



Food and Agriculture Organization
of the United Nations

Agroecology

How to assess its multidimensional impact ?

TAPE - Tool for Agroecology Performance Evaluation

Animal Production and Health Division (AGA)
Plant Production and Protection division (AGP)
Strategic Program 2 (SP2)

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Fabrizia De Rosa and Frank Escobar

*With the contributions of many divisions
and external partners*





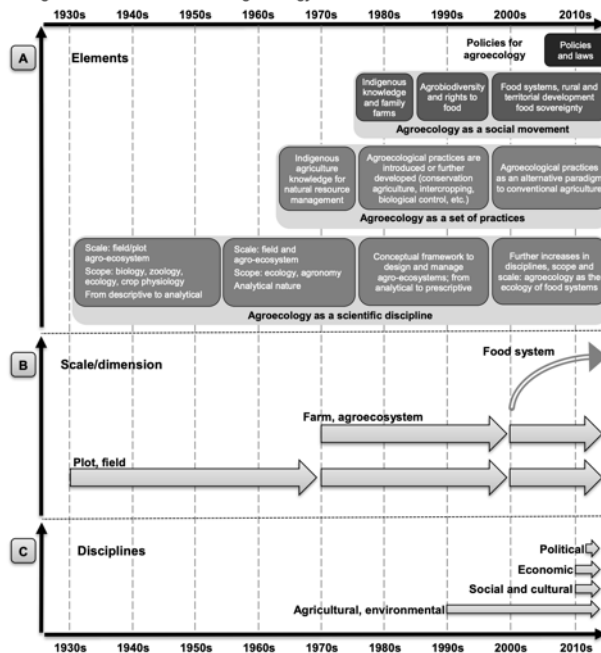
Agroecology: what are we talking about?

- 30's: agroecology as a **science**
- 70's: agricultural **practices** to protect the environment, by promoting use of ecological theories
- 80-90's: a social **movement**, addition of food sovereignty and social, economic & political sciences, while spreading from field to food system
- 00's: addition of food security and climate

NOT: agroecological zoning, type of production systems or optimization method
A definition that can vary between regions/countries.



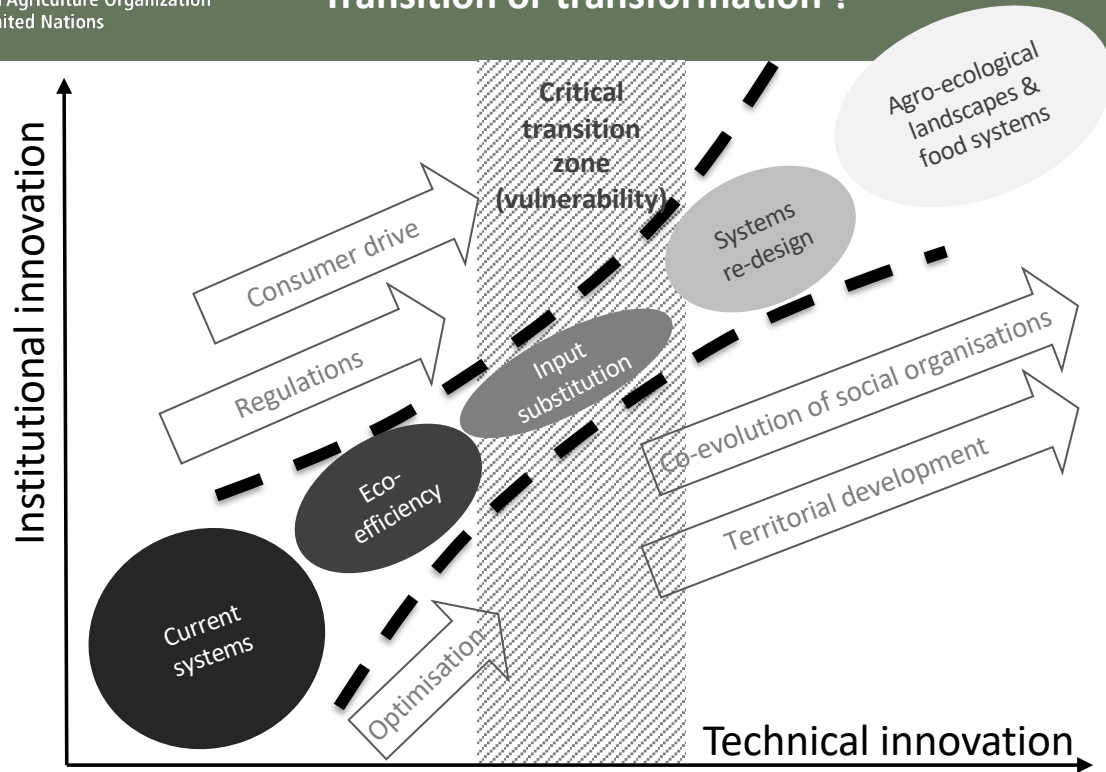
Figure 2 Historical evolution of Agroecology



