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Building the Evidence Base on the Agricultural Nutrition Nexus: Democratic Republic of Congo

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Building the Evidence Base on the Agricultural Nutrition Nexus: Democratic Republic of Congo

Professor Gustave Mushagalusa Nachigera, Professor Katcho Karume, Bintu Ndusha, Ayagirwe Basengere, Achiza Bayisha, Alpha Bisuri Byachentwali, Bigirimwami Chimanuka and Gédéon Banswe

Faculty of Agriculture and Environmental Sciences, Université Evangélique en Afrique

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List of acronyms

ACF	Action Contre la Faim (Action Against Hunger)
ADRA	Adventist Development and Relief Agency
AHEVO	Assistance Humanitaire aux Enfants Vulnérables Orphelins
APEE	Action pour la Protection et l'Encadrement de l'Enfant
BDOM	Bureau Diocésain des œuvres Médicales
CEMUBAC	Centre scientifique et Médical de l'Université libre de Bruxelles pour ses Activités de Coopération
CEPAC	Communauté des Eglises de Pentecôte en Afrique Centrale
CRAFOD	Regional Centre for Support and Training for Development
CRS	Catholic Relief Services
DFAP	Development Food Aid Program
DHS	Demographic and Health Survey
DRC	Democratic Republic of Congo
EDS	Etoile du Sud or Enquête Démographique et de Santé
FAO	UN Food and Agriculture Organization
FARDC	Armed Forces of the Democratic Republic of Congo
FDLR	Liberation Forces of Rwanda
FNS	Food and nutrition security
GAM	Global acute malnutrition
GDP	Gross Domestic Product
HKI	Helen Keller International
IFPRI	International Food Policy Research Institute
IITA	International Institute of Tropical Agriculture
ISTM	Institut Supérieur des Techniques Médicales
LWF	Lutheran World Federation
MERLIN	Medical Emergency Relief International
MSF	Médecins Sans Frontières

MICS	Multiple Indicator Cluster Survey
MALTESER	Corps international de secours d’urgence de l’Ordre de Malte (order of malte woldwide relief
NGO	Non-Governmental Organisation
PCIMA	Protocole national de prise en Charge Intégrée de la Malnutrition Aiguë
PIN	People In Need
PRONANUT	Programme National de Nutrition (National Nutrition Program)
SAM	Severe Acute Malnutrition
UNICEF	UN Children’s Emergency Fund
UNS	Supplementary Nutrition Unit
UNTA	Nutritional and Outpatient Therapeutic Unit
UNTI	Integrated Nutritional and Therapeutic Unit
WFP	World Food Programme
WHO	World Health Organization

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Executive summary

The provinces of North-Kivu and South-Kivu are located in eastern Democratic Republic of Congo (DRC), and both have been marred by conflict over the past two decades. This led to population displacement and instability, which in turn resulted in the abandonment of agriculture, food insecurity and severe malnutrition (UNICEF, 2012).

Food insecurity and malnutrition of children under 5 years old and women, especially pregnant women, is one of the major problems faced by these two provinces, and is often associated with very high infant mortality rates. Some reports have indicated that in South-Kivu malnutrition through wasting affected 7.8% of children, and the province had an infant mortality rate of 125‰. Despite some action being undertaken by the government and some international organisations to improve nutrition in the region, much more remains to be done.

To build evidence on the agricultural-nutrition nexus, a rapid scan was carried out in North-Kivu and South-Kivu provinces between July and November 2015. The following methodology was implemented:

- Analysis of existing data, including results of local surveys and databases from relevant public, private and humanitarian institutions.
- Interviews with provincial planners and NGOs dealing with agriculture, food and nutrition security (FNS).
- Dialogue with local resource persons.
- Group discussions with target institutions (institutions dealing with agriculture and FNS in the study area).

Preliminary findings were presented at a 1-day workshop in South-Kivu province, entitled 'Towards a harmonised approach on nutrition-sensitive development', to aid discussion between representatives of relevant national and international institutions and interested NGOs. A follow-up workshop was planned to be held in Goma, however given the security constraints the Goma workshop was combined with one held in Bukavu, South-Kivu.

In DRC currently, more than 6.4 million people are experiencing acute food insecurity (almost 10% of the rural population) from 82 territories, including five in North-Kivu. Unemployment is relatively high (6.1%) and very few households are connected to water (16.6%) or electricity (4.3%). Health services are very inadequate: North-Kivu has 47 hospitals, offering 12 beds per 100,000 people and 1 doctor for 24,030 people. This is far from the World Health Organization (WHO) standard which is 1 doctor for 10,000 inhabitants. As for sanitation, 99.8% of households do not receive sewage services for garbage disposal and 7% do not have toilets. The economy of both provinces is based on agriculture, livestock, fishing, forestry, and mining, which involves about 80% of the population and contributes about 49.7% of provincial GDP.

On average the population of Bukavu in South-Kivu consume about 1,027 kcal per person per day, of which 593.5 kcal, 92.4 kcal and 338.9 kcal are provided by products from Rwanda, North-Kivu and from within South-Kivu respectively. The majority of calories consumed in Bukavu city derive mainly from plant matter.

South-Kivu imports most of its food from Rwanda, even for products for which the region holds some comparative advantage, which is further aggravating deficiencies in the local production system. North-Kivu also imports much of its food from Rwanda, with the Rwandan districts of Rusizi and Gisenyi acquiring a strategic position as producers for both regions.

The results of a food security assessment study in North-Kivu and South-Kivu revealed that in 2014, 13% and 10% of rural households respectively were food insecure. Food insecurity in these provinces is linked to a problem of food availability and accessibility. Repeated armed conflicts have undermined the agricultural sector, thus increasing the dependence of the provinces on food imports and vulnerability to price increases. Insecurity has disrupted the functioning of the market system, resulting in frequent shortages and higher prices for basic foodstuffs. Since food insecure households have low purchasing power, they are often unable to compensate for their food deficit by buying food.

One of the problems for both South-Kivu and North-Kivu particularly, and DRC in general, is the inadequate and dilapidated transport infrastructure which makes the movement of people and goods difficult. The persistence of armed conflict and pockets of resistance from local uncontrolled armed groups (Maï Maï and others) and foreign armed groups (including the Liberation Forces of Rwanda (FDLR)), especially in rural areas, has added to this challenge, resulting in decreased agriculture and livestock production.

Moreover, in rural areas, markets are often only organised once or twice a week, preventing access to agricultural products even when a household has money to buy them. This makes access to some fresh products, like fish, difficult.

The issue of sustainability in these provinces is also a challenge due to climate-related problems, depletion of soil, access to and quality of inputs, poor agricultural techniques, pests and diseases, and animals' diseases related problems like theileriosis, Pest de petit ruminant, distomatose, African swine fever, new castle disease and the afteuse fever. Banana bacterial wilt and African cassava mosaic virus are also significant hurdles to revitalising agricultural production and the fight against food insecurity. Land reform issues are also important, as large industrial companies and investors are in possession of large amounts of fertile land, which currently remains unexploited.

The agricultural workforce is mainly composed of women and older men. Young people mostly engage in mining and trade, or leave rural areas altogether, which is impacting the availability of agricultural labour.

Results of the 2005 survey show that 11.74% of children born in South-Kivu weigh less than 2.5 kg and are predominantly girls (6.6%). In North-Kivu, however, the rate is 10.69% weighing less than 2.5 kg. A 2007 Demographic and Health Survey (DHS) had indicated a prevalence rate of children weighing less than 2.5 kg at birth of 13% for North-Kivu. This slight improvement was due to the impact of sensitisation and actions of different organisations working in FNS. Children weighing less than 2.5 kg at birth have a lower life expectancy, so a rate of over 10% for both provinces remains alarming. These figures also reflect high malnutrition rates among pregnant women.

The nutritional state of children is critical in North-Kivu and South-Kivu. Very few households have access to drinking water on their plots (14.8%) and even less have access to electricity

(2.5%). Limited access to drinking water increases waterborne diseases which are among the major causes of mortality and morbidity. As for sanitation, 99.5% of households do not receive a road service for garbage disposal and 8% do not have a toilet. Insufficient toilets for excreta disposal further contribute to the spread of infectious diseases, especially diarrheal diseases, which are also one of the main causes of malnutrition.

While the number of women involved in agriculture is on the rise in both provinces, they still face many disadvantages. Women often have limited or no access to land. Males are favoured in land allocation, while women only gain access to land through a male relative or after a husband's death. Moreover, women's access to financial services is limited, and they face inequities regarding access to livestock, inputs such as seeds and fertilisers, technology, market information, knowledge, skills and advisory services.

Many projects have been implemented to mitigate the malnutrition problem. The actions have all focused on implementing nutritional centres or supporting existing ones. Local, national and international non-governmental organisations (NGO), are all acting in this area with government organisations such as the National Nutrition Program (PRONANUT), Ministry of Health, and Provincial Inspection of Agriculture, Livestock and Fisheries, among others.

With security and policy challenges on one hand and environmental, agronomic and economic challenges on the other hand, achieving long-term sustainable food security in both provinces will not be easy. It is therefore necessary to:

- Strengthen agricultural recovery programmes and support livelihoods;
- Support and protect local small industries in the embryonic stage by implementing adequate trade policies;
- Developing storage and processing infrastructures for perishable products with high added value;
- Strengthen the management and maintenance of rural roads;
- Strengthen security measures in production zones;
- Strengthen programmes of prevention and management of malnutrition;
- Develop a system for food security and early warning monitoring.

The complexities of how agricultural policies could effectively address nutrition are not yet well understood. There is considerable conceptual knowledge on this topic, but little understanding of how to carry the concepts and policy objectives into effective implementation and delivery of food-based approaches that impact the nutritional status of populations. Policies and programmes are clearly relevant, but the tangible impact these have on food processing, storage, and transformation into improvements in dietary patterns and nutritional outcomes is fragmented. Debate continues between those who argue that agricultural policy should play a large role in producing nutritious food and those who believe that it is more important for agricultural policy to focus on economic development and bulk calories.

Introduction

The Democratic Republic of Congo (DRC), with 2345000 km^2, is the third largest country in Africa. The country is divided into 10 provinces plus the capital city: Bas-Congo, Bandundu, Equateur, Province Orientale, North-Kivu, South-Kivu, Maniema, Katanga, Kasai Occidental, Kasai Oriental, and Kinshasa. The population of DRC is approximately 60 million with an estimated growth rate of 3.18% per year. In DRC there are about 200 ethnic groups, with Bantu making up the greatest proportion.

Both provinces (North-Kivu and South-Kivu) located in eastern DRC, have been the theatre of violent conflict over the past two decades, with consequences: population displacement and instability, leading to abandonment of agriculture, food insecurity and severe malnutrition (UNICEF, 2012). Repeated conflict has also led to sexual violence against women, with more than 7,075 cases of rape reported in North-Kivu and 5,028 in South-Kivu in 2014 (UNFPA, 2013).

Food insecurity and malnutrition of vulnerable people (children under 5 years old and women, especially pregnant women), is among the major problems reported in these two provinces, and are often coupled with very high infant mortality rates. In South-Kivu, malnutrition through wasting affected 7.8% of children, and the province had an infant mortality rate of 125‰ (UNDP, 2009). More effort still needed, despite government and some international organisations intervention to improve the nutrition state in the region.

A number of projects have been executed to alleviate this malnutrition problem. Implementing nutritional centres or supporting existing ones was the focus of all of them. Local, national and international non-governmental organisations (NGO), are all involved in this action with government organisations like the National Nutrition Program (PRONANUT), the Ministry of Health, and Provincial Inspection of Agriculture, Livestock and Fisheries, among others (OCHA, 2015b).

It is appropriate to identify the objectives of these organisations, their target groups, their strategies to achieve their goals, the connection between them and the role of each, the type of feeding centre, nutrition's practices in feeding centres, the assigned role of women in these organisations, the nutritional impact of agricultural projects, as well as their means of communication and transmission of information on nutrition, to discover the gap.

There is also a need to conduct research on policies that influence the relationship between agriculture and nutrition on a broader level.

Objectives of the study

The overall objective of this study was to determine the strategies and practices that needed to be put in place to fight malnutrition and food insecurity.

This study aimed specifically at:

- Determining the rate of poverty, food insecurity and malnutrition in North-Kivu and South-Kivu.
- Summarising existing food and nutrition security (FNS) programmes and projects,

- Determining gaps and priority actions to fight food and nutrition insecurity
- Sharing lessons learned with national and international donors**.**

Methodology

The agriculture-nutrition nexus aims to maximise the positive impact of the food system on nutrition outcomes while minimising unintended, negative consequences of agricultural policies and interventions for the consumer. It is placing a nutrition lens on the food and agricultural sector as a whole without detracting from the agriculture sector's own goals, which historically focus on increasing production and improving incomes.

How agricultural policies could effectively address nutrition are not yet well understood. Policies and programmes are clearly relevant, but the perceptible impact these have on food processing, storage, and transformation into improvements in dietary patterns and nutritional outcomes is fragmented. Argument remains between those who claim that agricultural policy should play a big role in producing nutritious food and those who suppose that it is more important for agricultural policy to concentrate on economic development and bulk calories.

Data collection and analysis included secondary data analysis, review of policies, in-province consultations, stakeholder focus groups, and interviews. In addition, a desktop review, discussion of relevant scientific literature, and a scan of grey literature (policy documents, reports, web resources, including resources provided by different partners intervening in agriculture, health, and FNS in both provinces) occurred. International published FNS data and models of food security were also consulted.

The following methodology was applied:

- Analysis of existing data, including results of local surveys and databases from relevant public, private or humanitarian institutions.
- Interviews with provincial planners and NGOs dealing with agriculture and FNS.
- Dialogue with local resource persons.
- Group discussions with target institutions (institutions dealing with agriculture and FNS in the study area)

Analysis of existing literature

A comprehensive review of primary literature and an extensive review of grey literature on agriculture and FNS was conducted. This included a review of:

- Scientific literature to provide poverty-oriented cause-effect relationships for the North-Kivu and South-Kivu population.
- Government information (health department, agricultural sector, statistical offices etc.), which provided useful data about the demographic, health and socio-economic situation at the provincial level.
- Studies conducted by international organisations (World Bank, World Food Programme (WFP)), international NGOs (UN Food and Agriculture Organization (FAO), UN Children's Emergency Fund (UNICEF), WFP, Action Against Hunger (ACF), Catholic Relief Services (CRS), Medical Emergency Relief International (Merlin), Save the Children, International Red Cross, and Medecins sans Frontière (MSF)) and national

NGOs (associations working in the area of public health, nutrition, women's affairs, watershed management or rural development).

