
MILLENNIUM VILLAGES IMPACT EVALUATION, BASELINE SUMMARY REPORT

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Results in development



Acknowledgements

This report has been prepared by the team for the impact evaluation of the Millennium Villages Project. The team is composed of staff from Itad, the Institute of Development Studies, the London School of Hygiene and Tropical Medicine, and PDA-Ghana. The team is fully independent of the Earth Institute and the Millennium Promise. The principal authors of this report are Dr Edoardo Masset, Dr Dee Jupp, Dr David Korboe, Tony Dogbe, and Dr Chris Barnett. The team is nonetheless very grateful to all the researchers that have assisted with data collection, the staff at DFID, and everyone else that has provided support, information, and comments – including the work of the Earth Institute during the enumeration phase. The findings of this report are the full responsibility of the authors, and any views contained in this report do not necessarily represent those of DFID or of the people consulted. The first drafts of this report were edited and proofread by Pippa Lord, Jane Stanton, Alice Parsons, and Kelsy Nelson. The final copy was proofread by Caitlin McCann.

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Acronyms

ANCOVA	Analysis of Covariance
CHPS	Community-based Health Planning and Services
CSPRO	Census and Survey Processing System
CV	Control Village
DD	Difference-in-differences
DFID	Department for International Development
DHS	Demographic and Health Survey
EI	Earth Institute
FGD	Focus Group Discussion
GLSS5	Ghana Living Standards Survey 5+
GSS	Ghana Statistical Service
IDD	Initial Design Document
ISSER	Institute of Statistical, Social and Economic Research
JHS	Junior High School
MDGs	Millennium Development Goals
MICS	Multiple Indicator Cluster Survey
MMDA	Mamprugu-Moaduri District
MWDA	West Mamprusi District
MV	Millennium Village
MVP	Millennium Villages Project
OLS	Ordinary Least Squares
PPP	Purchasing Power Parity
PRA	Participatory Rural Appraisal
PRG	Peer Review Group
PVA	Poverty and Vulnerability Assessment
QA	Quality Assurance
RCA	Reality Check Approach
SADA	Savannah Accelerated Development Authority
SHS	Senior High School
TBA	Traditional Birth Attendant
UN	United Nations

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1. Introduction

1. This report presents the baseline findings from the Department for International Development (DFID)-commissioned impact evaluation of the Millennium Village Project (MVP) in Northern Ghana.¹ The project will run from 2012 until 2016, with interventions targeting a cluster of communities with a total population of approximately 27,000 people. The MVP has been designed to demonstrate how an integrated approach to community-led development can translate the international Millennium Development Goals (MDGs) into results. It is an approach that has been previously piloted in Kenya and Ethiopia and in 2006 launched at scale to reach nearly half a million people across 10 countries throughout Sub-Saharan Africa. The new Millennium Village (MV) in Northern Ghana is the first to be accompanied by an independent impact evaluation. Details of the conceptual approach and methodology for the evaluation are presented in the Initial Design Document (IDD), with appendices containing the tools used for data collection.²
2. The evaluation uses a mixed methods approach to impact evaluation. At the core of the methodology is a difference-in-differences (DD) design that compares changes in outcomes in the MVP areas before implementation to post-implementation, with changes in the same outcomes for an explicit control group. DD allows the evaluation to isolate the MVP impact on outcomes (including poverty, child development, undernutrition, and child mortality) from effects of other variables changing over time.³ Alongside the quantitative survey data, there are a number of supporting qualitative approaches that aim to better understand how and why change has occurred. There are four key qualitative methods. First, a **Poverty and Vulnerability Assessment (PVA)** describes local and multi-dimensional perspectives of wealth and well-being. Second, an **Institutional Assessment** captures empowerment and institutional change, particularly between the community and district levels. Third, a **Reality Check Approach (RCA)** uses a mini-anthropological study to better understand how the MVP affects the realities of people as well as captures any unintended consequences. And lastly, an **Interpretative Lens** approach takes the preliminary quantitative survey findings and obtains local feedback and interpretation around emerging themes of analysis. This last module will be deployed during the mid and end terms, when there will be a time series dataset that can provide a quantitative measure of change/impact. All other qualitative modules were deployed during the baseline.

¹ The Terms of Reference for the assignment is included in the Initial Design Document, Appendix A.

² Available at: www.ids.ac.uk/project/millennium-villages-in-northern-ghana-impact-evaluation

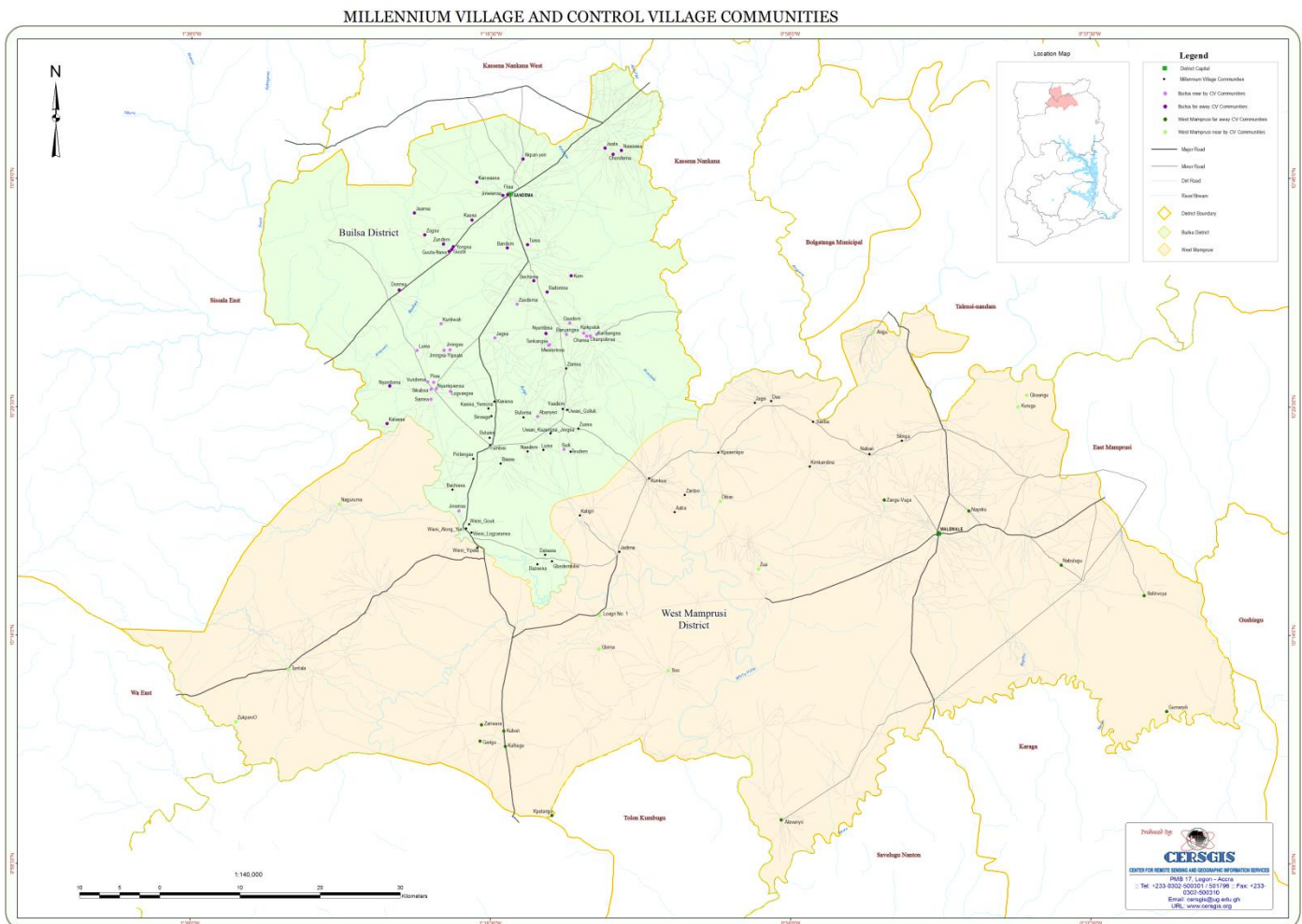
³ While the implementation of a randomised trial is in principle possible by, for example, randomly allocating the interventions to matched village pairs, it would have been highly impractical in this particular case and the cost would have been prohibitive. The matching of control villages to project villages (on aggregate characteristics) and further matching of project and control households at the analysis stage (on household characteristics) within a DD approach appears to be the next best feasible approach after a randomised design. For more detail, see Masset et al. (2013).

3. The purpose of this document is to:
 - Present the research instruments, both quantitative and qualitative, employed by the evaluation team
 - Provide a description of the MV and Control Village (CV) communities
 - Describe the main characteristics of the study population in terms of MDGs, poverty, and other outcome indicators
 - Test the validity of the control group
 - Assess the quality of the data collected
4. Section 2 provides an overview of the MVP area and some background information on its ethnic mix, geography, physical infrastructure, transport, and the local economy. Section 3 gives an overview of the survey instruments and qualitative research. Section 4 presents the characteristics of the study population, covering the baseline findings for MDG status, household characteristics, poverty, agriculture, health, education, gender, social networks, and attitudes towards risk. Section 5 then provides a summary of the characteristics of the data, focusing on balancing tests, the issues around seasonality, and an assessment of the data quality. Section 6 provides the summary, with conclusions about the characteristics of the study population as well as the baseline dataset (the balance tests, seasonality issues, and data quality).
5. This Baseline Report has been submitted to a two-stage review process. Firstly, the Evaluation Advisory Group (EAG), which is made up of stakeholders from DFID, EI and government, met in August 2013 to provide comments on the first draft. The purpose of the EAG is to ensure the continued relevance of the evaluation to a broader set of policymakers, as well as to contribute particular insights about how the MVP and other interventions in the region are operating on the ground. The comments of the EAG are advisory only, and while the evaluation team is obliged to justify its response, it is not required to alter the report to obtain approval. At the second stage, the Peer Review Group (PRG) reviewed the technical quality of the report in October/November 2013. The comments of the PRG have been satisfactorily addressed prior to the publication of this report. The PRG is being coordinated by the International Initiative for Impact Evaluation (3ie) and includes the following international experts:
 - Howard White, Executive Director, 3ie
 - Annette Brown, Deputy Director, 3ie
 - Thomas de Hoop, Research and Evaluation Specialist at American Institutes for Research
 - Chris Udry, Professor of Economics, Yale University
 - Robert Osei, University of Ghana
6. **Note:** As this is an ongoing study at the time of the public release of this report, the names of control villages and the identities of particular focus groups have been replaced with identification references to protect the identity of the control communities and the study population. For individuals and households, these are and will not in any case be presented in the data analysis and the evaluation findings.

2. Overview of the MVP area

7. This section provides an overview of the MVP area and is based on observations during reconnaissance visits to the Savannah Accelerated Development Authority (SADA) MVP sites, information gathered from the Reality Check, and focus group discussions (FGDs) with community members and district officials. The MVP area (including the control sites) is located in the former districts of West Mamprusi and Builsa in Northern Ghana. The community groups forming the MV cluster span across two different districts and have different languages and customs.⁴ In late 2012, these districts were split to form the four districts of **West Mamprusi** (District Assembly based in Walewale), **Mamprugu-Moaduri** (District Assembly based in Yagaba), **Builsa North** (District Assembly based in Sandema), and **Builsa South** (District Assembly based in Fumbisi).

Figure 1. The MVP and Control Communities



⁴ A detailed discussion of the selection process for the MVP sites is provided in the IDD, pages 25-27.

2.1 Institutional assessment

8. When the MVP began operations, it was split over the West Mamprusi and Builsa Districts. In 2012, the two districts were divided into four: West Mamprusi (old district), Mamprugu-Moaduri (new district), Builsa South (new district), and Builsa North (old district). The MV communities are in the first three districts with control communities located in all four districts. As of the end of 2012, the newly created districts did not have functioning offices though some district staff had been appointed and were working at their posts. For this reason, the leadership of the two old districts thought, for the institutional assessment, it would be more prudent to bring the staff of the new and old districts together for an FGD. The former were new to the district and were yet to acquire or settle into their offices. Furthermore, the MVP had been dealing with the staff of the old districts.
9. To understand the institutional arrangements the districts have put in place for the implementation, management, and tracking of the effectiveness and sustainability of the MVP, the administrative and department heads engaged in an FGD as each group plays a different role and experiences a project differently. These discussions took place on 16 November 2012 in the Builsa North and South Districts and on 22 February 2013 in the West Mamprusi and Mamprugu-Moaduri Districts at their respective district assembly halls. From the discussion, the focal persons in the districts' administrative arm for the MVP interventions are the District Planning Officers. The agriculture, education, health, works, and cooperatives each have focal people who participate in meetings organised by the MVP. The representatives of the Departments of Community Development and the Department of Social Welfare in the two districts appeared to have little knowledge of the MVP interventions because they did not directly participate in the meetings organised by the MVP. The representatives of the Departments of Community Development felt that considering their links with communities they should have been more involved than they were. The District Planning Officers who participated in the discussion did not have a copy of the final MVP project document nor did the representatives of the other departments. The MVP secretariat organises quarterly stakeholder meetings and workshops with the core administrative and decentralised department staff to provide updates on activities and progress on interventions.
10. According to the administrative leadership of the two old districts, they were involved in the formulation and design of the project and approved of intervention areas, namely agriculture, health, education, and infrastructure. However, they said they were not involved in the selection of the project communities, which they would have preferred since they are more conversant with their districts. In West Mamprusi, the district stakeholders believed that as a consequence of the selected project communities being located along the main road, the off-track and 'deeper overseas' communities where poverty and deprivation is very severe are ignored.
11. In both districts, department representatives working directly with the MVP felt involved in the planning and implementation of interventions such as the provision of boreholes and training of health volunteers, but felt they had limited roles in the monitoring and evaluation of the projects. Resource allocation to communities is done by the MVP and SADA and not by the districts, which the department representatives felt does not foster a sense of ownership by district officials despite their involvement in the planning and implementation.
12. The district assemblies contribute to the MVP by providing logistical assistance such as lending district vehicles, granting the use of the assembly hall for meetings with project stakeholders or assembly personnel, and technical assistance from district staff for project implementation.

