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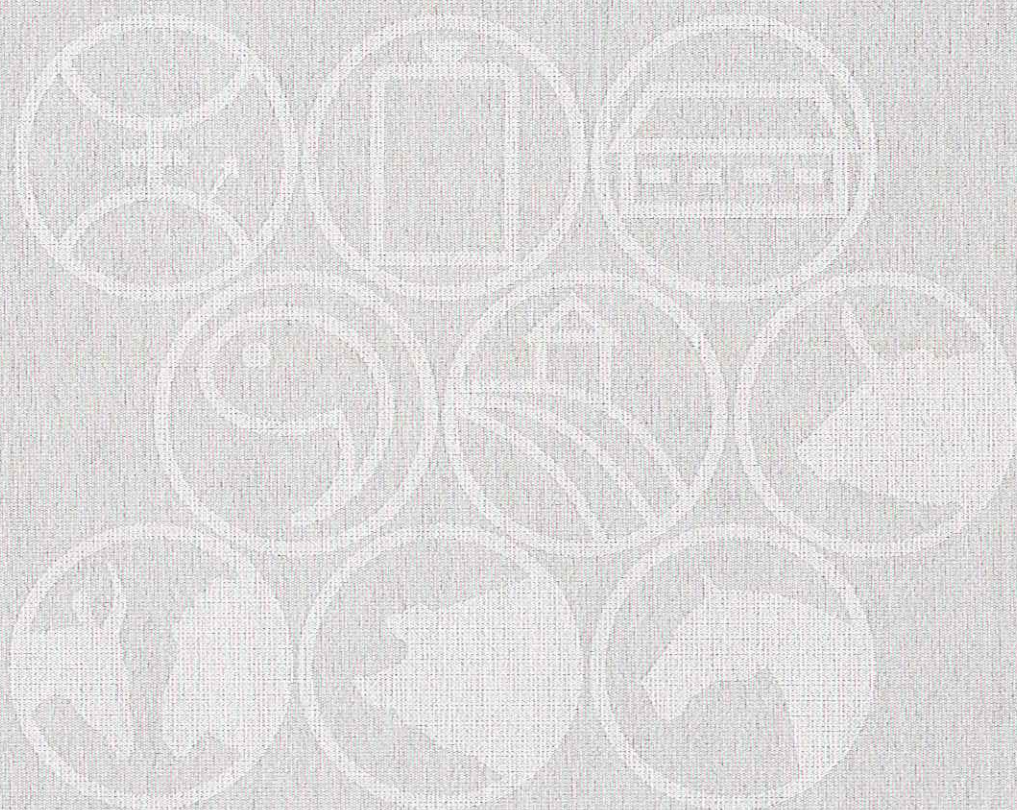
Sustainable intensification of smallholder livestock production: fact and fiction*H. Udo**Wageningen University, Animal Production Systems group, P.O. Box 338, 6700 AH Wageningen, the Netherlands; henk.udo@wur.nl*

Intensification of smallholder livestock production is widely advocated to contribute to improving livelihoods of rural households, to meet increasing demands for livestock products, and to reduce environmental impacts. Can smallholders live up to these expectations? This presentation discusses the impact of intensification using village poultry, integrated agriculture-aquaculture, small ruminant, and dairy case-studies. As livestock systems intensify, the relative importance of the various tangible and intangible functions of livestock changes. Smallholder dairying proved to be a good means to increase household incomes. A paradox is that poultry, pigs or small ruminants better fit the farming conditions of the poorest, but their contribution to household incomes remains relatively small. A major trade-off of livestock intensification is that only part of the smallholder farmers, particularly the better-off farmers, is able to take advantage of the increased demands for livestock products. A dual structure is developing with large-scale industrial pig and poultry systems producing for emerging urban markets and smallholder systems producing for local markets. Smallholder dairy cattle systems are competitive; they also supply the urban markets. In discussions about the future of smallholder livestock, it is often claimed that intensification is needed not only to meet increasing demands, but also to reduce environmental impacts per unit product. Our case-studies indicated that the relation between livestock and the environment is complex. The off-farm impacts of producing 'better diets' for intensifying livestock production need to be considered, together with impact allocation to the multiple functions of smallholder livestock. Can we expect smallholders to change their feeding practices in response to the global debate on greenhouse gas emissions? Innovations for sustainable smallholder livestock production will only be adopted if they fit farming household priorities and resources.

Research issues for crop-livestock integration in mixed farming systems in the tropics: a review*F. Stark^{1,2}, H. Archimede³ and C.H. Moulin^{4,5}**¹AgroParisTech, Centre de Montpellier, Montpellier, France, ²CIRAD, UMR SELMET, Montpellier, France, ³INRA, URZ, Guadeloupe, France, ⁴INRA, UMR SELMET, Montpellier, France, ⁵Montpellier Supagro, UMR SELMET, Montpellier, France; fabien.stark@supagro.inra.fr*

Agriculture has to produce more and better in a more constraint and changing world. In the tropics, agriculture is represented by a majority of familial small-scale mixed farming systems (MFS), which represent half of the world food production. These MFS could be characterised by agrobiodiversity and crop-livestock integration (CLI). Indeed, it is commonly accepted that agrobiodiversity – diversity of production activities on the same farm – is a pre-required for risk management and biodiversity. Moreover, CLI – agroecological complex integrated management between crop and livestock production – seems to be determinant too. By improving resiliency and efficiency of the whole farming system, CLI appears to be able to deal with the need for ecological intensification of agriculture, to produce more with less. Through a review of scientific literature, we identify research approaches concerning MFS and the key role of CLI for a sustainable development. Many studies deal with CLI and MFS, through strategic and methodological approaches, descriptive analysis or analytical case studies. However, few studies concern systemic analysis of CLI and MFS. Indeed, studies concern the theoretically benefits of CLI integration, the systemic analysis of a specific CLI practice or the inventory of CLI in a geographic area. The fundamental link between farms structures, the potential of integration, the effective integrated functioning and the performances of the system, stay partially treated in the literature. All these elements bring us to revise research posture to understand the key role played by CLI to meet new agricultural aims. A framework to guide future researches is finally proposed, through a comparative analysis of CLI in three territories of the humid tropics (Guadeloupe, Cuba, Brazil), characterised by contrasted socioeconomic situations.

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