

How to integrate Agroecology into livestock projects ?

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Outline

- 1. How do livestock contribute to the 10 elements of agroecology
- 2. Examples of agroecological investment in livestock developments
- 3. The challenge of reporting impact : some results from FAO TAPE in 9 countries in sub-Saharan Africa
- 4. Guiding principles for the way forward

Livestock, less visible than crops in agroecology but essential



Diversity

- Found in all agroecosystems with diversity of species and breeds and production systems.
- Enhance food security and nutrition by providing access to nutrient dense food
- Key to livelihoods of small-scale farmers, particularly women
- Increase agricultural productivity through integration with trees and crops
- Make use of biomass that humans cannot eat (e.g. grass and straw) and waste (e.g. swill)
- Provide manure which is key to physical, chemical and biological properties of soils
- Transfer nutrients, biomass and water (manure) and move people's assets in times of disasters (e.g. floods or drought).
- Can increase plant biodiversity in grasslands, which in turn enhances productivity, resilience, and other ecosystem services



Cult. & food trad.



Human & social values



Synergies



Efficiency



Recycling



Circ. economy



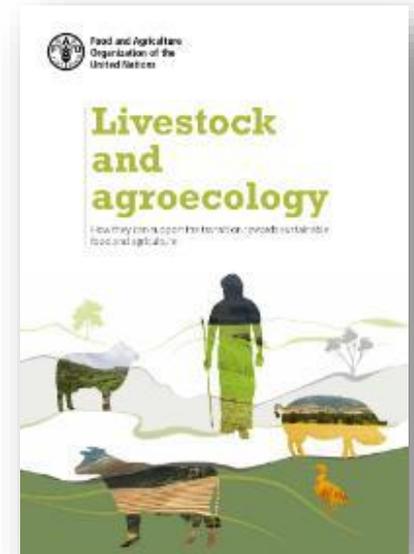
Resilience



Co-creation knowledge



Resp. governance



5 principles for animal production

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Prospects from agroecology and industrial ecology for animal production in the 21st century

B. Dumont^{1†}, L. Fortun-Lamothe², M. Jouven³, M. Thomas⁴ and M. Tichit⁵

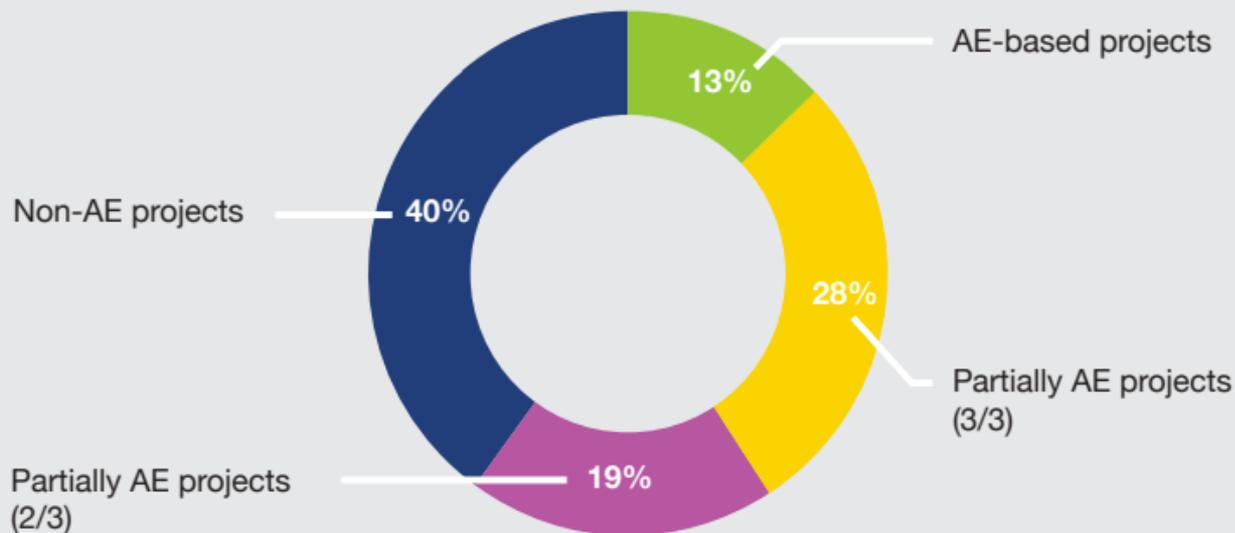
1. adopting management practices aiming to improve animal health
2. decreasing the inputs needed for production
3. decreasing pollution by optimizing the metabolic functioning of farming systems
4. enhancing diversity within animal production systems to strengthen their resilience
5. preserving biological diversity in agroecosystems by adapting management practices.



Agroecology in IFAD portfolio

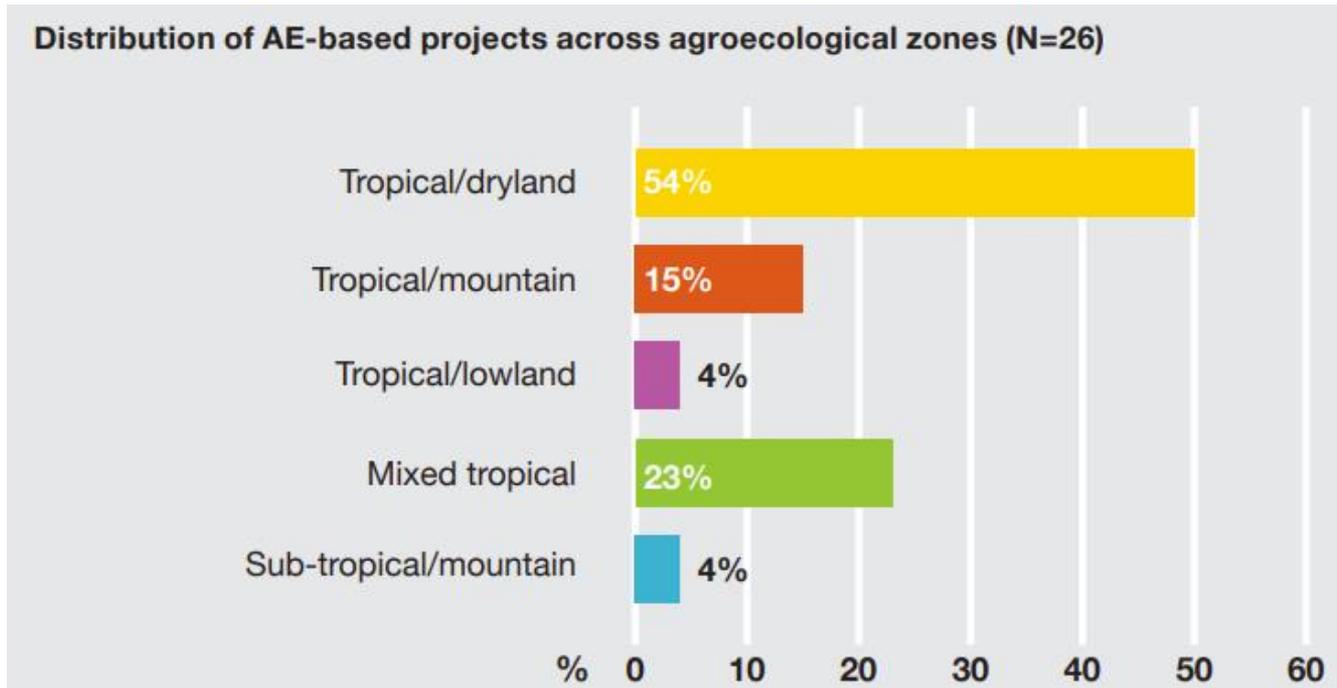
(sample of 207 projects completed between 2018 and 2023)