13. Administrative and department heads explained that from previous experience, projects that were sustained long after they ended were effectively monitored to ensure the interventions reached the target communities. User fees on services or facilities like an ambulance service can be introduced at the end term when income levels have improved so that funds can be recouped for project maintenance. Also, project sustainability depends on the extent to which community members and departments are actively involved in the implementation so as to ensure that a sense of ownership of the project and enough capacity building has taken place. Sustainability can be secured by building solid and durable physical structures like schools and clinics that are disaster resistant.
14. Overall, the district officials anticipate that the MVP interventions will reduce poverty as income levels increase, that infrastructure facilities will be improved and relieve the district assemblies of the cost, and that the district staff capacity will be strengthened.

2.2 Communities in the area where MVP operates

15. The descriptions presented in this section of the report refer to the communities in the focus group component of the study. Unlike the communities in the two Mampruli-speaking districts, which are characterised by a dispersed settlement pattern, those in the Buili-speaking districts follow a nucleated settlement pattern and are close to each other. Communities in Builsa North and South are closer to their district capitals of Sandema and Fumbisi, respectively. With the exception of BSCF1 and BSMV5, the rest of the participatory rural appraisal (PRA) for communities surveyed by our study⁵ in the Builsa South District are located within a distance of 5-20 kilometres of the district capital. Communities in the West Mamprusi and Mamprugu-Moaduri Districts such as MMCF2, MMCF1, MMCN2, and MMMV1 are more remote (over 20 kilometres to the district capital). The most remote community in the West Mamprusi District is MWCN1, a settler community with no social amenities. The area is subject to seasonal flooding, which leaves some communities cut off from others, and thus they are commonly referred to as 'overseas.'
16. **Ethnic mix.** Almost all of the communities are multi-ethnic as a result of migration, inter-tribal marriages, and diverse arrangements with settler populations such as the Fulanis. The ethnic groups in these communities differ according to area. The most common ethnic migrant groups are Kassena, Guruni, and Kantosi, plus the presence of *Dagaaba* and Busansi. Communities in the Builsa districts are predominantly Buili-speaking. Likewise, those in the Mamprusi districts are predominantly Mampruli-speaking. A significant exception is in MMMV1, a Buili-speaking community within the West Mamprusi District. With the exception of MMCF1, which is populated by Mamprulis exclusively, the rest of the communities have more than one ethnic group.
17. **Community organisation.** A number of the project and control communities in the Builsa North and South districts are regarded as sections of much larger communities. For this reason, these areas are traditionally under the leadership of sub-chiefs who report to the main chief of the larger community. Of the 16 communities in the Builsa North and South Districts selected for the qualitative baseline study, only three were not a section of a larger community. These are BNCN1, BNCF1, and BSMV4. The rest are regarded as sections.

⁵ See Section 3 for a description of how we obtained a sample of study communities from the full sample of localities in the two districts of intervention.

18. The communities are structured along traditional lines with shared powers between chiefs and sub-chiefs on the one hand and between chiefs and the landowners on the other. Whilst the chiefs or sub-chiefs role generally relates to governance, the landowners are the 'spiritual caretakers' of the land and are responsible for allocating it.
19. The focus groups felt that the Assembly representatives, as individuals, listen to the community and can be trusted in local governance arrangements⁶ whereas the District Assemblies are seen as detached and unresponsive. Even though Assembly representatives are not part of the traditional governance hierarchy, they play an important role in community development. They are consulted by chiefs and sub-chiefs on matters relating to the well-being of the community. Together with the unit committee, they are ranked high in terms of reliability, accessibility, and effectiveness in assisting community members with health, education, and sanitation issues.
20. The communities also have a number of existing self-help groups such as farmer groups, other occupation-based groups, women's groups, youth groups, and widows groups.
21. **Physical infrastructure.** None of the 21 communities selected for the focus group component of the impact evaluation have a tarred road linked to a major town such as district capital. However, the roads linking these communities are fairly motorable with the exception of those between MMMV1 to Djardema, BNCF1 to Sandema, and MMCF1 to MMCF2, which get flooded during the rainy season.
22. The most visible forms of physical infrastructure in these communities are public basic schools and Community-based Health Planning and Services (CHPS) compounds. All seven of the MV communities selected for the baseline study have schools. In some schools, the highest level of education taught is primary class six whilst in others it is Junior High School (JHS) three. Communities without a JHS are generally able to access one in a nearby community within approximately five kilometres. The communities that do not have schools are MMCF1, MWCN1, BNCF3, BSCN2, BSCF1, and BNCF2.
23. Another form of physical infrastructure is mechanised boreholes, mostly provided by the District Assemblies. As they are not equitably distributed by population size, communities with very few boreholes supplement their water supply with hand-dug wells and streams.
24. Except for BNCN1 and BNCF1, none of the communities surveyed by the study were connected to the national electricity grid. MWMV1, MMCN2, BSMV5, MMMV1, MMCF2, and BSCN2 have solar street lamps erected at vantage locations such as CHPS compounds.
25. **Transportation.** Although the roads linking some of the communities to the district capital are fairly motorable, transport to and from these communities is a major challenge due to the region's poor vehicular system. The primary means of transport is cycling and motorbikes. The newly introduced tricycles called 'motorkings' are owned by a minority of households and are used for commercial purposes.
26. In some communities, transport to markets is only available on market days via trucks. Communities such as MMCF1 and MWCN1 have no public transport to market centres and thus people must walk more than 10 kilometres to access public transport.

⁶ Note: the RCA did not concur with this finding.

27. Communities such as MMCF1, BSMV5, MMCN2, and BNCF1 lie within the flood zone and are cut off from major markets and district capitals during the rainy season. With the recent introduction of 'motorkings' or 'motor kia,' movement to district capitals and other major towns on non-market days has improved.
28. **Economic profile.** The main economic activities in these communities are farming and trading in agricultural produce. Almost every household has a farm, which is primarily used for subsistence consumption. A small proportion of the harvest is sold to cover other household costs such as education, health, and migration.
29. Market days are very important in the economic setup of the Builsa and Mampruli districts. They are also a major cause of girls' and boys' irregular school attendance in communities close to the markets. Apart from the major markets in Sandema, Fumbisi, and Walewale, there are additional satellite markets in Kaadema, MMMV1, and other non-MVP communities in Wiaga and Wulugu.
30. The communities lack basic economic endowments such as access to information, agro-processing, and manufacturing industries. All the communities studied are agrarian and survive on rainfed agriculture.
31. Besides farming, other economic activities include picking wild fruits and shea nuts, oil extraction, and producing charcoal. There is an active labour force ready to work, but these people are forced to take up employment outside of the communities due to a lack of opportunities. Non-farming seasons are plagued with idleness across both project and control communities. Over the past three decades, migration has become an important coping strategy. Migration generally occurs during the dry season and income generated is used to finance farm inputs, education, healthcare, and trading.
32. These communities have been recipients of a limited number of development initiatives from both government and non-governmental organisations including World Vision, Presbyterian Agricultural Station, Technoserve, and SADA, with interventions mostly targeted at reducing vulnerability, poverty, and improving resilience to disasters.

Comparison between MV and Control Communities

33. According to the MV project managers, one factor in selecting project communities was that they had to be in clusters.⁷ This seems to account for the proximity of the project communities to each other and major routes. Four of the MVs out of the seven studied are located along the major road to the district capitals or markets whilst their corresponding control near and far communities are remotely situated. This means that they have less direct access to major marketing centres in the district.
34. Based on the village narratives compiled for the 21 communities (seven MVP, seven control near, and seven control far) subject to the qualitative components, it seems the MVs in the qualitative study are slightly better off in terms of infrastructure than the CVs. For education, there are schools in six out of seven MVs of which two do not have a full set of classrooms from pre-school to JHS 3. In the control, there are schools in five out of the seven near communities. Of the five, only three are from pre-school to JHS 3. In the other two, one goes up to pre-school and children have to access education three kilometres away. In another community, the school is under construction after a community initiative. In the far CVs there are schools in three out of the seven communities. In CVs

⁷ For details of selection process please see pp. 25-29 in the IDD.

without schools, children have to travel on average about three kilometres to access one. In one of the three CVs the school classes only go up to class six. There is a similar distribution of health facilities to education in the areas. For the communities in the qualitative baseline study, there are health facilities in four out of seven MVs and two out of seven in control far and two of seven in control near communities. In terms of access to electricity, there is not a great difference between the MVs studied and the CVs. Only one MV and one control near and one control far are connected to the national electricity grid. Three MVs, one near CV, and one far CV have solar lamps located in parts of the community. In regards to water access, once again there is not much difference between the MVs and CVs. Six out of the seven MVs studied have boreholes with hand pumps. There are also hand-dug wells constructed by the community members. Five of the control near and five of the control far communities studied have boreholes with hand pumps.

35. After the new districts were created in 2012, subsections of some communities were legislated as separate communities. There are more instances of this in the Builsa South District. As a result, three out of five of the MVs studied are full standing communities. In the same district, the two remaining MVs studied and four near CVs as well as five far CVs are all sub-sections of larger communities. This occurred less in the West Mamprusi District (MWDA) and Mamprugu-Moaduri District (MMDA). The MVs and the far and near CVs are all whole communities, with the exception of one near CV, which is a subset of a larger community in these districts. These changes have implications for community organisation. The sub-set communities that are now full communities are traditionally under the supervision of a sub-chief who reports to the main chief of the larger community. Whilst this may not be a problem immediately, in the future a new generation of these sub-set communities that become full communities may struggle with their parent community for autonomy and access to resources.
36. The major livelihood in both project and control communities studied are farming and livestock rearing. Farming is done by households in all well-being categories. Women in both MVs and CVs also participate in trading. Women in the MVs that are on major transport routes are into much larger trading than those in their control near and control far communities that are located remotely with very difficult access to transportation.

3. Survey instruments and qualitative research

37. This section summarises the quantitative data collection undertaken for the baseline, including the processes of supervision and quality control. The section also summarises the qualitative evaluation modules, and ends with a discussion of the challenges of applying a theory-based impact evaluation approach to the Millennium Villages Project.

Survey data collection

38. As detailed in the IDD, the evaluation adopts a DD design by comparing the change in outcomes in the MVP areas before implementation to post-implementation, with changes in the same outcomes for an explicit control group. MV communities were matched with CV communities using community-level characteristics summarised by a propensity score. Two stratifications were adopted: district and geographic distance from the MV areas. Each project community was paired with a *nearby* control community and a *faraway* control community, and the pairing was conducted separately in the Builsa and West Mamprusi districts.⁸
39. Prior to the quantitative data collection, a census listing (the ‘household count’) was conducted in 35 project communities and 68 matched control communities.⁹ In the MV areas, 750 households were randomly selected from the household listing proportionally to the village population size. Similarly, 750 households were selected proportionally to the village population size in the nearby CV areas and another 750 in the faraway CV areas. The survey teams were only able to interview 712 of the selected 750 households in the project areas and 1,466 of the originally selected 1,500 households in the control areas. The total sample size of the survey therefore stands at 2,178 households, of which 32.7% resides in the project areas. This means that about 18% of the households listed in the census were eventually interviewed. The Earth Institute (EI) did not employ a replacement protocol, which resulted in the loss of a fraction of the planned sample. This fraction is very small because the MVP survey team visited each target household up to three times when it was not found. The overall response rate was 96.8% (94.9% in the MV areas, 98.4% in the near CV, and 97.1% in the faraway CV). Reasons for households not being found or interviewed were not reported during the data processing. However this information will be added by the MVP to follow-up datasets as it was collected during follow-up interviews in cases where it was missing. Table 1 provides a summary of the start and end dates for each survey instrument.

⁸ Note: At the time of selecting and pairing the control communities, there were two districts covered by the MVP (Builsa and West Mamprusi). These districts were later split to form four districts although the area covered is the same.

⁹ The final number of control communities is larger than twice the number of project communities because in the matching process a project community of about 10 households was considered to be part of another community.

Table 1. Actual enumeration start and end dates

	MV		Builsa Control Sites		West Mamprusi Control Sites	
	Start	End	Start	End	Start	End
Household Count	30 January	4 February	5 June	16 June	26 June	4 July
Demographic Collections	19 March	26 March	28 June	7 July	20 July	29 July
Adult Survey	16 April	21 June	1 August	13 August	25 August	18 Sept.
Household Survey	7 May	28 June	17 August	18 Sept.	1 Sept.	18 Sept.
Anthropometric Collections	10 May	17 June	29 August	20 Sept.	26 August	20 Sept.
Blood Survey	9 May	10 June	29 August	20 Sept.	15 Sept.	26 Sept.

Source: EI Report, SADA Ghana Survey Collection Dates and Response Rates.

40. Households were administered a number of survey instruments in order to track progress on the MDGs and other indicators selected by the evaluation team. Some of these instruments were designed by the MVP based on previous MVP sites and others by the evaluation team in collaboration with the MVP. All instruments were reviewed and approved by the evaluation's Peer Review Group (PRG) to ensure rigour and maintain independence. The full list of survey instruments with the numbers of interviews conducted is presented in Table 2.

