

SEED SYSTEM SECURITY ASSESSMENT (SSSA)

DOUMENTZA, NORTHERN MALI

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Catholic Relief Services/Mali and Partners

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It remains to recognize the information sharing, keen insight and vision of the farmers and traders interviewed within Douentza Circle for this SSSA. As both groups ‘live’ seed security stresses daily, we hope that the report contained herein strengthens their agricultural , seed and livelihood systems in ways they find productive and equitable.

TABLE OF CONTENTS

Acknowledgements

Executive Summary

I.	INTRODUCTION.....	7
II.	METHODOLOGY.....	8
III.	DOUENTZA CIRCLE: THE CONTEXT.....	12
	<i>OVERVIEW ZONE DESCRIPTION</i>	
	<i>OVERVIEW OF THE DISASTER IMPACTS</i>	
IV.	AGRICULTURAL OVERVIEW: NORMAL TIMES.....	23
V.	SEED SOURCING STRATEGIES: NORMAL TIMES.....	32
VI.	DISASTER IMPACTS AND SEED SECURITY: THE VIEW FROM FARMING AND TRADING COMMUNITIES.....	43
VII.	IMPLICATIONS FOR ACTION.....	54
	References.....	58
	Annexes.....	59

EXECUTIVE SUMMARY

This report presents the results of a *Seed System Security Assessment* (SSSA) in Douentza Circle, northern Mali, undertaken in March 2006. It aimed to gauge the effects of a series of crises on seed and agricultural systems, including: a severe drought and invasion of locusts in 2004-5, a sharp shortage of rainfall 2005-06, and flash flooding in select areas 2003-4. Beyond assessing the immediate effects of these acute stresses, the work also probed for signs of chronic system stress. Catholic Relief Services (CRS) is launching an 18-month program to strengthen agricultural, seed and livelihood systems in Douentza Circle and via the SSSA sought to gain insights to further shape its short and medium-term action plans.

The SSSA was effected by a team of professionals from 14 organizations over a 17-day period. Three communes were given particular attention in the assessment. Djaptodji, Dangol-Bore and Haire were chosen because they were heavily attacked by locusts, in normal times are among the major agricultural production areas, and have a majority of the population which is sedentary. Methods employed during the SSSA included: collection of secondary information, village group interviews, and interviews with seed/grain traders, farmers buyers and a large range of key informants. The functioning of seed channels (formal and informal) was evaluated pre and post-stress, using both qualitative and quantitative indicators: home production and market channel analysis were given special focus.

SELECT AGRICULTURAL FINDINGS

Crop/variety profiles

A large array of crops is grown in Douentza Circle: pearl millet (*Pennisetum glaucum*), sorghum (*Sorghum bicolor*), cowpea (*Vigna unguiculata*), groundnuts (*Arachis hypogaea*) Bambara nuts *Vigna subterranea*, various kinds of rice (*Oryza sativa* and *glaberrima*), sesame (*Sesamum indicum*), roselle (hibiscus) or 'oseille de guinee' *Hibiscus sabdariffa*, Gombo (okra) and a variety of horticultural crops (cabbage, carrots, onions, peppers etc., and in some places tobacco). In theory, this array of cultures helps farmers diversify use of production niches and hedge climatic instability. In practice, pearl millet dominates covering about 80% of the production area and proves particularly important in the higher-stress areas. Keeping the pearl millet crop productive should be a priority of food security/seed security initiatives.

In terms of pearl millet, farmers prefer to grow their own local varieties. They consider the range of adaptation of their varieties as fairly narrow (at a distance as close as 30-40 km). This is explained by date of flowering, local rainfall patterns, and differences in soil types. Thus while, varieties from dry areas may be adapted in somewhat more humid areas, the reverse is not true. These findings are key for seed aid interventions as farmers in the most risky and lowest rainfall areas can only be assisted with pearl millet seeds if they are local in origin.

For the other crops, specifically legumes, this varietal specificity is not nearly as strong as, even in higher rainfall areas, the varieties of cowpea, groundnut, or Bambara nut tend to be very early maturing and can grow in a wider range of areas. The same seems to apply for Gombo (okra) and hibiscus and most varieties of sesame (excluding the late-maturing). Rice is the crop for which most varieties exist and the only crop for which research-derived (formal-sector) varieties have had significant adoption within Douentza Circle.

Earliness, that is, somewhat earlier than the predominant local varieties, is sought after by farmers for all crops. This is especially strong in the years following a harvest failure. Early-maturing varieties end the

hungry season before later-maturing varieties. Again, this is of importance for planning seed aid programs/fairs, as care should be taken to seek out providers who can put on offer earlier maturing types.

Overall, the climatic stress in the zone is such that farming communities are adapting to the changing rainfall in quite concrete ways. In terms of crop profile, the more demanding crops have been dropped: sesame is rarely grown in villages of Haire and Dangol-Bore. Fonio was eventually dropped in Ngololo (even though villagers tried to reintroduce it several times). In Djaptodji commune overall, floodplain agriculture on is rapidly on the decrease, simply because the floods arrive less often.

Seed Sourcing Channels

Farmers use varied channels for sourcing seed. Given the local specificity (narrow adaptation) of the cereal crops, of pearl millet but also sorghum, farmers aim to source this seed mainly from their home production, and give priority to this. Legumes, in contrast (groundnuts, Bambara nuts and cowpeas) suffer from significant storage constraints (particularly high insect damage). This means that most farmers *on a routine basis* source their legume seed on the market.

Farmers constantly weigh different strategies for sourcing seed. While these vary by crop, seed sourcing is also shaped by farmer resources and preferences. In general, in terms of sourcing seed from any channel, the following base conditions have to be met:

- one has to know the variety—believe it will grow under his/her specific farming conditions;
- The quality of seed has to be ‘acceptable (If one cannot see quality, one has to have faith that the source delivers good seed—so social ties are important);
- The seed has to be of acceptable cost (or able to be bartered);
- The seed has to be available in time for planting;
- The seed has to be available in sufficient quantity to fill/top off seed needs.

Perhaps because the harshness of the zone and the exigencies to have certain types of varieties, traders here seem to give unusual attention to distinguishing between seed and grain. Generally, farmers rate the quality of seed found on the market as good.

For similar reasons, specialized seed production villages have emerged in Douentza Circle, specifically in Haire. These villages produced quality seed of the narrowly-adapted pearl millet varieties which are used in the more arid zones, but which are also sought after in others areas within and beyond Douentza Circle.

Finally, the large majority of seed in Douentza Circle is sourced from home production or via seed/grain markets. The formal sector and associated seed and cereal banks operate only at minimal scales.

THE EFFECTS OF THE ACUTE STRESSES: DROUGHT, LOCUSTS, FLOODS

Within Douentza Circle, the 2004-05 agricultural season was marked by a late start of the rains as well as by their early cessation. The dire climatic situation was aggravated by invasions of locusts of considerable severity (the worst in 20 years). In smaller areas, flash floods destroyed harvest during the 2003-04 season. The 2005-06 was also not a good one: pearl millet harvests were measured at about 55% of the norm. This means that farmers in the region have had poor harvests for 2-3 consecutive seasons. The locust invasion also affected livestock raising dramatically as large stretches of grazing were destroyed early in the season.

Studies conducted by the Regional Food Security Commission showed that Douentza Circle was the most severely affected in the Mopti Region by the 2004-05 disasters. The official figures estimated that 46,844 ha of crops were lost, which was equivalent to 78% of the cultivated area. The Commission further estimated crop deficits at -21 762 tonnes.

At the village level, farmers described steep declines in the production of all crops, except for rice, in 2004-05 and only partial recovery 2005-6 season.

Despite consecutive declines, villagers describe the large majority of their 'agricultural production units' as seed secure. They have found the means to save seed, or to buy it on the market. Social networks have not contributed significantly to ensuring seed security in these stress periods. Note that there were isolated cases of farmers' deciding to reduce the size of areas cultivated (Bore, Doumbara, Manko). More importantly, a small portion of farmers, but constant one (c. 10%), was described as having insufficient access to seed even in normal times. Poverty, not seed issues *per se*, is the root of these seed access problems.

While seed has been generally available in the market, across stress periods, two types of problems were noted .

- Prices rose significantly in 2005 (+50 to 75%) and have not stabilized in 2006: they are still elevated. While farmers have generally given priority to buying seed, this has not been done without cost. Animals have been sold (key for traction), agricultural equipment has been sold (which is needed for preparing and sowing fields), and many have simply out-migrated to seek much-needed labor income. Because farmers have had 'seed access' problems, important assets have been liquidated.
- In some areas of the commune of Dangol-Bore, farmers also report seed quality problems. They were not able to access the right kind of cereal seed (especially pearl millet variety), from surrounding markets in 2005. Some quantities were available, but not in sufficient quantity to meet escalating demand. Ensuring that well-adapted pearl millet and sorghum seed are available in this commune for 2006 sowing should be a priority concern.

RECOMMENDED ACTIONS

General

The existence of specialized seed production villages in the commune of Haire should be seen as a real boost for seed security in this zone. A range of villages produce the specialized (narrowly-adapted) varieties needed for the more arid areas but which prove also to be highly sought in others areas of the Circle, and beyond. Seed security in Douentza Circle partially depends on keeping these seed production villages functional. Two types of actions are important here.

- Seed stocks need to be maintained. In this vein, food security (and food aid) may be *the* key for promoting seed security. Food aid can help farmers keep stocks for their own use, but also for sale.
- Efforts should be made to intensify production in these renown seed villages (e.g. Tabi, Tega, Toupere, Sariegner). To assess what might best reinforce their capacity, further diagnostic work focused on seed village production strengths, weaknesses, and opportunities need best be carried out.

Short-term

CRS is planning a set of livelihood fairs to be held in Douentza Circle prior to the sowing season of 2006 (hence in the period May- June 2006). In response to the stresses identified, the SSSA team recommends that vouchers be given to allow farmers to access very specific goods (below). Local varieties of the cereals (pearl millet and sorghum) may be required by those particularly in Dangol-Bore, while local varieties of the legumes represent a more general need due to ongoing and severe seed storage constraints. Similarly, in relations to loss, seed treatments might be put on offer in limited quantity to minimize losses against soil insects, birds and the initial infections with downy mildew. Small-scale farm equipment and small stock would help replace assets sold during crisis period. In terms of new opportunities, farmers explicitly requested 'early-maturing varieties' overall and, in select zones, 'improved' rice varieties.

Livelihood fairs: priority to be give to

- Seed of local varieties of pearl millet and sorghum (with clear focus on their specific adaptation)
- Seed of local varieties of legume crops, particularly cowpea and groundnut
- Seed of local, early-maturing varieties, from neighboring adapted zones
- Farm equipment (shovels, hoes, wheelbarrows, etc)
- Small livestock (sheep, goats, poultry)
- Improved rice varieties, proven adapted for Delta zone
- Seed treatment products to be used prior to sowing

Medium-term

Within the SSSA, two seed-related constraints were identified which are having profound, negative, impacts on production: loss of legume seed in storage and the rising menace of *Striga* on pearl millet, particularly in Haire. In addition, farmers want to open up opportunities for testing early-maturing varieties across a range of crops (legumes and cereals), as well as to gain more horticultural knowledge and access to such vegetable seed. Via the format, of Farmer Field Schools (FFS), CRS and partners are launching an 18-month applied research and development program to address these three impact-oriented themes.

Medium-term research + development themes (seed/agriculture-related)

- Development of methods to control storage pests in legume seed
- Introduction of improved varieties addressing range of needs:
 - early-maturing
 - income generating (horticultural production)
- Development of methods to control *striga*

Finally, it bears mention that CRS is also implementing programs to try to address the chronic economic stress in Douentza Circle. These initiatives focus on extending *Micro-credit* and exploring *Agro-enterprise*.

Medium-term Assistance: initiatives to deal with poverty (access) problems)

- Micro-credit
- Identification of promising agro-enterprise opportunities

Attaining seed security goes well beyond a focus on seed or even agricultural systems. CRS' moving into areas of micro-credit and agro-enterprise attest to its insights that poverty, above all, contributes to production instability in Douentza Circle.

I. INTRODUCTION

Rationale for Seed System Security Assessment

This report presents the results of a *Seed System Security Assessment* (SSSA) in Northern Mali. The assessment took place during March 2006 and was implemented for three reasons.

First, there had been a series of successive acute stress events ('disasters') in the Douentza region ('Douentza Circle' or Cercle de Douentza). Catholic Relief Services (CRS) sought to know the effects of these crises on agricultural and seed systems, and particularly on immediate seed supplies. Severe drought and a strong invasion of locusts destroyed the harvests of 2004-5 and a shortage of rainfall led to a steep production decline in 2005-6. These two years of poor harvests were exacerbated in some areas of Douentza by flash floods in the preceding year, 2003-4.

Second, CRS is in the midst of planning extensive concrete actions to strengthen agricultural, seed and livelihood systems in Douentza Circle. In the short-term, "livelihood fairs" will be implemented in May-June 2006 to help ensure farmers are bolstered for their immediate short-term needs. In the medium term, CRS has received funding from the Bill and Melinda Gates Foundations to implement activities over a 18-month period so as to strengthen this agricultural economy on several fronts. The challenge has been to gain greater insight into agricultural and seed systems so as to shape 'on the mark' short-term response and a more refined medium term plan of action.

Third, CRS as an institution, often works at the heart of agricultural and seed systems. As its experience expands, CRS increasingly recognizes that achieving seed security is linked to, but also different from, achieving food security---- and that the assessment methods for each are also linked but distinct. The *Seed System Security Assessment* (SSSA) effected in northern Mali was designed not only to give technical insight but also to train CRS staff and partners in fast-evolving seed assessment methods. This on-the-ground training lasted 17 days and involved 14 organizations.

Aims and Structure of Report

This reports aims to present the results of the SSSA in Douentza. It is not an academic report but rather seeks to give in-depth insights to seed system functioning in a form intelligible to project managers and implementers (who may be drawn from various disciplines and professional backgrounds). Its practical aim is to influence the choice and design of programs which alleviate the immediate and longer-term stresses of populations in Douentza Circle.

Part II presents the overview elements of the SSSA methodology and describes how it was implemented in Douentza Circle. Part III presents the context of the assessment, including a broad snapshot of the Douentza Circle region and the sets of disasters which unfolded 2004-2005 and thereafter. The rest of the reports hones in on the specifics of agricultural and seed system management. Part IV describes agricultural in 'normal times' and Part V hones in on seed sourcing strategies per se. Both 'normal accounts' serve as a baseline against which to assess disaster damages and response. Part VI looks at the specific disaster impacts and farmers seed security responses during the stress periods. The last section, VII, considers how the assessment findings might shape immediate short-term (livelihood fairs) and longer-term CRS and partner assistance.

II. METHODOLOGY

Overview: Seed System Security Assessment

Seed security means that farmers have the seed (planting material) they need. Such security embraces three distinct aspects. Farmers need to have adequate quantities of seed available (in reasonable distance and in time for planting); they might have access to needed seed (through purchase, barter or exchange networks) and the seed on offer must be of acceptable quality (of the right varieties and adequate health) (Remington *et al.* 2002).

Achieving seed security is quite different from attaining food security, despite their obvious links. One can have enough seed to sow a plot, but lack sufficient food to eat (for example during the ‘hungry season’ prior to harvest). Conversely, a household can have adequate food, but lack access to seed for planting. Despite these important differences between food and seed security, seed security determinations are most often based, implicitly or explicitly, on food security assessments. This is due to a lack of appreciation and understanding of seed security issues, caused in part by a paucity of methods for assessing such security.

CRS, with its partner CIAT (The International Center for Tropical Agriculture) has pioneered the development of seed system security assessment methods (CIAT/CRS, ms). This has been done with support from USAID/OFDA and via funding from two specific projects, the “Seed Systems under Stress” and ‘Seed Systems at the Center’ projects, the first from 2003-2005 and the second, 2006 and ongoing.

Steps of SSSA

The steps for completing an SSSA are well-defined. In brief, one has to have insight into the different seed channels which farmers used for different crops before the disaster, assess their function after the disaster, and then determine whether the status quo should be restored –or actively changed-- to maintain and strengthen seed systems on which farm households rely. Such seed system security work has to be framed within a livelihoods perspective as helping farmers with the means to plant should assist them to produce for their own consumption and sale. For this reason, the SSSA while predominantly a short term analysis, includes scope for a longer-term perspective and looks for signs of chronic stress in the farming system and economy as well ongoing or potential sources of innovation. The basic steps used for the SSSA in Douentza are sketched presented in Box 1 (For full methodology, see CIAT/CRS manual). While the steps are presented sequentially, the process in Douentza was in practice iterative--going back and forth-- as the team started to understand better seed system functioning. Note that the Douentza analysis was only partly geared to examine the effects of the acute drought and locust shocks of 2004-5. The region suffers also from longer-term chronic stresses and the SSSA sought to identify and understand the effects as well as causes of these longer-term problems.

Sources of Information

The information gathering for the SSSA was programmed in diverse ways so as to:

- a) promote diverse stakeholder input (e.g. farmers, traders, research/development/NGO personnel, government officials);
- b) allow for historical as well as contemporary descriptions (including pre-and post disaster);

Box 1: Seed System Security Assessment: Douentza CIAT/ICRISAT/CRS

Broad Outline of the Steps

A 'triple A' approach will be used that combines assessment, analysis and recommendations for action. The seven steps laid out and described below follow a logical sequence. These steps will be discussed in detail in the section following this one:

1. Territory identification and characterization

Douentza circle has 16 communes, and at least three very different agro-ecologies, each with local variations

- 16 communes
- Agro-ecological zonation using the accepted criteria in Mali
- Population in the territory disaggregated by sedentary and transhumant, if possible
- Rainfall characteristics

2. Crop and seed system basics: normal times

For each territory, describe the different crop subsystems with a focus on the following:

- Crops, area planted, yields, production
- Preferred varieties
- Seed needs – average seed rates
- Seed sources/channels

3. The impact of the disaster on crop-seed systems

- Description of the disaster – to focus on drought
- Impact of the disaster on broad livelihood 'capitals'

4. Analysis of seed supply and of functioning of seed channels

May included analysis of seed supplies from:

- Own production loop/home stocks
- Local market loop
- Formal sector/commercial market loops

In each, looking at each seed channel supply, parameters to focus on include: the availability of seed (how much), its quality (varietal quality, seed quality (physiological and physical))

5. Reflection on Relief and Recovery Strategy

- Is the system strong and efficient and therefore should the focus be on recovering the system to the *status quo ante*?
- Are there inherent weaknesses in the system that can be addressed in recovery?
- Within the context of the disaster phase, what is the effective demand for Crops and Varieties at the specific time of intervention

6. Looking at the Longer-term

- Probing for chronic stress
- Identifying emerging opportunities

7. Matching analysis of the functioning of channels (including supply) with what is actually needed and what farmers decide to invest in: Determining appropriate response or set of responses.

