

# Millennium Challenge Corporation

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## Final Data Quality Review Report Di Irrigation Investment on Persons Not Affected by the Project

**Contract No:**  
**Task Order No. MCC-10-0111-CON-20 T002**

**September 2014**



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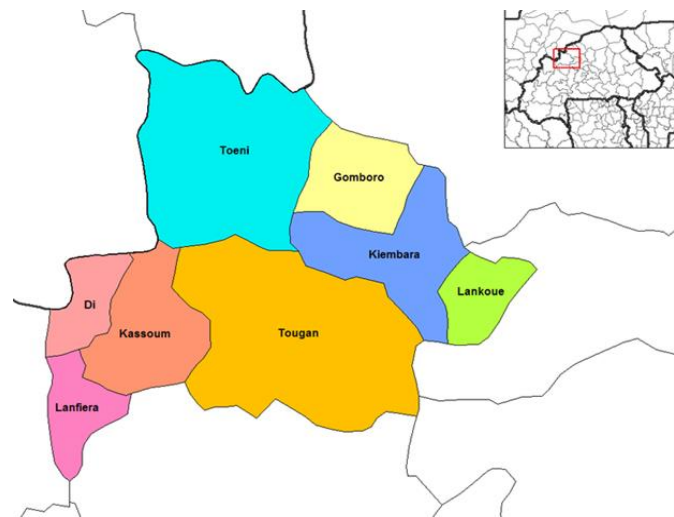
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## 1. INTRODUCTION

This report reviews the quality of the baseline data collected to assess the Millennium Challenge Corporation (MCC) Irrigation Investment on Persons Not Affected by the Project (Non-PAPs) in Burkina Faso. The data collection was contracted by the Millennium Challenge Account – Burkina Faso (MCA-BF) to The Centre d'Etudes, de Recherches et de Formation pour le Développement Economique et Social (CERFODES). As presented in Exhibit 1, the Di Irrigation Investment activity is located in the Di commune of Sourou province in Western Burkina Faso.

MCC collaborated with the government of Burkina Faso to build new irrigation infrastructures in a perimeter of 2,240 hectares (ha) of land in the Di commune. The Commission for the Attribution of Land (CAT), composed of local stakeholders and officials, allocated plots of land in this perimeter to beneficiaries. While most plots in the perimeter were distributed to households with pre-emptive rights (Persons Affected by the Project, PAPs) and to households living in disadvantaged villages near the perimeter, some of the plots were randomly allocated by a lottery system to Non-PAP households not located in disadvantaged villages. In addition to irrigated plots of land, the beneficiaries also received starter kits containing seeds, fertilizers, and tools to use for leveling the land and completing tertiary canals. Beneficiaries also received training on production related to the irrigated land.

**Exhibit 1: Di Irrigation Investment Activity Area**



IMPAQ has developed a randomized control trial (RCT) methodology to estimate the impact of the Di Irrigation Investment activity on Non-PAPs. IMPAQ will measure program impacts by comparing the outcomes for land recipients (treatment group) and non-recipients (control group). Since selection into the treatment group is random, the treatment status will be independent of observed and unobserved characteristics of the applicant. Thus, any changes observed between the two groups over time can be attributed to the effects of the intervention.

The impact evaluation will address research questions related to the following outcome categories:

- 1) Agricultural Production
- 2) Household Income
- 3) Land tenure

The specific questions to be addressed are listed in Exhibit 2.

### Exhibit 2: Research Questions

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

The purpose of this data quality review is to assess the quality of the baseline data for the impact analysis of the Di Irrigation Investment on Non-PAPs. This baseline data will be used in conjunction with the follow-up data (to be collected in the future) for an impact evaluation of the Di Irrigation Investment. In this report, we focus on the quality of the baseline data and discuss the sampling frame, sampling problems, data management issues, skip pattern problems, descriptive statistics of key variables and data documentation.

## 2. SAMPLING DOCUMENTATION

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### 2.1 Source of Sample

The Non-PAPs Di Irrigation Investment activity had 600 ha of land available for distribution to Non-PAPs who did not receive land in Phase 1 of the project. To be eligible for the lottery and win a plot of land, Non-PAPs had to meet the following criteria:

- Be 18 years of age or above.
- Be a resident of one of the six provinces of the Boucle du Mouhoun region (Kossi, Banwa, Mouhoun, Balé, Nayala, Sourou), as shown in Exhibit 3.
- Have at least two other people of age 15 or above who can cultivate the plot of land with the applicant.
- Not be a PAPs.

The verification of eligibility of Non-PAPs was based on an application statement that included an oath about the truthfulness of the information provided in the application, including the home address. The eligibility criteria was known to applicants before they filled out the application.