Distribution of projects by type in the project sample (N=207)



The key element of agroecology left out in two thirds of partially AE (2/3) projects is diversifying and integrating different farming sectors (high levels of agrobiodiversity of crops and/or animals). In the remaining one third of projects, the missing element is recycling

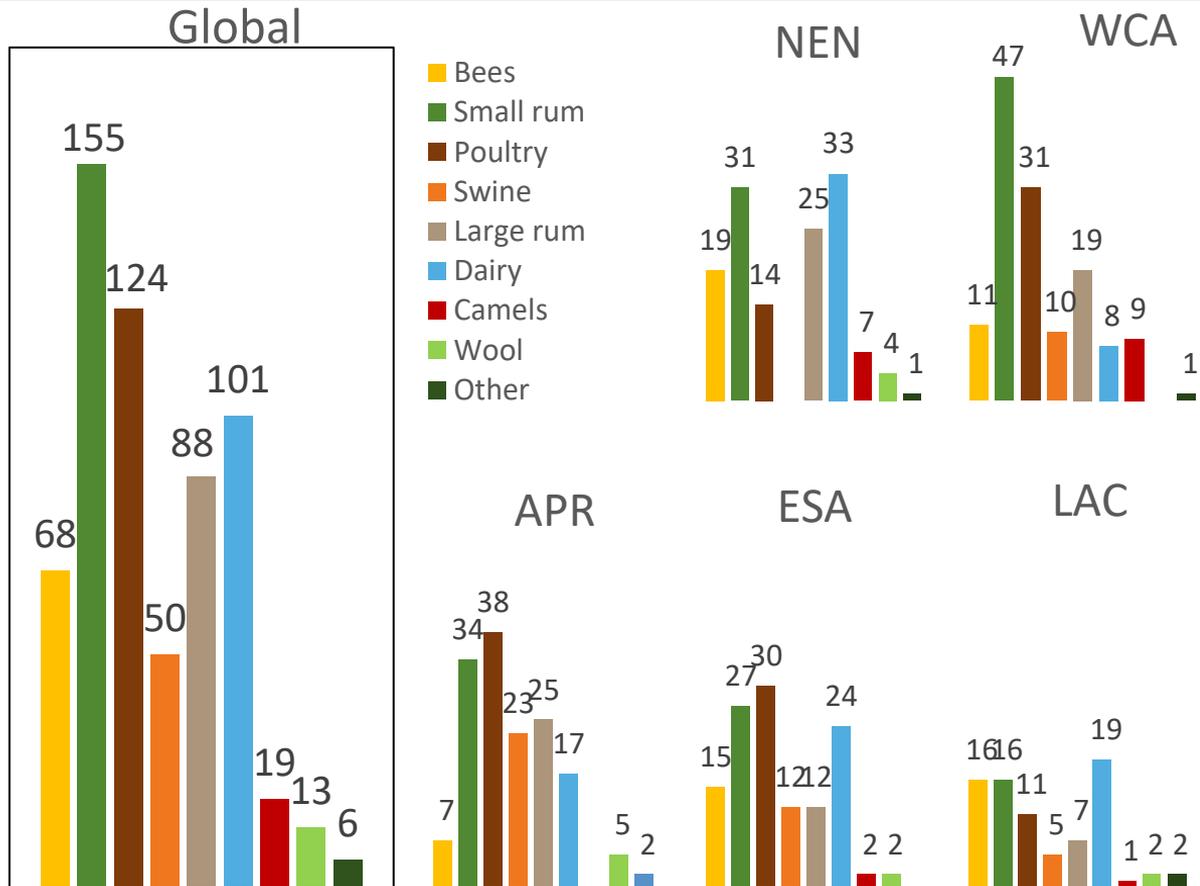
A strong focus on drylands



ANIMAL SPECIES AND PRODUCTS IN PROJECTS WITH LIVESTOCK

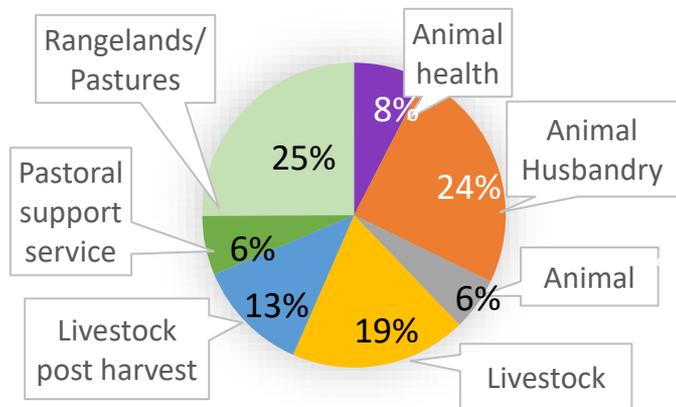
(Sample of 269 projects approved since 2010)

- ✓ 70% of projects include several species
- ✓ Small Ruminants and poultry are first and second. They are key for poverty eradication. This is particularly true in WCA
- ✓ Dairy is more important in NEN and ESA
- ✓ Non-traditional livestock are important in IFAD portfolio. For example, bee keeping, while accounting for a small part of agricultural GDP, is found in 24% of projects.
- ✓ Livestock-aquaculture integration is growing in IFAD projects, but still relatively new

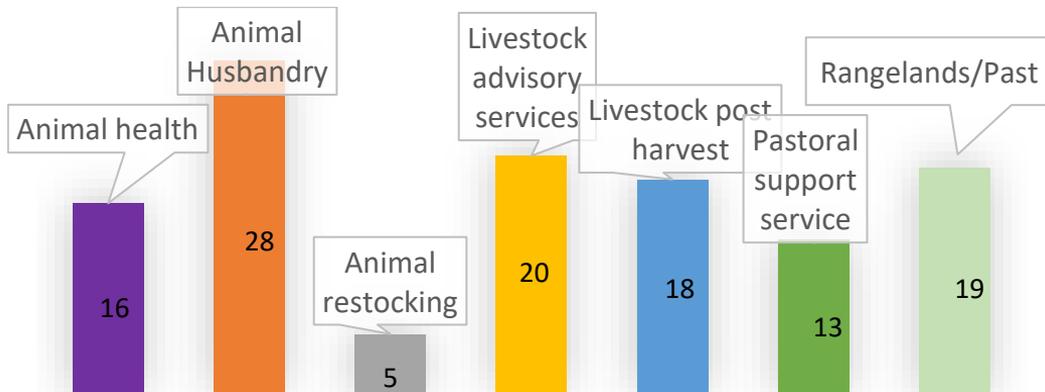


MAINS AREAS OF LIVESTOCK INVESTMENTS (sample of 88 projects specialized in livestock)

Value of activities as % of total (GLOBAL)



Number of projects with activities (GLOBAL)



Definitions:

- **Animal restocking:** This includes the **provision** of live animals.
- **Livestock post-harvest:** It handles postharvest **storage** mainly for consumption and food security, not value addition. Products include **milk, eggs, meats, fibers, hides, and skins**.
- **Animal health:** This includes provision of **drugs, vaccinations, veterinary products and services**, etc.
- **Animal husbandry:** Activities include **animal breeding, feeding** (including fodder crops and water points), **housing** (barns, sheds), and **beekeeping**.
- **Rangelands/pastures:** It involves managing **grazing lands** for forage production, regeneration of pasture with **rotational grazing** as part of management, and coordinating **seasonal herd movements** between regions to prevent zoonotic disease spread.
- **Livestock advisory services:** Involves empowering livestock producers, especially L-FFSs, through education, extension, and training programs, **demonstration farms and exchange farmer to farmer visits** as vehicles for building capacity to enhance their technological knowledge and skills.
- **Pastoral support services:** Involves enhancing pastoral support services, including **legal and institutional framework development**.

