

Report of a Participatory Rural Appraisal (PRA) in the Groupements of Miti-Mulungu and Tubimbi, South Kivu/DR Congo



by

Rachel Zozo, Wanjiku L. Chiuri, Dieudonné Katunga Musale and Brigitte L. Maass

Nairobi, Kenya

November 2010

**REPORT OF A PARTICIPATORY RURAL APPRAISAL (PRA)
IN THE GROUPEMENTS OF MITI-MULUNGU AND TUBIMBI,
SOUTH KIVU/DR CONGO**

CIAT Working Document No. 211

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Nairobi, Kenya – November 2010



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2. Participatory rural appraisal.
3. Livestock.
4. Monogastric animals.
5. Small scale farming.
6. Forage.
7. Democratic Republic of the Congo.

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1. Participation des agriculteurs.
2. Diagnostic rural participative.
3. Bétail.
4. Animal monogastrique.
5. Petite agriculture.
6. Fourrage.
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1. Participación de agricultores.
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REPORT OF A PARTICIPATORY RURAL APPRAISAL (PRA) IN THE GROUPEMENTS OF MITI-MULUNGU AND TUBIMBI, SOUTH KIVU/DR CONGO

—
1-6 March 2010

Project on ‘More Chicken and Pork in the Pot, and Money in Pocket: Improving Forages for Monogastric Animals with Low-income Farmers’

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SUMMARY

Within the project ‘More Chicken and Pork in the Pot, and Money in Pocket: Improving Forages for Monogastric Animals with Low-income Farmers’, a Participatory Rural Appraisal (PRA) has been carried out in Miti-Mulungu (*Territoire de Kabare*) and Tubimbi (*Territoire de Walungu*) ‘groupements’ (sub-counties) with participation of a total of 165 community members. During this activity, five tools have been used to gather information, (i) the seasonal calendar, (ii) the gender daily calendar, (iii) the gender wealth classification, (iv) the village resource map, and (v) the resource flow diagram.

The possession of livestock, especially large animals like cattle, is an important criterion of wealth for all participants. Despite their high abundance, people are apparently not aware about the value of their small animals (chickens, cobayes, ducks and rabbits), which are frequently exchanged with bigger ones, such as goats, swine and even cows; this indicates their potential to ascend on the so-called ‘livestock ladder’.

There was a general lack of knowledge and skills on animal husbandry. A lack of access to appropriate veterinary products and ignorance about their utilization are major livestock challenges in the two sites. People expressed the needs to feed their animals, especially in the dry season. However, forage cultivation is not traditionally practiced in the two sites. An additional challenge appears to be to cultivate forages in such a volatile environment in terms of security, extreme deforestation and livestock species, which do not have social class.

The most important difference between the two *groupements* was perceived in their general wealth status. Due to insecurity, the effects of multiple wars, the incidences of crop diseases, and low government support of the agricultural sector, Tubimbi has been deprived of its major means of survival and has been impoverished. On the other hand, gold mining by young men helps the community to obtain cash. People from Miti-Mulungu seemed to be better off, also because of the better connection with the provincial capital Bukavu.

¹ Local participants are listed in Appendix 1

RAPPORT D'UNE 'MARP' (MÉTHODE ACCELLÉRÉE DE RECHERCHE PARTICIPATIVE; OU PRA, PARTICIPATORY RURAL APPRAISAL) DANS LES GROUPEMENTS DE MITI-MULUNGU ET TUBIMBI, SUD-KIVU/RD CONGO

—
1-6 de Mars 2010

Projet de 'More Chicken and Pork in the Pot, and Money in Pocket: Improving Forages for Monogastric Animals with Low-income Farmers'

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RESUMÉ

Dans le projet '*More Chicken and Pork in the Pot, and Money in Pocket: Improving Forages for Monogastric Animals with Low-income Farmers*' (i.e., 'Plus de poules et porcs dans la casserole, et plus d'argent dans la poche: Amélioration des fourrages pour les animaux monogastriques en faveur des fermiers aux faibles revenus'), on a conduit, avec la participation de 165 membres de la communauté, une 'MARP' (Méthode Accellérée de Recherche Participative) chez les groupements de Miti-Mulungu (Territoire de Kabare) et de Tubimbi (Territoire de Walungu), Sud-Kivu, RD Congo. Pour mener à bien cette étude, nous avons utilisé cinq outils, (i) le calendrier saisonnier, (ii) les activités journalières par catégories (hommes, femmes et jeunes), (iii) la carte des ressources du village, (iv) le flux des ressources dans le village, et (v) la classification de la richesse dans le village.

La possession de bétail, et plus particulièrement des grands animaux comme les vaches, est un critère important de richesse pour tous les participants. Malgré son abondance élevée, apparemment les gens ne semblent pas se rendre de la valeur des petits animaux (les poules, les cobayes, les canards, et les lapins) qui sont fréquemment échangés pour des animaux plus grands comme les chèvres, les porcs et même les vaches. Cela indique leur potentiel pour monter la soi-disant 'échelle du bétail' [*livestock ladder*].

Le plus souvent, des manques de connaissances et de savoir faire en élevage ont été constatés. Le manque d'accès aux produits vétérinaires appropriés et l'ignorance sur leurs utilisations sont aussi de grands défis pour l'élevage en milieu réel. Les gens doivent nourrir leurs animaux, spécialement pendant la saison sèche, mais traditionnellement ils ne pratiquent pas la culture de fourrages. Un autre défi semble être la culture de fourrages dans un environnement peu stable que ce soit en terme de sécurité ou de déboisement extrême et dans ce cas les espèces de bétail qui n'ont pas de classe sociale.

La plus grande différence observée entre les deux groupements était leur niveau différent de richesse. A cause de l'insécurité, des effets négatifs des multiples guerres, l'arrivée de maladies sur les cultures, et le faible appui du gouvernement au secteur agricole, Tubimbi a été privé de ses majeurs moyens de survie et a été appauvri. En plus de cela les jeunes hommes chercheurs d'or fournissent de l'argent à la communauté. Les gens de Miti-Mulungu apparaissaient donc favorisés grâce à une meilleure connexion avec la capitale provinciale Bukavu.

² Les participants locaux se trouvent listés dans l'Appendice 1

REPORTE DE UN DIAGNOSTICO RURAL PARTICIPATIVO (DRP; O PRA, PARTICIPATORY RURAL APPRAISAL) EN LOS GROUPEMENTS DE MITI-MULUNGU Y TUBIMBI, KIVU DEL SUR/RD CONGO

–
1-6 de Marzo de 2010

Proyecto de ‘More Chicken and Pork in the Pot, and Money in Pocket: Improving Forages for Monogastric Animals with Low-income Farmers’

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RESUMEN

Dentro del proyecto 'Más pollo y cerdo en la olla, y dinero en el bolsillo: Forrajes mejorados para animales monogástricos de los agricultores de bajos ingresos', se ha llevado a cabo un Diagnóstico Rural Participativo (DRP) en los '*groupements*' (sub-condados) Miti-Mulungu (Territorio de Kabare) y Tubimbi (Territorio de Walungu) con la participación de un total de 165 miembros de la comunidad. Durante esta actividad, cinco herramientas se han utilizado para recopilar información; (i) el calendario estacional; (ii) el calendario diario considerando género; (iii) la clasificación de riqueza considerando género; (iv) el mapa de los recursos del pueblo; y (v) el diagrama de flujo de recursos.

La posesión de ganado, especialmente los grandes animales como las vacas, es un criterio importante de riqueza para todos los participantes. A pesar de su gran abundancia, la gente aparentemente no está consciente del valor de sus pequeños animales (pollos, cuyes, patos y conejos), que con frecuencia se intercambian por otros más grandes, tales como cabras, cerdos y hasta vacas, lo que indica su potencial para ascender en la llamada 'escala de ganado'.

Hubo una falta general de conocimientos y habilidades en la cría de animales. La falta de acceso a los medicamentos veterinarios adecuados y la ignorancia sobre su utilización son grandes retos de la ganadería en los dos sitios. La gente expresó las necesidades de alimentar a sus animales, sobre todo en la estación seca. Sin embargo, tradicionalmente no se practica el cultivo de forraje en los dos sitios. Un desafío adicional parece ser cultivar forrajes en un entorno tan volátil referente a la seguridad, la deforestación extrema y especies de ganado, que no tienen clase social.

