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Agroecological practices

Rémi Cluset - FAO

Agroecology and 4 for 1000 initiative for soils

27 January 2017 - Tokyo NODAI

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OUTLINE

1. FAO INTERNATIONAL PROCESS ON AGROECOLOGY
2. AGROECOLOGICAL PRACTICES OVERVIEW
3. AGROECOLOGICAL PRACTICES: EXAMPLES IN AFRICA, ASIA AND EUROPE

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1

FAO INTERNATIONAL PROCESS ON AGROECOLOGY

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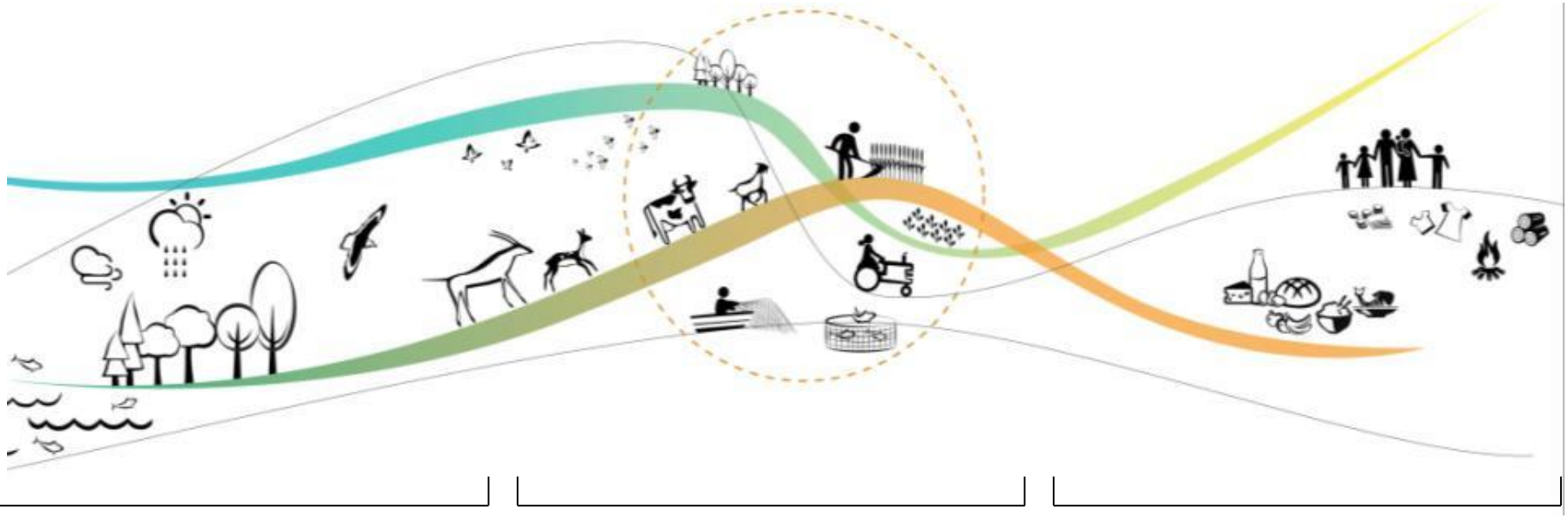
Agroecology and FAO's strategic Framework

- *Agroecology dialogue is held under the strategic objective 2: Sustainable Food and Agriculture Systems (SFA)*

➢ *FAO has defined five principles for sustainable food and agriculture (SFA)*



Conserve, protect, and enhance **natural resources**

Enhance the **efficiency of resource use**

Improve & protect **livelihoods** and human well-being

Enhance the **resilience** of people, communities and ecosystems

Promote and improve effective **governance**

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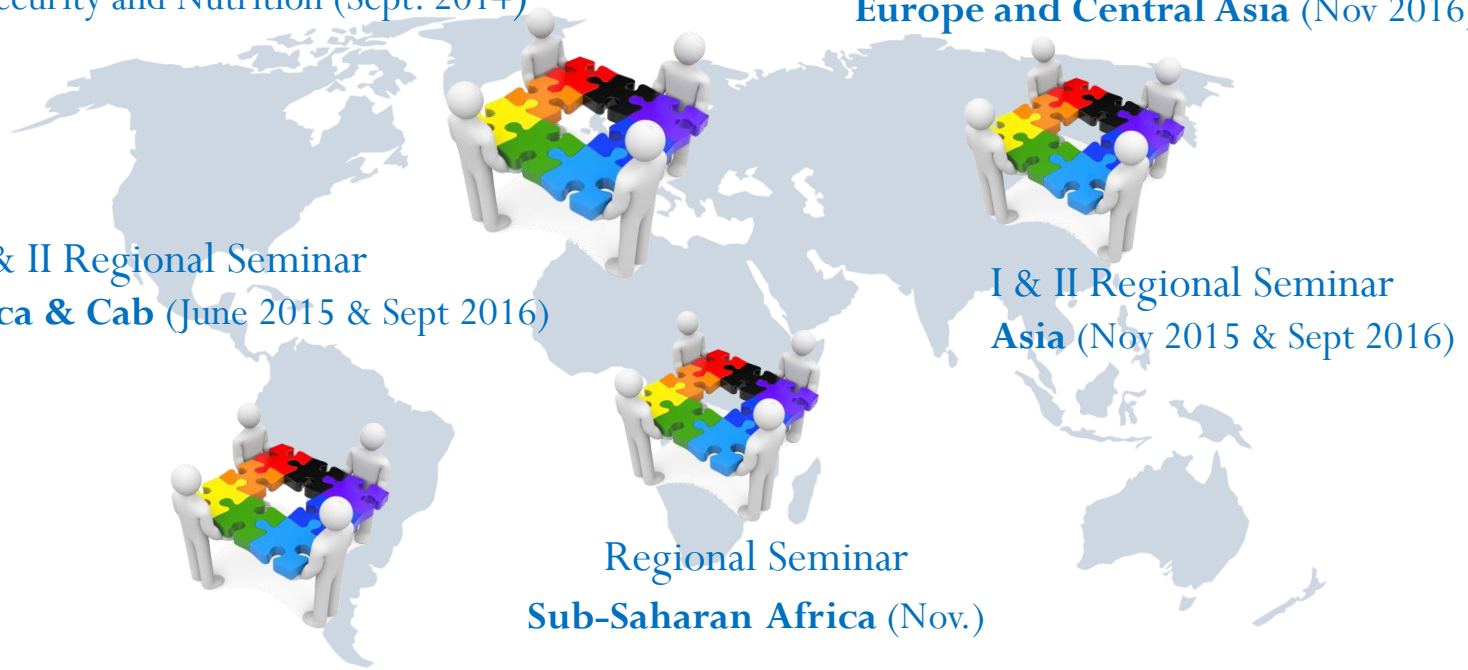
FAO Conferences 2014-2016