Investments in small livestock production in the IFAD portfolio (1/2)

ReLIV: USD 100M in dairy and beef value chains in Uganda (200,000 households, 40% women and 25% youth) – in prep.

- Choppers for crop residues and other fodder preparation/conservation techniques (also increases digestibility)
- Improve seed selection and distribution, especially legumes and drought resistant species/varieties
- Capacity development and equipment in farms for better milk hygiene
- Capacity development and equipment in milk collection centers for improved milk transport and conservation as well as recycling of waste
- Development of a quality based payment scheme
- Policy support (e.g. revision of the National Feed Policy)



Investments in small livestock production in the IFAD portfolio (2/2)

Dairy Value Chains Development Project: USD 39M in dairy value chains in Uzbekistan (20,000 households, 40% women and 30% youth) – completed, second phase in prep.

- Availability of land for fodder production is a major constraint → develop capacity for production of fresh and conserved fodder (yield increase 20%) and preparing high energy feed using hay, concentrate, silage and minerals
- Training on improved manure management and nitrogen cycles
- Development of milk collection centers and funding of milk storage and processing equipment and support to
- Support access to credit



TAPE: the Tool for Agroecology Performance Evaluation

- Developed through a large consultative process following a mandate to FAO, based on existing evaluation frameworks, including SDGs
- Stepwise approach
- Collects data at farm level with Kobo questionnaires, provides results at territorial level.
- Used for assessing agroecological transitions, comparing farm types, establishing baselines for projects, monitoring and evaluation etc.
- Since 2019, TAPE has benefited from various partnerships for continuous improvement and increased relevance (cf FOAG and Agroscope)



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METHODS

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Assessing Transitions to Sustainable Agricultural and Food Systems: A Tool for Agroecology Performance Evaluation (TAPE)

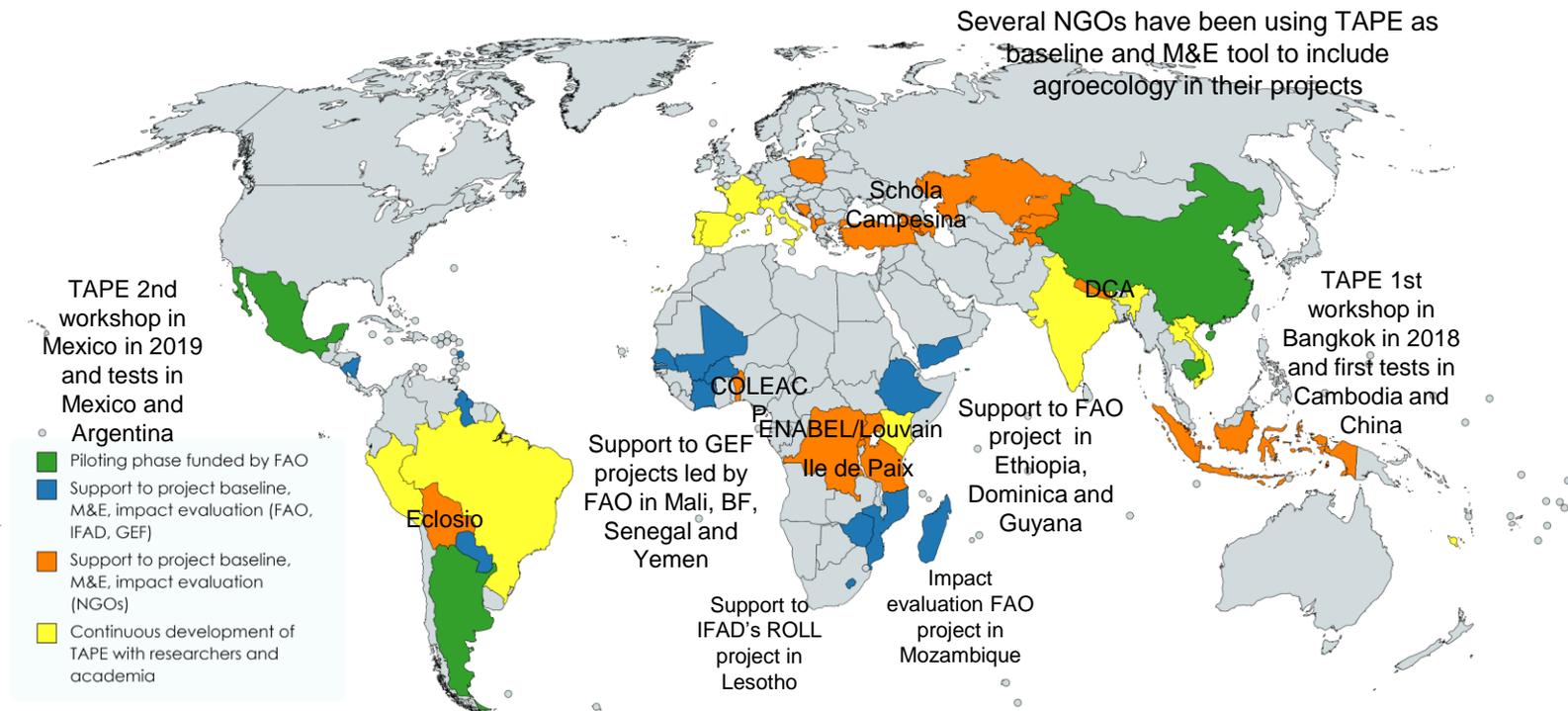
Anne Mottet^{1*}, Abram Bicksler¹, Dario Lucantoni¹, Fabrizia De Rosa¹, Beate Scherf¹, Eric Scopel², Santiago López-Ridaura³, Barbara Gemmil-Herren⁴, Rachel Bezner Kerr⁵, Jean-Michel Sourisseau², Paulo Petersen⁶, Jean-Luc Chotte⁷, Allison Loconto^{1,8} and Pablo Tittone^{2,8,10}

<https://www.frontiersin.org/articles/10.3389/fsufs.2020.579154/full>

<https://www.fao.org/agroecology/tools-tape/en/>



TAPE applications (as of 2023)



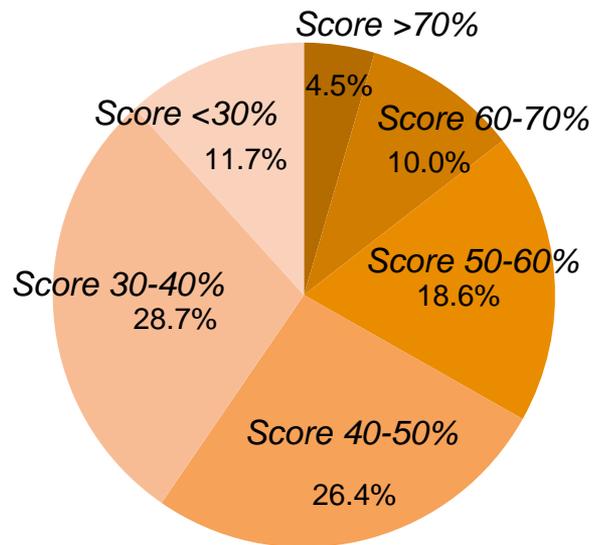
Cross country analysis with the FAO TAPE in Africa