Sources: (A) adapted from Silici (2014), based on Wezel *et al.* (2009) and Wezel and Soldat (2009); (B) adapted from Wezel *et al.* (2009).



Transition or transformation ?





A total of 1350 participants from 162 countries

- 2014 : International Symposium « *Agroecology for food security and nutrition* » (Rome)
- 2015-2017 : A series of 7 regional seminars

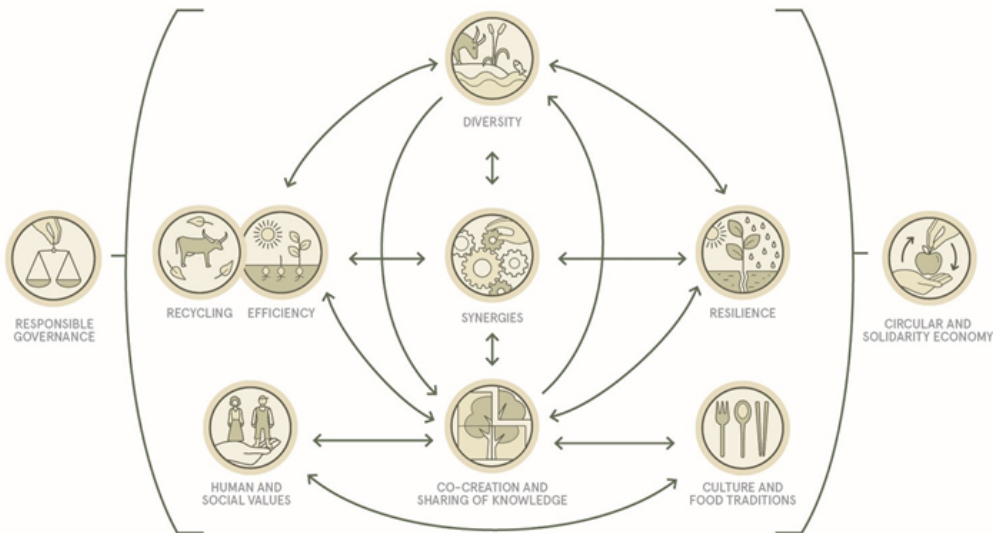
LATIN AMERICA AND THE CARIBBEAN	SUB-SAHARAN AFRICA	ASIA AND THE PACIFIC	EUROPE AND CENTRAL ASIA	NEAR EAST AND NORTH AFRICA
Brasilia Brazil June 2015	Dakar Senegal October 2015	Bangkok Thailand November 2015	Budapest Hungary November 2016	Tunis Tunisia November 2017
La Paz Bolivia (Plurinational State of) September 2016		Kunming China August 2016		

- 2018: 2nd International Symposium « *Scaling up Agroecology to achieve the SDGs* » (Rome)



The 10 Elements of Agroecology

Guiding Transition To Sustainable Food and Agricultural Systems
Approved by member countries in 2019





A request to FAO by the 194 member countries

“to assist countries and regions to engage more effectively in the transition processes towards sustainable agriculture and food systems by strengthening normative, science and evidence-based work on agroecology, developing metrics, tools and protocols to evaluate the contribution of agroecology and other approaches to the transformation of sustainable agriculture and food systems.” (C 2019/21 Rev.1 , Para. 15 a)





What is the objective of TAPE ?

To produce global and harmonized evidence on the multi-dimensional performance of agroecological systems

The tool can be used by governments, farmers, scientists and extension workers

- **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.



How do we assess performance in agriculture?

