

From taboo to commodity: history and current situation of cavy culture in the Democratic Republic of the Congo

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Abstract

For the first time, the status of cavy culture in the Democratic Republic of the Congo (DRC) is reviewed with emphasis on Sud-Kivu province. Cavy culture, as discussed in this paper, is the raising, production and utilization of the domestic cavy (i.e., Guinea pig, *Cavia porcellus*) for consumption. Many sources were used in the review, but published scientific research literature is extremely scarce. Nevertheless, it can be estimated that more than 2 million cavies are kept in DRC, contributing significantly to nutrition security, especially animal protein, and income generation of some hundreds of thousands of poor rural and urban households. The largest cavy populations are in the Kivu provinces, which is probably partly due to the inclusion of cavies in 'rehabilitation kits' of humanitarian NGOs and in the agricultural portfolio of development agencies who seek to address the challenges of widespread hunger and malnutrition in the area.

The review covers the history of cavy culture in Sud-Kivu since colonial times based on oral tradition; it describes the current 'cavy status' in the country and identifies research and capacity building needs. We suggest that cavy culture in DRC is likely to become more widespread and important due to the activities of a new project on 'Harnessing husbandry of domestic cavy for alternative and rapid access to food and income in Cameroon and the eastern Democratic Republic of the Congo'. Given the dimension, cavies should be included in livestock census as well as research and development agenda, honoring their role in the livelihoods of less endowed people, especially women.

Key words: *Cavia porcellus*, *cobaye*, *Guinea pig*, *Kivu*, *livelihood*, *non-conventional animal production*, *small livestock*, *women empowerment*

Introduction

In the East African Great Lakes Region, domestic cavies¹ are more widely kept than rabbits or pigs; though very little is known about cavy culture and its importance for the livelihoods of cavy keepers (Metre 2011; Maass et al 2012). Cavy culture, as discussed in this paper, is the raising, production and utilization of the domestic cavy as a small livestock species for meat, manure and income generation. The term was first used in French as '*cavi(a)culture*'². In 1920, Michaels (1920) applied the term 'cavy culture' in English. People seem to have kept this mini-livestock species in the Great Lakes Region for a significant time. Cavies may have been introduced by catholic missionaries during Belgian colonial times or even earlier, but there are no reliable records. An alternative view is their introduction may be more recent in some areas, for example for the Bahunde in Nord-Kivu, where youths now raise cavies in order to consume them (Murairi-Mitima 2012).

While in Sud-Kivu province most people call the animal *dende*, probably derived from the French *cochon d'Inde* (Maass et al 2012), the French term *cobaye* is also widely used, among others in the western provinces of Bas-Congo and Kinshasa. Other local names include *souris colorée* (i.e., coloured mouse; Mugisho 1995). In Nord-Kivu province, the animal is named *kururu* in Beni and Lubero *territoires*³ (F Tsongo, unpublished). In Kikongo-Baskongo language *Mpuku mputu* (= European rat) has been collected by Sikimuya (1964) and *Kikweyi* in 'Kikóngo ya Létá' language by

Masiala (2011).

Despite the wide distribution of cavies in many areas of the Democratic Republic of the Congo (DRC) (Figure 1), there has been little scientific evidence of the extent and use of the animal as a livestock species till now. In eastern DRC, where cavies are most prevalent, their existence has been mentioned in only a few research articles (e.g., Schoepf and Schoepf 1987; Vlassenroot 2008), in occasional reports (e.g., Kunze et al 1991; Metre 2005; Ouma and Birachi 2011), in an unpublished thesis (Mugisho 1995) or, more recently, in assessments of food security status in various areas by international NGOs, 'Action contre la Faim' (ACF 2009), Oxfam-Solidarité (2010) and Norwegian Refugee Council (van Bruaene et al 2011) among others. Only few publications exist from research in Kinshasa (Nkidiaka 2004; Bindelle et al 2007, 2009), while Metre's (2011) article is the first scientific record to highlight specific aspects of cavy culture in Sud-Kivu. It would appear from the literature and reports, and now in this paper, that the importance of small livestock species for nutrition security and livelihoods has been overlooked and underestimated by researchers and development agents. The underestimation of their value is exacerbated because small livestock do not specifically appear in national or regional census, which further reduces the likelihood of their inclusion in research and development initiatives (Perry et al 2002), creating a vicious circle of neglect.

Similar to the traditional systems in Cameroon (Manjeli et al 1998), cavies are both a source of meat and a flexible source of additional cash income in DRC (Mugisho 1995; Metre 2011). Cavies benefit from popular beliefs in the virtue of their blood to fight anemia in toddlers and young children (Mugisho 1995; B Kajinga-Mutumbo 2013, pers. comm.). Metre (2005) reports their importance, particularly during times of unrest, when cavies may be the only livestock that often escape looting (de Faily 2000). These small, monogastric animals have become more prevalent in the Kivu provinces since looting by armed groups has depleted larger animal resources in the region (Cox 2012; Maass et al 2012). Many households appreciate cavy manure, especially for horticulture (Mugisho 1995). Cavies have also been described as the lowest rung of the 'livestock ladder' (Maass et al 2013) that could assist poor livestock keepers to acquire certain levels of wealth.