- c) encourage a systems perspective (household, villages, agro-ecological zone);
- d) open possibilities for triangulating and cross-checking information.

Box 2 outlines the sources of information for the SSSA in Douentza Circle: collection and analysis of secondary information, key informant consultation, market-based interviews (with traders as well as buyers) and village-based group interviews.

Box 2: Data Collection: Overview

Sources	Sample sizes	Description
Collection of Secondary Information	----	<ul style="list-style-type: none"> ▪ Government official reports ▪ NGO official reports ▪ Grey literature- particularly statistical information ▪ Academic reports/theses
Village Group Interviews	<p>27 group interviews in , representing, 3333 Agricultural Production Units (APU) in 24 villages*</p> <p><i>Djaptodji:</i> Deri, Sobo, Poye, Beba, N'gouma, Segue, Sarafere-Mirion, Wakere</p> <p><i>Haire:</i> Nokara, Nissinata, Boni, Banaga, Touperre, Gai, Tega, Tabi,</p> <p><i>Dangol-Bore</i> Doumbara, Kirou, Manko, Marina, Falembougou, Bore, Amba, Nyongolo</p>	<ul style="list-style-type: none"> ▪ Interviews with men and women, together and separately. (in mixed groups, and with men's groups and women's groups)
Seed/Grain Trader Interviews	19	<p><u>Interviews with:</u></p> <ul style="list-style-type: none"> ▪ Wholesalers (of different scale) ▪ Retailers, ▪ Brokers ▪ Farmers selling their own production... <p><u>Interviews at four markets:</u></p> <ul style="list-style-type: none"> ▪ Douentza, Boni, Bore, N'Gouma
Farmer Buyer Interviews	20	interviews at 4 markets (as above)
Key Informant Interviews		<ul style="list-style-type: none"> ▪ NGOs (eg. Afrique Vert, USC-SOS) ▪ National Seed Service, ▪ Early Warning Specialists ▪ Food Security Offices ▪ Government Technical Services: Agriculture and Livestock ▪ Government administrative officers

* APUs were estimated by the village population

Part of the preparatory work of the SSSA also included development of tools for thinking about the Douentza stress. In this vein, a mixture of secondary information, and key informant interview allowed the team to devise base tables on normal cropping patterns, sowing rates, and harvest magnitudes. These were then modified in the course of the field exercises. Table 1 (A thru F) shows the results of this team work, looking at the relationship between normal harvests figures and seed needs. Even in this stressed Douentza zone, a harvest short fall does not necessarily equal a short fall. This means that one can have

a very poor harvest ---but not need outside seed aid, if parts of the harvest can be preserved until the following growing season. For example, for pearl millet, one needs only 3.4% of the average harvest to have enough seed (so harvest losses can be over 90% -- and a farmer may still have enough seed). Another example, for Bambara nuts, one needs 25% of the harvest—to have enough seed. (All figures are tailored to the on-the-ground situation in Douentza)

This preparatory work helped the team to ask more refined questions on the effects of stress—and not always to assume a worse-case scenario (i.e. that seed from the outside had to be imported as aid).

Table 1: Sowing Basics for the Principal Crops: Douentza Circle (farmer practice)

A. Pearl Millet

Seeding rate in normal times (considering several re-sowings)	<u>10-20kg /ha</u>
Total harvest	<u>430 kg/ ha</u>
Percent of harvest required to meeting sowing needs (assuming that all seed comes from home production)	<u>3,4%</u>

B. Sorghum

Seeding rate in normal times	<u>5- 10/ha</u>
Total harvest	<u>345kg/ha</u>
Percent of harvest required to meeting sowing needs (assuming that all seed comes from home production)	<u>2,17%</u>

C. Cowpea (when intercropped with Pearl Millet)

Seeding rate in normal times	<u>5kg/ha</u>
Total harvest	<u>70kg/ha</u>
Percent of harvest required to meeting sowing needs (assuming that all seed comes from home production)	<u>7,1%</u>

D. Groundnuts

Seeding rate in normal times	<u>15kg/ha pour ¼ ha</u>
Total harvest	<u>125kg pour ¼ ha</u>
Percent of harvest required to meeting sowing needs (assuming that all seed comes from home production)	<u>12%</u>

E. Bambara Nuts

Seeding rate in normal times	<u>15kg/ha pour ¼ ha</u>
Total harvest	<u>75kg pour ¼ ha</u>
Percent of harvest required to meeting sowing needs (assuming that all seed comes from home production)	<u>20%</u>

F. Sesame

Seeding rate in normal times	<u>6kg/ ha</u>
Total harvest	<u>25 0/ ha</u>
Percent of harvest required to meeting sowing needs (assuming that all seed comes from home production)	<u>2,4%</u>

Specific Features of Douentza Circle SSSA

Finally, in terms of methodology, a few special features of the Douentza assessment bear mention.

- The team gathered by CRS to conduct the SSSA was composed of a set of professionals, each of whom had expertise in his own right. Annex I lists the team members. *Inter alia*, they included project managers, scientists, economists, agricultural and livestock specialists, development personnel (etc). These specialists were drawn from National Seed Service, formal research system (IER: Institute of Economic Research), early warning system units, food security units, the agricultural and livestock extension systems, NGOs focusing on biodiversity, seed, livelihood and micro-credit issues.. and so on. This meant that the SSSA team was composed of professionals who could also serve as ‘key informants’ in a range of subject matter areas. They brought a wealth of existing information to the seed security analysis, as well as honed skills to seek further clarification in the field.
- The area of Douentza Circle is a particularly challenging one for those who seek close interaction with villages. Many ethnic groups speaking a range of languages (Bambara, Fulani, Dogon, Songhoi, Tamashek...), co-inhabit a small area. While the language of Bambara (and sometimes French) was adequate for most of the market interviews (even recognizing that there are variations of Bambara) even adding Fulani to the interview repertoire was not always sufficient for interacting with some of those in the villages, and particularly with women (whose dialects tend to be specialized local ones). The result was that when conducting interviews, many of the team members were interacting in their secondary and tertiary languages, with the same being true of farmer respondents.
- Finally, official documents and even published grey literature documents are not easy accessible for the Douentza zone. First, there are few longer-term records available in the region. Second, the more recent documents (even if formally approved) are closely managed by senior staff and are not freely accessible for circulation. In brief, public documents are/were not necessarily in the public domain. This made the collection of key secondary information a challenging enterprise, and not always a successful one.

The team itinerary for the SSSA appears in Annex II. The rationale for honing in on three particular regions: Haire, Djaptodji and Dangol Bore will be elaborated in Section IV when the impacts of the disasters are discussed. In short, the three areas were among those most heavily affected by the locusts attacks; they host sedentary (versus mobile populations), which means that agriculture central in the economy; and they are high production areas in normal times, suggesting that their seed security is important for both the local area, but also for Douentza Circle as a whole.

III. DOUENTZA CIRCLE: THE CONTEXT

OVERALL ZONE DESCRIPTION

Administrative Characteristics.

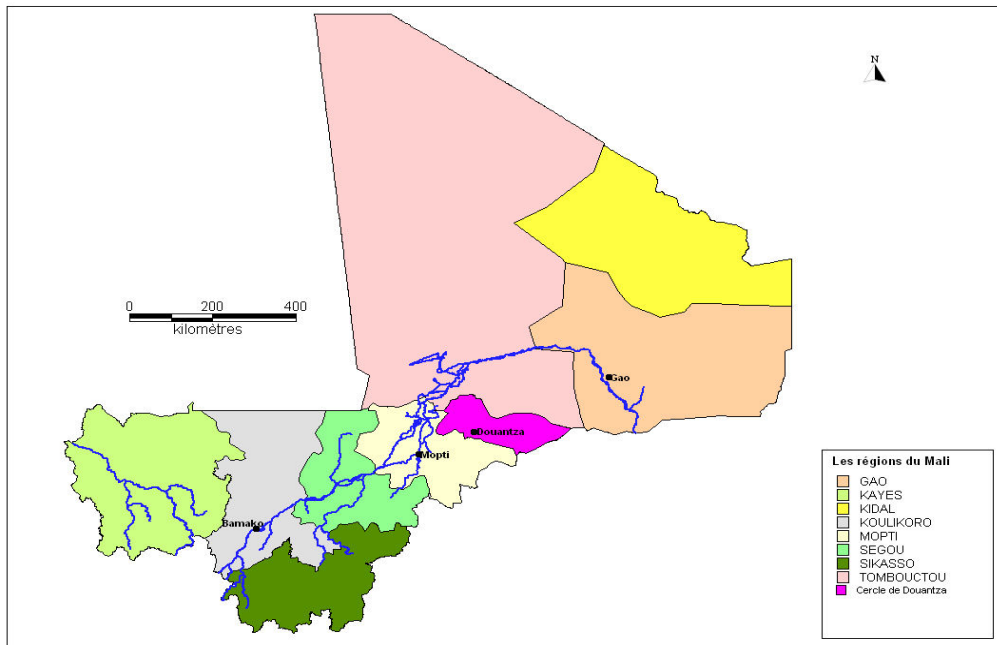
Douentza Circle is an administrative unit in Mali (one of ‘Cercles’) located approximately 800 km from Bamako and 175 km northeast of Mopti (the capital of the ‘Mopti Region of Mali). It covers an area of 18,903 km² which makes it the biggest ‘circle’ in the Mopti region. Figure 1 suggests the relative position of Douentza circle within Mali.

Agro-ecological zones

This Circle forms part of the Sahelo-Saharan agro-ecology. It is generally arid and lies at the border of where rainfed agriculture is possible. Much of the area north of Douentza Circle is part of the Saharan zone, where extensive pastoralism (camels, cattle sheep and goats) is the main occupation. Winds tend to be dry and strong: the ‘harmattan’ blows north to south in the dry season and the monsoon from east to

west during the rainy season. Vegetation is mostly of bushy types: combretaceae and rare ligneous plants. Herbaceous plants are mainly composed of grasses. Simply this is not an easy place to grow crops.

Figure 1: The position of Douentza Circle within Mali



Three distinct agro-ecological zones are generally recognized within Douentza Circle.

- ‘Seno’ occupies the central and southern areas, and encompasses the communes of Mondoro, Haire, Hombori and Dallah. Soils are predominantly of the sandy type and this is the zone where pearl cultivation dominates and is practiced across wide areas.
- The ‘Cliffs Zone’ forms the extension of the Bandiagara cliffs and again is largely under pearl millet cultivation. Some areas also prove favorable for horticultural use as there are springs and water reserves which allow for irrigated farming (communes of Dangol-Boré, Douentza, Hairé, Hombori, Dallah, Pétaka, Gandamia),
- The Delta-zone of the Niger includes parts of the communes of Diaptodji, Dangol Boré and Korarou. Here one finds more lush areas which can be flooded annually with overflows of the Niger River as well as expanses of sand dune. Soils range from silty to – silty clay – to clay. This Delta zone can be employed also for flood plain agriculture.

Seasonality, temperature and rainfall

Douentza Circle has three seasons, of unequal length: a rainy season from June to September, a cool dry season from October to February and a hot dry season from March to May. Temperature ranges are considerable: from 10- 20 degrees centigrade at night during the months of December and January to 35-45 degrees centigrade during the days of April and May. Overall rainfall in the zone is low, between 300-500 mm/annum, and highly variable. Table 2 shows monthly rainfall records of the last 5 years.

Table 2: Rainfall figures 2001-2005, Douentza Circle Mali

Year	Number of days and amounts (mm) of rain																			
	Apr		May		June		July		August		Sept		Oct		Nov		Dec		Total	
	d	mm	j	mm	j	Mm	j	mm	j	mm	j	mm	j	mm	j	mm	j	mm	j	
2001	0	16.3	3	39,1	4	60.8	9	184	8	75.5	1	0	0	0	0	0	0	378,1	33	
2002	0	20,	1	49	5	59	4	128	9	34	7	63	2	0	0	0	0	354	28	
2003	0	1	1	94.5	7	124	10	132	9	96	9	1	1	0	0	0	0	485,5	37	
2004	0	1	1	57,5	8	80,5	11	119	8	69	9	4.5	1	0	0	0	0	341,5	38	
2005	0	5,5	2	94,5	9	117	10	124	12	56	6	0	0	0	0	0	0	396.5	39	

Source : *Secteur Agriculture de Douentza*

In practical terms, these characteristics show that most of the Douentza Circle has only one cropping season—which also proves to be a stressed one. The exceptions are small pocket areas associated with the Delta zone and its associated floodplain agriculture, and areas at the edge of the Dogon Plateau, where rain water collects in areas with impermeable sub-soils. Rice cultivation and cool season vegetable cultivation are an opportunity in these areas.

Peoples and Occupations

Population overview

Figures from the years 1998 and 2005 put the population of Douentza Circle at between 160,000-170,000 habitants, with peoples being divided among 15 communes (Table 3) Population density is low, at 8,8 persons/ km² (using the 1998 figures), with a range of population groups represented : Fulani, Dogons, Songhoïs, Bozos, Tuareg/ Bellas, Bambara.. As several of these groups may have a nomadic way of life and migrate in and out of the Circle, these numbers are indicative only. Official figures suggest the male/female representation at 51 % and 49% of the population respectively.

Table 3 : Population of Douentza Circle

Commune	Number of villages*	Human Population in 1998*	Human Population in 2005**
Douentza	5	7857	14521
Débére	7	5672	5752
Pétaka	5	5337	5123
Korarou	9	3640	2038
Koubéwel Koundia	14	8513	11307
Tédjé	12	3257	7442
Dianweli	8	6241	6574
Gandamia	8	3287	3430
Kerena	3	8423	2044
Dalla	12	6048	7004
Dangol Boré	36	16141	19926
Haïre	32	16397	19840
Mondoro	22	19750	23176
Hombori	25	11750	14711
Djaptodji	64	27688	29350
Total	262	160,001	172238

Sources : * *Doc Projet de Développement Agricole de Douentza, November 2004*

** *Commission Regionale a la Securite Alimentaire*

Occupations—and Economy

While it has not been possible to get information specific to Douentza Circle, data from the entire region of Mopti suggest that poverty levels are quite high, with $\frac{3}{4}$ of the population living below the poverty line. Annual income per person have been estimated at 169,334 FCFA (reported in CRS, 2006).

Farming, mixed crop/livestock farming and pastoralism, as well as extensive nomadic pastoralism, are all practiced in the zone of Douentza Circle. Crop production as well as livestock- raising are integral to economic stability. Note that within the Circle, one finds a variety of subsistence modes over even short distances; those who exclusively farm, those who exclusively keep livestock—and peoples who engaged in both enterprises. Douentza Circle represents the most northern zone in Mali for such mixed economy modes: north of the area, rainfall quickly drops, and extensive pastoralism (camel-cattle-goats) becomes the main livelihood option. Table 4 gives a rough idea of the diverse livelihood modes practiced in this small area. ‘Sedentary’ generally implies a farming base, usually based on crops, but more and more also livestock (small ruminants as a source of income, and animals for traction). ‘Transhumant’ is equated with livestock raising as the predominant mode. ‘Semi-transhumant’ is as the name implies-- ‘only partially on the move’: people who farm during the rainy season and move with their animals during the dry season.

Table 4: Classification of communes according to occupations (type of activities)

Commune	Occupation
Douentza	Sedentary
Débère	Semi- Transhumant
Pétaka	Sedentary
Korarou	Transhumant
Koubéwel Koundia	Sedentary
Tédjé	Sedentary
Dianweli	Sedentary
Gandamia	Semi transhumant
Kerena	Transhumant
Dalla	Semi- transhumant
Dangol Boré	Sedentary
Haïre	Sedentary
Mondoro	Sedentary
Hombori	Transhumant
Diaptodji	Sedentary

Source : Conseil de Cercle Douentza

Wealth differences do not neatly match occupational modes. Table 5 presents a ranking of communes of Douentza Circle according to the revenue generated by the population. Areas characterized mainly by sedentary farmers, mixed farmers/herders and herding populations all fall within the top four. This suggests that no one economic mode automatically translates into higher living standards.

Table 5: Classification of communes by level of revenue

Commune	Rank according to level of income
Gandamia	1
Korarou	2
Koubel Koundia	3
Dianweli	4
Hombori	5
Kerena	6
Dallah	7
Tédjé	8
Pétaka	9
Hairé	10
Débéré	11
Dandol Boré	12
Mondoro	13
Diaptodji	14
C.U Douentza	15

Source : Conseil de Cercle Douentza

The role of livestock

While this report focuses on seed system security (and hence focuses on crops), it is important not to underestimate how much the raising of animals shapes livelihoods and even agriculture in the zone. Table 6 gives a quick overview of livestock numbers for the year 2004-5 (the latest data available) within the large Mopti region. Cattle, sheep, goats, horses, donkeys, camels, and poultry all figure within this impressive figure.

Table 6: Livestock Numbers; 2004-05 : Mopti Sub Sectors

Sub- sector	Cattle	Sheep	Goats	Horses	Donkeys	Camels	Poultry
Douentza	42614	42832	79276	103	3716	360	92324
Boré	25132	26277	74088	91	2971	309	79379
Boni	31689	26625	61354	73	2547	310	68179
Mondoro	22202	20837	46305	67	2759	309	54
Hombori	21855	21994	71734	96	3077	309	51932
N'Gouma	33867	33571	45147	53	2441	412	86554
Total	177359	172136	377904	483	17511	2009	378422

source: Report prepared by CRS/Mopti March 2006: Evaluation de la Securite du Systeme Semencier a Douentza. specific source not identified

In terms of the productive links between livestock and agriculture, the sale of live animals, meat, skins and livestock products (butter fat- *Sirime*) prove key for buying agricultural products (mainly grain) needed for food. The sale of livestock-related products also helps farmers conserve much-valued seed supplies during times of stress. In terms of the reverse relationship, agricultural by-products (crop residues of select crops and varieties) are routinely used for livestock forage, and several agricultural zones are expressly devoted to forage production (*borgou Echinochloa stagnina [Retz] Beauv*) and its subsequent sale (e.g. in Deri.). As in many Sahelian areas, (Mali and beyond) conflicts between the farming and livestock-raising populations are common, spurred especially by the movement of livestock

across agricultural zones, either when herds are in transit or as they graze on crop residues (e.g. millet stalks).