Table 2. Quantitative survey instruments and number of observations

	Interviews MV areas	Interviews CV areas	Total interviews
Community and facilities questionnaire	35	68	103
Household questionnaire	712	1,466	2,178
Adult female questionnaire (15 to 49)	848	1,995	2,843
Adult male questionnaire (15 to 49)	504	1,129	1,663
Anthropometry (under 5)	608	1,353	1,961
Blood tests: anaemia & malaria (under 5)	381	409	790
Cognitive tests (children 6 to 19)	1,160	2,296	3,456
Easy education tests (children 9 to 19)	573	1,163	1,736
Advanced education tests (children 11 to 19)	111	299	410
Time preferences and income expectations	432	704	1,136

Quality control of survey data

41. This section provides an overview of the data collection process and the quality checks undertaken for the 2012 baseline. The section summarises the checks undertaken by the MVP, as well as additional checks undertaken by the independent evaluation team. There are three main parts to the MVP's quality control system: (i) *Field-based systems that are used for capturing enumeration errors* including detailed form checks that take place three times for each questionnaire (once by the enumerator, a second time by a data editor, and third by a field supervisor); (ii) *Random spot-checks* of enumerators as conducted by field supervisors (with protocols for the random survey spot-checks); and, (iii) Once the field checks are complete, questionnaires are sent to the field office for *single entry, double data entry, and cleaning in CSPro* (Census and Survey Processing System).¹⁰ The

¹⁰ See: <http://www.census.gov/ipc/www/cspro/>

MVP deployed a total of 36 enumerators and eight editors and supervisors. For the control sites household survey there were a total of 39 enumerators and eight editors and supervisors.

42. **Field-based and random checks to capture enumeration errors.** The MVP's field-based systems make use of quality control forms that are used to verify the accuracy of the survey data. Different forms are used for the Household Survey and the Adult (Male/Female) Surveys, and in each case the supervisor selects a household (or individual, in the case of the Adult Survey) at random for verification. The supervisor will then re-interview the main respondent/individual, asking them a series of short, non-sensitive, and easily verifiable questions (10-15 minutes). The responses are recorded and then compared to the completed questionnaire previously filled out by enumerators. This is undertaken during the first 10 days of enumeration, where at least one household per day (or two female respondents per day, in the case of the Adult Survey) is selected randomly for re-enumeration/verification visits, from the target list of households enumerated that day. When selecting households/respondents, supervisors are to ensure that every enumerator had at least one revisit during the verification period. The same process is repeated during the last 10 days of enumeration.

Table 3. Re-enumeration/Verification Checks conducted by the MVP

	Target for verification	Actual verified for MV Surveys	Actual verified for Builsa Surveys	Actual verified for WM Surveys
Household survey quality control form	At least one household per day for re-enumeration/verification visits during the first 10 days and the last 10 days of enumeration. A minimum of 20 household questionnaires (about 5-10% of the original sample).	53	69	50
Adult female quality control form	At least two respondents for per day for re-enumeration/verification visits during the first 10 days and the last 10 days of enumeration. A minimum of 40 female adult questionnaires (constituting about 5-10% of the original sample).	24	58	62

43. **Data entry and cleaning in CSPro.** Questionnaires are single entered by a data clerk, cleaned, and then sent to a different data clerk for double entry, followed by another round of cleaning. The data entry templates and cleaning scripts contain four checks: (i) Missing data, (ii) Invalid response codes, (iii) Logical/consistency, and (iv) Structural. An overview of the data entry and cleaning systems using the education modules as an example is provided in Table 4.

Table 4. Types of data entry checks

Data entry checks	Description	Example (from the Education module)
Missing	Check if the required question is answered.	Q133 (ever attended school) cannot be left blank.
Range	Check if the response is within the allowable range of responses.	Q133 has the response codes of: "1 - yes"; "2 - no"; and "90 - Don't know." Any response not equal to one of these values is considered out of range.
Logical/consistency	Check if a particular response is consistent with a previous response.	If the individual has never attended school (Q133=2), then the rest of the questions in the module should be skipped.
Structural	Check for duplicates, that structural relationships hold within survey modules, and all household members are accounted for across all modules.	The name and ID of the individuals listed in the education table are consistent with the name and ID of individuals in the demographic/member roster.

44. The survey data (Household and Adult) are subject to a double entry system so that data on a number of key variables are re-entered for verification purposes in CSPro. The first cleaning stage involves the application of pre-established structural, range, logic, and consistency checks. The advanced cleaning stage involves an additional layer of quality/analytical checks¹¹ (e.g. outlier checks, continuous/open-ended data). Standardisation focuses on value labels, the missing and 'N/A' Codes, and Advanced Structural Checks. The de-identification internal release process strips names and other direct identifiers from the data in addition to scrambling IDs.
45. Independent Quality Checks by the Evaluation Team. **The independent evaluation team undertook additional checks to independently verify the effectiveness of the MVP's data collection and quality assurance system. The work of the external quality assurance (QA) team focused on the following:**
- **Enumeration and Supervisor Shadowing** processes to check the quality of training and fieldwork, including adherence to the MVP's quality control processes. These QA checks include the shadowing of enumerators and supervisors during enumeration.
 - **The Process Check** tool, which was used by the external QA team to check that the MVP's processes (according to the EI Enumeration Manual¹²) were correctly followed.
 - **Random spot-checks of Households and Adults.** This involved revisiting a sub-sample of households (random selection of 5% of the sample) to check: (i) The household members can be located and existed; and, (ii) Responses to a selection of questions within the survey instruments to test errors as a result of expectation bias or measurement inaccuracy.
46. A summary of the checks is listed in Table 5.

¹¹ At the time of writing, the EI's own report of their QA processes was not available. We would expect this to include details of the actual cleaning process, and whether data are 'corrected' or 'discarded' and on what basis.

¹² The Earth Institute, Columbia University, Survey Enumeration Manual – Guidelines for enumerators, field supervisors, and data managers, January 2012.

Table 5. Summary of independent quality checks

	MV Site	Control Sites (Near and Far)
	Numbers of Checks	Numbers of Checks
Training Observation	Field team attended training organised by EI on 10-12/4/2012, 23-30/4/2012	Training attended for nine days, starting on 17/9/2012
Supervisor Process Checks	4 – with 2 supervisor checks in Builsa and 2 in West Mamprusi Districts	4 conducted – with 2 in Builsa and 2 in West Mamprusi Districts
Comprehensive Process Checks	1 conducted	1 conducted
Shadow Enumeration	22 adults and 27 HH were shadowed during the enumeration process	None conducted – since no significant errors were identified from the shadowing exercise in the MV site, it was decided to discontinue these checks in the CV sites and focus resources on the spot checks
Spot Checks – Adults	25 spot checks – 14 female and 11 male	97 adult females – at least one female from each household that was checked – were spot checked
Spot Checks – HH	31 spot checks were carried out in relation to the HH survey	37 HH in near control site and 37 in far control site = 74 HH in all

Qualitative evaluation modules

47. The quantitative work was complemented by three strands of qualitative research. The first comprised of a series of FGDs with residents grouped by gender and well-being in 21 communities (seven MVs, seven nearby CVs, and seven faraway CVs). In total, 84 such focus groups and an additional 24 school-based interviews were conducted. In a separate strand employing the RCA, a team of researchers lived with selected households (both MV and CV) for short periods in order to ground truth and qualify the findings of the quantitative survey. And lastly, an institutional assessment was undertaken with the four districts' authorities. A total of 112 FGDs were conducted.
48. The aim of the qualitative work is to complement the quantitative work by shedding light on how and why things have changed, particularly from the perspective of community members and with a special focus on the experience of disadvantaged and marginalised groups. The qualitative methodologies are detailed in the IDD¹³ and in Appendices C – G of this report. Below is a brief summary:
- **Poverty and Vulnerability Assessment.** During the baseline, this work focused on identifying categories of households by different wealth/well-being groups and enabling community members to define poverty in their own terms by developing key indicators of wealth/well-being at the community and household levels. The well-being categorisation exercise was undertaken in seven project communities as well as 14 corresponding far and near control communities in the two (now four) districts. This process was the basis for forming focus groups determined by both the well-being

¹³ See IDD Appendix E, Part 1 (Quantitative Data Collection Instruments) and Part 2 (Qualitative Methods and Tools).

categories and gender, which were then used to gather baseline information on poverty, vulnerability, and local institutional issues. These focus groups will be used in subsequent years to consider changes since the baseline and capture local interpretations of the emerging quantitative findings (i.e. the Interpretative Lens approach). The work on well-being categorisation took place from 12th to 30th November 2012, with the focus group fieldwork during January to February 2013.

- **Reality Check Approach.** The RCA is a series of mini-anthropological studies used to better understand how the MVP affects 'ordinary' people as framed by their own realities at the individual and household levels. It also aims to capture unexpected effects of project implementation. RCA is a proven methodology undertaken in four countries to date, and draws on similar work conducted in another six countries. It is based on the principles of immersion, using participant observation and the conversations that take place during a four-night stay in the homes of poor families. The training of the team and pilot took place in December 2012, with the fieldwork conducted between February and March 2013.
- **Institutional Assessment.** The institutional assessment is based on a series of FGDs and interviews with district staff, undertaken in November 2012 and February 2013. During the baseline, the two original districts were both split into two, while some staff of the two new districts had been newly recruited, and many did not have functioning offices. In the light of this, the study team organised FGDs by bringing the two split districts together. The focus groups were separated between the core staff of the district administration¹⁴ and the heads of departments and agencies. This is because they play different roles in the MVP and in projects in general and hence experience the projects differently. The institutional assessment is complemented with ongoing data collection of district expenditure and time use in the MV and CV areas.

Applying a theory-based approach

49. At the core of the Millennium Villages impact evaluation is a difference-in-differences design based on a statistical analysis of the quantitative dataset. Alongside this is a mix of other methods, drawing on theory-based impact evaluation (TBIE) approach to evaluation (White 2009). TBIEs seek to elaborate the programme theory in order to better explain the impact (net effect). Therefore, while the quasi or experimental designs focus primarily on measuring the impact (what has changed), the TBIE approach is used to open up the 'black box' to answer questions about why an intervention has achieved its intended impact and how it worked (or otherwise). The aim is to yield evidence about how the programme is working, rather than just if it is working.
50. It is important to note that there is no single 'theory of change' for the MVP as a whole, and indeed there is no definitive example being used by the project implementation team. This is partly because of the sheer complexity of the MVP (in terms of the number and sequencing of interventions), but also because the MVP seeks to implement a 'learning-by-doing' approach. Based on interactions with the Earth Institute, the evaluation team have identified three possible sources for a more orthodox 'theory of change':
 - Firstly, an overarching 'theory of change' based on the economic theory of the 'poverty trap' and grounded in theoretical and empirical research. This will in any case be tested through data being collected by the evaluation (for a full discussion see the IDD, pages 10-16).

¹⁴ Namely, the District Chief Executive, the District Planning Officer, the District Coordinating Director, and the District Budget Officer.

- Secondly, there exists a series of detailed, generic ‘intervention logics’ that show the anticipated interconnections from inputs-to-outputs-to-outcomes, and then to MDG-level impacts (see IDD, Appendix B). It is important to note however that these are not specific to the northern Ghana MVP, and make reference to interventions that will/may not occur. Plus, despite their apparent detail (they have been summarised into thirteen A3 pages for the IDD), they contain many unknowns and many imprecise connections (particularly in terms of the sequencing and synergies between different sectoral activities).
 - Thirdly, there is the ‘logframe,’ which attempts to fit the MVP into a linear hierarchy from activities through to impact. While this is the only example of a type of ‘theory of change’ that is based on the specifics of the northern Ghana MVP, it has significant drawbacks in terms of being a highly simplified/stylised version of the underlying logic. In particular, it does not adequately reflect the complexity of the MVP operation, and does not provide sufficient detail on the assumptions and connections between outputs, outcomes, and impacts.
51. While the ‘intervention logic’ (second bullet, above) seems closest to a more usual ‘theory of change’ (i.e. mapping the causal logic, assumptions, etc.), it does not provide a robust basis for framing the quantitative/qualitative analysis. This is for a number of reasons, including: (a) It is a generic intervention logic that is non-specific to the MVP being implemented in northern Ghana; (b) It is too lengthy and cumbersome to provide a meaningful framework for identifying key areas within the ‘black box’; and, (c) It is still too vague about specific activities/interventions, how they are to be sequenced, and, importantly, where the synergies lie. In short, any attempt to utilise this version of the MVP’s generic ‘intervention logic’ as the basis for a theory of change risks leading to an overly mechanistic approach to the qualitative work (i.e. long lists of questions/areas of enquiry; too little focus on picking up unexpected findings; insufficient use of open-ended areas of enquiry; etc.).
52. In conclusion, the challenge of applying a TBIE approach to a complicated programme such as MVP has led the evaluation team to further refine its approach to one that does not assume a single (all encompassing) theory of change. The evaluation team proposes to:
- Firstly, at the mid/end term stages, the data collection is to be sequenced so that some of the emerging quantitative findings can be further explored through the qualitative work (the Interpretation Lens approach, as outlined in the IDD). This will ensure that there is a clear connection between the two datasets, and specifically, it will allow the qualitative modules to directly contribute to the interpretation of emerging quantitative findings. This process will also help ensure that the qualitative work is prioritised, with it being focused on those aspects of the theory of change where explanatory/qualitative information is most useful.
 - Secondly, the evaluation team will further develop an overarching ‘theory of change’ that focuses on the core institutional issues and their contribution to longer-term sustained change. This will draw upon both the literature and the emerging qualitative findings from the Reality Checks, the focus group discussions, and the institutional assessment. This institutional framing will be used to help guide the work of the Institutional Assessment, in particular.
 - And lastly, the evaluation team will develop an initial set of ‘micro theories of change’ that focus on selected parts of the MVP intervention logic – and which need further exploration through the mid/end term data collection and analysis (e.g. seed and fertiliser supplies). This will draw together the literature review, field observations, monitoring data from EI/SADA, as well as discussions with project managers. The number of ‘micro theories of change’ will necessarily be

limited – in part due to resource constraints but also because focusing on the minutiae of the causal chain for specific activities/sectors tends to downplay the integrated/synergistic dynamics of the MVP.

53. The above still aims to satisfy the two principle objectives of a taking a TBIE approach: (i) A focus on understanding how and why the impacts of the MVP have occurred; and, (ii) Providing sufficient integration between the qualitative and quantitative data collection and analysis to allow the core impact questions to be answered in a robust manner.