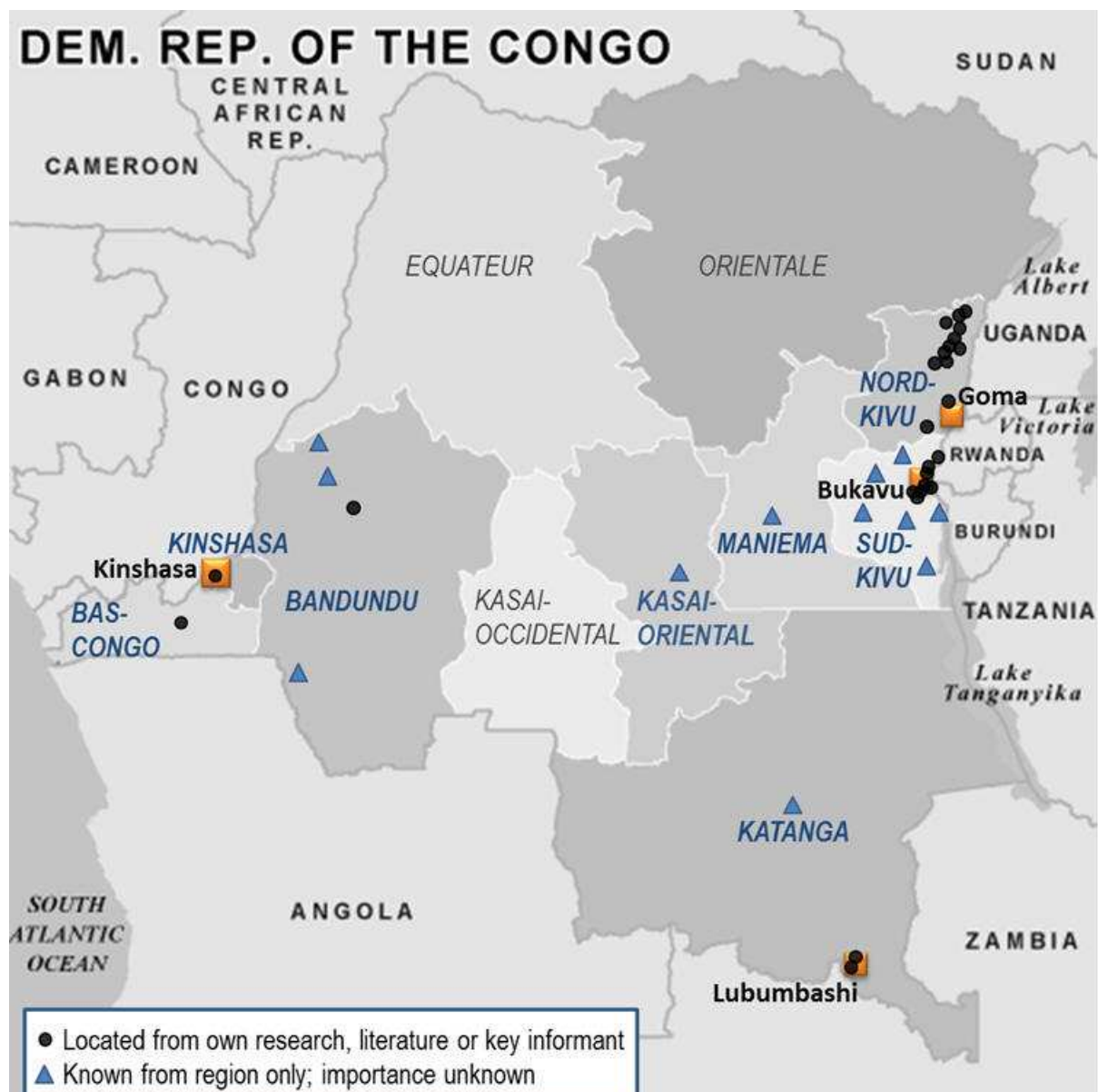


Figure 1. Distribution map of cavies for consumption in the Democratic Republic of the Congo (DRC) according to various sources (Source of basic map: www.mapsopen.com)

Cavies could also have replaced bushmeat to some extent, especially as massive deforestation occurred during the conflict periods (Draulans and Van Krunkelsven 2002). This is indicated in a couple of traditional Congolese bushmeat recipes, including a classic stew of ‘smoked cavy in groundnut sauce’ and ‘cavy in tomato sauce’ (Celtnet 2013), without giving more evidence of the extent of replacement. Furthermore, cavies form part of urban/peri-urban agriculture, known for example in Kinshasa (Nkidiaka 2004; Bindelle et al 2007), Lubumbashi (Kampemba 2011), Goma and Beni (PNUD 2009) as well as Butembo (VSF-B 2008; PNUD 2009), partly due to the minimal requirements for infrastructure and capital, and the ease of feeding. Domestic cavies, thus, demonstrate to be a very robust livestock species under minimal husbandry conditions in DRC.

Niba et al (2012) assessed recent developments of cavy culture in Cameroon in a review article similar to this. The objectives of this review are to document the existing knowledge on cavy culture in DRC with emphasis on Sud-Kivu as a basis of information for the research project ‘Harnessing husbandry of domestic cavy for alternative and rapid access to food and income in Cameroon and the eastern Democratic Republic of the Congo’ that strives to (i) assess the importance of cavies for nutrition security and livelihoods, (ii) understand genetic makeup of the animal for defining potential breeding objectives, (iii) enhance feeding especially through improved forages, and (iv) share knowledge and strengthen human capacity to deal with issues of cavy culture in Africa.

History of cavy culture in Sud-Kivu

Cavy culture in Sud-Kivu can be considered as having developed in three distinct periods, (i) from colonial times until 1994; (ii) from 1994 to 2009; and (iii) since 2009. As cavy culture has only been critically considered since 2009, and largely falls under the new research project, the focus here is on the two historical periods. Most of the information presented has been assembled by word-of-mouth and gathered over decades by T K Metre and A B Mugisho (unpublished) in discussions with old (± 80 years) key informants from different villages as no known written records exist on the history of cavy culture anywhere in DRC. The general lack of documentation in DRC is, in part, due to the incineration of countless documents at the end of the Mobutu-led government in 1997 and during the ongoing succession of wars in the area since then.

First period: colonial period to 1994

The timing of the commencement of what became cavy culture in Sud-Kivu, and the animals’ origin are not precisely known. It has been conveyed that the first cavies were held in the catholic convents in Sud-Kivu, led by Belgian and Italian Jesuit missionaries, probably starting around the early 20th century, when the Catholic Church established itself in the Bushi area (Nkunzi 2005). In the early colonial period, local people had no specific interest in cavies. Though, some of those working in the convents introduced the animal into their villages (Mugisho 1995), probably to supply meat to their children. Many people, however, thought cavies were a kind of rat and, hence, adults scorned their children’s animal inside the houses.

However, the chaos caused by the succession war for the *Mwami Kabare*⁴ (1985-1987) resulted in widespread famine and high levels of malnutrition, especially in children (Makungu 2006). Then, cavies became considered as a ‘medical treatment’ for malnutrition, particularly in overcoming anemia (Mugisho 1995). Some NGOs, such as *Comité Anti-Bwaki*⁵, recommended that children received cavy blood, mixed with Coca Cola and tomato concentrate to overcome the condition. The belief that cavy blood and meat has a health-improving effect especially for children perpetuates until today, also in other parts of the country (B Kajinga-Mutombo 2013, pers. comm.).

In a survey conducted in the early 1980s in four mountainous localities in Kabare *territoire* of Sud-Kivu near Mulungu, Schoepf and Schoepf (1987) found that in one third of the 160 households visited, older children raised cavies, which they consumed. This has to be seen in the context where mothers usually leave starchy staples prepared in the home before they leave to the fields; when children return from school, they prepare cavy stew by themselves. Kunze et al (1991) recognized the importance of cavy culture at that time in Kabare *territoire* based on its prevalence and its reported contribution to animal-source protein provision for children. Mugisho (1995) describes cavies as “omnipresent” in Mulamba *groupement* in Walungu *territoire*, the large majority (83%) of 40 interviewed households from four villages kept cavies successfully for a long time, meaning at least since independence in the 1960s.

Second period: from 1994 to 2009

Since the war following the civil unrest in neighbouring Rwanda in 1994, about 1.5-2 million refugees swept over the

border into the Kivu provinces, eastern DRC (Draulans and Van Krunkelsven 2002). Often the numbers of people in refugee camps substantially outnumbered the local village population in any one locality. As a result food was in short supply in both local households and displaced families. Emergency strategies by humanitarian NGOs started to include cavies as part of the solutions that could help during and after conflict. People were provided with seeds of short-cycle crops and vegetables, some agricultural tools and cavies as a basic livestock. Cavies were chosen due to their rapid multiplication and minimal inputs required.

