

Millennium Challenge Corporation

MCA-Burkina Faso Di Irrigation Investment - Persons Affected by the Project (PAPs) Baseline Data: Data Quality Review Report

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1. INTRODUCTION

This report reviews the quality of the baseline (pre-intervention) data collected by the Bureau d'Etudes et de Recherche pour le Développement (BERD), the local survey firm in Burkina Faso. The data collection was contracted by the Millennium Challenge Account – Burkina Faso (MCA-BF) to evaluate the Millennium Challenge Corporation's Di Irrigation Investment activity in the country.

In 2008, the government of Burkina Faso and the Millennium Challenge Corporation (MCC) signed a five-year USD 480.9 million Compact for 2009–2014 to finance a poverty-reduction program. The overall objective of the Compact is to contribute to poverty reduction in the country via economic growth. The Compact consists of four distinct projects:

- Agricultural Development Project,
- Rural Land Governance Project,
- Roads Project, and
- Burkinabé Response to Improve Girls' Chances to Succeed.

The Agricultural Development Project (ADP) seeks to extend the agricultural use of land as a way to increase the quantity and value of agricultural production. This will boost income and employment in rural areas and make the rural economies more competitive. Specifically, the project targets the main constraints in rural Burkina Faso: water management, low capacity, and poor access to information, markets, inputs, and credit. The expected results include growth in agricultural production, an increase in irrigated land and improved access to rural credit in the intervention zones.

The project has three main activities:

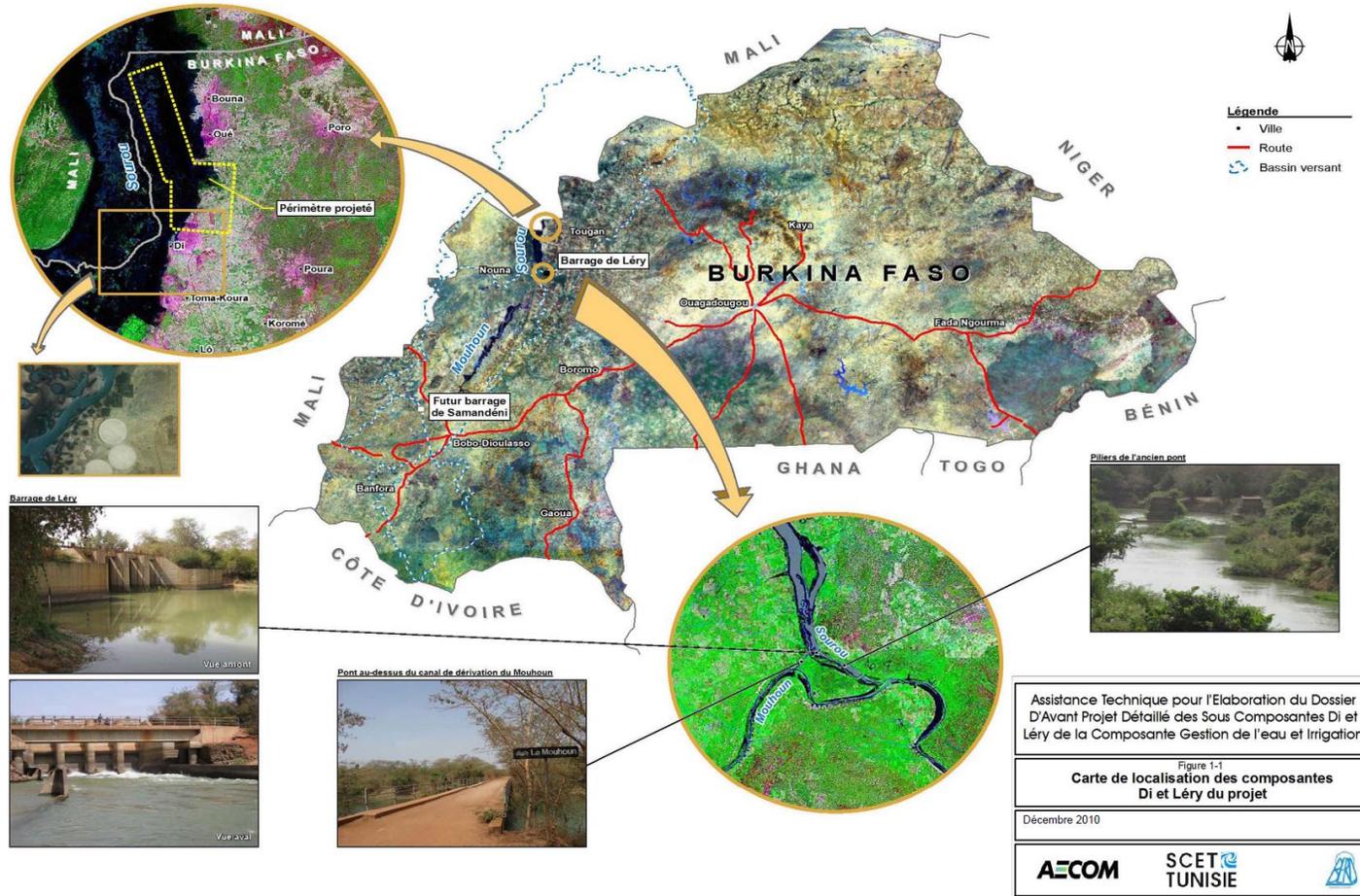
- Water Management and Irrigation – The goal of this activity is to promote improved water management resulting in better access to water through increased water resource protection and more efficient irrigation, including water availability, water delivery, flood control, and dam safety. This is expected to help support and protect investments (infrastructure and human/institutional capacity) in the Sourou Valley and Comoé Basin.
- Agricultural Diversification (DA) – This activity builds on the delivery of water resources in the project zones by supporting on-farm production and related activities throughout the agricultural value chain.
- Access to Rural Finance (ARF) – This activity provides access to term loans by participating financial institutions as a way to fund creditworthy borrowers in the region.

