



**CGIAR Research Program
Climate Change, Agriculture and Food Security (CCAFS)**

Summary of Household Baseline Survey Results:
Cinzana, Mali



December 2011

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Summary

This report presents the results of household baseline survey carried out in 7 villages of the Cinzana site (Ségou region, Mali) in January 2011, within the framework of the CGIAR research program on Climate Change, Agriculture and Food Security (CCAFS). The objective of the survey was to gather baseline information at the household-level about some basic indicators of welfare, information sources, livelihood/agriculture/natural resource management strategies, needs and uses of climate and agricultural-related information and current risk management, mitigation and adaptation practices. Subsistence agriculture and extensive livestock (cattle and small ruminants) production are the main economic activities at the site, and livelihood sources for the majority of the households. Agriculture is diversified with more than 7 crops cultivated by the households in general. However, inputs such as fertilizers and pesticides as well as machinery are barely used. Approx. 76.3% of the households surveyed own each at least 5ha of land. The households reported several changes in their farming systems over the past ten years. Some of the changes mentioned were related to the introduction of new crops/varieties as well as new breed. The main reasons of crop and livestock related changes reported were market prices fluctuations, changing climate conditions, pest/diseases, land and labor. Food security is mainly derived from own (on-farm) production and secondarily from off-farm activities. On average, 51.1% of the households reported being food secure all year while 39% were food secure during 10 months and 9.9% less than 10 months in the year. More than 80% of the households have reported receiving information on climate/weather over the past year. Main types of information were related to extreme weather events forecast, start of the rain season forecast, 2-3 months forecast and 2-3 days forecast. Men are the most dominant recipients of the information which they share with household members and neighbors in the village. Radio remains the main information source at village level. Farming advices often precede the forecast information and often households make use of the advices to improved decision-making processes at farm level. Collective action for agricultural and natural resource management-related activities appears to be very developed. Savings and credit, agricultural productivity improvement groups were the most common types of farmers' groups. Regarding asset ownership, approx. 70% of the households have reported 1-3 assets while only 21.3% have more than 4 assets. Most dominant assets were radio, cellphone, donkey carts, and bicycle.

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1. Introduction

The CCAFS program is a strategic ten-year partnership between the CGIAR and the Earth System Science Partnership to help the developing world overcome the threats posed by a changing climate, to achieving food security, enhancing livelihoods and improving environmental management. It brings together the world’s best strategic research in the fields of agricultural science, development, climate science and earth systems science to identify and address the most important interactions, synergies and tradeoffs between climate change, agriculture and food security. As a collective effort, the CCAFS program aims to become a hub that facilitates action across multiple CGIAR centers and research programs, as well as involving farmers, policy makers, donors and other stakeholders. Their knowledge and needs will be integrated into the tools and approaches that the CCAFS’ program develops.

This report presents the results of the household baseline survey conducted in January 2011 in seven villages (Folanassibougou, N'Tlomabougou, Tongo, Siekourani, Kamanago, Dougakoungo, Kallan) of the Cinzana Site (Ségou region in Mali) (Figure 1). The objective of the survey was to gather baseline information at the household level about some basic indicators of welfare, information sources, livelihood/agriculture/natural resource management strategies, needs and uses of climate and agriculture-related information and current risks management, mitigation and adaptation practices. The questionnaire and training materials associated with it, including data entry and management guidelines can be found at <http://ccaafs.cgiar.org>