To assess the required sample size for the impact evaluation, IMPAQ used the Burkina Faso household income data from 2011 for the Boucle du Mouhoun region (Deuxième Programme National de Gestion des Terroirs, PNGT2). IMPAQ conducted power calculations to estimate the minimum detectable effects (MDE) for different sample sizes. The MDE is expressed in terms of changes in agricultural income. Exhibit 4 provides the output of the power calculations.

The results of the power calculations indicate that a total sample size of 488 individuals for the treatment group and 488 for the control group with plot sizes of 2 hectares for rice and 0.75 hectares for polyculture will be able to detect an impact on income of 18% or more. This level of impact is in line with findings from agriculture literature, which has generally shown positive effect sizes of irrigation projects on real income.<sup>1,2</sup>

**Exhibit 3: Boucle du Mouhoun**



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<sup>1</sup> Hussain, I. and Wijerathna, D., *Irrigation and Income-Poverty Alleviation: A Comparative Analysis of Irrigation Systems in Developing Asia*, International Water Management Institute (IWMI), February 2004.

<sup>2</sup> Sawada, Y., Shoji, M., Sugawara, S. and Shinkai, N., *The Role of Infrastructure in Mitigating Poverty Dynamics: The Case of an Irrigation Project in Sri Lanka*, World Bank, August 2008.

#### Exhibit 4: Power Calculations

Household Income, 2011			
<b>Standard deviation</b>	719,111	719,111	719,111
<b>MDE</b>	<b>107626.6</b>	<b>128901.7</b>	<b>152207</b>
<b>MDE/mean</b>	14.91%	17.85%	21.08%
<b>Multiple for 80% power and 5% significance level (two-sided)</b>	2.8	2.8	2.8
<b>n1</b>	700	488	350
<b>n2</b>	700	488	350
<b>Total sample size (including control group)</b>	1,400	976	700
	<i>1.5 rice</i>	<i>2 rice</i>	<i>3 rice</i>
	<i>0.5 PC</i>	<i>0.75 PC</i>	<i>1 PC</i>

decided The size of the plots was changed from two hectares for rice and 0.75 hectares for polyculture to two hectares of rice and one hectare for polyculture because in order to provide parcels large enough to provide an economical output sufficient for the new farmers/households and the need to maintain a particular sample size for the evaluation.

All applications for land were reviewed and scored by SHER-GRET, an MCA contractor also known as “AD7”. The criteria used in the scoring are listed in Appendix A. In the first round, 2,178 applicants met the eligibility criteria. MCA allowed for a restitution period during which an applicant could appeal the decision that resulted in an ineligible designation, and as a result, the total number of eligible applicants increased to 2,229.

To ensure that a sufficient number of individuals were classified as eligible and to help ensure that 20 percent of lottery winners were women, CAT in collaboration with MCC and MCA-BF set the threshold score for eligibility for the lottery at 60. AD7 reviewed and selected 1,528 applications with a score of 60 points or above. This group entered the lottery pool. Those below the threshold score were dropped from the pool of applicants.

Initially, only those who entered the lottery (1,528) were to be surveyed. However, MCC and MCA-BF decided to survey all applicants who met the eligibility criteria. As a result, CERFODES surveyed the 2,178 applicants who met the eligibility criteria in the first round. The 1,528 applicants who scored 60 points or above represented the sampling frame that was used to randomly assign applicants to the treatment group (land recipients) and to the control group (non-land recipients).

The randomization was organized into a two-tier process. First, CAT randomly selected 503 names from the pool of 1,528 lottery candidates. Then, based on the selected candidates’ stated preference for plots of rice or polyculture land, CAT randomly selected a plot for the candidates from either a rice pool or a polyculture pool. The 503 selected lottery candidates who received plots formed the treatment group. The rest of the 1,025 candidates who did not receive plots formed the control group. CAT selected an additional 150 names to form a waiting list in the event that any of the 503 selected winners could not be found.



## 2.2 Data Collection

As agreed by MCC and MCA-BF, CERFODES was contracted to survey all 2,178 applicants who met eligibility criteria. In total, CERFODES actually surveyed 2,130 (97.8%) applicants and could not find the remaining 48 applicants. The distribution of selected households and respondent households by province is presented in Exhibit 5.

**Exhibit 5: Number of Households Selected and Surveyed**

Province	HH Selected (Nbr.)	HH Surveyed (Nbr.)
Balé	10	9
Banwa	43	43
Kossi	20	19
Mouhoun	43	40
Nayala	72	78
Sourou	1990	1,941
<b>TOTAL</b>	<b>2178</b>	<b>2130</b>

CERFODES surveyed five additional applicants in Nayala province. These were applicants that had submitted their application in Sourou Province but, after verification, CERFODES identified them as residents of Nayala Province.

