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Participatory Impact Assessment of CRS Ditekemena Emergency Seed Interventions in Kasai Central Province, Democratic Republic of the Congo

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Acronyms

ACF	Action Contre la Faim (Action Against Hunger)
APSKO	Association of Seed Producers in Kasai Oriental (Association des Producteurs de Semence du Kasaï Oriental)
BHA	Bureau for Humanitarian Assistance (USAID)
CBSP	Community-Based Seed Production
CDF	Congolese Franc (currency unit)
COPROSEM	Cooperative of Seed Producers of the Kasai
CRS	Catholic Relief Services
DFAP	Development Food Aid Program
DRC	Democratic Republic of Congo (République Démocratique du Congo)
DSD	Direct Seed Distribution
FAO	UN Food and Agriculture Organization
FCS	Food Consumption Score
FG	Focus Group
FGD	Focus Group Discussion
FOs	Farmer Organizations (Organisations paysannes)
GAP	Good Agricultural Practices
HH	Household
HHS	Household Hunger Score
IDP	Internally Displaced Persons
IPC	Integrated (Food Security) Phase Classification
INERA	Institut National pour l'Étude de la Recherche Agronomique (National Institute for Agronomic Study and Research)
IPAPEL	Inspection Provinciale d'Agriculture, Pêche et Elevage (Provincial Inspection of Agriculture, Fisheries and Livestock)
KII	Key Informant Interviews
MT	Metric Tons
OPV	Open Pollinated Variety
NGO	Non-governmental organization
PIA	Participatory Impact Assessment
PDM	Post-Distribution Monitoring Survey
PHM	Post-Harvest Monitoring Survey
QDS	Quality-Declared Seed
RFS	Bureau for Resilience and Food Security (USAID)
RSSSA	Rapid Seed Systems Security Assessment
S34D	Feed the Future Global Supporting Seed Systems for Development activity
SENASEM	Le Service Nationale des Semences (National Seed Service)
SGBV	Sexual and Gender Based Violence
SSSA	Seed System Security Assessment
USAID	United States Agency for International Development
WFP	World Food Program

Executive Summary

Introduction

This report presents the findings of a participatory impact assessment (PIA) of emergency seed interventions implemented by Catholic Relief Services (CRS) in Kasai Central province, Democratic Republic of the Congo (DRC). The assessment was designed and carried out by the Feed the Future Global Supporting Seed Systems for Development (S34D) activity, led by CRS. S34D is funded by the Feed the Future Initiative through the Bureau for Resilience and Food Security (RFS) and by USAID through the Bureau for Humanitarian Assistance (BHA). The aim of the assessment was to generate evidence on the impacts of selected emergency seed interventions on community beneficiaries and on local seed systems. Such evidence is currently lacking and is needed to inform and improve future humanitarian and development work.

Context

In August 2016, conflict between the Kamuina Nsapu local militia and the army in Kasai Central and Kasai Oriental led to the displacement of 1.6 million people. After two years, 63% of the displaced had returned to their homes and farms. An assessment in June 2019 showed that 52% of Kasai Central and 45% of Kasai Oriental populations had poor food consumption scores (FCS) and were severely food insecure.

In response to the food insecurity, CRS, funded by USAID's Bureau for Humanitarian Assistance (BHA), launched the initial *Ditekemena* (or 'hope' in the Tshiluba language), an emergency food security program, in Greater Kasai. The program provided a combination of food assistance, seeds, and tools to support agricultural recovery in an effort to address severe food insecurity. A series of year-long projects shifted from zone to zone with all households (HHs) in the targeted communities receiving assistance.

Assessment Methodology

Data collection was purely qualitative, comprising focus group discussions (FGDs) with farmers and key informant interviews (KIIs) with village chiefs, agriculture monitors, grain vendors, seed multipliers, government agricultural officials, and the World Food Program (WFP). In the Bukonde zone, the team visited 10 villages in 5 different health areas. A total of 104 female and 120 male farmers participated in gender-balanced focus groups (FGs). There were no single sex FGs.

PIA tools were used across twenty FGDs to determine the impacts of the seed interventions on crop production, household food security, and livelihoods. The PIA tools used included historical timelines, before and after scoring, proportional piling, and seasonal calendars. Additional FGDs (generally without PIA tools) were carried out in the same communities to understand the effects of the emergency seed interventions on community seed management practices, including changes in the crops and varieties cultivated over time, and changes in the seed acquisition channels for different crops.

Conclusions

Why, When, How, and What Types of Seed Were Received by Farmers? [And What Did They Do With Them?]

Because farmers had been planting seed for over three years since their return, the effective objective of seed provision was to improve livelihoods rather than to provide seeds that had been lost during the emergency. Most farmers reported that they planted the improved maize, cowpea, groundnut and rice seeds received from CRS seed fairs. The fairs provided seed early enough for planting during normal planting periods, although irregular rains, particularly in Season B (Jan-May), hampered the timing of planting and performance in the field. Crops planted in the "forest" (generally by men) and wetlands performed better than those planted in the more drought-prone savanna (generally by women). Some households tried to keep the seed

provided until the next season. The biggest challenge was the adverse effects of drought that followed the Season B (Jan-May) planting, leading to minimal harvest or total crop failure in many households. Season A (Sept-Dec) planting was successful and allowed farmers to harvest more, sell part of their harvest, and retain seed for the next season.

How Have Emergency Seed Interventions Impacted the Household Food Security of Male and Female Smallholder Farmers?

Farmers who received seed in Season A (Sept-Dec) reported improved production and income as a result of the seed intervention. The selection of crops also benefited women farmers and enabled them to increase sales of cowpea and groundnuts. The near failure of crops during the 2021 Season B (Jan-May) not only underlines the inherent risk of agriculture but makes investment in seed distribution as a short-term solution to food insecurity questionable. Distribution of food was a more effective and less risky way to address short-term food insecurity and yielded immediate nutritional benefits. There have, however, been longer-term benefits from the seed intervention including improved yields through the reintroduction of improved seed into the system accompanied by improved agricultural practices due to training on good agricultural practices. These benefits were particularly noticeable for farmers who received seed in Season A (Sept-Dec) and those cultivating in the forest lands rather than the savanna.

While the project was "emergency" in terms of addressing the critical food security crisis, in terms of seed, the situation was less critical. The displaced had returned to their communities and had been planting and harvesting for the previous three years. There was no shortage of seed. In terms of the three pillars of the seed security framework – availability, access, and quality – seed was available in the markets (availability); access was an issue given the extreme level of poverty in the region; and quality of available seed was also an issue. Even though some of the improved varieties seemed to be available in the market (using the same local name), that seed reportedly had lower production and smaller grains. Farmers reported considerable yield differences between the seed received from CRS and the local seed, so the new seed appears to have improved the quality of farmer seed stock. The objective of the seed intervention aimed to improve longer-term livelihoods by increasing production through making available improved seed accompanied by training. There are two pitfalls in undertaking such an approach in an emergency project: (1) improved seed is just one factor in increasing production (and consequently food security) and (2) the dysfunctional seed system itself prevents improved seed from being regularly available on a long-term basis.

The Three Pillars of Seed Security

Availability – Sufficient quantities of seed can be obtained within reasonable proximity and in time for sowing.

Access – People have adequate seed through own harvest or cash or other resources to buy appropriate seed or barter it.

Quality – Seed is of acceptable quality; it is healthy and useable and its varietal attributes are acceptable to the farmer (Sperling, Louise. When Disaster Strikes).

Many of the issues facing farmers in Kasai are systemic and thus require a systemic response. Chief among them is soil fertility. The practice of slash and burn agriculture has left a barren savanna and an ever-receding forest. The inability to maintain soil fertility and health means that, even with improved seed, harvests are minimal. It also puts the burden of ever smaller yields on women farmers, who are relegated to cultivating the savanna. Poor soil health and diminished organic matter (through seasonal burning) means that the crops are ever more susceptible to the vagaries of weather. While some soil fertility issues can be addressed with short-term fixes, restoring overall soil health requires a process of several years and is not something that can be adequately addressed in a short-term emergency project.

How Have Emergency Seed Interventions Impacted the Incomes and Livelihoods of Male and Female Smallholder Farmers?

Results varied by season. While those in Season A (Sept-Dec) reported a 40% increase in production, those in Season B (Jan-May) reported a 5% drop in production. For those with increased production, revenue from sales of CRS-provided groundnut, cowpea, and maize seed more than doubled. The selection of crops also benefited women farmers and enabled them to increase sales of cowpea and groundnuts. This additional income provided multiplier effects as farmers invested in other productive activities such as livestock, bicycles (for transport), and education, thus enhancing household livelihoods. However, the abysmal condition of the roads severely impedes markets and limits the ability of farmers and traders to sell their harvest beyond the local market.

Have the Varieties and Seeds Received Been Incorporated Into Local Cropping Systems and Local Seed Management Practices? If So, How? To What Benefit(s)? Any Dis-Benefits?

PIA results show that the seed received has generally been saved by farmers for their own supply and also sold in the local market. The presence in the market of grain harvested from CRS-provided seed is evidence that the varieties have been incorporated into the local seed system. While most of the varieties distributed by CRS were already known to farmers, displacement, and potentially other factors, seems to have affected local availability. Farmers were positive in their evaluations of the varieties received through the CRS intervention, noting that their productivity and drought resistance were higher than traditional varieties.

Most of the improved varieties promoted by the Ministry of Agriculture and distributed by relief organizations were developed over 30 years ago. The number of varieties available to and planted by farmers is extremely limited, with 2-3 different varieties of each crop available to farmers. Those organizations involved in seed development, introduction, multiplication, and diffusion in Kasai Central need to make newer, appropriate varieties available to farmers.

How Have Emergency Seed Interventions Impacted Informal and Formal Seed Systems (Including Seed Markets) in the Local Area?

The structure of the formal seed system itself prevents improved seed from being available to small farmers on a long-term basis. Currently, the only link between the formal system (agri-mulitpliers in this case) and the informal system is periodic institutional distributions of improved seed. The creation of the agri-multipliers was designed to link the formal seed system and small farmers. However, small farmers are unable or unwilling to pay the high prices for certified seed from agri-multipliers. This is not sustainable and currently there are no mechanisms to ensure that farmers have access to quality seed. Until this gap is addressed, farmers will keep on relying on institutional distributions (if they continue) to access quality seed. The quality of the seed in the local market will rely on grain vendor/producers maintaining the quality of their seed stock.

The local market plays a key role in furnishing farmers with seeds. Most farmers either rely entirely on the market or supplement their own saved seed with seed purchased from the market. Even though at the local level vendors do not distinguish between grain and seed in terms of price, these vendor/producers are potentially able to control the sourcing of seed, planting practices, and post-harvest management in order to maintain the quality of the grain they sell as seed. This offers an opportunity to introduce and maintain quality seed in the informal seed system.

How Has the Program Affected Gender?

The improved production from CRS-provided seed affected most those crops managed mostly by women – cowpea, groundnut, and maize. Data on improved production and revenue suggest an amelioration of the overall food security of the women and the larger family, particularly since women are responsible for feeding the household.

Recommendations

1. ***In food insecure situations, ensure that immediate food security measures accompany any provision of seed***. Immediate food insecurity challenges need to be addressed by immediate actions such as cash for food or food distribution.
2. In the medium term, distribution of improved seed appears to have boosted agricultural production. However, ***in addition to seed provision, for longer-term sustainable impact, systemic issues should be addressed***. Addressing the issues of soil health and a dysfunctional seed system normally require investment in longer term programs that are committed to support farmers well beyond the short-term time horizon of emergency programs.
3. ***It is critical to address soil health issues. This will result in increased production over the long term, make agriculture more resilient to climate change, and optimize results from any improved seed***. There are a series of practices that have been successful elsewhere under similar agro-climatic conditions to the Kasai. Among these practices are the elimination of burning, leaving crop residues on the field, incorporation of organic matter into the soil, erosion control methods, cover cropping and green manures, intercropping with legumes for biological nitrogen fixation, reducing soil acidity, and introduction of agro-forestry into the cropping system. Extension and adaptation of these practices to the Kasai would probably require a longer-term development program. Nevertheless, in Central America, CRS is adapting the Water Smart Agriculture (WSA)[1] soil health package that is normally a 4+ year program, to shorter-term emergency programming.
4. ***To further improve livelihoods, it is recommended that projects of this nature should include investments in livestock and poultry, seeing as many households invested the extra income from crop sales to livestock***. Further, it is notable that the communities are now past the emergency stage and future investments should focus on development interventions that improve markets, increase production, and invest in other human capital aspects of livelihoods such as education and health. Livestock is an important livelihood component in the Kasai zone, particularly for women, and can address soil fertility management by providing manure as well as household nutritional issues and income mobilization.
5. Maintenance of seed quality at the farm level is crucial for farmers who do not purchase certified seed themselves. ***Farmer capacity in seed production, post-harvest handling, and seed storage needs to be enhanced.*** Any training program should tap into the experience of local positive deviant farmers who already guard the genetic purity and maintain their own stock of quality seed.
6. The national research institute, Institut National pour l'Étude de la Recherche Agronomique (INERA), needs to accelerate the pace of research, testing, and diffusion of new varieties adapted to Kasai Central agro-climatic and cultural conditions. Programs need to focus on ***more climate-resilient varieties capable of adapting to the challenges presented by climate change.*** Because diffusion and access to new seed varieties is so low, the research should be undertaken at the community level. ***Participatory variety selection would engage communities in identifying and selecting the most appropriate varieties for their conditions and gender preferences***.
7. Grain vendors (mainly women) have the potential to serve an intermediary role between the formal and informal systems. If provided with technical training on seed production and linked to agri-multipliers to obtain an initial supply of certified seed, these vendors can produce seed quality grain at affordable prices. ***Grain vendors can serve as village-level agri-multipliers able to produce a reliable product without the costs of basic seed, transport, and inspection*** that agri-multipliers face to produce and market certified seed. This could involve actions such as: linking traders to credible sources of good quality seed; working with them on techniques of seed bulking; and advising and supporting traders in

[1] WSA- a series of farm practices developed by CRS programs across Central America that have been proven to improve soil moisture and fertility, increase yields, and reduce production risks related to drought and rainfall variability.

better storage options (Budikadidi/Catholic Relief Services, 2017). This also offers the opportunity to include youth in the process of seed multiplication and sale. Ensuring that farmers have the necessary skills to maintain the quality of their own seed stock through seed selection, post-harvest management, and improved seed storage is also critical.

8. Provide more drought resistant crops and varieties to women. In addition, ***promote water smart agriculture practices for savanna farms that will protect the soil, conserve moisture, and increase fertility so that the household (especially women) can benefit from increased and more resilient crop production***. Livestock promotion for women should allow them to improve direct income and savanna soil fertility to improve agriculture productivity.

1. Introduction

This report presents the findings of a PIA conducted on emergency seed interventions implemented by CRS in Kasai Central province, DRC. The seed interventions were implemented under the *Ditekemena IV* project financed by USAID BHA in 2021. The assessment was designed and carried out by S34D activity, led by CRS.

The assessment aimed to:

1. generate quality evidence on the impacts of selected emergency seed interventions on beneficiaries and local seed systems. Such evidence is currently lacking and is needed to inform and improve humanitarian and development work.

