Introduction to FAO work on Agroecology

Animal Production and Health Commission for Asia and the Pacific (APHCA) session
7 November 2019, Kuala Lumpur
Global & Regional context:
Why is Agroecology relevant?
In the next 35 years we expect complex and interconnected challenges that will put an unprecedented pressure on agriculture:

- Population increase projections; over 2.6 billion people overweight; poor diets, increased agricultural markets concentrations; conflicts and migration; rural poverty
- Competition for natural resources (land, water, energy)
- Consequences of climate change

→ **Current agricultural production system** based on intensive inputs and productivity can no longer be a sustainable option
THE ASIAN CONTEXT

- Important **changes in Food Systems** due to rapid economic growth, increasing population and demographic shifts, rapid urbanization, rural and urban transformation, changing food consumption behavior and climate change

- Important challenges to address in regards to:
  - **Nutrition**: triple burden (malnutrition, obesity, hidden hunger)
  - **Food Safety**: growing distrust of consumers towards food quality and food safety due to regular food scandals
  - **Biodiversity loss**: rapid economic growth at the expense of the environment (IPBES, 2019)
  - **Climate change**: systemic risk to achievement of food security and to natural systems that support agriculture sector (IPCC reports)
  - **Youth**: lack of interest for agriculture / lack of fulfilling job opportunities
AGROECOLOGY
An answer to the transformative call for our food and agricultural systems

“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 integral approach that agroecology can offer. FAO is committed to explore all the potential of agroecology in this regard.”


“Going beyond input use efficiency and input substitution, agroecology seeks to harness key ecological processes, such as the recycling of nutrients and synergies among the components of agrobiodiversity.”

Source: FAO. 2017. The State of Food and Agriculture 2017
What is Agroecology?
A polysemic concept with over 30 definitions adopted by government, Academia and CSOs (FAO website, AgroecologyLex)

Applies ecological concepts & principles to optimize interactions between plants, animals, humans and the environment while taking into consideration social aspects needed for a sustainable and fair food system

Based on bottom-up and territorial processes, helping to deliver contextualized solutions to local problems.
• AE innovations are based on the co-creation of knowledge, combining science with the traditional, practical and local knowledge of producers

• By enhancing their autonomy and adaptive capacity, AE empowers producers and communities as key agents of change

• Emphasizes social equity (job creation & gender aspects)

• Promotes local markets and direct consumer-producer exchanges (value addition & diverse diets)
10 Elements of Agroecology

Characteristics of AE systems, foundational practices & innovation approaches

Context features

Enabling environment
What’s about Agroecology and Livestock Production?
1) Five ecological principles
(Dumont et al., 2013; inspired from Altieri, 2002)

Connect, diversify & integrate!

5) Preserving biodiversity by adapting management practices

2) Reducing inputs by relying on natural processes

Be autonomous!

3) Decreasing pollution by optimizing "metabolic" functioning of farming systems

Be clean!

4) Enhancing diversity for increasing system resilience

Protect and defend local natural and cultural richness!
<table>
<thead>
<tr>
<th>Production per unit area or per animal</th>
<th>Production can slightly decrease per unitary component but at farm level, diversification of production increases overall farm yields, ES and profitability to farmers</th>
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<tbody>
<tr>
<td>Use of inputs</td>
<td>Systems less dependent on chemical inputs and use more on-farm produced inputs through recycling</td>
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<tr>
<td>Link to local environment</td>
<td>Use diversity to strengthen adaptive capacity and resilience</td>
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<tr>
<td>Biodiversity &amp; Ecosystem Services</td>
<td>AE as part of a land sharing approach with functional links with ES. Biodiversity considered as both a resource (that provides ES to farmers) and an output. Scaling up AE would benefit from payment for environmental services</td>
</tr>
<tr>
<td>Animal selection goals</td>
<td>Selection on a number of productive and adaptive traits (i.e., breeding for robustness). Animal genetic resources and local breeds offer opportunities to adapt animals to their local environment</td>
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<tr>
<td>Role of technology</td>
<td>Technology facilitates the collection of individual-based information and can be used to monitor every component of the system to increase its overall efficiency. Technology needs to remain accessible to smallholder farmers</td>
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<tr>
<td>Knowledge transfer</td>
<td>Mainly bottom-up, as AE places strong value on local knowledge. Farmer-to-farmer networks also play a key role in information transfer</td>
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<tr>
<td>Labor</td>
<td>More time to supervise and observe the system. Labour productivity can thus be lower than in industrial systems</td>
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<tr>
<td>Market</td>
<td>Selling in niche markets allows benefiting from the added value created on the farm</td>
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</table>
KEY OPPORTUNITIES FOR LIVESTOCK TO CONTRIBUTE TO THE AE TRANSITION