Data from c.a. 3,000 farms in 9 countries of Sub-Saharan Africa

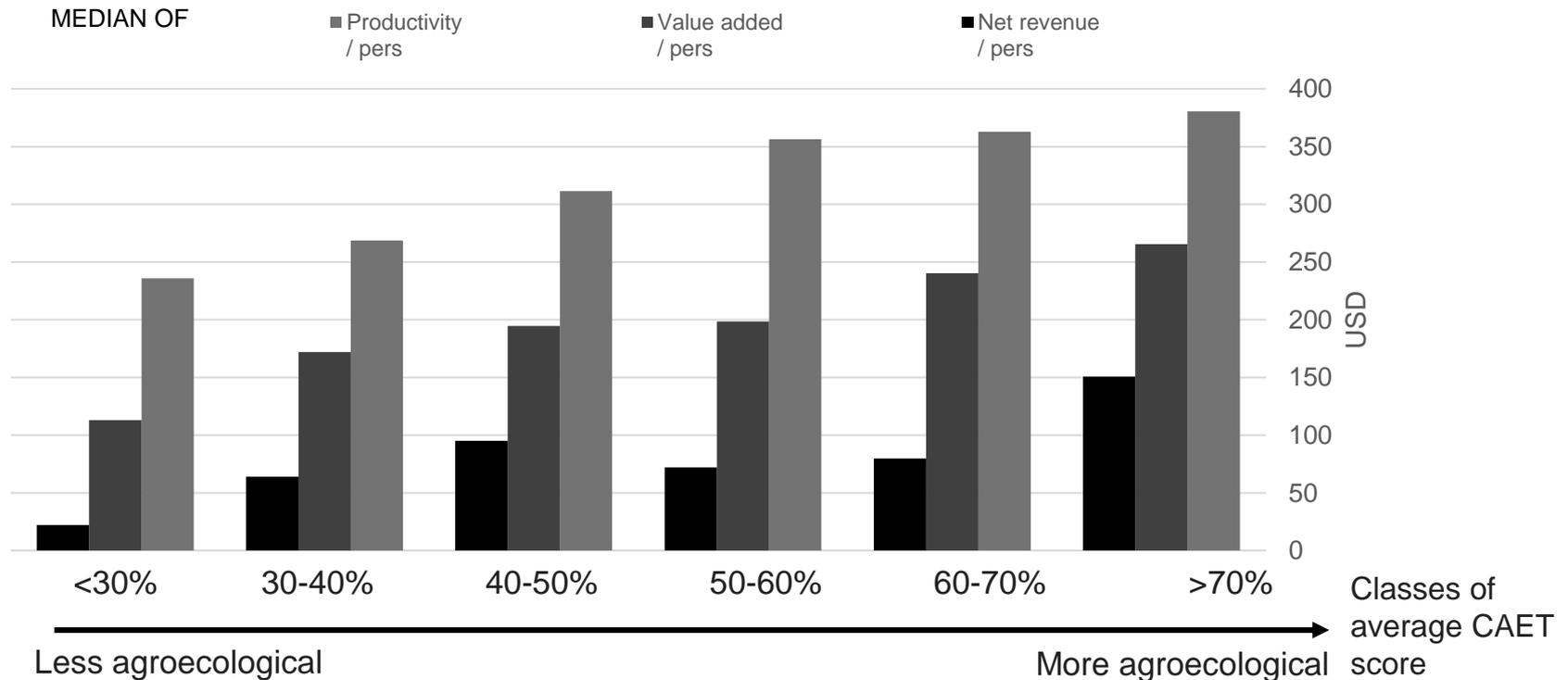
About one third of surveyed farms are engaged in the agroecological transition (score > 50% on the 10 elements)

One quarter are initiating their transition (40 to 50%)

Distribution of farms/households according to their aggregated score on the 10 elements



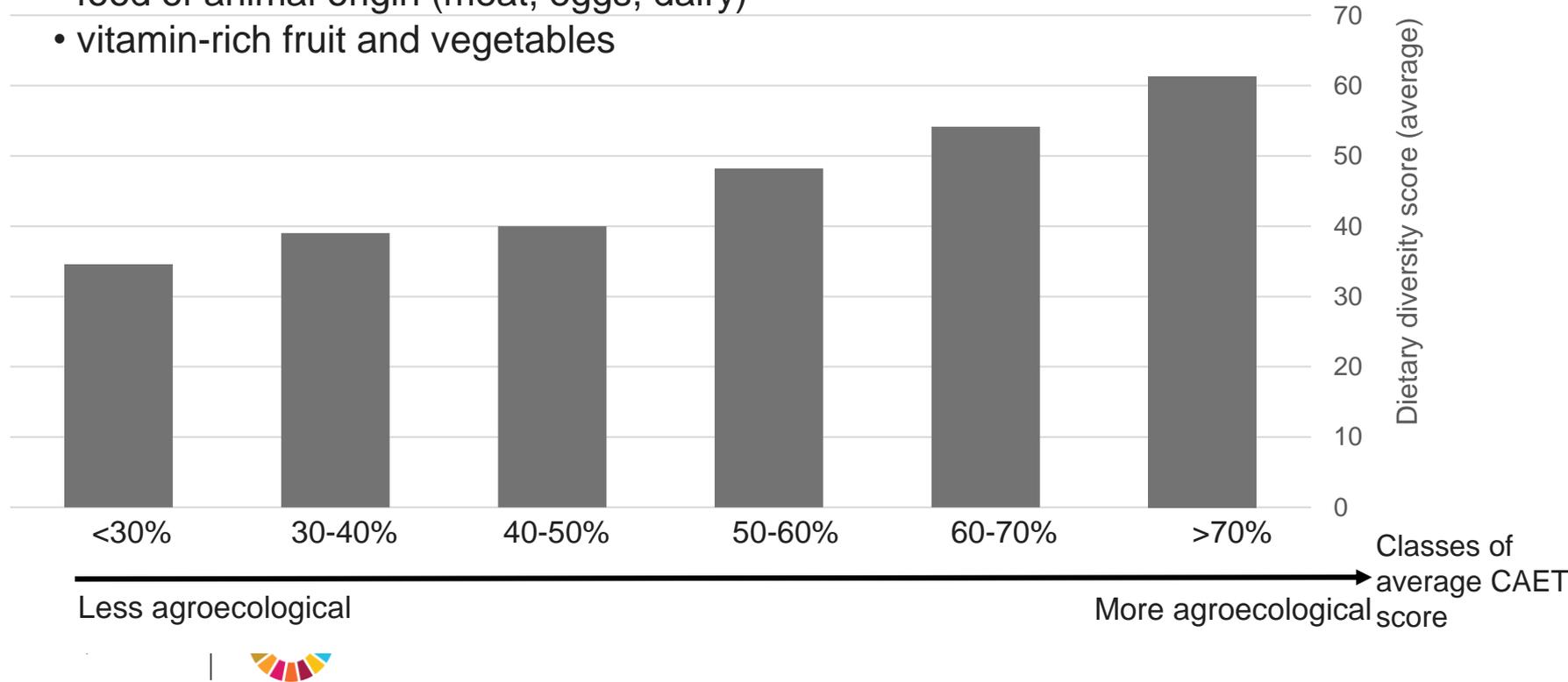
Farms with higher average scores over the 10 elements of agroecology show higher economic outputs