La diferencia más importante entre los dos '*groupements*' se percibió en su nivel general de riqueza. Debido a la inseguridad, los efectos de las guerras múltiples, la incidencia de enfermedades de los cultivos, y el apoyo gubernamental bajo al sector agrícola, Tubimbi ha sido privado de sus principales medios de supervivencia y se ha empobrecido. Por otra parte, la minería de oro realizada por los jóvenes ayuda a la comunidad para obtener dinero en efectivo. La gente de Miti-Mulungu parecía estar mejor, debido también a la mejor conexión con la capital provincial de Bukavu.

³ Los participantes locales se listaron en el Apéndice 1

REPORT

INTRODUCTION

The project 'More Chicken and Pork in the Pot, and Money in Pocket: Improving Forages for Monogastric Animals with Low-income Farmers' has initiated forage research in the South Kivu province of the Democratic Republic of the Congo (DRC) in mid 2009. The objectives of this project are (i) to assess and improve the suitability of forage-based protein feeds for monogastric animals; (ii) to co-develop optimal partnership approaches that connect low-income farmers with new forage germplasm and associated feed management practices, and co-examine technology effects on households and communities; and (iii) to critically examine the possibilities of farmers extending animal and feed sales within and beyond their community. In June 2009, a diagnostic survey was performed in seven '*groupements*'⁴ (sub-counties), located North, South-West, and South of the provincial capital town of Bukavu, comprising a total of 20 villages (Maass et al. 2010)⁵, part of which are research sites of the consortium CIALCA⁶, whereas others have been selected for their agro-ecological conditions. The non-CIALCA sites have not been included in previous baseline studies or any participatory assessment of agricultural production and activities, for which reason the present study was carried out.

A Participatory Rural Appraisal (PRA) is regarded necessary if one wants to inquire about the realities of an ambience. Before conducting the PRA, there was half a day of training the facilitators by Profs. Wanjiku Chiuri and Brigitte Maass of CIAT. Dr. Dieudonné Katunga Musale and Ms. Rachel Zozo provided logistical support. In addition to these four, another six persons acted as facilitators (Appendix 1). Four teams were constituted, equally comprising women and men, to apply different tools of the PRA. The tools selected were (i) the seasonal calendar (Appendix 4), (ii) the gender daily calendar (Appendix 3), (iii) the gender wealth classification (Appendix 2), (iv) the village resource map (Appendix 5), and (v) the resource flow diagram (Appendix 6).

The PRA was performed in the two *groupements* of Miti-Mulungu and Tubimbi each for two days, in the province of South Kivu, DRC in the first week of March 2010. Both *groupements* were included in the diagnostic survey. Most of the PRA was conducted in Kiswahili and French, while participants among themselves largely spoke the local language '*Mashi*'. Therefore, the report with all annexes has initially been prepared by Ms. Rachel Zozo in French and subsequently translated into English by her as well; additional amendments were carried out by the other leading participants.

Community participation

In Miti-Mulungu, there were overall 67 participants (33 women, 34 men) during the first day and 59 participants (32 women, 27 men) during the second day; 18 of the women from the

⁴ In South Kivu, administrative units are, from superior to inferior, *Territoire*, *Collectivité*, *Groupement*, *Localité*, and *Village*.

⁵ Maass, B.L., Katunga-Musale, D., Chiuri, W.L. and Peters, M. 2010. Diagnostic survey of livestock production in South Kivu/DR Congo. Working Document no. 210, Centro Internacional de Agricultura Tropical (CIAT), Nairobi, Kenya. 36 pp.

⁶ CIALCA, Consortium for Improving Agriculture-based Livelihoods in Central Africa; see www.cialca.org

first day returned, 15 dropped out, but 14 new women showed up; 23 of the men from the first day returned, 4 dropped out, but 11 new men showed up. The total list of participants showed 85 different names. Most of them (82%) indicated their livestock species owned (Table 1), especially goats, chicken, cobayes⁷ and rabbits. Only 3 participants had swine, and 1 each cattle or fish (aquaculture); 11 participants reported not to have any livestock.

In Tubimbi, 52 participants showed up on the first day (28 women, 16 men, and 8 not recorded), whereas there were 63 participants (32 women, 26 men, and 5 not recorded) during the second day; 20 of the women from the first day returned, 8 dropped out, but 12 new women showed up; 12 of the men from the first day returned, 4 dropped out, but 14 new men showed up; also 3 of the unknown from the first day returned, 5 dropped out, but 2 new unknown showed up. The total list comprises 80 different names, who all provided information about their livestock species owned (Table 1). Chicken were the most common; they are owned by about two thirds. Cobayes, swine and goats were owned by about half of the participants. Aquaculture apparently plays a substantial role in Tubimbi. There is a fish pond belonging to a local association that was supported by the '*Conseil des Facilitateurs des Pays des Grands Lacs*' (CFGL) that is currently inactive. Cattle, rabbits or sheep were owned by very few individuals, whereas 4 participants reported to not have any livestock at all.

The provision of a contact telephone number by participants was regarded as a certain sign of wealth, which differed substantially between men and women, but more so between the two *groupements*. While in Miti-Mulungu overall 65% of participants gave their telephone number, this was only the case for 16% in Tubimbi (Table 2).

Table 1. Proportion (%) of livestock species held by participants in a PRA in the *groupements* of Miti-Mulungu (N=70) and Tubimbi (N=80) of South Kivu province, DRC in March 2010.

Location	Cattle	Sheep	Goats	Chicken	Swine	Cobaye	Rabbits	Ducks	Aqua-culture (ponds)
Miti-Mulungu	1.4	n.a.	42.9	27.1	4.3	22.9	18.6	n.a.	1.4
Tubimbi	11.3	3.8	46.3	81.3	51.3	53.8	8.8	16.3	28.8

n.a., not available.

Table 2. Proportion (%) of participants in a PRA in the *groupements* of Miti-Mulungu (N=85) and Tubimbi (N=80) of South Kivu province, DRC in March 2010, who provided a telephone number.

Location	Women (no.)	Women (%)	Men (no.)	Men (%)	Total (no.)	Total (%)
Miti-Mulungu	24	51.1	31	81.6	55	64.7
Tubimbi	2	5.0	9	30.0	13*	16.3

* the gender of two telephone holders was not registered.

⁷ The French name '*Cobaye*' is being used here instead of the English '*Guinea pig*' because the latter provides a wrong impression of a domestic animal that neither originates from Guinea nor is a pig. In 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*'.

Environmental conditions

The *groupement* of Miti-Mulungu is located at about 1600 m asl., 25-27 km North of Bukavu, while Tubimbi is at about 1100 m asl., 77 km South-West from Bukavu. The dust road from Bukavu to Miti-Mulungu is a main road to the North that is in the process of being tarmacked; this will connect the people much better to the markets of the provincial capital. From Bukavu, Tubimbi is past the MONUC⁸ camp in Walungu and about further 20 km before arriving in Kasika, which is still said to be an unsafe area. The winding dust road bridges altitudinal differences of more than 1000 m. Isolation due to bad road infrastructure has been found to be an important determinant of wealth and/or development in South Kivu (Ulimwengu et al. 2009⁹).

The main rainy season (A) in both *groupements* is from March to May, while the short rains (season B) usually occur in September. Nevertheless, rainfall in Tubimbi is, most likely, higher than in Miti-Mulungu. During the long rains, there may be less rainfall intensity from March to April in Miti-Mulungu and during April in Tubimbi. The dry season lasts from June to August.

In the following, summaries are provided about the main findings and some key observations in the two *groupements*, Miti-Mulungu and Tubimbi. Thereby, most attention is given to all aspects of livestock husbandry and production.

MITI-MULUNGU

The discussions made with farmers have led us to understand the major problems that these people are facing in their daily living, but particularly with regard to livestock rearing.

1. The seasonal calendar

- Farmers plant cassava during February-April and September-October (Appendix 4), yet at INERA (Institut National pour l'Etude et de la Recherche Agronomiques) planting also takes place from April to May and in November¹⁰.
- At Miti, farmers grow amaranth to produce seeds for sale instead of legumes for home consumption. They derived much money from selling seeds to major NGOs such as OXFAM, CARITAS, SENASEM (Service National des Semences). However, in former times, certain farmers have been using amaranth grains to prepare children's food often by mixing them together with maize flour because of their excellent nutritional value. But this practice, which is not widely disseminated in DRC, was stopped when amaranth seed got a lucrative market.

