PrAEctiCe

Assessing smallholder farmers' transition to agroecology in a way that builds on indigenous knowledge: Indicator framework for measuring agroecology transition in smallholder farming context

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SUMMIT: PARALLEL SESSION

17TH OCTOBER 2024

Funded by the European Union

PrAEctiCe project is funded by the HORIZON Europe programme under Grant Agreement number 101084248

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Indigenous Knowledge

Indigenous Knowledge Systems (IKS) refer to the cumulative, dynamic body of knowledge, practices, and beliefs that are developed and passed down through generations within a specific community. This knowledge system is deeply rooted in the cultural traditions, values, and experiences of indigenous people and is used to sustain and improve their way of life, particularly in areas such as agriculture, healthcare, and natural resource management.

Source: World Bank (2004). Indigenous Knowledge: Local Pathways to Global Development. Retrieved from World Bank Indigenous Knowledge

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Photo source: Sven Torfinn. Kenya. December 2016. Seeds, Seed Banks, Seed Market, Community Seed Projects, Farmers Seed Depots, Farmers Seed Exchange, Seed Storage, Indigenous Seeds, Seeds Stocks,

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What are Agroecological Indicators?

Measurable variables or metrics used to assess, monitor, and evaluate specific aspects of a system. In agroecology, indicators may be used to evaluate factors such as soil health, biodiversity, water usage, or socio-economic impacts, providing insights into the sustainability and performance of agricultural practices.

Source: FAO (2021). Transforming Food and Agriculture to Achieve the SDGs: 20 Interconnected Actions to Guide Decision-Makers. Retrieved from FAO SDGs and Indicators

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Example of Indicators

Indicator Category	Indicator	Means of Measurement	Means of Monitoring	Thresholds and Critical Values	Mitigation Measures
Water Quality Indicators	Dissolved Oxygen (F)	DO concentration (mg/L)	Continuous or periodic water quality monitoring	>5 mg/L for fish survival	Aeration, water flow management
	Ammonia (F)	Ammonia concentration (mg/L)	Regular testing of water samples	<0.02 mg/L for chronic exposure	Increase water exchange, biological filters
	Nitrite (F)	Nitrite concentration (mg/L)	Water quality monitoring	<0.1 mg/L for sensitive species	Biofiltration, reduce feeding
	Nitrate (F)	Nitrate concentration (mg/L)	Regular water testing	<50 mg/L for freshwater systems	Water changes, improved filtration
	Total Suspended Solids (F)	Concentration of solids (mg/L)	Turbidity meters or sampling	System-specific, e.g., <25 mg/L	Sedimentation, mechanical filtration
	Biochemical Oxygen Demand (F)	BOD (mg/L)	Testing over 5 days	<5 mg/L for healthy systems	Improve organic waste management
	Chemical Oxygen Demand (F)	COD (mg/L)	Laboratory analysis	<50 mg/L in treated effluent	Improve waste management, filtration systems
	Total Phosphorus (F)	Phosphorus concentration (mg/L)	Regular testing of water samples	<0.1 mg/L for prevention of eutrophication	Use of phosphorus-free feed, water exchange
	Total Nitrogen (F)	Nitrogen concentration (mg/L)	Regular water quality testing	<1 mg/L for good water quality	Improve nutrient management, use of biofilters