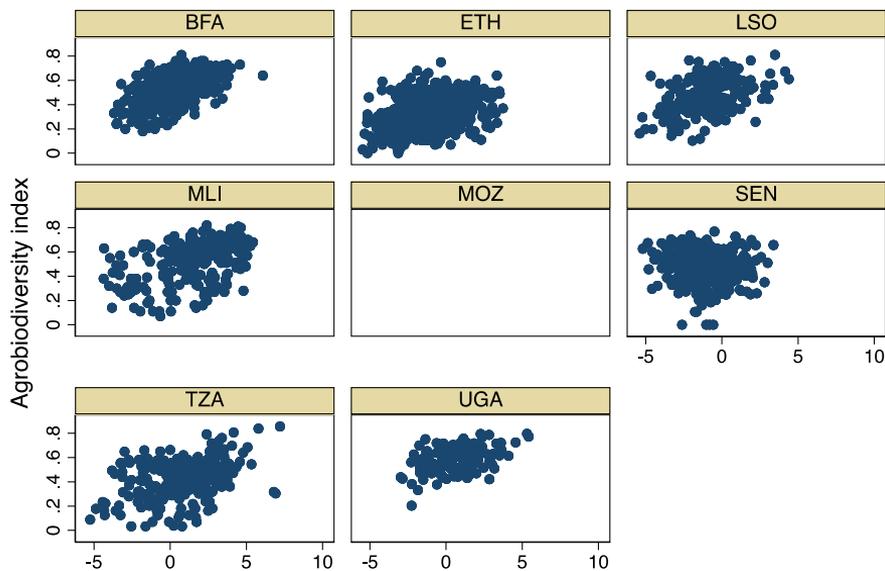
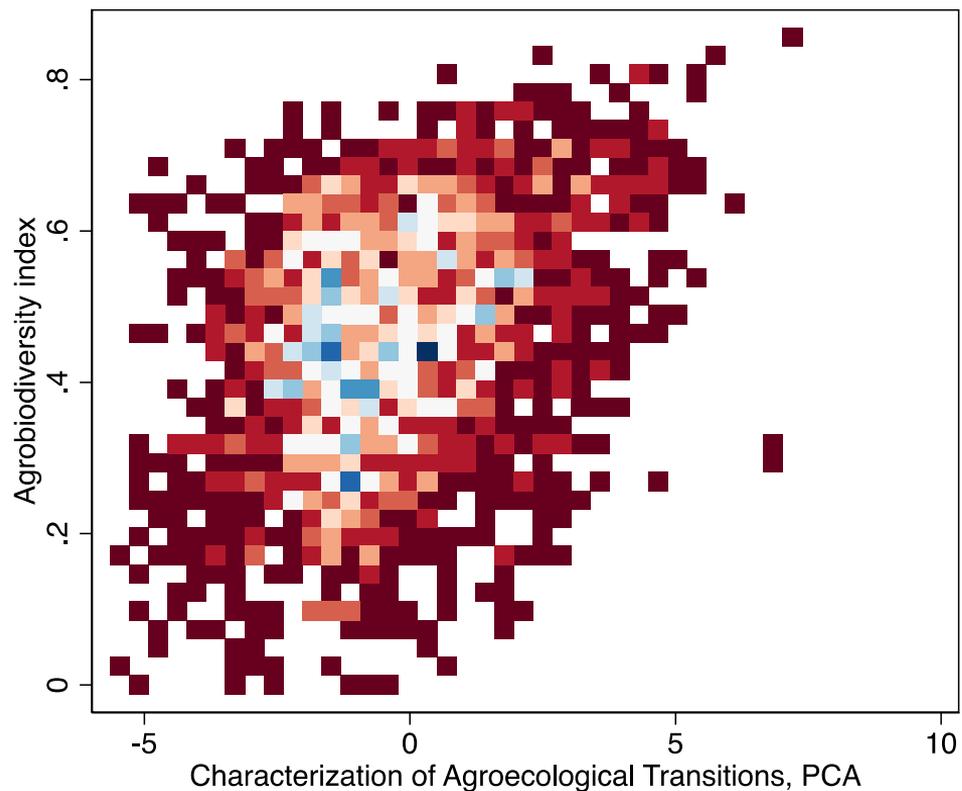
They also show higher nutritional diversity

More consumption of:

- food of animal origin (meat, eggs, dairy)
- vitamin-rich fruit and vegetables



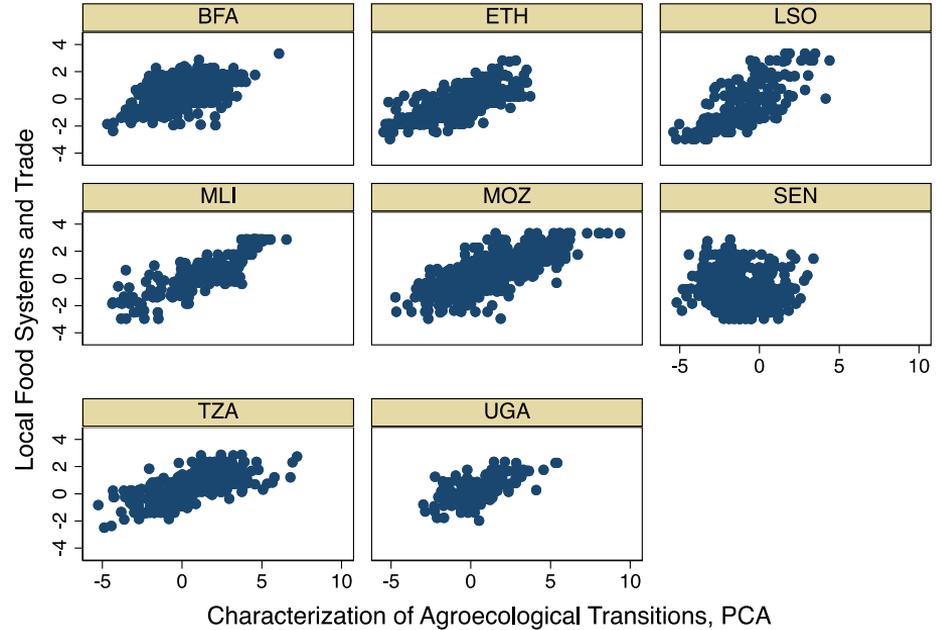
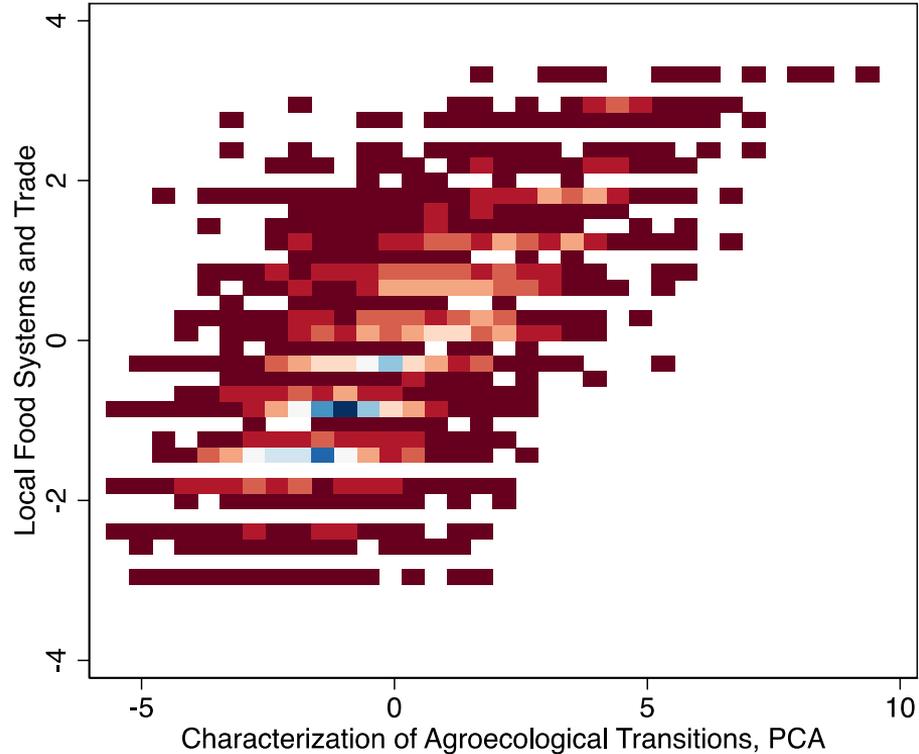
Higher scores on the 10 elements mean higher agrobiodiversity