OVERVIEW OF THE IMPACTS OF DISASTERS WITHIN THE DOUENTZA CIRCLE ZONE: LOCUSTS, DROUGHT AND FLOOD

Within Douentza Circle, the 2004-05 agricultural season was marked by a late start of the rains as well as by their early cessation. The dire climatic situation was aggravated by invasions of locusts of considerable severity (the worst in 20 years). In smaller areas, flash floods destroyed harvest during the 2003-04 season. While not highlighted in official reports, these inundations were well-known by local extension workers, i.e. those on the ground (personal communication B. Konta)—and reported by villagers during the SSSA survey period. The 2005-06 was also not a good one: pearl millet harvests were measured at about 55% of the norm. In overview, this means that farmers in the region had poor harvests for 2-3 consecutive seasons. Note also that the locust invasion did not only affect farming activities but livestock as well: considerable stretches of grazing were destroyed early in the season.

2004- 05: Harvest losses and Locust attack: Official Figures

Studies conducted by the Regional Food Security Commission showed that Douentza Circle was the most severely affected in the Mopti Region by the 2004-05 disasters. The official figures estimated that 46,844 ha of crops were lost, which was equivalent to 78% of the cultivated area (Commission Regionale a la Securite Alimentaire, ms.- reported in CRS 2005). The Commission further estimated crop deficits at **-21 762 tonnes**, with shortfalls most acute in Djaptodji, Mondoro, and Dandol Bore--- although all communes were variously affected (Table 7).

Table 7 : Cereal Deficits in Communes Attacked by Locusts, 2004-05, in t

Commune	Production (expected)	Cereal needs	Cereal deficit
Douentza	444,75	2962	-2518
Petaka	97,34	1045	-948
Debere	86,75	1173	-1087
Dallah	106,37	1429	-1322
Tédjé	62,97	1518	-1455
Koubel Koundia	75,75	2307	-2231
Korarou	200,56	416	-215
Dianweli	174,37	1341	-1167
Kerena	62,72	417	-354
Gandamia	62	700	-638
Hairé	1275,62	4047	-2772
Mondoro	1041,25	4728	-3687
Diaptodji	923,37	5987	-5064
Dandol Boré	787,35	4065	-3278
Hombori	115,75	3001	-2885
Total	5516,92	35137	-29620
Circle	13375	35137	-21762

source: Commission Regionale a la Securite Alimentaire

While the severity of drought across the area was not intensively mapped, all communes were somewhat affected. All communes were also affected by locusts, with official reports further aiming to distinguish among those more and less severely attacked. (Table 8).

Table 8: Douentza Circle : Incidence of Locust Attack 2004-05 (most affected=1)

Communes	Number of villages	Number of Villages Affected	% cultivated area lost	Ranking*
Douentza	5	5	68	14
Débère	7	7	78	5
Pétaka	5	5	79	6
Korarou	9	9	80	8
Koubéwel Koundia	14	14	59	13
Tédjé	12	12	90	10
Dianweli	8	7	84	9
Gandamia	8	8	78	3
Kerena	3	0	80	15
Dalla	12	12	78	11
Dangol Boré	36	36	58	2
Haïre	32	31	46	7
Mondoro	23	23	77	4
Hombori	25	24	93	12
Diaptodji	64	44	86	1

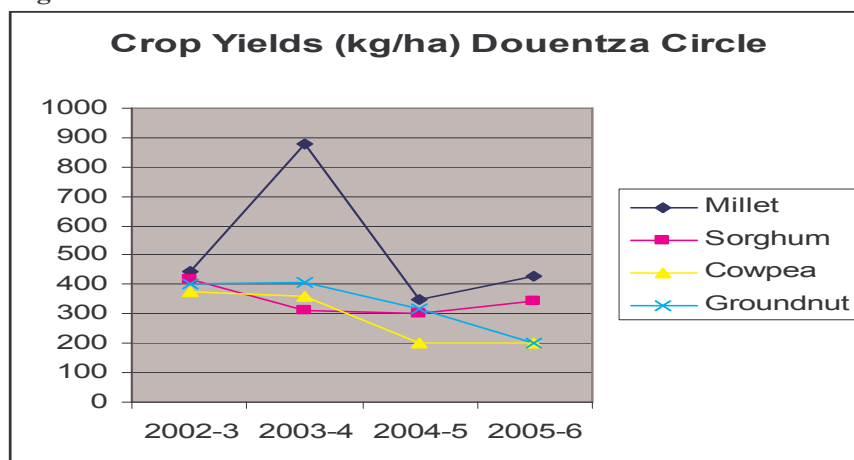
Source : Délégation de la Chambre Locale d'Agriculture de Douentza

*rankings are made considering both area lost but also total area under cultivation

2005-06 Production Shortfalls

Nor was the year immediately after the acute shocks a good one. Rainfall generally remained low and yields subsequently were well below the norm. Drawing on official data from Douentza Circle, Figure 2 gives a multi-year perspective on yields cross four key crops. 2003-04 was a good year for pearl millet, 2004-05 witnessed sharp drops, and in 2005-06 yields remained relatively low.

Figure 2



Price trends: Crops

The impacts of disasters and production shortfalls were felt not just in immediate harvest losses-- but also had subsequent effects on in market prices for highly valued goods.

CRS estimates (based on field survey) 2005 suggest that prices for cereals went significantly up during and after the acute crisis (Table 9) The SSSA fieldwork also addressed this issue from the point of view of traders and farmers (section VI), with field data confirming a consistent trend: a sharp rise after the crisis and extending into 2005, then prices going slightly down after the 2005 harvest, but remaining elevated at least for the first part of 2006.

Table 9: Price of different cereals (100 kg bag) before and after the crisis

Crop	Before the crisis : Harvest Period FCFA	During the Crisis : Harvest Period FCFA	Before the Crisis Period of 'Soudure' FCFA	During the Crisis : Period of 'Soudure' FCFA
Pearl Millet	4000 à 8500	20000	12500 à 15000	30000
Sorghum	3000 à 7500	19000	11500 à 14000	29000
Riz paddy	5000 à 7000	7500 à 12000	17000	21000

Source :Etudes menées par CRS/ septembre 2005

The official figures from the Early Warning System (System Alert Precoce) unit show a slightly different picture. They have been recorded month by month, over a period of years. (We report below the April to August data for the year 2003, 2004 and 2005. No more recent data were available). Prices are reported on a town by town basis, with Figures 3, 4 and 5 showing results for millet, sorghum, and rice from Douentza town. Prices in 2004 were relatively low (reflecting the good season before). Prices in 2005 rose midyear, broadly reflecting the stress of the 2004/05 failed season. However, generally prices in the government data remain relatively stable over the year and increase minimally with the depletion of stocks. The similarity of the sorghum and millet data (as well as the rounding off of figure entries) also suggest that the data may be based a relatively small number of observations. Hence, the overall picture of a step rise in 2005 concords with the CRS studies (as does the more micro trader- farmer data in Part VI). However, to interpret the monthly details (and between crops), more insight is needed on the specifics of how the town data was collected.

Figure 3

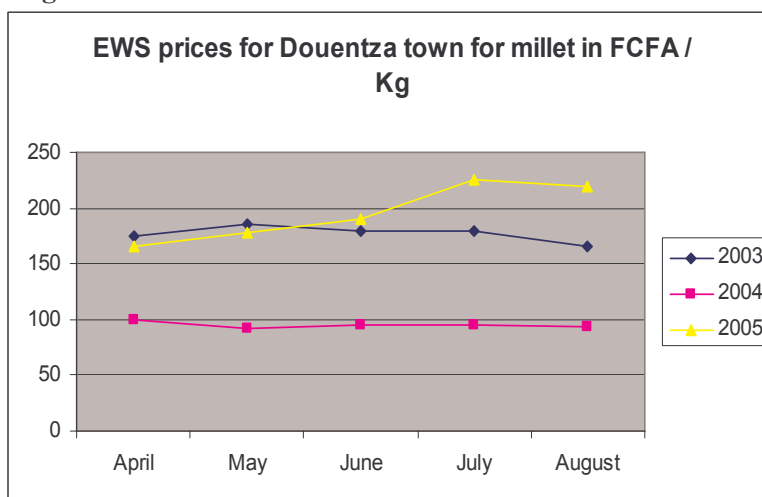


Figure 4

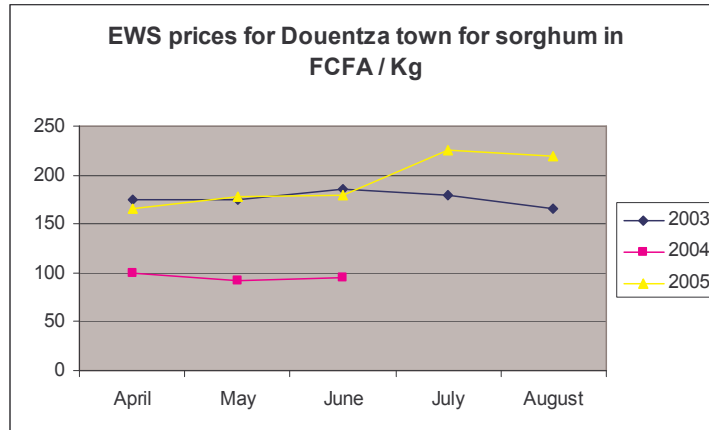
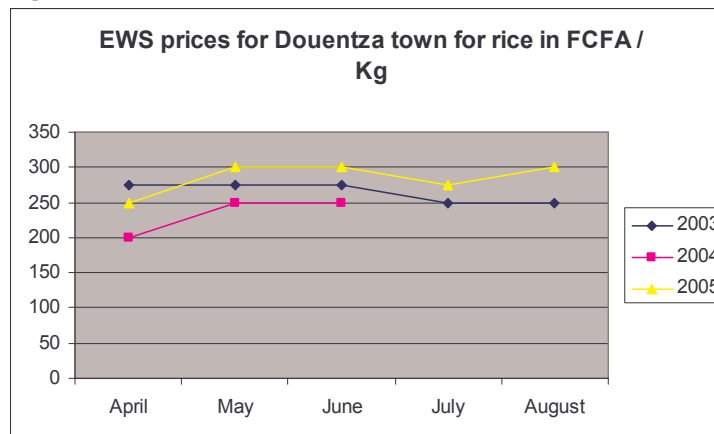


Figure 5



Price trends: livestock

Concomitant with cereal price rises, reports from several sources show the degree to which livestock prices figures fell during the stress period, while the volume of trade was rising

CRS field survey suggest the degree of price decline during the acute crisis (Table 10) while data from for the Early Warning System reports (Figures 6 and 7) show sales for both 2004 and 2005 were significantly above the 2003 levels.

Table 10: Livestock Prices Before and During the Crisis

Livestock	Before the Crisis FCFA	During the Crisis FCFA
Goats	7500 à 15000	4000 à 6000
Sheep	12500 à 37500	7500 à 20000
Cattle	80000 à 140000	30000 à 62500

Source : Etudes menées par CRS/ septembre 2005

Figure 6

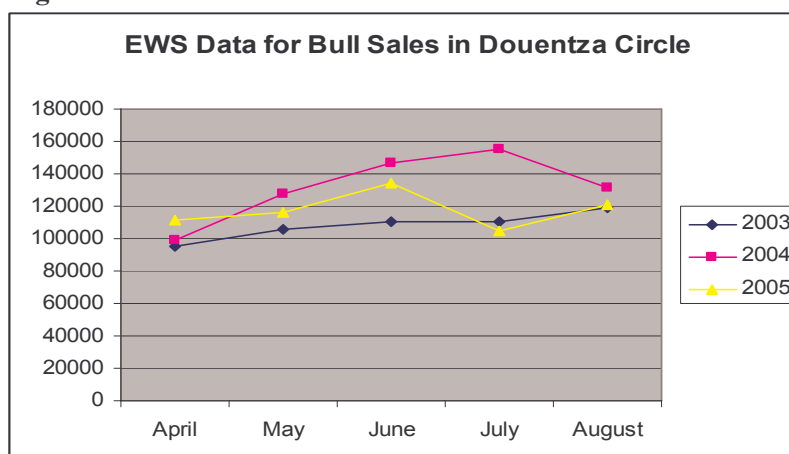
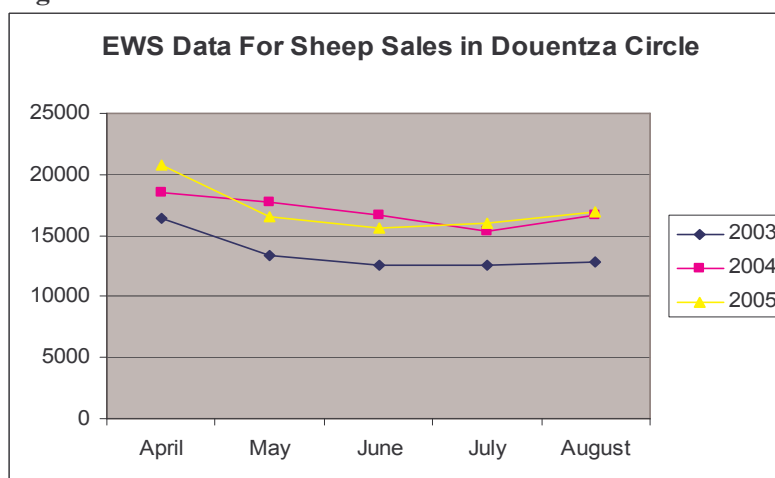


Figure 7



Other stress indicators

Aside from cereal and livestock quantitative indicators, qualitative signals the presence of a profound crisis in 2004-05., and continued stress 2005-6 For a region that is normally feels stress (probably even in good years), the 2004-2005 period proved to be particularly difficult—as the invasion of locusts tipped what is normally a precarious agricultural subsistence balance.

Among the qualitative stress signals noted during the survey: villages resorted to eating of famine foods, (Table 13), physical assets (including jewelry) were sold in haste, and out-migration had yet another spurt. Unofficial figures suggest some 40% of the young have exited from Douentza villages after the 2004 crisis (communication, villages interviews). While anecdotal evidence suggests that not many of them returned for the 2005 cropping season, more are expected to return 2006

It was in such a context that CRS initiated an enhanced humanitarian response program—including raising issues about seed security.

Table 11: Products which are especially used during periods of famine ('hungry periods')

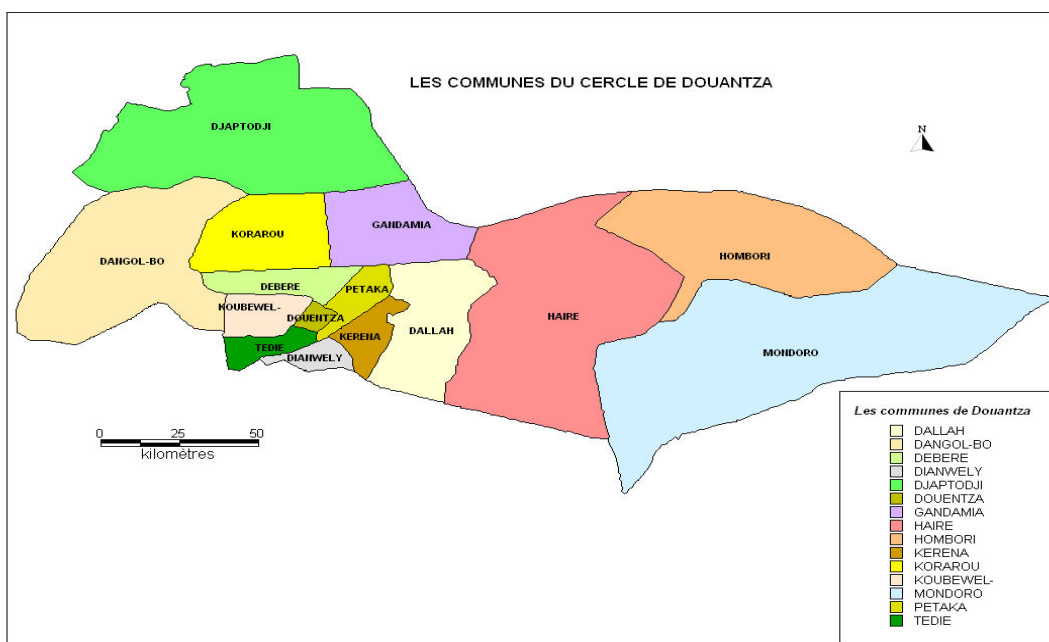
Scientific names	Vernacular Names			
	French	Bambara	Peulh	Famille
<i>Cassia obtusifolia</i>	-	Bani kono katiga	Oulo	Céalpiniacées
<i>Cenchrus biflorus</i>	Cram-cram	Sambara	Kébé	Graminées
<i>Cleome pentaphylla/Gynandropsis gynandra</i>	-	Nanzébé	Hisso	Graminées
<i>Cucumis prophetarum</i>	Pastèque sauvage	Kungo kono zèrè	Dénné	Cucurbitacées
<i>Dactyloctenium aegyptium</i>	-	N'déguélé	Bongotaki	Graminées
<i>Hibiscus sabdariffa</i>	Oseille de Guinée	Dakumu	Poolé	Solanacées
<i>Ipomoea Aquatica</i>	-	Bafaraka	Bologui/Bolodji	-
<i>Oryza longistaminata</i>	Riz sauvage	Koublen	Seko	Graminées
<i>Leptadenia hastate</i>	-	Zonié	Soboto	Asclépiadacées
<i>Panicum laetum</i>	Fonio sauvage	Finikisé/goma	Pagouri	Graminées
<i>Musa sinensis</i>	Banane	Namasa	Banana	Musacées
<i>Tribulus terrestris</i>	Croix de Malte	Musokoronignin	Tupé	Zygophyllacées
<i>Boscia senegalensis</i>	-	Béré	Guiguilé	Capparidacées

source: (H. Guindo, personal communication)

Choice of survey areas

Three communes were given particular attention in the assessment, as it was not possible to do in-depth analysis of each commune in the Douentza Circle. The three communes, Djaptodji, Dangol-Bore and Haire, were chosen because they were heavily attacked by locusts, in normal times are among the major agricultural production areas, and have a majority of the population which is sedentary. The three communes represent the different agro-ecologies of the circle quite well. Djaptoji borders the Niger interior Delta region, and has several lakes that may flood with the rising water levels in the river. As the floods recede, this area is suitable to flood recession farming, using residual moisture. The remaining part of the commune is largely covered by sandy areas (even dunes) and used for rainfed farming during the rainy season. The water table is rather shallow, due to the proximity of the river, and the lakes, and thus irrigated vegetable farming is easily possible. The Dangol Bore commune is located on the North edge of the Dogon Plateau, thus the soils types and micro-ecologies are influenced by the proximity of the barren rocks, with valleys, that can easily overflow and cause flashfloods during the rainy season. Soils are more diverse due to the diverse topography. The Haire commune is on the north-eastern edge of the Circle, where still isolated rock outcrop dominate the landscape. This commune has lower rainfall than the other two. Soils are mostly sandy, but on the slopes and foot of the hills heavier soil also occur. The water table is very deep at about 70 m, thus vegetable farming is not an option during the dry season. Several other zones would have also been appropriate (e.g. Mondoro), but the CRS and assessment team sensed that three areas were the maximum which could be adequately covered in the assessment period, as well as during project implementation. The team believes that the findings from these three zones can be extrapolated to wider areas in the Douentza region. (No evident biases or distortions in data became apparent as a result of the site selection specifics). The map below (Figure 8) suggests the relative position of the three sites within Douentza Circle.