The first initiative in the region to use cavies for animal protein production at larger scale was stimulated by the Belgian priest Père Georges Defour, a professor at the *Institut Supérieur de Développement Rural* (ISDR) in Bukavu (Vleugels 2012), who supported the first cavy farm run by Antheleme Buhashu Mugisho in Mulamba, Walungu *territoire* in 1995. Mugisho obtained his initial animals from the local market. Once the cavy numbers on the farm had been increased, Defour suggested that animals be distributed to all surrounding villages to form ‘*villages cobayes*’, which later developed into a registered non-profit organization, VICO, established to promote cavy raising for food security and income generation; every new nucleus would be started by 5 females and 1 male cavy.

As ISDR had a field station in Mulamba, many students coming to visit Mugisho’s cavy farm helped disseminate knowledge on cavies. UNHCR/UNICEF (The United Nations Refugee Agency/United Nations Children’s Fund) provided funds for increasing cavy production to feed refugees and this soon resulted in an animal population of about 1,200 cavies in Mugisho’s farm. At the same time, villagers also successfully increased their cavy populations, which made cavies the most accessible meat source in those years (Mugisho 1995). Unfortunately, when the first Congo war started with AFDL (*Alliance des Forces Démocratiques pour la Libération du Congo-Zaïre*) in 1996, the farm in Mulamba was looted and all the animals were consumed by armed gangs. Mugisho himself was forced to flee to the provincial capital of Bukavu, however, he managed to carry some few progenitors and continued to raise cavies at Université Catholique de Bukavu (UCB) in Karhale and at ISDR (A B Mugisho, unpublished).

During the following second Congo war (1998-2003) with RCD (*Rassemblement Congolais pour la Démocratie*), agricultural production in the countryside was severely reduced leading to aggravated poverty and extreme levels of malnutrition. This prompted some humanitarian NGOs to yet again include cavies (less so rabbits) in their ‘rehabilitation kits’ together with short-cycle horticultural and crop seeds. These all helped families survive under the harsh circumstances while, at the same time, enabling people to move with these food sources in the event they had to flee. Then larger livestock had been pillaged and many households were essentially left only with cavies as a source of animal protein. Some of those households supplied the military or resistance fighters with cavies as food item or as a ransom. In those years, cavies even became a currency that was used to pay, for example school fees⁶, and also exchange with other food items.

Table 1. Cavy distribution to Nutrition Centers supported by FAO in Sud-Kivu during 2004-2005 (Data compiled by T K Metre, unpublished)

Territoire	Localité*	Beneficiary NGO partner**	Cavy number at the start of project	Sponsor/ financier	Implementing partner	Cavy number at the end of project*
Kabare	Buhandahanda	CEMUBAC	165	FAO	APROMET	n.a.
	INERA/Mulungu	CEMUBAC	165	FAO	BEST	n.a.
	Bushumba	CEMUBAC	165	FAO	APROMET	n.a.
	Mumosho	Malteser	165	FAO	BEST	212
	Ihembe	Malteser	165	Malteser	Malteser	317
Walungu	Luhago	Malteser	165	Malteser	Malteser	179
	Bideka	Malteser	165	FAO	APROMET	420
	Walungu	Malteser	165	FAO	BEST	349
	Ibinza	Malteser	165	FAO	APROMET	178
	Nyamarhege	Malteser	165	FAO	APROMET	321
	Tubimbi	Malteser	165	Malteser	Malteser	219
	Cibanda	Malteser	165	FAO	APROMET	302
Kalehe	Cifunzi	IMC	165	FAO	APROMET	n.a.
	Rambo	IMC	165	FAO	BEST	n.a.
	Bunyakiri	IMC	165	FAO	APROMET	n.a.
	Bitale	IMC	165	FAO	BEST	n.a.
	Irangi	IMC	165	FAO	BEST	n.a.
Total			2,805			2,497

*n.a., not available; INERA, Institut National pour l’Etude et la Recherche Agronomiques. **Beneficiary NGO: APROMET, Association pour la Promotion de l’Education pour Tous et de Développement Durable; BEST, Bureau d’Etudes Scientifiques et Techniques; CEMUBAC, Centre scientifique et médical de l’Université libre de Bruxelles pour ses activités de coopération; IMC, International Medical Corps; FAO, United Nations Food and Agriculture Organization.

After 2004, the reconstruction of the Kivu provinces started with engagement of numerous NGOs and international organizations. For example, FAO financially supported three international NGOs engaged in fighting malnutrition by running 14 Nutrition Centers especially for pregnant women and children (Table 1). Their strategy was to supply returning women and children with a ‘rehabilitation kit’ that contained 6 cavies (5 females and 1 male) among other useful items. Before they returned to their locations, agricultural trainers in the Nutrition Centers instructed people on cavy husbandry. However, no systematic follow up was carried out on the development of cavy culture in the various

villages in Sud-Kivu. Nevertheless, cavy populations had increased between 8% and 150% at the end of the FAO project in those villages where data was available (Table 1).

In the following years, cavies became one of the favorite vehicles for NGOs to combat poverty and malnutrition of poor and displaced people all over Sud- and Nord-Kivu; they distributed the animal to poor farmers and refugees (Raeymaekers 2008; Table 2). For example, the NGOs 'Vétérinaires Sans Frontières Belgique' (Tsongo 2012) and 'DIOBASS' planned to distribute some thousands of cavies in Nord-Kivu; and others like 'Food for the Hungry' (FH 2009) and ACF (2009, 2010) promote cavy culture where they work in DRC. During 2006-2012, more than 100,000 animals were distributed to more than 18,000 households in Sud-Kivu alone (Table 2)

Table 2. Distribution of cavies in Sud-Kivu by various non-governmental organizations during 2004-2012 (Data compiled by T K Metre from Inspection Provinciale de l'Agriculture, Pêche et Elevage, Sud-Kivu)

NGO	Time period	Cavies distributed (no.)	Destination (territoire)
Oxfam Solidarité Belgique (OSB)	2006-2012	14,010	Mwenga
	2007-2012	46,088	Kalehe
	2008-2012	2,751	Uvira
		62,849	
Women for Women International (WWI)	2008	10,410	Kabare and Walungu
	2009	15,300	Kabare and Walungu
	2010	13,668	Kabare and Walungu
	2011	2,580	Kabare, Kalehe and Walungu
Total WWI		41,958	
Malteser	2004-2005	2,520	Kabare and Walungu
Total Malteser		2,520	
International Medical Corps (IMC)	2006-2007	850	Kalehe
Total IMC		850	
Overall total		108,177	

The growing distribution is also reflected by the steep increase of the number of people who initiated cavy husbandry in the three *territoires* of Kalehe, Kabare and Walungu in the last decade (Figure 2). Unfortunately, communities received neither technological information nor training when these NGOs distributed animals so that cavy production was poor and mortality high. As a consequence, Thierry Kalimira Metre endeavoured to establish a private farm in Nduba, Walungu *territoire*, in March 2009 to optimize cavy husbandry under the local conditions. He further aimed to give advice and training to interested persons, especially agricultural students from local universities. The farm has also given opportunity for collecting scientific data on cavy production and husbandry under improved conditions, partly summarized by Metre (2012).