The outcomes for this activity were:

- An interim report.
- Suggestions and recommendations based on the review of the literature and secondary data records, for reflection and study in North-Kivu and South-Kivu.

Interviews with provincial players and planners

In-depth interviews were conducted with provincial stakeholders in national and provincial agriculture and nutrition programming by administering a questionnaire. Specific thematic areas were assigned to each province's study. These included: engagement with the broader food supply chain; food, agricultural, and trade policies; and the potential impact of these policies on nutrition and health outcomes.

All parties with a connection to agriculture or nutrition (researchers, city managers, policymakers, government representatives, NGOs, programme staff, community leaders and activists, and representatives of international organisations and donor agencies) were considered. Topics covered included:

- Spatial distribution within provinces of poverty and forms of food insecurity, drawing on evidence from vulnerability assessment and mapping supported by the Food Information and Vulnerability Mapping Systems, FAO and WFP interagency initiative;
- Demographics;
- Education;
- Water and sanitation;
- Household assets;
- Agriculture and livestock;
- Income and livelihoods;
- Expenditures and debt;
- Food consumption;
- Sources of food;
- Coping mechanisms;
- Household exposure to shocks;
- Nutrition;
- Infant and young child feeding practices;
- Access to markets, health facilities and schools;
- Market prices;
- Impact of shocks to markets.

Dialogue with local resource persons

Dialogue with local representatives of government offices and NGOs (local, national and international) were undertaken.

- Several trips to selected communities were undertaken to talk with people in the surveyed area.

- Transects were made with local government officers and community leaders, through the province or community, in order to observe and compare secondary data and verbally communicated information with reality.

Dialogue with representatives of local government offices and NGOs were carried out after analysis of information and local statistics.

- Group discussions with local people were carried out to get an idea about food habits, beliefs, customs and perceived needs in the food security sector.
- Measuring children under 5 years old with a simple anthropometric tape and recording birth weight provided important information on chronic malnutrition, i.e. whether children were too small for their age. This reflects poor living conditions or poverty in communities. Data obtained from existing nutritional units or from hospitals and health centres in the surveyed area was also analysed. The prevalence of low birth weight, at less than 2.5 kg indicates the prevalence of malnutrition. The state of malnutrition in North-Kivu and South-Kivu provinces during the last 5 years was evaluated to check the sustainability of food nutrition.
- Constraints limiting women's ability to improve their own and their children's nutritional status and roles played by women in FNS were determined.

The outcomes for this activity were:

- A second interim report, based on the outcomes of dialogue with local key persons, semi-structured interviews, and guideline questions applied during group discussions in the field.

Group discussions with target institutions

Group discussions were held with institutions dealing with agriculture, health and FNS in North-Kivu and South-Kivu. These groups included representatives from various government ministries, researchers, city managers, policymakers, national and international NGOs, programme staff, community leaders and activists, and representatives of international organisations and donor agencies. Extensive and useful comments gained from these discussions were also incorporated into the final report.

Dialogue with key persons, using semi-structured interviews and group discussions were carried out.

A 1-day workshop entitled 'Towards a harmonised approach on nutrition-sensitive development' was organised in South-Kivu to present preliminary findings, to aid discussion with representatives of relevant national and international institutions and interested NGOs. Given the security constraints, the planned workshop to be held in Goma was combined with the South-Kivu workshop.

The consultancy took place between August and November 2015. A detailed timetable of the activities is provided below:

- 15 July -12 August 2015: Analysis of existing data.
- 13 August - 27 August 2015: First interim report.

- 28 August - 29 September 2015: Interviews with provincial players and planners in both North-Kivu and South-Kivu.
- 29 October: Draft report submitted.
- 13 November: Validation workshop combining FNS actors in North-Kivu and South-Kivu.
- 28 November: Final report submitted

Results

Overview of FNS in North-Kivu and South-Kivu

State of FNS in North-Kivu and South-Kivu provinces

Food production

Location of South-Kivu

South-Kivu province is located in eastern DRC. It shares borders with Burundi, Rwanda, and Tanzania. It is divided into eight territories in addition to Bukavu city: Kabare, Walungu, Idjwi, Uvira, Kalehe, Mwenga, Shabunda and Fizi (Figure 1). Its terrain is very varied; the eastern part of the province is mountainous, contrasting with highlands in the centre and lowlands in the west (IPAPEL, 2014). However, a low topography is observed in the Ruzizi plain from Uvira to Kamanyola.

The eastern part of South-Kivu province has mild temperatures and the dry season lasts 3-4 months from June to September. For example Bukavu experiences an annual average temperature of 19°C. Minembwe Mulenge and Kalonge highlands and Kahuzi-Biega mountains are even cooler. In contrast, central and especially western South-Kivu (particularly the territories of Shabunda and Mwenga) with areas of dense equatorial forest, experience an equatorial climate with heavy rain throughout most of the year. The Ruzizi plain, however, has its own tropical microclimate, which is prone to low levels of rainfall (± 1.000 mm per year) (DSRP, 2010).

In Kabare and Walungu, the soil is clayey and increasingly poor because of erosion and overexploitation. This partly explains the high level of land disputes, which are exacerbated by the scarcity of farmland; most good quality arable land is owned by companies and investors. Livestock farming is also facing a significant reduction due to a lack of pasture.

In Idjwi the soil is still rich but overpopulation is making arable land increasingly scarce. In Kalehe there is also a rich clay soil, mainly because of its proximity to the forest. The territories of Shabunda, Mwenga and Fizi have rich sandy soil. For Uvira territory, its soil is sandy and favourable for rice and cotton cropping. Uvira’s highlands, with its mild climate, are favourable for livestock. These variable agro-ecological conditions predisposed the province to the production of a range of food crops, fruits and vegetables and even industrial crops, and livestock (DSRP, 2010).

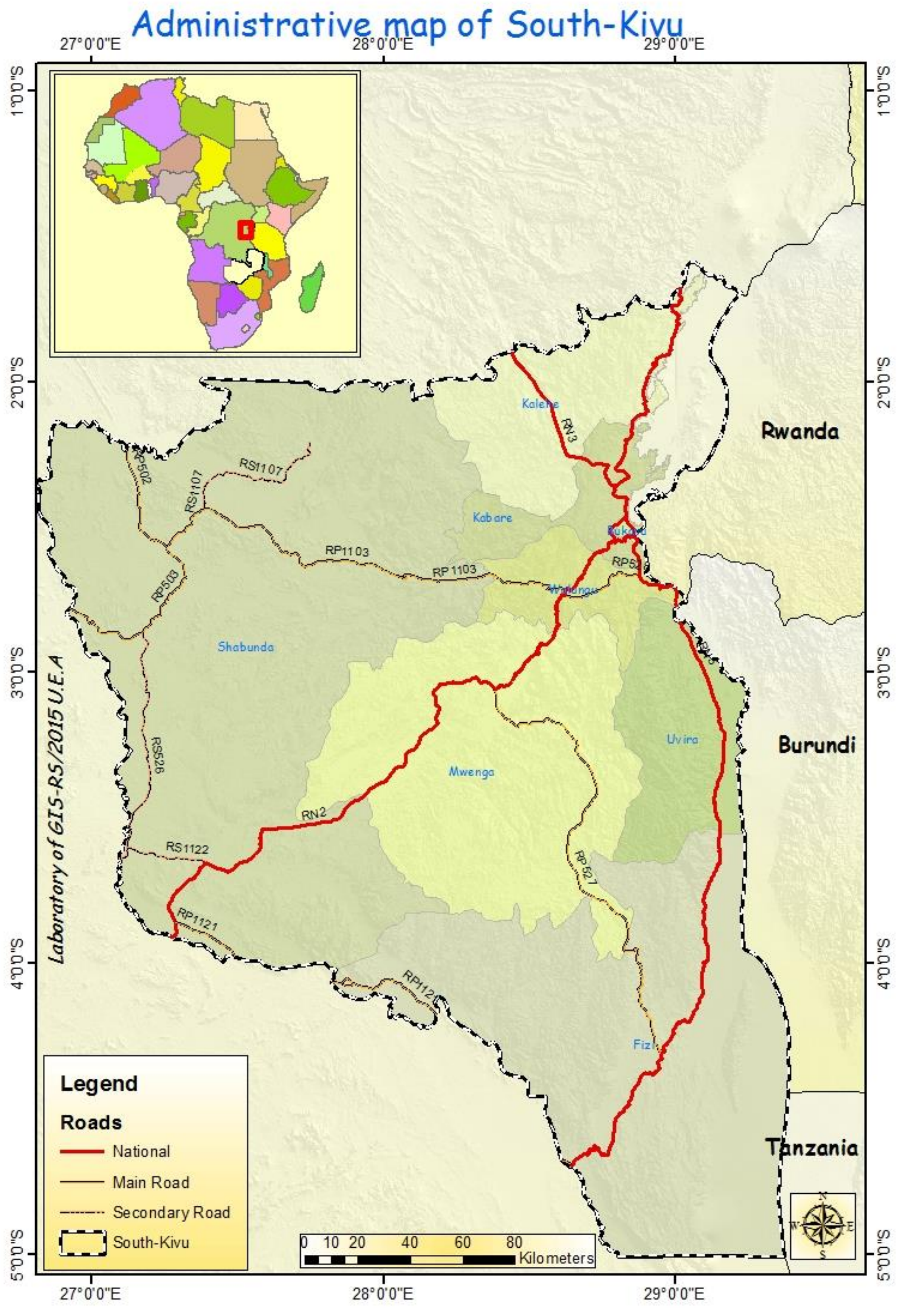

Figure 1: South-Kivu province

Geographic location of North-Kivu

North-Kivu province is located in eastern DRC and occupies 2.5% of the total surface of the country, comprising around 59.483 km². It shares borders with Rwanda and Uganda in the east, in addition to bordering Oriental province, Maniema province, and South-Kivu province.

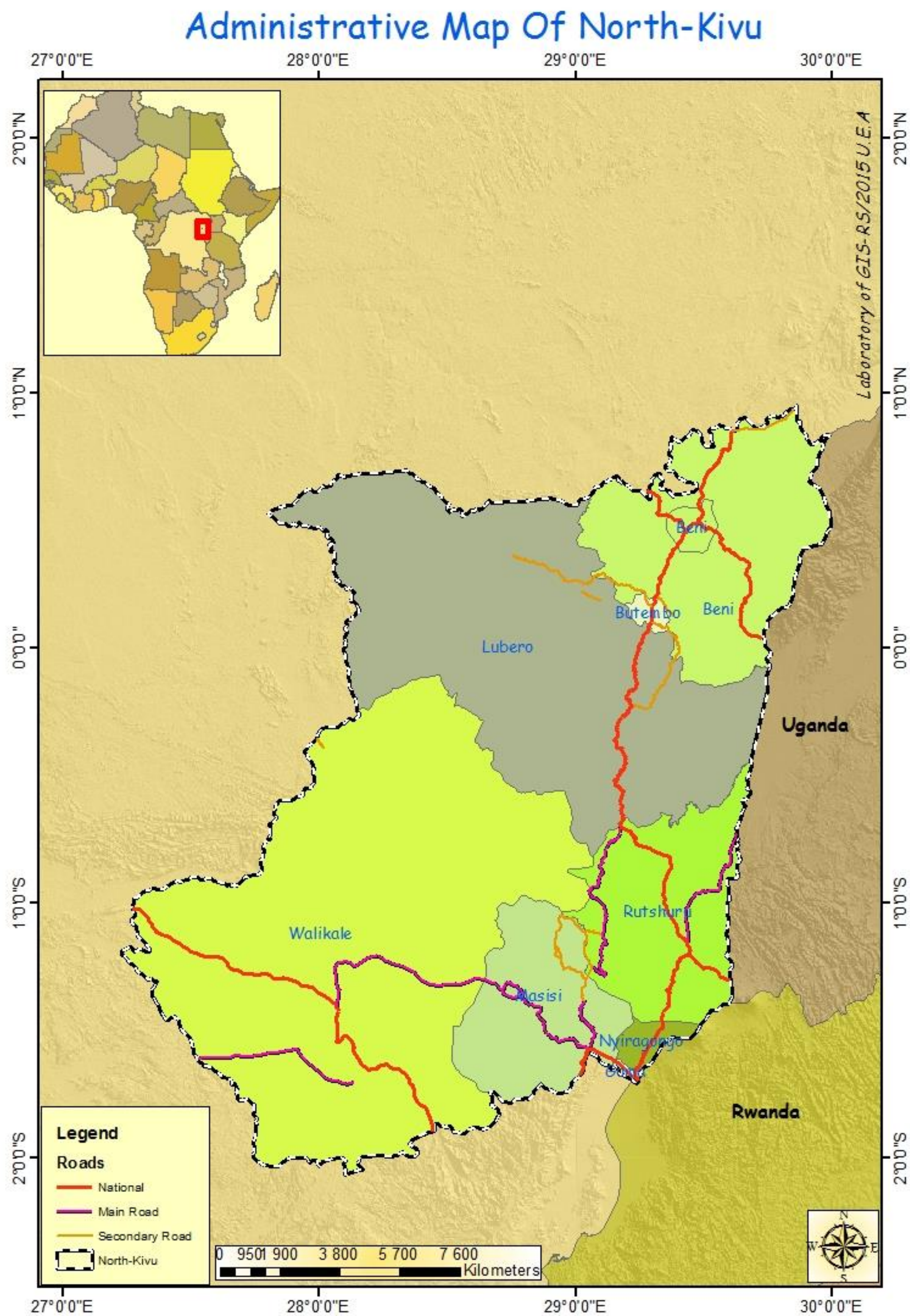

Figure 2: Administrative map of North-Kivu

The North-Kivu landscape is very hilly. The altitude varies from less than 800 m to over 2,500 m. The terrain heterogeneity brings a wide variety of climates. Below 1,000 m the temperature is close to 23°C, at 1,500 m it drops to about 19°C, and at 2000 m it is about 15°C. Average rainfall varies between 1,000 mm and 2,000 mm. North-Kivu has two wet seasons and two dry seasons. The highland climate and terrain in North-Kivu give the soil a certain complexity, however it can be divided into three classes: recent volcanic soils (between Goma and Rutshuru), floodplain soils (in the plains of Semliki) and soils made from ancient rock.