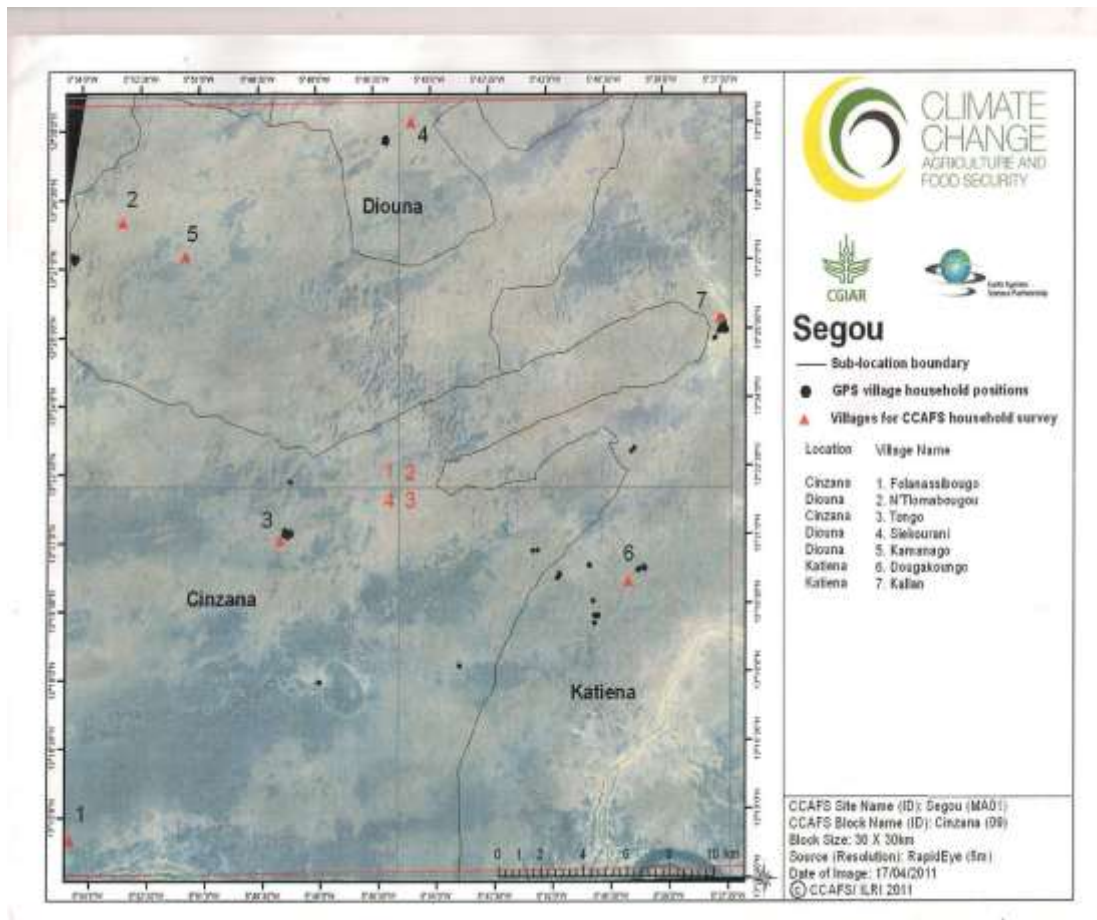


Figure 1. Location of the villages (Cinzana site)

The questionnaire was structured around the following key sections:

1. Household respondent and type
2. Demography
3. Sources of livelihood
4. Crop, farm animals/fish, tree, soil, land and water management changes
5. Food security
6. Land and water
7. Inputs and credits
8. Climate and weather information
9. Community groups
10. Assets

2. Household respondent and type

2.1. Household respondent

Of the 141 households surveyed, about 93.6% of respondents were men, and only 6.4% of women. Men (married, single, divorced or widowed) household heads dominate (98.6%) against 1.4% for women (single, divorced, widowed or husbands were absent).

2.2. Types of household

Three household types were identified based upon their size criteria, namely i) small-sized households (1-3 members), ii) medium-sized households (4-9 members) and large-sized households (> 10 members). Households with more than 10 members represent more than half (51%) of the total households, with about 1872 people, making 78% of the population of all households.

Figure 2 and 3 show respectively the proportion of household member of non-working age (younger than 5 and older than 60 years) and household members of working age (between 5 and 60 years). There are approx. 83% of the households with more 40% of members aged <5yrs or >60yrs, and 17% with non-working members between 40 and 80%. In more than half (58%) of the households, members of working age (between 5 and 60 years) represent between 60-80%. Across all the villages at the site, household members of working age represent 71% of the total population.

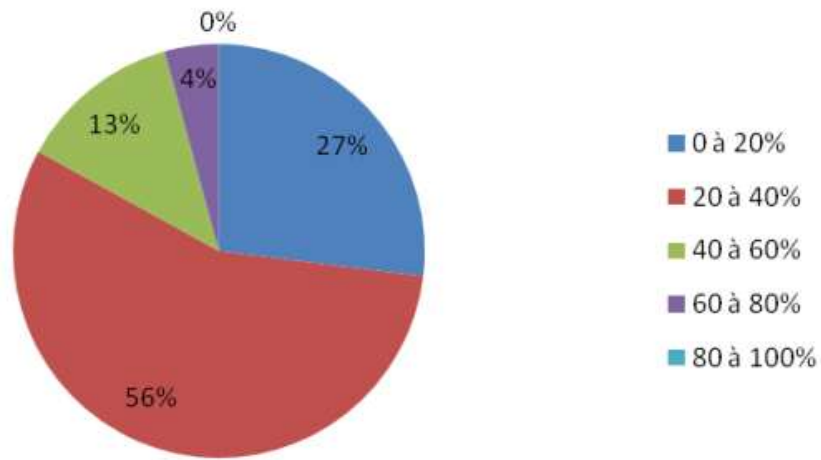


Figure 2. Percentage of people of non-working age

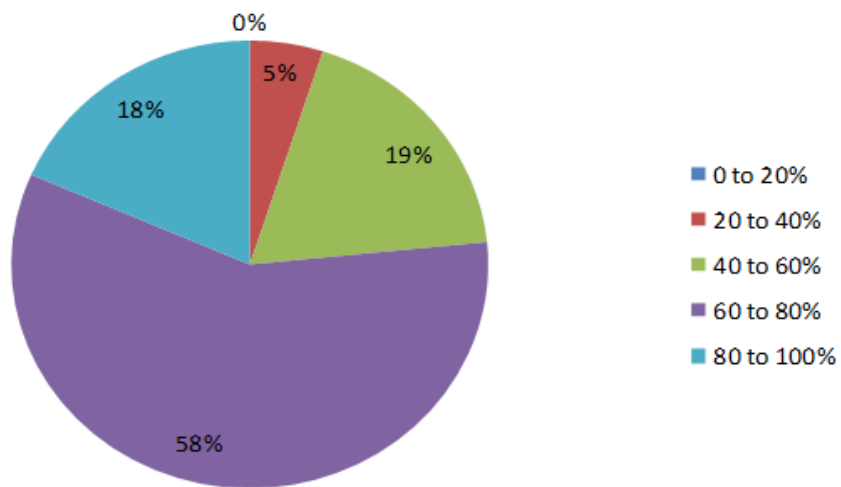


Figure 3. Percentage of people of working age

2.3. Education level

Table 1 provides information on the educational level of the households surveyed. The vast majority of the households (70%) reported having at least one member with a primary education. About 24% of household have no member with a formal education.