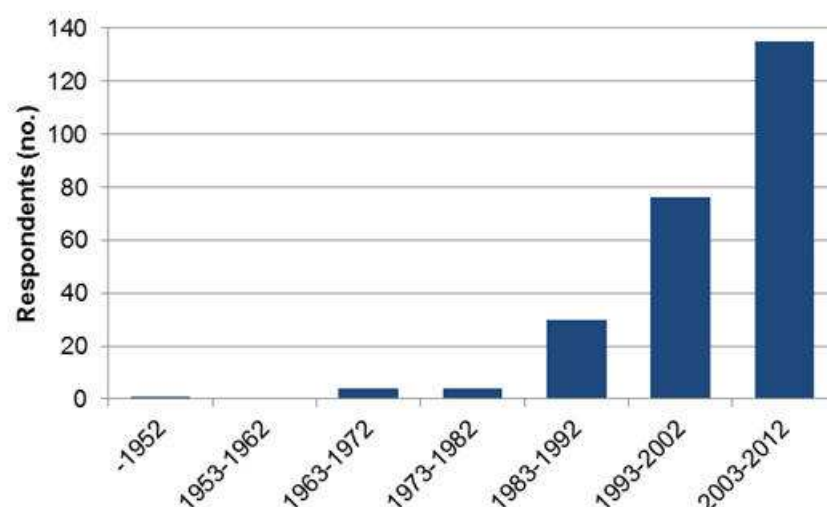


Figure 2. Year of beginning cavy culture indicated by 250 respondents to a survey in Kalehe, Kabare and Walungu *territoires* of Sud-Kivu, eastern DRC (Source: Baseline data from Cavy project in 2012, unpublished data)

The extensive distribution of cavies to all *territoires* of Sud-Kivu, the small-scale household production, together with the general shortage of alternative animal protein sources due to the pillage of livestock during the years of conflicts, led to a widespread acceptance of cavies as an economic food item. Many people in the region, regardless of sex and age, started to consume cavy meat (Metre 2011). This reflects the change of food pattern, from a commodity that was initially reserved for children to a food item consumed by almost all community members, even at ceremonies

(Vlassenroot 2008). Besides the traditional home consumption, small restaurants began operating at local markets, such as Mugogo and Mudwanga in Walungu *territoire*. On these rural markets, the demand for cavies is even now high, and cavies are usually sold out by 11:00 h on market days (T K Metre, unpublished observation). Interestingly, the cavy demand especially from mine workers and military personnel leads to markets swept empty when they receive their pay. This move from an initial taboo item for adults to public/open consumption in restaurants at market places illustrates a major paradigm shift in the appreciation of cavies within the Sud-Kivutian society. Yet, despite that paradigm shift, many urban dwellers are ambivalent towards cavy consumption because of the perceived relationship with poverty, past taboo status and lack of familiarity with the animal. On the other hand, these urban/educated people do not shy away from consuming roast cavy with ravenous appetite when an opportunity arises in rural environments (B L Maass, unpublished observation).

Third period: from 2009 until today

It is only since 2009 that there has been sustained scientific interest into evaluating options for improving cavy husbandry for increased productivity and consumption. Initial publications on the importance of cavy culture in Sud-Kivu (Metre 2011; Maass et al 2010, 2012) attracted the interest of donors to fund research-for-development and food security projects as well as support students with scholarships in order to build capacity. This increased interest also resulted in the project 'Harnessing husbandry of domestic cavy for alternative and rapid access to food and income in Cameroon and the eastern Democratic Republic of the Congo', from which several scientific articles are imminent. Furthermore, developing agencies like Europe-Third-World (ETW) recently started supporting the improvement of cavy husbandry in Sud-Kivu (GDI 2013). Interestingly, also cavy sales expanded into Bukavu town, where a supermarket offered both live animals and roast cavy ready for consumption as a snack.

Current status of cavy culture in DR Congo

Due to insecurity and weak public livestock service sector, recording livestock numbers has, for a long period, been a major challenge in DRC. As a result census data are incomplete and often records are based on estimates as reported by FAO and Tufts University (2002). While that report provides livestock numbers in DRC from 1985 to 2001, it excludes all small animals except poultry. In other DRC livestock records, cavies have even been pooled together under the term 'poultry' (RDC/BM 2011a,e,g,h,i). Consequently it is extremely unlikely that reliable statistics exist for cavies in DRC and, where data are available, the widely varying estimates from various sources suggest that these data need to be used with caution (Table 3). Because cavies have never been part of official livestock policies in DRC, cavy production has never been included in academic curricula, nor has there been a history of regional research. This has led to a large degree of ignorance amongst agricultural professionals on the potential of cavies to support livelihoods in the region.

Table 3. Discrepancy in estimated numbers of cavy population (no. of heads) in Nord- and Sud-Kivu provinces of DR Congo according to different sources

Source	Nord-Kivu		Sud-Kivu		
	PNUD (2009)	Worldbank (RDC/BM 2011h)	RDC (2005)	IPAPEL (2012)*	Worldbank (RDC/BM 2011j)*
Year					
2000			154,100		
2001			102,034		
2002			93,773		
2003					
2004				2,678 (1)	
2005		1,769,920		32,478 (2)	n.d.
2006		1,988,678		126,770 (5)	n.d.
2007		2,430,164		304,348 (7)	n.d.
2008	815,516	2,969,661		338,070 (7)	93,775
2009		3,052,683		397,825 (7)	103,406
2010		3,754,785		414,623 (7)	120,513

* IPAPEL, *Inspection Provinciale de l'Agriculture, Pêche et Elevage, Sud-Kivu*; data compiled by R B B Ayagirwe and P C Azine; number of territoires of the 8 territoires covered in brackets; n.d., not determined although the data set includes these years

Cavy culture has been reported from most provinces of DRC (Figure 1), although it is in the Kivu provinces that they are thought to be the most prevalent. In the following sections we will summarize available knowledge with particular emphasis on the eastern DRC provinces based on documentation sourced from thorough literature searches, including the available grey literature, and by key informant discussions in different villages over considerable time.

Table 4. Estimated cavy numbers according to territoire and in major towns in

Nord-Kivu (PNUD 2009) and Sud-Kivu (local statistics, Rapports Annuels des Territoires provided by Ministère d'Agriculture du Sud-Kivu) in 2008/09

Territoire/town	Cavies (no.)	Territoire/town	Cavies (no.)
Nord-Kivu (2008)	815,516	Sud-Kivu (2008/09)*	380,956
Beni	482,835	Kalehe	290,737
Beni town	59,607	Kabare	30,363
Lubero	115,201	Idjwi	15,329
Butembo town	101,064	Bukavu	11,494
Masisi	25,420	Walungu	24,054
Goma town	6,301	Shabunda	1,962
Rutshuru	22,120	Mwenga	1,919
Nyiragongo	2,834	Uvira	5,099
Walikale	134		
	Total Kivu provinces	1,196,472	

*The mean of 2008 and 2009 was calculated to cover all 8 territoires as different territoires lack data in every year

Sud-Kivu

In their diagnostic review of the livestock situation around the provincial capital of Bukavu, Maass et al (2012) found that about 50% of all keepers of any kind of livestock had cavies. Metre (2011) used a range of surveys to estimate that 80% of households keep cavies. Cavy herds are generally small, mostly ranging from 6 to 25 animals (Mugisho 1995; Metre 2011); Maass et al (2012) found an average of 8, however, population sizes are dynamic because of on-going consumption and sales (Mugisho 1995). Ouma and Birachi (2011) report far fewer cavies per household (average of 1.9 animals⁷) from interviews of 500 rural households in Sud-Kivu. Animals are traditionally owned and husbanded by women and youth (Mugisho 1995; Metre 2011). Hence, when men are interviewed in such baseline studies (e.g., Ouma and Birachi 2011), there is a high chance that average cavy numbers per household are grossly underestimated because men may not know – it is women and children/youth with knowledge (BACAS 2007). In addition to the typical small-scale household ownership, there have been two much larger undertakings with more than 300 animals each, operating in Mulamba and Nduba (both in Walungu *territoire*).

