



Tropentag 2010
ETH Zurich, September 14-16, 2010

Conference on International Research on Food Security, Natural
Resource Management and Rural Development

Livelihoods of Smallholders in South Kivu Depend on Small Livestock: the Case of the ‘Cobaye’

Brigitte L. Maass^{a*}, Dieudonné Katunga-Musale^b, Wanjiku L. Chiuri^c, Rachel Zozo^d,
Michael Peters^e

^a CIAT (Centro Internacional de Agricultura Tropical), PO Box 30677, Nairobi, Kenya;
Email: b.maass@cgiar.org; * corresponding author

^b CIAT, 6 Av. Kasongo, Commune d'Ibanda, Bukavu, DR Congo; Email: katungamusale@yahoo.fr

^c CIAT, PO Box 6801, Kigali, Rwanda; Email: w.chiuri@cgiar.org

^d CIALCA, 6 Av. Kasongo, Commune d'Ibanda, Bukavu, DR Congo; Email: rashzo2006@hotmail.com

^e CIAT, AA 6713, Cali, Colombia; Email: p.peters-ciat@cgiar.org

Introduction

Little is known about small livestock production in the South Kivu province of the Democratic Republic of the Congo (DRC). An assessment of livestock husbandry by a rapid diagnostic survey (MAASS ET AL. 2010) and a participatory rural appraisal (PRA; by ZOZO ET AL. 2010), revealed that more participants held non-ruminant (monogastric) animals than ruminants, such as chicken, swine and ‘cobaye’¹ (Figure 1a). More than half of the interviewees had *cobaye*. This high rate of occurrence of *cobaye*, an animal domesticated in the South American Andes (CHAUCA DE ZALDÍVAR 1995), and known as a laboratory animal and pet around the world, was unexpected. Therefore, the importance of this species for the livelihoods of smallholder farmers in the region was subsequently studied in more depth.

Material and Methods

Livestock production issues in the South Kivu province of DRC were assessed by employing a rapid diagnostic survey (RDS; in June 2009 and February 2010) according to FUJISAKA ET AL. (2005), and a PRA (in March 2010). Details on methods are provided by MAASS ET AL. (2010) and ZOZO ET AL. (2010). Overall, the diagnostic survey together with the PRA included almost 300 participants from eight so-called ‘groupements’², comprising 24 villages. These villages were located in the *groupements* of Bugorhe (Kavumu), Burhale, Kamanyola, Karhongo (Nyangezi), Miti (Mulungu), Mudaka, Mumosho and Tubimbi. The importance of *cobaye* for the livelihoods of smallholder farmers in the region has been emphasized when analyzing the data gathered. A thorough literature review on *cobaye* as a domestic animal was also performed.

¹ The French name ‘Cobaye’ is being used here instead of the English ‘Guinea pig’ because the latter gives a wrong impression of a domestic animal that neither originates from Guinea nor is a pig. In the scientific literature, it is sometimes called ‘cavy’ if it is not referred to as a laboratory animal or pet. The common name used in South Kivu is ‘Dende’ (‘D’Inde’), which is the (French) Kiswahili version of ‘Cochon d’Inde’.

² In South Kivu province, administrative units are, from superior to inferior, ‘Territoire’, ‘Collectivité’, ‘Groupement’, ‘Localité’, and ‘Village’.

Results and Discussion

Livestock abundance and herd sizes. Small animals like goats, chicken, swine and *cobaye* were found to be the basis of livestock production and more abundant than cattle (Figure 1a). About 70% of respondents of the RDS held goats and/or chicken and about 50% swine and/or *cobaye*. However, relatively few animals were held per livestock species in general (Figure 1b), assessing only a mean of 1.84 TLU (tropical livestock units) per respondent (MAASS ET AL. 2010). Herd numbers of *cobaye* by roughly one third each of respondent households was 1-4 animals, 5-10, and 11 to >20 (Figure 2); the largest herd of 35 *cobayes* was found in Burhale. Typical *Cobayes* in the region were tri-coloured, with straight coat hair of black and red-brown pigmentation with varying degrees of white spotting, similar to those described for Cameroon by NUWANYAKPA ET AL. (1997). When weighing 22 adult animals randomly, they were found relatively small with 457 ± 88 and 521 ± 59 g live weight of males and females, respectively (unpubl. data).