Table 1. Education level per household

Level of education	Household	
	Number	%
No formal education	35	24.9
Primary	101	71.6
Secondary	5	3.5
High education	0	0.0

Table 2. Highest education level and household size

Level of education	Household 1-3 pers		Household 4-6 pers		Household 7-9 pers		Household 10 +	
	No	%	No	%	No	%	No	%
No formal education	3	8.6	7	20	14	40	11	31.4
Primary	1	1	7	6.9	21	20.8	72	71.3
Secondary	0	0	0	0	1	20	4	80
High education	0	0	0	0	0	0	0	0

3. Sources of livelihood

3.1. On-farm livelihood sources

The figure below highlights household's production, consumption and sale of agricultural products at the farm level. Subsistence agriculture remains the main economic activity of production with about 85.1% of households involved in agriculture. Major crops grown are millet, sorghum, and maize. About 40% of households surveyed grow cash crops (sisal, cotton, sugar cane), and about 71% are involved in fruits production. In terms of agricultural diversification, approximately 86.5% of households produce more than seven products. Livestock (large and small ruminants) rearing is also an important activity, and is practiced by over 80% of households.

Concerning the consumption pattern, about 85.1% of households consume the products grown on their own farms. About 86% of households also consume meat from the small ruminants they rear. Sales concern mainly small ruminants (87.2% of households), cattle (40.4% of households), livestock products as well as cash crops (27.7%).

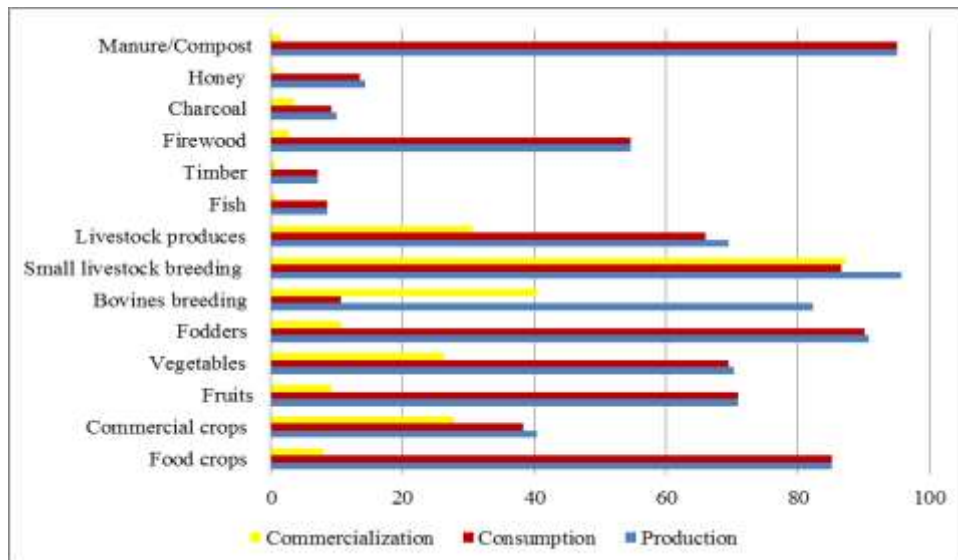


Figure 4. Percentage of households producing, consuming and selling of various agricultural products from their own farm

3.2. Off-farm livelihood sources

Approximately 45.4% of households consume off-farm products. Fruits and fish are consumed (respectively 74.5 and 91% of households). Very few households are engaged in trade of off-farm products for their livelihoods. Products sold are fruits (9.2% of households), firewood (7.1% of households) and food crops (6.4% of households).

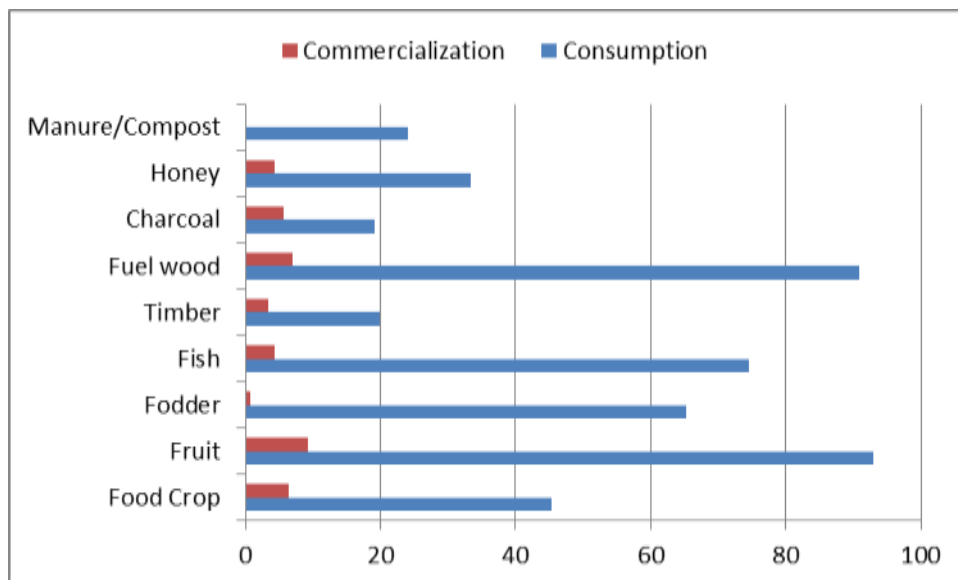


Figure 5. Percentage of households producing, consuming and selling of various off-farm agricultural products