The Water Management and Irrigation activity consists of a number of sub-activities that are depicted in Exhibit 1:

- Development of Integrated Water Resource Management (IWRM) plans,¹
- Léry Dam Investment,
- Di Irrigation Investment, including the provision of irrigated land to Persons Affected by the Project (PAPs), five villages with traditional rights in the area and Non-Persons Affected by the Project (Non-PAPs), and
- Institutional Capacity Building for Water User Associations (WUAs) and the Sourou Valley Authority (Autorité de Mise en Valeur de la Vallée du Sourou, AMVS) to provide Operation and Maintenance (O&M) for water infrastructure.

¹ This will cover the Sourou Valley and nine villages in the Comoé Basin.

Exhibit 1: Di Irrigation Investment Activity Area



To achieve the goals of the Di Irrigation Investment, MCC collaborated with the government of Burkina Faso to build new irrigation infrastructures on a perimeter of 2,240 hectares (ha) of land. In order to implement this activity, it was necessary to temporarily resettle 1,459 individuals and their families.

To determine the appropriate compensation for this temporary resettlement, MCA-BF created a Commission for the Attribution of Land (Commission d'Attribution des Terres, CAT) composed of local stakeholders and officials. The CAT allocated a total of 1,640 ha of land to people with pre-emptive rights (also called Persons Affected by the Project, or PAPs) and to people living in the five preferred-villages near the perimeter (Oué, Bouna, Poro, Niassari and Donon). Prior to the displacement of PAPs, BERD conducted an initial survey to help determine the level of compensation for the temporary relocation of PAPs from their land. IMPAQ did not receive the results from this survey since the data was not believed to be accurate. Our understanding of the data from this survey is that it is not useful since many PAPs inflated the value of their holdings. Nonetheless, the data also contained some information that is needed to determine the value of their production prior to the displacement. Without this data, we cannot compare the value of farm production prior to the intervention.

After completion of the irrigation infrastructure, PAPs received irrigated plots of land in the perimeter. In addition, PAPs also received starter kits containing seeds, fertilizers, and tools to use for leveling the land and completing tertiary canals. PAPs also received training on production related to the irrigated land.

To evaluate the irrigation investment on PAPs, IMPAQ proposed to use a pre/post methodology. To implement this design, researchers will need data on outcomes prior to the intervention. In addition, researchers will need data on the same outcomes following the intervention. BERD developed a baseline survey to collect the baseline data for the pre/post analysis. This information was collected in October 2013. The survey was administered after the temporary displacement of the PAPs relying on recall data. The main purpose of the baseline survey was to capture the characteristics of the affected population and to measure specific outcomes prior to the intervention. Unfortunately, the baseline data does not capture information on the value of agricultural output prior to the relocation.

