



Mixed crop-livestock systems in the El Hammam region (V. Alary)

## Context

- Diversifying farms to include livestock improves family economic wellbeing while integrating livestock into the whole system increases farm efficiency through biomass preservation and by-product recycling.
- How can we measure levels of diversification and integration to jointly describe the overall sustainability of farming systems? Working the newly cultivated desert lands of the western fringe of the Nile Delta in Egypt, our main challenge was to identify and integrate multiple indicators that reflect the differential roles of livestock at the farm and household levels.

## Our innovative approach

- We combined two approaches: Factor analysis to determine the different roles of livestock according to the main family assets, and a multi-criteria indicator assessment tool (TATALE) that calculates scores for five themes - diversification, integration, efficiency, and well-being, and sustainability (Fig.1 & 2).

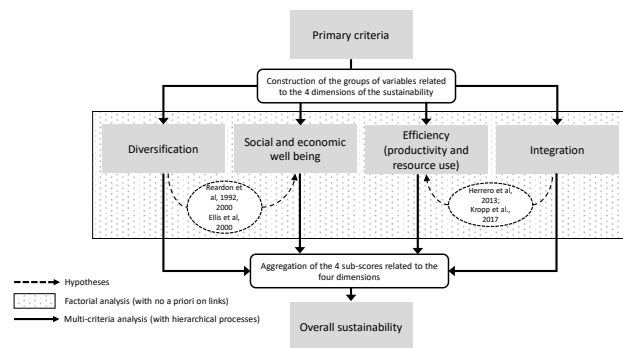


Fig. 1 General framework of the assessment of the sustainability at the family farm level



## POVERTY REDUCTION, LIVELIHOODS & JOBS

# A multi-criteria assessment of the sustainability of crop-livestock farming systems in the reclaimed desert lands of Egypt

- Factor analysis highlighted different integration and diversification profiles around on-farm assets, with no *a priori* on the hierarchy of indicators;
- Multi-criteria assessment provided a comprehensive framework to conceptualize aggregated indicators for end-users based on a tree-of-relationships between factors.
- These two methods are complementary when assessing the causal processes of a sustainability assessment.



RESEARCH PROGRAM ON Livestock

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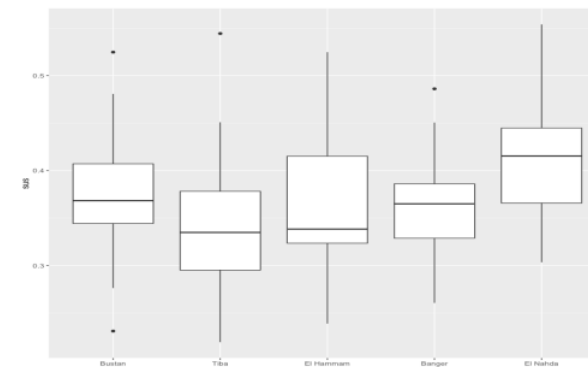


Fig.2. Distribution of the score of sustainability by zone

## Insights

- Farm sustainability depends on the integration of livestock into the system while diversification seems to have a more substantial impact on the sustainability score.
- These results challenge the Egyptian government's policies that so far privileged specialized farm models (for crops or dairy) over integrated crop-livestock models.

## Future steps

- This multi-criteria assessment approach offers an easy way to aggregate many criteria collected at the farm and local levels. It could be promising way to synthesize expert knowledge and compare different path analyses in the overall sustainability assessment.
- However, it does require a high level of expertise on the studied systems to design the causal processes.

**Partners:** CIRAD, ICARDA, ARC Animal Production Research Institute



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