4. Characteristics of the study population¹⁵

54. This section sets out the characteristics of the study population by focusing on the MDG status in the MVs and CVs, local perceptions of poverty, and household characteristics. The section then considers different aspects of people's lives including income poverty, agriculture, education, and health in addition to gender relations, social networks, and people's preferences and expectations.

4.1 MDG status in MV sites and comparison to the rest of Ghana

55. The goal of the MVP is improving the MDGs. The MDGs are presented in the MV and CV areas separately as they emerge from the baseline quantitative data in Table 6. For comparative purposes, the same indicators are shown for three other areas: the *rural north* (comprising the rural areas of the Northern Region, the Upper East, and the Upper West), *rural Ghana* (comprising all rural areas in the country), and *Ghana* (national level data). Since the rural north is the poorest geographical region in the country and the project selected an extremely poor cluster of villages for the intervention, the indicators should improve as Table 6 is read from left to right.

56. The indicators were calculated following the instructions from the official United Nations (UN) handbook for monitoring progress on MDGs. In the case of poverty and employment indicators (the first panel in Table 6) figures were calculated from the Ghana Living Standard Survey 5 (GLSS5) data of the Ghana Statistical Service (GSS) whilst all other figures were calculated using the Multiple Indicator Cluster Survey (MICS) data. Whilst looking at the indicators in Table 6 it should be kept in mind that the MVP survey is not strictly comparable to the other datasets because they were collected at different times, with different sample sizes, and employing different questions.¹⁶ Note also that because of the size of the MVP survey and of the characteristics of the questionnaires, not all MDG indicators can be calculated and are therefore not reported in Table 6.¹⁷

¹⁵ All tests of statistical difference between samples reported in the tables of this section and throughout the report are employing cluster standard errors following the methodology presented in Section 5.

¹⁶ GLSS5 is a nationally representative living standard survey conducted between September 2005 and September 2006. Expenditure data were collected year-round and with the supervised use of expenditure diaries rather than by a standard survey questionnaire. There is disagreement about whether expenditures from diaries are more or less accurate than expenditures from survey questions but they do deliver different figures. The sample size consists of 8,700 households. The MICS data are a nationally representative survey modelled to the DHS surveys. Data were collected on 12,150 households between September and December of 2011. Because a large portion of the EI survey was also modelled to the DHS survey, there is a high degree of similarity between our datasets and the MICS data.

¹⁷ The indicators excluded for lack of data are: Growth rate of GDP per person employed; Proportion of population below minimum level of dietary energy; Proportion of pupils starting grade 1 who reach last grade of primary; Share of women in wage employment in the non-agricultural sector; Proportion of seats held by women in national parliament; Maternal mortality ratio; Unmet need for family planning; HIV prevalence among population aged 15-24 years; Condom use at last high-risk sex; Ratio of school attendance of orphans to school attendance of non-orphans; Proportion of population with advanced HIV infection with access to treatment; Incidence and death rates associated with malaria; Incidence, prevalence and death rates associated with tuberculosis; Proportion of tuberculosis cases detected and cured directly; Internet users per 100 population.

Table 6. MDGs in MV and CV localities and in the rest of Ghana

Indicator	Millennium Villages (MV)	Control Villages (CV)	Rural Northern Ghana	Rural Ghana	Ghana
Goal 1 Eradicate extreme poverty and hunger					
Proportion of population below \$1.25 (PPP) per day	74.0	71.9	68.5	39.3	28.5
Poverty gap ratio	35.6	33.7	31.6	13.5	9.6
Share of poorest quintile in national consumption	4.6	5.6	2.5	4.9	5.2
Employment-to-population ratio	76.6	79.5	63.6	58.7	68.8
Proportion of employed people living below \$1 (PPP) per day	52.7	51.8	65.1	36.8	25.8
Proportion of own-account and contributing family workers in total	98.0	98.9	96.1	88.0	75.4
Prevalence of underweight	16.5	14.3	23.6	16.5	14.2
Prevalence of stunting	26.8	29.6	37.5	28.7	24.6
Goal 2 Achieve universal primary education					
Net attendance ratio in primary school	60.5	68.9*	59.0	66.4	71.2
Net attendance ratio in middle school	9.7	15.4	11.7	22.2	30.6
Literacy rate of 15-24 year olds	33.1	33.8	30.0	37.7	37.9
Goal 3 Promote gender equality and empower women					
Ratios of girls to boys in primary school	1.26	1.03	1.03	1.01	1.03
Ratios of girls to boys in middle school (JHS)	1.40	1.74	1.45	1.31	1.27
Goal 4 Reduce child mortality					
Under-5 mortality rate	70.6	105.1**	103.30	87.7	81.1 ^b
Infant mortality rate	43.2	69.9**	59.4	55.9	52.7 ^b
Proportion of children immunised against measles	86.2	75.1**	89.6	88.0	89.7
Goal 5 Improve maternal health					
Proportion of births attended by skilled health personnel	28.7	29.4	41.0	55.6	69.4
Contraceptive prevalence rate	10.0	10.3	16.6	27.6	29.5
Antenatal care coverage	96.6	85.4***	95.4	96.5	97.1
Goal 6 Combat HIV/AIDS, malaria, and other diseases					
Proportion of population with comprehensive correct knowledge of HIV/AIDS	16.0	17.3	14.6	16.7	22.6
Proportion of children under 5 sleeping under insecticide-treated bed nets	32.5	54.0***	48.3	48.3	41.1
Proportion of children with fever treated with anti-malarial drugs	29.9	38.3	42.5	41.4	42.6
Goal 7 Ensure environmental sustainability					
Proportion of population using an improved drinking water source	73.2	72.2	72.5	74.2	86.0
Proportion of population using an improved sanitation facility	8.7	8.7	8.9	47.9	66.0
Goal 8 Global partnership for development					
Telephone lines per 100 population	0.0	0.0	0.2	0.3	2.3
Cellular subscribers per 100 population	58.7	49.0**	50.1	68.1	80.0

*Difference statistically significant at 10%, ** significant at 5%, *** significant at 1%

57. Are the MVs worse off than the CVs? The MV localities were targeted based on an assessment of the levels of deprivation and there is a possibility that they are structurally worse off than other localities in the vicinity. Table 6 shows that there are differences between the MV and CV areas and of which some are statistically significant. Some of these differences can be the result of small sample sizes and of chance error. Other differences, like the availability of mosquito bed nets, are likely to be the result of seasonal factors (see Section 5.4), whilst others can be the result of structural differences between the two areas. The emerging pattern appears to be the following: First, there are no differences between the MV and CV sites in terms of poverty levels, characteristics of employment, and other indicators of material living standard such as access to water and sanitation facilities (though households in the MVs appear to have more mobile phones). Second, households in the MVs are better off in regards to health indicators. The MVs display lower child mortality rates, higher immunisation coverage, and antenatal care. Third, children in the MVs appear to be less educated. Primary school attendance is slightly higher in the CVs though there are no differences in literacy rates and gender parity in schooling. These differences in health and education indicators suggest that there might be some underlying structural differences between the two areas in terms of access to education and health services, whether provided by the government or NGOs.
58. Are households in the MVs worse off than households living in the rural north? The data in Table 6 suggest this is not the case. The MV localities appear to be quite representative of general living conditions in the rural north as there are no large differences. Poverty rates and employment characteristics are very similar as well as education indicators of school attendance, literacy, and gender parity. There are some differences in health indicators and thus the picture is more mixed: children from the MVs appear to be better off in terms of undernourishment and mortality rates, but the provision of health services, such as malaria treatments and assistance at delivery, is higher in the rural north.
59. Are MV localities worse off than the rest of rural Ghana? This is where large differences emerge. Poverty rates in the rural areas are from 2006 and therefore not strictly comparable to those calculated based on the MVP survey but the MV areas appear to be much poorer than rural Ghana. Access to sanitation facilities is also much more common in rural Ghana as well as the provision of health services, such as malaria treatment and assistance at delivery. No major differences emerge with respect to enrolment, literacy rates, undernourishment, or mortality rates.
60. Are MV localities worse off than the rest of Ghana? The differences are really visible in answering this question. Income poverty and inequality are much higher in the study area than in the rest of Ghana. This is not a surprise as the intervention area was selected because of its high level of deprivation. Perhaps more surprising is that there are no differences in terms of the nutritional status of children as measured by the prevalence of underweight children under five. An analysis of the causes and severity of malnutrition needs to go beyond the indicators adopted by the UN on the MDG list to include the distribution of outcomes in the population and seasonal stress in addition to the general composition of diet and micronutrients intake.¹⁸ All employment indicators show that in the study area most people are engaged in a large number of economic activities compared to the rest of the country, which is probably explained by the large number of low quality occupations or because all

¹⁸ A more detailed analysis of nutrition data and of iron deficiency is conducted in Section 4.7 and further work in this area will be conducted at the analysis stage.

household members have to do some form of work to survive.¹⁹ Education attainment is lower in the study area and the quality of education is doubtful as demonstrated by very low literacy rates obtained from adults' reading tests. In terms of access to education, there appear to be no gender differences as there are larger proportions of girls attending school than boys at each educational level. In some of the FGDs, girls reported that they chose to stay in school rather than work as *kaya yei* in the streets of the more prosperous south.²⁰ Following two decades of sustained development efforts encouraging households to educate their daughters, fewer parents are now willing to send them to live with urban-based relatives as 'foster children,' a euphemism for unpaid housework. Overall, the FGDs were still ambiguous about girls' educational progress. Whilst the RCA confirms that in several schools girls outnumber boys, especially at the primary level, it seems this is because boys are more likely to drop out of school to work on the farm or herd animals rather than because more girls are enrolling than boys.

61. Maternal health indicators show a very low number of births attended by skilled professionals,²¹ few antenatal visits, and low levels contraceptive use. Child mortality rates are comparable to those observed in all of Ghana. Knowledge of malaria is limited and the cases treated with orthodox drugs are fewer than in the rest of the country. Access to water and sanitation are similar to those observed at the national level. As can be expected, the use of landlines and mobile phones is well below the national average. The RCA indicated that although half of the houses had their own mobile phones, most other households could access them from their neighbours if they did not own phones themselves.
62. In conclusion, MV and CV areas appear fairly similar. There are differences, some of which can be the result of structural factors, such as the access to public or NGO provided education and health services. CVs display better education indicators whilst MVs show better health indicators. However neither area can be conclusively classified as better or worse-off than the other. There are no large differences between the MVs and the rest of the rural north. This suggests that the MVs might be considered representative of the wider rural north. However, there are large differences between the MVs, rural Ghana, and all Ghana. The data paint a picture of a deprived area where economic, education, and health conditions are very poor. The differences are particularly large in terms of monetary economic indicators of poverty. There are also some surprising facts. In particular, undernourishment and child mortality rates in the MVs are similar to those observed in the rest of the country.

4.2 Local perceptions of poverty²²

63. Poverty is perceived by people not only in monetary terms but also in more nuanced ways. Among the main criteria that participants in the FGDs distinguished the poor from the rich were:

¹⁹ The employment to population ratio is the proportion of individuals aged 15 or older who worked at any time during the 12 months preceding the interview either in formal or informal jobs. The ratio typically falls between 50% and 75% but is often higher than 80% in very poor countries reflecting a large number of low quality occupations or simply the fact that all household member have to do some work to survive.

²⁰ *Kaya yei* (singular: *kaya yoo*) are female head porters who sell their labour in urban market places. Recently, the term has been corrupted to include girls who wash pots and pans in street-side eateries.

²¹ It needs to be noted that several of the traditional birth attendants (TBAs) met in the course of the RCA had received extensive training from NGO programmes and were not strictly 'unskilled' although the survey would count them as such. Currently, few TBAs attend deliveries, with most referring their clients to the formal health facilities instead as a result of a change in national health policy.

²² This section is based on the wealth and well-being categorisation rankings, using participatory techniques to capture local perceptions of poverty.

- **Annual harvest volumes:** the well-off are those perceived to have year-round food security; this was the most dominant distinguishing metric
- The range and quantum of **physical assets:** the well-to-do have a wider range of capital assets (e.g. farm inputs and livestock) and in more substantial amounts
- Various **norms and cultural practices:** e.g. widows are largely considered to be poor, mainly because they tend to lack control over the assets of their deceased husbands in addition to having less decision-making power
- **Health and educational status**
- **Participation in community life**

64. This is illustrated in Tables 7 and 8.

Table 7. Local categorisation of well-being cohorts

Language group	Rich/well-to-do	Moderately rich	Poor	Very poor
	<i>Bundan-tiri</i> (rich person who has everything)			<i>Nambo</i> (extremely poor)
<i>Buili</i> (spatial area: Builsa)	<i>Jigsura</i> (wealthy person) <i>Dobroa</i> (weighty, heavy); at some sites (BNCF1 and BSMV2), variations include: <i>Ghantanyona</i> and <i>Pagroa/Pagra</i> (all meaning rich); at BSCN4 and BSCF1, the rich are referred to as: <i>Pagrim</i> (strong) or <i>Nyontanyona</i> (property owner)	<i>Azunchonga</i> or <i>Zunchong</i> (well-to-do person)	<i>Jajak</i> (poor person) In BNCF1, there is also <i>Jajakpiak</i> (harsh poverty); another variation in BSCN4 is <i>Nuwoba</i> (weak person)	<i>Nubowa</i> , <i>Akanuroa</i> ; in BSCF2 and BSCN4, there is also <i>Jajak silinyieng</i> (no hope poverty, most used in reference to poor people who are disabled); Another expression used in BNCF1 is <i>Nuwobataaling</i>

65. The distinguishing features of the different well-being categories as defined by community members are indicated in Table 8.