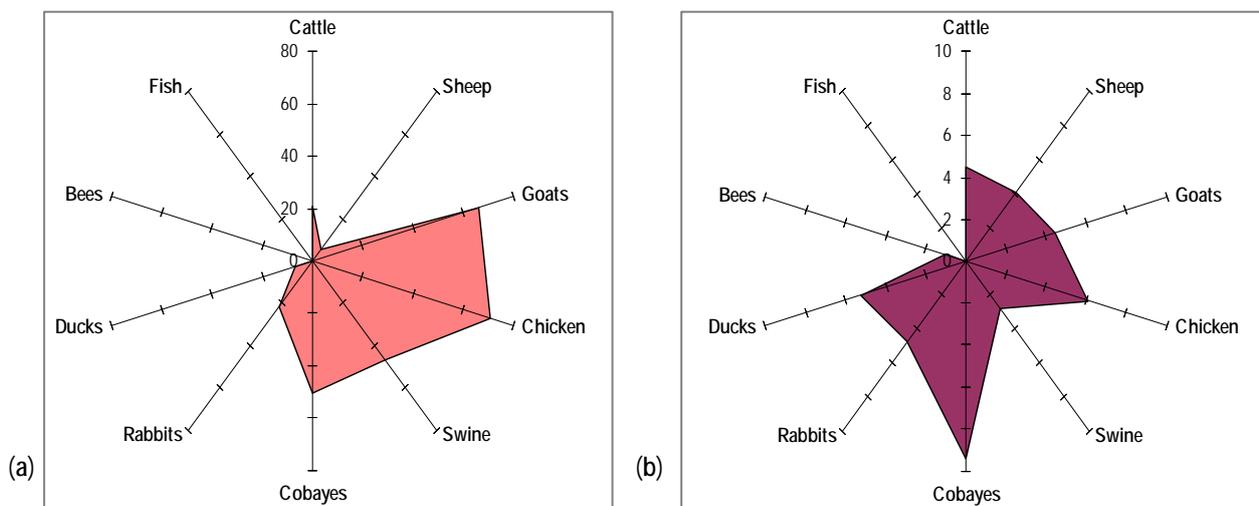


Figure 1. Proportion (%) holding a certain livestock species of 112 participants in a diagnostic survey in South Kivu, DRC; (a) livestock abundance (%) and (b) mean livestock per respondent (no.) of those who had the respective species.

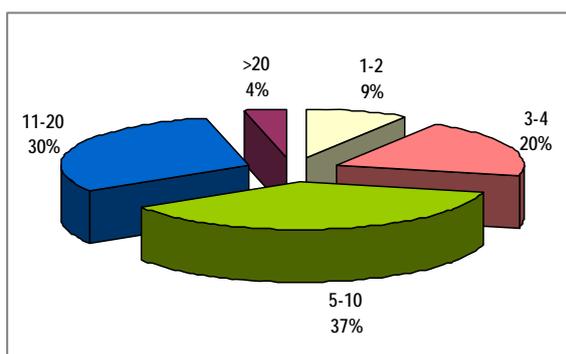


Figure 2. Number of *cobayes* held per household and proportion (%) as reported by 112 participants of a diagnostic survey in South Kivu, DRC.

Husbandry. Usually, *cobayes* were kept in the kitchen and were fed on kitchen wastes and collected forages. The latter included grasses and some herbs from field and road sides, such as *Galinsoga parviflora* and *Bidens pilosa* (MAASS ET AL. 2010). These two herbs are considered weeds elsewhere and do not provide adequate nutrition quality for *cobayes* (BINDELLE ET AL. 2007). *Cobayes* are predominantly kept by children and women, both of which are responsible to collect their forage at road or field sides. *Cobayes* are also fed on banana leaves and stems, a feed of low digestibility (KATONGOLE ET AL. 2008). No mating control is applied and, probably, a high level of inbreeding exists under traditional husbandry that, highly likely, impedes their productivity potential (NGOU-NGOUPAYOU ET AL. 1995). Female *cobayes* are capable to produce 4-5 litters/yr with 1-4 young (CHAUCA DE ZALDÍVAR 1995) resulting in 8 and more young/year,

provided that they are given adequate husbandry. However, no livestock production figures are available for the South Kivu region. Through breeding and improved management in Peru, 10.8 animals per year per female are produced under improved, as opposed to 5.5 under conventional management (CHAUCA DE ZALDÍVAR 1995).