To assess the Di Irrigation Investment on PAPs, IMPAQ prepared an evaluation design in June 2014 and presented this design in an Evaluation Design Report.² The report describes the proposed evaluation design as well as sample requirements for the evaluation. As described in the Evaluation Design Report, the main purpose of the proposed evaluation is to address a series of research questions related to (1) agricultural production and (2) household income. The specific research questions to be investigated are presented in Exhibit 2.

² *Evaluation Design Report*, Impact of the Agricultural Development Project (Draft), IMPAQ, June 2014.

Exhibit 2: Research Questions

Outcome Category	Research Questions
1) Agricultural Production	<ul style="list-style-type: none"> ▪ Has the land under production and the level of intensity of the land under production increased? ▪ Has the volume of agricultural production and yields increased, including high-value crops (vegetables) or crops that require intensive water use (rice)? ▪ Has there been a change in the adoption of new technologies/techniques?
2) Household Income	<ul style="list-style-type: none"> ▪ Has there been a change in the components of household income? ▪ Has there been a change in total household income?

The baseline survey was designed to collect information about:³

- 1) The socio-economic status of the PAPs before resettlement (family status, family supports, number and age of dependents, etc.).
- 2) Land use prior to the project: (1) type of agricultural production and yields and (2) use of agricultural production: household consumption, sharing with other households, sale, or exchange.
- 3) Non-agricultural use of land: grazing, timber harvesting and other forms of gathering.
- 4) Sources of income and livelihood.
- 5) Aspirations of the PAPs as a result of the receipt of compensation for loss of crops and the parcel granted as compensation.

In this report, we assess the data quality of the baseline data. This baseline data will be used in conjunction with follow-up data (to be collected in the future) in an evaluation of the Di Irrigation Investment.

To implement the Data Quality Review (DQR), we reviewed the questionnaire, datasets, the baseline report provided by BERD, sampling documentation provided by BERD, email exchanges between IMPAQ and MCA-BF, and field visit notes. The DQR focuses on the key variables of interest for the evaluation of the Di Irrigation Investment activities. In addition, an assessment was made to determine whether the baseline data adequately captured the situation of the PAPs prior to resettlement to allow for a pre/post evaluation. The goal of the DQR is to ensure the integrity and reliability of the data with particular emphasis on the variables of interest for the evaluation.

IMPAQ did not receive data collection documentation from the data collectors and therefore cannot check the data against the original data collection plan. In this report, we focus on the baseline data quality and discuss the sampling frame, data collection, and descriptive statistics of key variables.

³ Report on the identification of impact indicators and collection of baseline data for assessing the impact of involuntary resettlement of PAPs Irrigation Scheme (2014).

2. SAMPLING FRAME

A total of 1,459 PAPs across the three villages of Bouna, Oué and Di were displaced as a result of the Di irrigation investment activity. Of the 1,459 PAPs that were displaced, the location of 44 PAPs was unknown due to missing data.

Exhibit 3 presents the distribution of the PAPs by village. As indicated in the Exhibit, 50 percent of the PAPs came from Di. Another 21.2 and 25.8 percent of PAPs came from Bouna and Oué, respectively.

Exhibit 3: Distribution of PAPs by Village

Village	Number	Percentage
Bouna	310	21.2
Di	729	50.0
Oué	376	25.8
Missing	44	3.0
Total	1459	100.0

Source: Census for the development of the irrigated perimeter of Di, as reported in the Report on the identification of impact indicators and collection of baseline data for assessing the impact of involuntary resettlement of PAPs Irrigation Scheme (2014).

BERD calculated the sample size needed for a representative sample of the 1,459 PAPs. BERD's goal was to survey a sample that was representative of the population according to the following criteria:

1. Village distribution;
2. Gender distribution;
3. Age distribution: less than 30 years old (young), 30–59 years old (adults) and 60 years and above; and
4. Size of land lost: less than 0.25 ha (small), between 0.25 and 1 ha (average), and 1 ha or more (large).