Figure 8: Location of SSSA sites within Douentza Circle



IV. AGRICULTURAL OVERVIEW: NORMAL TIMES

Crop importance

A large array of crops is grown in Douentza Circle. These include: pearl millet (*Pennisetum glaucum*), sorghum (*Sorghum bicolor*), cowpea (*Vigna unguiculata*), groundnuts (*Arachis hypogaea*) Bambara nuts (*Vigna subterranea*), various kinds of rice (*Oryza sativa* and *glaberrima*), sesame (*Sesamum indicum*), roselle (hibiscus) or ‘oseille de guinee’ *Hibiscus sabdariffa*, Gombo (okra) and a variety of horticultural crops (cabbage, carrots, onions, peppers etc., and in some places tobacco). In theory, this array of cultures helps farmers diversify use of production niches and hedge climatic instability. However, in practice, pearl millet dominates covering about 80% of the production area (Table 12) and proving particularly important in the higher-stress areas. This implies that keeping the pearl millet crop productive, and its output stable, should be a priority of food security and seed security initiatives in Douentza Circle.

Table 12: Crop Areas in Douentza Circle 2005/2006

Crop	Yield (kg/ha)	Area sown	% of area sown
Millet	650	60,000	77.0
Sorghum	700	6,450	8.3
Groundnuts	500	2280	2.9
Cowpea	500	650	0.8
Bambara Nuts	500	230	0.3
Millet in floodplain	600	3500	4.5
Sorghum in floodplain	600	1500	1.9
Rice (irrigated)	5000	56	0.01
Rice (floating)	1500	1500	1.9
Riz (inland valley)	1000	2000	2.5

Source : DNMR de Mopti: Rapport bilan provisoire campagne 2005/2006

note: some of these crops might be grown at slightly staggered intervals.

Crop uses

Most crops are grown primarily for home consumption, with the exception of the horticultural crops (garden vegetables) – which are geared toward sale in town and urban markets. The rice grown in the irrigated areas is also primarily organized as a commercial enterprise—and for town/urban sale.

Subsistence crops, of course can also be sold. Small quantities of the pearl millet, sorghum, groundnut and cowpea harvests may be sold to generate needed monies for other household items (cooking oils, sugar, matches, etc). Larger sums may be needed to meet health care or marriage costs. Interestingly, some of the least important crops (in terms of area and production), become important during crisis periods. Sesame, hibiscus and the horticultural crops are important not only as dietary complements (to an overwhelmingly cereal-based diet) but also as revenue (Table 13) to buy cereals in times of stress, as well as at more normal times.

Finally, it bears mention that the residues of some crops as well as the leafy matter often prove important to farmers' livelihoods – both for use as forage for one's own livestock but also as forage for sale. Groundnut and cowpea hulms especially are important sources of income.

Tables 13 and 14, indicate the crop types in the two key zones considered during the assessment (the dryland zones and the Delta zone). Most of Douentza can practice farming only in a single season, under rainfed conditions (from June to October). In these areas pearl millet is by far the most dominant crop, as it is adapted to sandy soils, high temperatures and low, intermittent rainfall. Sorghum is grown primarily in areas with heavier soils, where water may be accumulating. Pearl millet is primarily grown as the staple food crop. Its residue is used as cattle or donkey feed. Sorghum is clearly a less preferred food, although its stover is considered quality animal feed. The whole plants are stored as dry feed in years, when the grain does not mature well. The various legume crops, and the hibiscus species are mostly grown as intercrops in millet fields, or on very low fertility fields as a means to restore soil fertility. Among many ethnic groups, the legumes are specifically women's crops, and are a primary source of income for women. Gombo, the African form of Okra, is grown only by women (for income), usually in fields near the houses, where soil fertility is higher. In areas with shallow water tables, horticultural crops can be grown during the cool dry season. The commune de Haire has generally a very deep water table, and thus horticulture is practically non-existent in this commune.

In the areas that are part of the interior Delta of the Niger River, flood recession agriculture becomes possible on a small area in some years from February to September, and expands the crop possibilities to include manioc and sweet potato. During the last ten years, the area receiving the floods has been reducing considerably in Douentza Circle. Reasons for this environmental change are not very clear.

In the Delta zone rice farming is possible under traditional natural submersion farming, or in fully managed irrigation perimeters. In the irrigation perimeters, two subsequent crops can be planted, one during the rainy season, and one during the cool dry season, usually it is planted to rice, but farmers are experimenting with other crops, which require less irrigation water, i.e. maize or sorghum. In the areas which receive the floods, during the cool period from November to February, horticultural crops can also be grown if irrigation water is available. Usually this is limited to small village level gardens managed by women's groups. Irrigation, including lifting the water, is usually done by hand.

Table 13: Dryland zone : Farmers' major crops for the rainy season : June to October :

Crop	For Consumption	For Income/Barter	Other
Pearl Millet	+		forage
Sorghum	+		forage
Cowpea	+	+	forage
Groundnuts	+	+	forage
Bambara Nuts	+	+	
Rice (irrigated)	+		forage
Rice (rainfed)	+		forage
Sesame	+	+	
Hibiscus	+	+	
Gombo	+		
Horticultural Crops	+	+	

Table 14: Delta-zone (Djapotodji): Rainy Season, post-rainy season (horticulture);and season sown in floodplain

Crop	For Consumption	For Income/Barter	Other
a- Rainy season (June- October)			
Rice (irrigated)	+	+	forage
Rice (rainfed)	+	+	forage
Pearl Millet	+		forage
Sorghum	+		forage
Cowpea	+	+	forage
Bambara Nuts	+	+	
Hibiscus	+	+	forage
Gombo	+		
b)Post-rainy (off-season) (November- February)			
Horticulture	+	+	
Season in Floodplain February- September			
Sorghum	+		forage
Pearl Millet	+		forage
Cowpea	+	+	forage
Cassava	+	+	forage
Sweet Potato	+	+	forage

General Agricultural Calendar in the Dryland Farming Zone

As in many climatic stress zones, the sequencing and staggering of crops is an important strategy of farmers to achieve a certain stability and balance of agricultural output. Hence it is important to know the types of crops grown, and their general seasonality, but it is also key to understand how farmers sequence and mix them so as to hedge their risks. Table 15 suggests the general planting and harvest periods.

Table 15: Sowing and Harvesting Times of Principal Crops in the Dryland Areas Douentza Circle.

Crop	Sowing period	Harvest period
Pearl Millet	May-mid July	October-December
Sorghum	June-July	November-December
Cowpea	June-July	August-September
Groundnuts	June-July	September-October
Bambara nuts	June-July	September-October
rice (main season)	July	November-January
sesame	July-August	October-November
hibiscus	May-July	leaves can be harvested one month after sowing, petals and seeds somewhat later

Sequencing of Crops

As indicated earlier, pearl millet is by far the most important crop in the dryland areas of Douentza Circle. It provides staple food and is an important source of occasional income. Being a cereal crop, pearl millet requires fairly good soil fertility to produce a reasonable yield. It is thus planted in the more fertile fields available to farmers. It is also the first crop to be planted, so that it can benefit from the first flush of nitrogen, released by the soil when the rains start. In the Haire commune, farmers even sow pearl millet before the rains set in, to ensure that the crop can capture the first rains when they arrive.

As sowing is practically all done by hand for all the crops, the area that can be sown after any single rainfall event is limited by the labor available to do the sowing. This is another reason for this practice of dry sowing before the rains set in, even if this increases the risk of losing the seed and having to re-sow.

Sowing and re-sowing of pearl millet occurs until the end of July in the areas we visited. The other crops, often referred to as minor crops, all get sown later, that is when the first-sown pearl millet is well established. Another reason for sowing the other crops later is that most of them have larger grains than pearl millet, and actually require more water for germination. These crops thus get sown only when the soil profile is well filled, and germination is more assured.

The sorghum is somewhat a special case, as it gets sown primarily in areas where water accumulates, where the soil is too hard and heavy for pearl millet roots to penetrate. These soils also keep the humidity for longer periods after the end of the rainy season, and thus can be planted at a later date.

Gombo and hibiscus (roselle) are primarily sown by women. The Gombo is most often sown as early as possible, into the higher fertility plots near their houses. The hibiscus can also be sown early by itself, but sometimes is intercropped into the pearl millet, or more often their groundnut fields.

In most cases cowpea, some of groundnut and Bambara groundnut, hibiscus and sesame are sown as intercrops into the pearl millet fields. The density and sowing arrangements depend largely on the rainfall received or expected by farmers. Usually the first sowing of pearl millet is made at very large distances between planting hills. As the millet crop establishes, and the soil moisture builds up, cowpea and possibly the other crops get sown into the developing pearl millet crop. It seems that with decreasing soil fertility, as the soils “get tired” the proportion of legume crops increases. Groundnut and Bambara nut are then sometimes sown as sole crops, often by women.

Sowing Densities

In terms of starting to understand seed security overall, attention to sowing densities is also important.

As indicated above first sowings of pearl millet are often done before the arrival of the first rains. Thus sowing densities tend to be greater in the higher than in the lower stress areas. Here farmers have to hedge against losses due to soil insects, ants, bird damage, and of course the risk of premature germination upon a minor rainfall event that will not sustain crop establishment for more than a few days.

It is also key to underscore that re-sowing of pearl millet is normal. Re-sowing takes place due to the risks mentioned above, and also due to very high temperatures after germination, if the cloud cover disappears and soil surface temperatures rise beyond 55°C. Re-sowing may take place regularly and farmers report that they routinely re-sow pearl millet 3-5 times the same season. This has implications for calculating seed needs. In such repetitive sowing, farmers often re-seed only pockets of fields rather than the whole field in its entirety.

The other crops particularly, cowpea, groundnut and Bambara nut are re-sown only in rare cases, as seed needs in general are higher, and thus costs associated are also higher.

Varieties

During the village interviews, farmers shared information on the main varieties used in each village for the dominant crops. Similarly at the different market places, traders and buyers discussed the main crops of principal crops on offer. However the interviews were rarely in depth, and did not cover the whole range of diversity available in any one site. The discussions focused on the adaptive range of the main cultivars sought after, and used by farmers, with the primary objective of achieving a better insight into acceptable options for sourcing seed from outside the target communities. Table 16 provides an overview of the variety names encountered by the SSSA team, merging all the information from the different interviews in the different communes for each of the crops.

Most of the discussions about varieties were focused on pearl millet, as it is the most important crop. In all the communes where discussions were held it was clear that farmers always preferred to grow their own local pearl millet varieties. They tended to consider the range of adaptation of their varieties as fairly narrow, that is, varieties from one village were not considered well adapted in areas at a distance as close as 30-40 km. This limit of adaptation of different varieties was mostly explained by their date of flowering and its correspondence with the predominant rainfall patterns in the specific locality. It was thus observed that varieties originating from very dry areas were adapted also in somewhat more humid areas, and thus had a wider range of adaptation. However, varieties from areas with somewhat higher rainfall were not acceptable in areas with lower rainfall. The differences in predominant soil type were also mentioned as causes for poor adaptation of the varieties from areas other than the local one.

These findings are of paramount importance for the implementation of seed aid interventions. Farmers, especially those in the most risky and lowest rainfall areas can only be assisted with pearl millet seeds if they are of local origin. Providing seeds from uncertain sources to farmers in such areas puts them and their farming at immense risk, which could easily include complete crop failure.

For the other crops, specifically legume crops this varietal specificity was not near as strong, as even in higher rainfall areas the varieties of cowpea, groundnut, or Bambara nut tend to be very early maturing. They thus can grow in a wider range of areas. The same seems to apply for Gombo and hibiscus and sesame. However, in the driest villages where interviews took place in the Haire commune, farmers indicated that their variety of sesame was really no longer well adapted, as it was too late maturing.

The crop for which the most different variety names were mentioned was rice, even when considering only lowland rice adapted to natural flooding. While rice is only grown on rather small areas, it is highly

appreciated and plays an important role for food security, and for income generation. For rice also a number of research developed varieties were mentioned by farmers.

For all the crops, earliness, that is, somewhat earlier than the predominant local varieties, is sought after by farmers. This is especially strong in the years following a crop failure. Early-maturing crops end the hungry season before harvest earlier than later maturing varieties. Again, this is of great importance for planning seed aid programs/fairs, as care should be taken to search out seed providers, who can offer such earlier maturing varieties to farmers, and this applies to all crops. This will not mean that farmer will not plant any later maturing varieties of their main crops, as it is usually these varieties that produce more and better quality grains for future consumption. Rather, it is a mix of early- and late- maturing varieties which can give help farmers get yield stability in times of fluctuation, and well as good production and income possibilities.

Table 16: Preferred and Important Varieties, by Principal Crop: Overview list

Crop	Varieties	Reasons for Preference
Pearl Millet	<u>local variety</u>	Rainfall 350-400 mm/yr
	Cadognon	Cycle=90-95j
	Bamanangnon	Avg yield. 430,4kg /ha
	Kérégnon	Taste ; appreciated
	Tabignon	Conservation : good
	Torognon	Other. adapted. very early, good grain quality
	<u>improved variety</u> CSM 63E (Diakumbe)	
Sorghum	<u>local variety</u>	Rainfall 350-400mm/yr
	M'boyori	Cycle 90- 95 days
	Makan keneké	Avg yield = 345,3 kg/ha
	Son golon	Taste : good
	Emé Piru (blanc)	Conservation : good
	Emé Gassi (tendre)	Other : adapted
	<u>improved variety</u> none	
Cowpea	<u>local variety</u>	Rainfall idem
	Niébé blanc	Cycle 60 days
	Niébé rouge	Avg yield : 200 kg /ha
	kolodialani	Taste : good
	Ni puru	Conservation : difficult due to lack of appropriate techniques
	<u>improved variety</u>	Other : adapted
	TN : variété blanche Gorom gorom Korobalen (introduction IER/FIDA à Dangol Boré)	
Groundnut	<u>local variety</u>	Rainfall idem
	Tiguadie Haire	Cycle 60-70 days
		Avg yield = 200 kg/ha
		Taste : good
		Conservation ; Easy to shell
	<u>improved variety</u> none	Other : adapted
Bambara Nut	<u>local variety</u>	Rainfall : idem
		Cycle : 60-70 days
		Avg yield: 200 kg /ha
		Taste ; good
		Conservation :fairly easy to shell
		Other : adapted

Rice in irrigated perimeters introductions by projects (AFVP, VRES) and by young people returning to the villages after exodus to find work	<u>improved variety</u> IKP BKN Wassa Gambiaca BG	Rainfall : idem Water depth : 5-10cm Cycle :90-100 days Avg yield : 4800kg /ha Taste : appreciated Conservation : easy Other : adapted
Lowland Rice (inland valley) (introductions by projects (AFVP, VRES) and by young people returning to the villages after exodus to find work	<u>local variety</u> <u>improved variety</u> IKP BKN Wassa Gambiaca BG	Rainfall : idem Water depth : 20-50cm Cycle :90-100 days Avg yield :1500kg /ha Taste : appreciated Conservation : easy Other : adapted
Floating Rices	<u>local variety</u> red rice (glaberima type) <u>improved variety</u> RAS	Rainfall : idem Cycle. 90-100 days Yield =800kg /ha Taste : appreciated Conservation : easy Other : adapted
Sorghum in floodplain	<u>local variety</u> Sorgho in floodplain <u>improved variety</u> none	Period. February to September Cycle : 240-250 days Yield = 385 kg /ha Taste ; good Conservation : easy
Pearl Millet in floodplain	<u>local variety</u> Pearl Millet in floodplain <u>improved variety</u> none	Period .February to September Cycle : 240-250 days Yield = 385 kg /ha Taste ; good Conservation : easy

Varieties: Some differences by Zone

While the general pattern of crop and variety is rather similar in the dryland areas of the three communes, there are some clear differences. These differences are largely related to the differences in agro-ecologies, and thus to the options that farmer may have for cropping and animal husbandry.

Both the market interviews as well as the village discussions showed that in the Dangol-Bore commune farmers can grow a somewhat broader range of pearl millet varieties than in the Haire commune. While they prefer to grow their local varieties, there are some farmers who grow regularly, also in non stress

years, varieties from neighboring areas. After the crisis in 2004 in this commune some farmers did also risk growing varieties they had never tested before from further away, i.e. San or Koutiala. This is an indication that farmers in this commune have at least some options for the choice of varieties to grow. However the bad experiences with poor rainfall, and poorly adapted pearl millet varieties has led farmers to voice very strong and targeted requests for earlier maturing varieties of pearl millet. This is an important finding for the project, as it indicates that early maturing varieties of pearl millet, and possibly the other crops should preferably be on offer at seed fairs in the Dangol-Bore commune. Similarly farmers may be interested to test earlier maturing varieties of pearl millet in this area.