Based on weak statistics, it would seem that there are at least 0.4 million cavies in households of Sud-Kivu (Table 4). When extrapolating from the data of Ouma and Birachi (2011), the overall cavy population could be as high as 1.0 million animals⁸ in Sud-Kivu alone. The seemingly increase of the animal population from 2007 to 2010 (Figure 3) is probably due to more comprehensive, although still incomplete, assessments due to the inaccessibility of the areas because of enduring insecurity and less so to a real increase.



Photo 1. Cavy production systems, traditional in Kavumu, Kabare *territoire* (left) and intensive in Nduba, Walungu *territoire* (right), Sud-Kivu, DRC

(Photos by T K Metre and B L Maass, respectively).

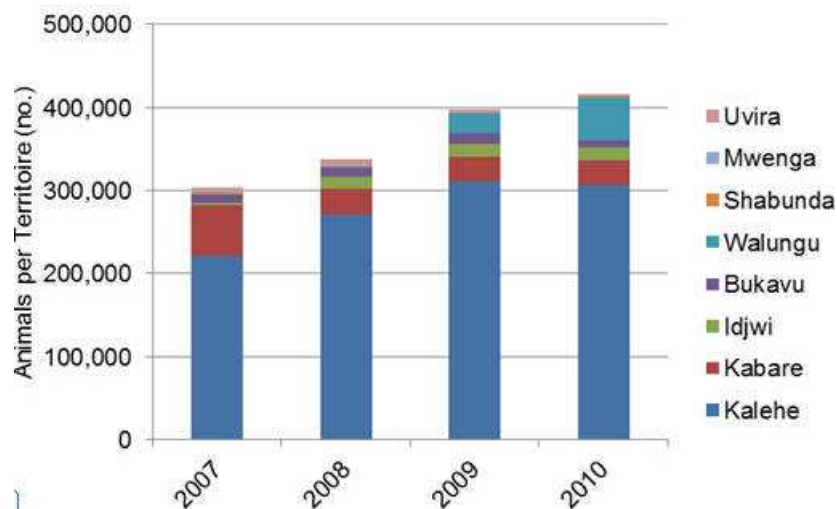


Figure 3. Estimated cavy population according to territoire in Sud-Kivu, DRC, based on weak statistics; only years shown with at least 7 provinces covered (Data compiled by R B B Ayagirwe and P C Azine from Inspection Provinciale de l'Agriculture, Pêche et Elevage, Sud-Kivu, Bukavu, DRC)

Cavies have three major advantages over most other livestock; they demand little concerning space and nutrition, have a rapid reproduction cycle, and offspring start feeding independently almost immediately from birth (Lammers et al 2009). Animals primarily seem to serve for household consumption and manure, but also for petty cash expenses as each cavy may fetch up to 1.5 USD (Mugisho 1995; Metre 2011) or more according to market demand. This is a substantial income in an economy where almost 85% of the population live under the poverty line⁹, like in Sud-Kivu in 2005 (Ansoms and Marivoet 2010). Although cavies occur widely in smallholder households in the rural Sud-Kivu region, they rarely seem to reach town markets like the one in Bukavu. Sales are mostly between neighbours in the village (Mugisho 1995). However, there are regional markets like in Mugogo and Kankinda (both in Walungu *territoire*), where considerable numbers of cavies are regularly marketed (Photo 2) and prepared for on-site consumption (Metre 2011).



Photo 2. Cavy sales (left) and a simple restaurant (right) at the market of Mugogo, Walungu *territoire*, Sud-Kivu, DRC (Photos by T K Metre)

Due to chronic poverty, consuming animal-source food is not common among the population. Children suffer particularly from the lack of animal protein, reflected in the very high stunting prevalence of 46% in under-five children in the Kivu provinces (Kandala et al 2011), making cavies a potentially important resource for their food and nutrition security. However, the impact of cavy culture on nutrition improvement especially for children has never been studied. Yet, the decision of a household to sell more rather than consume may contribute to perpetuate childhood malnutrition (Kandala et al 2011). Despite this knowledge gap, cavies likely contribute to household food and nutrition security because women and youth own the animals in Sud-Kivu (Maass et al 2013); this gives them control over this livestock asset, consequently, empowering them.

Nord-Kivu

In Nord-Kivu, PNUD (2009) estimates cavy populations as high as 815,500 in 2008, with largest proportions in Beni, including Beni town (more than 540,000) and Lubero with Butembo town (more than 210,000) (Table 4). By 2011, the

Worldbank (RDC/BM 2011h) estimated that there were more than 3.5 million cavies in Nord-Kivu (Table 3); this figure seems far too high as cavy populations of such size are only known from South American countries (Chauca de Zaldívar 2000). However, humanitarian and development NGOs have encouraged cavy culture more in Nord-Kivu than elsewhere. As stated earlier, during the wars and the post-conflict period, many humanitarian agencies distributed cavies as part of 'rehabilitation kits' for rapid livelihood reconstruction (ACODEV 2013), assisting to ascend the 'livestock ladder'. Paluku-Kitakya (2007), for example, reports some cases from Beni and Lubero *territoires*, how household wealth improvement has been based on small livestock, such as chicken and cavies. Cavies apparently were the most robust among small animals distributed and, thus, outnumber chicken and rabbits (PNUD 2009), the latter being too delicate for the harsh post-conflict environment regarding general care, feed requirements and disease susceptibility. Considering that there are 8 cavies per household on average, we estimate that (probably many) more than 100,000 households in Nord-Kivu can benefit from any improvement of cavy culture.