3.3. Diversification indices

A production diversification index was created by adding up the total number of agricultural products produced on-farm:

1=1-4 products (low production diversification)

2=5-8 products (intermediate production diversification)

3=more than 8 products (high production diversification)

Regarding the selling/commercialization, the total numbers of agricultural products produced on their own farms, with some of the products sold were added up:

- 0=no products sold (no commercialization)
- 1=1-2 products sold (low commercialization)
- 2=3-5 products sold (intermediate commercialization)
- 3=more than 5 products sold (high commercialization)

The results of these diversification indices are shown in Table 3. About 65% of the household surveyed have a high production diversification index, while 30% of households have an intermediate production diversification index. Regarding the commercialization, 53.2% of the households have an intermediate commercialization index, while 12.1% have a high commercialization index.

Table 3. Diversification indices

Production diversification	% of households
1 product	2.1
2 or 3 products	33.3
4 or 6 products	64.5
Selling/commercialization	
No product	4.3
1-2 products	30.5
2-3 products sold	53.2
4-6 products sold	12.1

3.4. Farm labor: who does most of the work on and off-farm

Figures below show the distribution of tasks (work) within and outside the farm. The majority of the household tasks are the responsibility of the men (55.32 of household responses), while in 32.63% of the households; these tasks are performed by many members of the households. More than half of the households surveyed (55.32%) indicated that men bear the responsibility of off-farm activities/tasks and in 36.88% of the cases, all household members are involved.

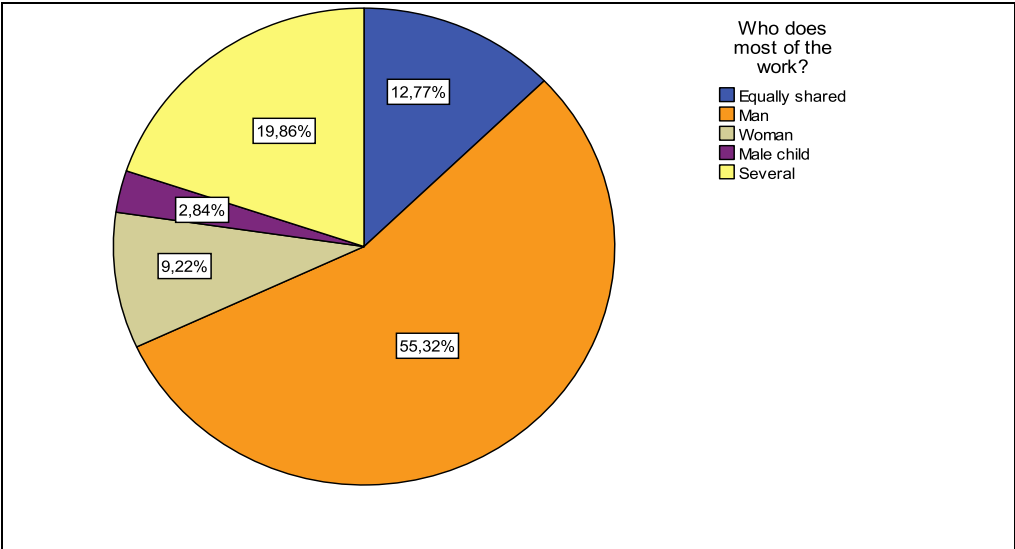


Figure 6. On-farm labor responsibilities

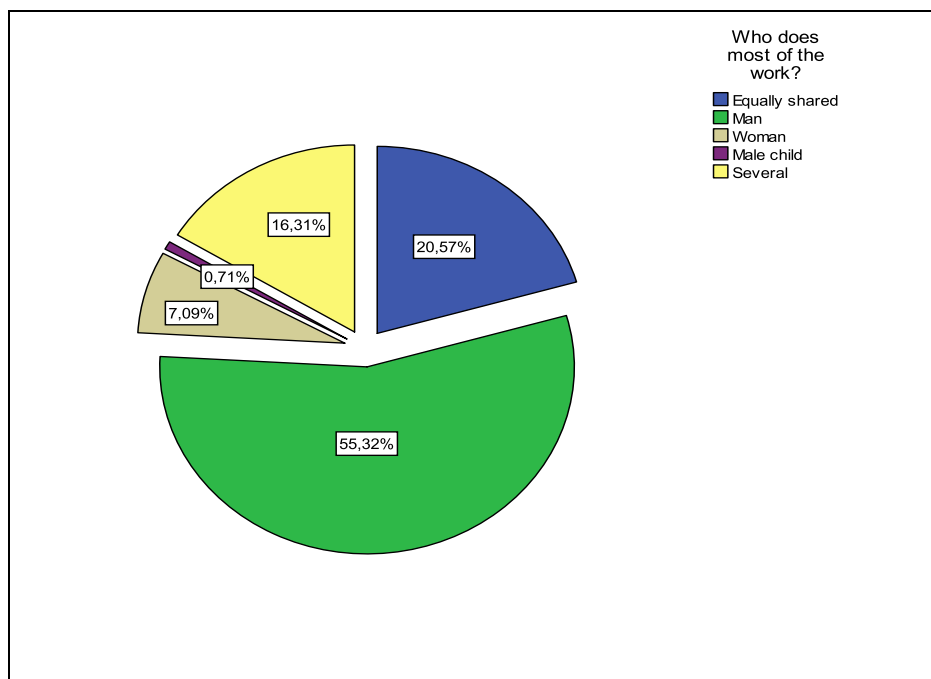


Figure 7. Off-farm labor responsibilities

3.5. Sources of cash incomes

The table below shows household's sources of income. Loan/credit (formal and informal), business and employment on other peoples' farms are the main sources of cash income, with overall 72% reporting receiving cash from these sources.