- *Recognizing the role that agroecology can play in food security and nutrition, FAO organized International and local multistakeholder consultations to analyze this approach and its diversity*

International Symposium on Agroecology for Food Security and Nutrition (Sept. 2014)

I Regional Seminar **Europe and Central Asia** (Nov 2016)



I & II Regional Seminar **Latin America & Cab** (June 2015 & Sept 2016)

I & II Regional Seminar **Asia** (Nov 2015 & Sept 2016)

Regional Seminar **Sub-Saharan Africa** (Nov.)

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FAO Conferences 2014-2016

- A strong interest and commitment for agroecology was observed in the regions

A total of about **1350 participants** from **162 member countries** participated in the meetings, including 11 ministers (as well as the EU Commission) and 85 other representatives of governments. Other participants included researchers, farmers' organizations, civil society and the private sector.

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Outcomes: set of recommendations on 4 topics

➢ Reflects the vision of partipants on agroecology, its practices and approaches
Put the emphasis on the wide range of agroecological practices and approaches and the need for more research and policy implication

Agroecology and sustainable food systems ①

Research, innovation, knowledge sharing and agroecological movements ④

② Agroecology and natural resources in a changing climate: water, land, biodiversity and territories

③ Public policies to develop agroecology and promote transition

Outcomes: FAO Knowledge Hub on Agroecology

www.fao.org/agroecology

- *As a follow-up of on recommendations of participants, a knowledge exchange platform was lauched by FAO (Nov 2016)*

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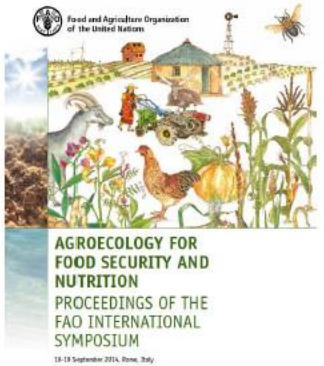
Meetings reports and proceedings

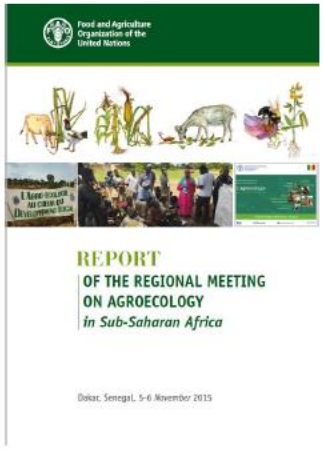
- Available online on FAO website

Publications of the FAO International Regional Symposia on Agroecology

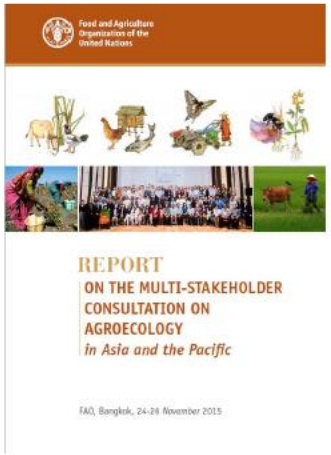


Proceedings of the FAO International Symposium on Agroecology
18-19 September 2014, Rome
http://www.fao.org/3/a-i4729e.pdf

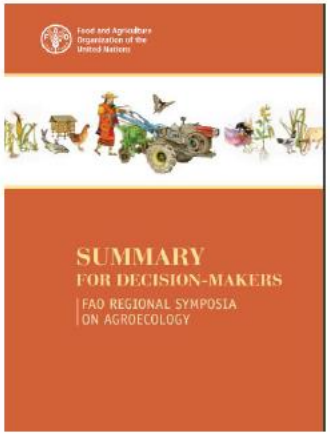
Final Report Regional Meeting on Agroecology in Latin America and the Caribbean
24-26 June 2015
http://www.fao.org/3/a-i5143e.pdf



Report of the Regional Meeting on Agroecology in sub-Saharan Africa
5-6 November 2015
http://www.fao.org/3/a-i6364e.pdf



Final Report on the Multi-Stakeholder Consultation on Agroecology in Asia and the Pacific
24-26 November 2015
http://www.fao.org/3/a-i5672e.pdf



Summary for decision-makers: FAO Regional Symposia on Agroecology
http://www.fao.org/3/a-i6332e.pdf

FAO approach on agroecology

- *« Business as usual is not an option anymore »*

As underlined by the FAO Director-General José Graziano da Silva during the regional meeting in Europe and Central Asia (Budapest, November 2016)

"New areas are still being cleared for agriculture at record rates, even with successful intensification. Current techniques are reducing damage only at the margins.
We need an integrated approach that agroecology can offer. FAO is committed to explore all the potential of agroecology in this regard