Substantial deforestation occurred during the movement of Rwandese refugees. Promises made by the international community to restore the vegetation cover that was damaged by the refugees have yet to be fulfilled (DSRP, 2005). Currently, rates of deforestation exceed rates of reforestation. The province also faces serious climatic disturbances, which affect the agricultural calendar and negatively impact harvests. Large livestock (mainly cattle) were looted during the war, but the livestock sector is beginning to recover, particularly in Masisi. The promotion of small livestock through the work of some NGOs is limited.

The economy of North-Kivu is based on agriculture, livestock, fishing, forestry and mining, which involves about 80% of the population and contributes about 49.7% of provincial GDP. Industrial agriculture is suffering; many plantations have been abandoned for several years. The main food crops are cassava, maize, potatoes, beans, banana, sweet potatoes, groundnuts and rice. The crops best suited for industrial exploitation in the province are Robusta and Arabica coffee, tea, palm oil, quinquina, sugarcane, papain and tobacco. Agriculture is practiced by farmers on small area of land with rudimentary tools and unimproved seeds.

In DRC more than 6.4 million people are currently experiencing acute food insecurity (almost 10% of the rural population) and come from 82 territories including five in North-Kivu (Rutshuru, Masisi, Walikale, Nyiragongo and Lubero). Unemployment is relatively high (6.1%). Child labour remains a serious problem, with 19.2% participating in some form of employment. The rate of primary enrolment is also a concern at 53.2%. Very few households are connected to water (16.6%) and electricity (4.3%), and health services are very inadequate. North-Kivu has 47 hospitals, offering 12 beds per 100,000 people and 1 doctor for 24,030 inhabitants. This is far from the World Health Organization (WHO) standard which is 1 doctor for 10,000 inhabitants. As for sanitation, 99.8% of households do not receive sewage services for garbage disposal and 7% do not have toilets (EDS, 2007).

Ranked 186th among 187 countries in the Human Development Index (UNDP, 2012), with 71.3% of the population living below the poverty line, DRC continues to have alarming rates in all basic indicators including health, food security, nutrition, and access to education. Basic state services do not reach many areas. The lack of infrastructure, or their poor state, makes many remote areas difficult to access for trade, services and humanitarian aid. Furthermore, the occurrence of a major natural disaster such as a volcanic eruption around Goma or an earthquake in North-Kivu or South-Kivu remains a possibility. These natural disasters often induce changes in family and community structures exposing the affected families to protection issues (OCHA, 2013).

Demography of North-Kivu and South-Kivu

Table 1 and 2 present demographic changes in North-Kivu and South-Kivu.

Table 1: Population growth in North-Kivu

Province	Population					
	2010	2011	2012	2013	2014	2015
North-Kivu	5,205,161	5,361,316	5,522,155	5,687,820	5,858,454	6,034,208

Source: National Institute of Statistics, 2015

Table 1 reveals a population increase, with a growth rate of over 15% between 2010 and 2015. Unfortunately, this population increase has never been proportional to the increase in agricultural production. The rate of food insecurity has therefore increased at the same pace as the population has grown.

Table 2: Population growth and growth of farming households in South-Kivu

Territories and municipalities	Area (km^2)	Total population			Farming households		
		2012	2013	2014	2012	2013	2014
Fizi	15,786	765,460	772,225	797,610	210,685	214,675	219,810
Idjwi	681	196,429	201,492	208,289	55,003	49,970	57,910
Kabare	1,960	616,507	916,574	680,452	56,865	60,329	61,006
Kalehe	5,707	572,187	648,982	583,724	149,997	150,082	159,495
Mwenga	11,172	675,659	630,195	823,909	93,759	97,655	97,732
Shabunda	25,216	830,347	851,337	879,298	152,736	108,924	126,882
Uvira	3,148	892,499	862,741	866,507	143,197	116,807	126,151
Walungu	1,737	663,725	718,300	736,219	174,825	19,3652	213,996
Bagira	37	208,474	213,301	222,151	2,954	2,849	2,824
Ibanda	13	283,807	291,392	311,083	2	1	0
Kadutu	10	308,293	312,436	323,742	0	0	0
Total	65,467	6,013,387	6,418,975	6,432,984	1,040,023	994,944	1,065,806

Source: IPAPEL, 2014

Table 2 reveals that with a population of 6,013,387 inhabitants (density of 91.8 inhabitants per km^2) in 2012, the number of farming households was 1,040,023. This rose to a total population of 6,432,984 (98.26 inhabitants per km^2) in 2014, with 1,065,806 farming households. This means that each household is responsible for feeding about six people.

While the population growth rate is 0.22%, the growth of farming households is 6.6%. Walungu, Kabare and Idjwi territories have the highest population density, with 423.85, 347.17 and 305.86 inhabitant per km^2 respectively, while Shabunda and Fizi territories have the lowest population density (34.87 and 50.53 inhabitant per km^2 respectively). Considering the number of farming households, Fizi and Walungu territories, with 213,996 and 219,810 respectively, have the largest number of farming households while Idjwi has the fewest (57,910).

This rapid demographic change undermines livelihoods and increases pressure on natural resources including land, pasture and water, especially in a context of stagnating agricultural production, and a lack of investment in the sector.

The main food crops produced in South-Kivu include:

- Starchy tubers: cassava (the staple food of most South-Kivu people), sweet potato, potato, taro and yam.
- Legumes: groundnuts, beans, peas and soybeans.
- Cereals: maize, rice, sorghum, and finger millet.
- Banana.

Leafy vegetables, fruit vegetables, bulbs vegetables, root vegetables and squash dominate the vegetable crops. Fruits produced are mainly citrus, pineapples, avocados, guavas and mangoes. Coffee, sunflower, tea, oil palm, tobacco, cotton, sugar cane and cinchona are the main industrial crops produced (DIOBASS & ADISCO, 2012; IPAPEL, 2014).

Table 3 presents the evolution of global production (tons) recorded during the last three years.

Table 3: Evolution of overall agricultural production (t) in South-Kivu

Crops	**Year**		
	2012	**2013**	**2014**
Food	7,500,064	7,872,450	7,383,063
Vegetables	79,263	108,441	113,015
Fruits	44,227	52,711	51,338
Industrial	203,177	191,410	199,324
Total	7,826,731	822,947	7,746,740

Source: IPAPEL, 2014

Regardless of the different agricultural enterprises, increases in agricultural production during the past 3 years have not grown as fast as the population has. The increase in agricultural households has not led to an increase in agricultural production. Taking production levels and the numbers of people into account, a local resident is theoretically entitled to 3.3 kg of agricultural production per day, including 3.144 kg of tubers, legumes and cereals, 0.048 kg of vegetables, 0.021 kg of fruit and 0.085 kg of industrial crops.

In 2014, only cassava, rice, taro, yams and beans did not experience a food production deficit, compared to other crops which saw a decline in production compared to 2013 (IPAPEL, 2014). The highest production of cassava and sweet potato was recorded in Kalehe and Walungu, and the greatest levels of potato and banana were produced in Kabare and Mwenga territories. The highest levels of maize and rice were produced in the Ruzizi plain and Mwenga. From a total of 7,383,063 t of fresh crops produced during 2014, approximately 35% was sold; family consumption is estimated at 65% or roughly 22.2 kg of fresh food per person per day.

The weak trade in agricultural food products in South-Kivu explains the high level of family consumption. Low production, insecurity, poor roads, and a lack of access to information, are elements that make commercialisation as well as market integration difficult (Vwima, 2014).

In South-Kivu, agricultural production remains low and is dominated by cassava, which makes up the bulk of the calories consumed. Cassava grows on poor and exhausted soil and requires little water. In addition, cassava can be harvested at any time (8 to 24 months after planting); it can be left in the ground to cater for unforeseen food shortages and is an important source of income for most producers (Vwima, 2014).

Table 4: Evolution of overall agricultural production (t) in North-Kivu

Crops	Year		
	2012	**2013**	**2014**
Cassava	586,699	843,350	1,151,850
Sweet potato	110,528	122,650	131,330
Potato	64,140	85,560	99,130
Banana	200,531	150,790	138,310
Beans	106,730	153,780	161,390
Groundnuts	11,364	11,690	13,040
Maize	51,379	69,500	71,590
Rice	33,544	35,200	38,260
Sorghum	24,044	32,100	34,060

Source: IPAPEL, 2014

Excluding banana, the yield of all other crops increased in the last 3 years, probably because of the improvement in the security situation in the province. The decrease of banana yield is due to the prevalence of banana wilt disease in the region, which has also contributed to the rise in cultivation of subsistence crops including beans, maize and sweet potato.

The livelihoods of nearly 80% of the population depend on agriculture despite the conjectural and structural constraints of this vital sector.

Livestock

The South-Kivu breeding potential is largely underexploited because of the loss of earnings for various reasons. According to De Failly (2000), the livestock sector has paid a very heavy price given the insecurity that has prevailed in the region since 1993.

There are no figures for the conflict periods in South-Kivu, but most of the large and small livestock disappeared during this period.

Table 5: Census of South-Kivu animal population

Species	2012	2013	2014
Cattle	347,195	302,675	448,116
Pig	73,861	82,759	91,631
Goats	419,704	484,242	470,669
Sheep	53,178	65,221	77,404
Fowl	332,723	323,669	567,710
Rabbits	83,563	105,793	109,777
Cavies	321,201	325,572	362,689

Source: IPAPEL, 2014

As shown in Table 5, the numbers of all species increased between 2012 and 2014. However, except for cattle, the current state of the livestock sector has not yet returned to pre-conflict levels, leading to animal protein deficits in South-Kivu's population. Cattle theft reached its highest level during the conflict which discouraged many farmers. It should be noted that the relationship between farmers and herders in South-Kivu has never been good, with disagreements sometimes ending up in court.

The greatest number of cattle herds in South-Kivu are probably located in the highlands of Uvira, situated in Uvira territory, and Itombwe in the territories of Mwenga and Fizi, as there is still enough space for grazing. Most of the cattle are bought from Burundi, Rwanda and Uganda to graze. The presence of large numbers of cattle in these areas are also explained by the influx of Burundian and Rwandese refugees in the 1960s.

The territories of Kabare, Walungu and Idjwi only have small numbers of cattle because of the pressures on land. In these areas, goats, poultry, cavies and rabbits, which were promoted by local and international NGOs, gradually replaced cattle. In Shabunda territory cattle keeping is not practiced because it is mostly covered by the rainforest which has a high prevalence of the tsetse fly, a carrier of Trypanosomas morsitans (sleeping sickness) (De Failly, 2000).

Sheep and goat breeding is practiced across South-Kivu province but the largest numbers are found in Uvira territory because of the presence of salty grass in the Ruzizi plain, which promotes greater production of these small ruminants. Pigs are considered to be a dirty animal so its meat is less expensive compared to beef and goat. That is why it is less practiced in South-Kivu province (PNSAR, 1998). The population of South-Kivu for meat and eggs engages in poultry rearing.

Table 6: North-Kivu animal population

Species	2012	2013	2014
Cattle	265,170	269,108	277,100
Pig	310,958	319,686	328,670
Goats	368,089	406,260	404,390
Sheep	230,898	234,012	222,320
Fowl	3,075,347	3,184,162	3,526,485
Rabbits	455,291	466,776	426,850
Cavies	1,099,902	1,150,563	1,274,538

As shown in Table 6, the number of all species increased between 2012 and 2014. However, like in South-Kivu, the livestock sector has not yet returned to pre-conflict levels, resulting in animal protein deficits within the population. Because of the displacement of the population, the most affected livestock species was cattle.

Fishing

Although there are 26,200 ponds in South-Kivu, only 4,250 are supervised by extension service (RDC, Plan Quinquennal de Croissance et de l'Emploi: Province du Sud-Kivu: 2011-2015). Fishing is mainly practiced on lakes Tanganyika and Kivu. Fishing activity on Lake Tanganyika was first conducted by Greeks who settled in Uvira, Baraka and Kazimyia, while Lake Kivu became an important source of fish only from the late 1970s (De Failly, 2000).

Lake Tanganyika has a surface area of 33,000 km² and extends over four countries: Burundi (8%), DRC (45%), Tanzania (41%) and Zambia (6%). Lake Kivu has a surface area of 2,700 km² and spans DRC (63%) and Rwanda (37%) (Kalibu M., 2002).

The potential of fisheries in South-Kivu is enormous. The potential of Lake Tanganyika on the Congolese side is estimated to be 450,000 t of fish per year (PNSAR, 1998; Beltrade, 2007), but current production of fish averages about 22,000 t per year, which represents 4.9% of production potential. The annual production potential of Lake Kivu on the Congolese side is estimated to be 7,000-19,000 t/year (Kalibu M., 2002).

Most fishing on Lake Tanganyika and Lake Kivu is traditional and artisanal (PNSAR, 1998; Beltrade, 2007). The main species caught are the Lake Tanganyika sprat (*Stolothrissa tanganicae*, 75%) and the Lake Tanganyika sardine (*Limnothrissa miodon*, 10%) and most is sold locally. The amount sent to Bukavu city is very low due to a lack of storage and fish drying racks, and poor transport for fishery products. Other constraints include police harassment and extortion of fishermen by security agents. Fishermen therefore usually end up selling fish locally for a low price.

The use of gillnets and mosquito nets to capture fry, as well as cutting of reeds and trees around the lakes, are not favourable to sustainable fishing and are challenges to developing fisheries in South-Kivu. The main sources of fishing equipment are Burundi, Rwanda and Tanzania.

In North-Kivu, the fishing sector contributes very little to the province GDP. Indeed its contribution is estimated at 1% in 87% provided by agriculture. This contribution increased from 798 million Congolese Franc (FC) in 2000 to 1559 million Congolese Franc in 2009 (900 FC = 1 US$) (UNDP, 2009c). In 2008, the number of fish farmers was 5824 and operated 3844 ponds with a total area of 45281.76 Ha (IPAPEL NK-2008) while in 2009 these figures increased to 2946 fish farmers operating 1934 ponds (IPAPEL-NK, 2009). Fishing is conducted in lakes, rivers and fishponds, especially on Lakes Kivu, Edward, Mokoto and various fishponds across the province. The main fish species concerned are Tilapia, Carias, Lungfish, Barbus, Mormyres and Limnotrissa. The application of fishing regulations is systematically hampered by persistent insecurity, the interference of the military and other outlaw, due to fisheries police under-equipment that exacerbates the already precarious situation. The marketed production of all categories fish was 19,302 tonnes in 2006 against 14,454 tonnes in 2008.. This recorded overall production has a downtrend from one year to another (UNDP, 2009c). The offer presents an overall deficit and the province heavily imports from Ugandan production yet fishing on the same lake. Customary and tribal status of fisheries on the North-Kivu lakes, as well as poor management and lack of active sector policy justify the destruction of infrastructure and production. The Fishing sector however offers enormous potential and opportunities immediately graspable in this sector of fishponds operated by craftsmen with inadequate means.