In the dryland zone of Djaptoji commune, pearl millet farming has many different primary objectives, and thus is managed in many different ways, depending on the ethnic group, and its main livelihoods options, and the specific agro-ecological conditions. In this area, pearl millet is mostly grown on deep sandy soils, often on sand dunes that may also be prone to wind erosion. While rainfall is relatively lower than in the Dangol-Bore commune, these sand dunes may actually store water well, and it remains accessible to the pearl millet crops. Thus also different types of sorghum are found, mostly of the durra race, which is well adapted to sandy soils. Crop farming in this commune is largely influenced by the migration patterns of the pastoralists' cattle, goat or sheep herds. Crops need to be harvested before the large herds arrive. In these areas the importance of early-maturing varieties again is paramount for successful farming. However, the degree of earliness is also limited by the patterns of pearl millet head miner attacks, early in the season, and the migration and feed availability patterns of grain feeding birds.

In the Haire commune, farmers had the most limited choice of pearl millet varieties, as their own local variety is widely known as the earliest pearl millet variety available in the whole area. Farmers in this commune are very conscientious of the fact that growing pearl millet varieties from outside areas is associated with great risks of crop failure. They thus have a very strong preference for their own variety, more so than in the other two communes. In fact, because of the stated importance and need for earlier maturing varieties in the other two communes, the demand for seed from the Haire commune is actually very high.

In all three communes, the pearl millet variety from Haire was known to farmers, and had been used successfully in the past. Some had received it through seed aid interventions following the 2004 locust invasion. It seems important for food security of these communes that seed from the Haire commune be made available during possibly fairs or other interventions, so that farmers can access early and earlier varieties than those available in their own local areas.

Male/Female Crop and Labor Divisions

Finally, not all crops are equally interesting or important to all farmers in Douentza Circle. In fact, the zone is remarkable for its agricultural heterogeneity. Even within the same agro-ecological zone, crop and variety choice may vary over short distances. For example, in the village of Deri, sorghum is grown, while 10 km away, in Sobo, it is not. This might be due to difference in ecological niches locally, but is also often due to different preferences and needs of diverse ethnic groups as well as differences in the specific culture of individual villages. There are also great variations in divisions of labor within the zone. For instance, in reference to women, different rules affect: the kind of work they can do in the family fields, how many days a week they spend working in family fields, the type of user rights women have for their individual fields, the type of crops they grow, how they can dispose of crops and harvests, and what their primary income generation activities can be. Box 3 gives but a flavor at how diversified these division are even over very small distances, and within the same ethnic groups. All this variation—in crop and variety choice, ownership and management --- by zone, by ethnic group and by gender--suggests that humanitarian and development support efforts have to be informed by a solid understanding of *their*

local target zone. Only with such a honed understanding can specific groups be targeted for assistance and can equity issues be centrally integrated into the program design.

Box 3: Looking at divisions of labor within a 50-70 km radius

<p align="center">What is women’s work” what is men’s work” in Douentza Circle, it depends on who and where you are</p> <p align="center"><i>examples</i></p>			
<p>Place: N’Gouma: Ethnic Group: Peuhl</p> <p>Men do all the agricultural work:</p> <p>Women make mats (for sale)</p>	<p>Place: Sobo Ethnic Group: Bozo, Bambara, Peuhl and Tamacheik</p> <p>Women and men both farm, but manage their separate fields.</p> <p>Men grow millet, groundnuts, Bambara nuts and rice</p> <p>Women grow groundnuts, Bambara nuts, rice, cowpea, and the horticultural crops (tobacco, onions, tomatoes, peppers)</p>	<p>Place: Wakere Ethnic Group: mostly Bambara</p> <p>Women manage the rice and horticultural crops</p> <p>The rest is men’s work: millets, sorghum, groundnuts, Bambara nuts, cowpea and even hibiscus.</p>	<p>Place: Sarafere-Mirion Ethnic Group: Bambara</p> <p>Women help during the sowing of millet and the transplanting of rice</p> <p>Men do all the rest of the work: on millet, sorghum, cowpea, groundnuts, Bambara nuts, and rice,</p>

General Reflections: Agricultural Overview in Douentza Circle

While this section has given an overview of agriculture in ‘stable times’ it is important to underscore that the agro-climate within the region is far from stable. Meteorological data, spanning some 40-60 years, clearly shows a) a trend towards more variability (more acute dry spells) than previously known, b) larger expanses exhibiting arid characteristics (is the desert expanding) and c) reduced length rainy seasons. Statistics document these trends ‘objectively’, but equally, they have become part of routine farmer testimony. Villages and farming communities feel, and are adapting, to the changing rainfall in quite concrete ways. In terms of crop profile, in several areas the more demanding crops have been dropped: sesame is rarely grown in villages of Haire and Dangol-Bore. Fonio was eventually dropped in Ngololo (even though villagers tried to reintroduce it several times). In Djaptodji commune overall, floodplain agriculture is rapidly on the decrease, simply because the floods arrive less often. And, as noted in the section of varieties, farmers are increasingly seeking out those which are early (and earlier-) maturing, and hence which give more production stability even in difficult years. This practically means that varieties coming from the northern areas of Douentza zone (the drier areas) are increasingly sought. As we will see in the next section, on seed sourcing, seed production in the northern zones is also becoming increasingly key for general seed security in the broader region (see ‘seed production villages—Part V).

V. SEED SOURCING STRATEGIES: NORMAL TIMES

Small farmers can theoretically source seed from several channels, from their own production or from neighbors and friends (who often have seed similar to their own—produced locally on farm); from seed/grain markets, which exist in fairly close spatial proximity throughout Douentza Circle; or from formal sector channels, where ‘improved varieties’ (emerging from research or the private sector) and certified seed are sold. Farmers tend to make use of multiple channels for accessing their seed. So they might get seed for one crop or variety mainly from their own production and another mainly from the market. Or, in many areas, a household may meet its seed needs for a single crop from several different seed channels, for instance starting with one’s own stocks, then filling in quantity gaps from the market, and even, in some cases, trying out small quantities of new varieties—from the formal system.

The way one sources seed is a *strategic* decision, as getting the right seed is one key factor for determining if one will have a harvest—or not. Sourcing seed, of course, depends also on practical concerns: where it is available, if it can be bartered or if cash is necessary (and what the prices may be), and whether the quality on offer (variety plus also seed health quality) is acceptable to farmer clients.

In practice, seed sourcing strategies in Douentza Circle are much less heterogeneous than in many other regions in Africa, mainly because of the severity of planting conditions and some specific seed storage challenges which farmers face even in routine times. Further, the formal sector in Douentza zone operates on a quite modest (near non-existent) scale. Small quantities of improved rice varieties are sold, and these are adapted mainly to the irrigated areas. For vegetables, imported seeds from international companies are sold in the area, but without controls from the public sector.

Table 17 gives the broad brush on seed sourcing strategies in Douentza zone. The relative proportions of seed sourced through varied channels in ‘normal times’ has been estimated through in-depth discussions with agricultural officials, development personnel, and farming communities. Hence the table is not quantitative, but suggestive. Overwhelmingly, the cereal seed (pearl millet, and to a slightly lesser extent sorghum) are accessed from home production. And uniquely, in large part, the legume seed (the cowpea and groundnuts in particular) is accessed from the market. In the Delta-zone, cuttings of the vegetatively-propagated crops (like cassava) generally come from home production. Further, overall, social networks prove important for getting smaller quantities of seed (particularly if one seeks a certain variety and wants to be absolutely sure of the quality)—but cannot be relied on for bulk quantities and certainly less so in times of stress (see part VI.). This global view is important for reflecting on strategies to support seed security, in normal times and in stress periods (and this theme is developed in all subsequent sections of this report). However, we also recognize the limitations of such a broad sketch: all farmers are not the same: the poor, especially, may be reduced to ‘substandard’ procurement strategies. Below, we discuss in greater detail the implications of using each seed channel to give an idea of the existing choices, positive opportunities and constraint for accessing seed in Douentza Circle.

Table 17 : Channels through which farmers obtain seed in normal times, by crop (figures suggest proportion of total seed obtained via each channel)

A. Zone (dryland))

Crop	Own Production	Social Networks	Local Markets	Formal Sector
Pearl Millet	85%	5	10%	0%
Sorghum	80 %	5	15	0%
Cowpea	20%	0%	80%	0 %
Groundnuts	20%	0%	80%	0%
Bambara Nuts	50% (check)	10%	40%	0%
Sesame	90%	10%	0%	0%
Gombo	80%	15%	5%	0%

B. Delta-Zone

Crop	Own Production	Social Networks	Local Markets	Formal Sector
Pearl Millet floodplain	90%	10%	0%	0%
Sorghum-floodplain	90%	10%	0%	0%
Rice (Irrigated)	60%	10%	0%	30 %
Rice (Rainfed)	80%	10%	10%	0%
Cassava	90%	5%	5%	0%
Gombo	80%	15%	5%	0%

Own Production

Cereals (Pearl millet and sorghum)

Farmers generally indicate that they produce their own seed of pearl millet, and mostly of sorghum too. They tend to produce seed by selectively harvesting panicles of pearl millet, as well as for sorghum from their good fields before the general harvest starts. The panicles for seed use are generally cut with a longer part of the peduncle attached to it. Thus seed are easily identified by anyone, even when they are mixed in with the food grain panicles. In most areas of Douentza Circle, farmers store their pearl millet grain and seed unthreshed on the panicles, and thresh as grain is needed for consumption on a daily basis. Seed panicles seemed to be stored often with food grain panicles, but tend to not be touched for food uses. Among the farming communities in Douentza Circle, general social norms encourage that a good farmer produce and store his own seed, especially of pearl millet. If someone does not have seed, or not sufficient seed neighbors or friends will provide seed for such a family, and will even try to avoid that the person will have to come to ask for seed, but rather give it to him secretly, so that no others may know. If a farmer comes and asks for seed, those who have seed or grain available are obliged to give him some. Usually the quantities given are relatively small, and do not cover the full seed need. Often this seed is given as a gift, but it can be given in exchange for other grain or seed, either at the time of sowing, or after harvest.

As we will see in Part VI, during times of widespread crisis, like following the locust attacks, pearl millet seed supplied through this type of social networks was actually very limited, as really most people were hit very hard. However, it was also clear that there are always some people who manage to keep some stocks. During the 2005 sowing period, farmers who still had their own stocks had stored grain or seed from the 2003 harvest. As storage conditions in Douentza Circle for pearl millet are very good, seed even

after several years of storage under local conditions remains viable and vigorous. However, these isolated stocks can not serve the needs of the majority of a community through these social channels. A good portion of these stocks becomes available via the market. For example, shortly after the crisis, a Malian NGO organized purchase from such farmers in surprising quantities for seed banks in other areas, 60t in one village (E. Weltzien, personal communication). Thus in difficult years farmers also do also use the market to access seed of pearl millet and sorghum (see next section, market). Box 5 gives a sense of the different ways for accessing pearl millet seed and some of the concerns associated with different seed channels.

Box 5: Sourcing Millet Seed --- farmer comments and strategies			
<p><i>Nouhoum Tamboura and Amadou Ongoiba, Douentza market:</i></p> <p>If someone buys seed of millet in the market at the approach of the rains it means that he has nothing, also parents, and his village have nothing. People feel ashamed to go the market for seed, so they may actually send their children to go and get it.</p>	<p><i>Male farmer, Boni market:</i></p> <p>For millet really each area has its own variety. The millet variety from here grows well here. The other varieties are too late, the soils may also be different here. We eat a lot of millet from other regions here, Koro, Segou, San, to save the seed from our own harvest for the next sowing. At the time of sowing the seed and grain of the local variety from Haire is more expensive than other millets (from the market), because it is well adapted here.</p>	<p><i>Male farmer, Bore market</i></p> <p>Millet is my principal crop----so I have to keep my seed. I may eat my sorghum seed--- and then buy more on the market—but not my millet.</p>	<p><i>Male farmer, N’Gouma market</i></p> <p>With millet, I can immediately distinguish between grain and seed—from the market. It depends on how it s threshed (that it is not beaten in bulk), that the grains are not broken or old---- and I especially know who the good suppliers are. It is more difficult with rice to distinguish between good grain and seed-- you really have to know the farmer-supplier.</p>

Legumes (Cowpea, groundnut and Bambara nut) and other minor crops

Legumes, as well as hibiscus and sesame are really all minor crops compared to pearl millet. It seems far more acceptable to purchase seed of these crops, and the social pressures for producing seed at home are not nearly as important.

Most farmers indicate that they tend to have problems with storing seed of cowpea, groundnut and hibiscus (roselle), often Bambara groundnut as well. The biggest problem is with respect to storage insects, which are particularly problematic for cowpea and hibiscus. Groundnuts and Bambara nuts loose viability very easily, if storage conditions are not adequate. All these crops are important sources of income, especially for women. Thus the harvest is also often sold, as the need for cash arises.

Thus for these crops, the markets are the most commonly used source for seed. In each village it was reported that only a small number of farmers actually maintain seed of these crops, and that they thus do not normally enter into the system of social exchanges for seed.

Market

In many areas of Africa, stereotypes about local seed/grain markets, suggest that planting material sourced from markets is of inferior quality (basically it is ‘food that is sown’), and that farmers who use the market do so as a ‘second-choice’ strategy (that is, they are ‘forced’ to do so). Both the quantitative and qualitative data gathered from Douentza Circle suggest a very different picture.

Below we look at market issues of distinguishing seed versus grain, and quality assessments in normal times. We then hone in on the very unusual phenomenon of ‘seed production villages’ that is highly specialized production sites to encourage that quality planting material is available within the wider region.

Seed versus Grain: how distinguished by traders

When canvassing among the team of experts involved in the SSSA, before the field investigations, all officials and project personnel asserted that market seed is not seed at all, as traders do not distinguish between bulk grain and seed. The team had a set of different findings emerging from the field evidence.

Criteria

Interviews (from both trader and farmer point of view) showed that traders in Douentza Circle clearly distinguish between seed and grain—for all crops. They distinguish the two by a set of well-defined criteria (which are slightly more refined if one goes crop by crop.) The overall criteria for distinguishing between grain and seed are presented Box 6.

Box 6: Market traders in Douentza Circle: How they Distinguish between Seed and Grain *Guiding Criteria*

- **Variety type:** only specific varieties can be sown. The sets of varieties for the cereals (pearl millet and sorghum) are quite narrow and very location specific. Those for the legumes (cowpea, Bambara nuts) are wider—but still which specific zones known as ‘adapted’ (or not)
- **Visual appearance (physical properties):** seed has to look mature, not broken, not mixed with dirt or pebbles or other non-seed matter.
- **Defined, Proven Sources (provenance):** many traders buy only locally, from surrounding farmers and regions with whom they place ‘orders’. (The bigger scale wholesalers may be less interested in the seed/grain distinction.) Some traders, if they import seed, actually test it in small areas.
- **Selection in the field** (for farmers selling their own production)
- **Selection before sale** (to remove inert matter and sub-standard grain)
- **Seed Treatments** (ash or chemical products for the legumes)
- **Germination Tests** (limited, but found with some traders)

Traders remarked that aside from these seed-related attributes, there can be concrete price differentials between seed and grain (especially for pearl millet). Further not all traders are the same, especially with respect to seed. The largest wholesalers, from outside the region, may not distinguish grain and seed from different regions, but even the large-scale suppliers within the region know well what is adapted or not and keep potential seed and grain apart. As grain is stored in bags, mixing of grain/seed from different regions is actually very rare. Retailers tend to use local supplies, and some of the smallest ‘retailers, i.e. those who directly see their own harvests, are among the most sought after for their seed stocks of local, well-adapted varieties, which are not mixed.

Zones

Box 7 lists the zones from which traders feel they can source seed (versus grain) -- crop by crop. Grains come be sourced widely, while the zones for collecting seed tend to be well-defined and few.

Box 7: Zones traders use for sourcing seed versus grain : view from four markets

Market	Crops	Zones for Accessing Seed	Zones for Accessing Grain
Bore	Pearl millet Sorghum Rice Cowpea Groundnut Bambara nut Maize Hibiscus	Bore, Dogon Plateau Bore Bore, Niono, Service Agricole, San, Mopti Bore, Douentza Bore Bore Ibissa Bore	Segou, Koutiala, Koro, Bgara, San, Mopti Bore Bore, Niono, San, Mopti Bore, Douentza Bore Bore Ibissa Bore
Douentza	Pearl millet Sorghum Rice Cowpea Groundnut Bambara Nut Maize	Douentza Douentza San, Niono Douentza Douentza Douentza Douentza San	San, Koro, Bankass, Douentza Douentza, San San, Niono Douentza Douentza Douentza Douentza San
Boni	Pearl millet Sorghum Rice Cowpea Groundnut Bambara nut Hibiscus	Boni, esp. Tabi, Tega, Toupere Douentza (no response) Douentza Douentza Douentza Douentza	Douentza, Koutiala, San Douentza Bamako Douentza Douentza Douentza Douentza
N’Gouma	Pearl millet Sorghum Groundnut Maize	Mopti, Douentza Mopti, Douentza Douentza (no response)	Mopti, Dounetza, Koutiala Mopti, Dounetza, Koutiala Douentza Koutiala

Seed versus grain: how farmers source seed from market

Farmers, for their part also clearly distinguish seed from grain on the market—in ways parallel to traders. They look for varieties they know, examine the physical condition, and, importantly, buy from a known source (and one who will be accountable—in the future.) The SSSA probed extensively on any negative effects of getting seed from the market. Specifically, farmers were asked if there were *risks* to sourcing seed on the market. Box 8 gives a representative sample of the responses. The strong tendency was for farmers to respond no—that there were not risks. But then, also, one had to navigate the market wisely: make active decisions about where to buy, what to buy—and to use your eyes and head. It is important to signal that the discussion on seed and markets can be a sensitive one. Across local ethnic groups, the area has long-held stigmas associated with having to buy seed on the markets (although these sentiments may be changing?) Cultural stereotypes suggest that if one has to buy seed: a) he/she must be poor (and have been forced to consume existing stocks), and or, even worse, b) he/she may be an inept seed manager—lacking the expertise to guarantee the family’s seed security.