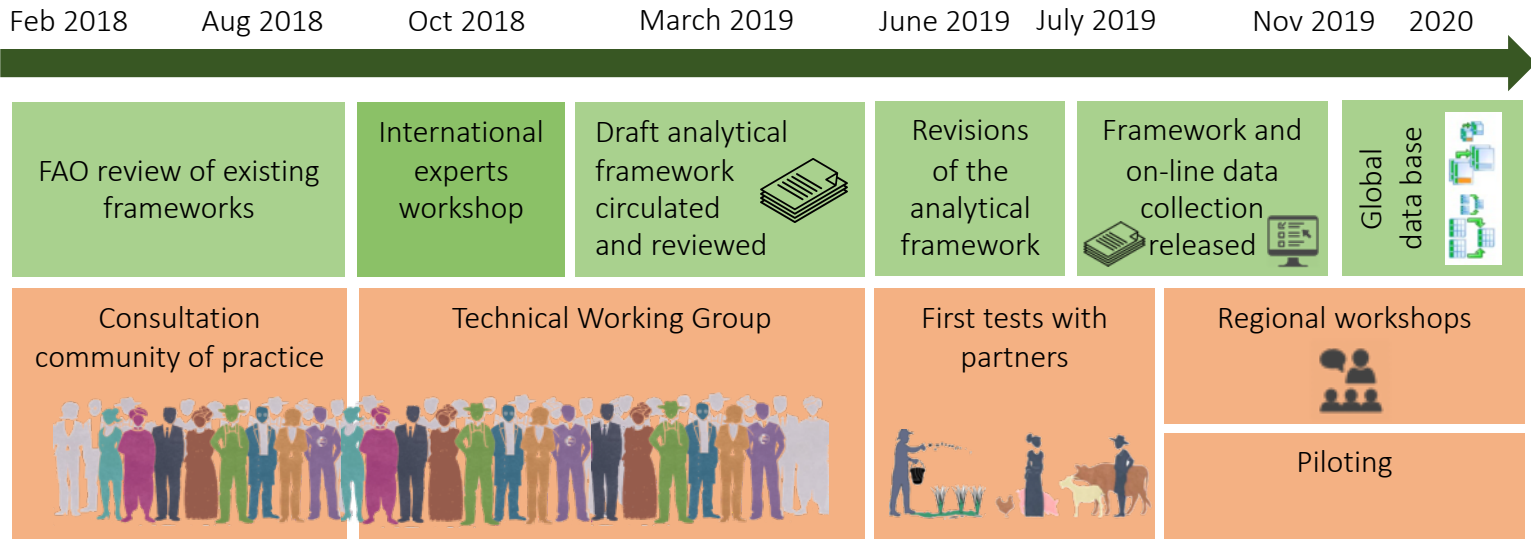


Yield/ha? \$/farm? Kcal/person?

Nitrogen leaching/ha? Number of healthy people?

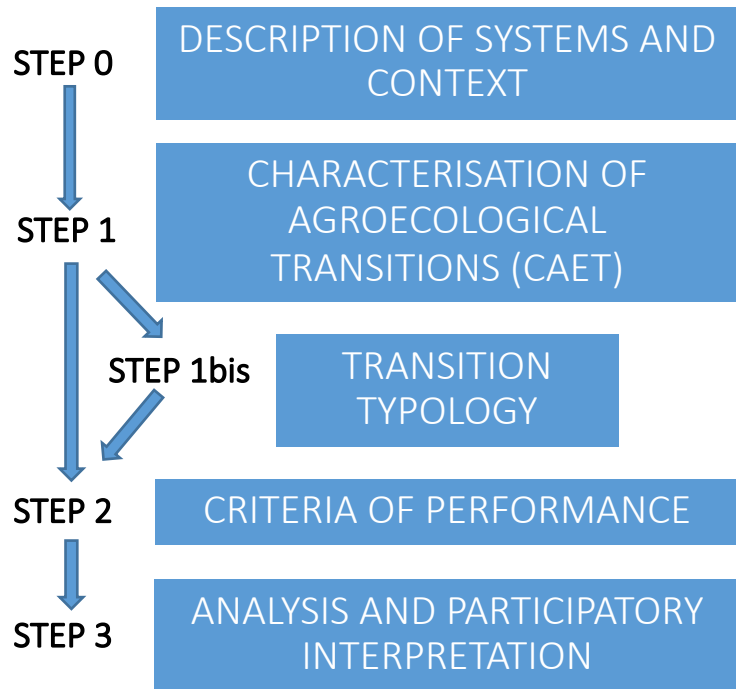


Process and timeline up to now





TAPE, step by step



Primary and secondary information:

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

On farm/household survey:

- Describe current status and provide a diagnostic
- Based on 10 elements of agroecology with descriptive scales
- Can be self assessment by producer

Statistical and/or participatory clustering to reduce sample size if large number of observations in CAET

On farm/household survey:

- Measure progress and quantify impact
- Addressing 5 key dimensions for policy makers and SDGs
- Time/cost constraints: keep it simple!

At territory/community scale:

- Review CAET results, explain with context, enabling environment
- Review Performance results and explain with CAET
- Analyze contribution to SDGs



STEP 1: CAET - Diversity



	Index	0	1	2	3	4
DIVERSITY	Crops	Monoculture (or no crops cultivated)	One crop covering more than 80% of cultivated area	Two or three crops	More than 3 crops adapted to local and changing climatic conditions	More than 3 crops and varieties adapted to local conditions. Spatially diversified farm by multi-, poly- or inter-cropping
	Animals (including fish and insects)	No animals raised	One species only	Several species, with few animals	Several species with significant number of animals	High number of species with different breeds well adapted to local and changing climatic conditions
	Trees (and other perennials)	No trees (nor other perennials)	Few trees (and/or other perennials) of one species only	Some trees (and/or other perennials) of more than one species	Significant number of trees (and/or other perennials) of different species	High number of trees (and/or other perennials) of different species integrated within the farm land
	Diversity of activities, products and services	One productive activity only (e.g. selling only one crop)	Two or three productive activities (e.g. selling 2 crops, or one crop and one type of animals)	More than 3 productive activities	More than 3 productive activities and one service (e.g. processing products on the farm, ecotourism, transport of agricultural goods, training etc.)	More than 3 productive activities, and several services



STEP 1: CAET – Other elements



Element of Agroecology	Index
Efficiency	Use of external inputs
	Ecological management of fertility
	Ecological management of pests & diseases
	Productivity (of land and animals)



Element of Agroecology	Index
Recycling	Recycling of biomass and nutrients
	Management of seeds and breeds
	Renewable energy (use & production)
	Water conservation and saving



Element of Agroecology	Index
Culture & food tradition	Appropriate diet and nutrition awareness
	Use of traditional (peasant & indigenous) knowledge and abilities
	Use of local varieties/breeds in production and cooking



Element of Agroecology	Index
Human & Social values	Women's empowerment
	Labour (productive conditions, social inequalities)
	Youth empowerment and emigration
	Animal welfare [if applicable]



STEP 2: Core criteria of performance

Main dimension	#	Core criteria of performance	Proposed method of assessment in survey
Governance	1	Secure land tenure (mobility for pastoralists)	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
Economy	2	Productivity	Farm output value per hectare (SDG 2.4.1 sub-indicator 1) Farm output value per person
	3	Income	Outputs - inputs - operating expenses – depreciation + other income (SDG 2.4.1 sub-indicator 2)
	4	Added value	Net income +rents +taxes +interests – subsidies
Health & nutrition	5	Exposure to pesticides	Quantity applied, area, toxicity and existence of risk mitigation equipment and practices
	6	Dietary diversity	Minimum Dietary Diversity for Women - FAO & FHI (2016)
Society & Culture	7	Women's empowerment	Abbreviated Women's Empowerment in Agriculture Index, A-WEAI (IFPRI, 2012)
	8	Youth employment	Access to jobs, training, education or migration (SDG 8.6.1)
Environment	9	Agricultural biodiversity	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)
	10	Soil health	SOCLA agroecological method to assess soil health, based on 10 indicators (Nicholls et al., 2004)