- By eating fibrous feeds (e.g. grass and straw) and waste (e.g. swill), livestock make use of biomass that humans cannot eat and increase natural resource use efficiency.
- Animal mobility within and between agroecosystems and landscapes transfers nutrients, biomass and water in the form of animal manure, and moves people’s assets in times of disasters such as floods or drought.
- Manure is rich in nutrients and organic matter, which are key to the physical, chemical and biological properties of healthy soils.
- Good livestock management practices increase plant biodiversity in grasslands, which in turn enhances productivity, resilience, and other ecosystem services.
- Livestock are part of climate solutions, through reducing enteric methane emissions and deploying diverse livestock resources to increase resilience on farm.
Concept of AE as an overarching umbrella under which many different approaches can exist as long as they are moving towards sustainable food systems

- **Production practices**: e.g. Agroforestry, Livestock-Crop Integration, SRI, IPM, Rice-Duck or Rice-Fish farming, Conservation agriculture...
- **Environmental dimension**: Biodiversity, Climate Resilience...
- **Economic dimension**: PGS, Farmer’s markets, Value addition...
- **Social dimension**: Farmers organization, Social movements, Focus on decent work...
FAO’s Outreach on Agroecology
OVERALL APPROACH

- Raising awareness and building capacities
- Generating *evidences* & Strengthening *credibility* (Scaling Up AE initiative, Global Knowledge Product on AE)
- **Mainstreaming** across current and future projects & Building **alliances**
FAO’s Agroecology Knowledge Hub

- Constantly updated with FAO and external content
- Publication of resources, experiences and events on agroecology
- Agroecology monthly newsletter
- Databases on agroecology:
  - **AgroecologyLex** - Selection from FAOLEX Database on country legislation, agreements and policies on agroecology
  - **Agroecology Knowledge Hub database** - Repository of publications, articles, courses and multimedia resources on agroecology

http://www.fao.org/agroecology
To produce global and harmonized evidence (information and data) on the multi-dimensional performance of agroecological systems in order to inform policy-making and to support the process of transition to Agroecology

- Build knowledge and empower producers through the collective process of producing data and evidence on their own practices;
- Support agroecological transitions at different scales and in different locations by proposing a diagnostic of performances over time and by identifying areas of strengths/weaknesses and enabling/disabling environment;
- Inform policy makers and development institutions by creating references on the multi-dimensional performance of Agroecology and its potential to contribute to the SDGs

The tool can be used by governments, farmers, scientists and extension workers
An overview of TAPE

DESCRIPTION OF SYSTEMS AND CONTEXT

- Production systems, type of household, agroecological zones
- Existing policies (incl. climate change)
- Enabling environment

CHARACTERISATION OF AGROECOLOGICAL TRANSITIONS (CAET)

- On farm/household/territory survey:
  - Describe current status
  - Based on 10 elements of agroecology with descriptive scales
  - Can be self assessment by producer

TRANSITION TYPOLOGY

ON FARM/HOUSEHOLD/COMMUNITY SURVEY:
- Statistical and/or participatory clustering to reduce sample size if large number of observations in CAET
- Measure progress and quantify impact
- Addressing 5 key dimensions for policy makers and SDGs
- Time/cost constraints: keep it simple!