Characterization of Agroecological Transitions, PCA
Graphs by World Bank country code



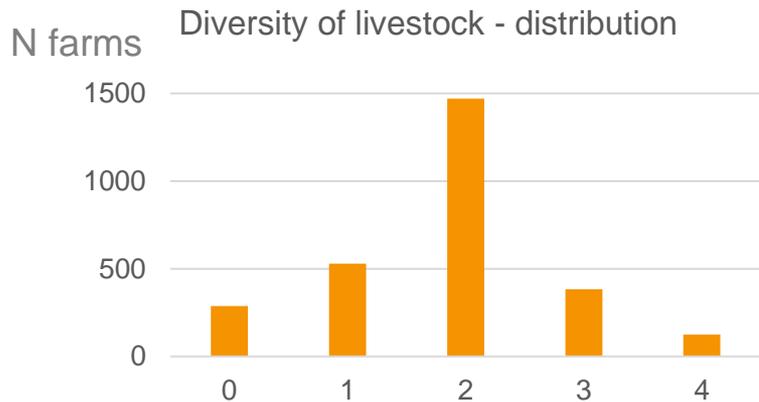
Higher scores on the 10 elements mean more local food systems



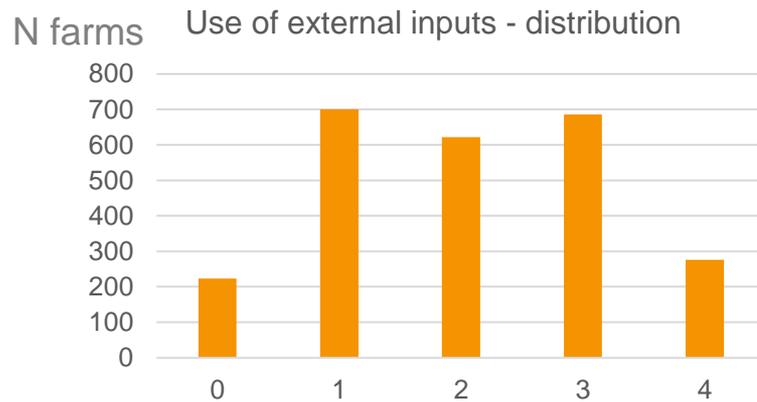
Characterization of Agroecological Transitions, PCA
Graphs by World Bank country code



Some insights from multicriteria assessments and agroecology in sub-Saharan Africa



- 0 - No animals
- 1 - One species
- 2 - Two or three species, few animals
- 3 - More than three species with significant number of animals
- 4 - More than three species, different breeds



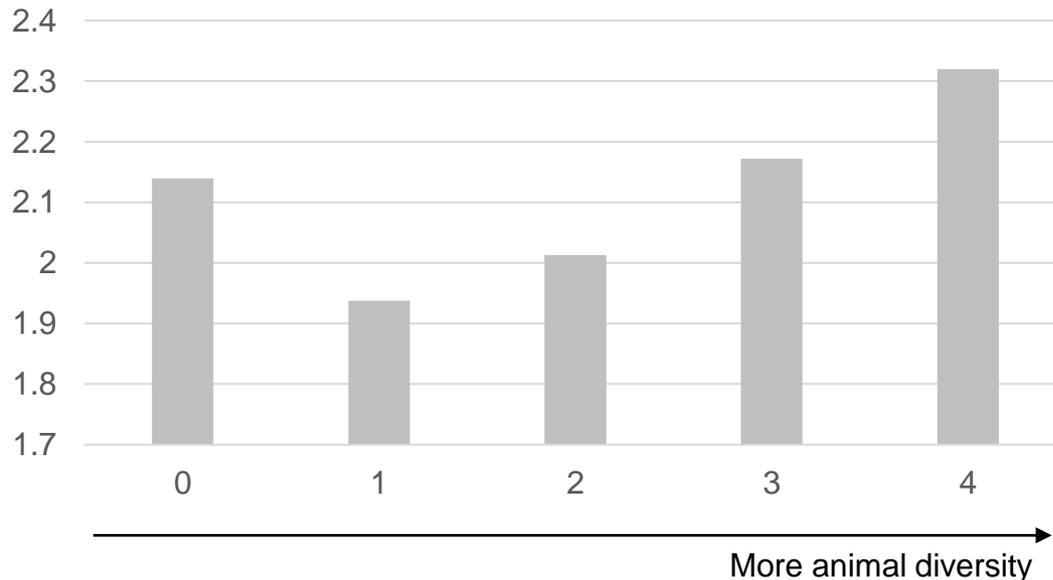
- 0 - All inputs purchased from market
- 1 - Majority of inputs purchased from the market
- 2 - Some inputs produced on farm/exchanged locally
- 3 - Majority of inputs produced/ exchanged
- 4 - All inputs produced/exchanged

Farms with higher animal diversity are less dependant on external inputs (except if specialised crops)

External input score measured as:

- 0 - All inputs purchased from market
- 1 - Majority of inputs purchased from the market
- 2 - Some inputs produced on farm/exchanged locally
- 3 - Majority of inputs produced/exchanged
- 4 - All inputs produced/exchanged

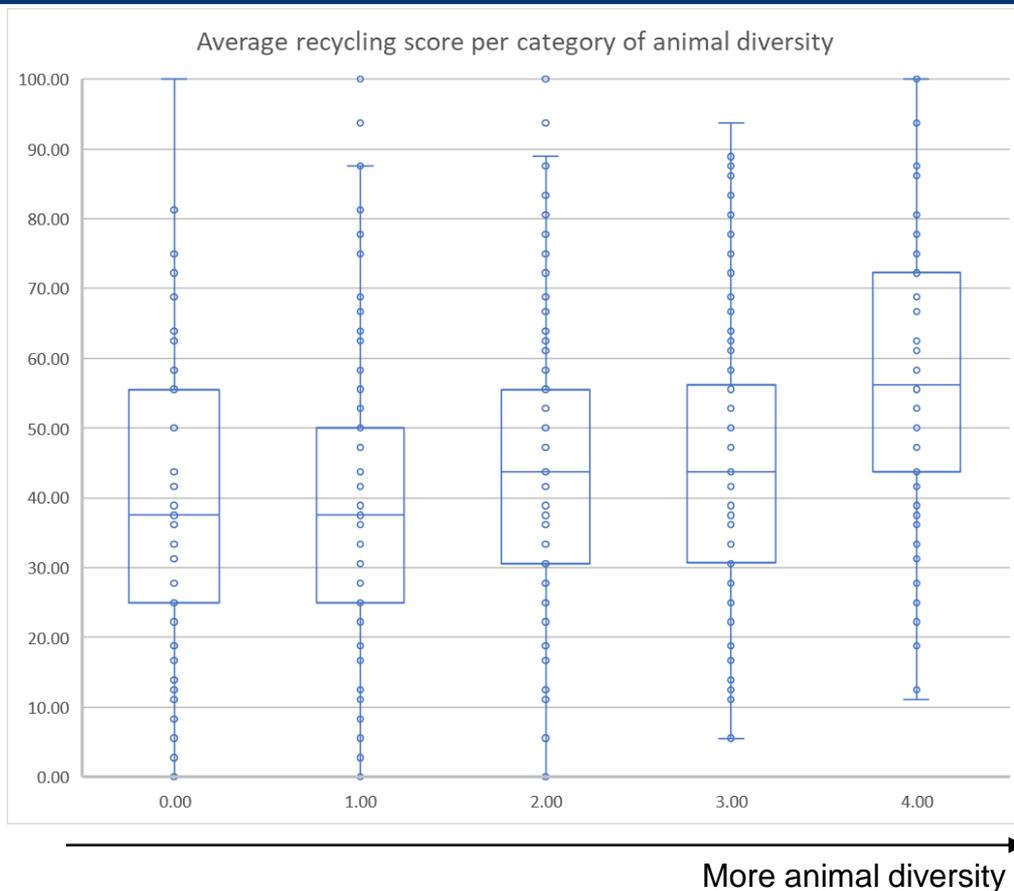
Average external inputs score per category of animal diversity