BERD reported using the following formula to calculate the size of the sample, which applies in the case of a finite and known population⁴:

$$n = Np(1-p) / (p(1-p) + (I^2/z^2)(N-1))$$

Where,

n = minimum size of stratum

p = the proportion = 0.5

I = error rate = 5%

z = statistical power = 1.96

N = size of the population of each stratum

The formula was applied to each stratum to determine the size of each one. The largest number was then selected as the minimum sample size. Exhibit 4 presents the results for each stratum as reported by BERD.

Exhibit 4: Calculated Sample Size by Strata

Village		Gender		Age		Land Size Lost	
Village	Number	Gender	Number	Age Group	Number	Area Lost	Number
Bouna	77.5	Men	266	less than 30 years	65	less than 0.25 ha	121
Di	182	Women	88	30–60 years	245	0.25 - less than 1 ha	140
Oué	79	-	-	60 years and above	38	1 ha or more	92
Total	339	Total	354	Total	348	Total	354

Source: Census for the development of the irrigated perimeter of Di as reported in the Report on the identification of impact indicators and collection of baseline data for assessing the impact of involuntary resettlement of PAPs Irrigation Scheme (2014).

As indicated in Exhibit 4, the minimum sample size calculated was 354. To allow for non-response, abandonment and other non-response reasons, BERD decided to add 30 percent of the calculated minimum sample size. The final sample size was agreed to be 500 PAPs.

IMPAQ attempted to replicate the BERD minimum sample size calculation. However, using the formula at hand, IMPAQ was unable to reproduce the numbers provided in Exhibit 4.⁵

⁴ Report on the identification of impact indicators and collection of baseline data for assessing the impact of involuntary resettlement of PAPs Irrigation Scheme (2014).

⁵ IMPAQ is waiting for clarification from BERD on how the numbers in Exhibit 4 were produced.

BERD selected the sample using simple random sampling with equal probability according to the following methodology:

1. In order to insure that each PAP has a likelihood of being selected (regardless of the stratum they belong to), the PAPs were listed by village, gender, age and “area lost”.
2. Based on the above ordering, each PAP was given a unique identifier for the sampling.
3. The sampling was done with an interval of 3 (1,459/500) until the 500 PAP size was obtained.
4. The first PAP was selected by randomly selecting a number between 1 and 3.

Data Collection

The data was collected between October 3–19, 2013. Because the PAPs had already been temporarily resettled, the survey relied on a retrospective data collection approach. PAPs were asked about the period between 2010–2011 or 2011–2012, before they were temporarily displaced.⁶ A total of 388 PAPs out of the selected 500 PAPs completed the survey, resulting in a non-response rate of 22.4 percent. Documentation was not provided on the reasons why data was not collected on the missing 112 PAPs.⁷ Exhibit 5 presents the distribution of the respondents across each of the strata.

Exhibit 5: Distribution of Sample PAPs

Village		Gender		Age		Land Size Lost	
Village	Number	Gender	Number	Age Group	Number	Area Lost	Number
Bouna	87	Men	299	less than 30 years	67	less than 0.25 ha	113
Di	206	Women	89	30–60 years	267	0.25 - less than 1 ha	148
Oué	95	-	-	60 years and above	54	1 ha or more	127
Total	388	Total	388	Total	388	Total	388

Source: 2014 Di Irrigation Investment – PAP Survey

Data File

IMPAQ received a zip file of the baseline data from MCC on May 9, 2014. The zip file contained 17 datasets. The datasets correspond to a relevant section of the questionnaire or to a specific question in the questionnaire. IMPAQ submitted the result of the data quality assessment to

⁶ The two separate recall periods were based on the last growing season the PAPs farmed within the Di perimeter since they were resettled at different times.

⁷ IMPAQ did not receive any additional sampling and data collection documentation and therefore is unable to report on any sampling or data collection problems.