Table 4. Sources of cash incomes

Sources of cash incomes	% of households
Employment on someone else's farm	12.5
Other employment	9.6
Business	24.3
Remittances or gifts	7.5
Payment for environmental services	1.1
Payment from projects/Government	1.3
Loan/Credit from formal source	14.1
Loan/Credit from informal source	21.1
Renting out farm machinery	4.3
Renting out your own land	1.9
No other source of cash	2.4

4. Crop, farm animals/fish, tree, soil land and water management changes

4.1. Crop-related changes

Approximately 87.9% of households reported having made changes in their farming system, with at least one change over the past decade. Changes made include:

- Adoption of new varieties: about 41.8% of households did not adopt any new varieties, while 37.6% and 20.6% respectively reported having adopted and/or introduced 1-2 and more than 3 new varieties on their farm.

Table 5. Adoption of new crops varieties during the past ten years

Changes of practices	% of households
No varieties introduced	41.8
1-2 new crops/varieties introduced	37.6
3 and more crops/varieties introduced	20.6

- Farming practices: approximately 49.6% of households reported having changed / adopted new agricultural practices, 45.4% have made no changes and only 5% of households have made more than 3 changes. Changes were the introduction of mechanization, land preparation in advance, early planting, late planting, pesticides/herbicides use, integrated pest management, integrated crop management.
- Water management: no change recorded
- Soil management: practices were reported, i.e. stopped burning, introduction of cover crops, mulching, soil and water conservation, tillage, rotation, etc. Roughly 25.5% of households reported having adopted soil management practices (> 2 practices), 25.5% (a single practice) and 25.5% of households (no practice).
- Agro-forestry practices: approximately 30.5% of households have planted trees. Other practices (not listed): only 0.7% reported having adopted practices not mentioned in the questionnaire

Table below summarizes the main farming system changes over the past ten years

Table 6. Changes in farming system

Practices	% of households
<i>Adoption of new crops/varieties</i>	
None	41.8
1-2 crops/varieties introduced	37.6
3 or more crops/varieties introduced	20.6
<i>Agricultural practices¹</i>	
No change	45.4
Adoption of new practices	49.6
More than 3 changes reported	5
<i>Soil management²</i>	
No change	36.3
1 practice	25.5
At least 2 practices	25.5
<i>Agroforestry management</i>	
None	69.5
Trees planted over the past ten years	30.5
<i>Other practices (not mentioned)</i>	0.7

¹ Introduction to machinery, land preparation in advance, planting in advance, late planting, start use of pesticides and herbicides, integrated pest management, integrated crop management

² Stop burning, introduction of cover crops, introduction to mulching, introduction to stones lines/bounds, rotation

Reasons for crop-related changes

When asked about the reasons for these changes, market, climate change, land, labor, insects, diseases and projects were listed by the respondents. Approx. 72.9% of households have made changes in their farming practices due to the market. The table below provides the main reasons and percentage of household that reported these reasons.

Table 7. Reasons for crop-related changes

Reasons for changes	% of households that have reported these reasons
Markets	72.9
Climate	45.0
Land	55.0
Labor	33.3
Diseases/pests	3.9
Projects	10.9

- Weather/climate reasons changes: 45% of households cited climate change as a major cause for the changes. The factors that led to these changes are given in the figure below. Approximately 65.5% of households reported irregular rainfall patterns as the major cause of changes in cropping systems., while other households (39.7%) attributed the changes to lower rainfall and drought (25.9% of households)

Table 8. Weather/climate reasons changes

Changes	% of households
More erratic rainfall	65.5
Less overall rainfall	39.7
More overall rainfall	3.4
More frequent drought	25.9
More frequent flooding	6.9
Later start of rains	29.3

- Land resource related reasons: 87.3% of households indicated declining productivity of land as a major cause of observed changes in land management (Table 9).

Table 9. Land resources related changes

Reasons	% of households
Land is less productive	87.3
Less land area	22.5
More land area	2.8

- Markets-related reasons: for 80% of households, the market was responsible for the changes reported in the cropping system through increased yields (greater supply), while 39.4% of the households reported best market prices that induced changes in cropping system.

Table 10. Market relates reasons

Reasons	% households
Best yield	79.8
Better price	39.4
New sales opportunities	34.0

4.2. Livestock-related changes

For livestock, over the last ten years, no animal was introduced by approx. 58.2% of households, while 38.3% of the households reported having introduced 1-2 more animals. Results show that:

- Herd related changes: 53.2% of households reported having made no changes to the herd;
- Animal management related changes: 80.1% of households have made no changes on animal management schemes
- Feed related changes: 73.8% of households have made no feed-related changes in the feeding (fodder growing, pasture improvement, storage of fodder)

Table 11. Household that have introduced new breed

Adoption of new breed	Households	
	Number	%
None	82	58.2
1-2 new breed introduced	54	38.3
3 or more breed introduced	5	3.5

The table below provides insights in livestock-related changes over the past ten years.