CRITERIA OF PERFORMANCE

ON FARM/HOUSEHOLD/COMMUNITY:
- Review CAET results, explain with context, enabling environment
- Review Performance results and explain with CAET
- Analyze contribution to SDGs

ANALYSIS AND PARTICIPATORY INTERPRETATION
### STEP 1: CAET - Diversity

<table>
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<tr>
<th>Index</th>
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<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Crops</strong></td>
<td>Monoculture (or no crops cultivated)</td>
<td>One crop covering more than 80% of cultivated area</td>
<td>Diversified number of crops</td>
<td>Diversified and balanced number of crops adapted to local and changing climatic conditions</td>
<td>High number of crops varieties and species well adapted to local and changing climatic conditions. Spatially diversified farm by multi-, poly- or inter-cropping functional to other productive activities within the agroecosystem</td>
</tr>
<tr>
<td><strong>Animals (including aquaculture)</strong></td>
<td>No animals raised within the agroecosystem</td>
<td>One species only or covering more than 80% of the animals in the farm (or good number of species but low in number or not well adapted to local conditions)</td>
<td>Good number of animals of more than one species</td>
<td>Good number of animals of different breeds and species adapted to the local and changing climatic conditions and functional to other productive activities within the agroecosystem</td>
<td>High number of animals of several breeds and species (including domesticated pollinators and aquaculture) well adapted to local and changing climatic conditions and functional to other productive activities within the agroecosystem</td>
</tr>
<tr>
<td><strong>Trees (and other perennials)</strong></td>
<td>No trees (nor other perennials) in the agroecosystem</td>
<td>Few trees (and/or other perennials) in the agroecosystem (or good number of trees of one species only)</td>
<td>Good number of trees (and/or other perennials) of more than one species</td>
<td>Good number of trees (and/or other perennials) of different species functional to other productive activities within the agroecosystem</td>
<td>High number of trees (and/or other perennials) of several different species integrated and functional to other productive activities within the agroecosystem</td>
</tr>
<tr>
<td><strong>Diversity of activities and products enhancing resilience of rural livelihoods</strong></td>
<td>One productive activity only (e.g. selling one crop only)</td>
<td>Few productive activities linked to a very small number of crops/animals</td>
<td>Diversified number of productive activities linked to more than one crop/animal</td>
<td>Diversified number of productive activities and services linked to a high number of products</td>
<td>Many productive activities linked to different products and services (crops, livestock, trees, native exchanging, ecotourism, little industry, etc.). Specific attention to enhance biodiversity</td>
</tr>
</tbody>
</table>
STEP 1 CAET: Example of application in Cambodia

Average CAET results: **28.3**
Farm rain fed upland area (Battambang)

Average CAET results: **45.3**
Farm rain fed upland area, project intervention area (Battambang)
## STEP 2: Core criteria of performance