⁸ MONUC, Mission de l'Organisation des Nations Unies en République Démocratique du Congo (English, Mission of the United Nations Organization in the Democratic Republic of the Congo, DRC), is a United Nations peacekeeping force established in 1999; since 30 June 2010 it is called MONUSCO, United Nations Organization Stabilization Mission in the Democratic Republic of the Congo.

⁹ Ulimwengu, J., Funes, J., Headey, D. and You, L. 2009. Paving the way for development? The impact of transport infrastructure on agricultural production and poverty reduction in the Democratic Republic of Congo. IFPRI Discussion Paper 00944. International Food Policy Research Institute (IFPRI), Washington, DC, USA, 48 pp.

¹⁰ It may even be planted during all the months of the year [Katunga].

- It was found that during the dry season, there is fodder scarcity, and the people resort to swamps in order to feed their livestock. They also use agricultural residues and kitchen wastes as feed.
- Chicken husbandry means that animals scavenge for feed. They are released in the morning for wandering around throughout the day and, in the evening, they return home by themselves. However, during the planting and flowering times of crops, chickens are kept in the house and are fed with maize, soybeans, cassava residues, and left overs from the kitchen.
- Rabbits and guinea-pigs are housed in the kitchen and are basically fed with sweet potatoes, cabbage, the herbs 'ragala' (*Galinsoga parviflora*), 'kashisha' (*Bidens pilosa*) of Asteraceae, 'Lwibahe'¹¹ and the legume 'djom-djom' (*Desmodium intortum*).
- Swine are raised in stables and are fed with bananas, cassava leaves, avocados, *Galinsoga parviflora*, *Commelina* spp.¹², sweet potato vines, yams, and kitchen wastes.¹³
- Populations of both swine and chickens/rabbits have seasons with high mortality.
- Farmers mentioned a number of animal diseases, affecting cobayes, swine, rabbits and chickens, throughout the year. These diseases appear to be consequences of lack of better nutrition and access to better life care. It has been noted that most farmers do not have access to veterinary services and/or products.

2. The gender daily calendar

It has been found that women and young men are the ones responsible of care and feeding animals (Appendix 3). Men are not directly involved in most of the livestock rearing activities except for the cattle, but they are the ones to make decisions (eating and selling).

It was stated that children do their homework early in the morning or when they herd animals in the field ('*la brousse*' – "*ils sortent avec leurs cahiers*").

Some people work in the fields of others to gain money for school fees; the usual daily pay is 1000 Fcs (1.2 US\$). School fees are 1500 Fcs/2 US\$ for primary per month per child; and 5 US\$ for secondary school.

Among the men, about half stated that they eat meat only once a month, the other half said once a week. The meat is usually from rabbit, cobaye or chicken. The typical household comprises 10 members, which may all share one cobaye in a meal.

¹¹ The species' scientific name was given as *Erlangea* sp. (Asteraceae), but could not be confirmed. In addition, Gilbert (1981) suggested that many species of the genus *Erlangea* be transferred to the genus *Bothriocline* (Gilbert, M.G. 1981. Notes on East African *Vernonieae* (Compositae). Kew Bulletin 36(3):591-596.)

¹² In the literature, *Commelina* species are often named as *C. benghalensis*, but without any evidence for its proper taxonomic identification. Specific names may have been assigned haphazardly, i.e., different species according to the references may as well be the same. During the diagnostic survey (Maass et al. 2010), at least two species were morphologically distinguished in the region.

¹³ As *Pennisetum purpureum* is observed everywhere in the study sites, it is highly likely that swine are also fed on this grass; however, this was not stated during the PRA. *Setaria sphacelata* is especially found in Miti-Mulungu, but not in Tubimbi [Katunga]. On the other hand, the abundance of these grasses would mean that people do cultivate forages. There could have been a communication problem.

3. The gender wealth classification

Livestock plays an important role for the classification of wealth by the local people. While possession of cattle is the criterion to be regarded as very rich, goats and swine characterize the rich and intermediate. The people considered the poorest in this *groupement* are those without any livestock (Appendix 2).

It has been observed that cobayes, even in large numbers, are not a criterion of wealth classification. The cobayes are basically raised by poor people because they do not have much money to acquire other animals and children are the ones who look after them. Once one has many cobayes, they are often converted into rabbits and chickens or goats and even cows.

4. The village resource map and resource flow diagram

- The village resource map has been drawn with the assistance of community members. Different key resources¹⁴ are represented on the map. The map shows that there is no grazing land; animals are raised depending on each one's understanding (Appendix 5).
- The importance of animals to produce manure was rated from goat superior to rabbit > cobaye > swine. Men stated that they do not hold swine to produce manure because "swine manure is not good"; but a strong reason to hold the other animals is because the manure is needed for crop production.
- This community is in contact with other communities or villages such as Mudaka, Bunyakiri, Kalonge and Katana (Appendix 6). It is also in contact with the two major urban centres, which are the major consumers (Bukavu and Goma). The flow of resources is very intensive. However, the flow of resources with Goma is low because this urban centre is very far away; people need to incur extra-transport cost.

TUBIMBI

Poverty has struck this community and people are deeply dispaired. Though their principal activity used to be livestock rearing, this population practiced intensive mixed agriculture with cassava and plantains as the major crops being produced for the Bukavu market. But due to insecurity and multiple wars, incidences of cassava mosaic and banana wilt diseases, the community has been deprived of its major means of survival and has been impoverished once again.

It was reported that banana wilt (Panama disease, caused by *Fusarium oxysporum*), arrived in the region during the late 1990s and, together with Black Sigatoka disease (caused by *Mycosphaerella fijiensis*) and nematodes, devastated banana and plaintain production. Whereas Cassava Mosaic Virus (CMV) started to occur since 2002, from when it has infested almost all cassava fields. People are now gradually replacing cassava by cultivating sweet potatoes. However, men complained that they would now have to eat sweet potato leaves as vegetable instead of the traditional '*sombe*' made from cassava leaves; and sweet potato leaves were regarded as pig feed ("*mais c'est nourriture des porcs*"). Also, since CMV occurred, young men have gone away to mine gold.

¹⁴ Interestingly, eggs were never mentioned, neither in Miti-Mulungu nor in Tubimbi.

Some men stated that they were the 4th generation to live in the village. They also had suffered from the war in 1998, when Hutu rebels from Rwanda fought through the *groupement*.

1. The seasonal calendar

- It has been observed that there was no diversity of crops (Appendix 4). The only available crop throughout the year is cassava, but in insufficient quantities even for household consumption. Several other crops, such as soybeans, cabbage and groundnut have been disseminated in the area by NGOs with not much success due to lack of follow up and lack of interest by the villagers.
- The animals raised throughout the year are swine, cobayes, poultry and rabbits but the latter have been recently introduced¹⁵.
- The major source of income in this community is from gold mining.
- The principal commodities of commercialisation are palm oil and brooms made from palm leaves.
- Among the human diseases, Kwashiorkor¹⁶ appears to be the major from naked eye observations. Nutritional studies can determine how severe this may be.

2. The gender daily calendar

- Firewood fetching seems to be an uphill task because women have to walk long distances to collect wood (Appendix 3). Therefore, they fetch wood two times per week. This is the outcome of deforestation in this area.
- It has been found that all household chores are undertaken by women. They provide both productive and reproductive tasks, they contribute tremendously to the coping mechanisms of the household survival.
- Men reported that they only eat once a day, in the evening. The left overs from that meal are usually given to the children before they go to school. Their typical meal consists of '*ugali*' made from cassava and a sauce from leafy vegetables, such as '*lengalenga*' (Amaranth) or '*sombe*' (cassava leaves).
- Traditionally, livestock held in this *groupement* was cattle. However, after the wars and substantial violence in the region, people only hold manageable numbers of smaller animals. For example, they stated that they could not have larger goat numbers because of a lack of stables; on the other hand higher goat numbers could not be held by tethering, which is the typical form of husbandry. They also stated that their capacity of livestock numbers has substantially been reduced due to banana and cassava diseases.