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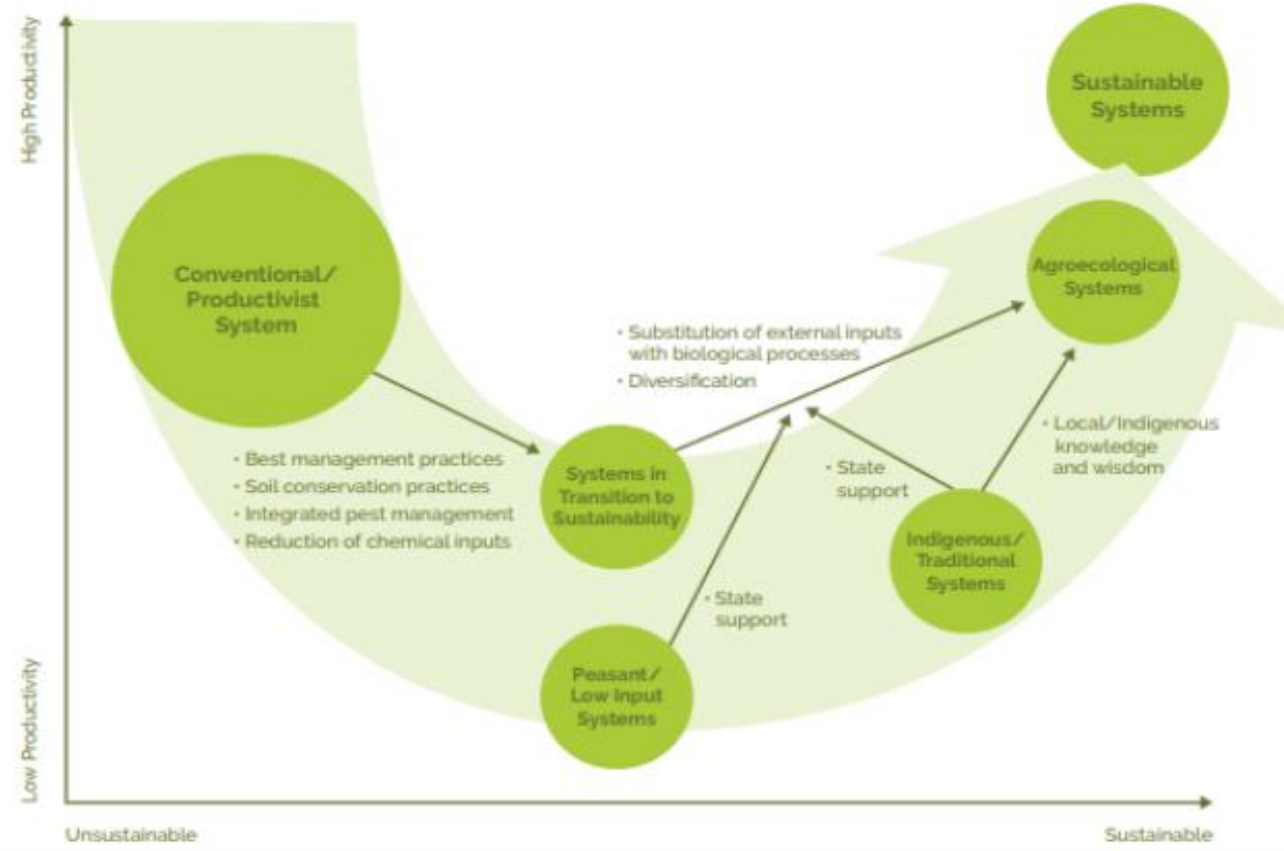
What is Transitioning?

In the context of agriculture, transitioning refers to the process of shifting from conventional or traditional farming methods to more sustainable or ecological practices. This may involve adopting new practices, adjusting current methods, and gradually moving towards a more holistic approach that focuses on environmental health, social equity, and economic viability.



Source: Altieri, M. A. (2018). *Agroecology: A Brief Account of its Origins and Evolution*. Food First Backgrounder, 24(1). Retrieved from Food First

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Characteristics of IKS in Agroecology

1. High levels of biodiversity that play key roles in regulating ecosystem functioning and also in providing ecosystem services of local and global significance;
2. Ingenious systems and technologies of landscape, land, and water resource management and conservation that can be used to improve management of agroecosystems;
3. Diversified agricultural systems that contribute to local and national food and livelihood security;
4. Agroecosystems that exhibit resiliency and robustness to cope with disturbance and change (human and environmental) minimizing risk in the midst of variability i.e climate variability and change;
5. Agroecosystems nurtured by traditional knowledge systems and farmers innovations and technologies;
6. Socioculture regulated by strong cultural values and collective forms of social organization including customary institutions for agroecological management, normative arrangements for resource access and benefit sharing, value systems, rituals, etc.

Source: Altieri 2004; Koohafkan and Altieri 2010:

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Knowledge Integration Challenges

- A challenge in the selection and adoption of tools and approaches for engaging knowledge-holders and that reflect divergent worldviews, identities, practices, ethics and asymmetries of power and rights
- A total absence of educational, research and extension programmes that integrate and built on indigenous values, beliefs and traditions
- Lack of Institutional Support and Policy Recognition
- Cultural Differences and Perceptions
- Intellectual Property and Knowledge Ownership
- Language and Communication Barriers
- Limited Research on Compatibility and Validation
- Risk of Knowledge Erosion and Loss of Traditional Practices
- Economic Pressures and Incentives for Modernization
- Climate Change and Environmental Degradation

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Suggestions for Integration

•Participatory Research: Engage Indigenous communities in co-designing research and projects, allowing them to contribute their knowledge and insights. Participatory methods foster mutual learning and can bridge epistemological differences.