2. develop, test, and refine a methodology that can be replicated elsewhere to assess the impacts of emergency seed interventions.

1.1 Background to the CRS Seed Intervention

In August 2016, conflict started between the Kamuina Nsapu local militia and Forces Armées de la République Démocratique du Congo that later spread to the entire region of Greater Kasai (Kasai Central and Kasai Oriental). As a result of the conflict, an estimated 1.6 million people were displaced. Many fled to forests in the zone; others crossed the border to Angola. After two years, 63% of the displaced persons had returned to their homes and farms. Many, however, had lost children and family members in the forest due to malnutrition and disease. Local infrastructure and market networks, already severely limited in the region, were decimated by the conflict. In 2021, a survey by CRS confirmed that 2% of the population (51,735 people) identified as displaced, 12.5% were host families and over 85% identified as returnees or never displaced, in six health areas.

An assessment in June 2019 by the Ministry of Planning and Agriculture, supported by WFP, showed that 52% of Kasai Central and 45% of Kasai Oriental populations had poor FCS and were severely food insecure. An estimated 1/3 of the population was expected to be in IPC 3 (crisis) or higher and the assessment identified different impacts of food insecurity amongst women and girls. For example, the final evaluation report, undertaken in February 2022, notes that the Sexual and Gender-Based Violence (SGBV) Sub-Cluster noted a strong connection between the incidence of SGBV – specifically, child marriage and negative coping strategies – among women and girls in areas of the Kasai, especially among displaced populations (Muhongya, 2022).

1.1.1 Production System Production Constraints

Kasai Central has vast expanses of arable land mixed with forest. Much of the non-forested land (known as savanna) is severely degraded, which can be attributed to slash and burn agriculture. The most fertile land is recently opened in the forest, in addition to wetlands. Cultivation practices are characterized by burning of fields, monoculture, the use of low-yielding seeds, lack of nutrients, and poor soil management technologies. This results in the reduction of vegetation cover, increased soil erosion, loss of soil fertility, and risks of infestation by diseases, pests, weeds and, ultimately, lower yields and continual pressure on the forest as farmers seek more fertile land (CRS DRC, 2022).

Photo 1: Recently cleared land in forest through slash and burn.

Among resident families, women or young people typically access houses after paying a dowry. Girls are often supervised by their mothers and accompany them in field activities before marriage; some have their own fields. Women more typically cultivate land in the savanna, while men often cultivate fields in the forest. Kasaians often organize to clear and plow fields in groups. Women typically manage property of the household; however, most large purchases in the household are usually decided by men (CRS DRC, 2020).

The study showed that there are notable differences between men and women in their access to the best farmland, major crops cultivated, expenditures, and income generating activities. Women are given the least productive plots in the savanna and must adjust cropping patterns to align with this reality. The land is also more susceptible to drought, making cultivation not only less productive but also riskier. This has a direct impact on family food security. It was also noted that women are involved more in households' subsistence crops, while men mostly prefer cash crops so that much of household finance is controlled by men.

Photo 2: Woman struggles pushing bike through highway which has become a sea of mud. Note the savanna in the distance.

Maize and cassava form the basis of the subsistence production system. Families generally have a few goats and chickens. Harvests cannot feed families for an entire year, so families rely on other livelihood activities, mainly casual labor, to earn enough money to be able to purchase the balance of food from the local market. Many families supplement their income through the sale of palm nuts and artisanal manufacture of palm oil.

1.2 The CRS Emergency Seed Intervention

In 2017, CRS, in partnership with Caritas Kananga, launched the initial *Ditekemena* (or 'hope' in the Tshiluba language) Emergency Project, in Greater Kasai. Funded by USAID BHA, the project provided a combination of food assistance, seeds and tools support for agricultural recovery in an effort to address severe food insecurity. A series of year-long projects shifted from zone to zone. In 2021, CRS launched the fourth phase of the *Ditekemena* Emergency Project in Kasai Central province in an area that had received no previous assistance from BHA. The project operated from January 2021 through February 2022. Unconditional food assistance was delivered in three rounds per targeted household via voucher fairs or food distributions. Beyond the immediate food security goal, the project adopted a second objective:

> *Ensure the protection and restoration of livelihoods of crisis-affected households to support their self-sufficiency and access to staple foods.*

With the aim or restoring agriculture-based livelihoods, the project implemented seed and tool fairs and associated agronomic training for 17,500 and 18,500 households respectively. All households in targeted communities were covered by the assistance.

CRS carried out needs assessments that identified the seed prioritized by communities. These consisted of cowpea, maize, groundnut, and rice, as well as vegetable crops like green beans, amaranths, red onions, eggplant, and bambara nut. A Seed System Security Assessment (SSSA) had been carried out in Kasai Oriental in 2017 with many findings informing the design of the Ditemekena project. CRS also piloted a Rapid Seed System Security Assessment in Kasai Central in 2021 which identified seed access, availability, and quality issues in the area.

Households participating in seed fairs received vouchers with a value of $40 for the maize, cowpea, rice, and/or groundnut for either agricultural Season B (January-May) or Season A (September-December). The vouchers enabled each beneficiary to purchase 10-15 kg of seed and plant 0.25-0.3ha. Each household also received two hoes/spades. The Service National des Semences (SENASEM) participated in CRS seed fair activities, providing direct government oversight of seed quality for the certified seeds. Farmers were also provided with training in Best Agricultural Practices including fertility management, seed selection, cultivation practices, and post-harvest management. Initial training was delivered through CRS's local partner, Inspection Provincale d' Agriculture, Pêche et Elevage *(*IPAPEL), to agricultural monitors. This was followed by cascade training of farmers by the agricultural monitors.

2. The Assessment Methodology

2.1 Fieldwork Methods

The impact assessment was predominantly a qualitative study undertaken to generate evidence on the impacts of selected emergency seed interventions on beneficiaries and local seed systems. The PIA conducted data collection in Kasai Central from September 1-14. The following key questions were addressed:

- RQ0: Why, when, how, and what types of seed were received by farmers? [And what did they do with them?]
- RQ1: How have emergency seed interventions impacted the household food security of male and female smallholder farmers?
- RQ2: How have emergency seed interventions impacted the incomes and livelihoods of male and female smallholder farmers?
- RQ3: Have the varieties and seeds received been incorporated into local cropping systems and local seed management practices? If so, how? To what benefit(s)? Any disadvantages?
- RQ4: How have emergency seed interventions impacted informal and formal seed systems (including seed markets) in the local area?

The RQs addressed project impacts at two levels - impacts on households (RQ1 on food security and RQ2 on income) and impacts on seed systems (RQ4). These two levels overlap in RQ3 (farming systems and seed management). The description of the methodologies and indicators presented below is structured around the various RQs. The food security and income FDGs (FGD1) focused on RQ1, RQ2 while the seed FGs (FGD2) focused on RQ3. RQ0 was added to provide background information. KIIs were used to compile information relating to RQ4 and to verify the information generated from FGs. **Annex 3** includes a breakdown of key questions and sub questions with the tools used to collect the information.

Broadly speaking, three different methods were used to address the various RQs:

a) FGDs with PIA tools to assess impact of the project on food security and income smallholder farmers;
b) additional FGDs (with some PIA tools) to compile detailed information about local seed management systems; and
c) KIIs with a range of stakeholders.

The PIA[2] tools utilized were:

- **A transect walk,** which was undertaken by a select group from the research team to appreciate the dynamics of food security and income levels within select villages in the community. **During the transect, global village characteristics (houses, fields, forest presence, people's health, presence of livestock, etc.) were also observed and their links on household livelihoods appreciated.**

- **Historical timelines** developed by group participants and guided by the research team to determine significant and memorable events in the community and to establish exactly when the intervention started and the probable impact on household. The discussions following the exercise also established and prioritized, by consensus, the most significant activities and seed types provided by and when.

Photo 3: FG participant drawing in the dirt on historical timeline.

- **Proportional piling** with 20 counters (small stones) used to establish and compare proportionally the sources of food and income before and after the intervention. The method was also used in the seed system FGs (FGD2) to weight different sources of seed and compare production of improved versus traditional varieties.

- **A seasonal food availability calendar** to establish seasonal fluctuations in household food security. This was done by allowing the respondents to use the counters to show which months their households had staple foods (mostly maize and cassava) from their own harvest and which months there was no stock of staple food in the household. The months without stock of staple food were recorded as "hunger months".

- Finally, the respondents were asked to score, through **proportional piling,** how they spent the income from the sale of crops for which seed had been provided, comparing before and after the intervention. These were only conducted with FGs that reported an increase in income as a result of the sale of crops produced from the seed received from CRS.

Seed systems differ for different crops, so it was necessary to focus the assessment on specific crops, not necessarily all that were distributed by the project. To determine which crops to focus on, farmers were asked which crop seeds received from the project were most important to them. Data was collected on only 3 or 4 different crops with each FGs.

For the seed systems and seed management (FGD2), FGs identified principal crops in Season B and Season A. These crops were further broken down by those important for food and those for sale by both male and female participants. The FG examined sources of seed and compared improved varieties distributed by CRS with traditional ones. Finally, in those communities that had higher production after the CRS distribution, households were asked how they utilized the additional income.

[2] See Annex 2 for a general overview of PIA, as developed by Tufts University.

KIIs were undertaken at various levels with a range of different stakeholders to triangulate and verify data collected by the FGDs and to compile additional data relating to RQs 3 and 4. **Table 1** lists the different types of stakeholders interviewed. This list was checked and expanded with help from CRS staff, who also assisted in identifying the specific individuals interviewed. **Table 1** also identifies different types of key informants interviewed. Semi-structured interviews were conducted using interview checklists designed for different key informant types, as presented in **Annex 7**.

Table 1: List of key informant interviews

Informant	Number	Women	Men
Grain Vendor	**10**	**10**	
Chef de Village	**1**		**1**
Agriculture Monitor	**4**		**4**
Agri Multiplicateur (Seed producer)	**4**		**4**
Inspection Provinciale d' Agriculture, Pêche et Elevage (IPAPEL)	**1**		**1**
World Food Program (WFP) staff	**1**		**1**
Service Nationale des Semences (SENASEM) staff	**1**		**1**
CRS staff	**6**	**3**	**3**

Table 2 shows the villages visited along with the number of participants in the two different FGs.

Table 2: Sampling for FGD groups (male and female)

Health Area Authority	Mulumba Muteba	Mbumba	Tshikuma	Ngombe	Kajangayi	Total
Villages Visited	Musuila Mulumba-Muteba	Kalamba-Mukala Mbumba A	Tshipopo Tshikuma	Tshikuenda Kabuebue	Kajangayi Ndaye	10
FGD1 Participants	•10 (F) •10 (M)	•10 (F) •10 (M)	•10 (F) •10 (M)	•10 (F) •10 (M)	•10 (F) •10 (M)	100 50(F) 50(M)
FGD2 Participants	•14 (F) •26 (M)	•10 (F) •10 (M)	•10 (F) •10 (M)	•10 (F) •13 (M)	•10 (F) •11 (M)	124 54(F) 70(M)

Village chiefs nominated two groups of between eight-10 men and eight-10 women per village who benefitted from the interventions to participate in mixed FGDs. These groups were then divided into two mixed groups – roughly comprising 5 women and 5 men to participate in FGD1 and the other in FGD2. Each village was thus represented in the study by approximately 20 participants. However, because farming is undertaken at household level and gender was not factored into the identification of project beneficiaries, the study FGD participants were equally considered, and discussions weighted all the answers equally. The facilitators also ensured equal participation in the groups and therefore it was not necessary to disaggregate the findings by gender.

2.1.1 What Worked Well, Challenges, and Limitations of the Methodology

Each session lasted no more than two hours, although in some villages – especially where large numbers had turned up for the conversations – it took a while to do the selection and respect the suggested maximum number. Often other community members would be observing the FGs, with some trying to volunteer their own opinions. The level of participation and the quality of responses were greatly enhanced by limiting participation only to those selected for the FGs.

The study had a number of limitations. Farmers from the three of four first villages visited had experienced a drought following planting of the seeds provided by the project, which led to no harvest being realized and therefore little or no positive outcomes. Because there was no harvest, there was no additional income from the seed intervention. However, the five of six villages that had planted the seeds in the following season realized better harvests, therefore the question on additional income became relevant and was asked and answered by the participants.

Ideally, impact measurement uses the "BEFORE" and "AFTER" PIA tools but, due to the fact that the intervention took place a while after the return of the beneficiaries from the displacement, and that the beneficiaries had settled and been farming since their return, it was difficult to establish with a level of certainty the point to draw the line. Therefore, there was no comparison of hunger months before and after the intervention to measure any change in the hunger period. However, the study was able to compare food availability from farm harvests and from market purchases before and after the seed intervention.

Finally, interaction between the farmers and the formal seed sector was limited to institutional seed distributions, so the study relied mostly on information from the farmers and grain sellers for information on the local seed system.

2.2 Data Analysis

The study was largely qualitative with data mostly collected in the form of stories and narratives but occasionally backed with scoring exercises. To understand the thread of participants' thoughts, each question from the interview guides was entered into the first column of a spreadsheet and the answers from various FGs were entered into the subsequent columns and final thoughts distilled in the last column of the analysis sheet.

Scores for particular questions were reached by consensus in each FG. These scores were entered in a spreadsheet and averaged producing graphs showing the trends. It should be noted that these scores were never intended to serve any quantitative purpose but rather to illustrate the extent of change according to each group.

Data from the KIIs was used to explain trends and issues raised by the FGDs, as well as to confirm findings that emerged from the FGDs and from secondary data. In addition, KIIs with institutional actors helped better describe the functioning of the formal seed system and emergency seed provision.

3. Main Findings of the Assessment

3.1 RQ0: Why, When, How, and What Types of Seed Were Received by Farmers? [And What Did They Do With Them?]

In 2021, CRS provided seeds to the target communities in either Season B (Feb-May) or Season A (the primary season from Sep-Dec). Because farmers had been planting seed for over three seasons since their return, the objective of seed provision was not to provide seeds that had been lost during the emergency but, rather, to improve livelihoods and long-term access to staple foods. CRS and the Kasai food security cluster considered the distributed seed to be of better quality better than what the farmers were planting at the time and the transfer also addressed constraints farmers had with limited to no own seed supply nor resources to purchase seed. The initial infusion of improved varieties was intended to enable farmers to continue to produce their own higher yielding seed in the future.

The seed was provided through fairs simultaneously through a food distribution scheme. Project staff and participants reported that the food distributions enabled recipients to plant the seed rather than eating it. Participants were provided food and seed vouchers to exchange for the seed (and food) of their choice during the fair. Each household received vouchers for each of three consecutive monthly food fairs during the hunger period. One of the months of food fairs coincided with the seed fair where participants also received a $40 voucher to exchange for seed available at the fair. In a different month, they received a direct distribution of two hoes. Available crops and varieties furnished at the fairs included maize (Kasai 1), groundnut (A65), cowpea (H36), and rice (IRAT 112). Agri-multipliers (local seed producers) from the province participated in the seed fairs and supplied the aforementioned varieties. A needs assessment in the communities beforehand determined the preferred crops and appropriate varieties for the communities.