## 2.3 Data File

On March 19, 2014, IMPAQ received a data file from MCC on the Non-PAPs Di Baseline Data (*Base de données non PAP de Di.sav*). In a memo dated April 23, 2014, IMPAQ submitted the results of the data quality assessment to MCC (*DQA Memo\_Non-PAP Di data\_received 14 04 19.docx*). IMPAQ checked the dataset for completeness and internal consistency. Overall, IMPAQ found that the data was of high quality and could be used to construct an analysis file for the impact evaluation. There were no significant issues related to missing individuals, individual substitutions, orphans or skip patterns.

Upon receiving additional information and documentation from MCC on July 3, 2014, IMPAQ found that 51 individuals on the list of individuals admitted to the lottery had not been surveyed by CERFODES. IMPAQ initially understood that CERFODES did not survey these individuals because they were added to the list of admitted individuals to the lottery after the restitution period. And, since CERFODES surveyed individuals using the pre-restitution list, these 51 individuals were never surveyed. However, after receipt of additional project documentation from MCC, IMPAQ found that 21 of the 51 individuals were in fact in the pre-restitution list. Only 4 of the 21 individuals had not been surveyed because CERFODES did not have the right number or because the individual was not present in the area. IMPAQ is still

waiting for additional documentation from MCC to clarify why the 17 remaining candidates were not surveyed.

Additionally, the baseline data contains 6 identifiers (IDs) (3 sets of duplicates) in which the individual identifier is not unique. The IDs are:

- N0037/N0037
- D00334/ D00334
- N00378/ N00378

The values for the variables for these duplicates are different. Therefore, these IDs are likely different cases. IMPAQ raised this issue in the DQA memo. However, we are still waiting for additional information to clarify why the three listed cases do not have unique household IDs. We removed the duplicates in the baseline dataset to generate the descriptive statistics below.

The above issues do not present major challenges for the impact analysis, however addressing them will improve the quality of the eventual public use data.

### 3. KEY VARIABLE DISTRIBUTION

#### 3.1 Demographic Information on the Lottery Candidates

Exhibit 6 presents the distribution of lottery candidates by province. The lottery assigned 1,025 individuals to the control group and 503 to the treatment group. Consistent with the eligibility criteria for lottery admission, all of the lottery candidates in the sample are residents of one of the six provinces of the Boucle du Mouhoun region (Kossi, Banwa, Mouhoun, Balé, Nayala and Sourou). The majority of the candidates (90.4%) come from Sourou province. The distribution of candidates by province is similar across the treatment and control groups.

**Exhibit 6: Distribution of Lottery Candidates by Province**

Province	Control		Treatment		Total	
	No.	%	No.	%	No.	%
Sourou	931	90.8	451	89.7	1,382	90.4
Kossi	2	0.2	2	0.4	4	0.3
Mouhoun	8	0.8	7	1.4	15	1
Balé	2	0.2	1	0.2	3	0.2
Banwa	11	1.1	7	1.4	18	1.2
Nayala	36	3.5	19	3.8	55	3.6
Missing	35	3.4	16	3.2	51	3.3
<b>Total</b>	<b>1,025</b>	<b>100</b>	<b>503</b>	<b>100</b>	<b>1,528</b>	<b>100</b>

An examination of the lottery candidates by age (Exhibit 7) indicates that 77.2 percent of the candidates are males and 19.4 percent are females. The distribution of candidates by gender is approximately similar across treatment and control groups 22.7 percent of the candidates in the treatment group are females.

**Exhibit 7: Distribution of Lottery Candidates by Gender**

Gender	Control	Treatment	Total
	%	%	%
Male	78.7	74.2	77.2
Female	17.9	22.7	19.4
Missing	3.4	3.2	3.3
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>

Exhibit 8 indicates that all of the candidates, except one, are 18 years old or older, which is consistent with the eligibility criteria for lottery admission.

**Exhibit 8: Distribution of Lottery Candidates by Age Eligibility**

<b>Age Eligibility</b>	<b>No.</b>	<b>%</b>
<b>Non Eligible (Under 18 years of age)</b>	1	0.1
<b>Eligible (18 years old or above)</b>	1,474	96.5
<b>Missing</b>	53	3.5
<b>Total</b>	1,475	97.6

Exhibit 9 provides the breakdown of the age distribution of the lottery candidates. The majority of candidates (80.4%) are between the ages of 25 and 55. The distribution of candidates by age is approximately similar across treatment and control groups.