Box 8: Farmer comments on whether there are risks to sourcing seed from the markets

General Comments

- There are no risks, if one knows the supplier well.
- Sometimes we have to buy seeds about which we don’t know a good deal, not about the variety or how it was conditioned. But we seek information from suppliers in which we have confidence, including about the exact source of the seed.
- The risks are minimum in terms of germination. There are no risks—if it rains
- Yes, there are risks, but we sort through the seed to minimize risk and we ask about the source to the seed, to further minimize risk. You never take seed directly from the market to the field: you must always sort.
- Yes, there are risks, especially when one doesn’t know the variety well. Also the seed might be old or might have insects inside.
- One buys from traders in which one has confidence and who have good seed. If this is done—there is no risk
- Traders are obliged to bring seeds of acceptable quality—otherwise clients simply don’t pay
- There are no risks. I always buy from farmers who come to sell their own production, from their own farms
- The varieties sold on the market are varieties known in the local area—there are no risks
- If one doesn’t find good seed- one doesn’t buy.

Comments Specific to Regions or Crops

- From Douentza market: From San and Segou come varieties that are not adapted here. That is why I prefer to buy grain to eat and to save my own seed stocks for sowing. I might even sell an animal to buy food, but I will save my seeds.

- on Pearl Millet: Here you have to watch out that the seed is not a mix of types
- I don't regularly purchase millet or sorghum from the market (only after a crisis). But rice, I do--- because of the problem of mixing in my own fields.

Comments Reflecting Stigma to Using Markets

- I wish there were a special store for seed. Why? It would be easy to go there and not be seen by others. It is not good when you buy seeds from the market: everyone might know.

Quality of seed from market: farmer buyer assessment

As a double-check on understanding how market seed is valued, farmers were also directly asked to assess the quality of seed normally on offer. While the sample size was small (20 farmers) the results were consistent across all four markets and across crops (Table 18). In normal times, one can find adequate seed quality on the market and often good quality seed. (As we will see in the crisis analysis, this assessment changed slightly—and downward—but not dramatically.)

Table 18: Farmer Buyers, seed quality assessments (N=20) Four markets in Douentza Circle: March 2006

	millet	sorghum	cowpea	groundnut
observations	15	15	14	11
less than normal	0	0	0	0
average	1	1	2	2
good	13	13	11	8
missing	1	1	1	1

Again, qualitative comments help nuance the response. It is easier to get good seed if the varietal differences are visible—and for the local varieties farmers generally feel they can control this aspect. The big challenge is with the seed which comes in packets—the seed from the formal (private) sector of horticultural crops. Farmers complain that they have few information tools for judging one batch from another.

General comments on markets and farmer use

- Cereals

All farmers interviewed did give some explanation about how they can make sure that they buy seed only of a locally well adapted variety: e.g. farmers prefer to go to local small scale vendors who sell millet grain as a source of income, often women farmers; or farmers know certain grain dealers who tend to have good quality local seed, or farmers go to specific farmers in specific villages who are known to have stocks for sale. All farmers explained how they can recognize the grain traits of their preferred varieties. Especially in the Boni market in Haïre commune, purchase of grain for use as seed had already started for pearl millet, as farmers wanted to make sure that they can access seeds of the locally preferred varieties.

For the cereals, it is difficult to estimate the quantities or proportions of seed procured from markets in comparison to the own production or local exchange, as so many social rules and expectations are attached to the use of home produced seed. The team saw, however, that commerce in pearl millet seed is quite lively (whatever the cultural stereotypes might portray).

- Legumes

As varietal specificity, also in terms of adaptation, appears to be much less of an issue for these crops, farmers are less concerned about the geographical origin of the seed and the varieties of these crops. However, social pressure as among seed/grain sellers and buyers is also strong to provide a certain level of guarantee to customers.

Seed Production Villages

We end this section of market seed, by commenting on an unusual but important phenomenon in Douentza Circle, the existence of seed production villages. A cluster of villages in Haïre are renowned for producing high quality pearl millet seed (i.e. villages of Tabi, Tega, Touperre, Sariegner, and maybe others). The villages produce an especially early-maturing variety needed for the more arid and northern areas of Douentza Circle. This variety is also highly sought after in other areas of the Circle and beyond. These villages help provide seed security for a broad swath of Douentza Circle and surrounding areas in normal times. Development priorities should be to keep these production villages functional and even strengthened. Following the crisis period, farmers came to these villages (e.g. Tabi,) from other regions such as Timbuktu, Goassi, Gao, and Burkina Faso to buy critical millet seed, which then sold for up to 25,000 FcFA/100 kg versus the normal (15,000). We elaborate further on the importance of these villages in Part VI.

Formal sector

The overview discussion of seed sourcing strategies in normal periods would not be complete without some discussion of the formal seed sector, that is, the circuit which produces certified seed, always of varieties emerging from public research system or private sector. We also add some brief comments on seed-related agro-enterprise in the region in general, as its limited scope parallels formal sector challenges.

New (modern) varieties of rice

Douentza Circle basically has a modest (very small) formal seed sector, with rice (mainly for the irrigated areas) being the sole certified seed on offer. Tables 19, 20 and 21 present the actual quantities multiplied in the zone. (Other crops such as millets, sorgho, groundnuts, etc. are produced in other secondary seed centers, such as Babouogu, M’Pessoba, Dalabari and Samanko.). Note in the Tables below (for the years 2004-6) that the great majority of rice seed is sold, and especially so during a crisis period (Table 20) — when humanitarian agencies tend to give seed aid.

Table 19: National Seed Service- Mopti: Rice Seed 2004 (kgs) (before the crisis)

Variety	Quantity available	Quantity sold	Remaining Stocks
Gambiaka	35,940.	35,940.	0
DM16	6,487	6,487	0
BH2	13,784	9,784	4000
Khao	13,709	5,709	8000
Total	69,920	57,920	12,000

source: Rapport annuel Chef d’Antenne: Service Semencier National-Mopti

Table 20: National Seed Service- Mopti: Rice Seed 2005 (kgs) (during the crisis)

Variety	Quantity available	Quantity sold	Remaining Stocks
Gambiaka	36,710	36,710	0
DM16	8,669	8,669	0
BH2	19,558	19,078	480
Khao	20,709	20,709	0
Swethossoki	4,513	4513	0
Total	90,159	89,679	480

source: Rapport annuel Chef d'Antenne: Service Semencier National-Mopti

Table 21: National Seed Service- Mopti: Rice Seed 2006 (kgs) (after the crisis)

Variety	Quantity available	Quantity sold	Remaining Stocks
Gambiaka	43,276	n/a	n/a
DM16	5,236	“	“
BH2	15,018	“	“
Khao	14,246	“	“
Swethossoki	9,466	“	“
Mut	8,114	“	“
Total	95,356	“	“

Source: Rapport annuel Chef d'Antenne: Service Semencier National-Mopti

New (modern) varieties of other crops (not rice)

Within Douentza zone, in terms of modern varieties of other crops, interviews with farmers suggest that there have been attempts at introduction, but that the modern varieties of other crops have been generally rejected by farmers, or are still grown, but on reduced scales. Some examples,

- In the commune of Dangol-Bore, farmers at Falembougou recount that varieties of millet, sorghum and cowpea were introduced by Winrock International in 2001, 2002 and 2003, with the pearl millet variety ‘Toronion’ also introduced by Appui Contre La Pauvrete (ALCOP). Some still cultivate these on small surfaces areas, but at least 7 UPA had harvest failures. In Kirou, new varieties of sorghum and millet were introduced, and, in Amba, millet was tested—but all without success. Within Dangol-Bore (within the eight villages interviewed) success cases were reported in a single site, Bore town, with pearl millet (variety ‘sunafin) and sorghum (variety ‘kenikelilen). Both were valued because of their early maturity. The other failures have been mainly due to the long cycle of varieties.
- Within the commune of Djaptodji, the National Seed Service introduced varieties of millet and sorghum at Poye, but these failed; similarly tests of new millet and sorghum varieties failed at Wakere and pearl millet varieties failed at N’Gouma. At M’Beba, there seems to have been some success with new millet and sorghum but the descriptions remain vague.
- In the commune of Haire, farmers’ experience has been much the same as in the other two communes. Among the seven villages visited, new varieties were introduced successfully only in one village Boni, and this consisted of sorghum varieties which were cultivated in wetter areas..

So, in terms of modern varieties , *except for rice*, the consensus seem to be that those on offer have cycles that are too long or for other reasons are not adapted to the prevailing (local) rainfall and agro-ecological conditions.

New Varieties- (local) from other adjacent regions

This does not mean that farmers in Douentza zone have not had success with new varieties (they have)—but these generally have been local varieties, originating from other zones. Some examples:

- In the commune of Dangol-Bore (with interviews in eight villages), farmers in Doumbara mentioned a pearl millet variety from Bandiagara which did well (but no longer exists in the zone).
- In the commune of Djaptodji (with interviews in eight villages), farmers in Ngouma mentioned new pearl millet varieties coming from Niger and from the seed production villages around Boni.
- In the commune of Haire (with interviews in eight villages); farmers in Boni mentioned that varieties that come from the Dogon area generally do well.

This does not mean that all new varieties from elsewhere are welcome. Generally the new local varieties are introduced (or brought back) by those who have migrated elsewhere and then returned (often young men for work). The migrants specifically seek out the early-maturing varieties.

In brief, farmers have been exposed to few successful innovations from formal services. They have, however, sought out new varieties from other zones. Villagers suggest they have had little access to information about new varieties—but that their interest in experimentation is high. They have well-articulated needs: they want first early-- maturing varieties (this is a bottom-line requirement for this zone). In areas where the parasitic weed *Striga hermonthica* has gained ground, they are looking for *striga*-resistant varieties of pearl millet. Farmers who have access to better watered garden plots also consistently ask for seed of the horticultural crops: beet, Irish potato, carrots, cabbages. They are looking beyond food security to income-generating crops geared for urban/town sale.

Agro-enterprise: some brief observations

Here we add but a few words on agro-enterprise as, like the formal seed sector, it is not well developed in Douentza Circle. Overall, the SSSA team assessed such enterprise as virtually non-existent, with a single possible exception at Nissinata (see below). While not really agroenterprises, some farmers' organizations do exist with the Circle to encourage seed and food security. These include cereal banks, seed banks, and several women's groups which have organized around issues of horticultural production. Brief commentary appear on these below. The SSSA team was unable to visit these enterprises in the field and cannot confirm how or at which level they continue to operate. We list them simply to indicate that such organizations have been contemplated within Douentza Circle. More follow-up on these might be merited.

Cereal Banks

- In 1992, in M'Beba village (Djaptodji commune), a cereal bank was created via a 770,000 FcFA loan from the national bank (BNDA). It seems to have generated profits of 700,000 FcFA which are used regularly to buy legume seeds, which are then sold to farmers. The bank also sometimes funds the purchase of pearl millet.
- In Sobo (Djaptodji commune) The Near East Foundation helped create a cereal bank via a loan of 400,000 FcFA. This loan has been completely reimbursed and 150,000 FcFA remain in the association's coffer.

- In Touperre (Haïre), a bank was created again with the support of the Near East Foundation, (1,500,000 FcFA). The cereal bank of Touperre gave 950,000 FcFA to the village of Tega.
- Other cereal banks seem to have been established in Wakerre (Djaptodji); in Nyongolo (by the Appui pour la Lutte contre la Pauvrete- ALCOP), in Nokara (by NEF); in Boni (by NEF) and in Falembougou, based on a loan from BNDA. In Deri (Djaptodji) there is also apparently a cooperative for both the sale of pearl millet and forage (*bourgou*). No other details on these are available.

Seed Banks

- A seed bank has been created by ALCOP in Doumbara to facilitate access of certain farmers to key varieties.
- In 2005, Afrique Vert established some communal seed banks in N'Gouma to help distribute to the zone 50T of seed, of which 36 consisted of pearl millet seed from Tabi and 14T consisted of sorghum seed from the National Seed Service at Segou.

Women's Associations

- ALCOP is helping women in Doumbara manage a horticultural perimeter.
- In Falembougou (Dangol-bore), another women's association seems to be managing a horticultural perimeter (no other details).
- In Deri, women's group recently established a perimeter with support from CRS
- In Nissinata (Haïre), there may be evidence for a single agro-enterprise. Women here reportedly manage a watermelon field which they use to subsequently produce soap and oil.

In brief, agro-enterprise outlets seem to be operating on a very modest scale. The majority of cereal banks and seed banks were said to be having financial difficulties and need support. Again, the team could not confirm these accounts.

Seed Sourcing and Enterprise: summary comments

As this section has shown, farmers use varied channels for sourcing seed. Given the local specificity (narrow adaptation) of the cereal crops, of pearl millet but also sorghum, farmers aim to source this seed mainly from their home production, and give priority to this. Legumes, in contrast (groundnuts, Bambara nuts and cowpeas) suffer from significant storage constraints (particularly high insect damage). This means that most farmers on a routine basis source their legume seed on the market.

Farmers constantly weigh different strategies for sourcing seed. While these vary by crop, seed sourcing is also shaped by farmer resources and preferences. In general, in terms of sourcing seed from any channel, the following base conditions have to be met:

- one has to know the variety—and have sufficient knowledge to believe it will grow under his/her specific farming conditions;
- The quality of seed has to be 'believed' to be acceptable (If one cannot see quality, one has to have faith that the source delivers good seed—so social ties are important);
- The seed has to be of acceptable cost (or able to be bartered);
- The seed has to be available in time for planting;

- The seed has to be available in sufficient quantity to fill seed needs or complement quantities garnered from other sources.

Perhaps because the harshness of the zone and the exigencies to have certain types of varieties, traders here seem to give unusual attention to distinguishing between seed and grain. Generally, farmers rate the quality of seed found on the market as good.

For similar reasons, specialized seed production villages have emerged in Douentza Circle, specifically in Haire. These villages produced quality seed of the narrowly-adapted pearl millet varieties which are used in the more arid zones, but which are also sought after in others areas within and beyond Douentza Circle.

Finally, the large majority of seed in Douentza Circle is sourced from home production or via seed/grain markets. The formal sector and associated seed and cereal banks operate only at minimal scales.

VI. DISASTER IMPACTS AND SEED SECURITY: THE VIEW FROM FARMING AND TRADING COMMUNITIES

The stress events within Douentza Circle 2004-05 are best put in a context of a series of stress events. As mentioned in Part III, some areas suffered in 2003-04 from flash floods. Also, the post-disaster harvest of 2005 was not a good one. However, in terms of contrasting stress versus non-stress, it is not easy to determine what a normal or good year might be in this zone as, during the last decade, harvests have been irregular and fluctuating. It is against this background that we look at how farmers in Douentza Circle evaluated the impacts of 2004-05 and 2005-06 stresses, discuss their response strategies and assess their immediate and longer term needs.

Extent of loss—farm level quantitative data.

For much of the quantitative data on harvest loss and seed security estimates, the SSSA team chose to work in large village groups (15 to 60 persons). While perhaps counter-intuitive for precision, these groups allowed farmers to discuss (and debate) the consequences of the stress periods together, and to jointly assess (and publicly) what average losses might have been. While the data below might not be exact ‘to the decimal’, we believe they certainly fall within the realm of ‘relative truth’. Further, they do not suffer from the false realism of individual (sensitive interviews) which may be conducted a) among people who do not trust each other and/or b) with single respondents who may not understand the concepts or quantitative units defined by the interviewer. In brief, we feel that the numbers and trends presented below are accurate (and we have attempted to cross-check them in a variety of ways).¹

¹ Within this region, quantitative data on harvest is challenging to get for a number of reasons—beyond the basic mis-connects mentioned above. Farmers measure in units of various sizes, one bag is not equal to another. Second, when populations are confronting hungry periods, they often harvest the fields in a staggered manner, continually eating what first matures on the vines or stalks for roots. Seed sourcing data similarly suffers from realistic practice. Farmers may buy bulk seed/grain on the market (for which they know the quantity) and then eat some and sow some, not measuring the proportional amounts. Also, farmers in this region (as described in Part IV) often re-sow fields—and then re-sow again. Keeping quantitative records of seed quantities may not be their priority.

Via village group interviews (24 villages, 27 interviews), the SSSA team pieced together an overview of the seed stress and seed security issues of the last 3-4 four years in Douentza Circle, with a focus on the three communes of Djaptodji, Haire and Dangol-Bore.

Table 22 summarizes the overall production figures per ‘Agricultural Production Unit’ (APU) as estimated by village groups for the key crops in the region. It is important to signal that in the psyche of villages a ‘normal’ year, that which was used as the base of comparison, is basically a ‘good year’, although good years are becoming fewer and farther between. As Table 22 indicates, the 2004-05 season was one of truly sharp production declines, across major crops. The irrigated rice yields (covering very modest expanses) were relatively better than the other crops. The last season 2005-06 has been a better one, but yields are still half of what would be considered an acceptable norm.

Table 22: Crop Production (kg.) in Douentza Circle (3 communes) as Estimated by Villages Groups

Crop	Normal Year Harvests by ‘APU’ *	Harvests in 2004 by ‘APU’	Harvests in 2005 by ‘APU’
Pearl Millet	2263	165	1285
Sorghum	1244	15	198
Rice (rainfed)	1765	689	786
Cowpea	220	2	41
Groundnuts	526	6	75
Bambara Nuts	141	6	36
Hibiscus	208	7	87
Rice (irrigated)	1250	1250	750**

* ‘APU= ‘Agricultural Production Unit’ and is translated from the French ‘Unite de Production Agricole’.(UPA). It is a standard measure in Mali and refers to the group (usually family which manages their agricultural plots in a joint manner.

** This figure is low as in one of the rice areas, near Sobo (Djaptodli) farmers have been working on the management of the perimeter basin and sowing rice only in limited in very small quantity. So this depressed production figure is not related to the stress.