¹⁵ It is unlikely that rabbits are a new introduction because they are known in the region, even Tubimbi, since many years ago [Katunga].

¹⁶ This disease is defined as "an acute form of childhood protein-energy malnutrition characterized by edema, irritability, anorexia, ulcerating dermatoses, and an enlarged liver with fatty infiltrates. Kwashiorkor was thought to be caused by insufficient protein consumption but with sufficient calorie intake, distinguishing it from marasmus. More recently, micronutrient and antioxidant deficiencies have come to be recognized as contributory"; cited 24 Apr. 2010 from: <http://en.wikipedia.org/wiki/Kwashiorkor>

3. The gender wealth classification

People are not aware that small animals (chickens, cobayes, ducks and rabbits) can be a criterion of wealth. These small animals are frequently exchanged with bigger ones, such as cows, goats and swine, indicating their potential for the owner to ascend on the so-called 'livestock ladder' (Perry 2002¹⁷).

Goats were stated to be rather rare as people prefer to eat beef or pork.

Neither the quality of housing nor the number of children were regarded as an indicator of wealth by the men (Appendix 2).

For casual labour in the fields of neighbours, men receive about 700-800 Fcs per day. From about 15 years of age onwards, young men go to the mines, where they can earn more/better per day¹⁸. This may not be true given the methods they use to get the gold dust and the prices in the local mines.

4. The village resource map and resource flow diagram

- The village resource map has been drawn with the assistance of community members (Appendix 5). Different key resources¹⁹ are represented on the map. It shows that there is no grazing land available to the villagers. Animals are raised either by free roaming or herded/tethered depending on the livestock species. On the other hand, the surrounding hillsides are covered by grasslands. Villagers stated that there has never been forest, not even during their grandparents' times. But this needs to be verified given that this region of DRC is located in the humid tropics where the climax vegetation would be expected to be montane rainforest. We observed that burning of the grassland was very common even during the rainy season when the vegetation was still green.
- This community depends more on outside food sources than its own production (Appendix 6). Local production is not sufficient to meet the needs of the population. The community is in contact with other communities or markets such as Kashunju, Kankinda, Burhuza and Mwenga. It is also in contact with the major urban center (Bukavu), where most food and other household products are coming from now.
- The *groupement* is well known for its production of palm oil. Because processing is only available in Bukavu, palm oil cake, which is an excellent animal feeding concentrate, needs to be bought by the villagers.

¹⁷ Perry, B.D. Randolph, T.F., McDermott, J.J., Sones, K.R. and Thornton, P.K. 2002. Investing in animal health research to alleviate poverty. International Livestock Research Institute (ILRI), Nairobi, Kenya, 148 pp.

¹⁸ However, some men stated "the same", i.e., that they would not earn more in the mines [Maass].

¹⁹ Interestingly, eggs were never mentioned.

GENERAL CONCLUSIONS

From the five tools applied during the Participatory Rural Appraisal (PRA) study in Miti-Mulungu (*Territoire de Kabare*) and Tubimbi (*Territoire de Walungu*) sub-counties with participation of community members, the findings have led us to draw the following major conclusions, especially concerning livestock husbandry:

1. The cultivation of forages is not practiced in the two sites, but farmers have expressed their need, especially in Miti, where all animals were kept in the stable.
2. The basic mode of animal husbandry is free roaming for chicken and ducks, while goats and cows are typically herded or tethered. Rabbits and cobayes are held in the house or stables. Swine are also kept in stables.
3. Tubimbi has very low crop diversity and low yields with regard to agricultural production leading to low resource flow. There is hardly any exchange with other villages, which makes this community dependent on others to sustain its needs.
4. Tubimbi is well known for this capacity of supplying palm oil but it has no processing system, and the farmers need to purchase palm cake in Bukavu to feed their swine.
5. At Tubimbi, family labour migration has a negative impact on agricultural productivity because most young men have migrated to the gold mining sites, leaving behind women, the elders and other vulnerable people who cannot produce enough to satisfy their needs.
6. Lack of access to appropriate veterinary products and ignorance about their utilization are major livestock challenges in the two sites.
7. Forage cultivation has recently been introduced to the two sites. People expressed the needs to feed their animals, especially in the dry season. But many questions need to be answered, when, how, where and why practice forage cultivation in such a volatile environment in terms of security, extreme deforestation and livestock species, which do not have social class.

Photographic documentation



The gathering location in Miti (left) and the main road from Miti towards Bukavu (right)



The men's group (left) and the women's group (right) in Miti



Unmarried men's group (left) and presenting some group findings to the plenary (right) in Miti



Discussing the findings from the previous day in Miti



The women's group (left) and the men's group (right) in Tubimbi



The gathering location in Tubimbi (left) and follow up of the first day in Burhale (right)



Presenting and discussing the findings from the previous day in Tubimbi



Women walking away after the PRA in Tubimbi with clean cassava stakes provided to them (left) and a farm house along the road towards Bukavu via Walungu (right) **Photographic documentation II**



Freely scavenging ducks in Miti



Chicken in Miti (left) and tethered pig in Tubimbi (right)



Cobayes ready for transport in Miti (left) and cobayes in a kitchen of Tubimbi (right)



Fire on hillsides at Tubimbi (left) and fire for managing fields near Tubimbi (right)



The main road from Miti towards Bukavu



The main road in Tubimbi towards Bukavu via Walungu

APPENDICES

Appendix 1. Participants in the PRA and composition of the teams

Name	Institution*	Email	Telephone
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Ir. Thomas NGABO	UEA	-	-

Four teams were constituted, equally comprising of women and men:

Team member	PRA tool applied
W. CHIURI, R. LWABOSHI, B. MAASS	Daily calendar of men and wealth classification
F. MUHIMUZI, B. NDUSHA	Daily calendar of women and wealth classification
G. CIZUNGU, E. MPINGA	Seasonal calendar
R. ZOZO, D. KATUNGA, T. NGABO	Village resource map and resource flow diagram

* ISDR, Institut Supérieur de Développement Rural; PIAL, Programme d'Intensification Agricole dans le Groupement de Lurhala; UCB, Université Catholique de Bukavu; UEA, Université Evangélique en Afrique.

Appendix 2. Gender wealth classification in Miti-Mulungu and Tubimbi; (a) minimum assets defined for general wealth classes

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 palms
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 cobayes	30 m ² cassava; neither cattle nor goats, 1 chicken / 4 cobayes
Poor	Rabbits and cobayes	House made of straw, small animals, live under difficult conditions	2-3 chickens, ±3 cobayes	1 cassava field; 2 cobayes, 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

(b) wealth classes defined for individual animal species (no.)

Location	Gender	Animal	Very rich	Rich*	Inter- mediate	Poor	Very poor
Miti-Mulungu	Women	Cattle	10	0	0	0	0
		Swine	5	2	0	0	0
		Goat	n.c.	>12	±12	0	0
		Rabbit	n.c.	n.c.	n.c.	1	0
		Chicken	n.c.	n.c.	n.c.	0	0
		Cobaye	n.c.	n.c.	n.c.	3	0
	Men	Cattle	n.r.	10	2-5	0	0
		Swine	n.r.	2	1	0	0
		Goat	n.r.	10	5	0	0
		Rabbit	n.r.	30	10-15	2	0
		Chicken	n.r.	10	5	1-2	0
		Cobaye	n.r.	50	20	5	2
Tubimbi	Women	Cattle	>2	0	0	0	0
		Swine	>5	>2	0	0	0
		Goat	n.c.	±4	0	0	0
		Rabbit	n.c.	n.c.	±5	2-3	0
		Chicken	n.c.	n.c.	±2	0	0
		Cobaye	n.c.	n.c.	>3	±3	0
	Men	Cattle		5	1-3	0	0
		Swine		2-3	1	0	0
		Goat		4-6	1-3	0	0
		Rabbit		2	1	1	0
		Chicken		30	20	5	2
		Cobaye		30	15-20	8-10	3

* n.c., not a criterion; n.r., not recorded.

