Agroecology, a diversity of concepts, definition and practices

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Why promoting ‘agroecology’ today?

Ecological crisis in agriculture

Agriculture (especially **family farming**) undergoing **economic** and **social crisis** combined with an **ecological** dimension (crisis in ecosystem fertility)

- Disappearance of former systems of fertility management (long fallow in s&b system)
- New systems not able to sustainably improve per-hectare yields
- Migrations of impoverished farming populations in fragile ecosystems (demographic pressure, government policies for conversion of temporary land use to permanent land use, land concentration…)

The Green Revolution's limits and negative impacts




- **Yield and productivity gain** (controlled environment and good agro climatic conditions / soil fertility) → **reached its limits**
- Poor performance in fragile environments and where the climate is unstable
- Deterioration of soil fertility, loss of farmland, decrease in biodiversity, exhaustion of non-renewable resources, deterioration of landscapes, contribution to climate change
- Family farmer dependency on firms upstream and downstream, indebtedness, pressure from large-scale farms (land and resource grabbing)

Impacts of climate change

- Increasing of intra and inter annual rainfalls variability, higher frequencies of extreme climatic hazard and pest and disease outbreaks
- Ecosystem in crisis are likely to be more sensitive to extreme climatic hazards (drought and flood)

Agroecology, a polysemic concept

Agroecology can be understood in many different ways according to the **people background** and **experiences**

Convincing and evidence-based **alternatives** to the **current agrifood system**

Agroecology seeks to

- produce diversified and high-quality food,
- reproduce – or even improve – the ecosystem's fertility,

- limit the use of non-renewable resources,
- avoid contaminating the environment and people,
- contribute to the fight against global warming

Agroecology is not new

- Farming systems and practices developed by farmers in their different contexts, based on **empirical learning processes and knowledge transfer from generation to generation**
- **Agro-forestry, crop rotation** and **association**

→ Local, indigenous knowledge highly relevant in designing alternative agriculture practices

Modern agroecology

- **Reaction to societal and environmental problems** generated by the expansion of conventional agriculture
- Build on both **traditional empirical knowledge and scientific research** for a better understanding and use of ecological processes operating in the farming systems
- Innovative concept and approaches capable of tackling issues related to **food security / sovereignty, and mitigation & adaptation to climate change**

Agroecology, a set of principles

Agro-ecology: historical principles (Altieri and al. 2005)

1. **Enhanced recycling of biomass (**nutrient availability, nutrient flows).
2. **Securing favourable soil conditions for plant growth**, (organic matter, soil biotic activity).
3. **Minimising losses** due to flows of solar radiation, air and water.
4. **Species and genetic diversification** of the agro-ecosystem in time and space.
5. **Promotion of key ecological processes and services**

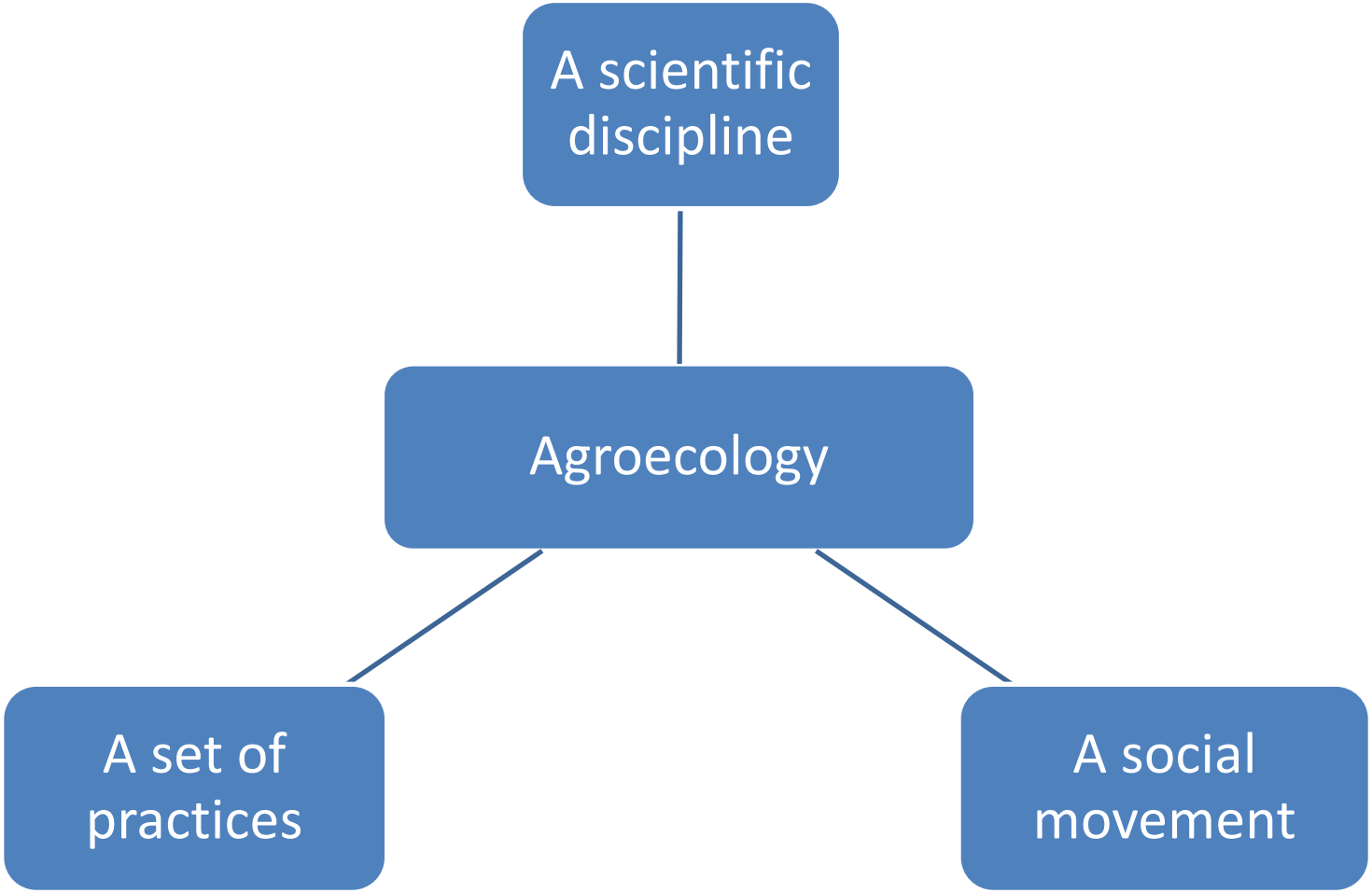
Agro-ecology: some additional principles (Gliessman, 2007)