The fish farm is in principle less expensive than animal farming especially cattle farming. It therefore deserves investments in the production of fingerlings, production and supply of fish food (UNDP, 2009c).

Food consumption

Food consumption should meet the needs of the population. In South-Kivu, people need a balanced diet that includes food from three food categories: Energy foods (energy-giving): Carbohydrates- wheat, rice, corn, fats or lipids; Body-building foods: Proteins- soy, meat, poultry, seafood and Protective foods (regulating): Vitamins & Minerals- All fruits and vegetables, as well as dairy products. Some cultures in South-Kivu prevent the consumption of some kind of foods, but the lack of financial means is predominantly responsible for dietary imbalance.

Staple foods in South-Kivu are tubers, including cassava, sweet potato, potato, and yam. These tubers are served with meat, fish and vegetables, such as beans, cassava leaves, peas, and groundnuts.

Table 7: Calorific input of staple foods by principal source of supply in Bukavu

Products	Total food supply (t)	Supply (g/day/ person)	Kcal per 100g	Total calories (kcal/day/ person)	Sources of supply		
					Rwanda (kcal/day/ person)	North-Kivu (kcal/day/ person)	South-Kivu (kcal/day/ person)
Maize	10,015	155.13	363	563.1	372.8	175.9	14.5
Cassava	2,293	35.52	338	120	27.9	38.1	54.1
Beans	3,164	49.01	341	167.1	51.3	114.4	1.4
Potato	1,419	21.98	67	14.7	12.1	2.7	0
Sorghum	911	14.11	361	50.9	37.1	7.0	6.6
Groundnut (grain)	1,045	16.19	567	91.8	63.4	6.8	21.6
Sweet potato	97	1.50	101	1.5	1.5	0	0
Rice	20	0.31	360	1.1	0.8	0	0.3
Plantain	24	0.37	75	0.3	0.1	0	0.2
Beef	619	9.59	150	14.4	12.2	0	2.2
Pork	55	0.85	220	1.9	1.7	0	0.2
Total	19,662			1,027	593.5	338.9	92.4

Source: Vwima, 2014

Table 7 reveals that basic food products provide the Bukavu population with 1,027 kcal per person per day, of which 593.5 kcal, 92.4 and 338.9 kcal are provided by products from Rwanda, South-Kivu and North-Kivu respectively. The calories consumed in Bukavu city derive mainly from plant matter.

Among foods with the greatest calorie contributions include maize (563.1 kcal), cassava (120 kcal) and beans (167.1 kcal). These crops, which together provide more than 82% of calories consumed, play a strategic role given their importance in Bukavu diets. In an urban economy where all food products are purchased, the elimination of bottlenecks in the production and marketing of maize, cassava and beans, can only improve calorie intake, not only for Bukavu city, but also across South-Kivu province where access to meat and fish remains difficult (Vwima, 2014).

Table 8: Structure of monthly food expenditure of consumer households in Bukavu city by food group

Groups	Amount (US$)	Percent
Cereals	59.15	23
Rice	23.72	9.2
Maize and maize flour	25.46	9.9
Wheat and derived products	5.64	2.2
Sorghum and sorghum flour	4.33	1.7
Roots and tubers and other staples	61.71	24
Banana plantain	5.64	2.3
Cassava and cassava flour	15.64	6.1
Potato	9.05	3.5
Yam	0.03	0
Sweet potato	4.87	1.9
Peas	0.04	0
Beans	24.74	9.6
Groundnuts	1.39	0.5
Legumes	10.52	4.1
Animal products	79.99	31.1
Fish	33.72	13.1
Meat	39.15	15.2
Milk products, eggs, honey	7.12	2.8
Oils and nuts	11.73	4.6
Condiments, spices and ingredients	6.03	2.3
Fruit	4.62	1.8
Sugar and sugar products	2.92	1.1
Beverages and soft drinks, juice, water in plastic bottles	21.65	8.4
Total	258.33	100

Source: Vwima, 2014

Income is an important determinant in food consumption. Income dramatically affects individual behaviour and practices towards food, including food purchases (quantity and quality), and levels of consumption within and outside the home (Caillavet *et al.*, 2009). Other important sources of supply in developing countries include donations and remittances from family members.

Some foods are only consumed occasionally. Table 8 shows that consumer households spend US$5.95 per month, or 2.3% on food consumed occasionally in a month. Of this occasional spending, 57.4% is spent during festivals and other family ceremonies (arrival of visitors, family meetings, infant baptisms), 33.1% is spent when a special meal is required,

and 9.5% is spent for other reasons, including the household head returning from travel, request of children, and celebration of job promotion (Vwima, 2014).

The 2008 global economic crisis had a huge impact in DRC, increasing the prices of staple foods and reducing the value of mining exports which are a vital source of income for a significant proportion of the population. GDP growth was limited to 6.2% in 2008, 4% lower than had been forecast. A decline in oil export revenues also contributed to weak growth.

Fluctuations in commodity prices in DRC have affected sustainable access to food for vulnerable populations. The increase in food prices also did not benefit small producers who were unable to increase their production significantly in order to enjoy the inflationary speculation in agricultural products.

Household expenditures in South-Kivu province are largely dominated by food, which represents 73% of total household expenditure, demonstrating the high levels of poverty within the province. It should be noted that there is an imbalance in expenditure, as shown by the Gini index of annual household expenditure (0.57) and especially the comparison of consumption quartiles. The poorest 25% of households in the South-Kivu province spend only 15.5% of total expenditures on food, while the richest 25% spend 34.3%.

Table 9: Average consumption in South-Kivu

	N (Sample size)	**Median**	**Average**	**Standard deviation**
Bukavu town	118	294	393	338
Uvira city	203	476	503	218
Kalehe	90	223	260	124
Walungu	44	319	314	134
Mwenga	89	459	500	198
Fizi	90	304	368	248
Uvira	89	243	238	118
Total	810	291	341	216

Source: Adapted from Ansoms and Marivoet, 2010

For all territories, average consumption (based on the Marivoet method) falls below the 589 FC (Congolese Franc) per day poverty line (900 FC = US$1; $2.75 PPP, 2005 prices), but intra-territorial differences are important (Table 9). First, consumption rates are higher in urban areas (Bukavu city and Uvira town) than rural areas (except Mwenga). However, the high standard deviation in Bukavu city implies a wide dispersion of consumption rates.

Comparison of rural areas (Table 9) reveals that average consumption rates in Mwenga are the highest, which is probably due to the importance of mining where the consumption is greater. This is surprising since Mwenga – endowed with mineral resources – has been greatly affected by instability and violence in successive conflicts. Fizi, one of the least populated areas and characterised by an equatorial climate, has relatively higher average consumption rates than other territories. Kabare and Walungu territories, both characterised

by overcrowding, have average consumption of about 50% below the poverty line. Finally, Kalehe and Uvira are the poorest territories, despite Uvira being the only territory, which is crossed from north to south by a fairly good road. Several economic activities (including trade) have developed around this road, which should have had a positive impact on the livelihoods of people in this territory.

In North-Kivu, the surrender of the M23 movement and the recovery of control over Rutshuru and Nyiragongo territories by the Armed Forces of the Democratic Republic of Congo (FARDC) have led to the improvement of the security situation in those areas, facilitating the return of a large number of people who were displaced. A return of displaced populations has also been observed in other areas where the security situation has improved, including in Masisi and Walikale. However, the continued activism of other armed groups, including the Islamic Alliance of Democratic Forces (ADF-NALU), as well as FARDC operations to dislodge them continue to cause new displacements, particularly in Masisi and Beni (FAO, 2014). As a result of recurring conflicts, high proportions of households (on average 79.5% in Masisi and Beni) have poor food consumption, suggesting that these households face enormous difficulties in accessing food and resort to severe coping mechanisms (FAO, 2014).

Another challenge facing subsistence farming (which constitutes more than 70% of livelihoods) is plant diseases (development of banana wilt, persistence of cassava mosaic virus) and epizootic diseases that significantly reduce production and cause price volatility in the markets (Beltrade, 2007).

In North-Kivu poor eating habits and irregular food intake (one meal a day with low levels of protein) result in high levels of malnutrition (OCHA, 2007). The results of a food security assessment study in North-Kivu (Table 10) have revealed that 4,398,000 people are affected by food insecurity; 19% of households in North-Kivu are severely food insecure (1,454,000 people), 42% are moderately food insecure (2,944,000 people) and only 39% are food secure.

Table 10: Levels of food security in different North-Kivu areas

Territories	Total population	Severe food insecurity	Moderate food insecurity	Food insecure (total)	Food secure
Masisi	1,162,072	441,587	453,208	894,795	267,277
Rutshuru	1,189,985	307,016	536,683	843,699	346,286
Nyiragongo	133,380	25,742	66,290	92,032	41,348
Beni	1,144,367	216,285	333,011	549,296	595,071
Butembo	683,771	121,711	395,220	516,931	166,840
Walikale	556,183	94,551	212,462	307,013	249,170
Ville de Beni	354,753	48,956	172,055	221,011	133,742
Goma	681,086	72,195	296,272	368,468	312,618
Lubero	1,368,667	125,917	479,033	604,951	763,716
Total	7,274,264	1,453,962	2,944,235	4,398,197	2,876,067

The results of a comprehensive evaluation of food security (MINAGRI *et al.*, 2013) (Provincial Ministry of Agriculture, Fisheries, Livestock and Rural Development) conducted jointly by the Provincial Ministry of Agriculture, Fisheries, Livestock and Rural Development, WFP and FAO indicated that 28% of households in the province were food insecure in October 2011; (8%) severely and (20%) moderately. As conflicts intensified and population displacements amplified, rates of food insecurity rose so that by 2013 six out of ten households were recorded as food insecure. All North-Kivu territories are affected, the situation is more worrying in Masisi, Butembo, Rutshuru and Nyiragongo, where over 65% of households are severely or moderately food insecure.

Food insecurity in North-Kivu province is both linked to food availability and accessibility. Repetitive armed conflicts have challenged the agricultural sector, consequently increasing the province dependency on food imports and vulnerability to price increases. Insecurity has disrupted the operational of market systems, occasioning recurrent shortages and higher prices for essential foodstuffs. The low purchasing power makes food insecure households often unable to compensate for their food shortage by buying food.

In North-Kivu studies have highlighted the influence of several factors on household food security (MINAGRI *et al.*, 2013):

- Households headed by women were most affected by food insecurity (69%) than those headed by men (58%).
- Households belonging to the poor (according to a wealth index), are more affected by food insecurity (78%) than the middle class (63%) or rich (46%).
- Household heads that have never been to school are more affected by food insecurity (72%) than those with a primary (65%), secondary (53%) or university (35%) level of education.
- Displaced families being looked after by host families (foster care) are also more affected by food insecurity (81%) than returned families (79%) or residents (59%).
- Recently returned families (less than 3 months) are more affected by severe food insecurity (43%) than those who had been returned for more than 6 months (37%).

Food access

One of the problems faced in North-Kivu and South-Kivu provinces is inadequate and dilapidated transport infrastructure, which makes the movement of people and goods difficult. With no railway infrastructure in either province, Lake Tanganyika and Lake Kivu have the potential to act as important transport links for the movement of agricultural products in all seasons, but investment is required to ensure that collisions between vessels are avoided. In recent years, the ships themselves have improved their services and provide ‘good enough’ transportation of goods and people.

Food access is also affected by the persistence of armed conflict in rural areas which has made the movement of crop and livestock products more difficult, and reduced production. Other factors include a rise in unemployment and drop in household income, and lack of infrastructure to preserve fresh food. Additionally, markets in rural areas are usually only organised once or twice a week, preventing access to agricultural products even when a household has money to buy them. This makes access to some fresh products, like fish, difficult.

Sustainability of food security

Food security (accessibility, availability, use and stability over time) is a great challenge for many developing countries. Analysis of the agricultural and mineral potential of DRC reveal that the causes of food insecurity are complex and include poverty, insecurity and armed conflict, lack of employment, and infrastructure, in addition to low levels of agricultural production.

Food insecurity is of particular concern in eastern DRC (North-Kivu and South-Kivu). South-Kivu, with 16% of its population being food insecure, has the lowest caloric intake (1,561kcal/person/day) in DRC (UNDP, 2010). Other contributors include the decline in production of all staple crops (cassava, sorghum, maize, beans) (Vwima, 2014). Growing pressure on land, soil depletion, high population growth and rampant poverty (84.7%, well above the national average of 71.3%) are among other factors resulting in high levels of food insecurity.

In North-Kivu, armed conflicts have led to a deterioration of FNS (Save the Children, 2013). In addition to population movements, conflict also led to the destruction or confiscation of means of production and infrastructure which blocked supply channels between rural areas and urban centres (Bisimwa and Bashi, 2009). While more needs to be done to tackle this situation, some NGOs including ACF already have had some success in reducing poverty, improving access to clean water, and building capacity in income generating activities (ACF, 2014). Despite these successes, the humanitarian community is continuing to look at ways to make assistance to displaced populations more sustainable, particularly in North-Kivu.

Ensuring the sustainability of food security in South-Kivu and North-Kivu also faces climate-related problems, poor soils, quality and quantity of inputs, and agricultural techniques, and the spread of plant and animal diseases. Banana bacterial wilt and African cassava mosaic virus are also significant hurdles to revitalising agricultural production and the fight against food insecurity. In some territories with steep slopes, the soil is completely washed. This situation is observed with great acuity in Walungu, Luwindja and Burhinyi. Land reform issues are also important, as large industrial companies and investors are in possession of large amounts of fertile land, which currently remains unexploited.

The agricultural workforce is mainly from women and older men. Young people mostly engage in mining and trade, or leave rural areas altogether, which is impacting the availability of agricultural labour (OCHA, 2005). It must also be highlighted that the literature review also underlines the increasingly Diverging idea from the dominant issue of African cities addressed in the 70th and 80th about food supply for the cities by countryside (Tchawe, 2003). This is associated with significant deterioration of trade between urban centres and rural areas, which is contributing to the rural exodus. The high food dependency of Bukavu city on food imports from Rusizi District in Rwanda is one of the most prominent examples of this (Vwima, 2014).