**Exhibit 9: Distribution of Lottery Candidates by Age**

<b>Age Group (In Years)</b>	<b>Control</b>	<b>Treatment</b>	<b>Total</b>
	<b>%</b>	<b>%</b>	<b>%</b>
<b>Younger than 25</b>	11.1	10.3	10.9
<b>25–55</b>	80.3	80.5	80.4
<b>Older than 56</b>	5.2	5.6	5.3
<b>Missing</b>	3.4	3.6	3.5
<b>Total</b>	100	100	100

Exhibit 10 presents the distribution of lottery candidates by education level. Approximately one-quarter of the candidates (23.4%) completed primary school. A higher percentage of lottery candidates (40.2%) did not complete a primary level of education. Only 3.5 percent of the candidates completed post-primary schooling. Another 13 percent completed secondary school, and 4 percent completed tertiary level schooling. The distribution of candidates by education is approximately similar across treatment and control groups.

**Exhibit 10: Distribution of Lottery Candidates by Education Level**

<b>Education Level</b>	<b>Control</b>	<b>Treatment</b>	<b>Total</b>
	<b>%</b>	<b>%</b>	<b>%</b>
<b>None</b>	39	42.5	40.2
<b>Primary</b>	23.1	24.1	23.4
<b>Rural School</b>	3	2.4	2.8
<b>Madrassa</b>	10.6	7.8	9.7
<b>Post-Primary</b>	2.9	4.8	3.5
<b>Secondary</b>	13.8	11.5	13
<b>Tertiary</b>	4.1	3.8	4
<b>Missing</b>	3.4	3.2	3.3
<b>Total</b>	100	100	100

### 3.2 Characteristics of Lottery Candidates' Households

Exhibits 11 and 12 present the characteristics of the houses of the lottery candidates. The majority of candidates' houses have walls made of mudbrick (81.8%) and roofs made of concrete screeds (80.1%). For both the wall and roof types, the distributions are approximately similar across treatment and control groups.

**Exhibit 11: Distribution of Lottery Candidates' Houses by Type of Wall**

Type of Walls	Control	Treatment	Total
	%	%	%
Straw or Other Plant	2.1	1.8	2
Mudbrick	81.7	82.1	81.8
Cinderblock	10.7	11.9	11.1
<i>Missing</i>	3.4	3.2	3.3

**Exhibit 12: Distribution of Lottery Candidates' Houses by Type of Roof**

Type of Roof	Control	Treatment	Total
	%	%	%
Concrete screed	79.4	81.5	80.1
Mudbrick	15.1	11.9	14.1
Straw or Other Plant	2	3.4	2.5
<i>Missing</i>	3.4	3.2	3.3
<b>Total</b>	100	100	100

### 3.3 Lottery Candidates' Household and Land Assets

Exhibit 13 and 14 shows the percentage of households that have formal or informal rights over the plots of land they cultivate or over community land.

As presented in Exhibit 13, more than half (60.2%) have rights over the land they cultivate. The distribution is approximately similar across treatment and control groups.

**Exhibit 13: Distribution of Households with Land Rights (Formal or Informal)**

Land Rights	Control	Treatment	Total
	%	%	%
No	39.1	30.8	36.4
Yes	57.4	66	60.2
<i>Missing</i>	3.5	3.2	3.4
<b>Total</b>	100	100	100

Out of the 36.4 percent of households without land rights over their own plots (see Exhibit 13), 61.9 percent have rights to access community land, as shown in Exhibit 14. The distribution is approximately similar across treatment and control groups.

**Exhibit 14: Distribution of Candidates' Households with Right of Access to Community Land**

Right of Access to Community Land	Control	Treatment	Total
	%	%	%
No	38.7	36.8	38.1
Yes	61.3	63.2	61.9
Total	100	100	100

Exhibit 15 presents the agricultural equipment owned by the lottery candidates. The majority of candidates have animal plows (73.9%) and traditional plows (71.1%), followed by fertilizer application device (43.5%) and wheelbarrows (29.6%). A smaller percentage have pumps (8.5%) and tractors (1.8%). The distribution of candidates by the type of agricultural equipment owned is approximately similar across treatment and control groups.

**Exhibit 15: Distribution of Lottery Candidates' Households by Agricultural Equipment Owned**

Agricultural Equipment	Control	Treatment	Total
	%	%	%
Animal plow	73.4	75	73.9
Traditional Plows	71.2	70.8	71.1
Pumps	8.7	8.2	8.5
Tractor	1.7	2	1.8
Fertilizer application device	43.2	44.1	43.5
Wheelbarrow	29.9	29	29.6

Exhibit 16 presents the type of farm animals owned by the lottery candidates. The five most common animals owned by lottery candidates are chickens (86.3%), oxen (68.3%), donkeys (59.5%) and sheep (50.5%). The distribution of candidates by the type of farm animal owned is approximately similar across treatment and control groups.