MCC in a memo on June 6, 2014 (*PAP DQA_Final.docx*). IMPAQ checked the dataset for completeness and internal consistency. As described in the initial DQA, IMPAQ identified a number of issues that needed to be confirmed and clarified, specifically:

1. When merging the individual files together, there were a few observations between datasets that did not match.
2. When checking for duplicate observations, five datasets contained duplicate observations.
3. There were some unexplained missing entries and a few variables with errors in response coding.
4. When checking the accuracy of the variables constructed by BERD, IMPAQ was unable to reproduce the values for the constructed variables. There were also discrepancies between information collected in the baseline data and the survey database.⁸

On July 24, 2014, IMPAQ received BERD's responses to IMPAQ's assessment of the Di Irrigation Investment - PAP data. In addition to the responses, IMPAQ also received a revised dataset. IMPAQ found that the revised data is of reasonable quality and can be used to construct an analysis file for evaluation. There were no significant issues related to missing individuals, orphans and skip patterns.

⁸ The data files contained information on the age and gender of the PAPs, the amount of compensation received by the PAPs, and the amount of land lost that was collected in the initial survey (referred to as the survey database). IMPAQ found discrepancies between the age and gender of the PAPs, as reported in the baseline survey and in the survey database.

3. KEY VARIABLES

This section provides an overview of the survey instrument and assesses the data that was collected. The focus of this section is on the variables that will be used to assess changes in the outcome variables of interest.

Survey Instrument

As discussed earlier, the survey was designed to collect information about:

- 1) The socio-economic status of the PAPs before resettlement (family status, family supports, number and age of dependents, etc.).
- 2) Land use prior to the project: (1) type of agricultural production and yields and (2) use of agricultural production: household consumption, sharing with other households, sale, or exchange.
- 3) Non-agricultural use of land: grazing, timber harvesting and other forms of gathering.
- 4) Sources of income and livelihood.
- 5) Aspirations of the PAPs as a result of the receipt of compensation for loss of crops and the parcel granted as compensation.

After a review of the questionnaire, a number of deficits were identified. IMPAQ has determined that the survey does not achieve its intended purpose of allowing for an assessment of the PAPs' situation prior to resettlement. In particular, the baseline survey did not provide information on land use within the perimeter prior to resettlement. Based on the baseline survey, IMPAQ is unable to assess crop production or agricultural practices on land within the perimeter prior to resettlement. The survey only asked about crop production and agricultural practices on land outside of the perimeter. IMPAQ concludes that the survey does not clearly and adequately represent its intended purpose.

Demographic Information

Exhibit 6 presents the age distribution of the PAPs by gender. As indicated, 16.7 percent of the male PAPs were younger than 30 years of age and 14.7 percent were older than 60 years of age. For female PAPs, 19.1 percent were younger than 30 years of age and 9.0 percent were older than 60 years of age.

Exhibit 6: Age Distribution of PAPs by Gender

Age groups	Male	Female	Total
less than 30 years	16.7%	19.1%	17.3%
30–60 years	68.6%	71.9%	69.3%
older than 60 years	14.7%	9.0%	13.4%

The remaining exhibits provide information on the situation of PAPs before temporary relocation. Survey questions relate to the recall period for the growing season 2010–2011 or 2011–2012, and depends on the last growing season the PAPs used their land prior to relocation.⁹ Specifically, the following exhibits provide distributions and descriptive statistics on how much land was lost, how much was compensated for land lost, the land owned outside of the perimeter, and income.

Land Lost and Compensation

Due to their temporary resettlement as a result of the Di irrigation investment, PAPs received compensation benefits in the form of cash, as well as a promise to receive the same amount of land lost or more within the perimeter after the irrigation investment was completed.¹⁰

⁹ PAPs were resettled from the land in two phases. The first group (Tranche 1) was resettled in December 2011–January 2012 and the second group (Tranche 2) was resettled in December 2012–January 2013.

¹⁰ Compensation benefits were determined based on a formula that took into account the PAP's production, area of land, tree-based income, and other factors. Refer to the Resettlement Plan (2011) for on how compensation benefits and land allocation were determined.

Exhibit presents the distribution of land area lost within the perimeter due to the Di irrigation investment and the average compensation provided to each PAP due to land lost by gender. For male PAPs, 39.5 percent lost more than 1 ha of land and 32 percent lost between 0.25 and 1 ha of land. For female PAPs, 10 percent lost more than 1 ha of land and 60 percent lost between 0.25 and 1 ha. On average, male PAPs lost 1.3 ha of land and female PAPs lost 0.6 ha. Male PAPs lost on average 0.7 ha more land than female PAPs. However, part of the larger average is due to a small number of male PAPs with large land holdings. The median land area lost for male PAPs is 0.7 hectares, only 0.3 hectares more than the median land holdings within the perimeter for female PAPs. Male PAPs received more than three times as much compensation than female PAPs, receiving on average FCFA 275,105 compared to FCFA 99,755 for female PAPs.