In general, farmers planted all their seed although, due to the drought in Season B, some tried to keep seed for the following season. Farmers in Ndaye reported they tried to save the groundnut seed until the next season, but the seed was lost in storage. Three people (out of 20) in Musuila in Mulumba Muteba farmers reported that they ate part of the seed received. In Kanjangayi, only cowpea seed was planted in its entirety; the remainder was reportedly saved for Season A. All the communities receiving seed during Season A reported planting all the seeds received.

3.2 RQ1: How Have Emergency Seed Interventions Impacted the Household Food Security of Male and Female Smallholder Farmers?

The PIA showed mixed results in terms of the food security impact of the seed intervention. There were significant differences reported between those who received seed during Season B and those who received during Season A (Sept-Dec). Season B (Jan-May) respondents reported that a drought followed the seed distribution, so any harvests were low and most of the households could not report any impacts on household food security. At the interviews, the six villages which received the support in Season A reported that ample rains following the planting of the project-provided seed resulted in good harvests. The selection of crops also benefited women farmers and enabled them to increase sales of cowpea and groundnuts.

Also, according to the post-harvest monitoring survey (PHM) after the 2021 Season A, more than half (62%) of the maize produced and 55% of cowpeas produced was consumed as food in the household.

The post-distribution monitoring survey (PDM) showed that, while food security increased substantially (as measured by the FCS) immediately after the three cycles of food distribution, the endline measurement of

FCS had reverted to near baseline levels.[3] Scores for poor food consumption at baseline were 81.2%. The negative score dropped dramatically during the PDM after harvest to 5.7%, only to bounce back to a level of 76% at the endline (Final Performance Evaluation of The Ditekemena Project, 2022).

Table 3: Food consumption score changes from baseline to PDM to endline

FCS Classification	Baseline	PDM	Endline
Acceptable	2.0%	67.3%	4.8%
Borderline	16.9%	4.8%	19%
Poor	81.2%	5.7%	76.2%

However, another indicator of food security, the reduced Coping Strategy Index (measuring coping strategies household engage in to address food insecurity) dropped from 28.6 at baseline to 2.7 at PDM rising to 18.28 at the endline, within the acceptable range of 0-19. The comparison reveals a significant progress on the use of negative survival strategies and access to food. The results show an immediate impact from the food distribution, but the long-term impact from the seed distribution/training package have yet to demonstrate the hoped-for food security benefits as measured by these indicators.

Historical timelines during the PIA showed that the return and resettlement took place in 2018 followed by food assistance from other agencies. While food assistance was received from ACF (Action Contre le Faim) in 2018 and cash from World Vision in 2020, communities visited during the impact assessment had received no seed assistance prior to the 2021 *Ditekemena* project.

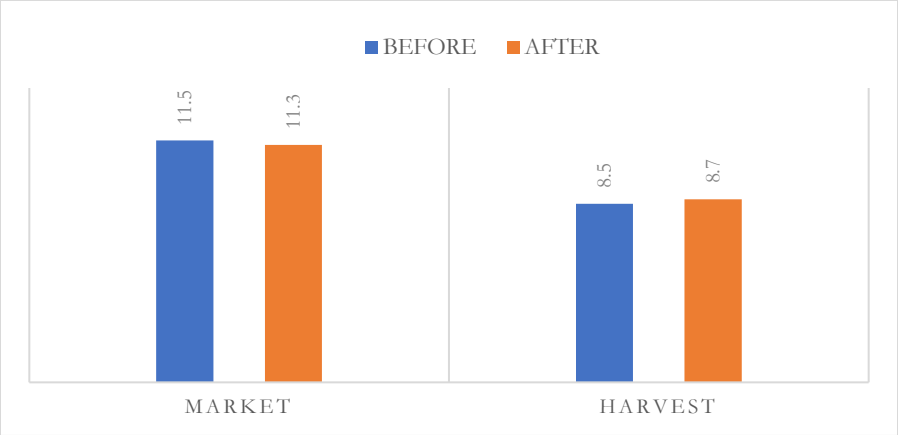
Textbox 1: Transect walk report of Mulumba Muteba Village - Mulumba Muteba Health Area

> Several HHs were drying cassava in the sun, and a majority of HHs crushed palm nuts as an activity. We also observed several closed HH doors, as the parents had presumably gone to the field and only the children stayed at home. Palm nut husks are visible everywhere in the garden of the plot. A woman was preparing *foufou* (a local cassava dish) in her HH and the men were sitting around talking or listening to music. In each plot there was a palm tree, some fruit trees (papaya, citrus, etc.), and some medicinal plants. The children were, however, seated quietly under trees and either playing happily or talking even where there were no parents minding them.

While various factors were reported to have undermined production in Mulumba Muteba Health Area Authority, including a dry spell in cropping Season A and destruction of crops by roaming cattle, the overall level of satisfaction with the *Ditekemena IV* was good. Given this overall satisfaction with the project and other observations during the transect walk, it was important to establish what were the main sources of food for households. Among all villages visited during the PIA, local markets were reported to provide most of the food for household consumption, showing that, while households produced some of the food from the seeds provided by the intervention, harvests were still inadequate to meet all the food needs. Much of the crop is sold immediately after harvest, so stocks run out sooner and require purchases in the market. The increased amount of food from harvests with a commensurate drop in food from the market shows a positive impact on food security by the seed provided under *Ditekemena IV*. However, the increase in food from the harvests and reduction of purchased food from markets was marginal.

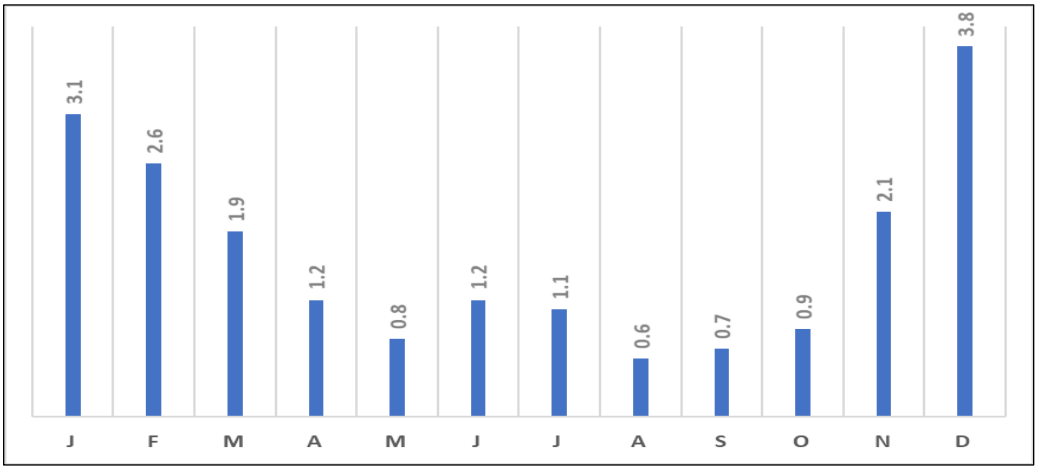
[3] The baseline was undertaken February 2021 and the endline took place in February and March 2022.

Figure 1: Average score on household food sources before and after the intervention (N=100)



The study used the seasonal calendar of hunger months to discuss HH food security. Overall, conversations with the HHs indicated that there is a general level of food security especially provided by the year-round availability of cassava, which is a strategic crop that covers the food needs for many HHs. Respondents indicated it is a fall-back food crop in cases where maize and other staples were inadequate or completely unavailable. However, HHs go through seasons of food stress during the planting seasons as shown in the figure below. The responses align to the harvest season which begins in November into December. The graph also confirms that the better harvest is from the main season, Season A (September-December), rather than Season B (Jan-May).

Figure 2: Months of household food security (N=100)



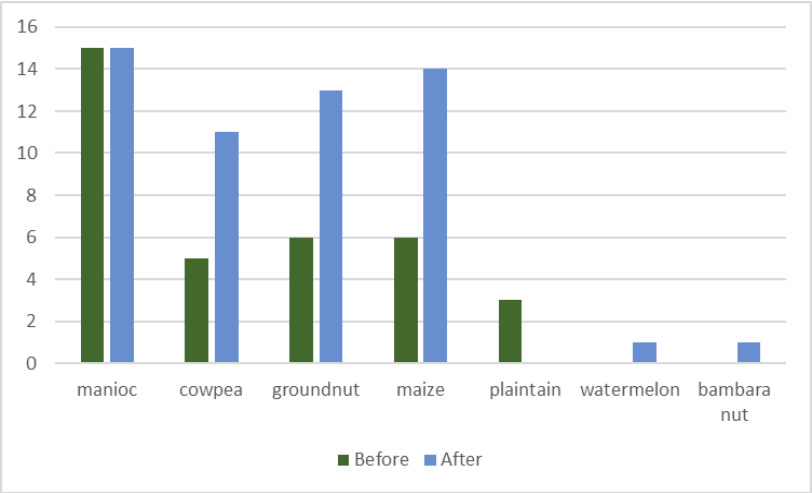
Given the minimal changes in FCS scores shown by the final evaluation, one might conclude that food security was not improved by the project. Nevertheless, as shown under question RQ2, the PIA has revealed important production and income effects from the seed intervention that have positively affected food security, particularly for those household receiving seed in Season A.

3.4 RQ2: How Have Emergency Seed Interventions Impacted the Incomes of Male and Female Smallholder Farmers?

Income effects of the distribution varied between Season A and Season B. The seed provided by CRS appears to have increased agricultural production and consequently, incomes in the many of the communities, mostly

in Season A. Six of the 10 villages visited indicated that the support given by CRS resulted in improved income from the sale of extra produce while four villages had no increase in agriculture production. Of the four villages surveyed in Season B, three reported no increase in production due to drought. One village in Season A reported no increase in production due to roaming livestock. **Figure 6** shows the jump in income from CRS-provided seed for those villages reporting increased production and income and highlights the increase in income from specific crops.

Figure 3: Income from crops before and after seed intervention (N=4)[4]

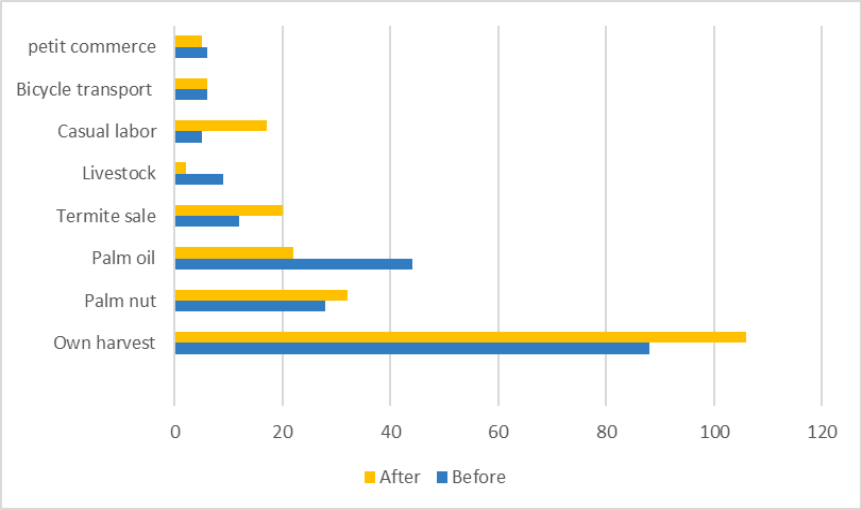


While cassava remained the most important income producing crop, income from those crops from CRS seed fairs – cowpea, groundnut, and maize - rose significantly. Another factor in increasing income is that two varieties distributed by CRS – A65 groundnut and IRAT 112 rice – sell for a higher price in the market than local varieties.

Respondents estimated a proportional 20% increase in income related to agricultural production after the CRS intervention (see **Figure 4**). Nonetheless, when we examine Season B compared to Season A, the differences are striking. For Season A, households estimated that revenue from their harvests were proportionally 40% more. However, for Season B, farmers estimated that revenue dropped 5% proportionally.[5] This demonstrates the preponderant impact that weather (a drought in Season B) has on agricultural production, despite access to improved varieties distributed by CRS.

[4] Out of a total possible 80 stones representing income, these are the number of stones placed on for each crop.
[5] For Season A villages, the total count rose from 48 to 68 whereas for Season B villages, the count fell from 40 to 38.

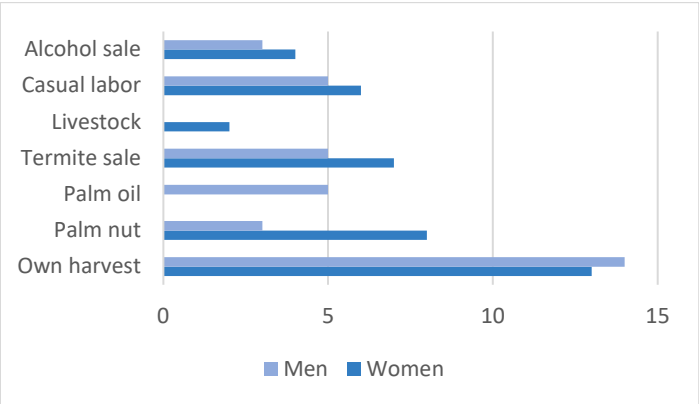
Figure 4: Proportion of income by source before and after the seed intervention



Overall, apart from the sale of crops, palm oil and palm nut sales provided the most income. The trades in palm nut and palm oil are the second largest income sources and serve to stabilize income. The proportion of palm nut sales increased moderately after the intervention, while palm oil as a proportion dropped by half according to the PIA scores. As shown in **Figure 5** below, with a smaller sample, trade in palm oil products is mainly a male activity. The women participants reported that they do not make much money from the sale of palm oil because they do not know how to make oil. However, they do dominate the sale of palm nuts. The men reported that though generally labor-intensive, palm oil trade is profitable and convenient as it is undertaken off-season. Income generating activities most important for women after crop sales were selling of palm nuts, casual labor, sale of small livestock (poultry, goats and pigs), and sale of home brewed alcohol. Interestingly, after palm nut sale, the sale of termites was the most lucrative activity for women. For men, the most important income generating activities after crop sales were the sale of palm oil, casual labor, and termite sale.

Photo 4: Bicycle loaded with charcoal. The bicycles are pushed and modified to carry large loads.