**Exhibit 16: Distribution of Lottery Candidates' Households by Farm Animals Owned**

Farm Animals	Control	Treatment	Total
	%	%	%
Oxen	68.1	68.6	68.3
Other Cattle	31.3	30.6	31.1
Donkeys	59	60.4	59.5
Other Asses	22	20.3	21.4
Horses	1.4	2.2	1.6
Other Equidae	1.2	1.4	1.2
Sheep	51	49.5	50.5
Goats	43.6	46.7	44.6
Pigs	8.3	11.1	9.2
Chickens	85.6	87.9	86.3
Turkeys	18.1	18.5	18.3

Exhibit 17 presents the type of agricultural inputs used by the households of lottery applicants during the last harvesting season. The most common agricultural input is traditional seed (79.1%), followed by organic manure (72.2%) and mineral fertilizer (70.2 %). The distribution of is approximately similar across treatment and control groups.

**Exhibit 17: Distribution of Lottery Candidates' Households by Type of Agricultural Inputs Used**

Type of Agricultural Inputs	Control	Treatment	Total
	%	%	%
Traditional Seed	78.7	79.9	79.1
Improved Seed	48.1	50.7	48.9
Mineral Fertilizer	69.6	71.6	70.2
Herbicide	62.6	67.2	64.1
Pesticide	61.4	63.6	62.1
Compost	60.2	60.8	60.4
Organic Manure	72	72.6	72.2
Other Input	2.1	2.2	2.2

**3.4 Experience in Agricultural Production**

Exhibit 18 shows the percentage of lottery candidates who are farmers at the time of the lottery. The majority of them (83.1%) are farmers. The distribution is approximately similar across treatment and control groups.

**Exhibit 18: Distribution of Lottery Candidates who are Farmers**

Farmers	Control	Treatment	Total
	%	%	%
No	13.7	13.3	13.5
Yes	82.9	83.5	83.1
<i>Missing</i>	3.4	3.2	3.3
<b>Total</b>	100	100	100

Exhibit 19 shows the distribution of lottery candidates by profession for those who are not farmers. Out of the 13.5 percent of candidates who are not farmers, the majority (6.9%) hold salaried positions. The distribution is approximately similar across treatment and control groups.

**Exhibit 19: Distribution of Lottery Candidates by Profession, if not Farmer**

Profession	Control	Treatment	Total
	%	%	%
Trader	3.1	2.6	2.9
Craftsman (mason, carpenter, mechanic)	1.2	1.4	1.2
Salaried	7.5	5.8	6.9
Worker / day laborer	0.5	1.2	0.7
Unemployed	0.8	1.4	1
<i>Missing</i>	0.6	0.9	0.8
<b>Total</b>	13.7	13.3	13.5

Exhibit 20 presents the level of technical training of lottery candidates in agricultural production. Over half of the candidates (54.8%) never received technical training in agricultural production. 18.2 percent received one training and 22.4 percent received more than one training in agricultural production. The distribution of candidates by level of technical training in agricultural production is approximately similar across treatment and control groups.

**Exhibit 20: Level of Technical Training in Agricultural Production**

Number of Technical Training in Agriculture Production	Control	Treatment	Total
	%	%	%
None	54.5	55.3	54.8
One Training	18.2	18.1	18.2
More Than One Training	22.2	22.9	22.4
<i>Missing</i>	5	3.8	4.6
<b>Total</b>	100	100	100



As indicated in Exhibit 21, a vast majority of households (83%) have 2 to 10 household members (15 years and older) supporting the household’s agricultural production. The distribution is approximately similar across treatment and control groups.

**Exhibit 21: Household members 15 years of age or Older Supporting Agricultural Production**

Number of HH Members 15 or Older	Control	Treatment	Total
	%	%	%
Less than 2	5.2	4.4	4.9
2–10	82.8	83.3	83
11–15	6.7	7.0	6.8
16 or More	1.9	2.2	2.0
<i>Missing</i>	3.4	3.2	3.3
<b>Total</b>	100	100	100

### 3.5 Land Ownership of the Lottery Candidates

Exhibit 22 presents the number of cultivable plots owned by the lottery candidates. The majority of candidates (53.9%) do not own any plots, 19.7 percent own one plot, 12.2 percent own two plots and the remaining 10.9 percent own more than two plots. The distribution is similar across treatment and control groups.