Appendix 3a. Gender daily calendars for Miti-Mulungu

MEN DAILY CALENDAR – MITI		
Time	Activities	Where
6h00	Wake up	At home
6h00-8h00	Assist women to prepare children for school	At home
	Fetch food for small animals under stabulation	Around the house
	Take animals for feeding	Around the house
8h00-14h00	Some go for farming, others work in banana plantation or build houses	Farm, banana plantation, at home
14h00-15h00	Fetch food for small animals under stabulation	Private farm or neighbors's or along the road sides
	Some take a rest, others go for alcohol	
15h00-17h00	Take animals to graze in fallow or in the field of religious sisters or along the road sides or trails	Fallow or field of sisters or along road sides at about 2 km distance
	Feed animals under stabulation	At home
17h00	Washing	At home
	Give money for buying food	At home
18h00-20h00	Enclose animals	At home
	Seeking for daily news in the village	In the village
20h00-21h00	Return back home if no money to buy alcohol and because of security purposes	At home
	Take supper and have a dialogue with the entire family	At home
21h00	Retire to bed (the spouses talk and plan about household projects, including school fees, and discuss major household problems)	At home

WOMEN DAILY CALENDAR – MITI		
Time	Activities	Where
6h00	Wake up	At home
6h00-6h30	Body care	At home
6h30-9h00	Household work (fetching water, prepare children for school, clean the house, washing utensils)	At home
	Feed the animals	
9h00-13h00	Farming	Farm
13h00-14h00	Washing	At home
	Making supper	
14h00-15h00	Taking animals for grazing	1 km-3 km distance
15h00-16h00	Fetch food for small animals under stabulation	In the field or bush, along the road side or in fallows
	Feed animals under stabulation	At home
16h00-17h00	Go for prayers	At church
	Go for selling	At market
	Go for buying food	

WOMEN DAILY CALENDAR – MITI		
Time	Activities	Where
17h00-20h00	Wash children	At home
	Making supper	
20h00-21h00	Rest	At home
	Family dialogue	
21h00	Prayer	At home
	Retire to bed	
21h00-22h00 /4h00-5h00	Sex	At home

YOUNG MEN DAILY CALENDAR – MITI		
Time	Activities	Where
6h00	Wake up	At home
6h00-8h00	Washing	At home
8h00-12h00	Farming	At about 3 km distance
	Fetching food for small animals under stabulation	
	School	
12h00-14h00	Resting	At home
	Taking lunch	
	Washing	
14h00-17h00	Taking animals for grazing	1 km-3 km
	Playing football	In the village
	Going for alcohol and entertainment	In the village
	Go for prayers	At church
17h00-20h00	Feeding small animals	50 m-1 km
	Fetch food for small animals under stabulation	Around the house
20h00	Supper	At home
	Listen to radio or watch TV	At home
	Retiring to bed or going for dancing	At home

Appendix 3b. Gender daily calendars for Tubimbi

MEN DAILY CALENDAR – TUBIMBI		
Time	Activities	Where
6h00	Wake up	At home
6h00-8h00	Release animals for grazing/tether them	At home
	Feed animals under stabulation	
	Men with no livestock go directly for farming	Farm
8h00-13h00	Farming activities	At 8 km to the farm (2h30' walking)
	Men who do not go for farming go for mining from 8h00-17h00	
13h00-14h00	Fetch feed for small animals under stabulation	At about 50 m from home
	Take animals tethered in the morning for grazing	
14h00-15h00	Feed animals under stabulation	At home
15h00-16h00	Washing or bathing	At home or in the river
16h00-18h00	Seek for daily news in the village, talk with others	In the village
18h00	Return back home	At home
	Enclose animals	
	Feed animals under stabulation	
18h00-22h00	Take supper	At home
22h00	Retire to bed	At home

WOMEN DAILY CALENDAR – TUBIMBI		
Time	Activities	Where
6h00	Wake up	At home
6h00-8h00	Household work (fetching water, prepare children for school, clean the house, wash utensils)	At home
	Search for forage for the animals	Farm
	Tether animals with ropes	Along road sides, communal grazing land
	Feed animals under stabulation	At home
8h00-13h00	Farming activities	Farm
	Fetch feed for small animals under stabulation	
13h00-14h00	Fetch water	At home
	Washing	
	Feed animals under stabulation	
14h00-17h00	Cooking	At home
	Go for choir	At church
	Rest	At home
17h00-20h00	Finish cooking	At home
	Enclose animals	
	Wash children	
	Feed animals under stabulation	
20h00-21h00	Taking supper	At home
	Family dialogue	
	Prayer	
	Put children to bed	
21h00-22h00	Dialogue between the spouses	At home
	Spouses go to bed	