Non exhaustive list of advance criteria

To complement the performance analysis with a particular dimension of interest

Main dimension	Advanced criteria	Possible methodologies for assessment	SDG
Economy	Resilience	-Self-evaluation and Holistic Assessment of climate Resilience of farmers and Pastoralists (SHARP)	1 2 8
Health & nutrition	Food security & nutrition	- Food self-sufficiency ratio: $\text{production} \times 100 / (\text{production} + \text{purchases} - \text{sales})$ - Nutritional value of agricultural production	2 3
Society & Culture	Decent work Access to market	- Decent Work Indicators for agriculture and rural areas (FAO, 2015) - Territorial Markets (ESN)	8
Environment	Water	-Water use efficiency (e.g. LEAP guidelines for livestock) -Water pollution (e.g. LEAP guidelines on nutrient use)	3 6
	Climate change mitigation	-GHG emissions (e.g. Ex-Act, GLEAM-i, Cool Farm tool) -Carbon sequestration (under development for GLEAM) - GTAE Memento pour l'évaluation de l'agroécologie (Levard et al., 2019)	13

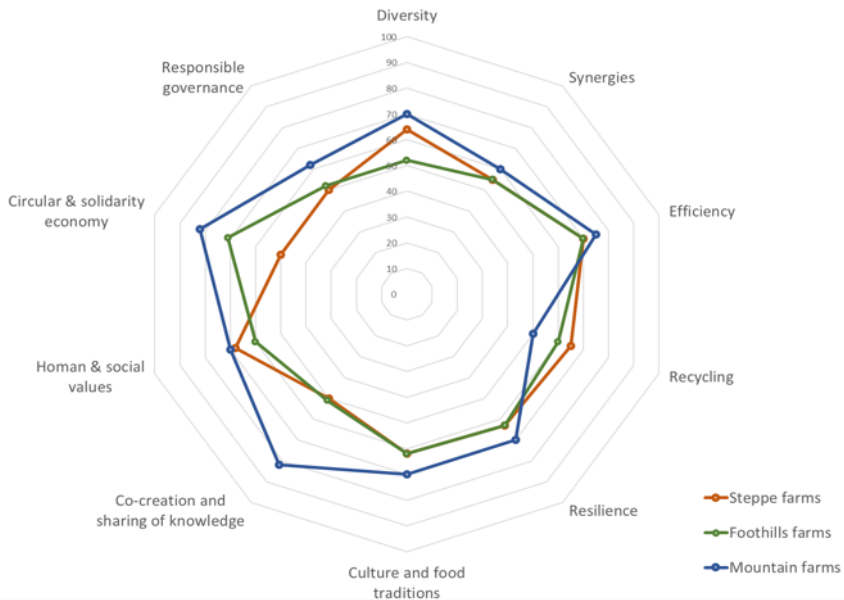


STEP 1 CAET : Example of application in Patagonia (1/2)

	Evaluated Productive Systems																								
Elements of Agroecology	HC	TA	CE	FA	MM	Va	DH	RC	OG	CC	LL	FL	AH	ND	MV	S/N	SC	AS	BT	LS	SR	T	NP	DM	DC
Recycling	55	65	40	5	50	25	40	50	50	55	75	55	50	30	25	50	60	65	50	60	70	65	65	85	75
Responsible Governance	63	44	63	38	63	81	88	31	63	31	56	63	63	44	50	56	50	50	69	31	56	63	50	56	56
Synergies	40	45	45	50	50	35	40	75	65	75	75	75	60	30	60	65	55	55	55	65	65	70	40	60	55
Diversity	56	69	56	44	44	44	44	75	75	81	75	81	69	81	94	75	63	31	44	56	50	50	56	63	31
Co-creation & sharing of knowledge	58	50	100	67	50	83	100	50	67	50	92	83	100	33	50	33	58	50	50	33	50	67	67	33	42
Resilience	44	38	69	50	69	69	69	63	63	56	88	88	88	81	81	56	50	69	25	50	69	75	38	63	63
Human & social values	58	38	67	46	71	79	63	71	88	75	71	92	46	67	58	67	67	58	58	50	58	46	63	71	71
Culture & food tradition	13	13	88	63	81	63	75	81	69	69	69	69	75	81	56	75	25	63	56	63	56	50	63	81	69
Efficiency	75	55	80	70	90	75	85	70	65	80	50	80	70	75	70	55	65	60	75	65	60	70	65	70	70
Circular & Solidarity Economy	58	58	83	50	83	100	83	75	83	92	83	83	75	83	75	58	50	42	75	75	83	75	42	42	67