**Exhibit 22: Distribution of Lottery Candidates by Number of Cultivable Plots Owned**

Number of Plots of Cultivable Land	Control	Treatment	Total
	%	%	%
0	53.5	54.9	53.9
1	20.7	17.7	19.7
2	11.8	13.1	12.2
3	6.8	6.2	6.6
4	1.7	3.0	2.1
5	1.0	1.0	1.0
6 or more	1.2	1.0	1.2
<i>Missing</i>	3.4	3.1	3.3
<b>Total</b>	100	100	100

### 3.6 Land Cultivated by the Lottery Candidates

Exhibit 23 shows the number of hectares that lottery candidates cultivated in the last 12 months for those who owned cultivable plots. The distribution is approximately similar across treatment and control groups.

**Exhibit 23: Distribution of Lottery Candidates By the Number of Hectares Cultivated in the last 12 months**

Number of Hectares Cultivated in the last 12 months	Control	Treatment	Total
	%	%	%
Less than 0.5	11.6	9.7	11
0.5–1	17.1	17.9	17.4
1–1.99	16.7	14.5	16
2–2.99	15.5	16.4	15.8
3–3.99	12.3	10.1	11.6
4 or more	26.9	30.4	28
Does not know	0	1	0.3
<b>Total</b>	100	100	100

**3.7 Land Rented by the Lottery Candidate from or to Others**

Exhibit 24 shows the number of cultivable plots rented from others. Approximately two-thirds (68.4%) of candidates do not rent land from others. The distribution is approximately similar across treatment and control groups.

**Exhibit 24: Plots of Cultivable Land Rented from Others**

Number of Plots of Cultivable Land	Control	Treatment	Total
	%	%	%
0	67.1	71	68.4
1	20.3	19.1	19.9
2	6.3	5	5.9
3	1.6	0.8	1.3
4	0.9	0.8	0.9
6	0.3	0	0.2
10	0	0.2	0.1
12	0.1	0	0.1
<i>Missing</i>	3.4	3.2	3.3
<b>Total</b>	100	100	100

Exhibit 25 shows the number of cultivable plots lottery candidates rent to others. Nearly all candidates (96.4%) do not rent any plots of land to others. The distribution is approximately similar across treatment and control groups.

**Exhibit 25: Distribution of Lottery Candidates by Plots of Cultivable Land Rented to Others**

Number of Plots of Cultivable Land	Control	Treatment	Total
	%	%	%
0	96.4	96.4	96.4
1	0.1	0.4	0.2
3	0.1	0	0.1
<i>Missing</i>	3.4	3.2	3.3
<b>Total</b>	100	100	100

**3.8 Income and Debt of Lottery Candidates**

Exhibit 26 presents the lottery candidates’ income from four different sources, including crop yield (wet season), crop yield (dry season), trade/commerce, animal sale, income generating activity and other sources of income. As indicated by the large median value, the most common source of income for candidates is crop yields (dry season) and it is followed by crop yields (wet season). The distribution is approximately similar across treatment and control groups.

**Exhibit 25: Distribution of Income Sources of Lottery Candidates in Last 12 months**

Income Source	Control		Treatment		Total	
	Mean (FCFA)	Median (FCFA)	Mean (FCFA)	Median (FCFA)	Mean (FCFA)	Median (FCFA)
Crop Yields (Wet Season)	173,221	25,000	194,699	42,000	180,303	30,000
Crop Yields (Dry Season)	468,910	100,000	354,224	75,000	431,252	100,000
Trade/Commerce	189,723	0	157,671	0	179,191	0
Animal Sale	96,478	4,500	105,250	3,500	99,362	4,000
Income Generating Activity	241,444	0	176,567	0	220,097	0
Other Income	60,997	0	67,736	0	63,214.4	0

Exhibit 27 presents the amount of debt for the 269 lottery candidates who declared they had debt. Out of the 269 candidates, a large number (46.5%) of candidates have debts higher than FCFA 100,000. The treatment group has slightly less debt on average than the control group.

**Exhibit 26: Distribution of Debt of Lottery Candidates in Last 12 months**

Household Debt	Control	Treatment	Total
	%	%	%
No debt	29.2	36.1	31.4
Debt less than or equal to FCFA 100.000	20.5	25.6	22.1
Debt higher than FCFA 100.000	50.3	38.4	46.5

## 4. DATA DOCUMENTATION

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Based on our review of the value label against the questions in the survey, we have not found any significant issues. The data seems to be well-documented.