Table 5. Summary of development and research projects for promoting cavy culture in the Democratic Republic of the Congo

Period	Actor*	Type of activity / project	Main activities related to cavies	Major results / outcome; additional remarks	Source
2004-2008	Université de Liège-Gembloux, Belgium; funded by CUD	AMINEKIN (Amélioration des miniélevages dans la ville de Kinshasa) – research project	Assessment of mini-livestock in Kinshasa; feeding and nutrition trials	Desmodium intortum, Euphorbia heterophylla, Amaranthus hybridus to complement Panicum maximum most suitable forages for cavies.	Bindelle and Buldgen 2006; Bindelle et al 2007, 2009
2004-2010	Centre agronomique et vétérinaire tropical de Kinshasa; Université de Liège-Gembloux, Belgium	Survey on urban livestock, capacity building, research	Organization of training for producers; importation of genitors from Belgium and selection program	7% of HHs keep cavies; selection of several cavy lines; project terminated early due to lack of funding.	Nkidiaka 2004; Unpublished project reports (2004-2010)
2007-2012	Université de Liège, Belgium; Université Catholique de Graben (UCG); and a consortium of NGOs; funded by CUD-PIC and DGD	Renforcement de l'autosuffisance alimentaire à Butembo (Nord-Kivu, RDC) par la promotion du compostage en culture maraîchère et l'amélioration zootechnique de la caviaculture dans le respect des coutumes locale – research project	Improving urban agriculture, including cavy breeding	Production of cavies has never been successful; major problems caused by war and civil unrest impeded project success.	J M Godeau (2013, pers. comm.)
2007-2012 and 2013-2017	VSF-Belgique; and funded by FBSA	LUVUPEL (Lutte contre la Vulnérabilité par le Petit Elevage and LUSAPEL (Lutte pour la Sécurité Alimentaire par le Petit Elevage) – food security and development projects	Establishing cavy breeding centers; capacity building in feeding, animal husbandry and health; training of para-veterinaries; marketing	6 cavy breeding centers established; >5200 cavies distributed to 900 HHs in 70 villages of Beni and Lubero territoires and also in Beni	VSF-B 2008; F Tsongo 2012; CNCND 2013; F Tsongo (unpublished)

			town; >1250 HHs trained on cavy breeding."		
2009-2012	CIAT; funded by BMZ	Improved forages for monogastric animals in Sud-Kivu – research project	Assessment of livestock situation; adaptation of improved forages; feeding cavies with improved forage legumes	Cavies slightly related to wealth classes defined by livestock holdings; forage legumes gave acceptable live weight gains; cavies preferred <i>Calliandra calothyrsus</i>	Maass et al 2011, 2012; Zozo et al 2010; Katunga-Musale et al 2011; Bacigale et al 2013
2011-2013	VSF-Belgique; funded by DGD	PROMELVU (Projet de Promotion de l'Élevage chez les Vulnérables Urbains, en ville de Butembo) – food security project	Cavy distribution; capacity building in animal husbandry, health and nutrition; producer group formation; marketing	630 cavies distributed to 105 households in Butembo town	VSF-B 2013
2011-2014	CIAT/UEA/ILRI; funded by AusAID	Harnessing husbandry of domestic cavy for alternative and rapid access to food and income in Cameroon and the eastern Democratic Republic of the Congo – research project	Livelihood assessment; value chain development; genetic makeup and breeding strategy; improved feeding; knowledge exchange and capacity building	Several research articles in process	

*Donors: AusAID, Australian Agency for International Development; BMZ, Federal Ministry for Economic Cooperation and Development, Germany; CUD, Commission Universitaire pour le Développement, Belgium; DGD, Direction générale de Coopération au développement et Aide humanitaire, Belgium; FBSA, Fonds Belge pour la Sécurité Alimentaire; VSF-B, Vétérinaires sans Frontières Belgique. HH, household.

The NGO Vétérinaires sans Frontières Belgique (VSF-B) has been most active in Nord-Kivu since 2007, promoting cavy culture as one of the livelihood strategies with small livestock species (Table 5). Among other activities, food security projects LUVUPEL (*Lutte contre la Vulnérabilité par le Petit Elevage*) in its first phase and LUSAPEL (*Lutte pour la Sécurité Alimentaire par le Petit Elevage*) in its second phase have focused on training para-veterinaries called AVE (*Auxiliaires Villageois d'Élevage*) who can assist smallholders in rural areas to combat diseases of small livestock in the absence of other veterinary services. Key diseases of cavies have been conjunctivitis, dermatophytosis, verminosis and vitamin deficiency (F Tsongo, unpublished). In addition, cavy breeding centers were established and farmers were trained in better husbandry, including feeding based on improved grass (*Pennisetum purpureum*) and crop residues such as leaves of banana, maize and sweet potatoes, as well as cabbage in higher elevations (*Territoire de Lubero*) in addition to kitchen scraps (Tsongo 2012). The project PROMELVU (*Projet de Promotion de l'Élevage chez les Vulnérables Urbains, en ville de Butembo*) promoted similar measures in Butembo town, focusing on food security of vulnerable urban population (VSF-B 2013). Cavies have been distributed as additional livestock to households in which malnourished children are registered in order to rapidly fight malnutrition (Photo 3).

Humanitarian motives have strongly guided many NGOs to distribute cavies in order to combat the rampant malnutrition, much of which is resulting from lack of animal protein due to looting of domestic livestock during the times of civil unrest. However, the introduction of cavy culture is also used in conservation projects in order to prevent local people from hunting wildlife for bushmeat, while obtaining sufficient animal protein to help reduce malnutrition, for example in villages near Tayna Nature Reserve (Mehlman 2010).



Photo 3. Distribution of cavies to youth and women in Kyalumba village, Lubero territoire, about 70 km from Butembo town, Nord-Kivu, DRC (Photos by F Tsongo)

Other provinces in DRC

Almost no other data on cavy populations in DRC could be sourced outside the Kivu provinces, except for assessments by the Worldbank (2009, 2011a-j), though data quality has to be considered with care, as discussed earlier (see Table 3). According to these sources, largest populations are found in Kasai-Oriental and Katanga, while in Equateur and Orientale provinces no cavies were recorded (Figure 4). Population sizes are much smaller than in the Kivu provinces, but numbers are clearly increasing, although again this may rather be due to more recent and more reliable data.

The driving force for the inclusion of cavies as suitable mini-livestock seems to have been the recognition that they can make significant contribution to food security and subsequent focus on this by various development projects. For example, projects in Bandundu province embrace cavies in their agricultural development portfolio (e.g., ISCO.Sc 2010). However, cavies are not being uniformly used in the country; from 7% of households in Kinshasa to more than 20% of households in Bas-Congo keep cavies for consumption (Table 6). B Kajinga-Mutumbo and J P Wambedila (2013, pers. comm.) indicated that cavies are less regarded as meat source in Equateur province, not because of the meat itself, but because of traditional believes; only bushmeat has value in that area. According to B Kajinga-Mutumbo (2013, pers.comm), cavy is more or less associated with poverty in Kinshasa, and many Congolese researchers at Université de Kinshasa look down on cavy research as poor research.

In the western provinces of DRC and especially in Kinshasa province, surveys carried out on cavies in 2003 showed that nearly one third of the population in Kinshasa practices some kind of livestock husbandry in urban or peri-urban areas; in some heavily populated municipalities, such as Masina, almost 7% of the livestock keepers raise cavies (Nkidiaka 2004). When establishing a nucleus of cavies for a selection program in the Institut supérieur agro-vétérinaire in Mont-Ngafula in Kinshasa in 2008, populations were introduced from the Kivu provinces, Lubumbashi and different villages and cities in the Bas-Congo province, such as Kimpese and Kisantu. Strong cavy nuclei seem to thrive unnoticed in all these areas as very few official reports are to be found that mention cavies (J Bindelle, unpublished).