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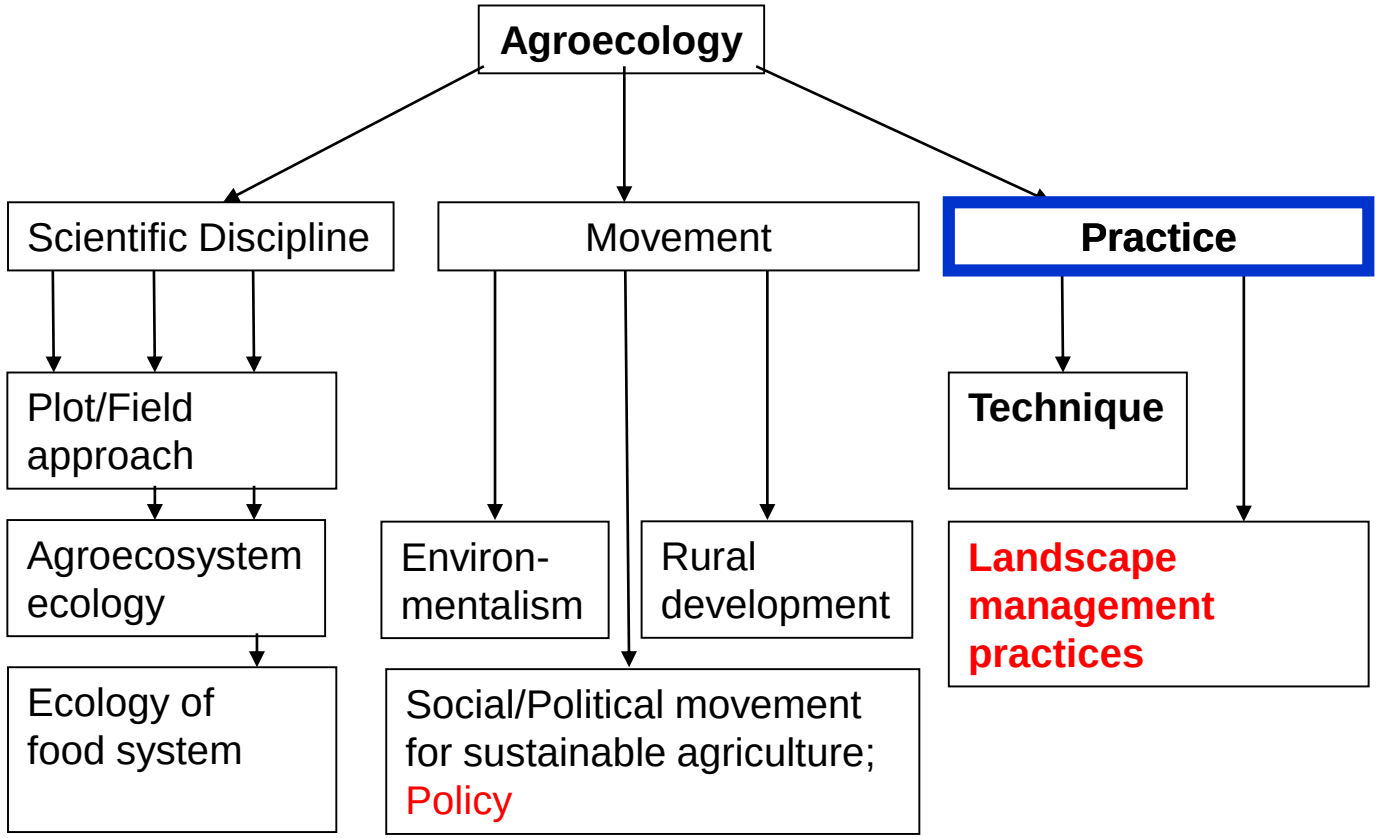
AGROECOLOGICAL PRACTICES: OVERVIEW

Main interpretations of agroecology

- Practices are (should go) going beyond plot **techniques**: landscape management practices are key for the conception of an agroecological system



(Wezel, Bellon et al. 2009, Agronomy for Sustainable Development;
updated in Wezel 2017, forthcoming book: Agroecological practices for Sustainable Agriculture: Principles, Applications, and Making the Transition)

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Agroecological practices

Agricultural practices aiming to produce significant amounts of food, which valorise in the best way ecological processes and ecosystem services in integrating them as fundamental elements in the development of the practices, and not simply relying on ordinary techniques such as chemical fertilizer and synthetic pesticide application, or technological solutions such as genetically modified organisms.

(Wezel et al. 2014, Agronomy for Sustainable Development)

- Practices can be understood wider than agronomic practices: innovations in the whole agricultural and food system reflect the innovative and holistic approach of agroecology in agriculture

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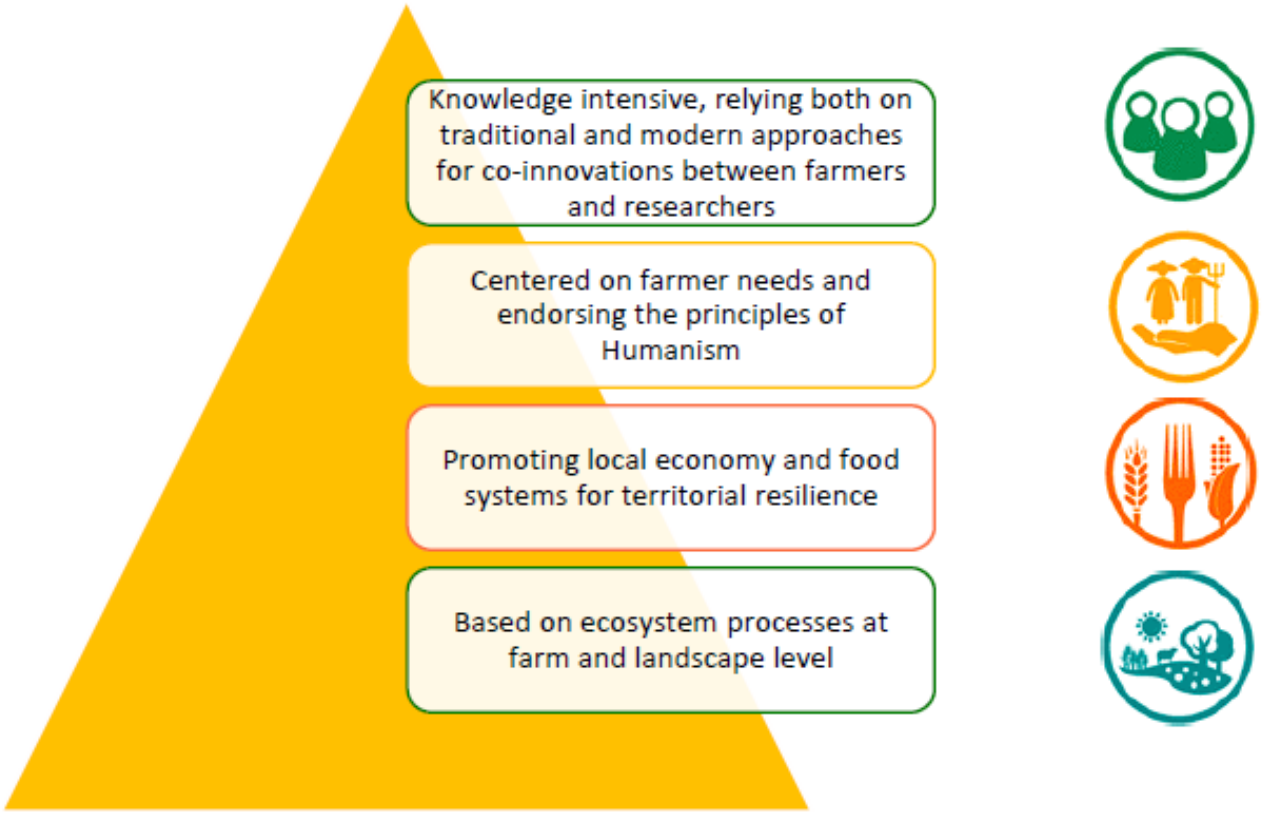
Key characteristics of agroecology