Below we list of files and datasets reviewed:

*Files (received between May and July 2014):*

- 130917\_Brochure informations - non PAP phase aleatoire VF revAD7.docx
- 130917\_dossier demande Non-PAP concurrentielle VF revAD7.docx
- 130917\_GUIDE DU DEMANDEUR VF revAD7.docx
- 140109\_Méthodologie de tirage au sort\_VF.docx
- Allocation des terres à Di MCA version finale.doc
- Arrêté Cahier de charges specifique\_Di.pdf
- Cahier Général des charges aménagements hydro-agricoles de type familial.doc
- Cahiers de charges sp PI Di vf 100912.docx
- Circulaire n2011-153-MAH-CAB\_Adoption land allocation Di.pdf
- Communiqué de presse.doc
- COMMUNIQUES presse écrite rev MCABF.DOCX
- COMMUNIQUES radio-télé\_rev MCABF.DOCX
- GOBF adoption Cahier de charge general 9.6.12.pdf
- Processus d'élaboration du cahier de charges spécifiques de Di MCA version finale rev 06 10 11.docx
- RAPPORT DE LA COLLECTE \_NON\_PAP DEPOSE LIVRABLE 3.doc
- Rapport final \_NONPAP.pdf
- Rapport final \_NONPAP2r2.doc
- Processus enquête ME7Bbis.docx
- Grille de ponderation pour l'évaluation des candidats MCA version finale.xlsx
- ~\$180214\_bdd\_nonPAPConcurrentielle - eligibles.xlsx
- 141212\_bdd\_nonPAPaleatoire\_VF.xlsx
- 180214\_bdd\_nonPAPConcurrentielle - eligibles.xlsx
- Liste des admissibles loterie Non PAP Di.xlsx
- LISTE DES CANDIDATS AD7 180114 Situation des NON-PAP non enquetes AD7FINAL FINAL110214.xls
- Liste des gagnants et liste d'attente Non PAP\_2.xls

*Datasets*

- Base de données non PAP de Di.sav. *(Received April 3, 2014)*
- Base de données non PAP de Di.sav. *(Received May 23, 2014)*

## APPENDIX A: Land Allocation Criteria for NON-PAPS

	Critères et sous-critères	Pondération Critères	Points sur 100
<b>C1</b>	<b>Disposer d'actifs (main d'œuvre familiale)</b>	0.20	
SC1-1	Par ha, justifier d'au moins 4 actifs en riziculture		20
SC1-2	Par ha, justifier d'au moins 3 actifs en riziculture		15
SC1-3	Par ha, justifier d'au moins 2 actifs en riziculture		10
SC1-4	Par ha, justifier de moins de 2 actifs en riziculture		0
SC1-5	Par ha, justifier d'au moins 6 actifs en polyculture		20
SC1-6	Par ha, justifier d'au moins 5 actifs en polyculture		15
SC1-7	Par ha, justifier d'au moins 4 actifs en polyculture		10
SC1-8	Par ha, justifier de moins de 4 actifs en polyculture		0
<b>C2</b>	<b>Disposer de matériel agricole</b>	0.10	
SC2-1	Ne pas disposer de matériel		0
SC2-2	Disposer d'une charrette à traction animale		5
SC2-3	Disposer d'une charrette à traction animale et d'une charrue ou tout équipement permettant l'exploitation des terres		10
<b>C3</b>	<b>Formation technique reçue du demandeur</b>	0.05	
SC3-1	Jamais suivi de formation technique de production agricole		0
SC3-2	Déjà suivi au moins une formation technique de production agricole		5
<b>C4</b>	<b>Expérience technique en irrigué du demandeur</b>	0.15	
SC4-1	Pas d'expérience en irrigué		5
SC4-2	Expérience en irrigué inférieure à 2 ans		10
SC4-3	Expérience en irrigué supérieure à 2 ans		15
<b>C5</b>	<b>Sexe</b>	0.05	
SC5-1	Féminin		5
SC5-2	Masculin		0
<b>C6</b>	<b>Age</b>	0.05	
SC6-1	18 à 30 ans		5
SC6-2	31 à 55 ans		3
SC6-3	Supérieur ou égal à 56 ans		1
<b>C7</b>	<b>Niveau d'endettement</b>	0.10	
SC7-1	Pas d'impayés		10
SC7-2	Impayés inférieurs ou égal à 100 000 FCFA		6
SC7-3	Impayés supérieurs à 100 000 FCFA		0
<b>C8</b>	<b>Lieu de résidence</b>	0.15	
SC8-1	Ressortissants des villages de la commune rurale de Di...		15
SC8-2	Demandeurs résident dans la Province du Souou		10
SC8-3	Demandeurs résident dans la Région de la Boule du Mouhoun		5
SC8-4	Reste du pays		0
<b>C9</b>	<b>Titulaire d'une exploitation autres périmètres AMVS</b>	0.15	
SC9-1	Exploitant au moins une parcelle		0
SC9-2	N'exploitant aucune parcelle		15