Appendix 4a. Seasonal calendar from Miti-Mulungu

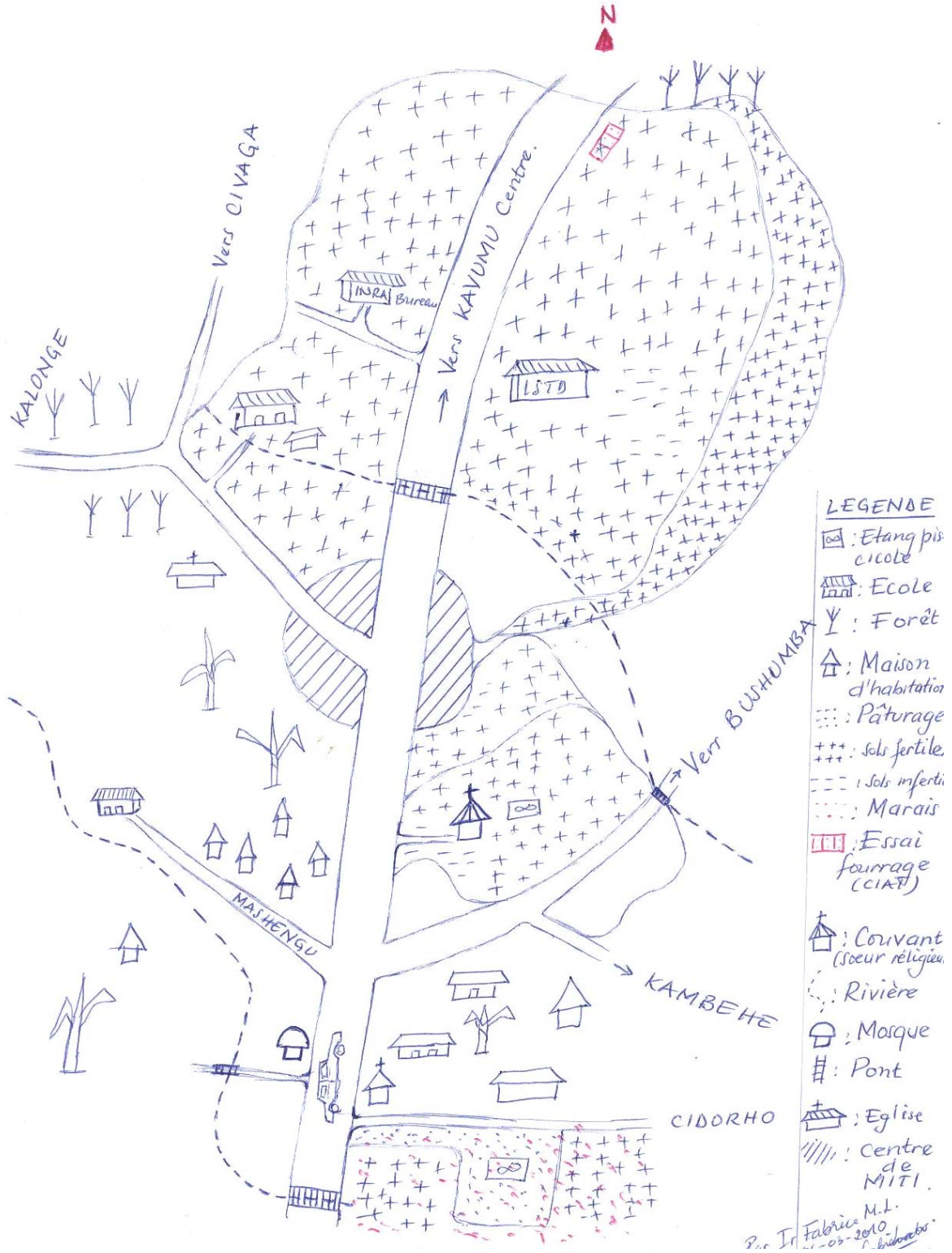
PARAMETRES	J	F	M	A	M	J	J	A	S	O	N	D
Pluiosité / Rainfall		short dry			short dry	dry	dry	dry				
Préparation de la terre / soil												
Semis / Sowing												
Haricots / Beans												
Soja / Soybean												
Pomme de terre / Potatoes												
Amarante / Amaranthus												
Mais + sorgho / Maize + Sorgh.												
Choux / Cabbage												
Oignons / Onions												
Colocase / Taro												
Patate douce / Sweet potato												
Tomate / Tomato												
Manioc / Cassava												
Entretien / Husbandry												
Recolte / Harvest	H,M,S,A	M,Sh,S				Mc,Ch	Mc	Mc				H,Pd,Ch,A
Post recolte / Post-harvest												
Vente / Sales	Mc,H,A	Mc,H,Pd,P	A,Pd,Ch	A	A	H	H	Mc	Mc			A
Légende: A=Amarante, Choux= Ch, H=haricot, M= Mais, Mc= manioc, Pd=Patate douce, P=pomme de terre, S=Soya, Sh= sorgho												
Fourrages	Aucune pratique de la culture fourragère dans le milieu. Sauf pour le moment, nous sommes à la phase d'essai avec le CIAT dans les champs d'adaptation.							Forages Except for the CIAT forage adaptation trial, there is no forage cultivation in the region.				
Elevage: animaux disponibles durant l'année						Available animals during the year						
Poules / Chicken							Scarcity	Scarcity				
Lapins / Rabbits												
Vaches / Cattle												
Porcs / Swine		Scarcity	Scarcity	Scarcity								
Cobayes / Cavy												
Chèvres / Goats												
NB: Reproduction						Reproduction						
Poules: 21 jours de couvain, 8 poussins à la portée, vente poussins à 5 mois, 3 mois d'intervall de reproduction						Chicken: 21 d incubation, 8 chicks, sale > 5 mo, 3 mo interval						
Lapins: interval de mise bas 4 mois, 6 lapereaux à la portée, vente à 3 mois						Rabbits: 4 mo interval of litters, 6 young, sale >3 mo						
Vaches: interval de mise bas 24 mois, 1 veau à la portée, vente à partir de 12 mois						Cattle: 24 mo interval of calving, 1 calf, sale >12 mo						
Cobayes: interval de mise bas 1 mois, 2 cobayes à la portée, vente à 2 mois						Cobayes: 1 mo interval of litters, 2 young, sale >2 mo						
NB: Alimentation des animaux						Animal nutrition						
Les animaux sont soumis au pâturage libre, à l'alimentation des résidus agricoles et des déchets de cuisine.						Animals are fed by free grazing, crop residues and kitchen left overs.						
Maladies humaines						Human diseases						
	J	F	M	A	M	J	J	A	S	O	N	D
Paludisme / Malaria												
Grippe / Flu												
Diarrhée / Diarrhea												
Toux / Cough												
Maladies des animaux						Livestock diseases						
Peste porcine / ASF		P	P	P								
Pseudo peste aviaire / ND							PI	PI				
Gale / Scabies	L	L	L	L	L	L	L	L	L	L	L	L
Verminose / Endo-parasites	C,V	C,V	C,V	C,V	C,V	C,V	C,V	C,V	C,V	C,V	C,V	C,V
Diarrhée / Diarrhea	Cb,L	Cb,L	Cb,L	Cb,L	Cb,L	Cb,L	Cb,L	Cb,L	Cb,L	Cb,L	Cb,L	Cb,L
Légende: C=chèvre/goat, Cb=cobaye, L=lapin/rabbit, PI=poules/chickens, P=porc/swine, V=vache/cattle;						AFS=African Swine Fever, ND=Newcastle Disease						
NB: Les différents problèmes liés à la pratique de l'élevage						Problems regarding animal husbandry						
Conflits sociaux entre les fermiers et habitants sur les pâturages libres						Social conflicts about free-grazing animals						
Insuffisance de terre						Land shortages						
Concurrence alimentaire entre les bêtes et les hommes						Nutrition competition between animals and humans						
Manque de moyen et prix de vente des bêtes bas par rapport aux besoins						Lack of resources and sales prices low						
Vols du bétails surtout les chèvres et les poules						Theft of animals, particularly goats and chickens						
Faible disponibilité des produits vétérinaires						Low availability of veterinary products						
Faible connaissance de lutte contre les maladies						Little knowledge how to combat diseases						
NB: Vente des produits						Sales						
La vente des produits de l'élevage se fait au marché local						Sales of products take place at the local market						
Les prix unitaires pour différents animaux sont:						Prices per unit of different animals are:						
1 Poules 5 \$						1 Chicken 5 \$						
1 Lapin 5 \$						1 Rabbit 5 \$						
1 Porc 100 \$						1 Swine 100 \$						
1 Porcin 20 \$						1 Piglet 20 \$						
1 Cobaye 1 \$						1 Cobaye 1 \$						
1 Chèvre 50 \$						1 Goat 50 \$						
1 Vache 350 \$						1 Cattle 350 \$						
Les prix des différents produits agricoles sont:						Prices of different agricultural products are:						
1.5 kg haricot 1 \$						1.5 kg Beans 1 \$						
1.5 kg arachide 2.5 \$						1.5 kg Groundnut 2.5 \$						
1.5 kg soja 0.8 \$						1.5 kg Soybean 0.8 \$						
1 kg sorgho 0.5 \$						1 kg Sorghum 0.5 \$						
1 kg manioc 0.5 \$						1 kg Cassava 0.5 \$						