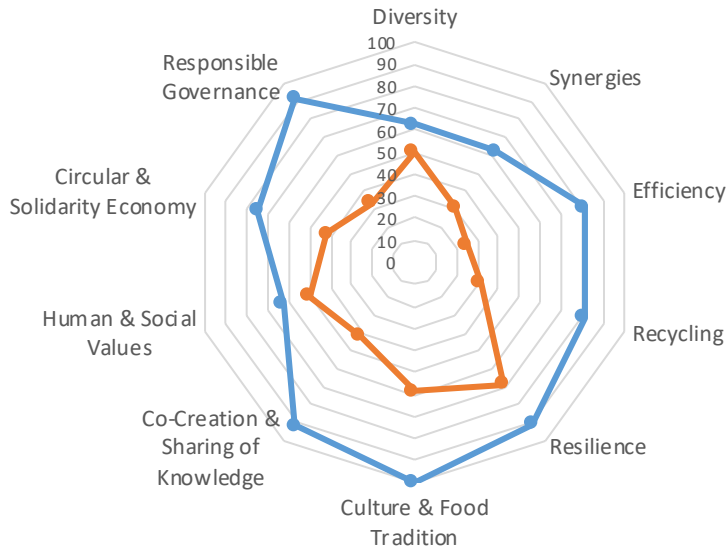
Systems classified within 3 types





STEP 1 and 2 : Example from 2 farms in Cambodia

STEP 1 CAET



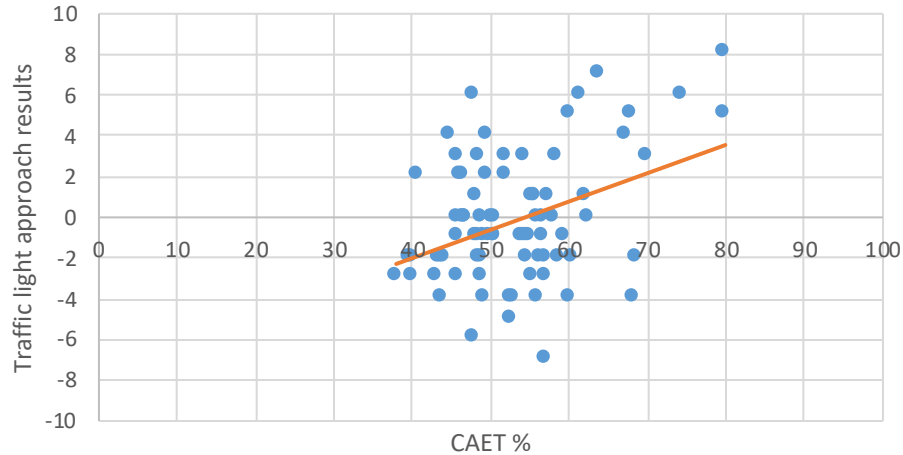
STEP 2: Criteria of Performance

Core criteria of performance	Takeo farm	Kampong Chhnang farm
Secure land tenure	Formal document of possession of land	Formal document of possession of land
Productivity	N/A	N/A
Income	12.223 USD	0 USD
Added value	12.330 USD	-1.000 USD
Exposure to pesticides		
Dietary diversity	9/10	5/10
Women's empowerment	93.9%	55.7%
Youth employment	N/A	N/A
Agricultural biodiversity	42%	33%
Soil health	3.2	3.5