Table 6. Records for the occurrence of cavy culture by province in the territory of the DR Congo, except the Kivu provinces

Province	Known territoires/ locations	Population surveyed and cavy keeping	Information on cavies	Source
Bas-Congo	Mbanza-Ngungu	No details	Forage species feeding on	Nguizani 2001
	4 villages in Cataractes	400 households – no further details	Average of 0.1 animals across all HHs	Ouma and Birachi 2011
	12, 7 and 4 villages from Cataractes, Lukaya and Bas Fleuve districts, respectively	77 households, 21% keep cavies	Average of 8 animals/HH (range 2-23)	Moula et al 2012
Kinshasa	Kinshasa town/ communes of Masina, Mont Ngafula and Selembao	644 households, 7% keep cavies		Nkidiaka 2004

Bandundu	Mai-Ndombe district, Bokoro	155 households (14.8% keep livestock), cavies are kept – no further data		ACF 2010
Kasai-Oriental	Kabinda district	125 households, 10.7% (in 2006), 13.8% (in 2007) keep cavies		PAIDECO 2007
Maniema	Kibombo-Hinterland of Kindu	130 households, cavies are kept – no further data		Kasigwa Masumbuko et al 2012
Katanga	Lubumbashi town	35 cavy-keeping households surveyed	Median 6, max. 10-12 animals/HH	F M Kampemba 2011, unpublished

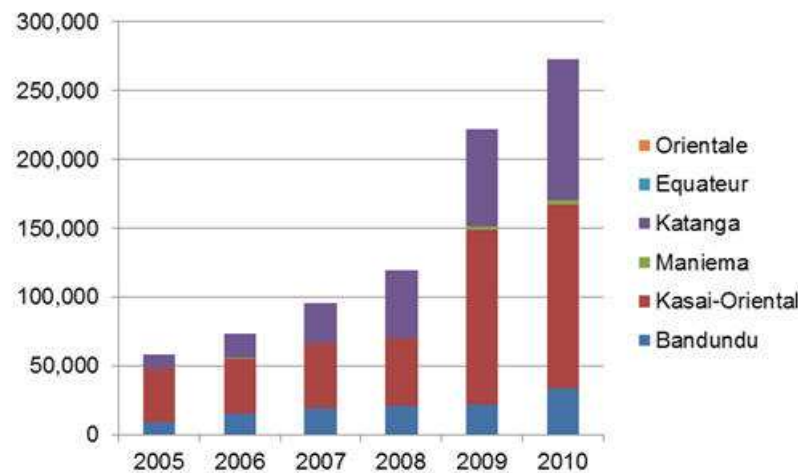


Figure 4. Estimated development of cavy populations in six provinces of DR Congo, excluding the Kivu provinces, according to data from the World Bank (RDC/BM 2011a-j)

Katanga is one of the provinces with a larger cavy population (RDC/BM 2011f), although F M Kampemba (2011, unpublished) deems cavy culture is declining in southern Katanga. B Kajinga-Mutombo (2013, pers. comm.) suggests that cavies have been used for more than 40 years in Katanga in almost all households to treat severe cases of anemia. The recipe was made up of fresh fowl egg mixed with fresh cavy blood, taken for a few days. The success of that treatment resulted in it becoming common practice in local pharmacopeia. In a survey of 410 households in Lubumbashi town, about half of them stated to consume cavy meat with different frequencies, though (Kampemba 2011). Kampemba (2011) mapped the distribution of 35 cavy-keeping households in Lubumbashi town; like in other parts of DRC, animals predominantly serve for household consumption in addition to sales. The majority of respondents (71%) considered cavy keeping essential for the family welfare, yet, further investigation of the animal's role for the cavy keepers' livelihoods is lacking.

Development and research of cavy culture in DRC

Until recently, development projects that included cavies and cavy husbandry, among other small livestock species, were only known from Nord-Kivu (Table 5). Traditional husbandry is mostly practiced with free-scavenging animals in the kitchen (Photo 1). Animals feed on kitchen scraps and additional herbaceous plants collected mostly by youth and children, a fact that may limit the available feed. Usually cavies are rather small and adult animals weigh around 500-600 g. Under improved husbandry (Photo 1) including dedicated feeding on the basis of green maize leaves and Guatemala grass (*Tripsacum andersonii*), respectively, adult animals reach 800 g (Maass and Metre 2011; Metre 2012). The report, however, that animals as large as almost 3 kg exist in the convent of Luhwinja close to Burhinyi at 75 km West from Bukavu (Metre 2005) is rather doubtful. Similarly, observed litter sizes of 6-8 kids conveyed earlier by Metre (2005) may have resulted from a lack of close observation that two females have given birth concurrently.

Research

Cavy production and utilization in DRC have received minimal scientific research attention thus far conducted in Kinshasa, Sud-Kivu and Lubumbashi with special focus on improving animal nutrition (Table 5, Table 7). Metre (2012) also achieved to reduce mortality by focusing on improved reproductive management, weaning at 3 weeks as well as

adequate feeding both in quantity and quality with improved forages. This shows that, when applying improved principles developed in Peru during several decades of cavy breeding (Chauca de Zaldívar 2000), cavy husbandry is also very promising in DRC.

Academic capacity building

As cavies have never been part of formal livestock research and development in DRC, there is a major need for capacity building and inclusion of cavy-related subjects in curricula. Some attempts have been made to boost academic capacity in cavy R&D, primarily through encouraging students in Bukavu to choose aspects of cavy culture for their undergraduate projects (Table 7). Some undergraduate theses conducted by Belgian students helped to gain initial insights into some aspects of cavy husbandry, particularly in Kinshasa. Over the past two years, cavy husbandry has become an integral part of teaching animal production at the Université Evangelique en Afrique (UEA) in Bukavu, so that all animal production students will become familiar with cavy as a small livestock species. The cavy project is assisting in capacity building of Congolese students at MSc and PhD level in universities of reasonable familiarity with cavy culture, such as University of Dschang in Cameroon and Sokoine University of Agriculture in Tanzania. Practical training of cavy keepers on improved husbandry and marketing, has probably received most attention by VSF-B through the food security and development projects LUVUPEL and LUSAPEL in Beni and Lubero *territoires* as well as Butembo town in Nord-Kivu (Tsongo 2012).