- Agroecology: from the farm and landscape practices to a global vision of sustainability

Agroecology is:



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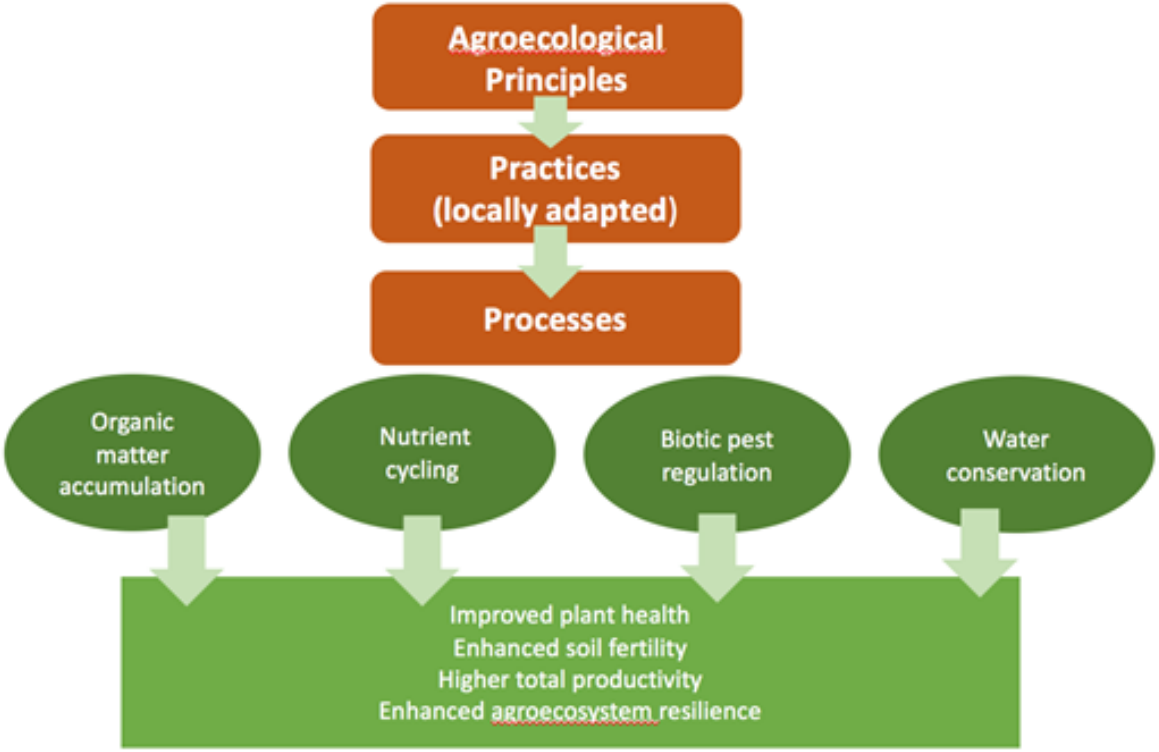
Principles, practices and processes

➢ Links beetwen principles, practices and processes



Source: Agroecological principles for the conversion of farming systems (Nicholls and al.)

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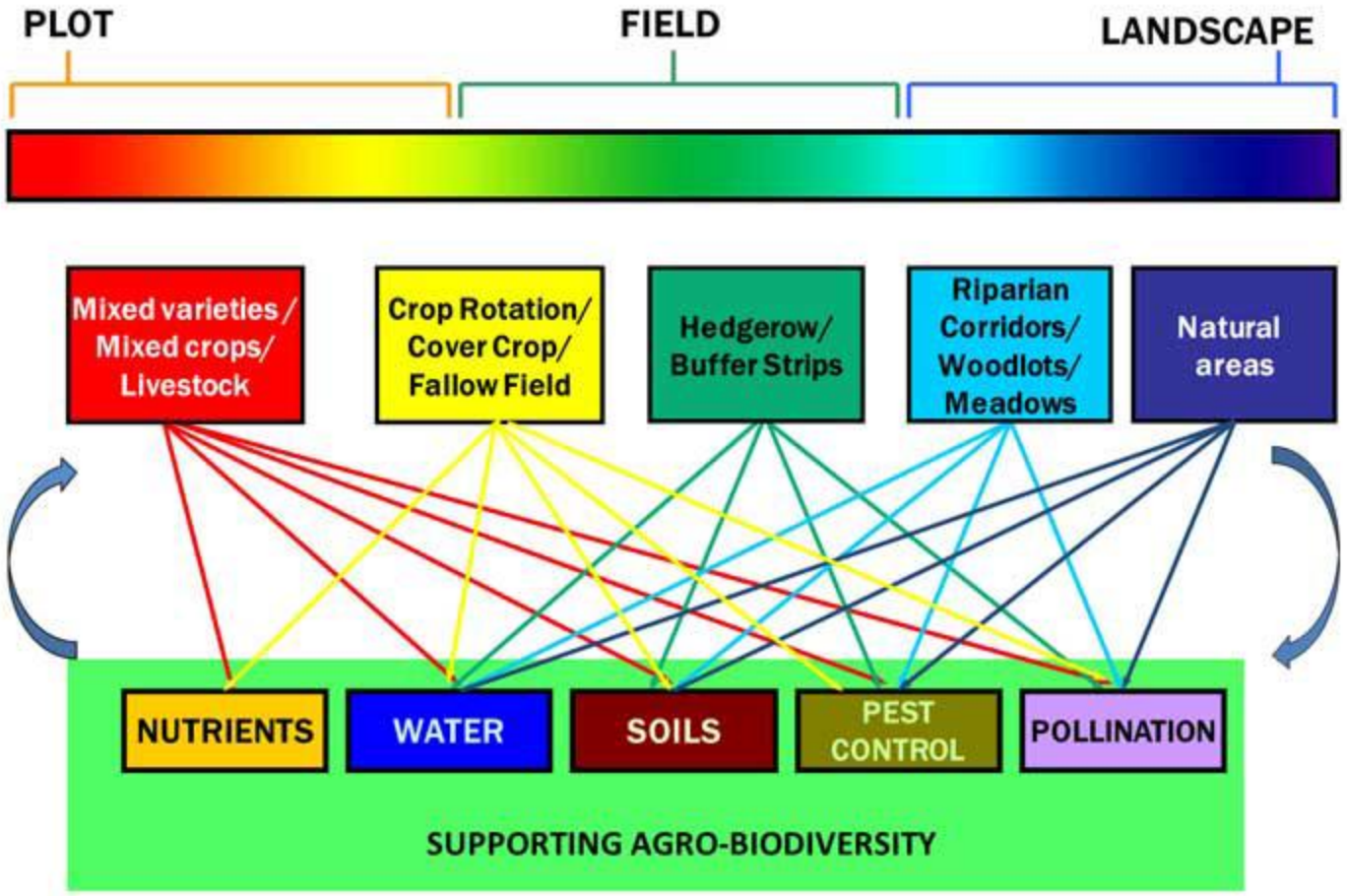
Conceptual model of a Diversified Farming System