Table 8. Characteristics of each well-being category

Rich/Well-to-do	Moderately Rich	Poor	Very poor
<p>They are able to feed their household three times daily throughout the year.</p> <p>They live in houses built with blocks and roofed with zinc.</p> <p>They have large (five acres of land and beyond) farms and never get short of food throughout the year.</p> <p>They are respected in the community by both the people and the traditional leaders.</p> <p>They start farming immediately after the first rain, which signifies the beginning of the farming season, because they have money to acquire a tractor and also buy farm fertiliser.</p> <p>Their children are well fed and are constantly in good clothes.</p> <p>They sleep on mattresses.</p> <p>They have a 'bank account' i.e. livestock such as cattle, sheep, goats, and fowls are sold to raise money immediately during difficult times (more than six of cattle, sheep, goats, and fowls).</p> <p>They own motorbikes and bicycles and are able to transport their wives to the market on</p>	<p>They are able to provide three square meals to their family with little or nothing to spare.</p> <p>Some live in houses built with blocks and roofed with zinc.</p> <p>Some of their children ride bicycles to school.</p> <p>They have a lot of household labour and are able to hire a bullock or tractor to plough their farm.</p> <p>They own motorbikes and bicycles.</p> <p>They have livestock which they get money from immediately if they need money.</p> <p>They own electrical appliances such as TVs and radios.</p> <p>They have enough food to feed their household throughout the year because they are able to acquire fertiliser and tractors to plough the farms.</p> <p>They have cows (four and above), sheep, goat, and fowls.</p> <p>Their children also look healthy.</p> <p>They own motorbikes and the men give rides to their wives to</p>	<p>They live in mud houses.</p> <p>They possess very few or no livestock.</p> <p>They are unable to immediately rebuild their houses when destroyed by storms and mostly stay with relatives for a long time until they are able to rebuild.</p> <p>Their children do not go to school especially during the hungry season.</p> <p>In most cases, their young children (less than 10 years) also work to assist around the house. These children are normally used as farm labourers.</p> <p>They offer labour to those who are well-to-do to get money to purchase seeds and acquire the services of a bullock to plough their land.</p> <p>Their children are not well fed and always look sick and skinny.</p> <p>Their children are always in tattered clothes and walk barefoot even to farm.</p> <p>They depend on local herbs when they are sick because they cannot afford to go to the hospital.</p> <p>They do not possess either bicycles or motorbikes and always walk long</p>	<p>They are regarded as the worst in the community in terms of survival.</p> <p>They live in mud houses roofed with thatch.</p> <p>They have smaller farm sizes, i.e. about one acre, because they do not have enough labour to cultivate large farms.</p> <p>They use manual labour for farming throughout the season because they do not have the means to acquire bullocks, ploughs, or tractors.</p> <p>They depend on herbs when they are sick because they cannot afford to go to the hospital.</p> <p>Some of them, e.g. the blind, lepers, cripples, etc., cannot farm so they depend on the benevolence of other community and family members to survive.</p> <p>They always look sick due to the nutritionally poor food they eat.</p> <p>They command very little or no respect in the community.</p> <p>They sometimes drink a lot of alcohol.</p>

Rich/Well-to-do	Moderately Rich	Poor	Very poor
<p>market days.</p> <p>Their children ride bicycles to school.</p> <p>They have access to farm labour because they have money to hire the poor during farming season.</p> <p>Their farming activities are not affected even if their children migrate because they can hire people to farm for them.</p> <p>They own mobile phones, solar lights, and rechargeable lamps which their children use to do homework.</p>	<p>the market and sometimes their children to school.</p> <p>They are able to take their children to the hospital when they are sick because they can afford it.</p> <p>They have family members who have migrated to the south and send money to them on timely basis.</p>	<p>distances to farm.</p> <p>Their wives walk long distances to the market every market day.</p> <p>They are always unhappy and drink a lot of alcohol to help them forget their problems.</p> <p>They offer labour to the rich for survival.</p> <p>Their children sometimes look after the livestock of the rich and do not go to school.</p> <p>They farm on a small piece of land (one to two acres) because they cannot afford fertiliser and bullocks to plough their land.</p> <p>Some of the men within this category are not married.</p> <p>A widow with a lot of small children is also considered poor because their breadwinner is dead and they cannot farm to feed their children.</p> <p>Their children drop out of school very early.</p> <p>Their children normally migrate to places like Accra, Kumasi, Obuasi, Techiman, etc. to work for money mostly on vacation and sometimes when school is in session.</p>	

66. The RCA findings and focus group discussions indicate that farming is, by far, the primary livelihood across MV and CV communities. Poor women and men are involved in subsistence farming of food crops as well as a small number of fowls and the occasional goat or sheep. Poor women's farms tend to be the smallest and are dominated by vegetables, legumes, and groundnuts that require relatively less labour and/or inputs. In contrast, men cultivate carbohydrates (maize, millet, and guinea corn), with legumes and pulses (typically groundnuts and bambara beans) as supplementary crops. In many cases, women do not have full control over the plots they farm as they are considered to be visitors regardless if they have married into the household. Whilst women are expected to help on men's farms with sowing, weeding, and harvesting, there is no reciprocal obligation for men to assist on women's farms.
67. Richer men tend to have the largest farms and keep larger ruminants. They hardly use their own labour but rather employ labour from other households. They have greater access to inputs such as land, seed, fertiliser, labour, tractors, and ploughs. Whilst the rich generally farm the same crops as the poor, their farms are bigger, diversified, and more dispersed. Rich men may also participate in trading as wholesalers and middlemen, dealing in cereals (maize, millet, and guinea corn), livestock, and occasionally agrochemicals (especially fertilisers and weed killer). In some of the Builsa communities, rich men also finance artisanal mining activities, employing the labour of poor young men as diggers in the mining pits. Rich women too may cultivate wholesale grains, shea nuts, and pulses or process and bulk trade in shea butter. Reflecting the high level of insecurity, the sector workers are perceived to be rich mainly because they have a steady income stream that enhances their access to food throughout the year.
68. Some of the poor men hunt game or harvest roofing thatch to sell to the rich men. Both the poor and rich produce charcoal though the rich have larger operations. They may also engage in by-day labour,²³ weave ropes from kenaf fibre, and produce baskets and *zaana*²⁴ mats from guinea corn stalks. Some poor women engage in retailing cereals, typically in meal-size portions. They also gather tama (shea nuts) to sell to the richer women while others sell their labour to the rich for farming, quarrying stones, plastering mud walls, and providing household chores. In some households, poor women rear fowls and the occasional small ruminant (mainly goats, but also sheep), only to be liquidated in an emergency. Though women's involvement in raising small ruminants is increasing, a married woman is still expected to seek her husband's consent before doing so. In the words of a poor woman in one FGD, "they [the men] own us and everything of ours." In spite of nutritional challenges faced by many households, domestic fowls are not routinely used for consumption by the poor. Whilst the rich may slaughter them for meat or on festive occasions, the poor generally save their livestock almost exclusively as security or for ritual sacrifices.
69. The rich tend to use agrochemicals whereas the poor may make use of animal droppings.²⁵ Because the poor have fewer animals, they have less access to opportunities that counter soil depletion. Even when subsidised fertiliser and tractor services are available, they tend to arrive too late in the farming cycle to be of use. Veterinary services are seen as important for the survival of livestock but are difficult to access, especially for the poor.

²³ Wage labour with payment typically made on the same day.

²⁴ Straw.

²⁵ The RCA findings suggested that the poor have few ruminant animals, if any, and are not using any fertiliser (except green manure in some instances).

70. Poor households sometimes employ rotating pooled labour arrangements to maintain their farms and harvest crops. In the agricultural slack season, the practice is extended to include house construction.
71. Due to the increasingly volatile climate and over-exploitation of the same lands without any form of crop rotation, a range of crop yields are declining. In the Mampruli sites, groundnut yields have been badly affected, compelling many farmers to shift attention to cultivating beans. Buili communities also report that millet yields are dropping. However, their staple foods are so dependent on millet that they are unable to make a shift to other crops.
72. The increasing demand for cash to meet needs such as health insurance premiums, school supplies, farming inputs, dry-cell batteries, and lighting fuel compels farming households to sell a larger proportion of their harvests than in the past. The high cost of funerals, marriages, cyclic festivities, and sacrifices is another factor contributing to selling yields.

Difference in well-being categorisation between the MVP and control areas

73. Since the well-being categorisation was done with a mixed group of community members in each community, using their own criteria to determine which household belongs to which well-being category (and therefore perception based), it is not appropriate to compare one community with the other. Moreover, it is possible that in a few communities the members sometimes may have sought to give the impression that there were more poor households in the hope that more assistance will come to the community. The main value of the exercise is that in the subsequent rounds of studies where almost the same mixed group will use the same criteria from the baseline to determine which households have moved up or down the well-being ladder and the reasons for these changes. The focus in this work is therefore on trends and explanation rather than absolute measures of poverty.
74. Despite the caution above, if one makes a comparison between the MVs and the CVs, then in the Builsa South District the community members in the five MVs classified 17.5% as rich, 30% as averagely rich, 35% as poor, and 17% as very poor. In their corresponding control-near communities, 13% were classified as rich, 31% as averagely rich, 35% as poor, and 21% as very poor. In the control far communities, 11% were classified as rich, 46% as averagely rich, 24% as poor, and 19% as very poor households.
75. In the MMDA and MWDA, the mixed groups of community members in the two MVs on average classified 2% as rich, 25% as averagely rich, 51% as poor, and 21% as very poor. In the control near communities however, 22% were classified as rich, 64% as averagely rich, 9% as poor, and 5% as very poor. In the control far communities, 17% were classified as rich, 28% as averagely rich, 31.5% as poor, and 13% as extremely poor.

4.3 Household characteristics

76. The survey interviewed nuclear households and not extended households (Box 1). The average size of a household in the study population is seven members. Women head about 10% of households and about 20% are polygamous. There are more out-migrants than in-migrants in the area. About 1 household in 10 is hosting a migrant, whilst approximately 50% of households have a member who has temporarily migrated. The FGDs suggest that whilst nearly everyone who leaves the community intends to be away only temporarily, a significant minority end up being away for lengthy periods. Women are as likely to migrate as men. The main reasons for temporary migration is work (50% of cases) followed by live with or care for a family or friend (25%), and then education (18%).

Table 9. Household structure

	MV	CV
Household size	7.2	7.0
Female headed household	0.09	0.12
Polygamous	0.22	0.20
Average number of in-migrants per household	0.10	0.07
Average number of out-migrants per house	0.46	0.30*

*Difference statistically significant at 10%, ** significant at 5%, *** significant at 1%

77. The RCA and FGDs confirm the high rate of out-migration (mostly as seasonal farm workers and market porters), which is increasing due to needing cash for farm inputs, health, and education.

Box 1. Defining the household (restricted and unrestricted definitions)

Like other living standard surveys, the MVP survey considers a household to be a common decision making unit where all members share income and other resources and ‘normally eat from the same pot.’ A usual member of a household is a person who (whether present or absent at the time of the data collection) has spent at least the last six months in the household. But people in Northern Ghana often live in households sharing the same compound with other related households. Households or individuals in one compound can also be related to people living in other compounds in many different ways. This ‘household’ is considered to be the decision maker in most of the quantitative analysis and is also used as a denominator, for example, in the calculation of per capita expenditure. But to what extent is the ‘household’ considered by the quantitative survey to be a decision-making unit? Do households share a common budget? Do parents decide about the education of their children?

The qualitative studies suggest a more complex situation, and quite a wide variation in what constitutes a household. The RCA found it easier to refer to the entire compound built around a single courtyard as one household. It revealed that some compounds comprise different generations and may include widowed or abandoned sisters who have returned to live in the ancestral family home, grandchildren living with grandparents, nieces and nephews with aunts and uncles, or several siblings living with their dependents in one compound. The men, even of different generations, tend to make economic decisions together but men and women of the nuclear families living within the compound make the decisions related to their own families, such as education and health, themselves (though the FGDs found that women are often sidelined even in decision-making at this nuclear level). Clearly, the conventional definition of ‘normally eat[ing] from the same pot’ applies less to the reality of compounds where cooking is sometimes shared, family members eat at different times of the day, or where no cooking is done at all on some days. The qualitative studies raise issues around the extent to which respondents understood the survey’s definition of ‘household’ and to what extent they answered consistently as a household or as a compound.

The quantitative study and the Reality Checks use different definitions of household, both of which have advantages and disadvantages. For this reason, the interpretation of the quantitative findings needs to be carefully considered and the Reality Check provides a counterpoint to understanding the full complexity on the ground.

4.4 Income Poverty

78. Over the last 20 years poverty reduction efforts have been substantial in Ghana, particularly in urban areas (World Bank 2011). Northern Ghana however has not been as positively affected by the economic growth and as a result poverty levels today are much higher than in the rest of the country. Table 10 provides the data on poverty, calculated using per capita expenditure data from the MVP survey which includes both cash expenditure and consumption of self produced goods and gifts.²⁶ The calculations are based on a poverty line of \$1.25 per person per day after applying an adjustment for purchasing power parity (PPP) to per capita expenditure figures. Poverty rates are very high in the MV villages (74%) but not significantly higher than in the CV areas, and a bit surprisingly, inequality indicators are higher than in the rest of the country. Despite the casual impression of undifferentiated poverty, there is large inequality of incomes, at least on a per capita expenditure basis, within the MV area.

Table 10. Poverty indicators

	Poverty headcount	Poverty gap	Squared poverty gap	Gini coefficient
MV villages	74.0	35.6	21.6	0.44
CV villages	71.9	33.7	19.7	0.41
SADA region ^a (2006)	58.3	24.9	13.6	0.43
All Ghana ^a (2006)	28.5	9.6	4.6	0.42

^aData from the GSS living standard survey of 2005/2006.

79. The MVs are largely food-based subsistence economies. The majority of household expenditure (both cash and consumption of home produced goods) is on food (74%) of which at least half is home produced. The RCA revealed that families at the time of the study²⁷ spent almost nothing on food, surviving entirely on their own stored harvests of maize flour and beans, supplemented by leaves gathered nearby. The only food expenditures were on seasonings. The data display unusual food Engel curves that increase with per capita expenditure suggesting that any additional income is spent on food because of the high levels of deprivation. However, a closer analysis of measurement error in expenditure data suggest that this is not the case and that the food Engel curve has the usual shape of decreasing food shares as income increases.²⁸
80. After food, the largest expenditure is on personal care, which includes items such as soap, hair dressing, personal care, and cleaning products. Overall, education and health are negligible components of total expenditure. However, in terms of proportion of cash expenditure for the household these become significant costs (particularly secondary education which requires lump sum payments). The RCA suggests that the increased need for cash, in what had been until recently a largely cashless society, has fuelled the search for paid work outside the community and is beginning to reduce the willingness of households to participate in traditional reciprocal labour arrangements.