Table 7. Capacity building with emphasis on cavy culture in the Democratic Republic of the Congo

Type of study, university/ institute*	Subject/theme	Additional remarks	Source
Diploma thesis at Institut Supérieur de Développement et Rural (ISDR), Bukavu, DRC	Detailed, comprehensive description of existing cavy culture in Walungu, Sud-Kivu and improvement potential	Unpublished	Mugisho 1995
MSc thesis at Univ. Catholique de Louvain, Belgium	Estimation of feed value of typical forages fed to cavies in Kinshasa		Picron 2007
MSc thesis at Univ. Catholique de Louvain, Belgium	Study on apparent digestibility of local feed resources in Kinshasa (DRC) for cavies		Marlière 2007
Diploma thesis at Univ. de Liège-Gembloux, Belgium	Practical guidelines for cavy husbandry in Kinshasa	Based on South American experiences	Pourtoy 2008
Thesis Med. Vet. at Univ. de Liège, Belgium	Cavy culture in peri-urban environment Nord-Kivu	Mainly literature review on South American cavy culture	Ekkers 2009
PhD thesis at Institut supérieur agro-vétérinaire, Univ. Kinshasa, DRC	Cavy breeding	Disrupted research	J Uмба di M'Balu (disrupted)
MSc thesis at Univ. de Liège-Gembloux, Belgium	Assessment of cavy production under improved husbandry conditions in Sud-Kivu		Metre 2012
MSc thesis at Univ. de Lubumbashi, DRC	Consumer survey; mapping cavy distribution in Lubumbashi town; nutritional analysis of local forages	Forages grown on mine spoil sites and fed to cavies	Kampemba 2011
PhD thesis at Univ. de Lubumbashi, DRC	Feeding cavies with improved forage legumes in Sud-Kivu		Katunga-Musale 2013
Research under ABCF fellowship#	Cavy genetic diversity in Sud-Kivu		B Bisimwa (in process)
MSc studies at Univ. of Dschang, Cameroon	Cavy genetic diversity in Cameroon; Feeding cavies with local Asteraceae in		R B B Ayaguirwe 2014; P C Azine 2014 – both UEA staff

	Cameroon	
MSc studies at Sokoine Univ. of Agriculture, Tanzania	Feeding cavies with improved forage grass and legumes in Sud-Kivu	S B Bacigale (in process)
Undergraduate 'mémoires' since the 2010s	Forage inventory and palatability; supplementary feeding with waste soybeans; assessment of animal production and reproduction; cavy marketing;	4 diplôme theses, unpublished10 Université Evangélique en Afrique (UEA), Bukavu, Department de Zootechnie – archives

*ABCF, Africa Biosciences Challenge Fund – see <http://hub.africabiosciences.org/activities/capacity-building/africa-biosciences-challenge-fund>

Challenges and opportunities of cavy culture in DR Congo

The extent and importance of cavy culture in DRC starkly contrasts development and research activities conducted thus far. A number of challenges have been identified regarding improvement and wider acceptance of cavy culture.

- Cavies as livestock are a neglected species and as such there is little support from institutions. On the other hand, part of their success under the harsh conditions of extreme poverty and insecurity prevalent in DRC are their robustness to even produce under minimal conditions, their small size for easy handling, and their prolificacy (Lammers et al 2009; Metre 2011).
- Due to unrestricted mating and lack of reproductive management of the herds, it is anticipated that high inbreeding rates (Mugisho 1995) may result in inbreeding depression and associated reduced size, poorer reproduction and greater disease susceptibility.
- Cavy consumption was originally the domain of children in DRC, even in practices such as using cavy blood to treat anemia (Mugisho 1995; B Kajinga-Mutombo 2013, pers. comm.). While adults consume cavies far more frequently since the mid-1990s (Vlassenroot 2008; Metre 2011), there remains considerable reluctance in urban communities to use cavies as food. This is probably related to the perception that cavies are often associated with poverty (Maass et al 2010; B Kajinga-Mutombo, 2013, pers. comm.).
- There are very limited marketing channels, and the cavy value chain is undeveloped.
- Information about improved cavy husbandry and advances in cavy culture from South America exists almost only in Spanish and is, consequently, practically inaccessible due to language barriers.

Many of the above challenges can be addressed through research, communication and regional development, once more is understood of the animal, its husbandry, and its potential contribution to livelihoods in DRC. The rapid growth in the role of cavies in some provinces and *territoires* shows that they can make important contributions to food and nutrition security. They also provide opportunities for income generation and wealth creation especially for women as well as soil fertility management with manure. Lastly, as a women's animal, they can assist their empowerment at home and in the community by giving them voice and space.

Conclusions

- Cavy culture contributes to the wellbeing of hundreds of thousands of mostly poor, rural and urban households in DRC who see the animal as an important asset. The rapid growth in their contribution – a contribution that is clearly being adopted widely – suggests that greater R4D investment is necessary if production is to reach the potential that is common place in some South American countries. There is firstly a need to get more accurate information on cavies and their roles across DRC; and to do that, cavies need to be included in livestock census. They have a particular stake in the empowerment of women and the youth as a non-monetary service and an indirect benefit by assisting to meet some of the household nutrition requirements and contribute to the educational costs of many children (Maass et al 2012, 2013). As such they may serve as the first rung on the livestock ladder that can help to acquire certain levels of wealth (Maass et al 2013). It is likely that cavy culture will continue its expansion in DRC and that growth will be supported by a project on 'Harnessing husbandry of domestic cavy for alternative and rapid access to food and income in Cameroon and the eastern Democratic Republic of the Congo'. Progress will expedite by accessing knowledge from South America, where improving cavy culture has received attention over decades (Chauca de Zaldívar 2000). Knowledge exchange between project partners from Cameroon and DRC will additionally help to advance cavy culture in the region.
- Most urgent research needs have been identified around the animal's reproductive management, adequate feeding and housing, animal health, human nutrition, value chain development and socio-cultural issues, together with thorough capacity building. By involving a most comprehensive set of stakeholders in research and development activities, we suggest that this new project offers a golden opportunity to move the agenda for domestic cavy

production forward for the benefit of cavy keepers and consumers in DRC and other countries of central and eastern Africa.

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Notes

¹ The term ‘Cavy’ is preferred over the colloquial ‘Guinea pig’ because the latter gives a wrong impression of a domestic animal that neither originates from Guinea nor is a pig.

² For example ‘Lapins et cobayes, revue mensuelle illustrée de cuniculiculture et de caviculture ... I [-V] 1910 [-1914]. E Meslay (avocat.)’

³ In the Kivu provinces, administrative units are, from superior to inferior, *Territoire, Collectivité, Groupement, Localité, Village*.

⁴ *Mwami* is a traditional chief of the small kingdoms in Nord-Kivu, Sud-Kivu and Maniema provinces of DRC.

⁵ *Bwaki* means malnutrition or Kwashiakor in the local ‘Mashi’ language.

⁶ Both primary and secondary school had to be paid for in DRC.

⁷ The CIALCA baseline (Ouma and Birachi 2011) was carried out with all rural households regardless whether keeping livestock or not; the average does not distinguish between rabbits and cavies.

⁸ Based on former studies in the region (Maass et al 2012), we assumed a proportion of 1 : 2 for rabbits : cavies. With an average of 1.9 rabbits + cavies, there would be 1.3 cavies/household; estimating about 800,000 HHs in Sud-Kivu, this would result in 1 million cavies.

⁹ According to Ansoms and Marivoet (2010), the poverty line is set to FC 420 per person per day (1.96 PPP\$, 2005 prices) in urban areas, and FC 268 per person per day (1.25 PPP\$, 2005 prices) in rural areas; PPP\$ means purchasing power parity; exchange rate was about FC 900 per 1 USD in 2010.

¹⁰ Heri Cishesha T 2011 Etude sur les circuits de commercialisation des cobayes (*Cavia porcellus*) dans les marchés périurbains de Bukavu. Travail présenté par l’obtention du diplôme de gradué en Sciences Agronomiques et Environnement, Université Evangélique en Afrique (UEA), Bukavu, DRC. 30 pp.

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