➢ Multiples practices for multiples and cross effects:
agrobiodiversity is central for design and management of agroecological systems



The **conceptual framework for the transition** from conventional to sustainable agriculture: ESR (Hill et MacRae,1996):

1. Efficiency
2. Substitution
3. Redesign and Diversification

Redesign and diversification are the key steps to move towards agroecological farming systems.

Diversification is a key entry points for agroecological processes as pest regulation, nutrient cycling, water conservation and organic matter accumulation.

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Examples of practices

Soil conservation

- Contour farming
- Grass striping/living barriers
- Terracing
- Check dams along gullies…

Soil Management

- Cover cropping
- Green Manures
- Mulching
- Compost application
- Conservation agriculture (organic-no till)
- Ploughing under of crop residues
- Manuring
- Intercropping
- Minimum tillage
- Organic soil amendments
- Biofertilizers …

Pest, weed and disease control

- Alternative weed control (hand weeding, solarization)
- Plant extracts for pest control
- Integrated Pest Management (IPM)
- Artisanal biocontrol centres
- Classical biological control
- Initial process of transition from chemical input substitution to agroecology …

Crop-livestock integration

- Deliberate integration of crops and livestock
- Alternative feeds and increased pasturing for livestock
- Improving of local animal feeds and pastures

Ecological livestock management

- Holistic grazing management
- On-farm production of animal feed and pasture for self-provisioning

Diversification

- Mixed or intercropping
- Agroforestry and coppicing
- Intensive sylvopastoral system
- Crop rotation
- Local variety mixtures
- Farmer seed saving
- Seed saving and recovery of local races and varieties
- Participatory Plant Breeding
- Diversity of crops and livestock…

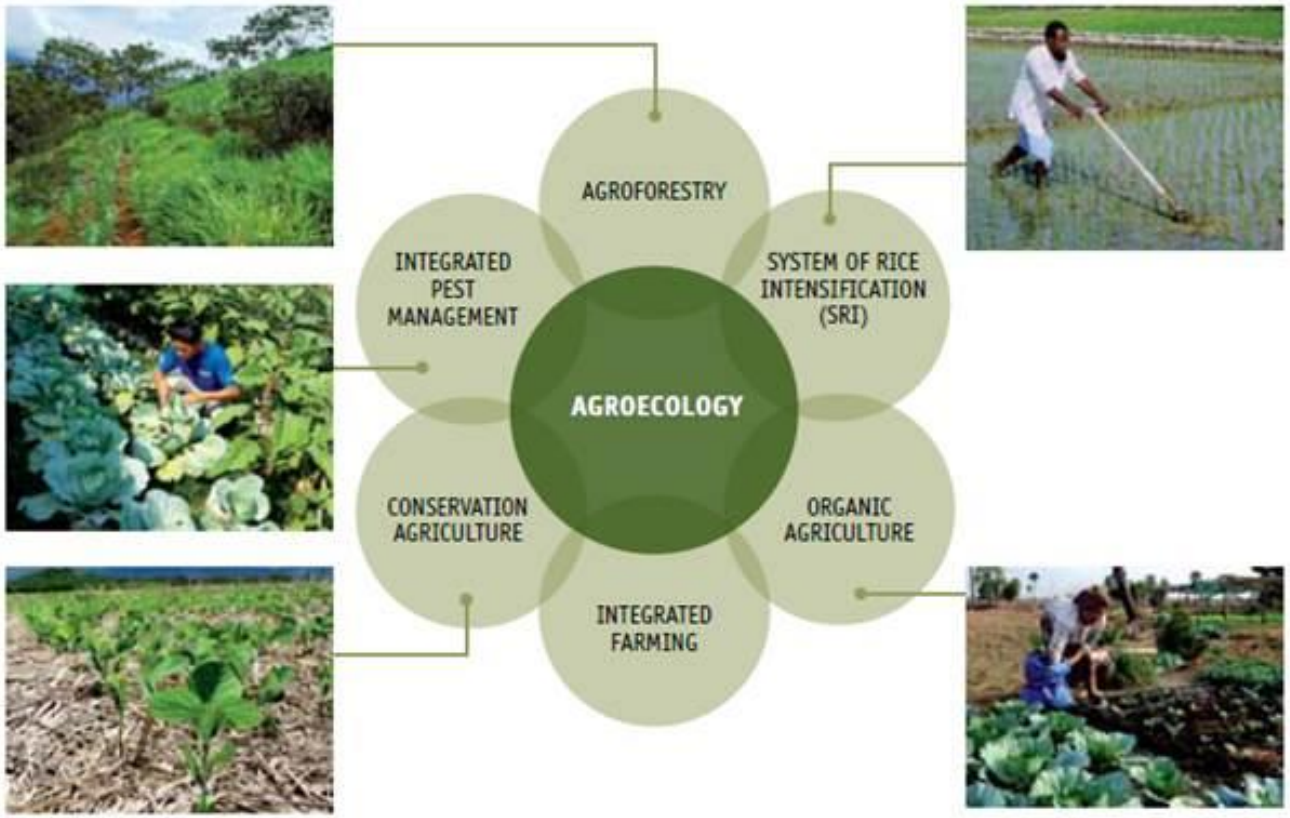
Energy use on-farm

- Animal traction
- Improved animal traction with new implements
- Alternative energy sources
- Environmental management
- Limits on burning of fields…