1. Reconnecting the two most important parts of the food system - **consumers and producers**, through the development of **alternative food networks**;

2. On the foundation created by **sustainable farm-scale agroecosystems** and **sustainable food relationships**, build a new global food system, based on **resilience, participation, localness, fairness, and justice**

Agro-ecology: some additional principles (Stassart et al. 2012)

1. **Agro-biodiversity as an entry point for the (re)conception of agriculture and food systems** (farmers autonomy and food sovereignty).
2. **knowledge diversity**
3. **Agro-ecological transition** in the long term, giving importance to properties of adaptability and resilience
4. Promote **participatory research driven by the needs of society and practitioners**, while at the same time guaranteeing scientific rigor.



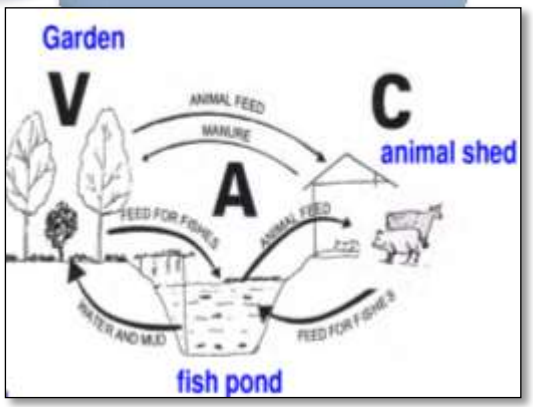
(Adapted from Wezel, 2009)

Agroecology practices in Mekong Region

Feasibility study commissioned by AFD (French Agency for Development) :

- **Better understanding of regional** and **national agroecology dynamics** and **initiatives,**
- **Strengths** and **weaknesses analysis,**
- Main issues at stake for their **large scale dissemination**

Geographic focus of the study: **Cambodia, Laos, Myanmar, Thailand, Vietnam, Yunnan/China**



Agroforestry

Integrated Pest Management

System of Rice Intensification (SRI)

Agro ecology

Conservation Agriculture

Organic Agriculture

Integrated Farming

Different dissemination dynamics




International institution driven

- **IPM, SRI, CA** and **Agroforestry**
- **key international institutions** (FAO, Cornell University, CIRAD and ICRAF)
- Activities implemented through **government agencies**
- **Regional networks** (support from **international donors)**
- International and local NGOs joined the movements later on to support extension activities
- **National NGOs** formed in order to maintain momentum beyond the project period

Government driven

- **VAC systems** (Vietnam) and **New Theory of Farming** (Thailand)
- National level initiatives/policies translated into large movements

Grass root level / CSO driven

- **Organic movement**
- Farmers and local activists getting organized and linking up with other groups to support their activities and to gain recognition
- Federated as members of **national associations**
- International Foundation of Organic Agriculture Movements (**IFOAM**) provide them technical support and certification service