²⁶ Details on the calculation of per-capita expenditure figures are reported in Appendix C.

²⁷ February to April 2013.

²⁸ See the analysis in Appendix I.

Table 11. Per capita expenditure and food shares

	MV	CV
Per capita expenditure (\$PPP)	401	406
Food share	0.74	0.72
Share of own produced food	0.51	0.50
Clothing	0.01	0.02
Personal care	0.08	0.08
Health	0.01	0.02**
Education	0.01	0.01
Transport	0.03	0.03
Fuel	0.03	0.04**
Durables	0.04	0.03**

*Difference statistically significant at 10%, ** significant at 5%, ***significant at 1%

81. Despite a large proportion of imputed expenditure devoted to food, households are not able to meet their food requirements (Table 12). More than 80% of households reported that there were months over the past year in which they did not have enough food to meet family needs. On average, they reported not being able to meet family food needs in 12 out of the 30 days preceding the interview. Finally, about 15% of households reported that there were times when a child in the household did not eat the whole day because of the lack of food.

Table 12. Food security

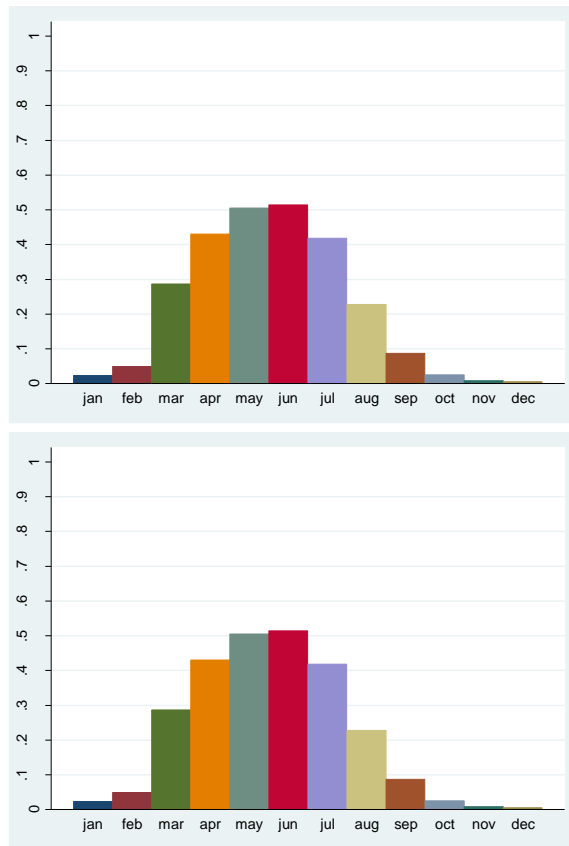
	MV	CV
Not enough food in any month over last year %	82.2	84.6
Days with not enough food over last 30 days	12.2	12.9
Any day a child went hungry the whole day %	16.4	14.8

*Difference statistically significant at 10%, ** significant at 5%, ***significant at 1%

82. There is a strong seasonal pattern in food availability. This is the consequence of a subsistence economy where there is only one cropping season and limited opportunities to save.²⁹ Households were asked about the months when they did not have enough food to meet their family's needs. Few families complained of food scarcity from September to February. However, March to August and particularly April to July seemed to be the 'hungry season' in which about 50% of households reported not having sufficient food (see Figure 2).

²⁹ The Reality Check suggested that households had space to store crops. As such, the problem was less about the lack of storage and more about not having enough produce to store. Observations suggest that in the hungry seasons some poor households borrow bags of food from more wealthy households and return them doubled at harvest time.

Figure 2. Percentage of households with not enough food by month of the year



4.5 Agriculture

83. Most households in the study area are primarily farming (90%). Farmers cultivate an average of three hectares of land scattered across three different plots.³⁰ Farmers are mostly subsistence farmers and the proportion of agricultural produce sold on the market is only about 20%. Farming also represents the largest share of total income (60%) followed by livestock (25%). The next most important source of income is having a microenterprise. About 20% of households have microenterprises, mostly in the areas of trading (40%), retailing (20%), and agricultural processing. Other sources of income are negligible. Less than 3% of households had a member engaged in any paid work over the year preceding the interview, and the share of transfer income, including remittances, over total income is less than 1%.

³⁰ Further research is needed around the reported estimates of landholding size: It is possible that farm sizes are over-reported by illiterate farmers. Agricultural officers interviewed assess the typical farm of a poor farmer to be in the region of 1-3 acres. See also: USAID, 2009. Ghana: Trade and Investment Program for a Competitive Export Economy (TIPCEE) GIS Work (http://www.cop-horti.net/IMG/pdf/TIPCEE_GIS_Work_Feb_2009.pdf) and Hainmueller, J, M Hiscox and M Tampe, 2011. Sustainable Development for Cocoa Farmers in Ghana, Baseline Survey. MIT and Harvard University (https://www.responsibleagroinvestment.org/sites/responsibleagroinvestment.org/files/Ghana%20Cocoa%20Baseline%20Report_Jan%202011.pdf).

Table 13. Farmers and income sources

	MV	CV
Farmers %	91.0	95.2**
Share of production sold in the market %	21.9	24.6
Farming share %	61.3	61.3
Livestock share %	26.3	23.6

*Difference statistically significant at 10%, ** significant at 5%, ***significant at 1%

84. Agricultural activities are conducted under very risky circumstances. All households report having been affected by a shock of some type during the year preceding the survey. Droughts, floods, and crop failures are particularly common (Table 14). There appears to be a contradiction between the smaller reporting of drought in the MVs at the same time as farmers in MVs are reporting a higher incidence of crop failure. These contrasting observations could be the result of seasonality (Section 5.4). MV households were interviewed in May and June and thus were in large part unable to report the outcome of the current crop as farmers in the CV areas who were interviewed over the months of September and October.

Table 14. Households affected by economic shocks

	MV	CV
Drought %	76.0	83.0*
Floods %	57.2	54.7
Livestock death %	86.5	73.6***
Crop failure %	72.5	63.6**

*Difference statistically significant at 10%, ** significant at 5%, *** significant at 1%

85. Most income is spent and very few households are saving. Only about 15% hold a bank account or are members of a *susu* group³¹ and less than 5% of households have taken a out a loan over the 12 months preceding the interview.

Table 15. Savings and loans³²

	MV	CV
Household has a bank account %	15.6	10.8*
Household is member of <i>susu</i> group %	15.0	8.5**
Any loan over last 12 months %	4.9	3.3

*Difference statistically significant at 10%, ** significant at 5%, *** significant at 1%

86. The most common form of savings is animal holdings. More than 80% of households save at least one animal such as chickens, goats, or guinea fowls. The median value of all animal stocks per household is about \$250-300 PPP, which is more than half of the average annual per capita expenditure. The RCA indicated that poorer households have very few animals and no large ruminants. They keep smaller ruminants such as goats (no more than three) and several fowl only as easily liquefiable assets or for sacrificial use.

³¹ *Susu* literally means “small small” and refers to traditional informal rotating savings and credit schemes.

³² The phrase “household” here refers to any household member having a bank account, *susu* membership or a loan. Typically, bank accounts and loans are taken out by an individual rather than a household as a whole.

Table 16. Animal stocks

	MV	CV
Households with animals %	85.2	80.4
Average number of cows ³³	3.1	2.2**
Average number of goats	3.8	3.5
Average number of chicken	6.8	7.4
Average number of guinea fowls	3.7	2.7
Median value of animal stock (\$PPP)	301	234

*Difference statistically significant at 10%, ** significant at 5%, *** significant at 1%

4.6 Education

87. Attendance³⁴ of primary school aged children is lower in the area than compared to the rest of Ghana, but not by a large margin. The net attendance rate in Ghana was 74% in 2008 (both in urban and rural areas) compared to 60% observed in the MV sites. The RCA indicated high motivation among parents to send their children to school even though they themselves had not received any education.
88. However, attendance ratios are very low in JHS and Senior High Schools (SHS). The RCA found that whilst primary education was highly valued for all, families chose which children should continue to secondary level based on the child's potential to succeed. The investment required for secondary education, distances to access secondary schools, and the fact that children completing primary education are often 'old for grade' act as disincentives to continue.

Table 17. Summary of education indicators

	MV	CV
% over 5 ever attended school	49.9	46.3
NAR primary	60.5	68.9*
NAR JHS	9.7	15.4**
NAR SHS	5.0	6.8

*Difference statistically significant at 10%, ** significant at 5%, *** significant at 1%

Note: These are net attendance ratios calculated as the proportion of children in school among children in the school-level specific age group (three age groups were used: 6-11, 12-14, and 15-18).

89. Interestingly, there are more girls than boys in school at all grades: 69% against 63% in primary school, 17% against 10% in JHS, and 7% against 5% in SHS. All differences are statistically significant. This contrasts with official enrolment data, which show a larger percentage of boys in school. The difference is explained by the fact that the national census and survey data look at different types of schooling: enrolment in the case of the census and attendance in the case of the survey. The latter is a better indicator of actual school attendance. The RCA study observations in schools and discussions with families and teachers confirmed the higher school attendance of girls. Possible explanations include that boys are more likely to experience punishment at school for poor behaviour, attendance, or study and thus become de-motivated. They are also eager to earn incomes as soon as they

³³ Note that 'cows' does not include bulls that are reported separately in the questionnaire. Observations of the enumeration by the QA team suggest that if anything, farmers are under-reporting the numbers of animals for a variety of reasons. There is however a minority with a higher number of cows that leads to a high sample average.

³⁴ Attendance is based on household interviews rather than school records. Respondents report whether they attended school at any time in the previous year or month. This is consistent with attendance rates used by DHS, MDGs, and the World Bank, and is considered to be more reliable than other figures.

become physically strong enough to work in order to purchase mobile phones, clothes, and snacks for themselves.

90. Literacy rates among adolescents are also higher among girls compared to boys. These rates are calculated as the percentage of young men and women (15 to 24 years of age) that are able to read a simple English sentence. These rates are much lower than in the rest of Ghana (80.1%) and the gender pattern is different from the rest of Ghana where young women are less likely to be literate (76.8% of girls against 84.0% of boys) and less likely to be in school.

Table 18. Literacy rates among adolescents (15-24)

	MV	CV
All	33.1	34.7
Young men	25.5	29.6
Young women	37.7	38.0

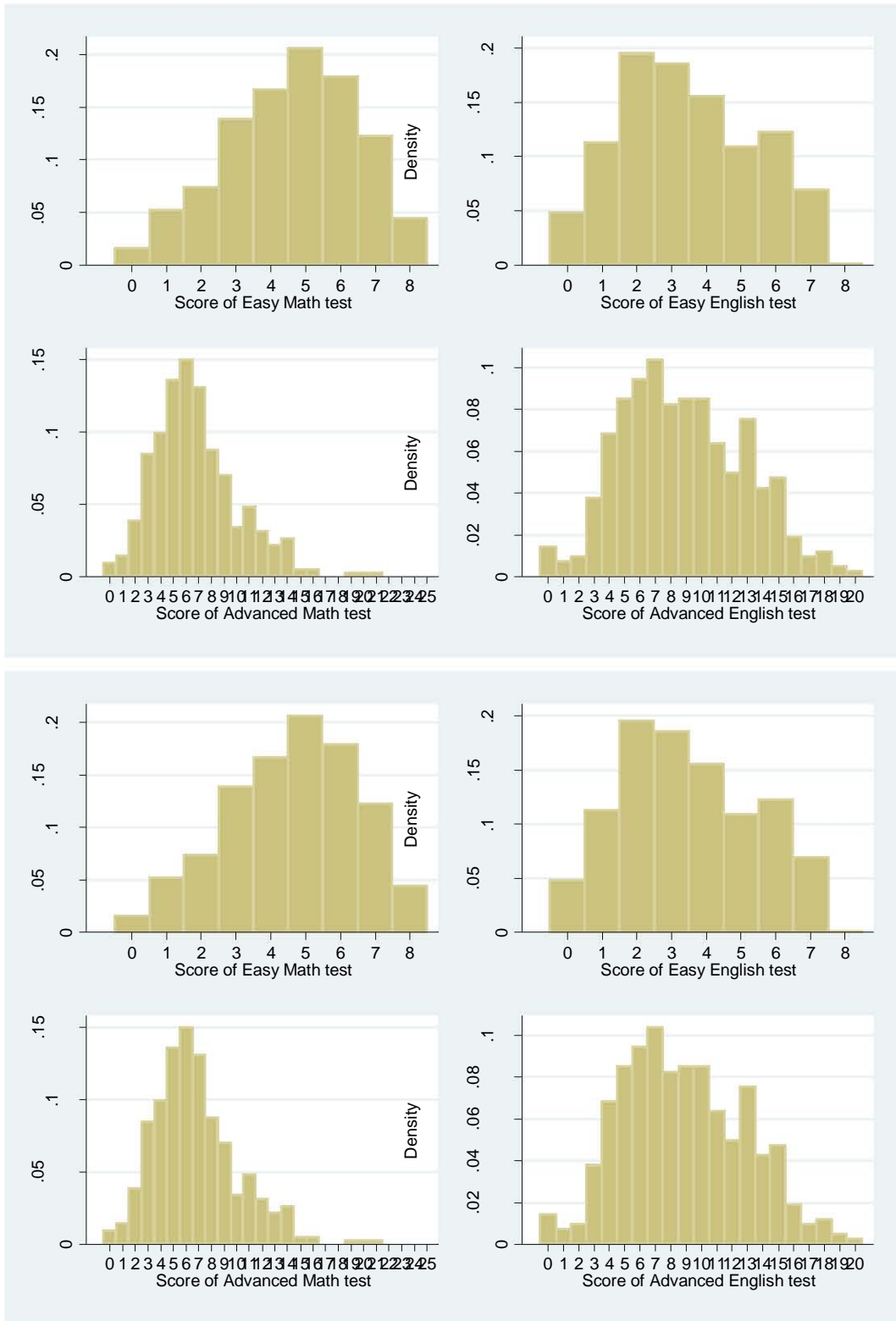
*Difference statistically significant at 10%, ** significant at 5%, ***significant at 1%

Note: These rates are calculated as the proportion of young adults (15 to 24) able to read aloud all the words of the sentence "The child is playing with the ball."