Table 12. Livestock-related changes

Changes	% of households
<i>Herd-related changes</i>	
None	53.2
1-2 changes	46.1
+ 3 changes	0.7
<i>Animal management</i>	
None	80.1
<i>Livestock feed³</i>	
None	73.8

Reasons of livestock-related changes

The reasons provided of livestock-related changes are shown in the table below. Market, climate change and animal diseases outbreaks are the major causes/reasons listed for livestock-related changes. Among the households surveyed, 73.9% have indicated market as the main cause of changes in livestock related changes (Table 13).

Table 13. Reasons of livestock-related changes

Reasons	% of households
Markets	73.9
Weather/climate	19.3
Pests/diseases	47.7

4.3. Adaptability/innovation index

An adaptability/innovation index was defined as the following:

0-1=zero or one change made in farming practices over last 10 years (low level)

1=2-10 changes made in farming practices (intermediate level)

2=11 or more changes made in farming practices (high level)

³ Cultivated pastures, rangeland improvement and storage of pastures

The table below shows that 87.7% of households reported changes (2-10 changes) over the past decade.

Table 14. Adaptability/Innovation index

Changes over the past ten years	% of households
2 - 10 changes (intermediate level)	87.7
11 changes or more (high level)	12.3

4.4. Mitigation indices

Several climate mitigation-related behavioral changes were used to create the following indices:

Tree management: This index shows whether a household has either protected or planted trees within the last year.

Soil amendments: This index shows if the household has used fertilizer in the last year, or have started using fertilizer or manure on at least one crop.

Input intensification: There are 7 changes in agricultural practices/behavior over the last 10 years considered here to create an index with 3 levels - no intensification (none of the following), low intensification (1-3 of the following), and high intensification (4-7 of the following). They are:

- Purchased fertilizer
- Started to irrigate
- Started using manure/compost
- Started using mineral/chemical fertilizers
- Started using pesticides/herbicides
- Started using integrated pest management techniques
- Planted higher yielding varieties

Productivity increase: This index shows if a household has reported achieving a better yield from any crop, or that their land is more productive for any crop over the last 10 years – such households are classified as showing an "increase in productivity". The table below presents the results.

Table 15. Mitigation indices

Index	% of household	
	None	Some
Tree management	11.3	88.7
Soil amendments	31.2	68.8
Input intensification	27	Low : 64.5 High : 8.5
Productivity increase	46.8	53.2

5. Food security

5.1. Food sources

The figures below provide information on the main food sources (on and off-farm) as well as the periods of abundance and shortage.