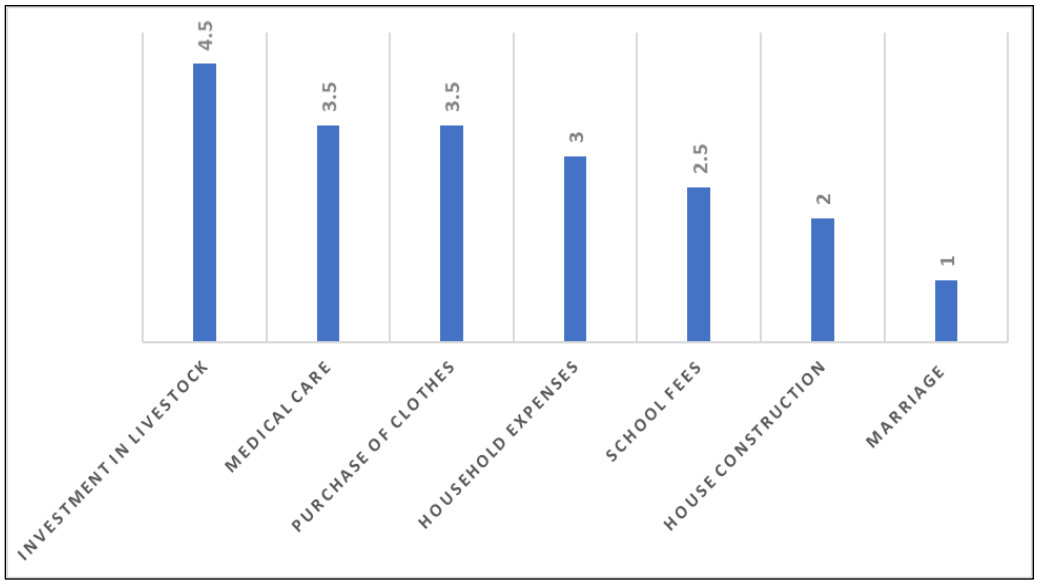
Figure 5: Women and Men's income earning activities



In addition to the major sources of income above, the respondents mentioned other sources of income before the intervention, some of which were unique to specific villages that included the making and sale of charcoal, fishing in the rivers, trading in coffee, and hunting. That their importance diminished with the harvests and sale of the CRS provided crops could suggest that, with better seed and crop management combined with favorable rains, crops sales could substitute for much of the other income sources.

Only two villages (N=20) scored on the use of the extra income as indicated in **Figure 6**. Investment in livestock was reported by the households as the best way to store value. Oddly, as shown in **Figure 4**, livestock sales dropped after the intervention; this may be an indication that with extra income, households were not needing to make forced sales of animals to fill income gaps. Respondents reported that households often fall back on income from livestock (especially small livestock) whenever cash is needed for other expenses such as payment of school fees or medical emergencies, and even to buy diversified food for the families (meat, eggs, vegetables, sugar, etc).

Figure 6: Average score on the use income from sale of crops. Extra income from changes brought about by seed support (N=20)



An interesting observation made during the transect walks, driving through the communities, and during visits to the villages was that most children did not attend any schools although school fees were still reported as a major household expense. Informal conversations with the locals revealed that most government schools were not operational due to lack of teachers.

3.3 RQ3: Have the Varieties and Seeds Received Been Incorporated Into Local Cropping Systems and Local Seed Management Practices? If So, How? To What Benefit(s)? Any Disadvantages?

Many farmers, mostly receiving seed in Season A, reported that seed received from CRS had been harvested and kept as saved seed for the next season. Farmers report keeping more of their own seed and having to be less reliant on seed from the market. One group reported that seed had been kept and planted for three successive seasons.

According to the PHM report for Season A, 87% of households reported that their production increased after receiving the new seed variety from the CRS intervention under *Ditekemena IV* project.

Community members report that varieties distributed by CRS can now be found in the market. Team members confirmed this on their visits to the markets. The local market is an important source of seed for farmers to supplement their own saved seed. The presence of these varieties in the market indicates that farmers can now find these varieties on the market if they need to supplement their own stocks.

The crops provided by CRS have benefited women both in terms of increased production of those food crops that women plant and the cash crops that they sell. Whether this affects the crop mix or sales is unknown.

Textbox 2: An agricultural monitor's observations

One agriculture monitor reports that distributed varieties were better in terms of having a short cycle compared to local varieties that take a long time in the field. Their productivity is also higher compared to local varieties. These new varieties are not as affected by diseases and insects in the field and in storage. Beneficiaries noted that they have the seeds and more than half of those interviewed mentioned that they produce and save their seeds every season. This has increased the availability of food in the household. Increases in the sale of agricultural products help to buy domestic animals and meet other household expenses.

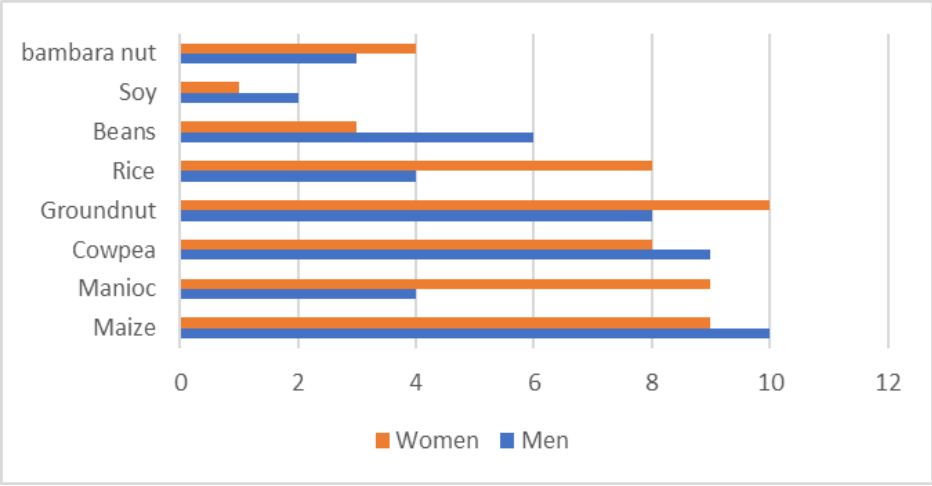
Agriculture monitors (community members engaged by CRS) report high adoption rates (>60%) of some of the recommended cultivation practices accompanying the seed. The techniques demonstrated in training accompanying the seed provision consisted of planting in lines, spacing of plants, thinning plants, and managing fertility. For pest management, farmers were trained in the use of plant-based repellents and pesticides. For storage, farmers were instructed to sprinkle coffee powder over the seeds and then store in airtight containers.

3.3.1 Main Crops Grown in the Area

Local communities (men and women) in the Bukonde health zone grow both staple and vegetable crops. The same crops are planted in both seasons. The main staple crops are maize, groundnuts, cowpeas, rice, and cassava. While all of these crops are grown in both seasons (A and B), cassava is generally grown in season A, which begins in September, because it faces a long drought season that decreases yield when planted in Season B.

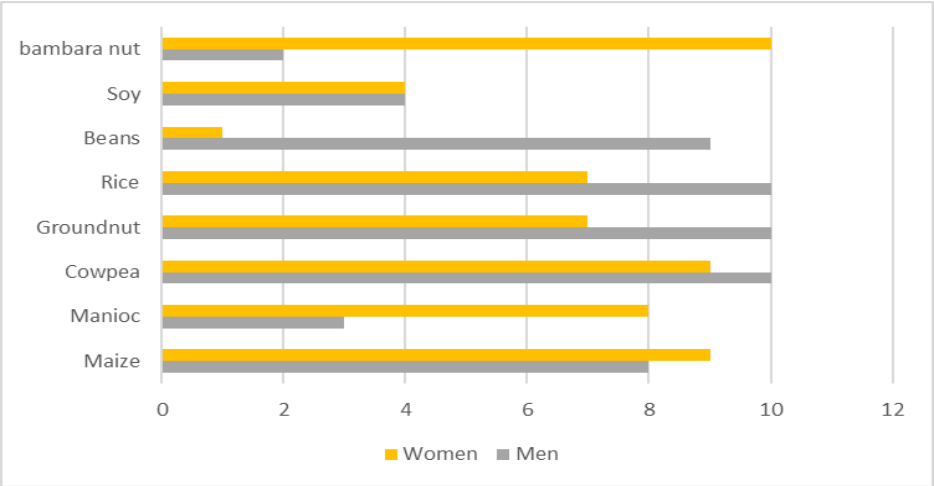
While men and women grow the same crops in Season B (**Figure 7**), the chart shows interesting differences in crop mix. More women plant rice, groundnut, and cassava than men. These three crops are important for consumption. Men plant significantly more beans, a cash crop, than women.

Figure 7: Crops grown by women and men- Season B (number of communities)



In Season A, Women had a fuller mix of crops, concentrating on bambara nut production, followed by cowpea and maize then rice and groundnut (**Figure 8**). Again, men planted beans extensively in Season A, but planted more rice, groundnut, and cowpea. Interestingly, men plant more rice than women in Season A while the opposite is true in Season B.

Figure 8: Crops grown by women and men - Season A (number of communities)



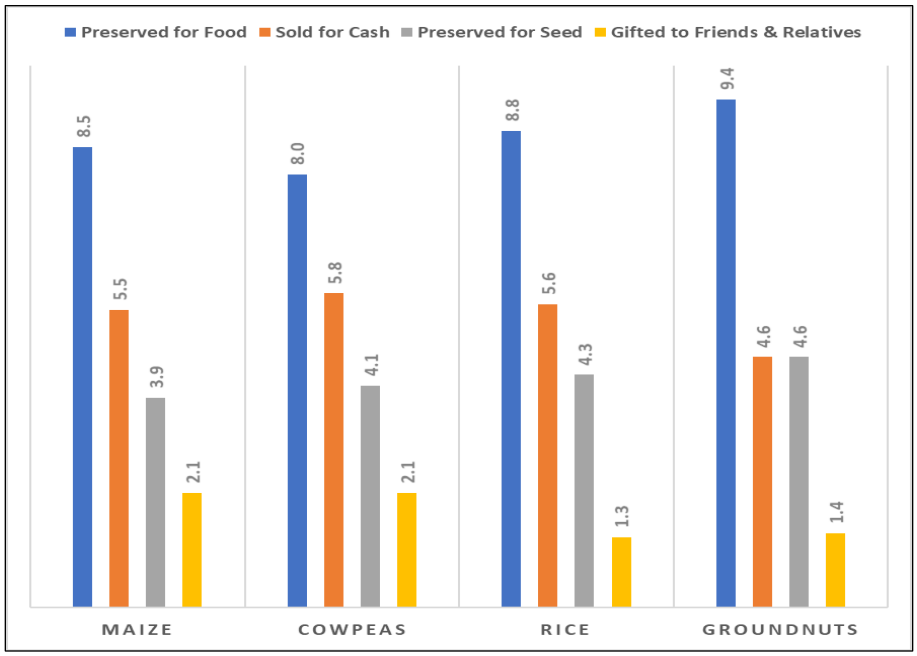
Tomatoes, onions, and okra are the main vegetable crops grown during the two cropping seasons. According to the statements of FG participants, onions are grown more by men because of the nature of the work required for this crop. Eggplant and spinach, on the other hand, are grown exclusively by women.

In general, women cultivate in the savanna while men prefer to cultivate fields in the forest. Cultivation is less arduous in the savanna than in the forest, where the practice of slash and burn requires more labor. However, the forest has good soil fertility compared to the savanna, with a positive impact on yield. Wetland cultivation is reserved exclusively for men.

According to the farmers interviewed, cowpeas and groundnuts are savanna crops, while rice, maize, cassava, and market garden crops are mainly grown in the forest. The lowlands are used to grow market garden crops and rice as well as vegetables. The most common crop associations in the *Ditekemena* program area are cassava/groundnut, maize/cowpea, and tomatoes/amaranth.

When asked during the PIA what they did with the crops harvested, the households indicated that the highest proportion of all the crops was preserved for food at household level, with no major differences recorded between male and female participants. The next highest proportion was sold, with seed saving taking the third highest proportion as indicated in **Figure 9** below. The significance of seed being saved for the next season, in addition to the amount making it into the local market, shows that these improved varieties have now been incorporated into the local seed system.

Figure 9: How the harvest was utilized by the households (N=80)



3.3.2 CRS Provided Seed Varieties and Their Characteristics

CRS provided four improved varieties to farmers, including Kasai 1 maize, A65 groundnut, H36 cowpea and IRAT 112 rice. Local communities confirmed that the H36 cowpea variety was introduced for the first time in 2021 through the CRS seed fairs. On the other hand, the Kasai 1 maize variety (locally called Djibouti), groundnut A65 (locally known as Batshiamba) and the IRAT 112 rice variety (called Ghana by beneficiaries) are not new to the Bukonde health zone. Kasai 1 was first introduced into Kasai Central province and in the Bukonde health zone around 1993 during the return of Kasai emigres fleeing violence in Katanga province. Faced with this massive return movement and the humanitarian disaster that followed, the Congolese government received support from USAID in terms of food and maize seed, including the Kasai 1 variety. A local, small grained, variety is also called Djibouti and could be the degenerated descendent of the original Kasai 1. There is also a smaller grained local groundnut variety known as Batshiamba; it is unknown whether this is related to the improved A65 Batshiamba variety. The improved rice variety IRAT 112 was introduced into the region around 2004 by farmers from what is now Sankuru province but was unfamiliar to many of the CRS target communities. None of these improved varieties are newly developed. All were initially released over 30 years ago. However, it is worth noting that CRS intervention has resulted in the reintroduction and the widespread dissemination of these varieties post-conflict.

FGs evaluated the productivity and other attributes of the CRS provided varieties:

- The drought resistant Kasai maize variety was reported to yield three times that of the local variety.
- According to FGs, the A65 groundnut variety yields twice as much as one local Bafike variety and three times another local variety. A65 also fetches a price premium in the market.
- Cowpea H36 is a short-cycle (2.5 months), high-yielding variety that, according to FGs, outperforms the local variety (Bipale) by a factor of three. The H36 variety is drought and disease resistant.

- FGs report that the IRAT 112 rice variety yields twice as much as the local variety. IRAT 112 is a good quality rice that sells for a higher price in the market than the local rice (Bumba). A significant attribute of IRAT 112 is that it can be ratooned (regrown after harvest) and can provide three separate harvests.

Photo 5: FG participant weighing productivity of CRS provided variety against local variety

The planting of the CRS-provided varieties were accompanied by a package of improved agricultural practices, adopted in part or in its entirety by the majority of farmer participants. The genetic benefits of any variety, particularly productivity, are greatly influenced by growing conditions, including rainfall, cultural practices, fertility, pests, and disease. Drought, disease, and pests are all exacerbated by poor soil health. In the greater Kasai region and the *Ditekemena* zone in particular, the practice of slash and burn agriculture has left a barren "savanna" and an ever-receding forest. The inability to maintain fertility and soil health means that even with improved seed, harvests are minimal. It also puts the burden of ever smaller yields on women farmers, who are relegated to cultivating the savanna. Poor soil health and diminished organic matter (through seasonal burning) means that the crops are ever more susceptible to the vagaries of weather. While some soil fertility issues can be addressed with short-term fixes, restoring overall soil health requires a process of several years and is not something that can be adequately addressed in a short-term emergency project (a more detailed comparison of varieties can be found in **Annex 6**).

3.5 RQ4: How Have Emergency Seed Interventions Impacted Informal and Formal Seed Systems (Including Seed Markets) in the Local Area?

3.5.1 Formal Seed Sector

The formal seed sector in the DRC, and Kasai specifically, is relatively underdeveloped. There are four main organizations operating in the formal seed sector in the Kasai – the agricultural research institute, INERA, agri-multipliers, the National Seed Service (SENASEM), and institutions distributing seed (NGOs, FAO, Ministry of Agriculture). INERA is responsible for researching and either producing or importing new varieties. Commercial seed companies do not exist. Instead, the government has created a system of private agri-multipliers to produce certified seed. The national seed service, SENASEM (Le Service Nationale des Semences) is responsible for assuring the quality of seed produced by private seed producers.