•Cultural Sensitivity and Training: Provide training for researchers, policymakers, and extension workers on the importance of cultural respect and IK. This can improve understanding and communication between stakeholders.

•Policy Advocacy: Advocate for policies that recognize and protect Indigenous Knowledge and promote its integration with scientific knowledge in sustainable farming programs.

•Knowledge Documentation and Preservation: Support initiatives that document Indigenous Knowledge and make it accessible to younger generations while ensuring cultural protocols and intellectual property rights are respected.

•Localized Indicators: Develop context-specific agroecological indicators that can be used to evaluate IK practices alongside scientific measures, allowing for a more nuanced assessment of sustainability.

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Indicator use to support IKS: Case 1

Assessing and Enhancing Soil Health

Indicators: Soil organic matter, nutrient levels, soil structure, and erosion rates.

Application with IK: Indigenous Knowledge often includes traditional soil management practices, such as the use of organic compost, crop rotation, and cover cropping, which can improve soil health. Agroecological indicators for soil health can be used to evaluate the effectiveness of these practices and identify areas where traditional methods, like mulching or fallowing, can be reinforced or expanded to enhance soil fertility.

Supporting Transition: Advisors can help farmers adopt IK-driven soil practices and monitor soil health with indicators that provide feedback on soil quality. This helps to validate and optimize traditional practices, guiding farmers in making sustainable improvements based on local context.

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Indicator use to support IK: Case 2

Improving Nutrient Cycling and Soil Fertility

Indicators: Soil nutrient levels, organic matter content, and decomposition rates.

Application with IK: Indigenous communities have long used techniques that naturally replenish soil nutrients, such as the incorporation of animal manure, composting, and planting leguminous crops.

Supporting Transition: Advisors can promote IK methods for nutrient cycling by monitoring soil indicators, helping farmers see how practices like crop rotation with nitrogen-fixing plants improve soil health. This also supports the adoption of composting and organic amendments as alternatives to chemical fertilizers.

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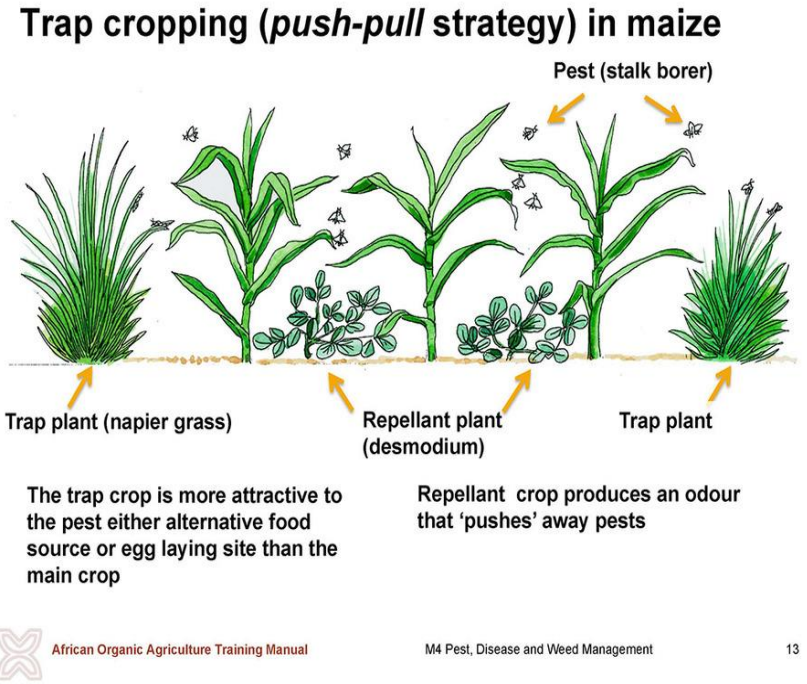
Indicator support to IK: Case 3

Supporting Pest and Disease Management

Indicators: Pest population levels, disease incidence, and crop damage.