Farms with higher animal diversity have higher scores of recycling

Recycling measured by:

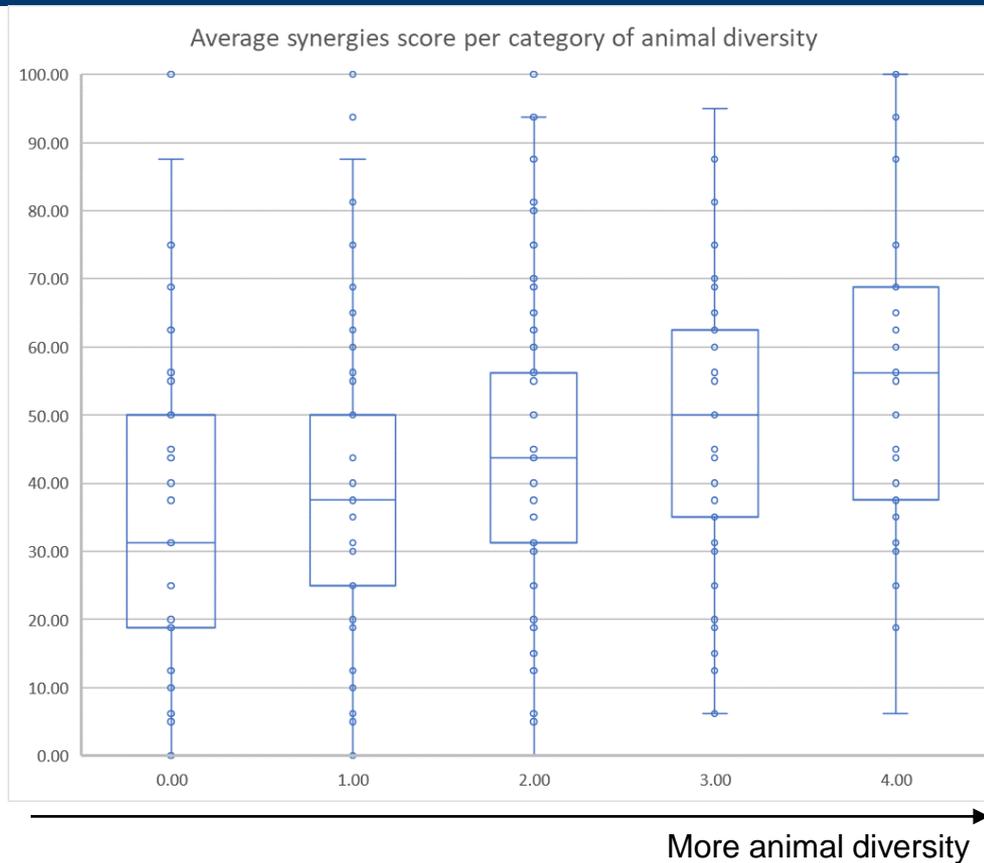
- Recycling of biomass and nutrients (crop-residues, waste etc.)
- Water saving
- Management of seeds and breeds
- Renewable energy use and production



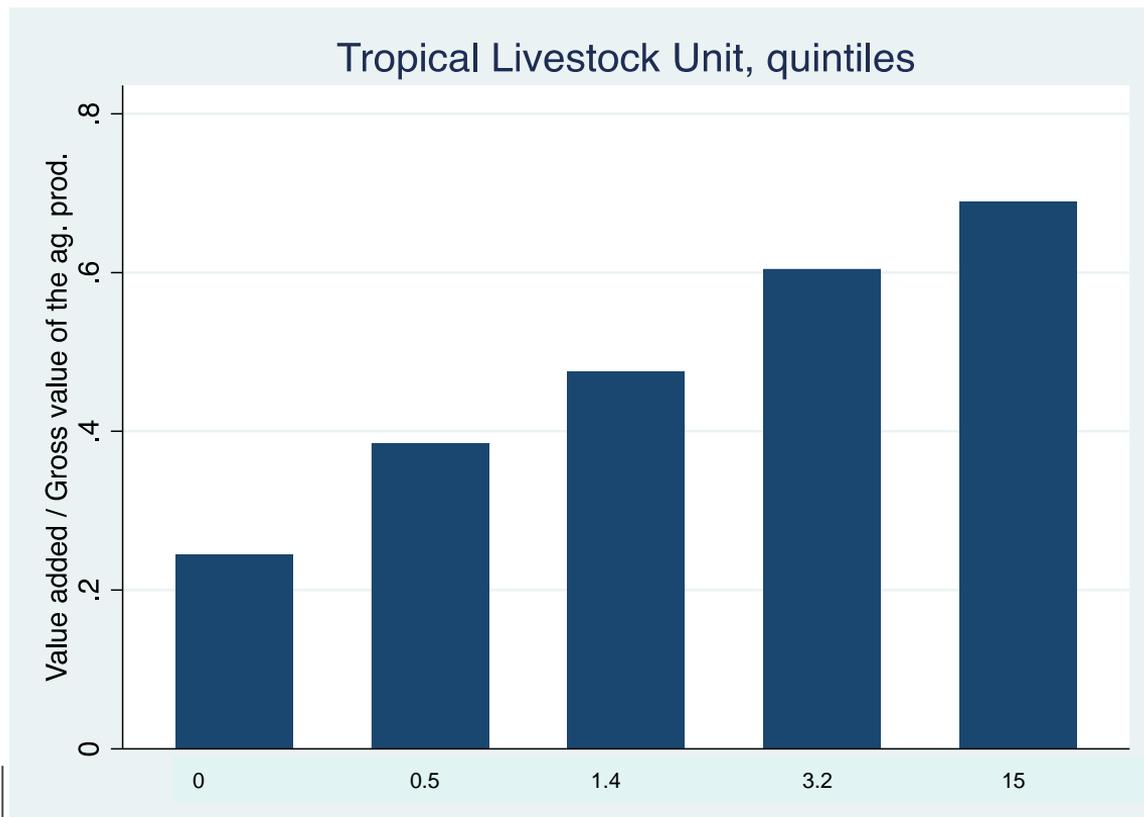
Farms with higher animal diversity have higher scores of synergies

Synergies measured by:

- Crop-livestock-aquaculture integration
- Soil-plants system management
- Integration with tree (agroforestry, silvopastoralism, agrosilvopastoralism)
- Connectivity between elements of the agroecosystem and the landscape