91. It is apparent from the maths and English tests that the quality of schooling is poor. Few children aged 9-19 who have ever attended primary school are able to complete tests based on eight simple arithmetic operations and the understanding of simple English sentences. Similarly, children aged 12-19 who ever attended JHS performed poorly in advanced English and maths tests (Figure 3). The FGDs identify hunger and seasonal streams³⁵ among the barriers to consistent attendance. In many of the communities with schools, teachers prefer to live in the distant district capitals as they are better served with social amenities, resulting in them being routinely late. In some of the FGDs, participants noted teachers' frequent absenteeism during the rainy season and major football festivals. Where possible, the well-to-do enrol their children in non-state schools to improve their prospects of getting a good education.

³⁵ This is not the same as the seasonal flooding. These are streams that are not permanent and flow intermittently.

Figure 3. Test scores in the study population



92. The RCA noted teacher shortages as well with high levels of teacher absenteeism in five of the six village primary schools in addition to empty teacher accommodation. There was also a chronic lack of

teaching materials and overcrowded classrooms. Children complained that they did not understand the lessons and ‘teachers do not teach properly.’

4.7 Health

93. Mortality rates are measures of child survival and a reflection of the general living conditions of a population. Mortality rates were calculated over the five-year interval preceding the survey using the synthetic cohort probability method used by the Demographic and Health Survey (DHS). Bootstrapped standard errors were calculated for the estimates and the results are presented in Table 19. Mortality rates in the study area are high by international standards and higher than in the rest of Ghana. There are large differences in the mortality rates observed in project and control areas. Mortality rates are not measured with precision because child deaths are rare events and the standard errors of the estimates are large. Precision in the estimates depends on the size of the sample; while the DHS estimates are based on a sample of 2,992 children the MV area contains 1,367 observations and the CV area contains 3,033. It is possible therefore that the small sample size in the MV area is underestimating the true mortality rates. An alternative explanation is that maternal and child health is better in the MV areas but this is not fully supported by other health indicators collected by the survey.

Table 19. Mortality rates (per 1,000 live births)

	Pooled data	MV	CV³⁶	P-value
Neonatal	35.6 (0.004)	28.1 (0.007)	39.5 (0.005)	0.090*
Post-neonatal	14.5 (0.004)	22.1 (0.007)	10.6 (0.005)	0.011**
Infant	61.1 (0.005)	43.2 (0.008)	69.9 (0.007)	0.005**
Child	36.0 (0.004)	28.7 (0.007)	37.8 (0.005)	0.144
Under 5	91.9 (0.006)	70.6 (0.010)	105.1 (0.008)	0.004**

*Difference statistically significant at 10%, ** significant at 5%, *** significant at 1%

Note: Mortality rates were calculated using the synthetic cohort probability method. Standard errors and p-values are obtained by bootstrapping and resampling the variance to take into account the two-stage cluster design of the datasets. Stata do-files for the calculation of mortality rates, standard errors, and p-values are available on request.

94. The RCA revealed that families regard themselves as ‘blessed with good health’ and use a mixture of traditional practices and conventional medicines that are available on the market to self-treat. They resort to government health provision only when illnesses are considered critical and tend to circumvent local health clinics by going directly to better resourced district facilities. Relatively few have health insurance, indicating that they do not need it either because they are healthy, have more accessible alternatives (e.g. local herbalists, soothsayers, medicine sellers) or that they consider the cost (both actual and opportunity cost of getting the card or of accessing distant health facilities) prohibitive. However, some families do have insurance for their children.

³⁶ The CV figures are higher than the MV and consistently higher than the Ghana figures. The explanation for this is not unclear.

95. Both qualitative modules also indicated a strong preference for using traditional birth attendants (TBAs), many of whom have received some formal training in the last 10 years. The PRA study suggested that TBAs are among the most respected people in the village. Discussions with families and TBAs suggest that families' preference is based on trust, their willingness to assist any time of day or night, the preference for giving birth among family at home, and the TBA's familiarity with the family. It was indicated that they refer difficult cases to health centres and are quick to seek assistance using mobile phones when they run into unexpected problems. Few incidences of neonatal or postneonatal deaths were noted by families or TBAs.
96. Undernutrition rates are high but strikingly similar to malnutrition rates observed for the whole of Ghana by the 2008 DHS. The 2008 DHS data report higher rates of stunting and underweight for the northern regions which may be reconciled to our data (from 2012) by considering the declining trends in undernutrition in the area.
97. The RCA noted that very few mothers feed their babies colostrum even though the 'nurses tell them to' as the belief that it is 'dirty' still prevails. They rarely practise exclusive breastfeeding and provide drinking water from when babies are only a few days old.

Table 20. Scores across MV and CV areas

	MV	CV
Height-for-age Z-score	-1.22	-1.18
Moderate malnutrition <-2	27.0	28.1
Severe malnutrition <-3	7.0	12.8**
Weight-for-age Z-score	-0.89	-0.85
Moderate malnutrition <-2	14.0	16.2
Severe malnutrition <-3	3.0	5.2**
Weight-for-height Z-score	-0.29	-0.23
Moderate malnutrition <-2	4.0	5.1
Severe malnutrition <-3	0.0	1.0**

*Difference statistically significant at 10%, ** significant at 5%, *** significant at 1%

Note: Z-scores and rates were calculated for children from 6 to 59 months of age. Z-scores were calculated using the reference population of the new WHO sample. There are differences in standard deviation units from the reference population norm.

98. Only about one third of children are regularly included in state-run preventative health services. Indications of the reach of health services is the proportion of households that reported being visited by government health workers and the proportion of children who reportedly received supplementary vitamin A and deworming tablets (Table 21). However, the RCA noted that the latter are school-based programmes that parents are not necessarily knowledgeable about.

Table 21. Coverage of state health services

	MV	CV
% taking vitamin A last six months	61.6	63.8
% taking deworming treatment last six months	33.6	32.6
% visited for family planning	24.8	25.4
% visited by health visitor for general care	35.3	39.7

*Difference statistically significant at 10%, ** significant at 5%, *** significant at 1%

99. The RCA found that interest in family planning was very low and there are strong social norms endorsed by both men and women to produce many children (Box 2).

Box 2. Reluctance to adopt family planning

Health workers came to one of the RCA villages two weeks before the study to speak about family planning to the men of the village, but the men refused to listen and sent them away ('God wants them to give birth to as many as they can'). Women explained that if a mother does not keep producing babies, the neighbours jibe and tease, suggesting the husband is impotent or that she is barren. However, once 'the eldest son is married then the husband and wife stop sleeping together – to have a baby then is not right and people will call you names' (older woman). In the Buili communities, there was also a sense that 'God will decide the number and we will take' (woman). Besides, 'you can die at any time, better to give birth to as many children as possible first' (woman). Several mothers told us they 'enjoy giving birth to many children.' Furthermore, as the Fulani men explained, 'children are a gift of God, you might block an important person coming into the world,' (men).

100. Anaemia rates are very high but are comparable to those in the rest of the country, which are also similar to or lower than other West African countries (Table 22). Following DHS standards, mild anaemia is calculated as the ratio of children with haemoglobin below 11 g/dL, moderate anaemia is haemoglobin below 10 g/dL, and severe anaemia is haemoglobin below 7 g/dL.

Table 22. Prevalence of anaemia among children under five

	MV	CV	Ghana ^a
Mild anaemia	74.2	84.0**	77.9
Moderate anaemia	45.7	60.0**	55.0
Severe anaemia	3.7	5.2	7.4

*Difference statistically significant at 10%, ** significant at 5%, *** significant at 1%

^a Data from the DHS 2008.

101. Anaemia may in part be related to malaria prevalence. Despite the high rate of households owning mosquito nets (above 80%), the incidence of malaria is rather high (Table 23).

Table 23. Mosquito nets and incidence of malaria

	MV	CV
^a Household has a mosquito net %	81.3	90.2***
Malaria incidence among children under 5	22.3	23.4

*Difference statistically significant at 10%, ** significant at 5%, *** significant at 1%

^a Note: this includes all bed nets whether they are insecticide treated or not.

102. The RCA also noted a high level of mosquito net ownership, in some cases there were more nets than necessary, but less than 25% of families used them due to sleeping outside. Families recorded using nets in the wet season and when mosquitoes disturbed their sleep. A connection was not made between a reduction in malaria incidence and using bed nets.
103. Most of the population has access to improved drinking water, but only 10% uses an improved toilet facility. Even though boreholes and wells are reasonably accessible, both the RCA and the FGDs noted that poorly maintained facilities result in time-consuming queues or further distances to collect water from working facilities. In some communities, there was a strong preference for well water over borehole water because people claimed the latter tasted bad. All of the RCA study families practised open defecation and the RCA team observed very little use of the few improved toilet facilities.

Table 24. Access to improved water and sanitation

	MV	CV
Households with improved water %	73.2	72.2
Improved sanitation facility %	10.1	10.4

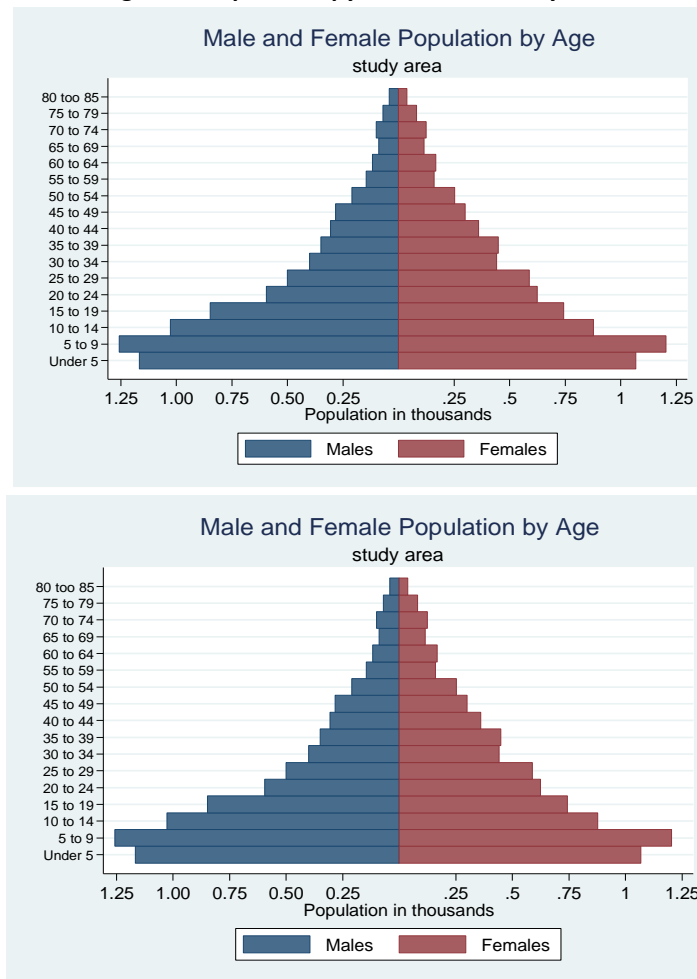
*Difference statistically significant at 10%, ** significant at 5%, ***significant at 1%

4.8 Gender

104. The state of maternal health is very poor in the MV area with only 27% of births attended by a skilled professional, 66.7% of women visiting a health facility before delivery, and only 10% using contraceptive methods (Table 6). These values are very low not just in absolute terms but also in comparison with the rest of the country. The data do not show that girls are disadvantaged in terms of access to education. On the contrary, a larger proportion of girls attend school compared to boys at all levels of education.

105. The demographic structure of the population by gender shows interesting patterns (Figure 4). There are more boys than girls up to the age of 20, after which there are more women than men at all ages. It is difficult to explain this without further data analysis, though it may relate to different patterns of mortality and migration between men and women.

Figure 4. Population pyramid in the study area



4.9 Social networks

106. There are extensive social networks in the area with about 80% of households reporting that important people (e.g. relatives [55.2%] or friends [21.2%]) live in another village. In 50% of cases, help (sought or provided) consists of general advice or farming advice, while in 30% of cases it consists of gifts, and only in a few cases it consists of borrowing or lending. This information will become relevant and useful to estimate the size of spillover effects from the MV area to the neighbouring areas.

Table 25. Social networks

	MV	CV
Any important people living elsewhere? %	76.0	83.5**
Of which distant relatives %	55.2	64.2*
Of which friends %	21.2	20.9
Asked any help over last 12 months? %	45.0	45.7
Provided any help over last 12 months? %	53.0	50.4

*Difference statistically significant at 10%, ** significant at 5%, *** significant at 1%

107. Both the RCA and FGDs noted that the traditional reciprocal arrangements for farm work and house construction during the non-farming season still operate, but that the need for cash is gradually eroding this system. Some households indicated that they have to pay wages whereas before they would have exchanged labour and food or part of the crop as payment.
108. More than half of the RCA families and their neighbours own mobile phones, which are considered the primary way of maintaining social networks and sharing both advice and information.