Both provinces, South-Kivu and North-Kivu import most of its foodstuff from Rwanda, even for products for which the region holds some comparative advantage, which is in addition exasperating deficiencies in the local production system (CRONGD, 2010); then, Gisenyi and Rusizi Rwandan districts have secured a strategic position as producers for both provinces (Vwima, 2014).

To boost the competitiveness of local economies, appropriate policies are required to protect small nascent local industries. For example, imported products are currently cheaper than local products. Due to a lack of adequate infrastructure, input supply systems and cheap means of processing, local products sometimes pass through Rwanda first before being sold back to DRC. This phenomenon is particularly true in South-Kivu, which makes it more vulnerable to external shocks than North-Kivu.

Achieving long-term sustainable food security in both provinces will not be easy, given the security and policy challenges on one hand and environmental, agronomic and economic challenges on the other hand. It is therefore necessary to (WFP, 2013):

- Reinforce agricultural recovery programmes and support livelihoods;
- Support and protect local small industries in the embryonic stage by implementing adequate trade policies;
- Acquire storage and processing infrastructures for perishable products with high added value;
- Improve the management and maintenance of rural roads;
- Strengthen security measures in production zones;
- Strengthen programmes of prevention and management of malnutrition;
- Develop a system for food security and early warning monitoring.

As highlighted by Tollens (2003), poverty is one of main sources of food insecurity in DRC particularly in the eastern part of the country, so sustained economic growth and long-term improvements in security will be necessary to sustainably address FNS.

The status of nutrition in North-Kivu and South-Kivu

DRC is one of ten countries, which has more than 60% of children under 5 years suffering from acute malnutrition (UNICEF, 2012). More than 4 million children under 5 years old suffer from acute malnutrition each year, and over half of these children (2,163,000) face a high risk of death if nothing is done (WFP, 2013).

Table 11: FNS situation by province in 2015

Province	Rural population	Number of food insecure people	% of population that is food insecure
Kongo Central	3,080,907	68,215	2
Equateur	10,216,324	515,817	5
Katanga	10,143,018	1 658,317	16
Maniema	2,122,944	386,054	18
North-Kivu	6,364,503	824,800	13
Province Orientale	10,046,500	465,141	5
South-Kivu	5,550,526	537,762	10
Total	47,524,722	4,456,106	9

A food security assessment conducted by WFP, FAO and the Ministry of Agriculture in 2015 indicated that about half a million people (10% of the rural population) in South-Kivu are food insecure, and over 800,000 people (13%) in North-Kivu are food insecure (Table 11), both of which are higher than the national average (9%). The highest levels are observed in Maniema (18%), Katanga (16) and North-Kivu (13%), while the lowest are found in the more secure provinces of Kongo Central (2%), Equateur (5%) and Province Orientale (5%).

The activism of local armed groups (Maï Maï) and foreign groups (Liberation Forces of Rwanda (FDLR) and National Liberation Forces), ethnic conflicts and inheritance disputes caused large-scale population movements (estimated at 66,350) during July-September 2013, mainly in Shabunda, Fizi and Uvira (ACF, 2013). This has exacerbated food consumption in both provinces. South-Kivu's average food consumption score (% of households with poor or limited food consumption) of 47.1% is very alarming and negatively affects food diversity in the province. Food consumption scores reveal high proportions of households with poor or limited food consumption in Shabunda (76.7%), Kalehe (76.6%), Fizi (70.8%), Mwenga (56.2%) and Walungu (56.1%). The lowest food consumption score is in Idjwi territory (35.9%) (Figure 3).

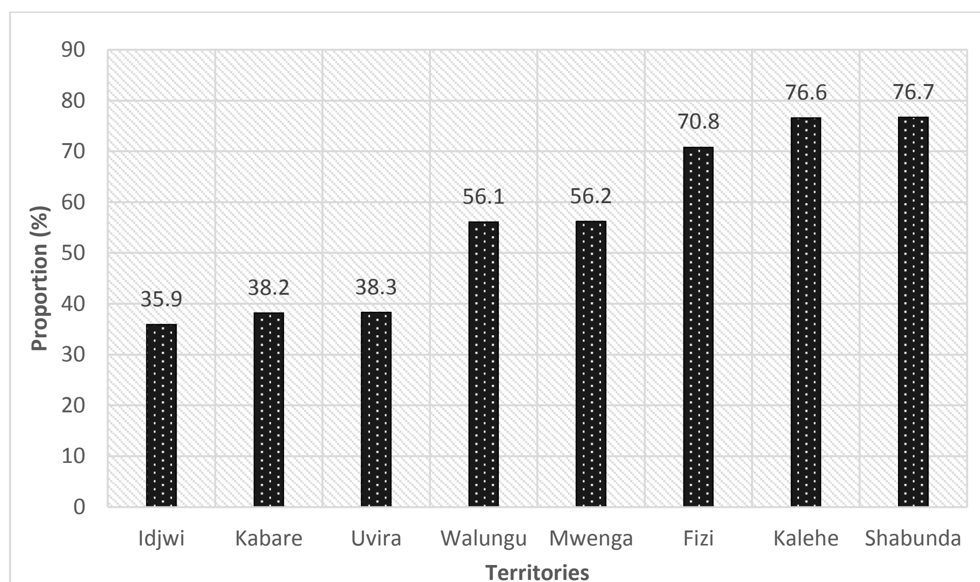

Figure 3: Proportion of households with poor or limited food consumption by territories in South-Kivu province

Source: SNSAP, 2013

According to surveys conducted by ACF (2007) in Fizi, very few people had three meals a day (4%), 57% had two meals and 39% only had one.

During the lean season, in the plain and coastline everyone takes only one meal a day while in the basin and highland some people take two meals daily (40% and 20% respectively of the population surveyed). This can be explained by the fact that in these areas the production of cassava has increased since cassava mosaic virus has not affected the area. The food is also more diversified, in the basin people eat rice and in the highlands they consume beans (ACF, 2013).

An anthropometric nutritional survey organised in 2009 in Miti Murhesa zone revealed (ACF, 2011):

- Prevalence of global acute malnutrition (GAM[1]): 8%.
- Prevalence of severe acute malnutrition (SAM): 1.1%.

An anthropometric nutritional survey organised in 2009 in Kabare revealed (ACF, 2012):

- Prevalence of GAM: 11.4%.
- Prevalence of SAM 1.6%. A therapeutic feeding programme supported by ACF is in place in this area with one integrated nutritional and therapeutic units (UNTI) and eight nutritional and outpatient therapeutic units (UNTA) since April 2011; 1,185 admissions were recorded up to February 2012, of which 891 (75%) were children under 5 years.

In Fizi, malnutrition is often linked to low incomes which limits access to a balanced diet and health care, a lack of awareness of the importance of a diverse diet, inadequate feeding habits, lack of clean drinking water and poor sanitary conditions (Plaza, 2007).

In North Kivu (Figure 4) the situation is better in urban centres compared to rural areas. For example, Goma and Beni cities have the lowest scores, while Walikale, which is still an insecure area, has the highest.

FNS improvements are being seen in both North-Kivu and South-Kivu, probably because of an improvement in security since the M23 rebel movement ceased activities.

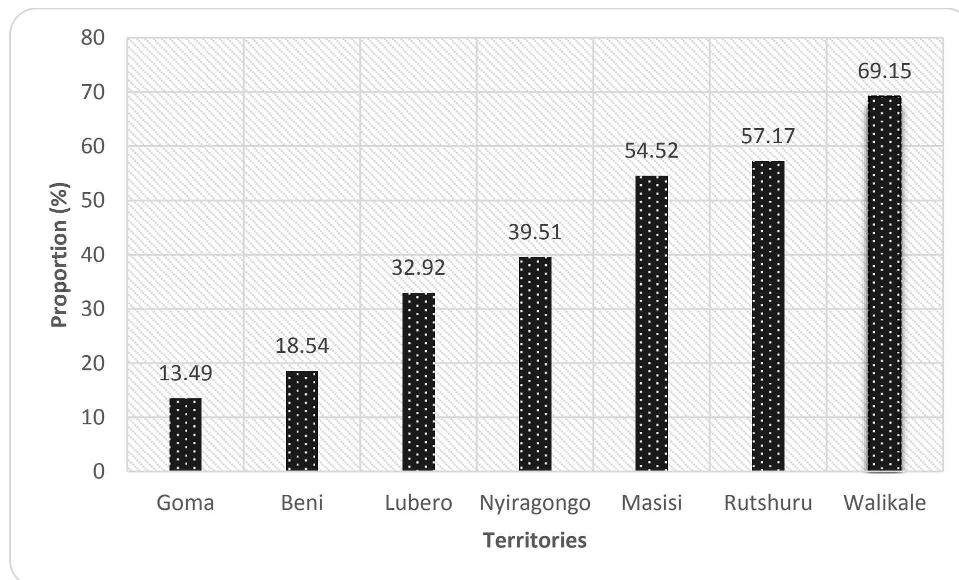

Figure 4: Proportion of households with poor or limited food consumption by territories in North-Kivu province

Source: SNSAP, 2013

[1] GAM is a measurement of the nutritional status of a population that is often used in protracted refugee situations

Nutrition trends: women and children's diets

In South-Kivu, despite good agro-ecological conditions for agricultural production, the nutritional status of the populations is unsatisfactory. According to WFP (2008) 11.7% of households have poor levels of food consumption and 33% struggle with limited consumption, a situation which mainly affects vulnerable groups: children, pregnant women, elderly or displaced populations. ACF (2012) reported that by restricting the access of household to their fields, insecurity has exacerbated malnutrition in children in these territories (ACF, 2012).

In the highlands of South-Kivu, the staple meal is cassava (*fufu*), with green vegetables and fish and/or beans, and/or meat (wild or domestic). In the plain, cassava is supplemented with maize for preparation of *fufu*, which increases its nutritional value for energy and protein (ACF, 2009). The main food used to wean children is cassava porridge, unless the child develops an intolerance to cassava, identified by diarrhoea according to popular belief. In this case, the child is weaned using porridge made of dried banana flour. A child will still continue to be breastfed until the mother becomes pregnant again (ACF, 2013).

According to the 2007 Demographic and Health Survey (DHS) in South-Kivu, GAM (weight/height below -2 SD and or oedema) affects 13% of children under 5 years old, with 8% in South-Kivu severely affected.

Across the province, 43% of children suffer from chronic malnutrition, with about half of all children (23%) severely affected. The level of stunting increases rapidly with age: 15% for children under 6 months, rising to 28% among 9-11 month olds, and increasing to a height of 54% among children aged 36-47 months. The level of chronic malnutrition is slightly higher among male children (45%) than female (40%) children, and children from rural areas (47%) frequently lag behind as far as growth is concerned than those in urban areas (33%). Chronic malnutrition is significantly influenced by the level of mother's education, with malnutrition rates ranging from 51% (children whose mother had no education), to 47% (primary education), 33% (secondary education), and 13% (higher education) (EDS, 2013).

The poor nutritional status of women is one of the determinants of maternal mortality. It also influences the outcome of pregnancy, either through premature birth or low birth-weight. Therefore it is imperative to break the vicious cycle of intergenerational malnutrition.

According to a Demographic and Health Survey [Enquête Démographique et de Santé (EDS)] (2007), 19% of women aged 15-49 are malnourished, which is nearly one in five women. The proportion of malnourished women is more acute in rural areas (21%) compared to urban centres (16%).

A study carried out by the medical college Institut Superieur des Techniques Medicales (ISTM) on the nutritional status of pregnant women in Kadutu/Bukavu health zone revealed that only 24% of pregnant women had knowledge about different food categories that were most needed during pregnancy. Only 39.4% ate twice daily (Alice, 2011).

The prevalence of children protein-calorific malnutrition in 2012 varies between 4.9% in the city of Bukavu compared to 12.6% in Walungu. About 7.4% of children in South-Kivu are born with a low birth-weight of less than 2.5 kg, which decreases their chances of survival in the first few months of life. This is very close to the national average of 7.7% (UNDP, 2009b). In Minova, in South-Kivu, the GAM rate is 10.8% (PRONANUT, 2011).

In 2006, GAM rates were above WHO's emergency threshold of 10% in Fizi (14%), Walungu (12.4%), Kabare (12.4%), Uvira (10.5%) and Mwenga (10.1%). SAM rates, where the emergency threshold is 2%, were exceeded in Walungu (4.8%), Fizi (4.1%), Kalehe (3.2%), Shabunda (2.2%), Kabare (2.1%) and Mwenga (2%) (WFP, 2013).

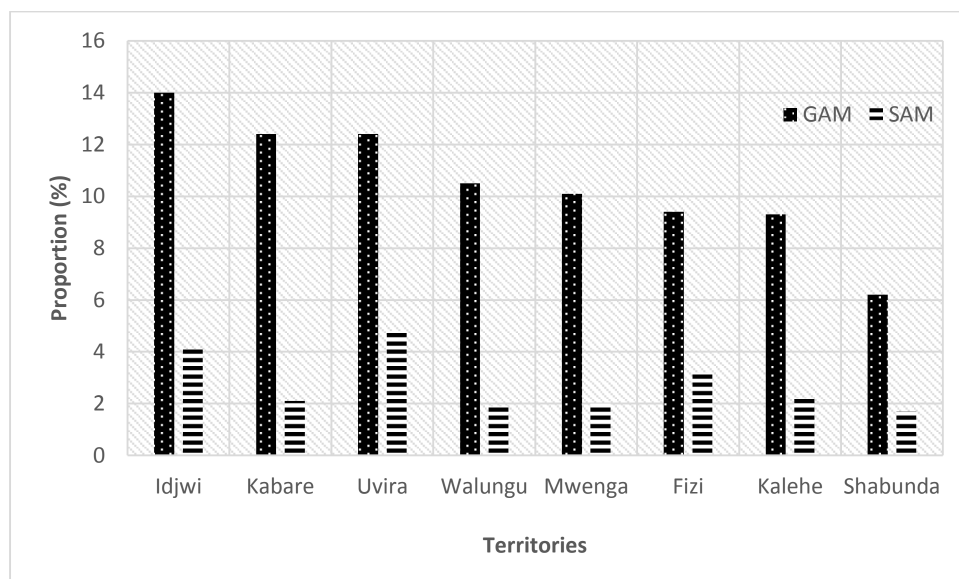

Figure 5: Prevalence of Global and acute malnutrition (GAM) and Severe and acute malnutrition (SAM) in south-Kivu territories

Source: SNSAP, 2013

The immediate and main causes leading to the classification of both provinces (North and South-Kivu) as having high nutritional deficiencies and resulting to food and humanitarian security needs remain: the persistent of armed groups activities, abuses by military and the aftermath of military operations. To this we should add the high population growth, the decline in agricultural production, and food habits (OCHA, 2011).