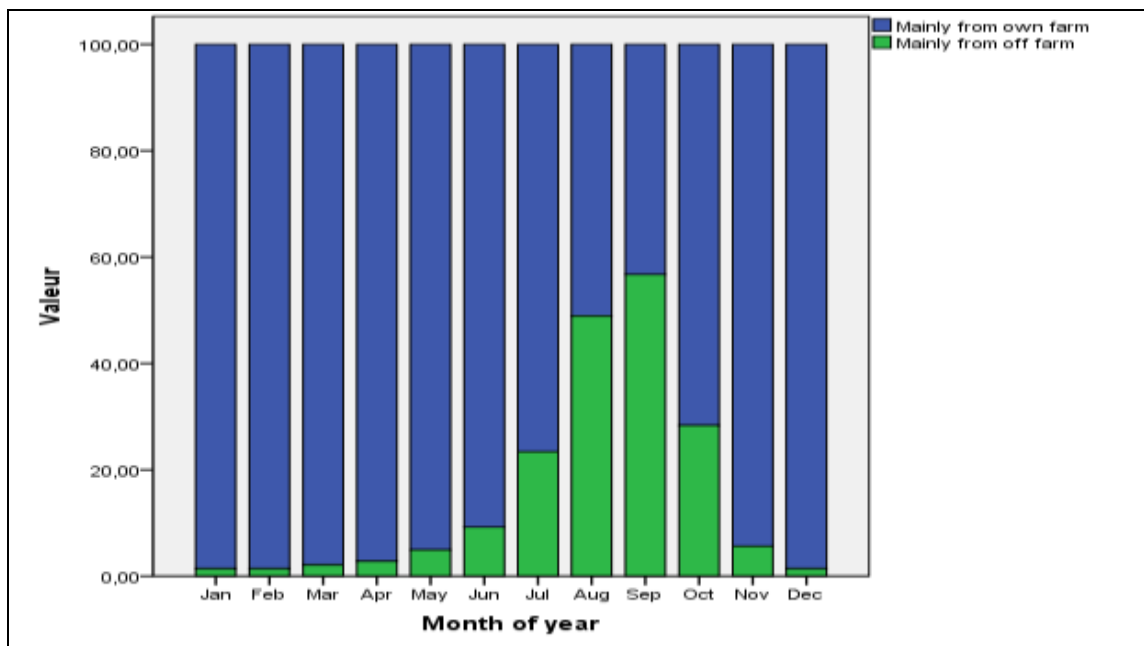


Figure 8. Household food main sources

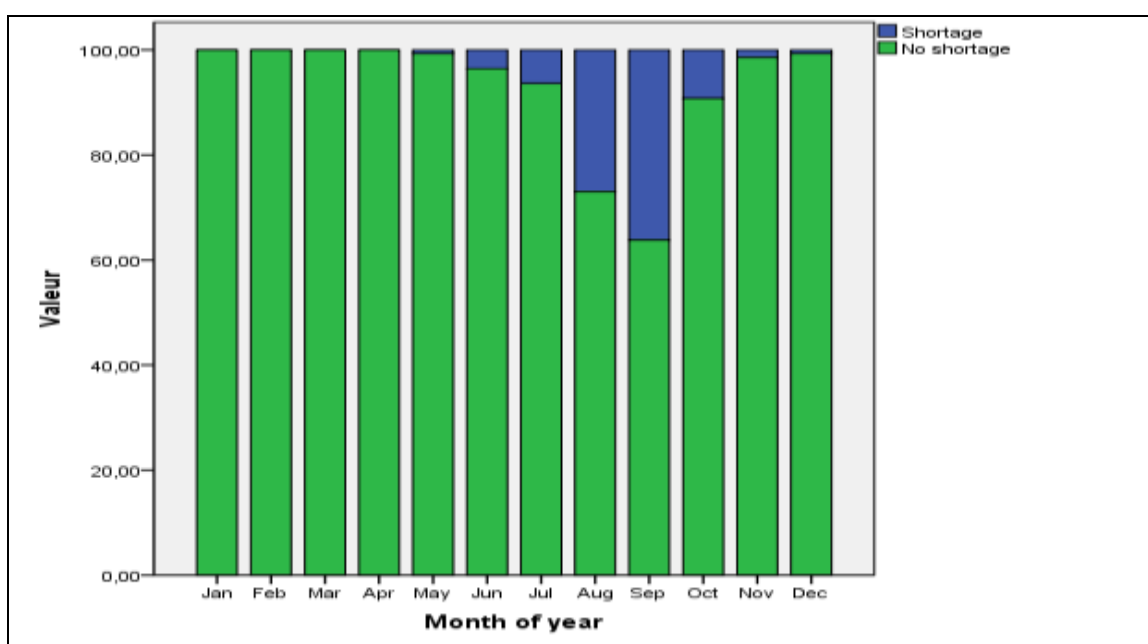


Figure 9. Household food shortage and no shortage periods

Results show that many households derive their food security from own production, with a little (mainly July to October) from elsewhere and/or off-farm activities. Food is therefore available most of the year, except in August to October period where food shortage/less is reported by the households.

Food security Index

The food security index we created is based upon the number of months that the household has difficulty getting food from any source (i.e. from their own farm or off-farm, from stores, gifts, purchases or transfers). Table 16 below shows that half (51.1%) of households surveyed were able to meet their annual food needs, while 39% of the households are food secure during 10 months and 9.9% food secure for less than 10 months of the year

Table 16. Food security Index

Percentage of sampled households		
< 10 months food secure	10 months food secure	12 months food secure
9,9	39	51,1

6. Land and water

6.1. Water for agriculture

Table 17 shows the sources of water for agriculture (not for domestic purposes). It appears that about 86.2% of households do not use any of the following sources (irrigation, reservoirs, dams, wells and pumps). They rely on rainfall for agricultural water.

Table 17. Water sources for agriculture

Water Sources	% of household
Irrigation	-
Tanks for water harvesting	1.4
Dams or water ponds	4.8
Boreholes	6.9
Pumps	0.7
None of the above	86.2

6.2. Land use

The land available for each household includes both land that is owned by the household and land that is rented. Table 18 shows average land available per household. Approximately 76.3% of households own over 5 ha of land. 87.7% of the households said they don't use communal lands solely for agricultural purpose, rather as grazing land. For land use, 41.4% of households use labor. The use of mechanization (tractors and other agricultural machinery) is very limited.

Table 18. Land available

Land owned/rented	% of household
Between 1 and 5 hectares	23.7
More than 5 hectares	76.3

7. Inputs and credit

Table below shows that inputs use is very limited. Approx. 48% of the households bought some veterinary products, while 18% bought some fertilizers and 13.7% of households have received credit for agricultural activities. Di-ammonium phosphate is the most used fertilizer (54.3% of households reported using this fertilizer) and on millet crop field (74.39% of households).

Table 19. Purchase of inputs over the past 12 months

Type of purchased input	% of households
Seeds	9.8
Fertilizers	18.0
Pesticides	7.0
Veterinary medicine	48.0
Credit for agric. activities	13.7
None of the above	3.5

Table 20. Types of fertilizers used

Fertilizers	% of households
Urea	34.8
NPK	8.7
DAP	54.3
Other types (not listed)	2.2

8. Climate and weather information

An analysis of which households are receiving any type of climate or weather-related information shows that approximately 80.1% of households reported receiving information on climate/weather, while 19.9% said no.

8.1. Who is receiving weather related information?

Men are the primary recipients of climate and weather information. Out of the households surveyed, 77.9% of women did not receive any information.

Table 21. Gender breakdown of different kinds of weather-related information

Type of information	% of HHs reporting that men are receiving the information	% of HHs reporting women are receiving the information
Extreme events	4.3	20.1
Pests & disease out break	2.5	10.7
Start of the rains	6.1	28.3
Weather for the next 2-3 months	3.1	8.2
Weather for the next 2-3 days	6.1	23.3
Women have not received any information	77.9	9.4

8.2. Types of information

The main types of information received are forecasts of extreme events (droughts, floods), the start of the rainy season and the weather forecast (2-3 days and 2-3 months).

Forecast of extreme events

Results show that 45.4% of the households surveyed received information on extreme events (droughts, floods). 70.7% of households said that they received the information through the radio, followed by relatives and friends. 89.1% of households reported that men are the main recipients of extreme events information.

