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Insurance Function of Livestock: Farmer's Coping Capacity with Regional Droughts in South-Western Madagascar

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Summary. — In semi-arid areas, pastoralism is attributed to an insurance function for smallholder farmers relying otherwise on rain-fed agriculture. In southwestern Madagascar, zebu cattle are the most prominent herded animal, and the heads a household owns is a strong indicator of both prestige and social status. Given the extreme socio-cultural value of zebu cattle in Malagasy culture, however, many authors question the economic rationale of zebu accumulation. Consequently, improved zebu herding has been widely ignored as a suitable target for development interventions. Empirical micro-level data on the role of livestock herding in terms of household economics is missing, though. With this contribution, we close this knowledge gap by analyzing the economic importance of zebu herding against (i) the general role of livestock husbandry and (ii) non-cattle-related livelihood and coping strategies to safeguard smallholders against crop failures. We conducted a longitudinal household and recall survey ($n = 150$ households, stratified random sampling, *bi-weekly* data acquisition) covering a year in which crop failure was widespread. Our study finds that households spent large shares of their total cash income on food purchases, whereas proceeds from the sale of livestock accounted for >56% of cash food expenditures. Remittances from out migrated household members were the 2nd most important income source. Similarly, the collection of wild foods and the reduction of food consumption were widespread coping strategies, as well as reliance on food aids from NGOs. The sale of zebu contributed a highly variable share to total income, depending on the livelihood strategy by households. However, while we can document an insurance function from zebu herding, small ruminants, i.e., goats and particularly sheep and chicken were more important for compensating food expenditures. Policy implications include a promotion of livestock diversification and poultry, systematic fodder forestation and improvements for the security of pastoralists in southern Madagascar.

Keywords — Africa, Insurance function, Food security, Madagascar, Rural development, Semi-arid regions

1. INTRODUCTION

In southwestern Madagascar, rural smallholders experience an annual "lean season" (Malagasy: *kere*). The lean season is a result of a pronounced seasonality of rainfall and food production, which, combined with low absolute agricultural yields, makes regional inhabitants chronically food insecure (Hänke, 2016; WFP, 2015a). In semi-arid areas of Madagascar, farming households regularly keep animals such as poultry, goats, sheep and zebu cattle (Feldt, 2015; Wüstefeld, 2004). Because of the extremely high socio-cultural value of zebus in the Malagasy culture (Fauroux, Fieloux, Joelson, & Rabedimy, 1987; Wüstefeld, 2004), however, there is substantial disagreement on the actual role that zebus play in terms of livelihood security. E.g., Wüstefeld (2004) analyzed the insurance function of zebus as a subsistence food source among the *Tandroy* in southern Madagascar during crop failures, whereas she found that farmers did not consume zebu meat even in times of extreme food scarcity. Consequently, some authors regard zebu husbandry as an "economically irrational activity" in Madagascar (cf. Klein, Réau, & Edwards, 2008; Rauh, 1992; Wüstefeld, 2004). This assessment is based on several observations.

- Substantial resources in terms of labor, water and rangeland biomass are needed for zebu production. Still, farmers are reluctant to sell or consume zebu cattle except for culturally mandated customs such as funerals, circumcisions, and marriages (Fauroux et al., 1987; Wüstefeld, 2004).
- The size of a zebu herd is widely regarded as an indicator of wealth and social status (Fauroux et al., 1987; Götter, 2016).
- Despite high livestock numbers, there is no systematic dairy production and no integration into arable agriculture (Feldt, 2015; Hanisch, 2015).
- Livestock is believed to have a strongly negative impact on biodiversity in and around the close-by Tsimanampetsotse National Park (TNP) (Kaufmann & Tsirahamba, 2006; Ratovonamana, Rajeriarison, Roger, Kiefer, & Ganzhorn, 2013), which is one of the "hottest biodiversity hotspots" globally (Ganzhorn, Lowry, Schatz, & Sommer, 2001; Waeber et al., 2015).

Pastoralism is in conflict with regional biodiversity conservation policies, and conservation and development policies have, consequently, ignored animal husbandry as the potential for sustainable intensification appeared low (cf. Feldt, 2015; Wüstefeld, 2004). Systematically sampled data on the economic role of zebu cattle and other livestock are not available, however (Feldt, 2015; Wüstefeld, 2004). Given the fact that most of Madagascar's land is dedicated to pastoralism (Klein et al., 2008), its role for policies on development and risk management is insufficiently studied.

Several current developments are pressuring traditional livestock husbandry in the region. First, the substantial expansion of cropland has reduced the total amount of forest and rangeland accessible to herders (cf. Brinkmann, Noromiarilanto, Ratovonamana, & Buerkert 2014). Second, institutional changes have occurred, i.e., privatization of former open access resources due to land- and fodder scarcity (Götter, 2016). Third, the political crises in 2009 in Madagascar has precipitated a demise of law and order, and resulted in an increase in zebu theft. The zebu thieves have evolved into organized, criminal gangs who use modern weapons and attack entire villages (Feldt, 2015; Götter, 2016). Security concerns have forced livestock owners to change traditional

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gazing regimes leading to spatial and temporal shifts of livestock densities, which jeopardize risks of overgrazing and degradation of rangelands, and have led to land use conflicts with crop farmers (Feldt, 2015). Particularly the extension of the TNP from 43,200 to 207,000 ha in 2010 (Kiefer, 2011) is restricting traditional migration routes of zebu transhumance and access to water sources within the TNP.