Agri-multipliers primarily produce seed for institutional buyers – NGOs, FAO and the government. Sales to individual farmers are minimal. Small, resource-poor farmers are unable/unwilling to pay the premium for certified seed ($2.5/kg for maize seed vs $.60-.70/kg for the grain). Essentially, the only way small farmers obtain quality seed of improved varieties is through institutional distributions. Up to 95% of agri-multiplier production is purchased by institutions. When there is remaining seed after institutional purchases, it is distributed to members, or sold as grain. Since the return of refugees, 25% of the province's population has received relief seed. The agencies currently involved in seed distribution are FAO, CRS, World Vision, RACOGE, and Handicap International.

During the 2022 B Season, 1,000 tons of improved seeds were distributed by the four organizations through seed fairs.[6] FAO remains by far the largest partner of Kasai Central province in terms of seed support (77% of the total quantity distributed in the 2022 season).

3.5.1.1 Agro-Dealers

Just two agro-dealers operate in Kananga and they only handle veterinary products. These agro-dealers carried no certified seed, pesticides, or even chemical fertilizer. Agri-multipliers reported that, to obtain pesticides for their crops, they need to procure them in Kinshasa and sometimes from the Kivu provinces. No one reported using chemical fertilizer on their fields.

3.5.1.2 Agri-Multipliers

Agri-multipliers are usually members of farmers' associations and cooperatives or unions of cooperatives. These cooperatives furnish members with basic seeds and also provide training. This enables small-scale farmer members to obtain good quality seed. In Kasai, most agri-multipliers are located in the health areas of Bureau-Kananga, Luiza, Kananga, Louamto and Mashika. For the agri-multipliers associations, seed multiplication is done at two levels: at the community level (community fields of the cooperative) and the individual level (fields of the cooperative members). Seeds are collected at these two levels and assembled by the cooperative for sale.

The oldest agri-multiplier interviewed for the PIA started operations in 1998. All the others started after 2003, with the most recent initiating in 2018. Areas cultivated range from 35 to 480 Ha, while individual members cultivate significantly smaller areas.

The agri-multipliers receive basic and pre-basic seeds from the INERA research station at Ngandajika. The distance to Ngandajika presents a large hurdle to the agri-multipliers – it is located 500 km from Kananga and often requires a week of travel to obtain the basic seed.

The quality controls are carried out at two levels. At the first level, it is done internally at the level of the cooperatives by their agronomists. At the second level, SENASEM carries out four inspection visits during the period of production and undertakes tests on the harvested seeds as the final step before certification.

Seeds are generally packaged and sold in 50kg bags, in some cases bearing the cooperative's label. Agri-multipliers report that their major clients are NGOs absorbing up to 95% of sales. Private sales are a negligible part of overall sales. A portion of production is returned to members ostensibly to produce seed the following season. Any unsold seed sold as grain. In an interview with one agri-multiplier, when asked about back-up plans if institutional demand falls in the future, he said he anticipates continuing to sell to institutions and has no plans for expanding private sales. Costs of production and sale for agri-multipliers are high because, in addition to the costs of inspection, poor transport infrastructure hampers the purchase of basic seed, the collection of seed from members, and delivery of NGO-purchased seed to communities.

[6] According to the head of the Provincial Division of Agriculture, three received seed: Dibaya, Luiza and Demba. The territories of Kazumba and Dimbelenge were not included in the latest distributions (season A/2022) because they were previously supported. In addition, the last IPC report showed that the three territories (Dibaya, Luiza and Demba) were the highest priority. In September 2002, the territories of Dibaya and Luiza were classified as phase 4 (emergency), while the province of Kasai Central was in phase 3.

3.5.2 Informal Seed Sector

The informal seed sector supplies virtually all seed to small farmers in Kasai province. No farmers interviewed reported obtaining any certified seed from formal sector agri-mulitpliers. Farmers mainly access seed from their own harvest and the local market.

The below table from FGs shows the proportion of seed that farmers obtain from different sources. Most of their seed (other than rice) comes from farmers' own saved stock. The market provides the main supply of seed for rice. The market plays an important role in supplementing farmers' own supply. Apart from their own harvest and the local market, maize and groundnut seeds come, to a lesser extent, from neighbors. In the latter case, the farmer borrows the seeds from her/his neighbor, which will be repaid at double the initial quantity after the harvest.

Table 4: Scores for sources of farmer seeds in Bukonde, 2022[7]

Crops	Seed sources		
	Own harvest	**Local market**	**Social networks**
Maize	6	3.5	.5
Groundnut	7	2.5	.5
Cowpea	7	3	
Rice	4	6	

Farmers in the Bukonde health zone rely on the informal sector. Effectively, the formal system functions parallel to the informal system and farmers have little to no interaction with the formal system. While improved varieties (maize, cowpea, groundnuts, and rice) have been introduced into the *Ditekemena* program area by CRS, the dissemination from one cropping season to the next is mainly done through the informal sector. The local market is not only a source of local seed, but also serves to recirculate improved seed. **Annex 4** presents additional details on informal seed systems.

[7] Scoring using 10 stones to weight the different sources.

3.5.2.1 Grain Vendors

Grain vendors play an extremely important role in seed supply to small farmers. Vendors are mostly women who are individual traders in the market. Vendors in the regional market source their grain from farmers and collectors while vendors in small local markets are usually also farmers who primarily sell their own harvest. Most of the local vendors interviewed saved their harvest until the next planting season and then sold it at the local market. The grain is purchased as either grain or seed. A few local vendors reported that they bought seed quality grain from other farmers to store and be able to sell during the sowing period when grain is more expensive.

Photo 6: Local grain vendor in Bukonde. Note the unshucked maize destined for planting.

Discussions with vendors in the local markets reveal that in general no sorting is done to separate the grains from the seeds and grain for seed is sold at the same price as grain. Vendors report that, during planting season, they assume that most of their grain sold is for planting. These vendors have saved good quality grain from their own harvest to sell during the planting season when they can capture the higher price. They say that they have repeat customers from year to year because the clients know they sell quality grain, and it is reliable as seed.

In contrast, in the main market at Kananga, vendors charge a premium for seed quality grain. One vendor charges a premium of 500 CDF for groundnut, 300 CDF for cowpea, and 600 CDF for common bean. These vendors purchase their product from local farmers and collectors who transport their grain/seed on bicycles. Farmers in the *Ditekemena* target area generally do not patronize the larger Kananga market because of access issues so make their purchases from their local market. During the CRS seed fairs, local vendors report that demand dropped as many of their regular clients obtained seed from CRS. Thus, they were forced to lower prices.

4. Conclusions and Recommendations

4.1. RQ0: Why, When, How, and What Types of Seed Were Received by Farmers? [And What Did They Do With Them?]

- Because farmers had been planting seed for over three seasons since their return, the effective objective of seed provision was to improve livelihoods rather than to provide seeds that had been lost during the emergency. Most farmers reported that they planted the improved maize, cowpea, groundnut, and rice seeds received from CRS seed fairs. The fairs provided seed early enough for planting during normal planting periods, although irregular rains, particularly in Season B, hampered the timing of planting and performance in the field. Crops planted in the "forest" (generally by men) and wetlands performed better than those planted in the more drought-prone savanna (generally by women). Some households tried to keep seed until the next season. The biggest challenge was the adverse effects of drought that followed the Season B planting leading to minimal harvest or total crop failure in many households. Season A planting was successful and allowed farmers to harvest more, sell part of their harvest, and retain seed for the next season.

Recommendation: ***In food insecure situations, ensure that immediate food security measures accompany any provision of seed***. Immediate food insecurity challenges need to be addressed by immediate actions such as cash for food or food distribution.

4.2 RQ1: How Have Emergency Seed Interventions Impacted the Household Food Security of Male and Female Smallholder Farmers?

- Farmers who received seed in Season A reported improved production and income as a result of the seed intervention. The selection of crops also benefited women farmers and enabled them to increase sales of cowpea and groundnuts. The near failure of crops during the 2021 Season B not only underlines the inherent risk of agriculture but makes investment in seed distribution as a short-term solution to food insecurity questionable. Distribution of food was a more effective and less risky way to address short-term food insecurity and yielded immediate nutritional benefits. There have, however, been longer-term benefits from the seed intervention including improved yields through the reintroduction of improved seed into the system accompanied and improved agricultural practices due to training on "Good Agricultural Practices" (GAP), particularly for farmers who received seed in Season A and cultivating in the forest lands rather than those cultivating in savanna.

Recommendation: In the medium term, distribution of improved seed appears to have boosted agricultural production. However, ***in addition to seed provision, for longer-term sustainable impact, systemic issues should be addressed***. Addressing the issues of soil health and a dysfunctional seed system normally require investment in longer term programs that are committed to support farmers well beyond the short-term time horizon of emergency programs.

- While the project was "emergency" in terms of addressing the critical food security crisis, in terms of seed, the situation was less critical. The displaced had returned to their communities and had been planting and harvesting for the previous three years. There was no shortage of seed. In terms of the three pillars of the seed security framework – availability, access, and quality – seed was available in the markets; access (ability to obtain seed either through own harvest, borrowing, or purchasing at the market) was an issue given the extreme level of poverty in the region; quality of available seed was also an issue. Even though some of the improved varieties seemed to be available in the market (using the same local name), that seed reportedly had lower production and smaller grains. Farmers reported considerable yield differences between the seed received from CRS and the local seed, so

the new seed appears to have improved the quality of farmer seed stock. The objective of the seed intervention aimed to improve longer-term livelihoods by increasing production through making available improved seed accompanied by training. There are two pitfalls in undertaking such an approach in an emergency project: (1) improved seed is just one factor in increasing production (and consequently food security)[8] and (2) the dysfunctional seed system itself prevents improved seed from being regularly available on a long-term basis.

- Many of the issues facing farmers in Kasai are systemic and thus require a systemic response. Chief among them is fertility. The practice of slash and burn agriculture has left a barren "savanna" and an ever-receding forest. The inability to maintain fertility and soil health means that even with improved seed, harvests are minimal. It also puts the burden of ever smaller yields on women farmers, who are relegated to cultivating the savanna. Poor soil health and diminished organic matter (through seasonal burning) means that the crops are ever more susceptible to the vagaries of weather. While some soil fertility issues can be addressed with short term fixes, restoring overall soil health requires a process of several years and is not something that can be adequately addressed in a short-term emergency project.

Recommendation: ***It is critical to address soil health issues. This will result in increased production over the long term, make agriculture more resilient to climate change, and optimize results from any improved seed***. There are a series of practices that have been successful elsewhere under similar agro-climatic conditions to the Kasai. Among these practices are elimination of burning, leaving of residues on the field, incorporation of organic matter into the soil, erosion control methods, cover cropping and green manures, intercropping with legumes for biological nitrogen fixation, reducing soil acidity, and introduction of agro-forestry into the cropping system. Extension and adaptation of these practices to the Kasai would probably require a longer-term development program. Nevertheless, in Central America, CRS is adapting the WSA[9] soil health package that is normally a 4+ year program, to shorter-term emergency programming.

4.3 RQ2: How Have Emergency Seed Interventions Impacted the Incomes and Livelihoods of Male and Female Smallholder Farmers?

- Results varied by season. While those in Season A reported a 40% increase in production, those in Season B reported a 5% drop in production. For those with increased production, revenue from sale of CRS-provided groundnut, cowpea, and maize seed more than doubled. The selection of crops also benefited women farmers and enabled them to increase sales of cowpea and groundnuts. This additional income provided multiplier effects as farmers invested in other productive activities such as livestock, bicycles (for transport), and education, thus enhancing household livelihoods. However, the abysmal condition of the roads severely impedes markets and limits the ability of farmers and traders to sell their harvest beyond the local market.

Recommendation: ***To further improve livelihoods, it is recommended that projects of this nature should include investments in livestock and poultry seeing as many households invested the extra income from crop sales to livestock***. Further, it is notable that the communities are now past the emergency stage and future investments should focus on development interventions that improve markets, increase production and invest in other human capital aspects of livelihoods such as education and health. Livestock is an important component in the Kasai zone, especially to address soil fertility management by providing manure as well as household nutritional issues and easy income mobilization.

[8] While seed provision was accompanied by training on GAP, farmer training was brief, and the multiple topics could only be covered in a cursory manner.
[9] WSA is a series of farm practices developed by CRS programs across Central America that have been proven to improve soil moisture and fertility, increase yields, and reduce production risks related to drought and rainfall variability.

4.4 RQ3: Have the Varieties and Seeds Received Been Incorporated Into Local Cropping Systems and Local Seed Management Practices? If So, How? To What Benefit(s)? Any Dis-Benefits?

- PIA results show that the seed received, in general, has been saved by farmers for their own supply and also sold in the local market. The presence in the market of grain harvested from CRS-provided seed is evidence that the varieties have been incorporated into the local seed system. While most of the varieties distributed by CRS were already known to farmers, displacement, and potentially other factors, seems to have affected local availability. Farmers were positive in their evaluations of the varieties received through the CRS intervention, noting that their productivity and drought resistance were higher than traditional varieties.

Recommendation: Maintenance of seed quality at farm level is critical for farmers who do not purchase certified seed themselves. ***Farmer capacity in seed production, post-harvest handling, and seed storage needs to be enhanced.*** Any training program should tap into the experience of local positive deviant farmers who already guard the genetic purity and maintain their own stock of quality seed.

- Most of the improved varieties promoted by the Ministry of Agriculture and distributed by relief organizations were developed over 30 years ago. The number of varieties available to and planted by farmers is extremely limited, with 2-3 different varieties of each crop available to farmers. Those organizations involved in seed development, introduction, multiplication, and diffusion in Kasai Central need to make newer, appropriate varieties available to farmers.

Recommendation: INERA needs to accelerate the pace of research, testing, and diffusion of new varieties adapted to Kasai Central agro climatic and cultural conditions. Programs need to focus on ***more climate-resilient varieties able to adapt to the vagaries presented by climate change.*** Because diffusion and access to new seed varieties is so low, the research should be undertaken at the community level. ***Participatory variety selection would engage communities in identifying and selecting the most appropriate varieties for their conditions and gender-based preferences***.

4.5 RQ4: How Have Emergency Seed Interventions Impacted Informal and Formal Seed Systems (Including Seed Markets) in the Local Area?

- The structure of the formal seed system itself prevents improved seed from being available to small farmers on a sustainable basis. Currently, the only link between the formal system (agri-mulitpliers in this case) and the informal system is periodic institutional distributions of improved seed. The creation of the agri-multipliers was designed to link the formal seed system and small farmers. However, small farmers are unable or unwilling to pay the high prices for certified seed from agri-multipliers. This is not sustainable and currently there are no mechanisms to ensure that farmers have access to quality seed. Until this gap is addressed, farmers will keep on relying on institutional distributions (if they continue) to access quality seed. The quality of the seed in the local market will rely on grain vendor/producers maintaining the quality of their seed stock.
- The local market plays a key role in furnishing farmers with seeds. Most farmers either rely entirely on the market or supplement their own saved seed with seed purchased from the market. Even though at the local level, vendors do not distinguish between grain and seed in terms of price, these vendor/producers are potentially able to control their own sourcing of seed, planting practices, and post-harvest management to maintain the quality of the seed they sell as grain. This offers an opportunity to introduce and maintain quality seed in the informal seed system.

