training objectives into research and development projects.

For private advisers:

Strengthen the capacity of private advisers to disseminate the principles of agroecology more widely to their customers.

Vocational training for farmers is still weak: state training structures often lack the necessary human and financial resources, and the private sector and NGOs only partially compensate for this (Baraket *et al.*, 2024)⁶. There is also a lack of capitalisation on training provided as part of development or research projects.

Encourage the capitalisation of training

For international networks and organisations:

Organise a census and systematic capitalisation of agricultural training and advice in agroecology.

For farm advisory organisations:

Produce training catalogues based on and capitalising on previous experience and available resources.

⁵ These recommendations are based on a study of existing training and educational programs on agroecology (Baraket *et al.*, 2024) conducted as part of the NATAE project (<https://www.natae-agroecology.eu/>), and on the scientific literature.

⁶ Baraket, M., Ayadi, S. *et al.* (2024). Review of Existing Training and Education Programs and Recommendations for Further Integration of AE in Training and Education Content in North Africa. NATAE Project Report. <https://doi.org/10.5281/zenodo.14244217>

⁷ Mar, F., Requier, M. & Jalkh, R. (2025). Conference Report. Conference on Agroecology: Science and Policy, 29–31 January 2025, Gammarth, Tunisia. https://zenodo.org/records/18493804/files/HE%20NATAE_Milestone6_Regional%20Conference%20on%20Agroecology_OSS_18022025_vF_v2.pdf?download=1

⁸ Depending on the country, public training agencies and institutes report to the Ministry of Vocational Training and Education and the Ministry of Agriculture and Rural Development (Algeria), the Ministry of Agriculture and Animal Resources (Libya), the Ministry of Agriculture, Maritime Fishing, Rural Development, Water and Forests (Morocco), and the Ministry of Agriculture, Hydraulic Resources and Maritime Fishing (Tunisia).

Rethinking agroecology training

For trainers:

Train to a more holistic approach of agroecology in academic and vocational courses

To ensure that course participants gain an understanding of the many dimensions and scales of agroecology, from the farm to supply chains and regions.

University courses in North Africa do not cover all the pillars of agroecology equally. They focus mainly on agronomic aspects, highlighting the benefits of these production methods in terms of diversity, the resilience of agrosystems and the quest for greater resource efficiency. The pillars relating to the social and organisational aspects of agroecology, such as the co-creation and sharing of knowledge, responsible governance and the circular and solidarity economy, are often only timidly addressed (Baraket *et al.*, 2024)⁶.

This is also true of farm advisory services, which focus primarily on technical principles at plot and farm level (recycling, input reduction, soil health, synergies) and rarely on the social principles of agroecology at regional level (such as the co-creation of knowledge) (CIRAD *et al.*, 2023)⁹.

Renew the 'top-down' training paradigm and promote collaborative, multi-actor training courses

- Encourage the co-construction and sharing of knowledge in agroecology, between traditional and local knowledge and modern scientific approaches and innovations
- Draw on the expertise and levers for action of the wide range of stakeholders involved in agroecology: farmers, researchers, political decision-makers and civil society organisations.
- Encourage a «farmer to farmer» approach to pass on knowledge

Establish contextualised training courses, in line with national and local needs, because local adaptation of agro-ecological innovations and practices is a key to a successful agroecological transition

- Draw up an inventory of agroecology training courses in each country, and complete it to offer training adapted to needs, practices, supply chains and national and regional agricultural policy strategies.
- Co-construct the training offer with the various stakeholders of the agricultural sector (companies, NGOs, research institutes, agricultural training schools, agricultural councils, ministries responsible for agriculture, etc.) who know the challenges and specific features of the region.
- Train relay trainers in each region to adapt farming practices to the local context and needs, and support farmers.
- Encourage training adapted to the region, based on practical experience and the results of living labs and «pilot» farms.

⁹ CIRAD, Djamen, P., Fédération des paysans du Fouta Djallon, Bourazza, M., Balla Diallo, T. & Institut Agro Montpellier. (2023). How to 'Agroecologise' Agricultural Advisory Systems? Grain de Sel, 85.



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