Exhibit 7: Distribution of Area of Land Lost and Average Compensation by Gender of PAPs

Area Lost	Male	Female	Total
Less than 0.25 ha	28.8%	30.3%	29.1%
0.25 - less than 1 ha	31.8%	59.6%	38.1%
1 ha or more	39.5%	10.1%	32.7%
Average Area Lost			
	1.3	0.6	1.2
Median Area Lost			
	0.7	0.4	.6
Compensation: Avg (FCFA)			
	275,105	99,755	234,883
Median (FCFA)			
	151,599	63,733	111,991

Use of Compensation

Exhibit and

Exhibit provide information on how the PAPs anticipated using the land and the benefits they received as compensation due to their temporary resettlement.

Exhibit provides information on what the PAPs intended to do with the land they received as compensation. They were allowed to choose multiple uses. Almost all PAPs reported using the land for cultivation (Operate). A small share of female PAPs (1.2 percent) reported that they would rent out their land. Male PAPs were more likely to report using the land for purposes other than cultivation.

Exhibit 8: Expected Use of Land Received as Compensation by Gender of PAPs

Land Use	Male	Female
Operate	98.7%	98.8%
Rent	2.0%	1.2%
Sharecrop	0.4%	0.0%
Sell	0.8%	0.0%
Other	0.4%	0.0%

Exhibit provides information on how the PAPs used the compensation benefits they received. They were allowed to choose multiple uses. The main use of compensation benefits was to purchase grain for consumption: 86 percent of male PAPs and 84 percent of female PAPs used their compensation benefits for food consumption. The purchase of animals was the second most common use of compensation benefits: 14 percent of male PAPs and 12 percent of female PAPs used their compensation benefits to purchase animals. A larger share of male PAPs used

their compensation benefits to purchase agricultural inputs: 11 percent of male PAPs compared to 6 percent of female PAPs. A larger share of male PAPs also used their benefits to purchase building materials for their home. In addition, 9.3 percent of female PAPs used their compensation benefits for trade compared to 6.6 percent of male PAPs.

Exhibit 9: Use of Compensation Benefits by Gender

Type of Activity	Male	Female
Trade	6.6%	9.3%
Other Non-Agricultural Activities	1.7%	1.2%
Purchase of Agricultural Equipment	4.0%	0.0%
Purchase of Agricultural Inputs	10.9%	5.8%
Purchase of Seeds	4.6%	3.5%
Purchase of Grain for Consumption	85.8%	83.7%
Purchase of Animals	14.2%	11.6%
Purchase of Equipment for Home	2.6%	1.2%
Purchase of Building Materials for Home	6.0%	1.2%
Purchase of Rolling Stock	4.3%	2.3%
Savings	1.0%	0.0%
Other	7.9%	9.3%

Land Outside of Perimeter

The survey listed several questions about whether the PAPs had land outside of the perimeter and, if so, how they used the land.

Exhibit presents the share of PAPs that reported having land outside of the perimeter and their average land holdings: 73 percent of male PAPs reported having land outside of the perimeter compared to only 42 percent of female PAPs. Of the PAPs that reported having land outside of the perimeter, 20 percent of male PAPs and 5 percent of female PAPs reported using a water pump to irrigate their land. A traditional irrigation system was most commonly used on land outside of the perimeter: 45 percent of male PAPs and 8 percent of female PAPs reported using a traditional irrigation system.

Exhibit 10: Land Outside the Perimeter

	Male	Female	Total
Share of PAPs with Land Outside the Perimeter	72.9%	41.6%	65.7%
Average Land Area (ha)	0.54	0.16	0.49
Irrigation Source: Share of PAPs Using:			
Pump	19.7%	5.4%	17.6%
Traditional Irrigation	45.4%	8.1%	39.9%

System			
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Exhibit provides information on the different types of crops produced on land outside of the perimeter. Most households produced maize and sorghum. PAPs reported producing on average 6,051 kilograms of maize and 1,573 kilograms of sorghum.