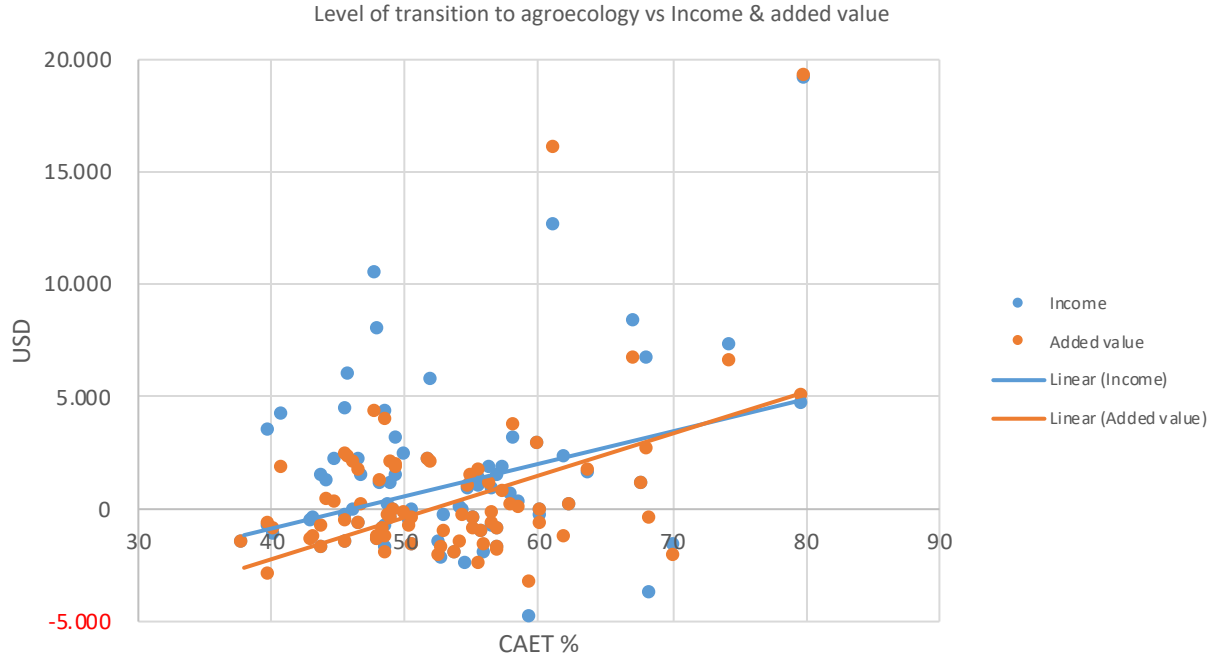
STEP 1 and 2 : Example from Cambodia

Multidimensional performance





STEP 1 and 2 : Example from Cambodia





Achievements to date

- TAPE published online + translations (EN, SP, FR, RU)
 - 2 regional workshops took place (Asia-Pacific and Latin America). 2 planned sub-regional workshops are postponed (Central Asia and Western Europe) and 1 is in planning (Africa)
 - Projects or contracts with governments, NGOs, universities and farmer's organisations to test TAPE in Cambodia, China, Saint Vincent, Vietnam, Laos, Mexico, Perú, Mali, Tanzania
- + collaborations in Nicaragua, Colombia, Spain, Italy and India
- Link with UNISECO project H2020-EU.3.2.1.1 led by Thünen (DE)
"Understanding and improving the sustainability of agro-ecological farming systems in the EU" to be
 - General interest in collaborating from > 30 academia and civil society organizations



<http://www.fao.org/3/ca7407en/ca7407en.pdf>



On-line tool for data collection

- Open Data Kit (Kobo Toolbox)
- Works also offline
- Can be georeferenced
- Secured on UN server
- Available on Android mobile devices and all others via URL
- 3 languages: EN, FR, SP

Sign up on <https://www.kobotoolbox.org/> under the

“Unlimited Use for Humanitarian Organizations”

Once you're registered, the TAPE survey is available at

<https://ee.humanitarianresponse.info/x/#mEov3aos>

To start filling up a record, we need to authorize your profile so get in touch with us!

Step 0 - Description of systems and context



* 1a. Select your region:

none selected

* 2. Location (municipality, province):

3a. Please take GPS of this location.

latitude (x,y °)

longitude (x,y °)

altitude (m)

accuracy (m)

search for place or address



Step 1 - Characterisation of agroecological transitions





Next steps

- Continue filling the global database from pilots (and adapt for remote support)
- Strengthen links with case studies in EU and link with the development of living labs
- Continue evaluating the potential of TAPE for monitoring and evaluation of projects (tests with GEF and IFAD), longitudinal studies (repeated observations)
- Continue engaging technical partners and identifying financial partners for pilots
- Continue strengthening the place of livestock in FAO's work on agroecology, including through TAPE pilots
- Validate TAPE in second international workshop (end of 2020?)



Thank you !