<table>
<thead>
<tr>
<th>Main dimension</th>
<th>#</th>
<th>Core criteria of performance</th>
<th>Proposed method of assessment in survey</th>
<th>SDG indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Governance</td>
<td>1</td>
<td>Secure land tenure (mobility for pastoralists)</td>
<td>Type of tenure over land: property, lease + duration, verbal, not explicit (SDG 1.4.2, 5.a.1 and 2.4.1 sub-indicator 11) Existence and use of pastoral agreements and mobility corridors</td>
<td>1.4.2, 2.4.1, 5.a.1</td>
</tr>
<tr>
<td>Economy</td>
<td>2</td>
<td>Productivity</td>
<td>Farm output value per hectare (SDG 2.4.1 sub-indicator 1) Farm output value per person</td>
<td>2.3.1, 2.4.1</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Income</td>
<td>Outputs - inputs - operating expenses – depreciation + other income (SDG 2.4.1 sub-indicator 2)</td>
<td>1.1.1, 1.2.1, 1.1.1, 1.2.2, 2.3.2, 2.4.1, 10.2.1</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Added value</td>
<td>Net income +rents +taxes +interests – subsidies</td>
<td>10.1.1, 10.2.1</td>
</tr>
<tr>
<td>Health &amp; nutrition</td>
<td>5</td>
<td>Exposure to pesticides</td>
<td>Quantity applied, area, toxicity and existence of risk mitigation equipment and practices</td>
<td>3.9.1, 3.9.2, 3.9.3</td>
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<td></td>
<td>6</td>
<td>Dietary diversity</td>
<td>Minimum Dietary Diversity for Women - FAO &amp; FHI (2016)</td>
<td>2.1.1, 2.1.2, 2.2.1, 2.2.2, 2.4.1</td>
</tr>
<tr>
<td>Society &amp; Culture</td>
<td>7</td>
<td>Women’s empowerment</td>
<td>Abbreviated Women’s Empowerment in Agriculture Index, A-WEAI (IFPRI, 2012)</td>
<td>2.4.1, 5.a.1, 5.a.2</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Youth employment</td>
<td>Access to jobs, training, education or migration (SDG 8.6.1)</td>
<td>8.6.1</td>
</tr>
<tr>
<td>Environment</td>
<td>9</td>
<td>Agricultural biodiversity</td>
<td>Relative importance of crops varieties, livestock breeds, trees and semi-natural environments on farm (SDG 2.4.1 sub-indicator 8.1, 8.6 and 8.7)</td>
<td>2.4.1, 2.5.a.1</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Soil health</td>
<td>SOCLA agroecological method to assess soil health, based on 10 indicators (Nicholls et al., 2004)</td>
<td>2.4.1, 15.3.1</td>
</tr>
</tbody>
</table>
### Non exhaustive list of advance criteria

<table>
<thead>
<tr>
<th>Main dimension</th>
<th>Advanced criteria</th>
<th>Possible methodologies for assessment</th>
<th>SDG</th>
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</thead>
<tbody>
<tr>
<td><strong>Economy</strong></td>
<td>Resilience</td>
<td>Self-evaluation and Holistic Assessment of climate Resilience of farmers and Pastoralists (SHARP)</td>
<td>1</td>
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<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>8</td>
</tr>
<tr>
<td><strong>Health &amp; nutrition</strong></td>
<td>Food security &amp; nutrition</td>
<td>- Food self-sufficiency ratio: production x100/(production +purchases -sales)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Nutritional value of agricultural production</td>
<td>3</td>
</tr>
<tr>
<td><strong>Society &amp; Culture</strong></td>
<td>Decent work</td>
<td>Decent Work Indicators for agriculture and rural areas (FAO, 2015)</td>
<td>8</td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td>Water</td>
<td>- Water use efficiency (e.g. LEAP guidelines for livestock)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Water pollution (e.g. LEAP guidelines on nutrient use)</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Climate change mitigation</td>
<td>- GHG emissions (e.g. Ex-Act, GLEAM-i, Cool Farm tool)</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Carbon sequestration (under development for the Global Livestock Environmental Assessment Model / GLEAM)</td>
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<td></td>
<td></td>
<td>- GTAE Memento pour l'évaluation de l'agroécologie (Levard et al., 2019)</td>
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</table>
Way forwards and next steps for TAPE

- Disseminate TAPE to FAO decentralized offices & partners, provide trainings upon request (eg Vietnam & Laos)
- Test TAPE in selected countries with partners (Cambodia/ALiSEA, China/CSA network)
- Use on-line tool for data collection and populate the global database
- Validate / revise TAPE based on feedback from tests
- Publish TAPE and on-line data collection tool
Thank you!

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