Exhibit 11: Average Quantity Produced on Land Outside the Perimeter

Crop	Average Amount (kg)	Number of hectares
Onions	2,147	27
Tomatoes	1,743	25
Cucumbers	10,000	1
Okra	51	2
Rice	12,771	62
Maize	6,051	133
Sorghum	1,573	136
Millet	3,836	42
Beans	1,336	72
Peas	200	1
Peanuts	128	6
Cowpeas	325	20
Sesame	557	41
Groundnuts	1,521	69
Peppers	2,038	13

Production and Income

Although the survey did not collect information on crop output on land within the perimeter, it did collect information on the types of crops produced on that land. The survey also collected information on the proportion of crop production consumed and sold.¹¹

Exhibit presents the percent of crop production consumed and sold by the household. The primary crops produced on land within the perimeter prior to resettlement were rice, maize and sorghum. Approximately 75 percent of the maize and sorghum was consumed. Approximately 57 percent of the rice produced was sold.

Exhibit 12: Percent of Production Consumed and Sold by Crop

Crop	Consumed	Sold	Number of ha Producing Crop
Onions	15.6%	75.0%	70
Tomatoes	18.6%	79.6%	56
Cabbage	50.0%	48.3%	4
Carrots	20.0%	50.0%	1
Cucumbers	60.0%	50.0%	2
Chili peppers	25.0%	75.0%	1
Okra	58.6%	45.0%	10
Rice	41.7%	56.8%	132
Maize	74.1%	28.5%	260
Sorghum	77.5%	25.0%	188
Millet	76.7%	29.9%	79
Potatoes	22.5%	55.0%	2
Beans	56.9%	50.5%	105
Peas	10.0%	80.0%	1
Peanuts	50.6%	63.3%	21
Cowpeas	30.0%	53.3%	23
Sesame	20.2%	78.2%	41
Groundnuts	33.6%	64.5%	96
Peppers	29.2%	54.1%	19

Note: The total sum of crop production consumed and sold may not add to 100 as households could have also exchanged or gifted a proportion of their crop output.

¹¹ PAPs were asked about the proportion of crop output that was consumed and sold. The responses were expressed as percentages. The survey did not ask how much was produced.

Exhibit provides information on revenue received by the PAPs from different sources: agricultural income outside of the perimeter, non-agricultural income, transfers, livestock, fishing and non-timber products. For all revenue sources, male PAPs reported receiving more than female PAPs. Agricultural income received from land outside of the perimeter was six times larger for male PAPs than for female PAPs. Transfer income was also six times larger for male PAPs than for female PAPs.

Exhibit 13: Revenue (FCFA) for Agricultural Season 2010/2011 or 2011/2012

Revenue Source	Male	Female	Total
Agricultural Income from Land Outside the Perimeter	64,441	10,122	52,401
Non-Agricultural Income	61,894	16,008	51,723
Transfers Received	18,744	3,006	15,256
Income from Livestock	131,086	23,459	107,231
Income from Fishing	28,991	1,395	22,874
Income from non-Timber Products	15,346	6,140	13,305
Other Income	3,344	581	2,732

Note: Averages include zeros.

5. CONCLUSION

This report reviewed the quality of the baseline data collected by BERD. The purpose of the data quality review was to assess the quality of the baseline data for the analysis of PAPs' outcomes following the Di Irrigation Investment activity. The DQR involved a review of the questionnaire, datasets, the baseline report provided by BERD, sampling documentation provided by BERD, email exchanges between IMPAQ and MCA-BF, and field visit notes. The DQR focused on the key variables of interest for the evaluation of the Di Irrigation Investment activities. In addition, an assessment was made to determine whether the baseline data adequately captured the situation of the PAPs prior to resettlement to allow for a pre/post evaluation.

Although IMPAQ finds the data to be of high quality, IMPAQ was unable to assess the integrity and reliability of the data due to insufficient data documentation. Additionally, IMPAQ concludes that the data does not adequately represent its intended purpose, given that information needed to assess the PAPs' situation on land within the perimeter was not collected (i.e. crop output and farming practices). IMPAQ suggests that during follow-up data collection, the survey should ask questions about how the PAPs perceive their current situation relative to their situation before resettlement. This will allow an evaluation of whether PAPs perceive their situation as having improved due to the Di irrigation investment.