Seed Sourcing strategies also changed over the same relative period. Table 23 focuses on seed stocks available from home production (recognizing, as shown in Part V, that ‘home production’ is the norm for the cereal crops but not for the legumes.). As the table shows, the sowing period for 2004, before the stress, was basically a normal year. For both 2005 and 2006 relatively less of the seed stock has come from home production. Complementary questions showed that nearly all of the gap was filled by market purchase of seed. There were isolated cases of farmers deciding to reduce the size of areas cultivated, because of seed shortages (in Bore, Doumbara, Manko), or due to labor declines (because of out-migration spurred by the stress), but these were the exception rather than the norm. What is remarkable about Table 23, is the relatively small amount of cereal seed, and particularly pearl millet seed obtained through home production. Supplies even for the upcoming season, 2006, will be topped off from the market. In Douentza Circle, market seed acquisition for the cereals is definitely considered a ‘second-choice strategy.’”

Table 23: Quantity (kg) of seed needed overall and available from ‘home production’. by crop

Crop	Qty needed in a normal year, by ‘APU’	Qty available from home production by APU, 2004	Qty available from home production by APU, 2005	Qty available from home production by APU, 2006
Pearl Millet	132	115	23	71
Sorghum	67	56	9	22
Rice (rainfed)	133	138	62	85
Cowpea	7	6	7	3
Groundnut	17	14	1	3
Bambara Nut	16	12	1	1
Hibiscus	11	11	1	2
Watermelon	3	3	1	1
Rice (irrigated)	60	60	60	60

Table 24 presents the communities’ assessment of their own seed security. It bears emphasis that the SSSA team did not promise seed aid delivery (even if some farmers presumed it.). We also were careful to describe seed security as being able to access seed from anywhere, that is, being able to get it from home production, but also from other sources, such as the local markets or friends/relatives.

The results in Table 24 are rather interesting. The sowing period of 2004 was a ‘normal’ one: this was prior to the drought/locust crisis. Yet, across crops with the exception of the irrigated rice, and minor crops of water melon and hibiscus, farmers assessed that some members of their village were not seed secure. It was a small portion, but a constant one which had insufficient access to seed, suggesting that even in normal times, in this stressed zone, some farmers (particularly the very poor) may not be able to satisfy all their seed needs. The data from 2005 are also revealing. While this was a period of dramatic stress, with crop production levels tumbling, villagers clearly felt that the large majority of farmers found a way to access seed, and certainly gave strong priority to this.. Similarly in 2006, even though some farmers may have suffered two or three years of poor harvest, farmers are mobilizing to find seed (and in the absence of outside seed aid).

So in brief, during this period of production shortfall, the great majority of farmers in Douentza Circle have been seed secure (see next sections on ‘qualitative insights’ for nuances of this discussion). This observation does not mean that farmers in this circle did not suffer greatly, and in multiply ways. Farmers may have sold animals, sold jewelry, and resorted to famine foods to be able to maintain seed and to buy seed of acceptable quality. But lack of seed security was not a major problem. The bottom line is that farmers who live in stress zones may be able to live there because of a determination to meet the basics--- and seed is a basic need.

Table 24: Percentage of ‘Agricultural Production Units’ (APU) who have ‘seed security’

Crop	Number of ‘APU’ who sow specific crop	% of seed secure APU’ in 2004	% of seed secure APU’ in 2005	% of seed secure APU’ in 2006
Pearl Millet	156	91	84	82
Sorghum	142	92	72	81
Rice (rainfed)	162	89	80	86
Cowpea	144	90	91	81
Groundnut	142	90	87	76
Bambara nut	90	89	80	69
Hibiscus	179	99	86	98
Watermelon	33	98	88	83
Rice (irrigated)	28	100	100	80

Box 9 further gives a sense of the explicit actions that are put in place to ensure seed security. It presents the example of just one village, Sobo, which organizes itself to work collectively so all have needed seed. Interestingly, the women seem to do this on a continual basis, while the men organized explicitly only during the period of crisis.

Box 9: Organizing for Seed Security: The Case of Sobo

Women in Sobo have decided to take issues of seed security seriously—and into their own hands. Strong insect attack on the legumes (cowpea, Bambara nuts and groundnuts) mean that they can't store these seeds at all. Their strong interest in horticultural crops (onions, tomatoes, peppers and tobacco) also ties them to the market, season after season. While women grow seven different crops, only the seed of tobacco and pepper seeds can be sourced from their own family stocks. This adds up to a lot of money---and sometimes substantial risk.

Sobo women have united to help promote their seed security and named their association. "Dounkafa" meaning: "Eat until you are satisfied". Women of the village, all of them, contribute to the association's coffers: 50 FCFA every week to pay for the legume seed and another 100 FCFA every month to purchase the even more expensive garden seed. Delegates fetch the legume seed from neighboring Douentza town. The horticultural varieties (sold in packets) can be sourced from towns of Douentza, Korientze or Mopti. Seed is divided evenly, for example three bowls of cowpea (2 kgs) for each.

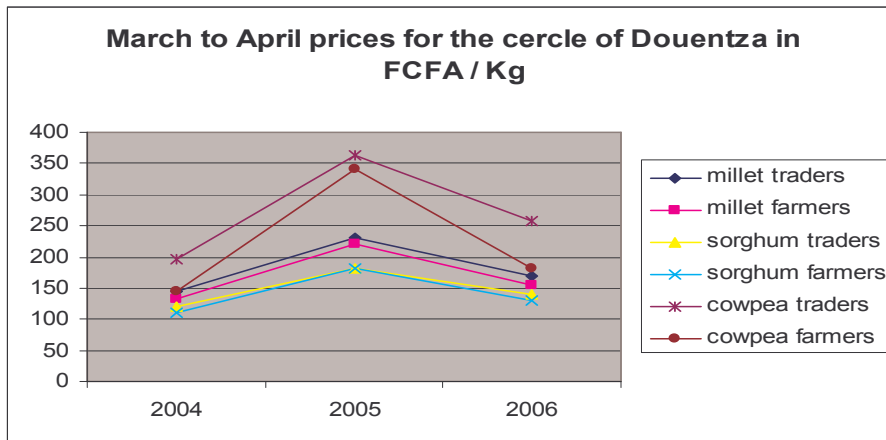
Men of Sobo have also organized ---but only after the crisis of 2004-05. Then each contributed to the male community pool to buy their highly valued millets. Again, a small set of delegates made the journey to Douentza town to buy millet seed for entire male group.

Market level quantitative data

Market prices are also a good general indicator of potential stress during this 2004 to 2006 time span (that is, starting with a normal period of sowing, then moving into two stress periods.) The SSSA team collected price data from both traders (wholesalers and retailers) and, independently, from farmers buyers. (Note that traders were not matched with respective buyers. Rather a set of traders was interviewed at four markets, and a set of buyers interviewed at four markets).

Figure 9 presents an overview of prices for three main crops in Douentza Circle. What is first remarkable is the degree of concordance between trader and farmer recall on prices, even though the former specializes in this business and the latter only occasionally buys. Their concordance both on the level of price data and the trends in price data over the three periods suggests that the figures have a good deal of accuracy. For pearl millet, sorghum and cowpea, the price trend was clear. In 2004, after a good year (2003-04), prices were low; they rose sharply during sowing in 2005, after the crisis, and have not yet fully recovered in 2006, although there seems to be a downward trend.

Figure 9: (price data from farmer and trader interview)



Figures 10 and 11, present the data of two crops individually to show the magnitude of price differentials more clearly. The trends are the same across crops.

Figure 10

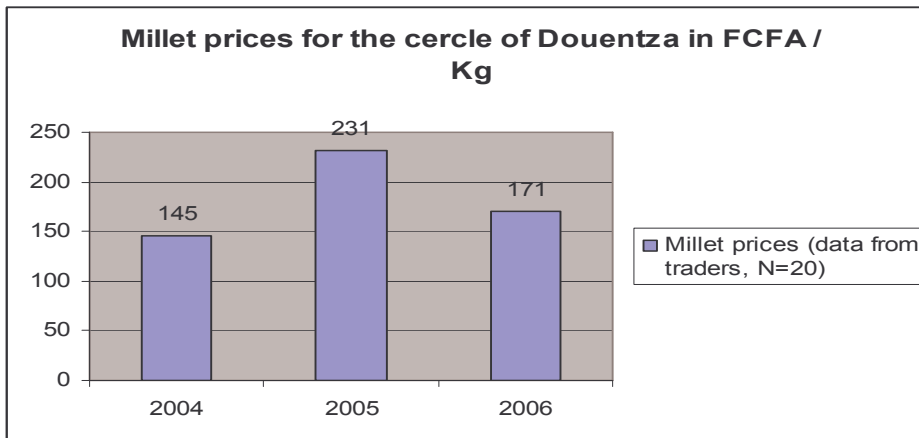
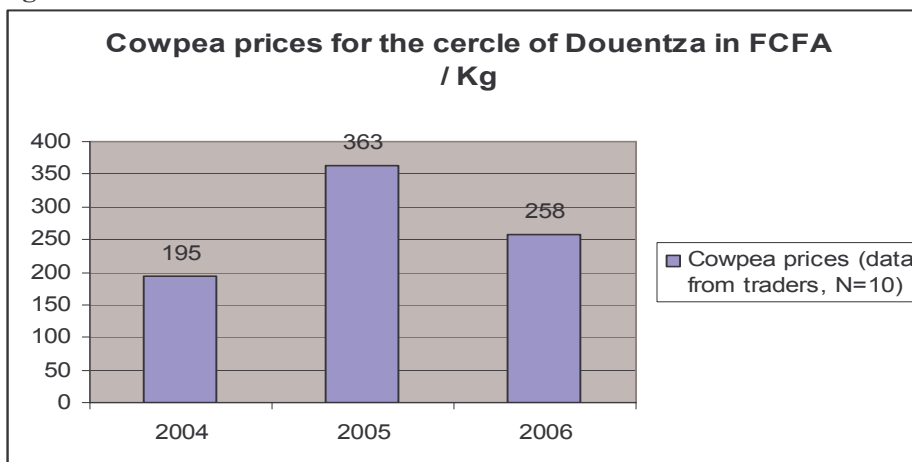


Figure 11



The trends in this farmer and trader crop price data are also broadly similar to the official figures, as reported via the Early Warning System data collection (Part III). However, In terms of absolute price, the field level data are slightly higher. This may be for several reasons. First, many of our respondents answered in the unit of bols, which we converted to Kg (3 bols = 2 Kg). It is possible that the government office has measured in larger quantities, eg. bags (sacs) of 100 Kg and therefore obtained lower prices. Second, and maybe more importantly, we have presented averages of grain and seed prices, while the government data are grain prices. On occasion, seed prices are higher than grain prices.

Market level Seed Quality Data

We also considered overview data on seed quality available on markets, in the thick of the crisis (sowing period for 2005) and the year after (the current sowing for 2006). Overall, farmer assessments suggest that the quality of seed is still average or good, across crops (and with not much difference between 2005 and 2006). This data set, however, (and even though modest in scale), is slightly less positive than the assessments farmers made for the quality of market seed in normal years (see Table 18). The problem in select areas seems to have been in accessing the preferred and adapted cereal varieties (particularly pearl millet) in sufficient quantity for all during the stress periods. We follow up on defining this constraint in the next section.

Table 25: Farmer Buyers, seed quality assessments (N=20)
Four markets in Douentza Circle for period after crisis, 2005 sowing

	millet	sorghum	cowpea	groundnut
observations	17	17	12	11
less than normal	3	3	3	2
average	3	4	2	3
good	9	8	6	6
missing	2	2	1	0

Table 26: Farmer Buyers, seed quality assessments (N=20)
Four markets in Douentza Circle for period after crisis, 2006 sowing

	millet	sorghum	cowpea	groundnut
observations	18	14	9	8
less than normal	3	3	1	0
average	6	4	5	5
good	9	6	3	3
missing	0	1	0	0

So, in sum, overall production and price figures suggest that 2005 was a hard year for farmers (in terms of production fall and seed/grain price). The following year 2005-6 was not one of good harvests, and prices remain elevated now in 2006. Seed quality issues (specifically variety quality) also were occasionally cited as an area of concern for the cereals. However, in the majority of cases, the quality was deemed acceptable or even good, across crops. So, in general, seed security does not emerge as a formidable issue for farmers in Douentza circle. Farmers reiterate, again and again, that they made sacrifices in other ways to get they seed they needed. Animals were sold, tools were sold, and youth left for work. 'Hunger' emerged as a theme particularly in 2005 and famine foods were eaten. Adults may have skipped meals, even for an entire day to preserve food for children. and particularly the elderly complained of lack of enough food to have the force to sow and tend fields. Both the effects of labor outmigration, as well as decreased labor energy probably had a negative effect on yields (but this direct link remains to be

documented.). Note that with pearl millet weeds are a major constraint, and weeding is the main labor requirement for millet cultivation.

In the next sections, we turn further to these more qualitative insights from farmers and from traders on the 2005-06 period. These more nuanced discussions help to indicate the less pronounced seed-related challenges farmers in Douentza Circle faced, how they solved them or how select needs still remain.

Farmer insights on stress periods/qualitative comments

The aggregated quantitative data, above, suggests that all was “semi-well’ in Douentza zone during the crisis and post crisis periods. Here we look at some of the social support networks (which did or didn’t function), and delve further into differences among the three communes to understand further subtleties of what was happening on the ground.

Social Networks and Seed

As indicated in Part V, on seed sourcing, the general cultural idiom in the region is that people should share seed, especially of the cereals. Via social networks, farmers may give, lend, exchange and occasionally sell seed. Seed can also be ‘bought’ in return for a day’s work (labor) on another’s farm. In terms of gifts *per se*, farmers in a range of villages (Kirou, Segue) indicate that the amounts are ‘symbolic’: farmers cannot expect to receive free seed in larger quantities.

During the crisis (2005 sowing and after), and across villages, farmers consistently reported that these social networks virtually didn’t function, except at very small scale. Farmers mention that the availability of home saved seed was simply low: extra amounts were minimal (Kirou) and/or that seed could come from neighbors only if payment was in the offing, e.g. the borrower was ready to sell an animal (Poye).

Interestingly, it is the traders (see section. trader insights crisis/stress periods, below) who filled the gap to extend the social ethic of seed lending and gifts.

Seed security differences among communes

Separating out villages discussions, commune by commune (and in some cases village by villages) also helped the SSSA team understand seed security concerns in slightly greater detail.

- Djaptodi

Djaptodji is an area where one finds multiple agro-ecologies and seasons. During the crisis, what most affected the population was the steep rise in seed prices (and this rise was severely felt by farmers across Dounetza Circle). The market continued to furnish adapted varieties across a range of crops and the demands for specific varietal adaptation are not that rigorous (except for specific dryland areas of pearl millet production). Also seed quality was quite adequate (except for a modest dip in 2005, see Table 27A). Here many non-seed issues guide what can be planted. The transhumance of cattle means that late-maturing crops are destroyed by herds on the move. It is here that the sale of forage (*borgou*) provides a particularly important source of income. In terms of seed issues, what emerged in Djaptodji was basically an access problem: people are poor and spent more money than usual on seed. Seed was available, of good quality, but the price was high.

- Haire

Haire is at another extreme in Douentza Circle. The scarcity of water and deep water table means that horticultural crops do not perform particularly well in this zone and that ‘minor crops’ are even more minor than in other parts of Douentza. The harsh conditions also mean that pearl millet reigns supreme, with sorghum being limited to areas with water stagnation. Because of these constraints, and especially the narrow adaptation of its pearl millet, farmers here ferociously save their millet seeds and, it is in this commune that ‘seed production villages’ have evolved (Tabi, Tega, Touperre, Sariegner) to ensure seed security for much larger expanses. During the crisis, people came here (e.g to Tabi,) from other regions such as Timbuktu, Gossi, Gao, and Burkina Faso to buy millet seed, which sold up to 25,000 FcFA/100 kg versus the normal (15,000). For the cereals, seed quality was not a problem here even during the peak of the crisis (sowing 2005—see Table 27B). As varieties are so finely-tuned to the context, and villages expressly organized to guarantee their own seed stocks as well as stocks for larger-scale sale, the focus in this zone needs to be on food. Food has to be given here in sufficient quantity and at appropriate timing, that farmers can keep the maximum of their own production and seed stocks. It is in a zone such as this that ‘seed security’ most directly correlates with ‘food security’. Also, bolstering up seed security here, translates into bolstering up seed security in the wider Douentza region as Haire is the key regional source for adapted pearl millet varieties. In brief, seed security here is not the main problem, food security is...in this particularly harsh zone. Looking more longer-term, development agencies might strategize how to maximum further seed production from this area: that is, how to bolster already impressive efforts of the ‘seed production villages.’

- Dangol-Bore

Of the three communes, Dangol-Bore seems to have suffered most during the crisis: it has neither the agro-ecology diversity of Djaptodji to draw on, nor the focused efforts to guarantee adapted varieties of the Haire area. The commune of Dangol-Bore wasn’t necessarily harder hit than the other two, although this area occasionally also had flash floods. Here, in common with the other two communes, prices steeply rose across crops, and the legume seed (groundnut, Bambara nut and cowpea) is always very difficult to store. Overall, seed security issues (and problems) were the same here as elsewhere, with one exception. Some farmers here (not all),complained of the difficulty of accessing preferred sorghum and millet varieties on the market during the crisis period. They were there, but not in sufficient quantity to meet the heightened demand in 2005. Thus, some farmers did resort to sowing seed of unadapted pearl millet varieties which had come from southern Mali. Table 27C shows some of the dissatisfaction with the quality of cereal stocks in 2005 (even in ‘home production’). While planting of inferior cereal seed in 2005 may have lead to lower harvests in 2005 in restricted zones, the team was not able to establish the decline directly as too few sites were sampled. Certainly most farmers interviewed in Dangol-Bore felt the quality of their 2006 stocks better than 2005 and generally good. So in brief, Dangol-Bore suffered from high prices as did the other two communes and, like others, they had access seed ‘access’ problems in 2005. In addition, there is some evidence that sufficiently adapted cereal seed was not on offer, so seed quality of the central crop may have also aggravated stress. Ensuring that well-adapted pearl and sorghum seed are available for 2006, for all, should be a priority concern.

Seed quality of home production

In references to these three communes, farmers’ assessments of the quality of their own home production reflect the trends above (Table 27 a,b,c). For the cereals, the most important crops, Haire and Djaptodji maintained quality throughout the 2005-6 period. Dangol Bore suffered important quality drops, particularly decreased access to adapted varieties in 2005, although adapted materials are increasingly entering fields this upcoming (2006) season.