Socio-Economics. Together with chicken, *cobayes* were associated with poverty, regardless of the gender group when assessing wealth classes during the PRA in Miti-Mulungu and Tubimbi. Possessing *cobayes* was not a criterion of asset ownership in terms of animal wealth classification. However, the poorest people in both *groupements* would not have any animals at all (Table 1). MAASS ET AL. (2010) showed that the possession of *cobayes* was related to lower levels of education and lower numbers of other livestock. Typically, *cobayes* were used to supply meat to the family and pay school fees. A *cobaye* may fetch about 1-2 US\$ in the market (ZOZO ET AL. 2010), while fees are about 2-3 US\$/ month/child in primary and 5-10 US\$ in secondary school.

Table 1. Minimum assets for general wealth classes defined by women and men groups in a participatory rural appraisal (PRA) in Miti-Mulungu and Tubimbi, South Kivu, DRC (Zozo et al. 2010).

Wealth class	Miti-Mulungu		Tubimbi	
	Women	Men	Women	Men
Very rich	A personal veterinary; 2 ha of grazing land; has cows and swine	A vehicle, a house in durable materials, private farmland, animals for grazing	>2 cattle (1st), >5 swine (2nd)	1-2 ha land with/ without cassava; >5 cattle, 0.25 ha plantains, 3-4 ha oil palm
Rich	Goats and swine		>2 swine (1st), ±4 goats (2nd)	0.5 ha land with cassava; 3 cattle, 1 swine, 1 goat, 5 chicken; 2 ha oil palm
Inter-mediate	Goats	Children, pets, farmland	5 rabbits, ±2 chickens, >3 <i>cobayes</i>	30 m ² cassava; neither cattle nor goats, 1 chicken / 4 <i>cobayes</i>
Poor	Rabbits and <i>cobayes</i>	House made of straw, small animals, live under difficult conditions	2-3 chickens, ±3 <i>cobayes</i>	1 cassava field; 2 <i>cobayes</i> , 1 chicken
Very poor	Has nothing at all	House made of straw, has neither land nor animals; is used as hired labour, depends on others to survive	No animals	No land, no animals

Cobayes have great potential to contribute to reducing food insecurity in developing countries (LAMMERS ET AL. 2009). Among the advantages for smallholders to raise *cobaye* are its rapid reproduction cycle, its lack of competition for human food and, in case of looting, its potential to either be hidden or recover its population fairly quickly. The latter advantage is well recognized under the insecurity due to wars and armed conflict prevalent for the past decades in the Kivu region. *Cobayes* have helped these rural people's livestock populations not to be fully diminished by pillage; they have served for some cash income; finally, they were most valuable for paying school fees (METRE 2005). When in numbers around 25, *cobayes* were said to be exchanged at the market for other animals, basically swine and chickens. Thus, *cobayes* can serve as the first rung for climbing the 'livestock ladder' (PERRY 2002) that may lead to larger livestock species such as goats and cattle.

Issues raised. Respondents to the RDS and PRA raised a number of issues regarding *cobaye* husbandry, which were strongly related with the risk of losing animals due to predators (e.g., dogs) and theft. Animals also suffer from diseases, especially diarrhea, that was said it could occur any time of the year (Zozo et al. 2010). Also, much time is required to fetch dry season

feeds for livestock. Respondents were less aware about other important issues like the frequent inbreeding of *cobaye* herds, in-appropriate housing, and lack of hygiene.

Outlook. The actual contribution to food security of unconventional livestock species like *cobayes* has, probably, been greatly ignored (BINDELLE ET AL. 2007). This contribution should be properly documented. In addition, its potential for improving the livelihoods of smallholders in South Kivu and elsewhere in Africa ought to be explored, including the possibilities to reduce some burdens of animal husbandry for both children and women. Children may get more time for their school work and play, and women for other chores. Finally, there will be enough meat for regular consumption and, thus, improved diets resulting in better nutrition security.