Recommendation: Grain vendors have the potential to serve an intermediary role between the formal and informal systems. If provided technical training on seed production and linked to agri-multipliers to obtain an initial supply of certified seed, these vendors can produce seed quality grain at affordable prices. ***Grain vendors can serve as village-level agri-multipliers able to produce a reliable product without the costs of basic seed, transport, and inspection*** that agri-multipliers face to produce and market certified seed. This could involve actions such as: linking traders to credible sources of good quality seed; working with them on techniques of seed bulking; advising and supporting traders in better storage options (Budikadidi/ Catholic Relief Services, 2017). This also offers the opportunity to include youth in the process of seed multiplication and sale. Ensuring that farmers have the necessary skills to maintain quality of their own seed stock through seed selection, training in post-harvest management techniques, and improving seed storage is also critical.

4.6 Gender Impacts of the Program

- The improved production from CRS-provided seed affected most those crops managed mostly by women – cowpea, groundnut, and maize. Data on improved production and revenue suggest an amelioration of the overall food security of the women and the larger family, particularly since women are responsible for feeding the household.
- The study showed that there are notable differences between men and women in their access to the best farmland (women cultivate in the savanna), major crops cultivated, expenditures, and income generating activities. Women are given the least productive plots in the savanna and must adjust cropping patterns to align with this reality. The land is also more susceptible to drought, making cultivation not only less productive but also riskier. This has a direct impact on family food security. It was also noted that women are involved more in households' subsistence crops, while men mostly prefer cash crops so that much of household finance is controlled by men.

Recommendation: Provide more drought resistant crops and varieties to women. In addition, ***promote water smart agriculture practices that will protect the soil, conserve moisture, increase fertility, and production in the savanna so that women (and the family) can benefit from increased and more resilient crop production***. Livestock promotion for women should allow them to improve direct income and improve savanna soil fertility to improve agriculture productivity.

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Annex 1: Fieldwork Schedule

Date	Activity
30-Aug	Arrival Kinshasa
31-Aug	Kinshasa - Briefing and travel authorizations
1-Sep	Kinshasa - Briefing and travel authorizations
2-Sep	Flight from Kinshasa to Kananga on UNHAS
3-Sep	Kananga Meeting with CRS and Field Assistants
4-Sep	Kazumba - Test of Tools
5-Sep	Travel to Bukonde
6-Sep	Data collection - Dibaya
7-Sep	Data collection - Dibaya
8-Sep	Data collection - Dibaya
9-Sep	Data collection - Dibaya
10-Sep	Data collection - Dibaya
11-Sep	Travel Bukonde- Kananga – debrief CRS Kananga
12-Sep	Data entry and interviews in Kananga
13-Sep	Debrief Kananga, Fly UNHAS Kananga-Kinshasa
14-Sep	Depart Kinshasa

Annex 2: What is a Participatory Impact Assessment?

Extracted and adapted from Catley et al, 2013.

PIA involves adapting participatory methods to measure changes in people's livelihoods over time and to understand how different factors caused these changes. In contrast to many traditional project monitoring and evaluation (M&E) approaches, PIA aims to measure the real impact of a project on the lives of project participants. This differs from evaluation because many evaluations focus on measuring project objectives, the extent to which they were achieved, and if they weren't, why not. PIA goes beyond typical evaluation and the measurement of objectives to examine how project activities actually benefited the intended recipients, if at all.

There are three main types of PIA methods – ranking or scoring, visualization, and informal interviews. Conventional statistics can be used to summarize and analyze the numerical data produced by standardized ranking, scoring, and visualization methods, which can include comparisons of different types of activity or support. Measures of project impact can be translated into economic values, which, in turn, support benefit–cost analysis. These aspects of PIA are particularly useful when engaging in policy reform processes or developing good practice guidelines.

Information and numbers from participatory methods are validated through triangulation and analysis of a project's technical plausibility. The question of attribution is addressed through different types of comparisons. Using comparisons in PIA can be very useful for improving the credibility of the findings but needs a good understanding of the project design and activities, and the wider context in which the project took place. When PIA is well-designed, with a good understanding of local context and the systematic use of comparisons and triangulation, it seems to produce evidence that is of reasonable quality and which a range of people – from community members to policy makers – can understand and use.

The Participatory impact assessment approach in Kasai Central

The assessment for each of the selected seed interventions will be undertaken using the eight-stage framework, as outlined below. Some of these stages will take place simultaneously rather than sequentially. Section 5 describes how the different stages will be incorporated into specific tasks and activities.

Stage 1 *Define the questions to be answered.* Each individual assessment will include the overarching PIA questions: How have selected emergency seed interventions impacted on the livelihoods of the smallholder farmers and seed suppliers involved? What have been the impacts of selected emergency seed interventions on the informal and formal seed systems (including seed markets) in the local area? One or two additional questions that are appropriate to all the interventions will be agreed among the partners to make three or four questions that are the same for all interventions. In addition, each intervention may have one or two questions that are unique to that particular intervention, though the total number of questions for each intervention assessment will be limited to five in total.

Stage 2 *Define the geographical and time limits of the intervention.* The seed intervention to be assessed may have formed a part of a larger emergency project, so it will be necessary to have a clear understanding of the seed intervention itself, both in terms of the geographic (spatial) boundaries as well as the time boundaries in relation to planting and harvesting seasons. Background documentation and information from the in-country NGO staff will be used to describe the geographical and time limits of the seed interventions to be assessed. At the community level, participatory mapping and timelines will be used to ensure that everyone is clear about the geographical and time periods being assessed.

Stage 3 *Identify and prioritize locally defined impact indicators.* Community-defined impact indicators will be identified by asking participants about how they benefitted from the intervention and how their coping strategies may have changed in the period leading up to, during, and after the crisis. Both quantitative and qualitative indicators

will be used. Examples of quantitative indicators might include yield from seeds planted, income from crop sales, or diversity of crops and varieties planted. Examples of qualitative indicators might include improved knowledge of agricultural practices and technologies, or wellbeing. Project documentation, including any M&E reports or post-distribution monitoring reports, will be used to triangulate the PIA findings.

Stage 4 *Decide which methods to use for measuring change and test them.* The methods to be used will be carefully selected by the PIA Consultant with support from the PIA Technical Advisor. Potential methods include simple ranking, simple scoring, before and after scoring, before and after proportional piling, pair-wise ranking, and impact calendars, among others. Each method will be tested in one of the communities before being applied in others, so that the instructions/guidance can be modified to be sure that it is well understood by the participants. Where appropriate, data will be collected from men and women separately, noting any differences with regard to youths so that gender- and/or age-based differences can be captured.

Stage 5 *Decide which sampling method and sample size to use.* Given that the assessment intends to generate evidence to be used by donors, NGOs, and international agencies at a global level as well as governments and implementing partners at the national level, sampling will be undertaken at the appropriate level of representation. Due to budget and logistical considerations, it is likely that purposive sampling will be used. If possible, male and female beneficiaries and non-beneficiaries within the same communities will be sampled for each intervention. The repetition of specific methods with different informants and in different communities will increase the reliability of the results.

Stage 6 *Decide how to assess intervention attribution.* Three main approaches will be used to assess attribution: (a) the relative importance of intervention and non-intervention factors contributing to changing livelihoods; (b) participatory comparison of intervention and non-intervention activities and seed providers; and (c) comparison of beneficiaries and non-beneficiaries. For interventions where it is possible to compare beneficiaries and non-beneficiaries, it is not necessary to use all three approaches. Special attention will be given to any differences in impact in relation to gender.

Stage 7 *Decide how to triangulate and how to assess technical plausibility.* Triangulation will include the comparison of results from different participatory methods and the comparison of results from the participatory methods with secondary information, include project documentation and monitoring data, and direct observation. Technical plausibility typically relies on expert review of a project's causal logic, from inputs to impacts.

Stage 8 *Plan the feedback and final cross-checking of results with communities.* Feedback and validation will be done at four levels: (a) at the local community level, key findings will be presented to community leaders, representatives and local stakeholders to verify that the findings are correct and offer the opportunity for further explanation and information about the intervention; (b) with in-country staff from the implementing NGO partner; (c) at the national level, findings will be presented as part of the stakeholder workshop involving staff from the NGO partners, FSC members, government representatives, and key stakeholders from the seed sector; and (d) at the global level, gFSC members will be invited to a presentation of the synthesized findings from the different assessments. At each level, participants will contribute to the identification of best practices.

Annex 3: DRC PIA Tools and Methods

Table 2A. RQ1 & RQ2: How have emergency seed interventions impacted household food security of male and female smallholder farmers? How have emergency seed interventions impacted on the incomes and livelihoods of male and female smallholder farmers?

Variable to be measured	Source	Methods	Outputs
Historical timeline [to incl number and timing of seed fairs and other project activities]	FGD1	- Ask the participants to list the main events leading up to, and following their displacement - Include in the timeline emergency seed distributions /fairs - Include other project activities undertaken by CRS (specific for purposes of attribution)	A timeline of all emergency seed interventions [An historical timeline - this exercise does not need to be repeated in detail in all groups if they are broadly consistent]
	FGD2		
	KII	- Triangulation of the historical timeline by local administrators/CRS staff	- Verification of the historical timeline

Intervention assessment [crops and seeds acquired from intervention and other sources]	FGD1	Detailed assessment of the intervention package - building on historical timeline
		- Details of all seeds (use local names where necessary), tools and other inputs by agency for individuals and groups.
		- Proportional piling
		  - proportion of seed by source e.g., emergency intervention, friends, purchase, other farmers etc. in the year of the intervention
		  - Proportion of seed by source - as above - in the latest planting season
			Detailed assessment of all seeds, tools and other inputs
			Input charts for each FGD
			Chart of seed sources

	FGD2		
	KII	• Triangulation by local agriculture bureau/ CRS staff; • Number and types of seed received – CRS implementing staff	- Verification of the assessment charts

Variable to be measured	Source	Methods	Outputs
		• Number of new crops / new varieties – CRS implementing staff	

Food Security and income assessment	FGD	• Proportional piling - intervention year
		  ○ % sources of food in HH diet
		  ○ % sources of HH income
		• Proportional piling - latest planting season
		• As above - sources of food in HH diet and sources of income
		• FS coping strategies
		  ○ % of meals per day before and after
		  ○ dietary diversity before and after
			- Impact assessment on food security
			- Impact assessment on income
			- Impact assessment on sustainability

	KII	- Triangulation by local agriculture bureau/ CRS staff	Verification of proportional piling outcomes
Comparative yield of varieties acquired from seed fairs	FGD1		
	FGD2	Use list of seed varieties acquired from seed fairs (see below) to compare seed fair varieties with local varieties • Proportional piling to compare yields, noting other comparisons that are discussed in relation to specific varieties, e.g. time to maturity, resistance to drought / pests, cooking qualities, marketability, etc.	Yield comparison of seed fair varieties and local varieties Characteristics of different varieties (local and fair varieties), indicating advantages and disadvantages.
	KII	CRS staff / local agriculture & extension staff to verify performance of seed fair varieties	

Variable to be measured	Source	Methods	Outputs
HH income	FGD	- Develop local language livelihoods coping descriptors - Use the descriptors to create coping mechanisms chart, by season, A/B to BA 2017 to the present [harvest of natural resources, casual labor, borrowing from welfare groups to meet food needs, receiving food gifts from relatives, selling physical assets etc.] - Proportional piling - use of income from emergency seed intervention including paying off debts, savings, giving to welfare groups etc.	Use of Income
	KII	- Triangulation by local administrators/ CRS staff	- Verification of use assessment

Table 2B RQ3: Have the varieties and seeds received been incorporated into local cropping systems and local seed management practices? If so, how? To what benefit(s)? Any disadvantages?

Variable to be measured	Source	Methods	Outputs
Crops and seeds acquired from intervention and other sources	FGD1		
	FGD2	Details of all seeds, tools and other inputs acquired at fairs (use local names where necessary), for individuals and groups. Check whether or not seeds from fairs were actually planted. Proportional piling of seed by source for focus crops - for all seed planted in planting season of seed fair ● % proportion of seed by source e.g., emergency intervention, friends, purchase, other farmers etc. in the year of the intervention ● Proportion of seed by source - as above - in the latest planting season	Chart showing types of seeds acquired from fairs, indicating new crops / new varieties Chart of seed sources, comparing year of intervention and most recent year

	KIIs (CRS)	• Details of all seeds, tools and other inputs acquired at fairs for individuals and groups.	
Farming practice	FGD	- Ask the participants to list all changes in their farming practices the result of agronomic training and the seed intervention that they have sustained to the present - crop choice, cultivation and land preparation, seed choice and source, crop management, harvesting and storage and use - Transect walk - with some of the team and some of the beneficiaries to see some of the sustained changes	- Sustained 'before' and 'after' changes in farming practice - Ranked changes in farming practice
	KII	- Verification by agricultural bureau staff	Verification of changes in farming practice

Table 2C: RQ4: How have emergency seed interventions impacted on informal and formal seed systems (including seed markets) in the local area?

Variable to measured	Source	Methods	Output
Seed systems	KII	- Discussions with different stakeholders in the seed system - how did the seed system function before the displacement, what are the key differences, how do you perceive future trends	- A list of changes in the seed system and forecasting of future trends

Annex 4: Description of Formal and Informal Seed Systems

Smallholder farmers access seed through a variety of channels. The major ones fall into two categories: formal and informal seed systems, with additional 'intermediary' seed systems occasionally drawn on, but to a much lesser extent (AgriLinks, 2020; Sperling et al., 2006). These are described below and illustrated by **Figure 1**.

The **formal seed system** provides farmers with new 'modern' varieties that are offered as 'high quality', certified, or quality-declared seed (QDS). Formal channels include government bodies and commercial companies. Within formal systems, seed and grain are produced differently, with clear standards dictating what may or may not be labeled as seed.

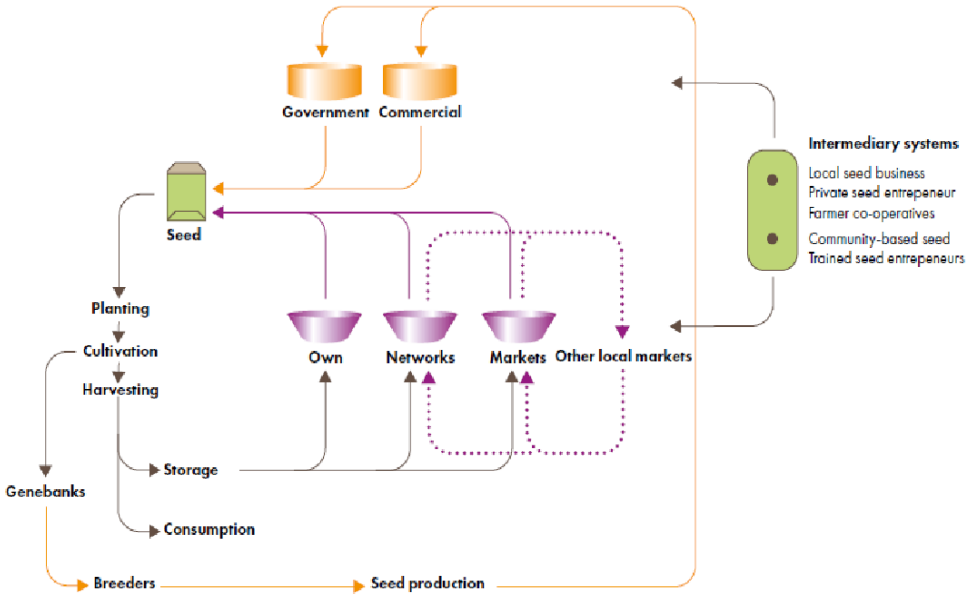
The **informal seed system**, also known as the 'local', 'traditional', or 'farmer' seed system, centers on farmer or local varieties. The informal system includes most of the ways farmers and traders themselves produce, select, disseminate, and procure seed: directly from home harvest, through barter or sale among friends, neighbors, and relatives, and through local grain markets and traders. In the informal system, seed is mainly produced or sorted as an integral part of grain production, and not as a discrete enterprise, although a small portion is sometimes produced and managed as seed specifically. Despite its name, the informal seed system also plays a role in moving modern varieties, sometimes labeled 'improved', that have been further multiplied on farm.