Table 27: Home Production: Farmer assessments of seed quality by crop and year (by % of respondents)

A. Djaptodji

Crop	2004			2005			2006		
	g	a	p	g	a	p	g	a	p
scores*:									
Pearl Millet	100			75	13	13	100		
Sorghum	100			71	14	14	100		
Cowpea	100			71	14	14	100		
Groundnut	100			100			100		
Wandzou	100			100			100		
Rice	100			100			100		

* good=g; average= a; poor= p

B. Haire:

Crop	2004			2005			2006		
	g	a	p	g	a	p	g	a	p
scores*:									
Pearl Millet	100			75	13	13	75	25	
Sorghum	100			75	13	13	75	25	
Cowpea	87	13		50	37	13	50	50	
Groundnut	87	13		50	37	13	63	37	
Wandzou	87	13		57	22	22	63	37	
Rice	n/a			n/a			n/a		

* good=g; average= a; poor= p

C. Dangol-Bore

Crop	2004			2005			2006		
	g	a	p	g	a	p	g	a	p
scores*:									
Pearl Millet	100			50	37	13	75	25	
Sorghum	100			50	37	15	75	13	13
Cowpea	87	13		62	37		50	37	13
Groundnut	75	25		62	37		50	37	13
Wandzou	75	25		62	37		50	37	13
Rice	75	25		25	75		25	50	25

* good=g; average= a; poor= p

We round out this discussion of farmers' qualitative insights during the stress, with a sample of their comments on seed sourcing during this period (Box 10).

Box 10: Sourcing Seed: Select Farmer Comments during and after crisis			
<p><i>Aissata Ongoiba, from Fombori village at the Douentza market:</i> After the crisis the market continued to function, but there was a problem of availability. For each market day only one truck came, instead of 3-4 normally. Especially at the time of sowing, when people came from surrounding areas we had to get up early, to be at the place where carts arrive early to get anything to sell for use as seed.</p>	<p><i>Alou Kassambara, Doumbara:</i> There is not one family in this village who did not send someone out to the cities to earn money, to pay for our food, but also for seed for sowing. We will now start organizing a collection of seeds from surrounding villages and markets, to make sure we can get the right varieties.</p>	<p><i>Women farmer Douentza market</i> I obtained my seed from the market, but it was really from farmers in the nearby area. Maybe because I sow small quantities, I was able to do as I always do: ‘as usual’.</p>	<p><i>Male farmer, N’Gouma</i> We had the millet in home stocks [after the drought and locust attacks], but it isn’t wise to sowed seed from a failed harvest. It is better to go for rejuvenated seed [from the market] —if you can.”</p>

Trader insights on crisis/stress periods: qualitative comments

Interviews with traders helped flesh out what happened to the seed markets during the period of crisis and beyond. As we have already reported, trader insights in terms of price (first section, Part VI) we focus on concerns specific to their trading occupation.

Overview of markets and zones of seed acquisition:

Overwhelmingly traders indicate that the stresses of locust and drought did not change marketing structures and patterns. Traders sourced seed from the same geographic zones as always, all major and minor markets still held their routine marketing days, and farmers circulated without risk and fear. The large majority of traders said that seed was easily available, with one trader from Ngouma confirming that in his 12 years of trading (and across a series of crisis in Douentza), seed has always been available. Note of course, that seed availability is directly related to means: if one has the trucks, the storage facilities, and the funds to pay cash, seed can be found. It is rather the smaller-scale traders, competing with but bicycles and with no storage depots, who may find it difficult to source seed quantities quickly. Among the 19 traders interviewed, only a single one complained of having problems getting the seed he wanted. This was a smaller-scale trader in Boni seeking out pearl millet and sorghum varieties. As note above, Boni is one of *the* central regions for supplying this specialized seed : demand (and competition) for the best seed is high.

The SSSA team found it difficult to get an idea of the varying scales on which trades sold seed/grain. At the modest end, one female farmer (Boni) sold only her own, very specialized production (and she had no problem with seed availability in 2005). At a much larger scale, several traders in Ngouma spoke of selling 12-20 tons of cereal per season (presumably only some of which went for seed). Perhaps, the team interviewed traders working on even larger scales, but this is not possible to verify.

Credit/Gift Policy

One of the biggest concerns, traders faced during the period of stress (and the depressed economy after), had to do with giving credit or loans of seed. Credit, of course, forms a routine part of traders business: they may give seed before sowing, and then expect to be paid in cash at harvest: 16 of the 19 traders interviewed (84%) said they routinely gave credit.

In 2005, and particularly at sowing, the scale of demand for seed credit escalated. The team in Ngouma saw one record book where upwards of 400 farmers had taken loans around that period. Seventeen of the 19 traders (89%) claimed to have given loans during the crisis, not just 'to do business' but also to meet their social obligations of supporting the community. Several of the larger-scale traders interviewed suggested that they had not expected some of the loans to be repaid (given the very modest resources of the borrowers). Having said that, several have indicated that they are surprised by the high level of continuing non-payment. The trader who recorded 400 loan transactions, indicates a year later, that less than half have been repaid. One of the traders moving 20 tons of seed/grain in 2005, says, today, he is restricted to 2-3 tons, as a result of his lending liquidity problems. One of the consequences of high levels of non-repayment is that a good number of traders are not giving loans for 2006. Only 12 of the 19 (63%) are committed to continuing credit, and most say they will do so only on a more modest and a much more selective scale (i.e. he/she who borrows should have good prospects for repaying.)

The Impacts of the Disaster: summary comments

In summarizing the effects of the disaster(s) in Douentza Zone, the following emerge as the main findings.

- In both 2005 and 2006, there have been marked production declines in the cereals, pearl millet and sorghum, which are also the main crops of the zone.
- To compensate for some shortage of seed stocks on farm, villagers have been using the market to access additional seed.
- Overwhelmingly villages describe themselves as 'seed secure'. They have found the means to save seed, or to buy it on the market. Social networks have not contributed significantly to ensuring seed security in these stress periods.
- While seed has been generally available in the market, two types of problems should be noted (and addressed).
 - Prices rose significantly in 2005 and have not stabilized in 2006: they are still elevated. While farmers have generally given priority to buying seed, this has not been done without cost. Animals have been sold (key for traction), agricultural equipment has been sold (which is needed for preparing and sowing fields), and many have simply out-migrated to seek much-needed labor income. Because farmers have had 'seed access' problems, important assets have been liquidated.
 - In some areas of the commune of Dangol-Bore, farmers also report seed quality problems. They were not able to access the right kind of cereal seed (especially pearl millet variety), from surrounding markets in 2005. Some quantities were available, but not in sufficient quantity to meet escalating demand. Ensuring that well-adapted pearl millet and sorghum seed are available in this commune for 2006 sowing should be a priority concern.

- The existence of specialized seed production villages in the commune of Haire should be seen as a real boost for seed security in this zone. A range of villages produce the specialized (narrowly-adapted) varieties needed for the more arid areas, but which prove also to be highly sought in others areas of the Circle... and beyond. Seed security in Douentza Circle partially depends on keeping these seed production villages functional. Two types of actions are important here.
 - Seed stocks need to be maintained. In this vein, food security (and food aid) may be *the* key for promoting seed security. Food aid can help farmers keep stocks for their own use, but also for sale.
 - Efforts should be made to intensify production in these renown seed villages (e.g. Tabi, Tega, Touperre, Sariegner). To assess what might best reinforce their capacity, further diagnostic work focused on seed village production strengths, weaknesses, and opportunities need best be carried out.

We now move the concluding section, which links the findings of the Seed System Security Assessment in Douentza to needed practical humanitarian and development action.

VII. IMPLICATIONS FOR ACTION

The Seed System Security Assessment (SSSA) in Douentza clearly highlighted a number of seed system-related constraints which farmers face in the short-term (associated with the stresses of the last few years), but also in the medium term. The articulation of these stresses should help guide concrete actions of Catholic Relief Services (CRS) within Douentza Circle.

A. Short-Term Assistance, via Livelihood Fairs

CRS is planning a set of livelihood fairs to be held in Douentza Circle prior to the sowing season of 2006 (hence in the period May- June 2006). In response to the stresses identified, the SSSA team recommends that vouchers be given to allow farmers to access goods listed in Box 11. The explanation for the choice of these goods follows below.

Box 11:	CRS: Livelihood Fairs 2006 in Douentza Circle:
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Priority to be given to

- | | |
|--|--|
| | <ul style="list-style-type: none"> ▪ Seed of local varieties of pearl millet and sorghum (with clear focus on their specific adaptation) ▪ Seed of local varieties of legume crops, particularly cowpea and groundnut ▪ Seed of local, early-maturing varieties, from neighboring adapted zones ▪ Farm equipment (shovels, hoes, wheelbarrows, etc) ▪ Small livestock (sheep, goats, poultry) ▪ Improved rice varieties, proven adapted for Delta zone ▪ Seed treatment products to be used prior to sowing |
|--|--|

Seed of local varieties of pearl millet and sorghum (with clear focus their specific adaptation)

Farmers in Dangol-Bore certainly need access to the local varieties specific to their zone. (Simply, some have been using sub-standard types). Traders should be invited fairs who draw stocks locally from this commune, as well as from the highly sought after Haire varieties. More broadly, across the three communes, farmers are poorer due to asset sale of the last several years. Help with accessing the desired cereal seed stocks will alleviate their financial burdens elsewhere.

Seed of local varieties of legume crops, particularly cowpea and groundnut

Across the zone, farmers routinely source large amount of legume seed off-farm and in markets. Again, the priority should be to invite traders who draw stocks from within adapted areas (see Box 7) and who, more generally, take care to distinguish seed from grain. The rationale for giving vouchers here would be a poverty (access) one. Farmers will buy this seed anyway and CRS might help them receive the same desired seed 'free'.

Seed of local, early-maturing varieties, from neighboring adapted zones

Throughout the period of the SSSA, farmers requested more information and greater access to earlier – maturing varieties, especially of the cereals. At this point there are no research-derived varieties of sorghum or pearl millet which have been sufficiently tested on farm so as to justify their diffusion with a humanitarian fair. (Such testing of novel varieties, however, should be a major thrust in CRS' medium-term plan, below). Locally, however, there do exist early-maturing varieties which are adapted to the stress conditions of the Circle. Farmers mentioned some of these as coming from the Dogon area, and one, trader (from Bore), on his own initiative, said he would seek out early-maturing varieties and put them on offer (as seed for testing). In brief, explicit efforts should be made, within the fair to give farmers' access to early-maturing varieties of pearl millet and sorghum, already proven adapted and in use in the region. At least one trader indicates he has the knowledge and sources to deliver this specific planting material.

Farm equipment (shovels, hoes, wheelbarrows, etc)

Simply, farmers (and many farmers) sold this basic equipment when in stress; they need it replaced.

Small livestock (sheep, goats, poultry)

As above, these assets were sold when in stress: they need to be renewed, particularly to jumpstart income generation. Note that what many farmers requested as priority was the replacement of *larger draft animals* (and access to draft animals). It is not clear how or if CRS can accommodate this request/need in the short-term.

Improved rice varieties, proven adapted for Delta zone

For the upcoming livelihood fairs, there are small clusters of farmers (in Djaptodji) who sow in irrigated areas and who use improved of rice. They have requested that such research-derived varieties (multiplied as certified seed) be made available at fairs to help them renew their much-recycled rice seed stocks.

Seed treatment products to be used prior to sowing

Finally, to minimize losses against soil insects, birds, and the first initial infection with downy mildew and smut (for pearl millet), seed treatments will be made on offer in limited quantity. The product best-known

within the zone (Apron Star) is used just prior to sowing. CRS should confirm that it has already been used safely when applied under farmer practice (which may not always correlate with recommended practice).

B. Medium-Term Assistance: Seed/Agriculture -Related

Within the SSSA, two seed-related constraints were identified which are having profound, negative, impacts on production: loss of legume seed in storage and the rising menace of *Striga* on pearl millet, particularly in Haire. In addition, farmers want to open up opportunities for testing early-maturing varieties across a range of crops (legumes and cereals), as well as to gain more horticultural knowledge and access to such vegetable seed. Via the format, of Farmer Field Schools (FFS), CRS and partners are launching an 18-month applied research and development program to address these three impact-oriented themes. (Box 12).

Box 12: CRS Medium-Term Assistance: Seed/Agriculture -Related Themes

- Development of Methods to Control Storage Pests in Legume Seed
- Introduction of Improved varieties addressing range of needs:
 - early-maturing
 - income generating (horticultural production)
- Development of Methods to Control *Striga*

Development of Methods to Control Storage Pests in Legume Seed

Storage losses of the legume seed (cowpea, groundnut and Bambara nut), are widespread and severe within Douentza Circle. They are so commonplace that the routine strategy for most farmers is to access such seed, every season, from the seed/grain markets. Apparently, products are on offer to limit damage in storage, but the few farmers who have used them fear their toxicity. A range of control methods needs to be tested within Farmer Field Schools. Current local control practices are widely tried (such as using ashes, fine sand and urine) but apparently not sufficiently effective to stop high storage loss.

Introduction of Improved varieties addressing range of needs:

early-maturing

Farmer in this zone are eager to test new varieties and particularly early-maturing ones of pearl millet and others crops. Within the current research profile, varieties of cowpea and possibly groundnut, can be made on offer immediately, on an experimental basis. In the medium-term there are also good prospects emerging for early-maturing pearl millet varieties. FFS will provide the cadre for testing these.

Before introductions will be made on farmers' fields for broader promotion, there has to be strong evidence that a) varieties are adapted to zone and b) that they meet producer consumer preferences. It is

always advisable to do the first promotions on a small-scale (in test, ‘risk-free sizes for farmers) and to ensure that sufficient information accompanies the varieties to help farmers make *informed* decisions.

Income generating (horticultural production)

Horticultural production is particularly important for women, and for their income generation. There were farmer requests to broaden the range of crops used in the zone (beets, for example were mentioned), and to help farmers to learn to discern better among the packets of seed available. It is ironic that some farmers mentioned that they know least about the quality of ‘seed in packets’. When accessing seed from markets or neighbors, farmers can see the varieties and part of their quality attributes: also they know the provenance. In contrast, the certified seed packets, for them, is somewhat of a ‘black box.’ So efforts here might focus on testing new crops, experimenting with different varieties of the same crop, and also on helping farmers to decipher written ‘seed packet’ information.

Development of Methods to Control *Striga*

In the medium-term agricultural action plan, varied approaches to controlling *Striga* need to be tested. (Note that ICRISAT has recently finished a survey on this theme in Douentza Circle which can provide important baseline information) (personal communication, E. Weltzien). Within Douentza Circle, *striga* is found problem primarily on pearl millet, and in Haire commune, where cropping densities are somewhat higher than elsewhere in the zone.

C. Medium-Term Assistance: Initiative to deal with POVERTY (access) problems

Finally, it is important to highlight that CRS is also implementing programs to try to address the chronic economic stressed in Douentza Circle. These initiatives focus on extending *Micro-credit* and exploring *Agro-enterprise* opportunities seek to address the core problem in Douentza zone, which is one of widespread poverty and declining livelihood base. These potential activities fall beyond the scope of the seed system security assessment. They will demand their own thorough and ongoing diagnoses to figure out the types of enterprises and market possibilities which can best unfold in this chronically stressed, primarily agricultural zone.

Box 13: CRS: Medium-Term Assistance: Initiative to deal with POVERTY (access) problems

- Micro-credit
- Identification of Promising Agro-enterprise opportunities

Attaining seed security goes well beyond a focus on seed or even agricultural systems. CRS’ moving into areas of micro-credit and agro-enterprise attest to its insights that poverty, above all, contributes to production instability in Douentza Circle.

To become truly seed secure, farmers in Douentza Circle will also need assistance from varied pools of expertise. The SSSA team would encourage CRS to seek out partnerships, broadly and in-depth. Already, via this SSSA, we have seen how excellent a ‘facilitator for action’ CRS can be.

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ANNEXES

Annex I

PARTICIPANT LIST: SSSA/ESSS

Participants à l'atelier ESSS		
Nom	SSSA/ESSS	Titre
Nom	Titre	Structure
Sekou Salla Boré	coordinateur du projet DCC	CRS-Mopti
Dogola Coulibaly	adjoint chef antenne	SSN-Mopti
Bamba Abderahamane	Suivi évaluateur	CRS-Mali
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Soungalo Traoré	Liaison -Recherche-Vulgarisat	DRA-Mali
Cheik O Keita	chercheur	CRRA-Mopti
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M'Pè Ballo	chef antenne	ONG Afrique Verte
Alassane Maiga	chercheur	IER/URC-Bamako
Fassory Sangaré	assistant chercheur	IER/ECOFIL
Moussa Kanouté	technicien de recherché	ICRISAT
Baba Sanogo	technicien de statistique	DRPSIAP-Mopti
Hamidou Guindo	chargé de suivi des parcelles	USC/SOS-Douentza
Boureïma Konta	chef S/Secteur	Service Agri-Douentza
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Janine Scott Shines	chef de bureau	CRS-Bamako
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Louise Sperling	senior scientist	CIAT
Eva Weltzien	principal scientist	ICRISAT
Moussa B. Sangaré	chef programme	CRS/ Mali

Annex II

Itinerary: Seed System Security Assessment in Douentza Circle

Date	Action
5 march Sun	Arrival of facilitator
6 mar, Mon	preparation Bamako
7 mar, Tue	Travel to Mopti
8 mar, Wed	Training in Mopti
9 mar, Thu	Training in Mopti
10 mar, Fri	Training in Mopti
11 mar, Sat	Travel to Douentza, market interviews in bore
12 mar, Sun	Market interviews Douentza
13 mar, Mon	Village interviews: Dangol-Bore
14 mar, Tues	Village interviews Djaptodji
15 mar, Wed	Village interviews Haire
16 mar, Thu	Market interviews Boni and N'Gouma
17 mar, Fri	Analysis of results
18 mar, Sat	Analysis of results
19 mar, Sun	Prepare report
20 mar, Mon	Presentation in region: Gouvernat, Mopti
21 mar, Tue	Return to Bamako. report back
22 mar Wed	Depart Bamako