Appendix 4b. Seasonal calendar from Tubimbi

PARAMETRES / PARAMETERS	J	F	M	A	M	J	J	A	S	O	N	D
Pluiosité / Rainfall			short dry		short dry	dry	dry	dry	short dry			
Préparation de la terre / soil												
Semis / Sowing												
Manioc / Cassava												
Mais / Maize												
Haricot / Beans												
Patate douce / Sweet potato												
Entretien / Husbandry												
Recolte / Harvest	Mc	Mc	Mc	Mc	Mc	Mc,M,H,Pd	Mc	Mc	Mc	Mc	Mc	Mc,M,Pd,H
Post recolte / Post-harvest												
Vente / Sales	NB: Production insuffisante même pour la consommation familiale						Production is insufficient even for family consumption.					
Légende: H=haricot/beans, M=maïs/maize, Mc=manioc/cassava, Pd=patate douce/sweet potato												
Fourrages / Forages	Aucune pratique de la culture fourragère dans le milieu. Sauf pour le moment, nous sommes à la phase d'essai avec le CIAT dans les champs d'adaptation.						Forages Except for the CIAT forage adaptation trial, there is no forage cultivation in the region.					
Elevage: animaux disponibles durant l'année						Available animals during the year						
Vaches / Cattle												
Chèvres / Goats												
Moutons / Sheep												
Porcs / Swine		Scarcity	Scarcity									
Poules / Chicken		Scarcity				Scarcity	Scarcity			Scarcity		
Cobayes / Cavy												
Lapins / Rabbits												
Canards / Ducks												
NB: Reproduction						Reproduction						
Poules: 21 jours de couvain, 8 poussins à la portée, vente poussins à 5 mois, 3 mois d'intervalle de reprod.						Chicken: 21 d incubation, 8 chicks, sale > 5 mo, 3 mo interval						
Lapins: interval de mise bas 4 mois, 8 lapereaux à la portée, vente à 3 mois						Rabbits: 4 mo interval, 8 young, sale >3 mo						
Vaches: interval de mise bas 18 mois, 1 veau à la portée, vente à partir de 24 mois, allaitement 6-10 mois						Cattle: 18 mo interval, 1 calf, sale >24 mo, weaning 6-10 mo						
Cobayes: interval de mise bas 1 mois, 2 cobayes à la portée, vente à 2 mois						Cobayes: 1 mo interval, 2 young, sale >2 mo						
Chèvres: 1-2 chevreaux à la portée, reproduction 1 fois les 12 mois, vente 8-12 mois						Goats: 12 mo interval, 1-2 kids, sale >8-12 mo						
Moutons: 1-2 agneaux à la portée, reproduction 2 fois par an, vente de 8-12 mois						Sheep: 6 mo interval, 1-2 lambs, sale >8-12 mo						
Porcs: 6-8 porcs à la portée, reproduction 2 fois par an						Swine: 6 mo interval, 6-8 piglets						
Alimentation des animaux						Animal nutrition						
Les animaux sont soumis au pâturage libre, à l'alimentation des résidus agricoles et des déchets de cuisine.						Animals are fed by free grazing, crop residues and kitchen left overs.						
Les vaches sont soumises au gardiennage. Les porcs, les lapins et les cobayes sont soumis à l'étable tandis que la poule, le canard divaguent.						Cattle are herded. Swine, rabbits and cobayes are kept in stable, while chicken and ducks scavenge for food.						
Maladies humaines			Human diseases									
	J	F	M	A	M	J	J	A	S	O	N	D
Paludisme / Malaria												
Grippe / Flu												
Maladies des animaux			Livestock diseases									
Pseudo peste aviaire / ND						PI	PI			PI		
Peste porcine africaine / AFS		P	P									
Piroplasmoses	Pir	Pir	Pir	Pir	Pir	Pir	Pir	Pir	Pir	Pir	Pir	Pir
Légende: C=chèvre/goat, Cb=cobaye, L=lapin/rabbit, Pl=poules/chickens, P=porc/swine, V=vache/cow;						AFS=African Swine Fever, ND = Newcastle Disease Pir=Piroplasmoses, tick-transmitted diseases						
NB: Les différents problèmes liés à la pratique de l'élevage						Problems regarding animal husbandry						
Conflits sociaux entre les fermiers et habitants sur les pâturages libres						Conflicts among farmers about free-grazing animals						
Faible disponibilité des produits vétérinaires						Low availability of veterinary products						
Faible connaissance de lutte contre les maladies						Little knowledge how to combat diseases						
Petit nombre d'éleveurs avec comme conséquence, la carence en protéines animales						Low number of livestock holders, resulting in a lack of animal protein						
NB: Vente des produits						Sales						
La vente des produits de l'élevage se fait au marché local						Sales of products take place at the local market						
Les prix unitaires pour différents animaux sont:						Prices per unit of different animals are:						
	1 Poules		5-10 \$				1 Chicken		5-10 \$			
	1 Lapin		5 \$				1 Rabbit		5 \$			
	1 Porc		150-200 \$	Prices are in US\$			1 Swine		150-200 \$			
	1 Cobaye		2 \$				1 Cobaye		2 \$			
	1 Chèvre		40 \$				1 Goat		40 \$			
	1 Vache		400 \$				1 Cattle		400 \$			
	1 Mouton		30 \$				1 Sheep		30 \$			
Les prix des différents produits agricoles sont:						Prices of different agricultural products are:						
	1.5 kg haricot		1.3 \$				1.5 kg Beans		1.3 \$			
	1.5 kg arachide		2.5 \$				1.5 kg Groundnut		2.5 \$			
	1 kg manioc		1 \$				1 kg Cassava		1 \$			
	1 kg patate douce		0.5 \$				1 kg Sweet potato		0.5 \$			

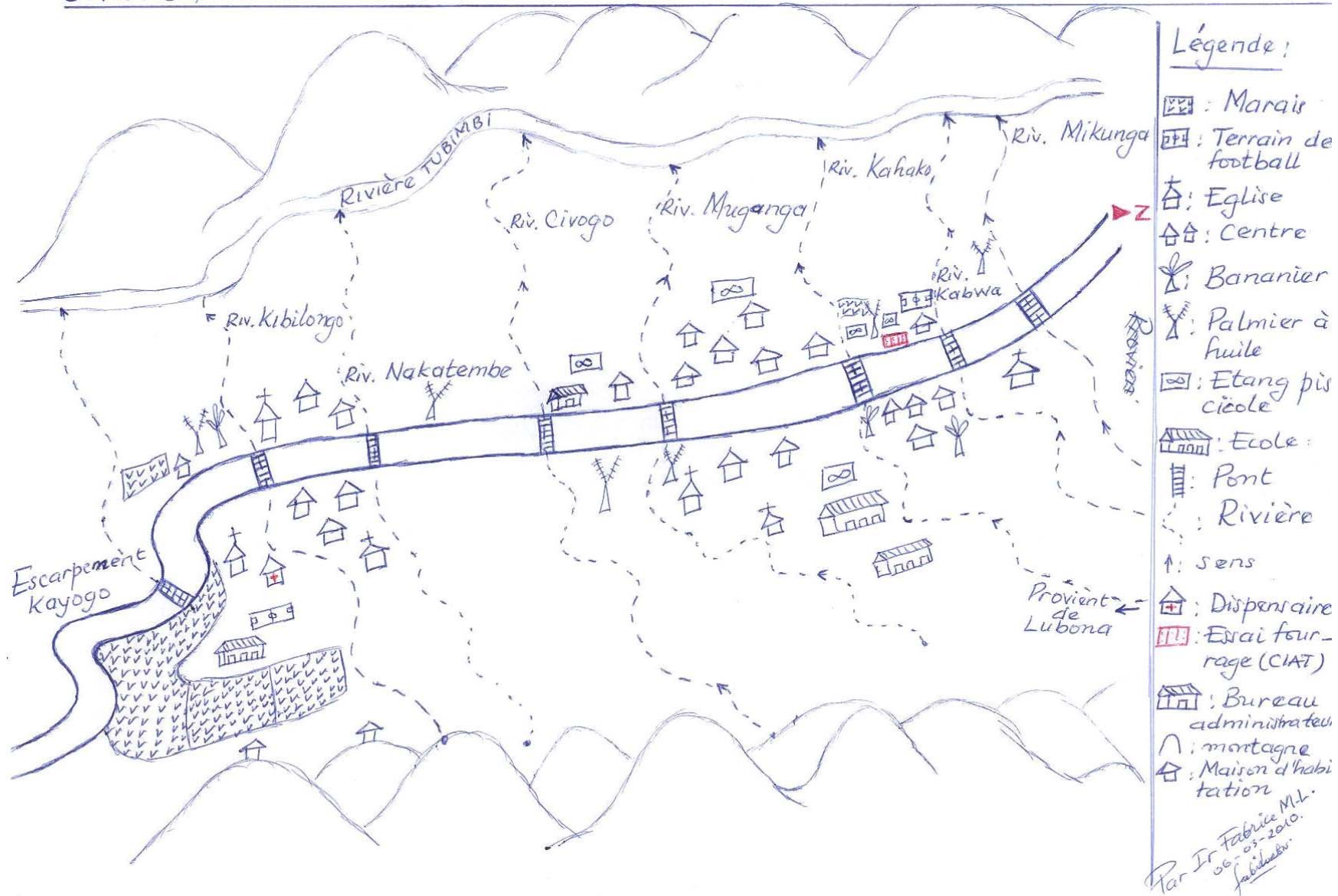
Appendix 5a. Village resource map from Miti-Mulungu