## APPENDIX B: Additional Variable Distributions

**Exhibit 27: Distribution of Lottery Candidates who were Previously Farmers\***

Previous Farming Experience	Control	Treatment	Total
	%	%	%
No	1.6	0.6	1.2
Yes	13.7	12.5	13.3
<i>Missing</i>	84.8	86.9	85.5
<b>Total</b>	100	100	100

\* of those not currently farmers

**Exhibit 28: Number of Years of Farming Experience of Lottery Candidates\***

Farming Experience	Control	Treatment	Total
	%	%	%
Less Than One	0.3	0.4	0.3
1 to 5	12	13.1	12.4
6 to 10	27.3	23.7	26.1
More than 10	55.4	59	56.6
<i>Missing</i>	5	3.8	4.6
<b>Total</b>	100	100	100

\* Of those who currently working as farmers or who previously worked as famers

**Exhibit 29: Years of Experience in Irrigation of Other HH Members**

Irrigation Experience of Other HH Members (n Years)	Control	Treatment	Total
	%	%	%
None	34.1	34.6	34.3
Less Than 2 years	7.9	10.1	8.6
More Than 2 Years	53.8	51.7	53.1
<i>Missing</i>	4.2	3.6	4
<b>Total</b>	100	100	100

**Exhibit 30: Years of Experience in Rice Production of Other HH Members**

Rice Production Experience of Other HH Members (In Years)	Control	Treatment	Total
	%	%	%
None	40.6	41	40.7
Less Than 2 years	7.5	8	7.7
More Than 2 Years	47.5	47.3	47.4
<i>Missing</i>	4.4	3.8	4.2
<b>Total</b>	100	100	100

**Exhibit 31: Years of Experience in Other Relevant Farming Experience of Other HH Members**

Other Relevant Farming Experience of Other HH Members (In Years)	Control	Treatment	Total
	%	%	%
None	30.6	32.8	31.3
Less Than 2 years	7.9	8.9	8.2
More Than 2 Years	56.5	54.5	55.8
<i>Missing</i>	5	3.8	4.6
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>

**Exhibit 32: Number of Cultivable Plots Owned by Lottery Candidate that are Irrigated\***

Number of Cultivable Plots Irrigated	Control	Treatment	Total
	%	%	%
0	28.7	26.6	28
1	10.6	11.7	11
2	1.9	1.8	1.8
3	0.9	1	0.9
4	0.6	0.6	0.6
5	0.1	0	0.1
6	0.3	0	0.2
<i>Missing</i>	57	58.3	57.4
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>

*\*Of those who own plots of land*

**Exhibit 33: Total Area (in ha) of Cultivable Plots Owned by the Lottery Candidate\***

Total Area (in ha) of Cultivable Plots	Control	Treatment	Total
	%	%	%
Less than 0,5 ha	5.8	4	5.2
0,5 - 1 ha	7.1	7.8	7.3
1 - 1.99 ha	7.3	5.8	6.8
2 - 2.99 ha	6.5	6.6	6.5
3 - 3.99 ha	4.7	4.2	4.5
4 ha or more	11.7	13.5	12.3
Don't know	0	0.2	0.1
<i>Missing</i>	56.9	58.1	57.3
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>

*\*Of those who currently own plots of land*

**Exhibit 34: Distance (in Km) Between Home of Lottery Candidate and his/her Closest Cultivable Plot\***

Distance (in Km) Between Home and Closest Cultivable Plot	Control	Treatment	Total
	%	%	%
Less than 1 km	9.5	11.7	10.2
1 - 1.99 km	9.8	9.7	9.8
2 - 2.99 km	8	8.7	8.2
3 - 3.99 km	6	4.2	5.4
4 km or more	9.8	7.6	9
<i>Missing</i>	57.1	58.1	57.4
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>

*\*Of those who currently own plots of land*

**Exhibit 35: Total Area (in ha) of Community Plots Used by Lottery Candidates\***

Total Area (in ha) of Community Plots	Control	Treatment	Total
	%	%	%
Less than 0,5 ha	4.3	6	4.8
0,5 - 1 ha	6.9	6	6.6
1 - 1.99 ha	4.1	4.2	4.1
2 - 2.99 ha	3.7	4	3.8
3 - 3.99 ha	2.6	1.4	2.2
4 ha or more	3.1	3.6	3.3
Don't know	0.1	0	0.1
<i>Missing</i>	75.1	75	75.1
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>

*\*Of those who farm community plots*