Value Chains

- Development of Local Markets and Food Systems
- Artisanal Food processing
- Decentralization of production
- Urban agriculture

Multiple approaches under agroecology umbrella



Source: P. Ferrand, presentation FAO Agroecology Symposium for Aisa, adapted from E. Hainzelin

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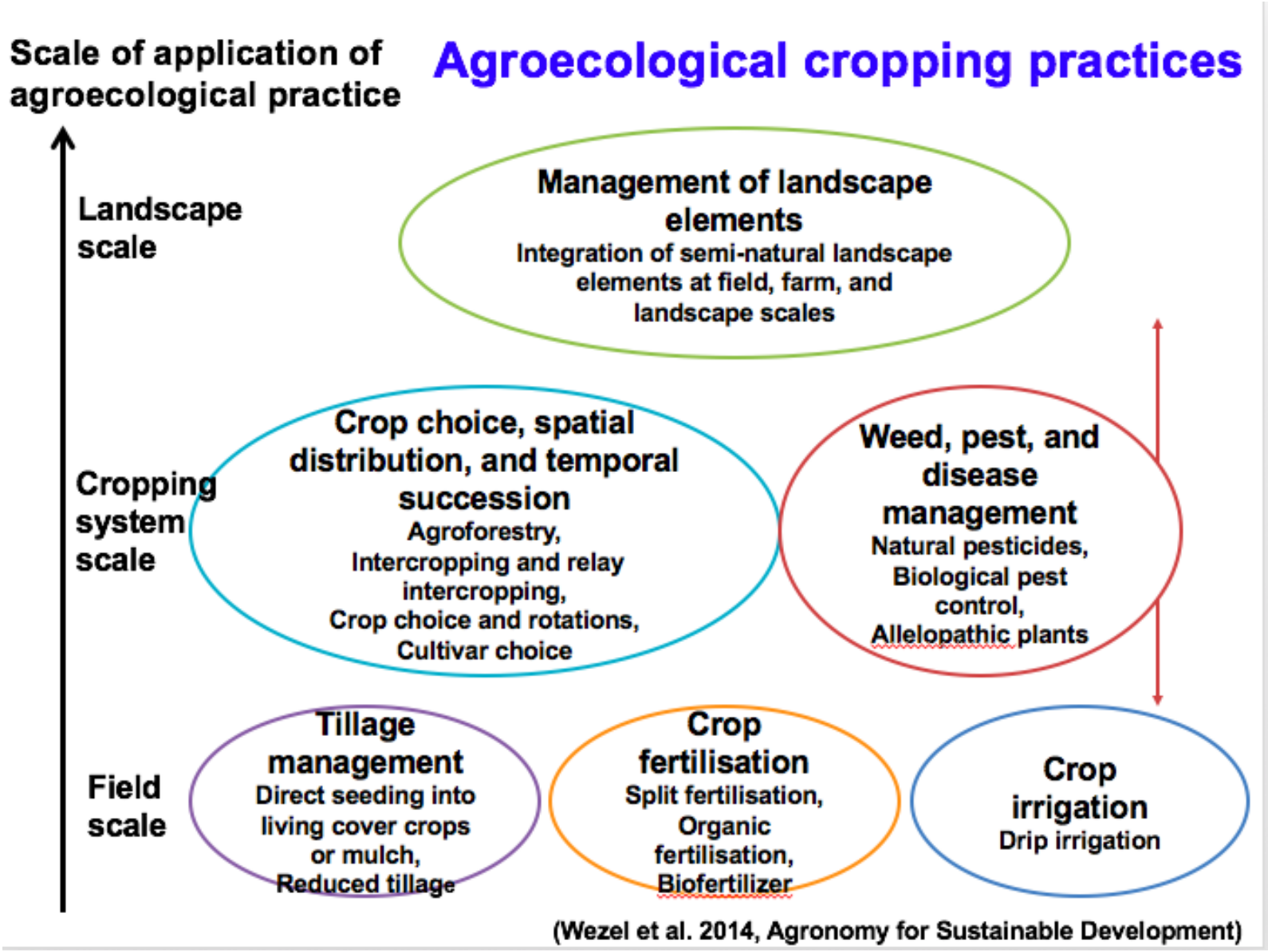
Scale of application of agroecologogical practices



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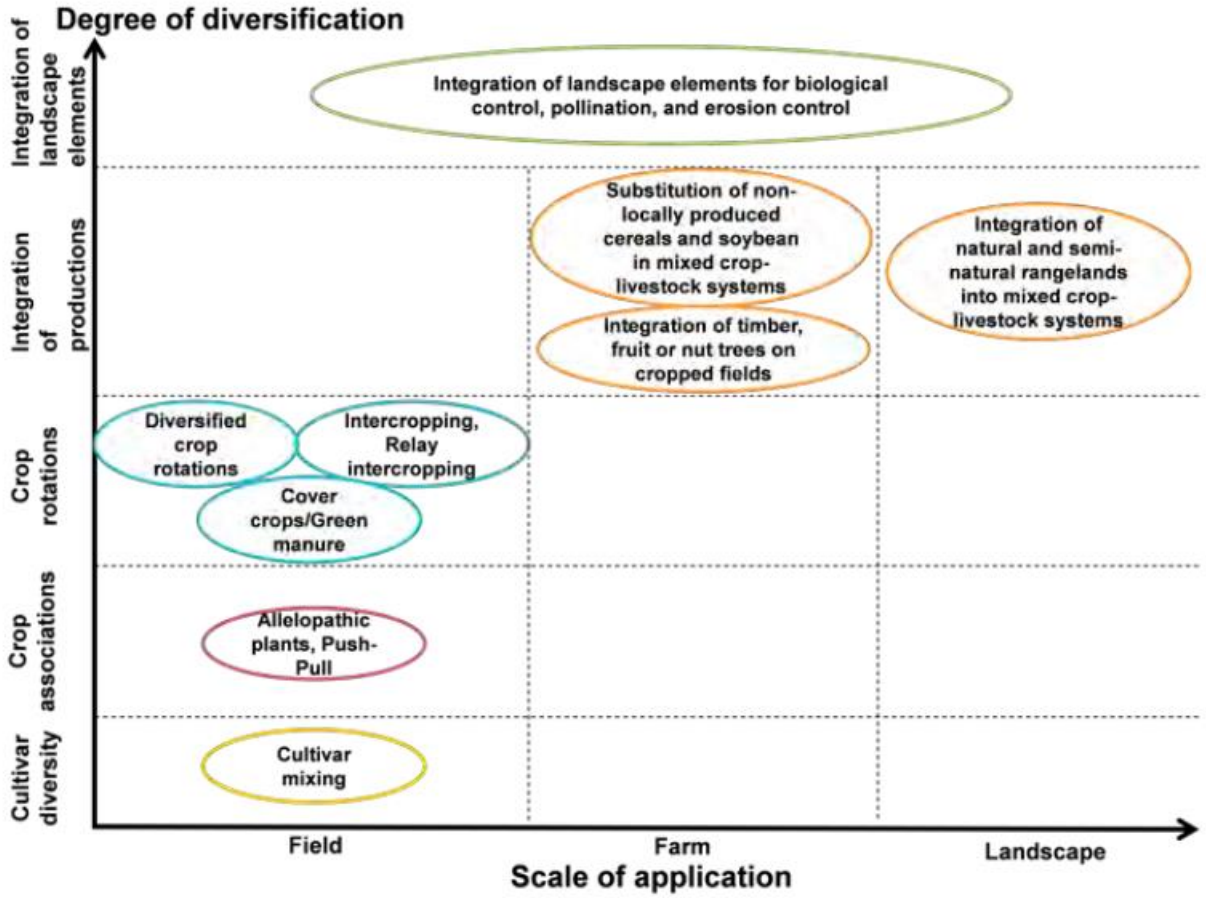
Degree of diversification of agroecological practices