Against this background we conducted a detailed socio-economic longitudinal survey using a representative stratified sample of farming households ($n = 150$). The households (HHs) span a transect from the coast (littoral) west of TNP to the upper parts of the Mahafaly Plateau east of TNP (see Figure 1). Our longitudinal dataset starts in December 2013, the typical start of the lean season covering the whole rainy season until the harvest and sale of annual crops in April/May. To complement the longitudinal study, we conducted a recall survey with all respondent HHs. The recall survey focused on strategies to cope with food shortages including migration of HH members, collection of wild food, borrowing of money, reasons to sell livestock as well as food aid received.

Due to low and poorly distributed rainfall, crop failures in annual crops were regionally widespread (Hanisch, 2015; WFP & FAO, 2014). Consequently, it appeared likely that a substantial share of households had to invoke the insurance function of livestock (cf. Wüstefeld, 2004). Thus, we were in a prime position to investigate how "subsistence" farming households cope with crop failure, and which role their livestock assets play in coping with such shocks. The research questions in this study are: (i) Which role does livestock play as an insurance to cope with crop failure? (ii) Which other, non-livestock-related livelihood and coping strategies are employed by smallholders to buffer against crop failure. To comprehensively assess the insurance function of livestock, we surveyed (i) cash income from all major agricultural activities, (ii) income from zebu as well as other livestock, (iii) off-farm and non-farm income sources, (iv) cash expenditures on food and other consumption goods and (v) implemented coping strategies by HHs. This database sheds empirical light on the actual role of zebu cattle, as well as other livestock and non-farm income sources, and may provide hints to potential interventions and self-organizing developments that can effectively increase livelihood resilience (cf. Ellis, 2000). Through this, we provide a view into households' livelihood and coping strategies among which they can choose in order to survive such harsh circumstances.

(a) *Risk-management, coping strategies, and livelihood diversification*

Even if there is a lasting view of African farmers as "subsistence farmers" (Barrett, Reardon, & Webb, 2001) including farmers in SW Madagascar (Neudert, Götter, Andriamparany, & Rakotoarisoa, 2015; SuLaMa Marp, 2011), there is in fact little evidence to support this view. Particularly African farming households whose livelihoods are vulnerable to climatic risks are often forced to adopt livelihood strategies beyond subsistence agriculture (Barrett et al., 2001. In Sub-Saharan Africa (SSA), around 34% of HH income is, in fact, estimated to come from non-farm sources (Haggblade, Hazell, & Reardon, 2010). The importance of non-farm income is underscored by a positive relationship between non-farm income and HH welfare indicators across most of rural Africa (Barrett et al., 2001; Ellis, 2000). Thus, non-farm income has a clear potential to increase socioeconomic resilience at the household level (Ellis, 2000).

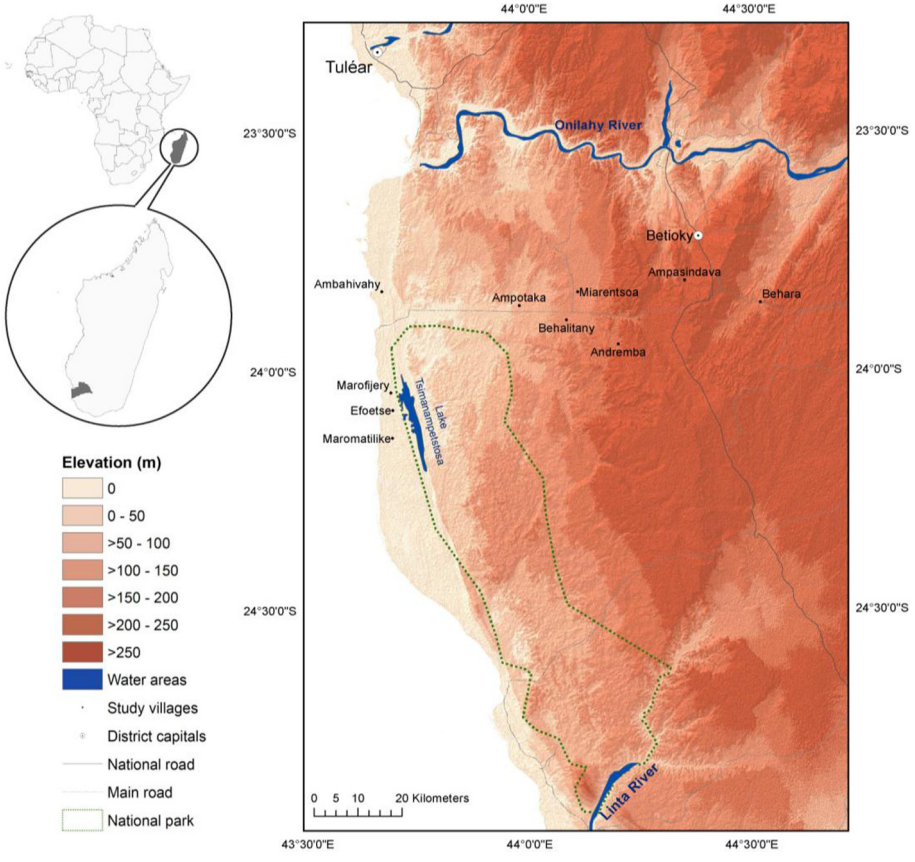

Figure 1. *Map of the study area.*

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