Application with IK: Indigenous Knowledge often includes the use of natural pest control methods, such as companion planting, using specific plants for pest deterrence, and encouraging natural predators.

Supporting Transition: With indicators tracking pest levels, advisors can encourage the use of IK-based pest management practices, showing how these methods reduce the need for chemical pesticides. This helps farmers transition towards integrated pest management strategies that build on local knowledge and maintain ecosystem health.



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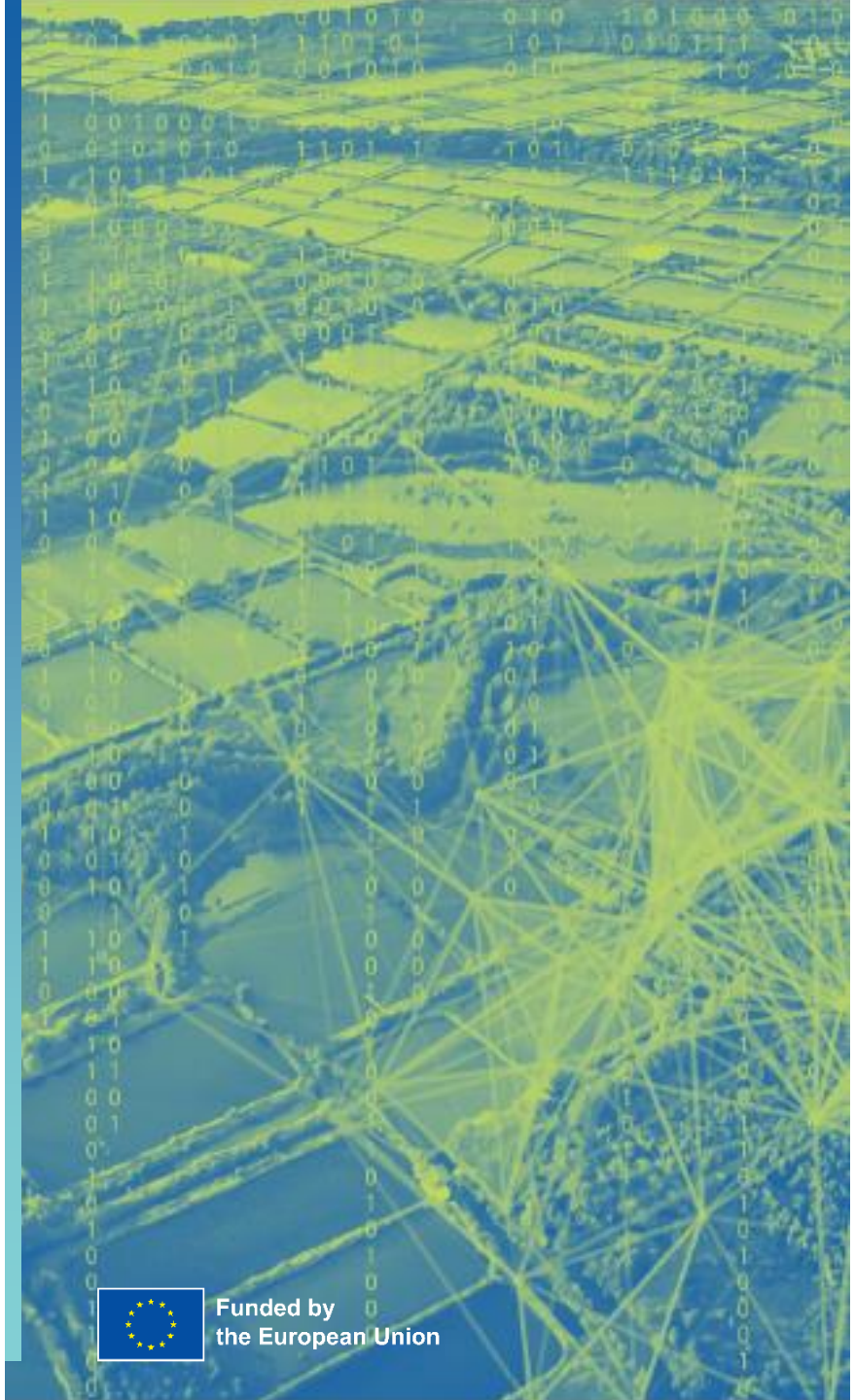

Thank you