Wezel and al. Agroecology for sustainable development

Figure 1. Agroecological practices which integrate a higher diversity of cultivars, crops, production systems, and landscape elements. Practices are placed along a diversification gradient from intra-species diversity via crop and production systems diversity to integration of landscape elements.

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AGROECOLOGICAL PRACTICES: EXAMPLES IN AFRICA, ASIA AND EUROPE

3.1
AFRICA - Malawi

Légume diversification to improve soil fertility

Project with 6600 farming households in 308 villages on 2 areas

Issues raised in this context

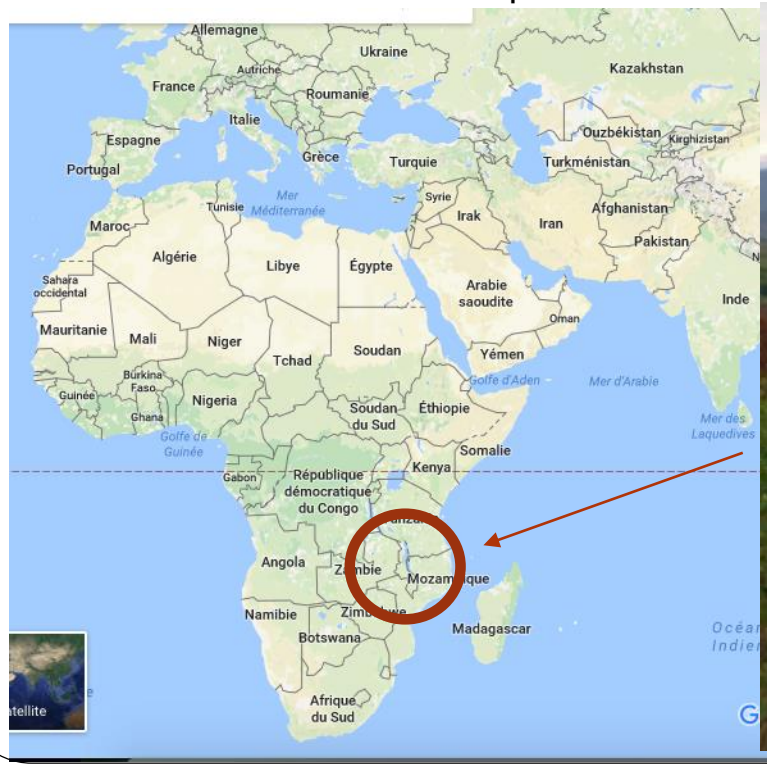
- Flood and drought
- Food insecurity and maternal and child nutrition
- Low crop and dietary diversity
- Limited organic matter
- High gender inequality and high levels of child malnutrition
- Rising costs of commercial fertilizer
- Reliance on external input

Practices

- Use of site adapted cultivar: local maize variety (orange maize)
- Incorporating crop residues (vs burning)
- Crop rotation
- Intercropping with Legumes

+ Participatory research

Source: Soil and Food - http://soilandfood.org/malawi-farmer-to-farmer-agroecology-project/



Family farm with pigeon pea harvest

Groundnut and pigeon-pea field

Child with local maize

Farmer in groundnut and pigeon pea field

Consequences of the agroecological redesign of the system

Consequences on the agronomic system

- Indigenous seeds drought tolerant used and rediscovered
- Early harvest of sweet potatoes increased harvest period
- Soil cover with mixed system and soil management with organic matter protecting soil from erosion, drying up and improving soil moisture levels and water penetration
- Organically rich soils contains more mycorrhizalfungi improving plant water relation and thus increase the resistance of host plants
- Agroforestry provide shade cover to reduce erosion, improve soils fertility and attract beneficial insects
- Pigeon pea draw nutrient from deeper in the soils with deep roots
- C sequestration
- Less erosion
- Less use of mineral fertilizer and pesticides (légume options contributed between 30 and 90 kilogram of nitrogen per hectare per year)

Positive impacts on food and nutrition security

- Legumes help to diversify the diet providing important source of protein
- local orange landrace varieties of maize having potential to contribute vitamin A in diets
- Greater crops without use of external fertilizer
- Early harvest of sweet potatoe
- Yield stability in the midst of climatic variability

Positive impact on rural livehood and social well being

- Reduce of the costs (less input) and source of income through legume sale
- Greater improvement in decision making for women and men taking more household tasks
- Improved cohesion and social relations at the community level
- Piegon pea provide firewood