A study by Hyawe-Hinyi and Baudry (2009) in South-Kivu, found that four out of ten children die of hunger before the age of 2 years old. In this province, which has the necessary conditions for crops to grow in abundance, people eat a poor diet of mainly cassava. Despite the efforts of various actors involved in FNS, the infant mortality rate has risen from 31.5% in 1990 to 47.6% in 2008 (DSRP, 2008). Over 70% of children in the province show signs of malnutrition

Assessment of children's weight at birth

Table 12 reveals that 11.74% of children born in South-Kivu weigh less than 2.5 kg and are predominantly girls (6.6%). In North-Kivu, however, the rate is 10.69% weighing less than 2.5 kg, with a predominance of males (7.44%). A DHS survey (2007) indicated a prevalence rate of children weighing less than 2.5 kg at birth of 13% for North-Kivu. This slight improvement was due to the impact of sensitisation and actions of different organisations working in FNS. Children weighing less than 2.5 kg at birth have a lower life expectancy, so

a rate of over 10% for both provinces remains alarming. These figures also reflect high malnutrition rates among pregnant women.

Table 12: Birth weight of children by sex and region in November 2015

Province	Sex	<2.5	>2.5
South-Kivu	Girl	6.605	42.24
	Boy	5.14	46.01
	Total	11.745	88.25
North-Kivu	Girl	3.25	48.11
	Boy	7.44	41.2
	Total	10.69	89.31

Source: own results following a survey in different general hospitals in both provinces

In North-Kivu, the nutritional situation is particularly worrying in light of the pockets of insecurity in certain health areas; less than 50% cover in PCIMA (Protocole national de prise en Charge Intégrée de la Malnutrition) in certain health zones, displacement, epidemics etc.

Table 13: Nutritional surveys conducted in Walikale and Kamango health zones (2005-2013)

Health zones	Period	GAM trend *	SAM trend	Oedema
Walikale (SMART PRONANUT survey)	11/2013	11.9%	3.5%	
Kayna (LWF: Lutheran World Federation)	12/15/2005	*6.6%	0.8%	3%
Mweso (SCI: Save The Children International)	17/22/2006	*13.3%	4.3%	
Masisi (LWF : Lutheran World Federation)	11/14/2005	*7.3%	2%	1%
Masisi (SCI : Save The Children International)	5/12/2005	*12%	3.3%	3%
Karisimbi (COOPI: Cooperazione internationale)	2/7/2006	*8.7%	0.8%	1%
Birambizo (Caritas Internationalis)	8/11/2005	*15.2%	4.5%	9%
Kamango (SMART LWF survey)	06/2007	8.9%	2.8%	

* Screening data
Source: ACF, 2009

Table 14: Malnutrition indicators and infant mortality in North-Kivu

	North-Kivu	DRC
Percentage of children with birth weight under 2.5 kg in Failure to thrive	13.5%	7.7%
• Chronic (size/age ≤ - 2 SD)	53.6%	45.5%
• Severe (size/age ≤ - 3 SD)	28.2%	24.2%
Wasting in 2007		
• Chronic (weight/height ≤ - 2 SD)	6.6%	10%
• Severe (weight/height ≤ - 3 SD)	3.8%	4.3%
Underweight in 2007		
• Chronic (Weight/age ≤ - 2 SD)	20%	25.1%
• Severe (Weight/age ≤ - 3 SD)	6.1%	8.4%

Source: EDS, 2007 SD: Standard Deviation

The nutritional state of children is critical in North-Kivu. Very few households have access to drinking water on their plots (14.8%) and electricity access stands at 2.5%. Limited access to clean drinking water increases waterborne diseases, which are among the major causes of mortality and morbidity. 99.5% of households do not have road access for garbage clearance and 8% do not have a toilet. The spread of infectious diseases, especially diarrheal diseases, which are frequently one of the causes of malnutrition are link to the insufficient toilets for excreta disposal.

A 2007 DHS survey revealed that malnutrition is common in North-Kivu where about 13.5% of children (7.7% in DRC) are born weighing less than 2.5 kg, which decreases their chances of survival in the first few months. In addition, 53.6% of children under 5 years old are stunted (45.5% in DRC). Malnutrition can also be measured through wasting. Severe wasting affects 6.6% of children under 5 years old (10% in DRC) and chronic wasting affects 3.8% (4.3% in DRC). The same is true for underweight (low weight for a given age) which affects 20% of North-Kivu children under 5 years old (25.1% in DRC).

Infant mortality

Malnutrition results in significant mortality rates in North-Kivu. The infant mortality rate is 57 ‰, compared to 92‰ in DRC, while the child mortality rate is 102‰ in North-Kivu, compared to 148‰ across the entire country (Table 15).

Table 15: Infant mortality rate and child mortality rate in North-Kivu

	North-Kivu	DRC
Infant mortality rate		
- 2007 (EDS)	5,7%	9,2%
- 2001 (MICS 2)	14,0%	12,6%
Child mortality rate		
- 2007 (EDS)	10,2%	14,8%
- 2001 (MICS 2)	23,7%	21,3%

Source: EDS, 2007

Weight evolution in malnourished children compared to normal children

Figure 6 reveals the results of weight differences between malnourished and nourished children in North-Kivu. The data were collected during an anthropometric survey of around 2,000 children (half of which had acute malnutrition). Malnourished girls aged over 4 years old had weights greater than malnourished boys. The four growth curves look similar, but the degree of the slope is higher for nourished children compared to malnourished children, indicating stunting. On average this ponderal gap is 4.5 kg for malnourished girls and 4.9 kg for malnourished boys. As children grow, these differences increase due to an accumulation of effects; children exposed to malnutrition over a long period have a larger growth delay compared to those exposed for a short time.

Figure 6: Weight evolution (kg) of normal and malnourished children in North-Kivu by gender

Distribution of malnutrition by sex

Table 16 shows the distribution of children admitted to nutritional units by sex and age group in North-Kivu. According to centres caring for malnourished children, more girls (51.76%) than boys (48.24%) are admitted. There are also more children under 2 years old (41.9%)

than for other age groups. The high percentage of children under 2 years old is the result, not only of their poor nutrition after birth, but also the poor nutrition of their mothers during pregnancy.

Table 16: Proportion of malnourished children admitted to nutritional units by age and sex in North-Kivu

Age (years)	Girl		Boy		Total (%)
	Number	Proportion (%)	Number	Proportion (%)	
0 to 1.9	210	21.15	206	20.75	41.9
2 to 3.9	158	15.91	141	14.20	30.1
4 to 5.9	90	9.06	75	7.55	16.6
> 5.9	56	5.64	57	5.74	11.4
Total	514	51.76	479	48.24	100

The more a child grows, the more he has opportunities to visit other households for additional meal (supplement), which would explain a gradual reduction in the malnutrition rate by age. It should be noted that adults are often ashamed to visit the malnutrition treatment centres so do not bring their children unless it becomes severe. Considering the classification of malnutrition according to the weight/height index in the Z-score, 33.37% of children have SAM (with medical complications) and most are female.

Nutrition capacity

Existing governmental programmes

The management of FNS is under the responsibility of the Ministry of Health and interventions are organised in health zones, which are the basis operational level for the organisation and planning of health care in DRC. A health zone is a defined geographical area with a population of about 50,000-100,000 people in rural areas and 100,000-250,000 people in urban areas. It consists of two levels of intervention:

- Health areas consist of a health centre network, each corresponding to a health zone, within which contains UNSs and nutritional and outpatient therapeutic units (UNTA).
- A general referral hospital that offers complementary health care for health zones and UNTIs.

For several decades, the management of malnutrition was organised according to the existing protocol, before the advent of CMAM in 2008. Only international humanitarian NGOs largely implemented nutrition activity. In the majority of cases, treatment was organised in makeshift structures erected alongside health care structures. In light of conflict, particularly in eastern DRC, there has been a major deployment of nutrition NGOs in this part of the country. Nutrition management did not exist, with each NGO having its own protocols for malnutrition. To end this, the Ministry of Public Health began to develop a national nutrition policy in 2000 that resulted in the creation of a single national nutrition programme, National

Nutrition Program (PRONANUT) in 2002. The new integrated management of acute malnutrition is based on the following basic principles:

- Community involvement in raising awareness, prevention, early detection and monitoring of cases of malnutrition;
- Decentralisation of points of contact between patients and health care structures, facilitating management and monitoring to improve coverage;
- Use of ready-to-use therapeutic foods that enable outpatient treatment;
- Integration of PCIMA in routine activities of health care facilities;

National Nutrition Program (PRONANUT) includes several intervention strategies including:

- Community component: aiming to promote ownership and active participation of the community in prevention activities and care of malnutrition.
- Health centre component: begins with passive screening, triage and referral of cases, and includes two units of nutritional support: UNSs for the management of cases of moderate acute malnutrition, and systematic monitoring of discharged patients from UNTA; and the management of SAM cases without medical complications and with an appetite.
- Hospital/reference health centre component (including UNTA): ensures the management of SAM with medical complications and/or loss of appetite as well as infants from 0-6 months with a nutritional problem.

In DRC, nutrition is the responsibility of the National Nutrition Program (PRONANUT), which is one of 52 specialised programmes under the Department of Health (UNICEF, 2010). PRONANUT was established in 2000 after the fusion of two former specialised programmes; the Human Nutrition Planning Center (CEPLANUT) and the National Office for the Fight against Iodine Disorders (BN-IDD). Since its creation in 2000, the lack of finances and human capacity, the size of DRC, and difficulties in accessing some areas, has led to the decentralisation of national PRONANUT activities. However nutritional situation of DRC has improved since the creation of PRONANUT; the GAM rate at the national level decreased from 16% in 2001 to 11% in 2010 (PRONANUT, 2012).

PRONANUT has a coordination office in each of the 11 provinces. The role of the provincial coordinators is to oversee the province's nutrition activities. UNICEF and other international NGOs assist PRONANUT by providing inputs to the Community-based Management of Acute Malnutrition (CMAM) programme as well as general financial, technical and logistical support.

Given the severity of the nutrition situation, DRC has committed to investing in nutrition to improve the nutritional status of its population. This was expressed through the creation of PRONANUT, and the execution of two master plans, including the Director Plan of Nutrition 2001-2005, and 2006-2008 Triennial Plan of Nutrition (PRONANUT, 2012). In 2013, a new nutrition policy (multi-sectoral) was adopted and the country joined Scaling Up Nutrition (SUN) movement to strengthen nutrition activities and providing leadership in FNS (UNICEF, 2012).

In 2003, management of SAM began in areas of eastern DRC affected by conflict. This is provided in hospitals by humanitarian NGOs, including ACF in South-Kivu and World Vision

in North-Kivu (UNICEF, 2013). In South-Kivu, in the territory of Kabare, an anthropometric nutritional survey conducted in 2009 found that the prevalence of GAM was 11.4% and SAM was 1.6%. By 2012 the GAM rate had improved to 7.4% (ACF, 2012). An improvement was noticed at national scale and this is actually the translation of a very significant reduction of malnutrition in eastern provinces (North-Kivu, South-Kivu, Maniema and Katanga), which is largely attributable to the efforts of the humanitarian community.

National and international NGOs, research institutions, and religious communities support PRONANUT. These include: Action Against Hunger (ACF), Helen Keller International (HKI), World Vision, Save the Children, Memisa, COOPI, Medecin sans Frontière (MSF), Cordaid, Merlin, Caritas, Red Cross, CRS, BDOM, Communauté des Eglises de Pentecôte en Afrique Centrale (CEPAC), International Food Policy Research Institute (IFPRI), HarvestPlus, International Institute of Tropical Agriculture (IITA), Initiatives de Développement pour l'Afrique (IDEA), Médecins d'Afrique, Centre scientifique et Médical de l'Université libre de Bruxelles pour ses Activités de Coopération (CEMUBAC), LWF, Presbyterian Community of Kinshasa (CPK), Adventist Development and Relief Agency (ADRA), Concern, Regional Center for Support and Training for Development (CRAFOD), Action pour la protection et l'Encadrement de l'Enfant (APEE), Armée du Salut, and Aide et Action pour la Paix (PAA).

In South-Kivu, several nutrition projects are implemented by UN organisations and national and local NGOs (Table 17). The main objective of these projects is to improve the nutrition of children and pregnant and lactating women.

WFP projects aim to provide food assistance to people accompanying severely malnourished children admitted for therapeutic treatment in feeding centres, and distribute food to children and pregnant and lactating women admitted to supplementary nutrition units (UNS). In Bukavu town municipalities WFP has assisted 245 malnourished children (Ibanda), and provided food for 240 malnourished children under 5 year and pregnant and lactating women (Panzi and Kadutu). Assistance has also been provided to malnourished children under 5 years old and pregnant and lactating women in Kabare (10,400), Mwenga (3,815), and Walungu (2,665), and 60 food insecure people in Shabunda. This assistance started in 2011 and will end up in 2016.

The ADRA Jenga Jamaa II project aims to improve the nutritional and health status of children under 5 years old and pregnant and lactating mothers. In Fizi and Uvira, 31,986 people have benefited directly, including pregnant and lactating women, children under 2 years old, and indirectly the mothers of children under 5 years. The project started in 2011 and is planned to close in 2016.

From 2008 to 2012, UNICEF supported a project to care for the malnourished and prevent its occurrence. In Fizi, nutrition surveillance has detected 5,261 malnourished children, and 123,386 children under 5 years and 10,445 pregnant women in need for malnutrition prevention. Nutrition surveillance also identified 41,574 children (6-59 months) in Idjwi and 34,229 children (6-59 months) in Kabare. In Kalehe, 1,241 severely malnourished children, 76,180 children under 5 years for malnutrition prevention, and 3,158 pregnant and lactating women were identified. In Mwenga, 976 malnourished children, 91,780 children under 5 years for malnutrition prevention and 3,974 pregnant and lactating women were identified. In Uvira, 19,326 children 6-59 months in Shabunda and 99,020 children 6-59 months were identified.