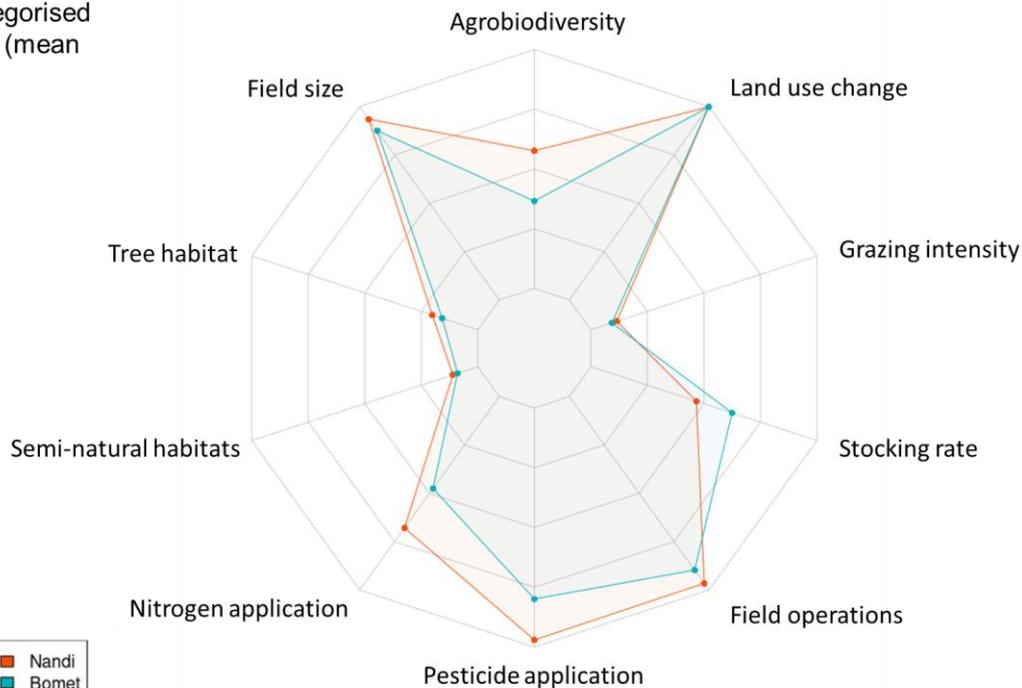


More animals also mean more economic value



Results from Western Kenya on new biodiversity indicator developed by Agroscope

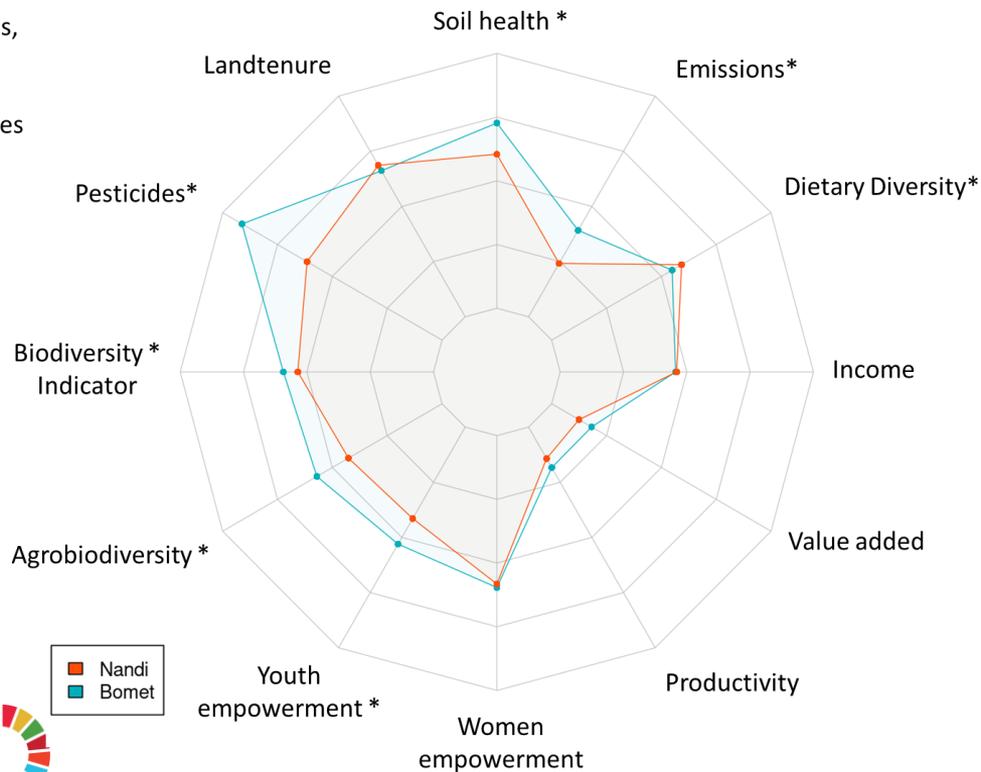
New biodiversity index categorised by county (mean values)



Results from Western Kenya on new biodiversity indicator developed by Agroscope

Figure X: Step 2 scores, categorised by counties.
* significant differences (p<0.05)

Emissions per household CO₂ equivalent All livestock (cattle + shoats) [CO₂ household⁻¹ Year⁻¹]



Way forward

- Agroecology is an approach that can increase the sustainability of our food systems
- Farm animals play an important role in the agroecological transition, especially for adding economic value, for women's empowerment, for agricultural biodiversity, for nutrition and for soil fertility
- Multicriteria tools can help address the trade offs between various dimensions of sustainability and TAPE contributes to closing the gap of evidence, especially in Africa where agroecology is often challenged
- Specific entry points are available for livestock projects to include more agroecological approaches

Main AE entry points for livestock

- Feed and fodder system (see next slides)
- Transfer of fertility and water through grazing animals to increased crop productivity
- Recycling manure (including, but not limited to, composting and biogas)
- Small stock for improved nutrition and women/youth inclusion
- Improved animal health and animal breeding for gains in efficiency



Moving away from the use of cultivated feed resources

- crop residues, cover crops and coproducts from food processing, waste.
E.g. Nearly 25% of net primary production of French agriculture is non-used biomass (byproducts + non-grazed grasslands in cropping systems)
- Forages from areas unfit for mechanization, with heterogeneous feed values in time and space, that can only be harvested by grazing (lower cost of forage harvesting, storing, distribution, manure spreading).
E.g. energy used -50% with high cellulose fodder dispersed in space (rangelands or vineyards) in sheep production in France (Benoit et al., 2019)

Redistributing livestock in territories

- Avoid competition with arable land AND with resources that have a “harvestable” energy content, for example for biogas production
- Give priority to resources with low spatial concentration, for which mechanical harvesting is restrictive and costly: heterogeneous and spatially diluted crop residues, vineyards and orchards, mechanized but not very productive pastures
- Leading animals to the resource, by practicing transhumance, seasonal or not, and using mountains, lowland, vineyards, orchards or forests, reduces energy consumption but also GHG emissions per kg of product (Vigan et al., 2017; Ocak Yetişgin et al., 2022).



What type of animal performance is needed?

- Feed efficiency takes little account of low-nutrient and highly cellulosic resources, or “low opportunity cost feed” not edible for humans.
- Need to clarify the notion of feed efficiency to design desirable feeding strategies. The notion of “qualitative efficiency” can be useful.

What role for livestock?

- Animal = “collector/concentrator of energy and proteins”, with maximum autonomy and reduced production costs
- Reducing breeding and feeding costs in the new energy context and to reduce competition for land
- Recognizing other services provided by livestock (Dumont et al., 2019) and their adequate remuneration, including cultural landscapes

Benoit & Mottet, 2023. Agricultural Systems



What policies for livestock?

- Reshape national breeding policies (and animal feed policies when exist)
- Balance public support for renewable energy (e.g. biofuels, biogas) that can increase competition for land
- Develop feed/fodder value chains, regulations and certifications to increase the use of byproducts and food waste as animal feed
- Support efficiency gains in livestock systems that do not currently depend on feed, such as pastoral or grazing and mixed systems in low-income countries (animal health, herd management etc.)

Contact

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Thank You

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