Acknowledgements

We thank all respondents to the surveys for their unreserved collaboration and openness in sharing their views and experiences. The participation of all interviewers from South Kivu province is acknowledged. Logistic support provided by the CIALCA office in Bukavu and the 'Université Evangélique en Afrique' (UEA), Bukavu, DRC is also recognized. The investigation was funded by the Federal Ministry for Economic Cooperation and Development (BMZ), Germany through the project 'More Chicken and Pork in the Pot, and Money in Pocket: Improving Forages for Monogastric Animals with Low-income Farmers'.

References

- BINDELLE, J., ILUNGA, Y., DELACOLLETTE, M., MULAND KAYIJ, M., UMBA DI M'BALU, J., KINDELE, E. AND BULDGEN, A. (2007). Voluntary intake, chemical composition and *in vitro* digestibility of fresh forages fed to Guinea pigs in periurban rearing systems of Kinshasa (Democratic Republic of Congo). *Tropical Animal Health and Production* 39(6): 419-426.
- CHAUCA DE ZALDÍVAR, L. (1995). Producción de cuyes (*Cavia porcellus*) en los países andinos. *World Animal Review* (FAO/AGA) 83(2): 9-19. [online from: <http://www.fao.org/DOCREP/V6200T/v6200T05.htm>]
- FUJISAKA, S., HOLMANN, F., PETERS, M., SCHMIDT, A., WHITE, D., BURGOS, C., ORDOÑEZ, J.C., MENA, M., POSAS, M.I., CRUZ, H., DAVIS, C. AND HINCAPIÉ, B. (2005). Estrategias para minimizar la escasez de forrajes en zonas con sequías prolongadas en Honduras y Nicaragua. *Pasturas Tropicales* 27(2): 73-92.
- KATONGOLE, C.B., BAREEBA, F.B., SABIITI, E.N. AND LEDIN, I. (2008). Nutritional characterization of some tropical urban market crop wastes. *Animal Feed Science and Technology* 142: 275-291.
- LAMMERS, P.J., CARLSON, S.L., ZDORKOWSKI, G.A. AND HONEYMAN, M.S. (2009). Reducing food insecurity in developing countries through meat production: the potential of the guinea pig (*Cavia porcellus*). *Renewable Agriculture and Food Systems* 24: 155-162.
- MAASS, B.L., KATUNGA-MUSALE, D., CHIURI, W.L. AND PETERS, M. (2010). Poultry, swine and cobayes in South Kivu, DR Congo – constraints and opportunities for alleviating smallholder poverty. *Tropical Animal Health and Production* (Submitted in August 2010).
- METRE, T.K. (2005). Mon compagnon: Le cobaye *Cavia porcellus* L., expériences personnelles au Kivu, R.D. Congo. *Bulletin BEDIM* 14(1): 9-11.
- NGOU-NGOUPAYOU, J.D., KOUONMENIIOC, J., FOTSO TAGNY, J.M., CICOGNA, M., CASTROVILLE, C., RIGONI, M. AND HARDOUIN, J. (1995). Possibilités de développement de l'élevage du cobaye en Afrique subsaharienne: le cas du Cameroun. *World Animal Review* (FAO/AGA) 83(2): 21-28. [online from: <http://www.fao.org/ag/aga/agap/frg/feedback/war/v6200b/v6200b08.htm>]
- NUWANYAKPA, M., LUKEFAHR, S.D., GUDAHL, D. AND NGOUPAYOU, J.D. (1997). The current stage and future prospects of guinea pig production under smallholder conditions in West Africa; 2. Cameroon case. *Livestock Research for Rural Development* 9(5): 10 pp. [online from: <http://lrrd.cipav.org.co/lrrd9/5/gp952.htm>]
- PERRY, B.D. (2002). Investing in animal health research to alleviate poverty. *International Livestock Research Institute* (ILRI), Nairobi, Kenya.
- ZOZO, R., CHIURI, W.L., KATUNGA MUSALE, D. AND MAASS, B.L. (2010). Report of a participatory rural appraisal (PRA) in the groupements of Miti-Mulungu and Tubimbi, South Kivu/DR Congo. Working Document no. 211. Centro Internacional de Agricultura Tropical (CIAT), Nairobi, Kenya. (In press).