Table 17: Institutions, NGOs involved in FNS, projects and target populations in South-Kivu

Institution	Project title	Intervention area	Target group
Adventist Development and Relief Agency **(ADRA)**	Projets Jenga Jamaaa II (Nutrition-Health-Water-Hygiene-Sanitation-Food Security)	Fizi and Uvira	Pregnant and lactating women.
World Food Program (**WFP**	Food assistance projects for children and pregnant/lactating women who are moderately malnourished Relief Food Project to children and pregnant/lactating women who are moderately malnourished carers in Integrated Nutritional and Therapeutic Unit (UNTI)	Fizi, Kabare, Mwenga, Shabunda and Walungu, and Bukavu municipalities	Malnourished children under 5 years and pregnant and lactating women. Food insecure people.
UN Children's Emergency Fund **(UNICEF)**	Support projects for the management of acute malnutrition Mass supplementation projects in vitamin A and deworming with mebendazole	All provinces and Bukavu municipalities	Children 6-59 months old. Malnourished children, children under 5 years of age (malnutrition prevention), and pregnant and lactating women.
Assistance Humanitaire aux Enfants Vulnérables Orphelins **(AHEVO)**	Project to support children, and pregnant/nursing mothers suffering from acute malnutrition in Miti-Murhesa area	Kabare	Children under 5 years and pregnant and lactating women suffering from acute malnutrition.
Corps international de secours d'urgence de l'Ordre de Malte (order of malte woldwide relief (**MALTESER)**	WFP assistance projects	Mwenga, Shabunda and Walungu	Vulnerable people.
Médecins Sans Frontières **(MSF-E)**	Medical and nutrition care project	Shabunda	
People In Need **(PIN)**	Nutrition and health project	Shabunda	Children 6-59 months old, pregnant and lactating women, and health facility personnel.
Food for Hungry (FH)	Development Food Aid Program (DFAP)	Walungu	Pregnant women, women nursing a child under 2 years old.

Source: OCHA, 2015a

In Kabare AHEVO distributed nutritional inputs and agricultural inputs to 350 people including children under 5 years and pregnant and lactating women suffering from acute malnutrition in 2014.

In Mwenga, Shabunda and Walungu, MALTESER supports the WFP project for the last decade but also helps to enhance the nutritional status of 7,240 mentally ill victims of armed conflicts. MSF-E has the project of Medical and nutritional take care of malnutrition, and PIN project of nutrition and health aiming to ensure screening, treatment and prevention of severe and acute malnutrition of children (6 – 59 months) and vulnerable adults. The project worked in Shabunda with 19,326 children 6-59 month old since 2014.

PRONANUT also carries out sensitisation programmes with a view to educating parents about the causes of malnutrition, and methods of prevention, through community mobilisation. This is carried out by one nutritionist per health zone who trains nurses involved in the malnutrition project. Emphasis is placed on food security and prevention methods, including ten personal hygiene behaviours of mothers after birth. PRONANUT believes that if the security situation continues to improve, people gain access to farmland, and changes in behaviour occur, malnutrition will continue to decrease.

A survey carried out by OCHA (2014a) into the assessment of humanitarian needs in North-Kivu highlights a vulnerability of people to malnutrition in most health areas as well as the end of support in health zones with even high vulnerability especially in terms of health (inputs by international NGO involved in heath) in Rwanguba, Binza, Birambinzo, Kamango and Alimbongo. An administrative strike in October 2014, has also aggravated access to basic health services, including immunisation, leading to the resurgence of cholera in Rutshuru, Binza, Karisimbi, Masisi and Alibongo, and malaria and measles in Rutshuru and Itebero. There is also a gap for management of malnutrition and low coverage of health structures in areas with high health vulnerability.

The Kirotshe Health Zone has 21 functional health areas. Health facilities include a general referral hospital, 21 health centres and 126 health posts. Medical personnel across these facilities consist of four doctors, one nutritionist, 22 A1 nurses (3 years under-graduate degree), 76 A2 (secondary school diploma) nurses and several support staff. The zone includes a training school for nurses. According to epidemiological data, the most frequently reported diseases are malaria, respiratory infections, worm infestations, and malnutrition. Cholera is also an endemic problem in the area.

A nutritional survey of the Kirotshe area conducted by COOPI in January 2009 in North-Kivu revealed an overall malnutrition rate of 5.9% and SAM of 0.8%. In 2011, these rates had dropped to 2.6% and 0.2% respectively (ACF, 2011).

Since November 2008, ACF has supported the establishment and operation of a therapeutic feeding programme in health structures that conforms to the national protocol, Protocole national de prise en Charge Intégrée de la Malnutrition Aiguë (PCIMA) approach. One UNTI and 12 UNTA are currently functional in the hospital and health centres in North-Kivu.

The GAM rate observed, following the survey (Enquête Nutritionnelle Anthropométrique Zone de Santé de Kirotshe in 2011), is below the emergency threshold but above the alert threshold, as defined by DRC's national nutrition policy (> 5% alert threshold and > 10% emergency threshold) (ACF, 2011).

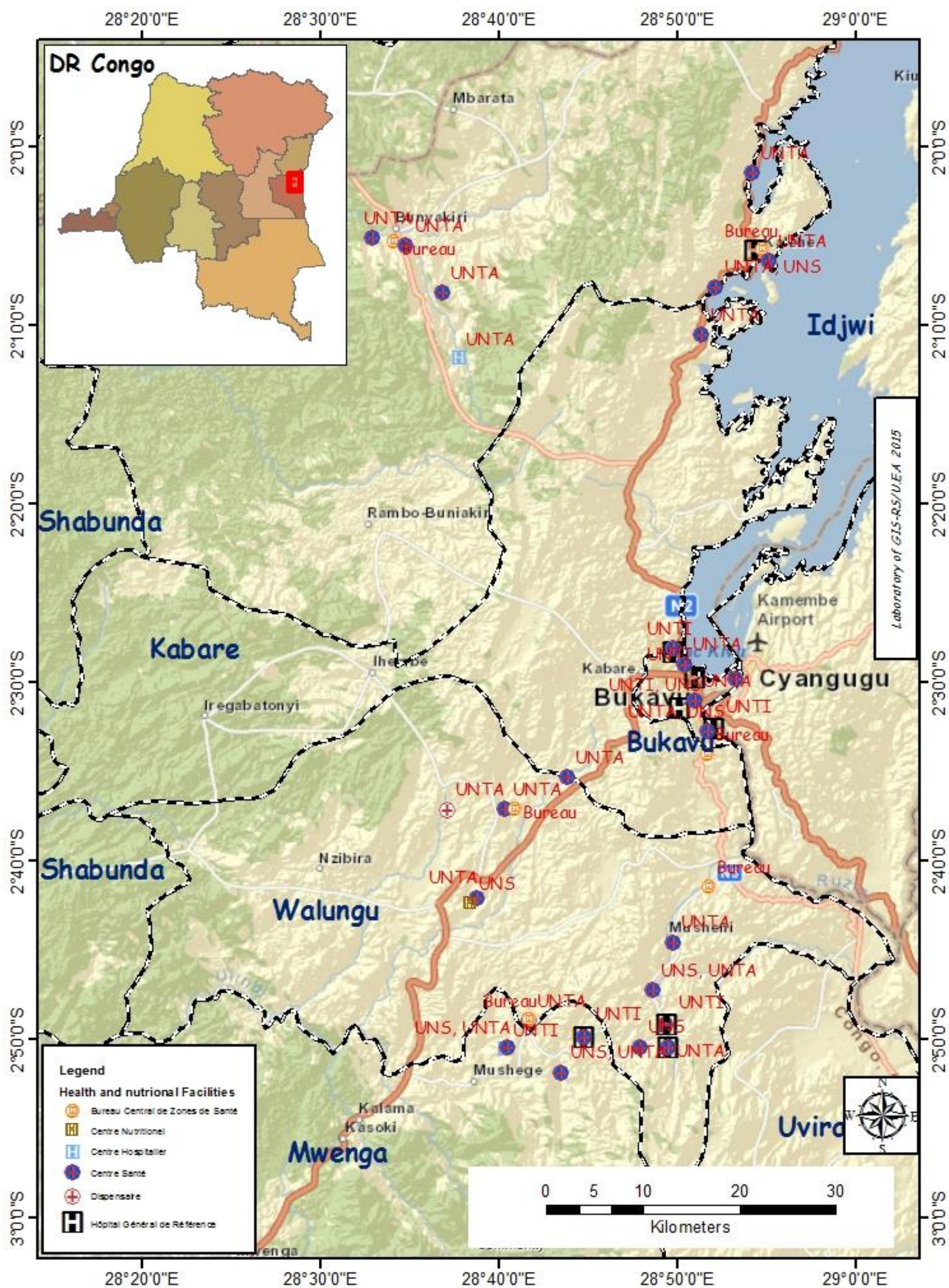

Figure 7: Nutritional centres in South-Kivu

The role of women in FNS

Female workers play an important role in agriculture and in food production. In sub-Saharan Africa women average 50% of the agricultural labour force (FAO, 2012). Female workers

therefore play a key role in achieving FNS at the household level, both with regard to production, processing, and preparation. The importance of the nutritional status of mothers for the nutrition and health of their children has been confirmed. Women also tend to save more of their generated income, and thus improve the households' food security in times of natural disasters, such as drought (ICCO, 2014).

The role of women in FNS is essential. Overall, women are responsible for about 50 per cent of the world's food production and, in some countries in sub-Saharan Africa women provide between 60-80% of the food for household consumption, mainly as unpaid labourers on family plots. Women's contribution to agricultural production varies from country to country, crop to crop and task to task. In Southeast Asia, women provide up to 90% of the labour for rice cultivation. In Colombia and Peru, women perform 25-45% of agricultural field tasks. In Egypt, women contribute 53% of the agricultural labour. Men are more likely to be involved in agricultural wage labour and cash crop production, while women are mostly found producing food for their families and local markets (Karl, 2009). In South-Kivu, around 72% of food crops (production of food crops in South-Kivu is very high (around 72%) and includes generally vegetables, beans, soybeans, sweet potatoes) for household consumption are produced by women (DSRP, 2010).

Women's access to education is a determining factor in levels of nutrition and child health. Studies from Africa show that children of mothers who have spent 5 years in primary education are 40% more likely to live beyond the age of 5 years. The subordinate position of most women, compared with men, limits their learning opportunities and their capacity to act on their own behalf and that of their family and society. Activities aimed at improving the health and nutrition of children are often limited by a lack of time and energy of the mothers to participate in them. Other determining factors in levels of nutrition are the time allocated to household activities, access to household income, and employment status.

In South-Kivu and North-Kivu, women make up about 53% of the population (MONUC, 2010) but are often economically and socially disadvantaged: many household and community decisions are still made by men, frequently to the detriment of women. Their level of participation in education, employment and politics is very low, and a higher proportion of women (61.2%) compared to men (51.3%) live below the poverty limit (Gaps, 2009). A report published by UNDP (2009) reveals that the proportion of attendance of girls: boys at university is around 6.8 (number of boys is 6.8 times number of girls), meaning one girl to 10 boys attain the higher levels (university). The illiteracy rate for women is very high in South-Kivu and North-Kivu; only 38% of women are literate compared to 78% of men (DSRP, 2010). Poverty and child marriage are the major causes of this illiteracy trend.

Only 0.1% of women in South-Kivu and North-Kivu are highly positioned in formal institutions, while around 97% of women are employed in informal institutions. The main occupation of women in South-Kivu and North-Kivu is subsistence agriculture (70%) and the informal sector (60%). Most women are underemployed and occupy low positions in many organisations (UNDP, 2009a). The participation of women in DRC politics is also very low, about 10% (Cedef, 2013). Women represent 2% of labourers in mining, 3% in industries, 3% in public services and 8% in entrepreneurship (DSRP, 2010). In commerce, women are fully represented and many sell food products. It is also important to mention the role of women in nutrition programmes, in cooking and serving food, and in working in supplementation programmes, orphanages, and hospital paediatric units.

The low status of women limits their opportunities and freedom, reducing their interaction with others and their ability to conduct business independently, limiting the transmission of new knowledge and adversely affecting their self-esteem. The women's multiple roles are challenging in terms of time allocation. Agricultural activities increase women's workload and thus decrease the time left to care for their children. As a consequence, many children drop out of school in order to look after their younger brothers and sisters. Women are key to breaking the vicious circle of generational malnutrition. Children born from malnourished mothers often are underweight and face a 20% increased risk of dying before the age of 5 years (UNICEF, 2007). The health and nutrition of mothers directly influence the well-being of their children.

In addition, attacks by armed groups, human rights violations, violence against women, looting and displacement affect the day-to-day life of women in South-Kivu and North-Kivu. Humanitarian indicators remain alarming – and services inadequate to meet basic needs – in areas such as health, water, sanitation, education, nutrition and food security. Over 70% of the population lives on less than US$1 per day, and 1.65 million people remain displaced. The long-term nature of this crisis has left many families with little or no ability to face new shocks, as coping mechanisms have been eroded over decades (FAO, 2012).

Gender balancing and sociological aspects linked to food consumption

In developing countries, rural women and men play different roles in guaranteeing food security for their households and communities. In South-Kivu and North-Kivu, while men grow mainly cash crops, women are usually responsible for growing and preparing most of the food consumed in the home and raising small livestock, which provides protein. Women also carry out most home food processing, which ensures a diverse diet, minimises losses and provides marketable products. Women are more likely to spend their incomes on food and children's needs: research has shown that a child's chances of survival increase by 20% when the mother controls the household budget (Karl, 2009). Women, therefore, play a decisive role in food security, dietary diversity and children's health. Male out-migration in search of work is also increasing the numbers of female farm managers (FAO, 2012).

Though the number of women involved in farming is increasing in both provinces, they still confronted to many handicaps. Women often have limited or no access to land (DSRP, 2010). Males are privileged in land allocation, while women only gain access to land through a male relative or after a husband's death. Furthermore, women's access to financial services is limited, and they face discriminations concerning access to livestock, inputs such as seeds and fertilisers, technology, market information, knowledge, skills and advisory services (GIZ, 2013).

Many women in North-Kivu and South-Kivu lack control over household income, as well as income generation possibilities. Some women do not even receive their own generated income, as it is often paid to their husbands. In turn, men are less likely to spend money for the benefit of the entire household, and prefer non-food items. There is a clear need to create awareness among men regarding the benefits of an adequate diet for the whole family (Cedef, 2013).