CARTOGRAPHIE DE LA LOCALITE DE MITI



Appendix 5b. Village resource map from Tubimbi

CARTOGRAPHIE DU GROUPEMENT DE TUBIMBI: Localité LUHUNDU et MASHULULWE



Selected words in French – English – from the village maps

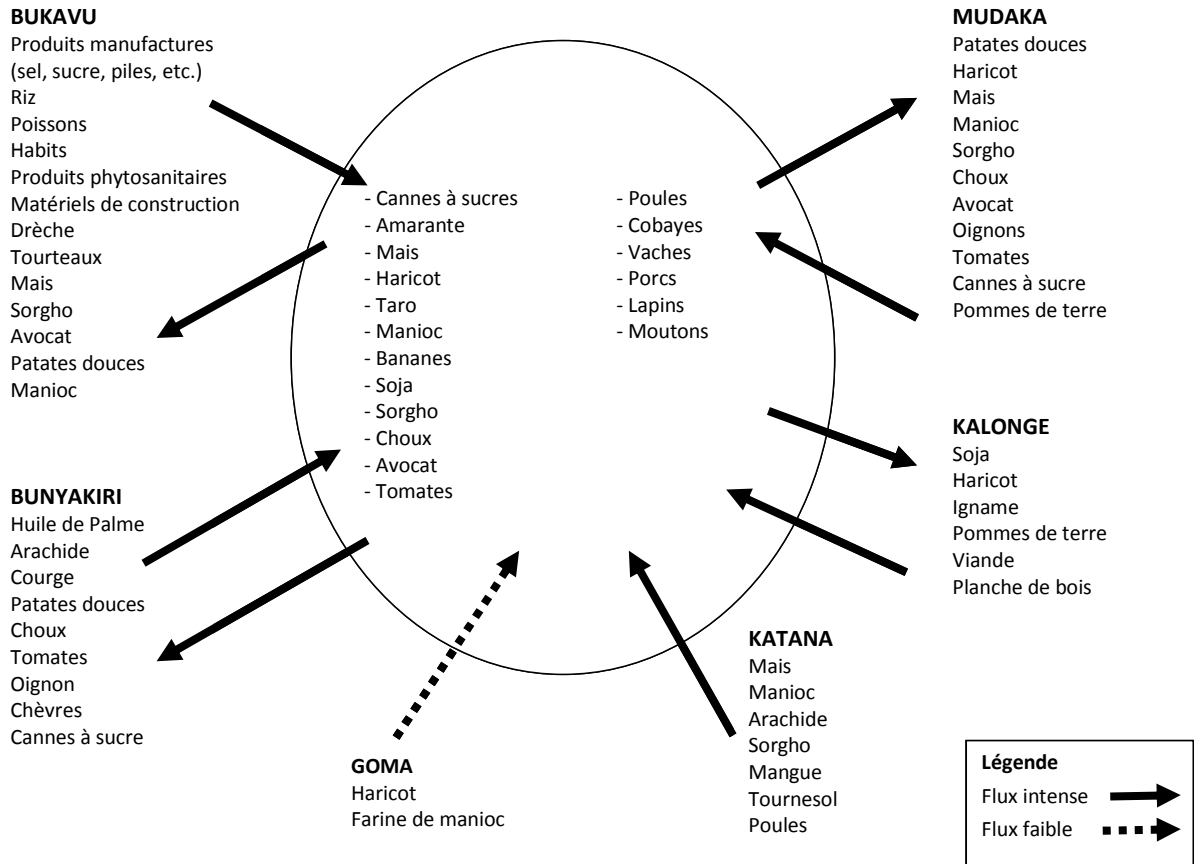
Français/French	English	Comments
Banancier	Banana plantation	Mostly plantains
Bureau administrative	Administrative office	
Centre	Center	Village center
Couvent (soeurs religieuses)	Convent (religious sisters)	
Dispensaire	Health care center	
École	School	
Église	Church	
Escarpement	Escarpment	
Essai fourrage (CIAT)	Forage trial	Established within the project
Étang piscicole	Fish pond	
Forêt	Forest	
Maison d'habitation	House to live in	
Marais	Swampland	
Montagne	Mountains	
Mosquée	Mosque	
Palmier à huile	Oil palm plantation	
Pâturage	Pasture, grassland	
Pont	Bridge	
Rivière	River	
sens	Direction towards	
Sols fertiles	Fertile soils	
Sols infertiles	Infertile soils	
Terrain de football	Football ground	

Selected words in French – English – from the resource flow charts

Français/French	English	Comments
Amarante	Amaranth	
Arachide	Groundnut	
Aubergines	Egg plants	Probably African egg plants
Avocat	Avocado	
Balais	Brooms	Made from palm leaves
Bananes	Bananas/Plantains	
Canards	Ducks	
Cannes à sucre	Sugarcane	
Chèvres	Goats	
Choux	Cabbage	
Cobayes	Cavy	
Courge	Pumpkin, squash	
Drèche	Draff	To feed animals, e.g., swine
Farine	Flour, meal	e.g., manioc flour or mais flour
Flux faible	Weak flow	
Flux intense	Intensive flow	
Habits	Clothes, clothing	
Haricot	Beans	
Huile de palme	Palm oil	
Igname	Yams/Taro	
Lapins	Rabbits	
Mais	Maize	
Mangue	Mango	
Manioc	Cassava	
Matériels de construction	Construction materials	
Meubles	Furniture	
Moutons	Sheep	
Oignon	Onions	
Patates douces	Sweet potato	
Piles	Batteries	
Planche de bois	Wooden boards	
Poissons	Fish	
Pommes de terre	(Irish) Potatoes	
Porcs	Swine	
Poules	Chicken	
Produits manufactures	Manufactured products	e.g., salt, sugar, batteries
Produits phytosanitaires	Phytosanitary products	
Riz	Rice	
Sel	Salt	
Soja	Soybean	
Sorgho	Sorghum	
Sucre	Sugar	
Taro	Yams/Taro	
Tomates	Tomatoes	
Tournesol	Sunflower	
Tourteaux	(Palm kernel press) cake	To feed animals, e.g., swine
Vaches	Cattle	
Viande	Meat	

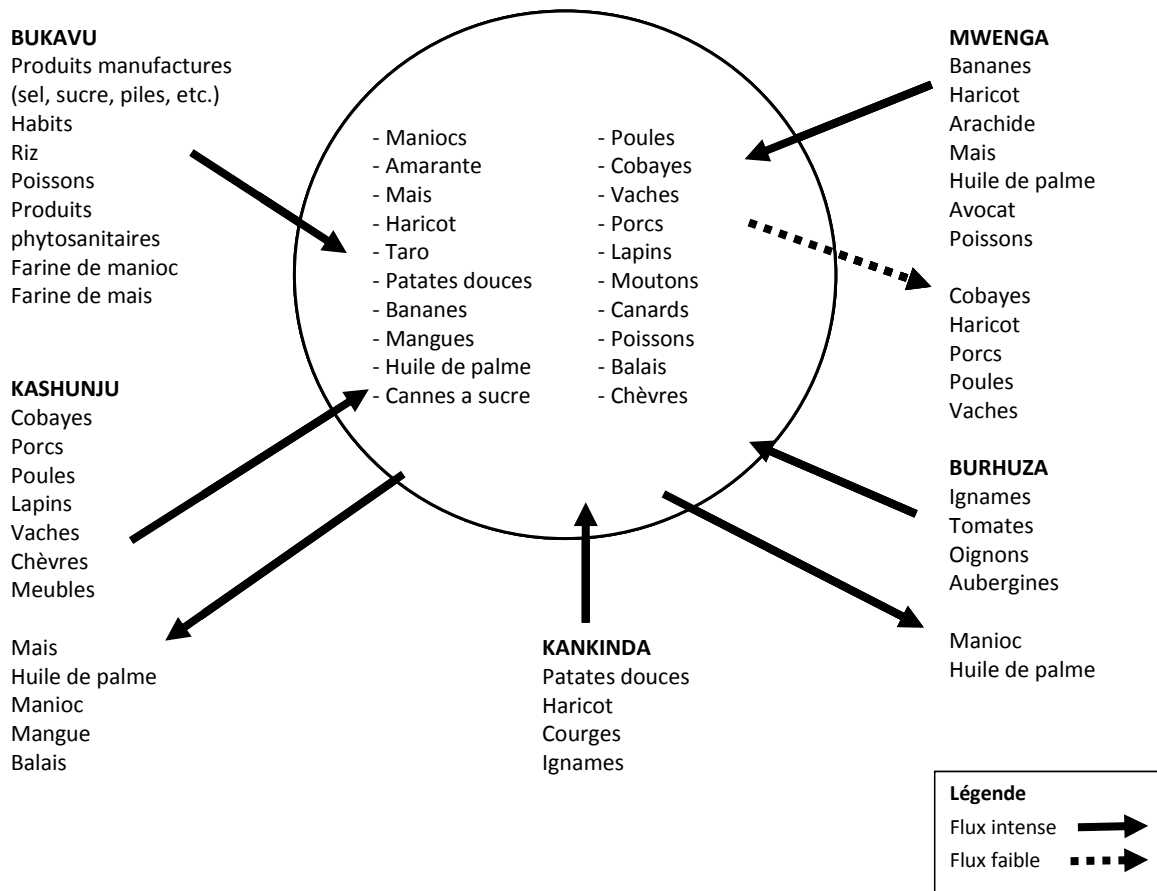
Appendix 6a. Resource flow of the *groupement* Miti-Mulungu

FLUX DES RESSOURCES DU GROUPEMENT DE MITI-MULUNGU



Appendix 6b. Resource flow of the *groupement* Tubimbi

FLUX DES RESSOURCES DU GROUPEMENT DE TUBIMBI



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