Table 22. Extreme events information sources

Extreme events information sources	% of households
Radio	70.7
Television	4.0
Relatives/friends	20.0
Religious source	5.3

For those who have received and used forecast of extreme events information, the following management changes were made.

Table 23. Agricultural management changes

Changes	% of households
Nothing	8.3
Land management	8.3
Crop varieties	4.2
Inputs	4.2
Manure	4.2
Farm location	4.2
Agricultural calendar	75

Table 24. Diseases outbreak information source

Information source	% of households
Radio	74.3
Television	5.7
Relatives/friends	22.9
Own observations	2.9

Approx. 24.8% of the households surveyed said that they have received some information on disease outbreak last year. Radio still remains for 74.3% of the households the main source of information. Men received more information than women. Approx. 57.1 of the households who received the information were able to use them.

The following table highlights the measures/actions taken by the households. For instance 33.3% of the households have used this information to make changes in fertilizers use (seeds, fertilizers, pesticides) and 50% of households have made changes on agricultural calendar.

Table 25. Measures/actions taken following diseases outbreak information

Changes in agricultural practice	% of households
None	8.3
Land management	8.3
Inputs use (seeds, fertilizers, pesticides)	33.3
Time allocated to activities	50

Forecast of the start of the rains

64.5% of the households received information on the beginning of the rainy season last year. Radio was the primary provider for this kind of information for 68.4% of the households, while other

households highlight friends and relatives as main source of information on the start of the rainy season.

Table 26. Source of information on the start of the rains

Source of information on start of the rains	% of households
Radio	68.4
Television	2.6
Friends/relatives	22.8
Local forecast/local knowledge	0.9
Own observations	0.9
Religious sources	4.4

For those who received this type of information, 81.3% said it included advice and 71.6% of these households said were able to use the advice. Changes made associated with the advices were related to land management, changes of the timing of farm activities.

Forecast for the next 2-3 next months

Approx. 18.4% of households stated they received information regarding predicted weather patterns over the next 2-3 months, whereas 81.6 responded no. Regarding sources of information for this information 82.1% mentioned the radio as the main source of information for the 2-3 month weather forecasts.

Men receive more information than the women (80.8% and 19.2%). In 76.9% of the cases, the 2-3 month weather forecast included some advice and 55% of the households receiving these advices were able to use them. Table below shows the changes made upon receiving the 2-3 month forecast.

Table 27. Aspects of farming changed with 2-3 month forecast information

Aspects of farming changed with 2-3 month forecast information	Number de responses	% of households
Crop varieties	19	11
Changes of the timing of farming practices	16	10

Forecast for next 2-3 days

Approx. 52.5% of the surveyed households received short-term weather forecast information. 90.9% of the respondents indicated the radio as the main information source. Approx. 83.8% of the households reported having received some advices alongside the forecast and 54.8% of them did use the advices. 17.6% of the households did not operate any changes while 2.9% have changed their land management and 79.4% have changed the timing of farming practices

9. Community groups

Respondents were asked if someone in the household was a member of an agricultural or natural resource management related group. Table below shows that the households are affiliated with diverse groups at the village level. Two main groups dominate, namely the group on improving agricultural productivity (70.2% of households) and the group on savings / credit (about 65.2% of households).

Table 28. Group membership

Type of group	% of households
Nursery tree planting	11.3
Fishing	14.9
Fish Pond	24.1
Collection of Forest Products	7.0
Soil improvement activities	1.4
Savings / Credit	65.2
Marketing of agricultural products	14.2
Improving agricultural productivity	70.2
Seed production	4.3
Vegetable production	7.8
Other groups not mentioned above	2.8
No group	11.3

10. Climatic crises

Several climate crises have been reported over the last 5 years. Some households have received aid, others not.

11. Assets and capital

Households were asked about household assets they had, from a set list. The total number of assets in all categories was added up and the following asset indicator created:

0=no assets (basic level)

1=1-3 assets (intermediate level)

2=4 or more assets (high level)

It is important to note that this indicator is not intended to include every possible type of asset, and that the checklist includes some indicators that we expect to see becoming more important in the future than they may be at present. It also does not include a critical asset for resource-poor households, livestock assets.

About 70% of households own between 1-3 assets (intermediate level) and only 21.3% of the households are within the high level. 7.8% of households have none of the asset (basic level) (Table 29). The types of assets own by the households are presented in the table 30 below.

Table 29. Assets indicator

Number	% de ménages
None (basic)	7.8
1-3 assets (intermediate level)	70.9
4 and more (high level)	21.3

Table 30. Types of assets owned by households

Group	Types of Property	Number of households	%
Information	Radio	122	53.0
	TV	15	6.5
	Mobile phone	79	34.3
	No property in the information group	14	6.1
Energy	Solar Plate	13	8.6
	Motor (electric or diesel)	3	2.0
	Battery	41	27.0
	LPG	1	0.7
	No property in the group "energy"	94	61.8
Production	Mechanical Plough	126	83.4
	Mill (for grinding grain or oilseeds)	3	2.0
	Treadle pumps	2	1.3
	Fishing nets	5	3.3
	No property in the group "production".	15	9.9
Transportation	Bicycle	128	59.3
	Motorcycle	76	35.2
	Vehicle or truck	2	0.9
	No assets in the group transport	10	4.6
Others	Bank account	3	2.1
	No assets in the group of luxury goods	138	97.9