Women are also often impeded by limited access to assets, traditional norms, and the challenges posed by their often-competing roles. For example, in South-Kivu, women face

many restrictions versus consumption of some food and mostly quality food like chicken meat, eggs, milk… (DSRP, 2010).

Intra-household food allocation is another limiting factor: even though a household may have enough food, girls and women may still suffer from malnutrition. Having an adequate supply of food does not automatically translate into adequate levels of nutrition. In many families in North-Kivu and South-Kivu, women and girls eat the food remaining after the male family members have eaten. Women, girls, the sick and disabled are the main victims of this 'food discrimination', which results in chronic under nutrition and ill-health. Twice as many women suffer from malnutrition as men, and girls are twice as likely to die from malnutrition as boys (GIZ, 2013).

Research institutions involved in FNS

Several research institutions are currently involved in FNS. There are also teaching and research institutions organising nutrition and dietary courses, including ISTM in North-Kivu and South-Kivu, with branches in different territories, and Etude Supérieur d'Etude Agronomique et Véterinaire (ISEAV) and technical secondary schools.

Among the major research centres with a focus on FNS are: IITA, le Centre de Recherche en Sciences Naturelles (CRSN/Lwiro), l'Institut National d'Etude et de Recherche Agronomique (INERA/Mulungu), Centre de Recherches Hydrobiologiques (CRH) Uvira, International Fertiliser for Development Centre (IFDC), International Centre for Tropical Agriculture (CIAT), International Livestock Research Institute (ILRI), and universities, including the Université Evangélique en Afrique (UEA), Université Catholique de Bukavu (UCB), Université de Goma, and Université Catholique de Graben.

Women's organisations involved in FNS

Various women's organisations involved in FNS are presented in Table 18. The list is far from being exhaustive, for example local organisations are not included due to their high number.

Table 18: Women organisations involved in FNS

Name of the organisation	Action area
Association Coopérative en Synergie Féminine (ACOSYF)	South-Kivu
Service d'Accompagnement et de Renforcement des Capacités d'Autopromotion de la Femme (SARCAF)	South-Kivu
Women for women	South-Kivu
Promotion et Appui aux micro Entreprises Féminines de la ville de Bukavu et des milieux ruraux environnants (APEF)	South-Kivu
AFEM (Association des femmes des medias)	South-Kivu
SAMWAKI (Sauti ya Mwanamuke Kijijini)	Walungu
Solidarité Féminine Contre la pauvreté (SOLIFEM)	Kalehe and Kabare

Many women organisations make specific contributions to FNS. Compared with men, women are frequently disadvantaged for a range interrelated, social, economic and institutional reasons in their access to and control over food and nutritional resources, and economic opportunities available to them. This is important for their income, and in turn for the well-being and food security of their households.

In many women organisations most key roles still held by men. This is probably because of a lack of highly-educated women to lead these structures. The organisations also have poor access to financial resources to support FNS activities. There is no specific governmental programme to promote gender equality in the area of FNS, and the majority of women's organisations are local structures with limited resources. An important challenge is therefore to promote and build the capacity of women in FNS, to increase the number of women leaders in these organisations. There is also a need to fund some of these organisations operating in FNS, rather than just having international NGOs involved in FNS.

Platforms for linking agriculture and nutrition

Platforms involved in FNS already exist and are functional in North-Kivu and South-Kivu but each cluster works independently. The food security platform (food security cluster) is led by FAO in both provinces, whereas the nutrition platform (nutrition cluster) is led by UNICEF. PRONANUT represents the state in both clusters, which exist to share information about the actions of each partner and harmonise interventions.

The Nutrition cluster is led by UNICEF. ACF is co-facilitator at the national level and in South Kivu. In North Kivu and other provinces, PRONANUT, a governmental body, acts as co-facilitator. In each province there is a presence or not of sub-cluster hub, two agencies (provincial and local clusters) are formally designated as lead and co-lead. This structure has enabled greater coverage through a centralized coordination structure. However, a 2010 review of the DRC cluster noted that it was important to ensure that the different roles and responsibilities of the two functions were made clear, that systematic preparation of

individuals and agencies to fulfil those roles was needed and that strategic integration of provincial government into the structure was required (UNICEF, 2013).

The establishment of a Nutrition cluster has helped to improve coverage of nutritional needs. The Nutrition Custer works on harmonizing intervention criteria and disseminating standards, which is a challenging task. Some actors still intervene on the basis of their own standards (MSF, Caritas). There have been good interactions with RRMP (Rapid Response to Population Movements) regarding the exchange of information about existing needs (Binder *et al.*, 2010).

The food security cluster includes all NGOs and state organisations working in the sector. These include PRONANUT (Programme National de Nutrition), COOPI (Cooperazione Internazionale), Caritas Belgique, Agency for Technical Cooperation and Development (ACTED), Première Urgence - Aide Médicale Internationale (PU-AMI), ALDI (Association Locale pour le Développement Intégral), MFR RDC (Union Nationale des Maisons Familiales Rurales) , EEF (East Eagle Foundation), FAO, WFP, OCHA, USAID, ICRC, etc. The strategy developed by the food security cluster is focused on urgent and persistent needs relating to food security and structural aspects including those related to sudden crises. Their objectives are the implementation of sustainable adaptation strategies, diversification of livelihoods, and contribution to improving knowledge management and best practices to promote promising practices in strengthening the resilience of the population.

During the workshop, the focus group suggested that the two clusters should be merged, forming one multi-sectoral platform to coordinate nutrition and food security measures at provincial level. Efforts in this direction are being made and a political decision is expected shortly.

At the national level, there is also a group including WFP, FAO, the Ministry of Agriculture, the Ministry of Health and the Ministry of Planning. The main objective of this group is to assess FNS in DRC and provide the government with guidance on the best ways to strengthen FNS.Conclusions and recommendations

Ranked 186th among 187 countries in the Human Development Index (UNDP, 2012), with 71.3% of the population living below the poverty line, DRC continues to have alarming rates in all basic indicators including health, food security, nutrition, and access to education. Basic state services do not reach many areas. The lack of infrastructure, or their poor state, makes many remote areas difficult to access for trade, services and humanitarian aid.

In DRC more than 6.4 million people are currently experiencing acute food insecurity (almost 10% of the rural population) and come from 82 territories including four in North-Kivu (Rutshuru, Masisi, Walikale, Nyiragongo). Very few households are connected to water (16.6%) and electricity (4.3%), and health services are very inadequate.

Food insecurity in North-Kivu province is both linked to food availability and accessibility. Repetitive armed conflicts have challenged the agricultural sector, consequently increasing the province dependency on food imports and vulnerability to price increases. Insecurity has disrupted the operational of market systems, occasioning recurrent shortages and higher prices for essential foodstuffs. The low purchasing power makes food insecure households often unable to compensate for their food shortage by buying food.

The results of a food security assessment study in North-Kivu have revealed that 4,398,000 people are affected by food insecurity; 19% of households in North-Kivu are severely food insecure (1,454,000 people), 42% are moderately food insecure (2,944,000 people) and only 39% are food secure. In South-Kivu, despite good agro-ecological conditions for agricultural production, the nutritional status of the populations is unsatisfactory. According to WFP (2008), 11.7% of households have limited levels of food consumption and 33% struggle with limited consumption, a situation which mainly affects vulnerable groups: children, pregnant women, elderly or displaced populations. ACF (2012) reported that by restricting the access of household to their fields, insecurity has exacerbated malnutrition in children in these territories (ACF, 2012).

Staple foods in both South-Kivu and North-Kivu include tubers, cassava, sweet potato and potato, combined with vegetables such as beans, cassava leaves, peas, and amaranths. The production and consumption of cereals are poor and mainly imported from Asia (rice) or Katanga province (maize). Weak trade in agricultural food products in South-Kivu explains the high level of family consumption. Low production, insecurity, poor roads, and a lack of access to information, are elements that make commercialisation as well as market integration difficult (Vwima, 2014). Agriculture is predominantly practiced by small farming households on small areas of land with rudimentary tools and unimproved seeds.

Intra-household food allocation is another limiting factor: even though a household may have enough food, girls and women may still suffer from malnutrition. Having an adequate supply of food does not automatically translate into adequate levels of nutrition. In many families in North-Kivu and South-Kivu, women and girls eat the food remaining after the male family members have eaten. Women, girls, the sick and disabled are the main victims of this 'food discrimination', which results in chronic under nutrition and ill-health. Twice as many women suffer from malnutrition as men, and girls are twice as likely to die from malnutrition as boys (GIZ, 2013). Women are restricted to consume some food and mostly quality food like chicken meat, eggs, milk… (DSRP, 2010). There is a clear need to create awareness among men regarding the benefits of an adequate diet for the whole family (Cedef, 2013).

The nutritional state of children is critical in North-Kivu. Very few households have access to drinking water on their plots (14.8%) and electricity access stands at 2.5%). Limited access to clean drinking water increases waterborne diseases, which are among the major causes of mortality and morbidity. 99.5% of households do not have road access for garbage clearance and 8% do not have a toilet. The spread of infectious diseases, especially diarrheal diseases, which are frequently one of the causes of malnutrition are link to the insufficient toilets for excreta disposal. The infant mortality rate is 5,7%, compared to 9,2% in DRC, while the child mortality rate is 10,2% in North-Kivu, compared to 14,8% across the entire country.

High levels of malnutrition result in significant mortality rates in the provinces, even if they are lower than the national averages. The GAM in some critical territories such as Kabare in South-Kivu improved from 11.4% in 2009 to 7.4% in 2012. An improvement was noticed at national scale, which is actually the translation of a very significant reduction of malnutrition in eastern provinces (North-Kivu, South-Kivu, Maniema and Katanga), and basically attributable to the efforts of the humanitarian community.

National and international NGOs, research institutions, and religious communities support PRONANUT. These include: ACF, HKI, World Vision, Save the Children, Memisa, COOPI, MSF, Cordaid, Merlin, Caritas, Red Cross, CRS, BDOM, CEPAC, IFPRI, HarvestPlus, IITA, IDEA, Médecins d'Afrique, CEMUBAC, LWF, CPK, ADRA, Concern, CRAFOD, APEE, Armée du Salut, and PAA.

Based on the review of the literature and secondary data records, for reflection and study in North-Kivu and South-Kivu, FNS policymakers should:

- Ensure that women's work in FNS (both paid and unpaid) is captured in national statistics, and increase the availability and use of sex-disaggregated data for the sector.
- Enhance the understanding of gender in FNS, support value chain activities performed by women, and work with existing processing and marketing groups in which women participate.
- Systematically integrate gender into policy frameworks through gender-specific needs assessments, gender audits, gender-sensitive data collection systems and budget allocations, and support women's active participation in policy process.
- All FNS programmes should meet the needs of women.
- Organise value chains for principal products such cassava, sweet potato, potato, banana, beans, maize and rice.
- Concentrate on improving agricultural productivity and enhance livelihoods and FNS in poor rural communities.
- Promote productive activities and employment opportunities.
- Expand and ameliorate rural infrastructure, including capacity for food safety and plant and animal health, and broaden market access.
- Raise awareness about unbalanced diets, through education, information, and labelling regulations.
- Adopt measures to eradicate discriminatory practices, especially with respect to gender, in order to achieve adequate levels of nutrition within the household.

During the workshop discussions, ideas were raised to solve food and nutrition insecurity in North-Kivu and South-Kivu. The main points from the debates are highlight below:

- In both North-Kivu and South-Kivu, FNS is determined to a large extent by security, yet ensuring long-term stability is difficult given the multiple factors that influence conflict.
- Agricultural production remains low due to the low productivity of crops and depletion of soils. Low production levels may also be affected by an expectation among some people that humanitarian NGOs will provide free food and free medical care, reducing the incentive to carry out agricultural activities
- While FNS indicators in South-Kivu seem more improved compared to North-Kivu, the situation in South-Kivu is more volatile because the province depends on Rwanda for over 50% of its food.
- Participants suggested interdepartmental programmes and strengthening of PRONANAUT, including greater integration of aspects of agricultural production.
- The government should take the lead in the FNS sector, so that NGOs support government initiatives instead of initiating them.

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Annex A. Interview guide

Fiche d'interview avec les acteurs de la sécurité alimentaire et nutrition au Sud et Nord-Kivu

Interview with food and nutrition security actors in South-Kivu and North-Kivu

1. Identification de l'organisation (*Identification of the organisation*)

Nom, situation géographique, zone d'action (*Name, location, area of action*)

2. Profil et objectif de l'organisation : type d'organisation, partenaires (*Profile and objective of the organisation: type of organisation, partners*)
3. Groupe cible de l'organisation (*Target group of the organisation*)
4. Stratégies d'intervention (*Intervention strategies*)
5. Type de projet déjà effectués dans le cadre de la sécurité alimentaire et nutrition et leurs résultats, difficultés rencontrés, les leçons apprises, etc. (*Type of project already carried out in the context of FNS, and their achievements, difficulties encountered, lessons learned, etc.*)
6. Organisation des projets : ressources humaines, politique d'intervention (*Project organisation: human resources, intervention policy*)
7. Types des projets sécurité alimentaire et nutrition en cours : objectifs, groupe cible, stratégies de mise en œuvre, partenaires, etc. (*Types of ongoing FNS projects: objectives, target groups, implementation strategies, partners, etc.*)
8. Type de projet exécuté ou en exécution en collaboration avec le gouvernement, FAO, WFP, ou les organisations féminines (*Type of ongoing or executed project in collaboration with the government, FAO, WFP, or women's organisations*)
9. Type de projet spécifique aux femmes et enfants (*Type of project specific aimed at women and children*)

NB: for each type of project and organisation, effort was made to gather information on: demographics, education, water and sanitation, household assets, agriculture and livestock, income and livelihoods, expenses and debts, food consumption, food sources, coping mechanisms, nutrition, households' exposure to shock, child nutrition practices, market access, ease of access to health care and education, market availability, market prices, etc.

The Technical Centre for Agricultural and Rural Cooperation (CTA) is a joint international institution of the African, Caribbean and Pacific (ACP) Group of States and the European Union (EU). Its mission is to advance food security, resilience and inclusive economic growth in Africa, the Caribbean and the Pacific through innovations in sustainable agriculture.

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For more information on CTA, visit **www.cta.int**

Contact us
CTA
PO Box 380
6700 AJ Wageningen
The Netherlands

Tel: +31 317 467100
Fax: +31 317 460067
Email: cta@cta.int