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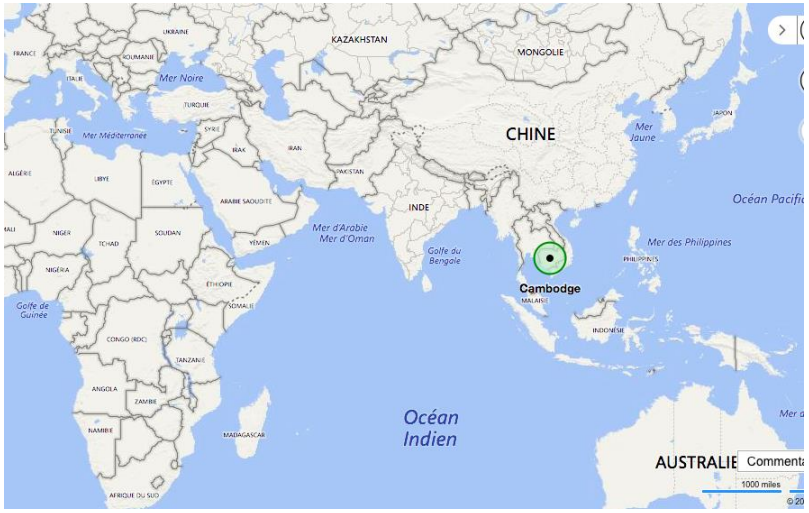
3.2
ASIA - Cambodia

Ecological intensification for resilient farming in Cambodia



FAO Agro-ecology Symposium in Asia and the Pacific, Bangkog 25 November 2015: *Rada Kong, Veng Sar, Sopheak Trang, Vira Leng, Koy Ra, Lyda Hok, Manuel Reyes, Stéphane Boulakia and Florent Tivet*

Issues raised in this context

High land saturation and high rate of poverty

Extensive rice-based system due to scarcity of labor force and

Low levels of diversification, low soil fertility and highly vulnerable

Increasing contractual services for land preparation and harvesting

Constant state of undernourishment for cattle and buffalo

Soil degradation effects 78,000 km2 or 43% of total land area (Bai et al., 2008 in Soil Use and Management)

Biodiversity extinction, High GHG emission, Rapid soil degradation

Building healthy soil: Plant diversity as a driver of soil – crop interactions and ecosystem services

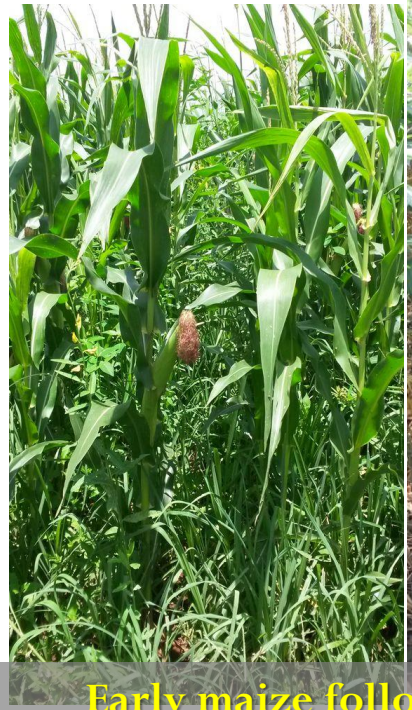
Practices

Minimum or no soil tillage

Permanent soil cover

Specie diversity and arrangement

Translating technical principles of Conservation Agriculture into ecological processes Cropping systems engineering: design and assessment



Early maize followed by cassava

Soybean after sorghum

Maize with Pigeon pea

Dry season cassava

Building healthy soil

Biodiversity is the engine that drives soil-crop interactions and enhances ecosystem services. Increasing the Soil Organic Matter (the fuel) to enhance the soil biota (the gear).

Towards an inclusive approach

3.3
EUROPE: HUNGARY

MagosVölgy Ecological Farm
Testing small-scale agro-ecological practices in a real-life environment

Source: CIA World Factbook

Source: wikipedia.org

Issues

- Lowest GDP in Hungary (41% EU av.)
- High unemployment
- Exodus among young/educated people
- Low innovation capacity
- Low image of agricultural labour
- Low employment capacityLarge-scale agriculture (over 100 ha)
- Few viable small-scale farms
- Ageing farmer population (av. 56 yrs)

Hungary > North-Hungary Region > **Terény** (380 people

Source: Presentation from Zoltán Dezsény
FAO Agroecology Symposium - 24.11.2016- Budapest

MagosVölgy Ecological Farm
Testing small-scale agro-ecological practices in a real-life environment

- **MagosVölgy Ecological Farm** est. in **2013** at **Terény, start-up rural ag enterprise**
- New entrants with urban backround with MSc degrees in Agronomy, Env.Mngmt & Int.Ag.Dev.
- Small-scale, mixed certified organic farm < 3 ha
- 1000m2 polytunnel, 3000m2 open field vegetables, 2 ha grassland, cows

Our Mission

At MagosVölgy we are working to create a farm shaped by the principles of sustainability.

An agriculture oriented small-scale ethical enterprise which utilizes local resources, creates values and synergies, builds communities, feed people, provides livelihood and perspective, and bridges the urban and rural world.

Vegetable Cropping System

- No machinery, only hand labour
- Compost mulch permanent beds, minimal tillage
- 30+ species, 100+ varieties – some of it heirloom/old
- Micro Irrigation: drip lines and micro sprinklers
- Diverse Crop Rotation
- Green manures
- No syntethic chemicals and fertilizers – minimal use of copper

- Heritage breed **Brown Carpathian** Cattle since 2016
- Currently only 1 cow, 1 heifer and 1 calf

PLANS:

- Herd enlargement
- Planned Rotational Grazing on abandoned grassland
- Milk processing - artisan cheese making
- « Adopt a Brown Carpatian Cow » Program
- On-farm nutrient cycle

Marketing

- **Community Supported Agriculture (CSA)** since 2016
- *Partnership between farmers and consumers in which the responsibilities, risks and rewards of farming are shared*
- Share of harvest for 60 members
- Standard veggies portions
- Seasonal commitment
- Pick-up points in Budapest
- Pre-payment
- NO Price

Human resources

<u>People are the most precious resource</u>

- **Not** employees, but **Team** members (4 locals, 3 moved in)
- 2016: 7 people Farm Crew, 2 volunteers, 1 intern
- 1 farm labour camp, 100+ visitors

PLANS

Educational & Knowledge transfer activities

Thematic programs, Regular Open Farm Days

Form a Farming Community and build close cooperations with local stakeholder

‘Give biodiversity a chance!’

Alan Peteers, Budapest 2016

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Thank you

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