Overview of main AE practices

System of Rice Intensification

- SRI is practice coming from field observations in Madagascar
- SRI is well known and disseminated in the region
- In Myanmar: first introduced in 2001 by Metta Development Foundation in the Uplands. Spread to other areas with support from various INGOs

System of Rice Intensification

SRI is a set of 12 principles to manage and maximizing the rice crop productivity based on main techniques:

- ✓Early, quick and healthy plant establishment
- ✓Reduced plant density
- ✓Improved soil conditions through enrichment with organic matter
- ✓Reduced and controlled water application

Main constraints: scarcity of labor force involve capacity of increase land cultivation, water level management, implementation of the 12 principles

Integrated Pest Management

- **FAO introduced IPM in 1990's** in Mekong Region based capacity building farmers' skills on pest surveillance and self-reliant crop management decisions (Farmers Field School)
- Strong involvement of the Ministries of Agriculture and Education as well as support from FAO
- Mainly addresses rice and vegetable crops
- No certification

Integrated Pest Management

IPM effective and environmental approach to pest management that relies on a combination of practices : mechanic, biological and chemical

IPM used comprehensive information of the life cycles of pests and their interaction with environment

- ✓ Grow a healthy crop,
- ✓ Conserve natural enemies,
- ✓ Conduct regular field observations
- ✓ Farmers become expert

Organic Agriculture

OA relies on ecological processes, biodiversity and cycles adapted to local conditions rather than the use of external inputs. (IFOAM)

- Dominated by rice, vegetable, coffee, tea and fruit trees
- Emerged only recently with the notable exception of **Thailand**
- Still marginal in all countries (Volumes & production areas)

Organic Agriculture

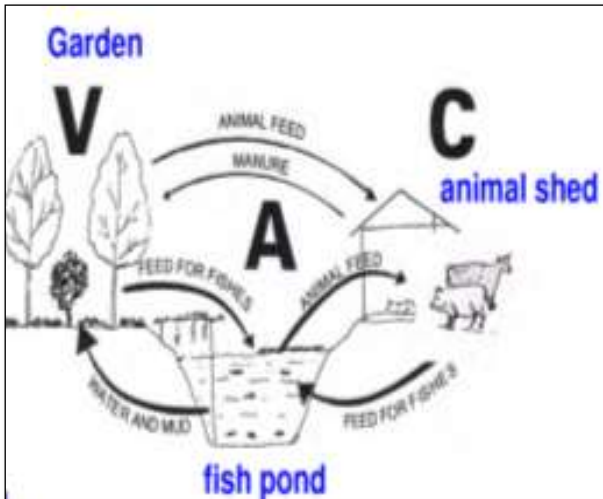
- **Defined by standard of production** adjusted according to own regulations, request certification by external body
- Emerging initiatives such as **Participatory Guaranty Systems** (recognized internationally by IFOAM in 2004) relying on multi stakeholders participation
- **A big challenge for organic networks**: to differentiate themselves from initiatives led by international agrochemical companies

Integrated Farming System

- Integrated farming approaches promoted as **alternatives to Green Revolution agriculture** since the 1990s for self-sufficient farming by central governments
- Highly bio-intensive methods of small-scale farming in which food gardening, fish rearing and animal husbandry are integrated

Pioneered by **Thailand** and **Vietnam**

Other Mekong countries recently at more local scales with the support from local and international NGOs



Integrated Farming System

VAC system is managed by family farming, can be adapted to different agro-ecological area (rice + duck, rice + fish, fruit trees)

Integrated management of three components: garden, fish pond and livestock.

a. Some products from garden are used to feed fishes.

b. Fish pond provides water, mud and slime for irrigating and fertilizing the garden.

c. Some fishes and weeds can be used for livestock nutrition.

d. Animal manure is used for feeding plants and fishes.

Conservation Agriculture

- ✓ **Conservation agriculture coming from research center** on soil conditions improvement
- ✓ **CA is mostly associated to CIRAD** in the region as main promoter and practitioner (Cambodia, Laos, Vietnam)
- ✓ In **Myanmar**, promoted by INGO (WHH) as well as UN organizations (UNDP & FAO).

Conservation Agriculture

CA is based on 3 principles :

- ✓ Continuous minimum mechanical soil disturbance (direct planting of crop seeds)
- ✓ Permanent organic soil cover (crop residues and cover crops)
- ✓ Diversification of crop species grown in sequences and/or associations.

but larger understanding by including **water and soil conservation**

Agroforestry

AF has been used and promoted by ICRAF (World Agroforestry Center) and becomes now popular in many countries

AF is ecologically-based natural resource management practice that through the integration of tree on farmland in the agricultural landscape, diversifies and sustains production.

Agroforestry

Combinations of trees, crops, and/or livestock are intentionally designed, established in the same land, and/or managed to work together and yield multiple products and benefits, rather than as individual elements which may occur together but are managed separately.

Thank you for your attention