Intermediary seed systems refer to varied, small-scale enterprises, often local. They integrate elements of both formal and informal seed systems. They may include community-based seed producers, farmer cooperatives, and local seed businesses, among other forms (ISSD-Uganda, 2015).

Smallholder farmers routinely tap these multiple sources for their different seed needs. For example, in Southern Africa, farmers typically procure maize hybrids through agrodealers (formal) and sorghum seed from their own harvest or from neighbors (informal). Smallholders might also use multiple channels even for a single crop. Bean farmers in much of East Africa, for example, obtain some seed from their own stocks, some from markets, and might also get seed of new varieties from an extension agent or research station.

Evidence shows smallholder farmers access over 90% of their seed from the informal system, with local markets being particularly important. Seed from the formal system accounts for only about 3% of what is sown (dominated by maize), and the intermediary system's share is less than 0.5%. The rest comes from a variety of sources, including aid projects (McGuire and Sperling, 2016).

Figure 1 Seed systems and their interconnections



Channels through which farmers obtain seed are depicted by the cylinders. Farmers' own seed stocks, social networks, and local seed/grain markets constitute informal channels. Commercial seed companies, and government or research outlets are formal channels. Intermediary forms vary, but can include farmer cooperatives and other community based seed sources.

Source: modified and expanded from Almekinders and Louwaars, 1999

Annex 5: Formal Seed System in DRC

Available documents and laws

Agriculture activities in DRC are organized and overseen by the Ministry of Agriculture at the national level and represented at the provincial level by the provincial Ministry of Agriculture. In 2011, a revised agriculture law was adopted to govern the organization and functioning of the agricultural sector, in terms of access to and use of land for crop production. Little additional information was given about access to agricultural inputs such as seeds, fertilizers, and harvest infrastructures.

At the national and provincial levels, the Ministry of Agriculture operates under a specific service focusing on seed issues. This is locally known as the National Seed Service (Service National des Semences, SENASEM) which was officially created in 1996. At the creation, SENASEM has received an official mandate to:

i) Organize and coordinate all the activities related to seed both for internal use and export, including the planning and coordination of seed production in the whole country, training all seed stakeholders, control and management of seed centers in the country, collaboration with research for variety release and dissemination, document and manage seed production data, etc.

ii) Organize the seed quality control and the certification process for internal production and use of seeds as well as exported seeds. In this, SENASEM is responsible of monitoring the varieties release process, the varieties' behavior across time and agroecology zones and document major changes in collaboration with agriculture research institutions, review the seeds catalogues when needed, monitor and control the seed laboratories as well as all seed companies and all stakeholders involved in the seed industries and business.

In 2012, the national Ministry of Agriculture received a financial and technical support from the Belgian Technical Cooperation Agency (Coopération Technique Belge - ENABEL) to strengthen its capacity in providing goods and services to farmers for improving crop productivity via a sustainable access to good quality crop seeds. Many reports and documents were produced under this initiative among, of which two technical reports specifically address the seed sector and they are the definitive guides for the seed industry in DRC.

The first report entitled "Réglement technique de la production, du contrôle et de la certification des semences des principales cultures vivirières et maraichères" (MINAGRI, 2012a), is focused on technical rules for the production, control and certification of seeds for the major food crops in DRC. This document outlines the general recommendations applicable to major food crops; the criteria for good quality seeds; seed production organization and requirements; stakeholders and their responsibilities; and the certification process. It aims to help SENASEM improve its performance and adhere to international seed industry requirements. According to the rules outlined, only seeds from varieties recognized by SENASEM and listed in the official catalogue can be used by farmers. Several categories of seeds are defined on a general scale (ranked as follows: parental [foundation] seeds, pre-base seeds, base seeds, certified seeds, QDS, standards seeds). Specific rules on production of each seed category are provided in this document.

This document describes also the certification process including: (1) crop field declaration; (2) crop field monitoring by SENASEM; (3) acceptance of the seed crop field by SENASEM; (4) sampling during the harvest; (5) laboratory analysis for quality control; and (6) seed certificate deliverance.

This report also provides specific technical rules for each food crop that includes each crop's biological properties and seed production practices. The targeted crops in this document include cereals (maize and

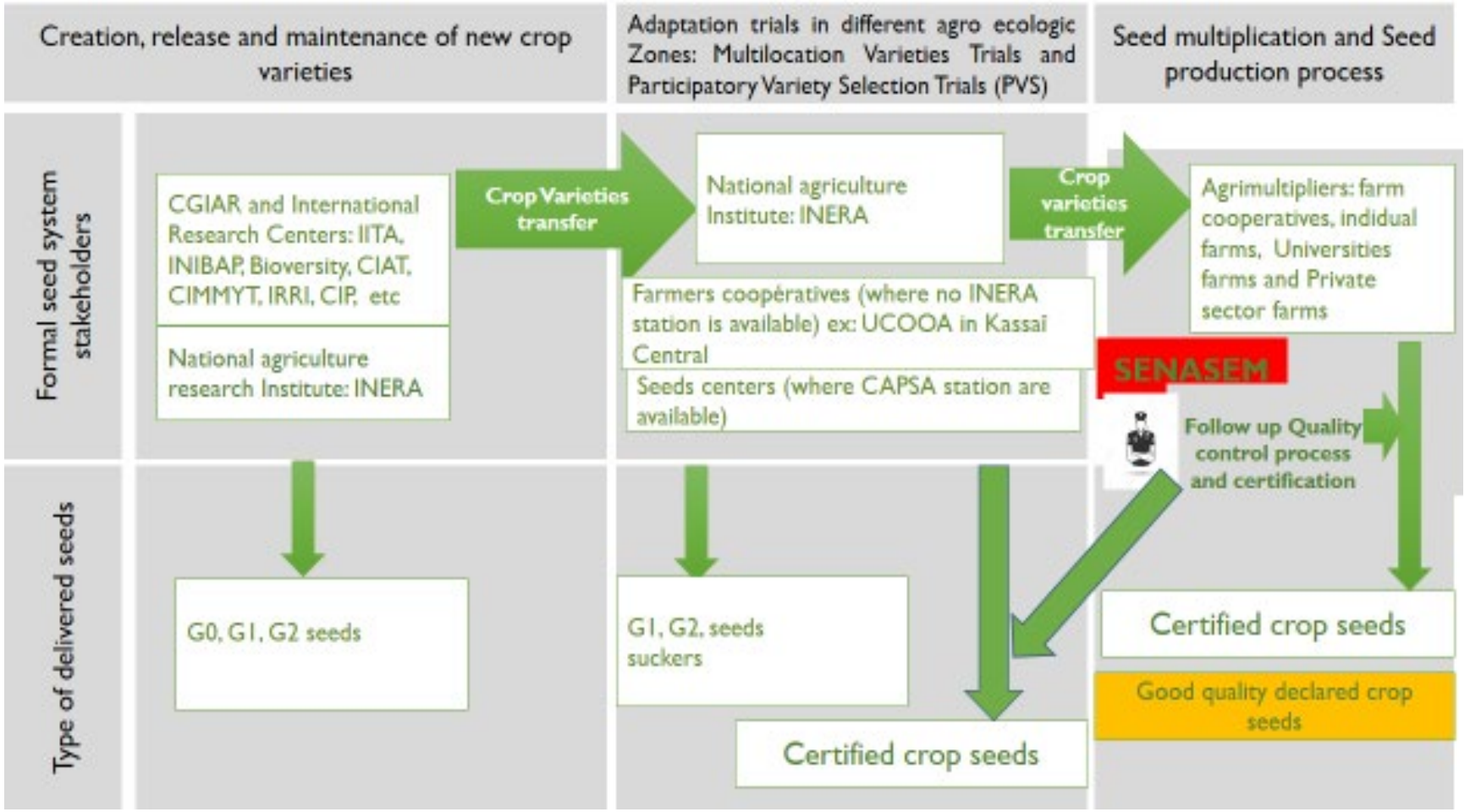
rice), roots and tuber crops (cassava, potato and sweet potato), legumes (groundnuts, common beans, cowpea and soybean), vegetables, and banana.

The second report, *Catalogue variétal des cultures vivirières (maïs, riz, haricot, arachide, soja, niébé, cassava, patate douce, pomme de terre et bananier)* (MINAGRI, 2012b), presents the available varieties of the crops listed along with their agronomic characteristics and performance in different agro-ecological zones of DRC. This presentation of genotypes allows farmers and other stakeholders to have a clear idea about genotypes' performance to guide their choice of food crop varieties depending on the agro-ecologic zones they are located in.

Three years after, these two documents were revised in four different documents entitled:

1. Procédures administratives et techniques des prestations des services du SENASEM, volume 1. Published in 2015.
2. Catalogue national variétal des cultures vivrières : répertoires des variétés homologuées des plantes à racines, tubercules et bananier. Published in 2019.
3. Catalogue national variétal des cultures vivrières : répertoires des variétés homologuées des cultures des légumineuses. Published in 2019.

Catalogue national variétal des cultures vivrières : répertoires des variétés homologuées des cultures des céréales. Published in 2019.



The formal seed system described in the figure above is specific for food crop seeds and for perennial crops produced internally.

For imported seeds, generally food crops' seeds and vegetables seeds, a phytosanitary certificate is needed before entry and the quality control process is done by OCC (Office Congolais de Contrôle). After the control and importation process, imported seeds are directly admitted to enter and can be sold in the internal market.

The informal seed system is considered as any other way seeds are disseminated to farmers. These include:

- seed distribution by NGOs without SEANSEM quality control;
- grain vendors at rural market providing local grains to farmers for planting;
- farmer's internal exchanges of seeds and grains within the villages; and
- imports of seeds and grains without OCC control.

Agri-multipliers

Agri-multipliers consist of farmers' associations and cooperatives or unions of cooperatives, most of which have registration certificates. These cooperatives furnish members with basic seeds and provide training. This enables small-scale farmer members to obtain good quality seed.

The agri-multiplier cooperatives receive support from various partners, including:

- FAO-WFP: Seed production, support for farmers' field schools, support for the extension of improved cassava cuttings.
- BTC/ENABEL: support for the extension of improved cassava cuttings.
- INERA- INERA NGANDAJIKA: introduction and evaluation of new varieties.
- CRS: Seed Production and Seed Fair.
- Fastenopfer Switzerland: Strengthening the dynamics of the associations.
- Government of DRC (national and provincial): Organization and launching of agricultural campaigns, support with tractors.

Table 1: Varieties Produced by Agri-multipliers

Crops	Varieties
Maize	Musangana1, Kasai 1, Salongo 2,
Cowpea	H36, H4, Jamaa, Diamond
Groundnut	MG17, A65, JL24, MJ24, Kabina
Cassava	Butamu, Bangana, Obama, Sadisa, Rav, Disanka
Rice	INRA 112

Table 2: Percent of agri-multiplier production to different clients

Seed customers	**Proportion of sales to this category**
International and humanitarian NGOs (FAO, WFP, ICRC, NRC, CRS, World Vision, ACF, Hime-earth, Handicap, Red Cross	50-95%
Private sales	1-5%
Cooperative members	5-45%

Cooperatives link to different clients:

- through radio programs, where they discuss their seed offerings.
- by responding to calls for tender for seeds frequently launched by humanitarian organizations.
- by being contacted directly by the customers themselves.

The quantity of seed produced varies from one cooperative to another depending on their landholdings. The sale price for seed is generally stable but can vary by tender. Essentially, price becomes a function of the negotiating power of the cooperative and also the availability of seed. For example, the institutional price of maize seed varies between $1.5-2/kg to $3/kg during deficit periods.

When demand from institutional buyers falls, agri-multipliers are forced to sell their seed as grain at a loss. Costs of production and sale for agri-multiplicators are high because, in addition to the costs of inspection, poor roads hamper the purchase of basic seed, collection of seed from members, and distribution of ONG-purchased seed to communities.

Agri-multipliers cite the need to improve packaging, support to the supply chain of basic and pre-basic seeds, as well as the supply of other inputs (fertilizers and pesticides).

Annex 6: Description of Local and Improved Varieties in Central Kasai

FGs report that the main crops grown by local communities in the Bukonde Health Zone as listed in **Table 4**. A total of 17 local (farmer) seed varieties were identified during the PIA: 5 maize varieties (Kapesa/semoule, budanda, kasota, kakumbuji and kakese), 6 groundnut varieties (tunene/bafike, Katapi, Muzembe, Binkole, Bakala, Nigeria), 2 rice varieties (Lunene/bumba and tshivuma) and 3 cowpea varieties (Nkunde, Diamant, bibale). All of these varieties have existed for a very long time in the *Ditekemena* program area. The communities interviewed during the FGs have no recollection of when these varieties were introduced in their localities.

Table 4: Main crops grown by cropping season

Type	Types of crops	Season B (From the 2nd half of January to the 2nd half of May)	Season A (From the 2nd half of September to the 2nd half of December)
Men	Staple	Beans, corn, cowpeas, rice, plantain, groundnuts, cassava, soybeans, sweet potatoes, bambara nut	Beans, corn, cowpeas, groundnuts, rice, sugar cane, taro, yams, watermelon
	Vegetable crops	Onion, amaranth, okra, pepper, tomato	Amaranth, tomato, onion, pepper, okra, sorrel
Women	Staple crops	Corn, groundnut, cassava, cowpea, rice, bambara nut, taro, watermelon	Beans, corn, cassava, rice, cowpeas, groundnuts, cassava, soybeans, pistachios, bambara nut
	Vegetable crops	Tomato, eggplant, sorrel, spinach	Onion, Tomato, Chinese cabbage, amaranth, eggplant

Table 5: Improved and Local Varieties

Crops	**Varieties**		**Observations**
	Improved	**Local**	
Maize	Kasai 1 (Djibouti)	Kapesa (semolina, makunze) Budanda, Kasota, Kakumbuji, kakese	Local varieties have been introduced for a very long time in the region. The improved variety (Kasai 1) was first introduced in 1992 during the flight of Kasaians from Katanga (USAID grant). But it had disappeared for several years. This

			variety was reintroduced during the CRS intervention in 2021.
Groundnut	A65 (Batshiamba)	Tunene (bafike), Katapi, Muzembe, Binkole, Bakala, Nigeria	The improved variety (A65), commonly known as Batshiama, was introduced in 2021 through CRS intervention in the area. All local varieties have been known to local communities for a long time. The Katapi variety was introduced in 1992 during the flight of Kasaians from Katanga through the emergency intervention. The Nigeria variety dates from the 2000s.
Rice	IRAT 112 (Ghana)	Lunene (Bumba), Tshivuma	While the local variety Tunene has been introduced in the region for a long time, the improved variety IRAT 112 was introduced in the region around 2004 from what is now Sankuru province. CRS support has enabled the reintroduction of IRAT 112 in large quantities in the Bukonde health zone.
Cowpea	H36 (cowpea)	Nkunde, Diamant, bibale,	The Nkunde and Diamond varieties have existed in the community for a very long time. CRS during its interventions in 2021 introduced the variety H36

Maize

The Kasai 1 variety of maize (short cycle) is drought resistant and produces large cobs. FGs reported that its yield is three times greater than that of the local variety (Kapesa/semoule). Nonetheless, Kasai 1 is susceptible to lodging during heaving rains due to its height.