Members of the Technical Working Group, in alphabetical order: Rachel Bezner-Kerr (Cornell University), Jean-Luc Chotte (Institut de Recherche pour le Développement), Martín Drago (Friends of the Earth International), Barbara Gemmill-Herren (ICRAF-World Agroforestry Center), Allison Loconto (Harvard University/ Institut National de la Recherche Agronomique), Santiago López-Ridaura (CIMMYT/International Maize and Wheat Improvement Center), Bertrand Mathieu (Agronomes et Vétérinaires Sans Frontières), Delphine Ortega (La Vía Campesina), Paulo Petersen and María Noel Salgado (MAELA- Movimento Agroecológico da América Latina e Caribe), Éric Scopel and Jean-Michel Sourisseau (Centre de Coopération Internationale en Recherche Agronomique pour le Développement)

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Other contributors: Valeria Alvarez, Sofia Hara and Juan de Pascuale Bovi (INTA, Argentina), Bertrand Mathieu (AVSF), Laurent Levard (GRET) and Patrice Burger (CARI), France





Annexes



TABLE 1 Key attributes retained from a number of existing frameworks reviewed and main differences

FRAMEWORK	KEY ATTRIBUTES RETAINED	DIFFERENCES
MESMIS – Marco para la Evaluación de Sistemas de Manejo de recursos naturales incorporando Indicadores de Sostenibilidad (GIRA-UNAM)	<ul style="list-style-type: none"> » Participatory » Step-wise » Hierarchical » Flexible » Starts with contextualization 	Indicators can be quantified by different method vs protocol provided in this framework
GTAE – Groupe de Travail sur les Transitions Agroécologiques (CIRAD-IRD-AgroParistech) – Memento pour l'évaluation de l'agroécologie	<ul style="list-style-type: none"> » Simple and reasonably time consuming » Allows integration in broader systems of monitoring and evaluation » Almost all criteria are common 	Initial step of complete agrarian diagnostic not included in this framework Some criteria are proposed as advanced as they require more time and resources.
SOCLA – Sociedad Científica Latinoamericana de Agroecología, Method to assess sustainability and resilience in farming	<ul style="list-style-type: none"> » Soil health assessment used as core criteria » Almost all other criteria common » Participatory and simple 	In depth crop health assessment not included in this framework
Sustainable Intensification Assessment Framework (Michigan State University)	<ul style="list-style-type: none"> » Not focused on particular practices » Addresses different scales (field/animal, farm/household, community/territory) » All 6 domains are common 	Some of the criteria/indicators are included as advanced and not core in this framework
LUME – Método de Análise Econômico-Ecológica de Agroecossistemas (AS-PTA & MAELA)	<ul style="list-style-type: none"> » Based on MESMIS method » Almost all criteria/indicators are common » Valuing the invisible non-monetary economy 	Centrality of the principle of autonomy vs one of the aspects to assess in this framework
Measuring the impact of ZBNF , the Zero Budget Natural Farming (State Dept of Agriculture, Andhra Pradesh & Amrita Bhoomi Center)	<ul style="list-style-type: none"> » Participatory and possible self-assessment » Large number of common indicators /impact 	Method largely left to implementer to define

FRAMEWORK	KEY ATTRIBUTES RETAINED	DIFFERENCES
The Economics of Ecosystems and biodiversity – TEEB (ICRAF)	<ul style="list-style-type: none"> » Separates 2 steps: description of the system and analysis of the impacts » 4 dimensions of impacts are included (and this framework adds a 5th) 	Economic assessment so based on 4 capitals, which is not the entry point in this framework
Sustainable Rural Livelihoods approach (CIRAD)	<ul style="list-style-type: none"> » Includes an analysis of the context (institutions, household activities...) » Could be adapted for this framework by integrating the 10 elements in the qualification of assets 	Not participatory
Participatory methodologies from Malawi and Tanzania (Cornell University)	<ul style="list-style-type: none"> » Assessing systems in transition » Participatory and based on interviews 	Does not prescribe indicators
SAFA – Sustainability Assessment of Food and Agriculture systems (FAO)	<ul style="list-style-type: none"> » Includes 4 dimensions of sustainability (environment, social, economy and governance), which are 4 of the 5 dimensions on this framework » Aims to be universal/global 	Time consuming (21 themes and 58 sub-themes, 118 indicators) Targets enterprises (farms or companies)