Kasai 1 is profitable in the context of the *Ditekemena* program intervention area. In terms of food, foufou and maize-based porridge from Kasai are much more appreciated by local communities because of its consistency and taste, respectively.

Despite its disadvantages (long vegetative cycle, less resistant to drought, seeds easily attacked by insects, too light a porridge), the local variety (Kapesa/semoule) is appreciated by local communities especially because of the yellow color of its foufou. Beyond this visual aspect, Kapesa produces a lot of maize seeds, not to mention the fact that these seeds dry more quickly as compared to the Kasai 1 variety.

Groundnut

According to local communities in the Bukonde health zone, the A65 groundnut variety yields twice as much as the local Bafike variety. This yield is even better (three times higher) compared to the local Muzembe variety. However, it is advisable to harvest when ripe because pods can rot if left in the ground too long. Under conditions of heavy rainfall, pods are also susceptible to rot.

On the market, the selling price of A65 groundnuts is higher than the price of local varieties. In terms of food, the A65 variety has several advantages: FGs cite its nutritional benefits (high protein content). It can be ground and put in a broth to boost children's nutrition. It is also used in the preparation of various dishes (vegetables, leaves, sauces, etc.).

Cowpea

Cowpea (H36) is a short-cycle (2.5 months), high-yielding variety that, according to FGs, outperforms the local variety (Bipale) by a factor of three, even if leaves are picked. The H36 variety is drought and disease resistant. Cowpea is one of the main food legumes grown in the Bukonde area and has the following advantages: it is highly nutritious and cooks quickly. It should be noted, however, that there can be a significant drop in production with the improved cowpea variety (H36) if spacing is not respected. In addition, in high nitrogen soils, the variety has considerable leaf growth at the expense of pod formation.

The local variety (Bikunya) has some disadvantages - its leaves are consumed as a vegetable by local people and the seeds are large.

Rice

The IRAT 112 rice variety is highly productive and has a short vegetative cycle (3 months). FGs report that it yields twice as much as the local variety (Bumba). The yield after milling also appears to be better. IRAT 112 is a good quality rice that sells for a higher price in the market than the local rice (Bumba). A significant attribute of IRAT 112 is that it ratoons and can provide three separate harvests. One FG stated that they were not aware of this attribute and had plowed the rice crop under after one season.

Many farmers planting in the savanna in Season B lost their crop due to drought. Some farmers reported that they had problems with birds attacking IRAT 112 as the grain was maturing.

Table 6: Farmer assessment of improved vs most common local variety

Culture	Variety	Benefits	Disadvantages
Maize	Kasai 1 (Djibouti)	• Fast growth and short cycle (3 months) • Drought resistance • Large ears of maize • Cost effective (high market price) • A good taste • Foufou consistent • Sweetened porridge	Long stem but less resistant to weather, especially during rain
	Kapesa/ Semoule	• Lots of seeds • Nice presentation of foufou (yellow color) • Fast drying	• Long vegetative cycle (3.5 months) • Seeds exposed to insect attacks during storage, • Less resistant to drought, • Too light a porridge
Groundnut	A65 (Bathsiamba)	• Fast growth and short cycle (2.5 months) • Easy to harvest • Cost effective (high market price) • Very nutritious, especially for children's health • Used as a tea for children, • Use in the preparation of dishes (vegetables, cassava leaves) • High oil content	• Less drought resistant • After the harvest period, the pods are damaged and the yield decreases • Rot in case of heavy rain

	Bafike	• Drought resistant • It can stay in the soil for a long time without deteriorating the pods	
Cowpea	H36 (Cowpea)	• Fast growth and short cycle (2.5 months) • High production despite leaf harvesting • Cost effective (high market price) • Very nutritious • Quick cooking • Swelling during cooking • Resistant to diseases	• Decrease of the production in case of non respect of the distances
	Bikunya/ Bibale	• Consumption of leaves • Big seed	• Less profitable • Long cycle (3 months) • Less resistant to diseases
Rice	IRAT 112 (Ghana)	• Short cycle (3 months) • Cost effective (high market price) • High yield after shelling • A good taste • Harvest twice • Available on the market	
	Bumba		• Less profitable • Long cycle (6 months)

Annex 7: Key Informant Interview Guides

A. Interview Guide for Village Chief

1. What is your name ?
2. How long have you been the village chief?
3. What are your main duties as village chief?
4. What is the composition of returnees/hosts in the village?
5. When did the returnees come back?
6. What assistance did they receive?
7. How did they acquire land to plant?
8. Is there any friction between returnees and hosts?
9. What was your involvement in the Caritas/CRS *Ditekemena* food and seed distribution project in 2021?
10. What seeds and seed varieties were distributed?
11. Did all households receive seed?
12. What would you say was the impact of the seed distribution?
13. Have any other NGOs operated in this village?

a. If so, during what time period and what did they do?

14. Have any other organizations distributed seed in this village?

a. If so, when ?
b. If so, what seeds did they provide (e.g., cereals, legumes, vegetable seeds etc)?
c. How did they provide seed? (e.g., direct or in-kind distribution; seed fairs and vouchers; other)

15. What would you say is the main objective of the seed support?
16. What are some of the other ways that farmers in this area can access seed, apart from the seed provided by NGOs and government projects?
17. Do you know of any seed producers in the area?

B. Interview Guide for Grain Traders

1. Name and gender
2. Name of business/location
3. Number of years in this business
4. Are you a member of any Traders Association or Co-operative or other Group? Which one, if so. What support does this provide to your business?
5. Please describe your business – products sold, where/how purchased, where/how sold
6. Do you deal in seed or do farmers buy your grain for seed? If yes:
    a. For which crops and which varieties?
    b. How long have you been dealing in seed for each crop?
7. For when selling grain for seed, how do you distinguish between grain and seed quality grain (e.g., known variety, known supplier, clean, unbroken, disease free, etc.)?
8. When selling seed quality grain, do you sell for a different price?
9. What is the price difference between seed and grain [for all crops that he/she sells).
10. Who do you sell your seed to? [Differentiate main categories, e.g., small farmers, large farmers, NGOs, schools, etc.]
11. For farmers, do you mainly sell to commercial or small farmers? Any female and young farmers among your buyers?
12. For each crop, approximately what proportions are sold to each category?
13. Where do you sell? Do you have any sales outlets or agents? Describe if so.

14. How do you market your seed? How do you find your customers?
15. What are the sale arrangements, e.g., do you provide seed on loan basis?
16. Do any of your customers ask for specific varieties or types (e.g., improved or local varieties)?
17. What characteristics are farmers seeking in their seed from grain?

We have various questions about your supplier, management, and sales processes, as below:

18. Suppliers:
    a. Who are your preferred seed suppliers? Why? How do you find your seed suppliers?
    b. What premium do you pay for seed vs grain price? (% or actual cost comparison)
19. Management and storage:
    a. Do you manage/handle seed differently from how you manage/handle grain? Please describe. [Probe to find out about any quality checks, handling (e.g., keeping varieties separate), processing, packaging, storage (e.g., use of pesticides or special containers), etc.]
20. What are the challenges that you've experienced in the seed business?
21. What are your ideas for how these challenges can be overcome?

C. Interview Guide for Agriculture Monitor

1. What is your name?
2. Name of village and health area.
3. How long have you been working as an agricultural monitor?
4. What organization do you work for?
5. What are your responsibilities as an agricultural monitor?
6. What training do you provide farmers? How?
7. What is the adoption level of these practices? (What do farmers traditionally do?)
8. What other organizations agencies have been involved in agriculture in the area?
9. Have any agencies other than CRS provided seed to this village?
10. What seeds did they provide (e.g., cereals, legumes, vegetable seeds etc)?
11. When did the CRS seed fair take place?
12. Was that the only seed CRS has provided to this village? If not, what other seed distributions took place and when?
13. During the 2021 seed fair, what crops and varieties were provided to the famers?
14. Did all households receive seed?
15. Did all farmers plant all of their seed? If they did not plant the seed, what did they do with it (sell, exchange, consume, hold)?
16. What varieties of seed are planted by farmers here?
17. Had farmers previously planted the seed varieties CRS provided?
18. If so, where did they obtain this seed? Are they available in the local market?
19. How did the CRS-provided seed varieties perform in the field and yield?
20. Do you have yield results for the seed fair seed? How does that compare to local seed?
21. If farmers are already planting the varieties offered in the seed fair, did the seed fair seed perform better? If so, why do you think so?
22. What are some of the other ways that farmers in this area can access improved seed, apart from the seed provided by NGOs and government projects? [Probe for details about markets, traders and other seed providers, including gender]
23. Are there any farmer seed producers in the area?
    a. If so, do any farmers procure seed from them?
24. Do grain traders differentiate between grain, and (grain as) seed?
25. How (e.g., clean, one variety, healthy…)?

26. Do they sell (grain as) seed at a higher price?
27. What are the main sources of seed for farmers?
28. In the local market, do farmers differentiate grain and grain as seed?
29. Are they willing to pay more for grain as seed?
30. Based on your experience, what have been some of the positive impacts of the seed intervention in this village? What are the key factors that contribute to positive impacts?
31. Have there been any negative impacts or unintended consequences?
32. How can farmers have sustainable access to seed in the future?

D. Interview Guide for Ministry of Agriculture/IPAPEL

1. What is your name?
2. What is the area covered by your office?
3. How long have you been working here?
4. What are the responsibilities of your office?
5. How do you carry them out?
6. What is your role in seed projects?
7. Which agencies have been involved in seed distributions since you've been working here?
8. What seeds do they provide (e.g., cereals, legumes, vegetable seeds etc.)?
9. What are the different ways in which they've provided seed? (e.g., direct or in-kind distribution; seed fairs and vouchers; other)
10. What would you say is the main objective of the seed support?
11. Based on your experience, what have been some of the positive impacts of the seed interventions? What are the key factors that contribute to positive impacts?
12. What would you consider the best practices in formal and informal seed systems?
13. Have there been any negative impacts or unintended consequences?
14. What other types of support or complementary activities are provided with the seed?
15. What are some of the other ways that farmers in this area can access seed, apart from the seed provided by NGOs and government projects? [Probe for details about markets, traders and other seed providers, including gender]
16. Does IPAPEL provide any support to agri-multipliers?
    a. If yes, what support do you provide?
    b. How do agri-multipliers operate, who do they sell seed to?
    c. What have been their successes?
    d. What have been their challenges?
17. How can farmers have sustainable access to seed in the future?
18. What could be done to improve the seed system?

E. Interview Guide for Agri-Multiplier

1. Name of interviewee(s)
2. Type and name of seed enterprise (if applicable)
3. Location, incl. Aire de sante
4. Are you multiplying seed individually or within a group or other organization?
5. How long have you been multiplying seed?
6. Approximate total area for seed production.
7. Describe how your enterprise was established. What types of support did you receive, from which agencies / projects? Is the support on-going? If no, when did this support end?
8. Who else has supported you since formation, what support do they give?
9. Does your group have any certification / registration? Describe if so.

10. Which crops and varieties do you multiply?
11. What type of source seed do you use (foundation, generation 1,2,3)? How and from where do you obtain your source seed for the different crops / varieties?
12. Have you had any challenges in obtaining source seed? Describe if so.
13. What are the quality checks that are done and who does these – both during the growing season and after harvest / processing?
14. Do you package your seed in any way? Describe.
15. Who are your customers? (Different customer types) Any female and young farmers among your buyers?
16. How do you link to customers / market the seed that you produce?
17. Please provide approximate percentages of seed sold to different customer types (by crop).
18. Please summarize production and sales trends (by crop / variety) for recent years, including sale price.
19. Have you had any challenges in selling your seed? Describe if so.
20. How has your business benefited farmers?
21. What could be done to improve your seed business?

F. Interview Guide for Other NGOs and the UN Organizations (WFP, FAO, UNOCHA etc.)

1. Name
2. Organization/Position
3. Number of years in organization
4. Which agencies have been involved in seed distributions since you've been working here?
5. What seeds do they provide (e.g., cereals, legumes, vegetable seeds etc)?
6. What are the different ways in which they have provided seed? (e.g., direct or in-kind distribution; seed fairs and vouchers; other)
7. How do they coordinate?
8. What would you say is the main objective of the seed support?
9. Has your organization undertaken any seed interventions in Kasai? If yes, please describe each intervention:
    a. Year of intervention
    b. What problems did the intervention address and what objectives did the intervention have
    c. Who was targeted (target population and geography)?
    d. Approach used in the intervention (distribution modality, complementary services, etc.)
    e. Where did you source your seed (farmer producers, local agrodealers, seed companies, etc.)
10. How have your seed interventions affected the farmers?
11. How have your seed interventions affected the informal seed sector (agri-multipliers, grain vendors, home retained seed)
12. Based on your experience, what have been some of the positive impacts of the various seed interventions in Kasai? What are the key factors that contribute to positive impacts?
13. What challenges have you observed in the seed system?
14. How could these challenges be addressed?

G. **KII SENASEM**

1. What is SENASEM's mandate?
2. What activities is SENASEM undertaking in Kasai?
3. What varieties does SENSASM promote in Kasai?
4. Where did varieties come from (what research institutions)?
5. How long varieties been available?
6. What are the prospects for new varieties being developed and introduced in the near future?
7. Where does foundation seed come from?
8. How seed multiplied?
9. How did the agri-multipliers program originate?
10. How does the program function?
11. Currently, the agri-multipliers depend on NGOs for their business, how do you envision their sustainability as NGO seed programs diminish?
12. What have been successes of the agri-multipliers?
    a. What have been their challenges?
13. Which agencies have been involved in seed distributions since you've been working here?
14. What seeds do they provide (e.g., cereals, legumes, vegetable seeds etc.)?
15. What are the different ways in which they've provided seed? (e.g., direct or in-kind distribution; seed fairs and vouchers; other)
16. What would you say is the main objective of the seed support?
17. What other types of support or complementary activities are provided with the seed?
18. What are some of the other ways that farmers in this area can access seed, apart from the seed provided by NGOs and government projects? [Probe for details about markets, traders and other seed providers, including gender]
19. What could be done to improve the seed system?
20. Do you have any relevant documents (preferably electronic) related to the seed system in Kasai that you can share or refer us to?