4.10 Expectations and time preferences

109. Attitudes towards risk, such as expectations of survival, income, education, and educational returns, affect behaviour and choices. It is believed that many life decisions such as educational or occupational choices or even the purchase of fertiliser (Duflo, Kremer, and Robinson 2011) are influenced by 'impatience.' Impatience can be defined as people's inability to postpone current pleasure in exchange for future benefits. Rational and patient people will buy health and travel insurance; they will save for their studies or for old age and will forgo other current pleasures to obtain future benefits. Impatient people on the other hand are not able to exercise self-control and end up uneducated and without insurance. Extremely poor households tend to be highly 'impatient' because they are deprived of almost everything and are forced to spend the few means they have, an idea that goes back to Fisher (1930). The evaluation estimated time preferences among a sample of approximately 1,000 commercial farmers using hypothetical lotteries.³⁷ Farmers were given hypothetical choices to make between present and future rewards in order to assess their ability to postpone current gains for future highest benefits. It was found that about 30% of farmers apply a zero discount rate whilst the average monthly discount rate is not far from discount rates observed in other contexts by similar exercises. At first sight these farmers do not appear to be particularly impatient. The discount rate decreases with the time horizon, thus pointing to hyperbolic discounting. Hyperbolic discounting is commonly observed in behavioural experiments and reflects an inconsistency in people's evaluation of future rewards. People tend to discount future rewards

³⁷ Hypothetical lotteries use the matching task method (rather than real rewards) to test people's choice preferences between immediate and (higher) delayed rewards.

more heavily than current ones. In other words, they value more highly rewards coming sooner rather than later. Farmers in our sample appear to conform to this type of behaviour.

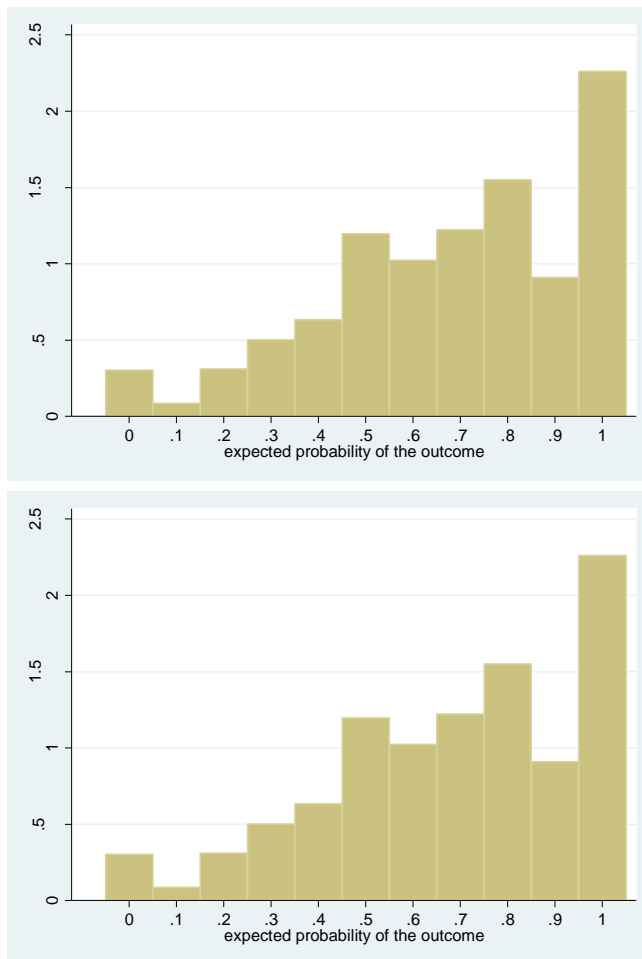
Table 26. Discount rates and 0 discount rates for the whole sample

	% Monthly discount rate is zero	% Monthly discount rate
1 month horizon	0.33	0.087
3 month horizon	0.14	0.075
6 month horizon	0.07	0.071
12 month horizon	0.06	0.055

*Difference statistically significant at 10%, ** significant at 5%, ***significant at 1%

110. In order to make the lotteries closer to a real life situation, the hypothetical lotteries for the time preference exercise were based on expected agricultural output. Farmers were asked first to indicate the range of possible agricultural output under the best and worst scenarios. They were then asked to rate the chances of obtaining the midpoint of this range. The expected probability for the average agricultural output is displayed in Figure 5. Farmers show different degrees of uncertainty regarding their expected production. Uncertainty plays a significant role in farmers’ production decisions and the variability in uncertainty among farmers will be both explained in the analysis and used to explain production choices.

Figure 5. Expected probability of the average agricultural output



111. The evaluation also calculated parents' and children's wage expectations. Parents, and their children separately, were asked to rate the current average daily wage in the area and in Accra for different levels of education. Standard cost-benefit analysis of educational choices in Becker's tradition posits that parents compare the cost of schooling to the expected future income stream from schooling in order to decide about schooling their children. How expectations about future incomes are formed is not known but there is a consensus that they should play an important part in schooling decisions. Parents expected wages are reported in Table 27. The wage expectations are not far from the actual wages observed in the field. The community questionnaire finds an average male wage of five cedis per day for agricultural labour.³⁸ In expectation terms, the wage increases with educational level and is believed to be more than twice in Accra compared to the study area. It is puzzling that control areas have much higher wage expectations than the MV area, which cannot be explained by seasonality because these interviews were conducted at the same time of the year in the two areas.

Table 27. Wage expectations in Ghanaian cedis (parents)

	MV	CV
Daily wage primary education	4.94	6.91***
Daily wage secondary education	6.72	13.13***
Daily wage primary education Accra	12.26	18.80***
Daily wage secondary education Accra	18.19	30.49***

*Difference statistically significant at 10%, ** significant at 5%, *** significant at 1%

³⁸ This appears low, and is around 2.5 dollars per day. It is however higher than some comparable areas, such as rural wages in dry land India (less than \$1 per day for men and 50 cents for women).

5. Characteristics of the data

5.1 Balancing tests

112. The success of the DD strategy adopted by this study rests on the validity of the assumption that project and control villages are similar. The selection of the control communities was conducted by matching control communities to project communities using village-level variables. This selection is clearly not as good as a random selection and it needs to be assessed whether there are any large and statistically significant differences between project and control villages. In principle, DD analysis is only based on the assumption of parallel trends. Baseline equality in the levels is not needed. What really matters for the identification of the project effect is that the rate of change over time in the variables of interest is the same in the two groups. In practice, for many variables trends and levels are related in such a way that a specific rate of change (slope) of an outcome is normally associated with a specific level of a determinant. Therefore, a comparison of project and control communities is conducted for both in the levels and in the trends.
113. A list of variables was selected at the locality and household levels in order to test differences between different samples. The surveys collected data on several dimensions and a full balancing test would require hundreds of variables. It was instead decided to select a representative set of variables and to do so blindly as much as possible. A large pool of candidate variables was selected first that are known to be relevant to the analysis of the results because: (i) They are key outcome variables, such as poverty; (ii) They are determinants of the outcomes that will be used as control variables when estimating treatment effects, such as land; and (iii) They are variables determining participation in project activities that could be used to match households or individuals at the analysis stage, such as demographic structure. At a second stage the most relevant variables were retained, such as poverty and household size, and blindly selected one or two variables within a group of similar variables. For example, 'fetching water' and 'collecting wood' were blindly taken from a pool of six 'time use' variables. The final list of tested variables includes:
- Final and intermediate outcomes
 - Factors determining the outcomes
 - Factors affecting project participation
114. In conducting the comparisons, both the size of the difference and its statistical significance will be looked at. Absolute values and percentage differences will be used when these are easily interpretable. When interpretation of the absolute values is difficult, for example in the case of test scores, standardisations of the means by the standard deviations will be used. The convention of considering a difference of 0.2 standard deviations between groups as 'small' and a difference of 0.5 standard deviations as 'medium' (Cohen 1988) is adopted. A difference of 0.1 is considered 'very small' and anything below this difference irrelevant. With populations normally distributed, with equal variability and equal size, these differences can be interpreted in terms of percentage shift of the normal distribution curves between the two groups. For example, a standardised difference of zero means a perfect overlap between the bell curves of the two populations; a difference of 0.2 is equivalent to a 15% shift and a difference of 0.5 is equivalent to a 33% shift.
115. The sample for the study was selected through a two-step design in which communities were first selected and then households were randomly selected within communities proportional to the size of

the communities. This self-weighted design, in which large communities are represented by a larger number of households, does not require the use of weights at the analysis stage. The cluster structure of the sample however generates an artificial reduction of the variance through the intra-cluster correlation of the variables. The cluster structure of the data is taken into account by calculating standard errors that are adjusted by the values of the intra-cluster correlation coefficients. The fact that the matching procedure was conducted within each district (separately in Builsa and West Mamprusi) by controlling for regional differences is also taken into account. In this way the standard errors are reduced and differences are more accurately estimated. In practice, ordinary least squares (OLS) regressions were run for each variable including a dummy for the treatment status, a dummy for the region, and a correction for the cluster structure of the standard errors.³⁹

116. This exercise was conducted using (i) Village-level variables collected by the community questionnaire and (ii) Community averages of household-level variables collected through the household and the adult questionnaires, anthropometric, and educational modules. These test differences are used to evaluate the accuracy of the matching performed at the community level in order to select control sites. In addition, the household level differences across the entire samples are tested. Communities have different sizes and were selected proportionally to their population size. This latter comparison better captures the differences between the study populations. These results are presented in Tables B1, B2, and B3 in Appendix B. In the tables four differences are presented with respective P-values. Stars have the usual interpretation of increasing statistical significance (one star at 10%, two stars at 5% and three stars at 1%). The differences are as follows:

- CV-MV: the difference between the control group and the project group
- CVN-MV: the difference between the nearby control communities and the project group
- CVF-MV: the difference between the faraway control communities and the project communities
- CVF-CVN: the difference between the faraway and nearby control communities

117. If the data had been collected from randomly selected samples of communities, as in a cluster randomised trial, it would be possible to accept up to 10% of statistically significant difference below the 10% threshold, because this is the number of differences that could be obtained just by chance. A percentage of variables statistically different at 10% in excess of 10% of the total number of variables considered is a sign of structural differences across the samples. The percentage of statistically significant (at 10%) differences is reported in Table 28 for each of the Tables B1, B2, and B3 in the Appendix.

³⁹ The stata code for, for example, poverty is: *regress poverty CV Builsa, cluster (community)*. In this example, the reported differences and p-values are those associated with the CV coefficient.

Table 28. Percentage of significantly different variables at 10%

	CV-MV	CVN-MV	CVF-MV	CVF-CVN
Table B1 Community level variables	30%	26%	20%	23%
Table B2 Community level household variables	23%	21%	25%	17%
Table B3 Household variables at household level	23%	23%	25%	17%

118. Mean differences were tested between project and control villages using 30 variables selected from the criteria outlined above. Nine statistically significant differences were found at the 10% level between the project and control communities corresponding to 30% of selected variables. Notable differences include cropping patterns (in the MV maize production is predominant against millet in the control group); social organisations (there are more farmer cooperatives in the MV area but fewer women's groups); and population covered by health insurance (this is higher in the control areas).
119. The exercise was repeated using community-level averages of household data collected by the household questionnaire and other modules using 53 variables. Community-level variables (such as the availability of a primary school) and community averages of household level data (such as test scores) do not need to be strongly correlated and therefore a good (or poor) matching on the community-level variables does not necessarily imply a good matching on the household level variables. 12 statistically significant differences were found between the samples of MV and CV communities corresponding to 23% of the selected variables. Observed differences in CV areas include: a larger number of in-migrants, higher primary school attendance, longer time spent in household chores, poorer credit access and larger share of farmers, larger social networks, higher use of mosquito nets, higher incidence of anaemia, better wage expectations, and proficiency in English tests.
120. A test using the full household data was conducted using the same process. The results are very similar to those obtained in the previous exercise. 53 variables with 12 statistically significant differences were found between MV and CV areas, representing 23% of all variables. This percentage is larger than the 10% that was expected to be found through chance. There are several possible explanations for why this occurred. First, some differences are found among seasonally-sensitive variables, such as episodes of diarrhoea in the last two weeks or anaemia incidence and are probably the result of the different timing of the surveys in the project and control areas (see Section 5.4 for a discussion of seasonal issues). Second, some could be a reflection of differences in the socio-economic characteristics of the two areas. For example, the large difference in expected wages consistently held by parents and children that is not affected by seasonal bias. Finally, some differences are simply due to chance.
121. Are the nearby CVs more similar to the MVs than the faraway CVs? By simply counting the number of statistically significant differences, faraway communities are not more different than nearby communities as the number of statistically significant differences is very similar for the two groups.

Are the nearby and faraway villages more similar to each other than to the MV villages? Only slightly so as there are fewer statistically significant differences between faraway and nearby communities. Households from faraway communities are different in the following ways: they are less food secure and display lower weight-for-age Z-scores, they have much larger social networks, they have a larger average number of years of schooling, and they show higher use of mosquito nets and visit health facilities more frequently (a result mirrored by the higher access to health facilities emerging from the community-level data). Note that no differences were found between faraway and nearby communities in those variables that were believed to be affected by seasonal bias such as shocks, time use, incidence of anaemia, and diarrhoea.

5.2 Balancing by matching

122. In the previous analysis of village and household characteristics it was found that there are differences between the MV and CV groups in the averages of the project outcomes and in the averages of the determinants of the outcomes. These differences amount to 30% of characteristics in the case of village-level variables and to 23% in the case of household-level variables. The samples of villages and households in the MVs and CVs are unbalanced. This poses two questions regarding the validity of the data collected. First, are the differences observed large and can they be safely ignored? Second, can the differences be balanced using matching methods?
123. With respect to the first question, the per cent differences reported in Section 5.1 should be interpreted as in excess of 10% differences that would have been found anyway because of chance error. The number of observed differences, particularly in the case of the household-level variables, is therefore not too large, though clearly larger than the number that would have been obtained by randomly allocating the intervention within a large pool of candidate villages. As for the size of the differences, it should be noted that these mostly amount to few percentage points for binary variables, or less than 0.2 standard deviations for continuous variables. These differences are therefore 'small' and do not suggest that there are large structural differences between the project and the control groups. There are however some 'large' differences, namely in mortality rates (2-3% lower in the MVs), school attendance (6-8% lower in MVs), ownership of mosquito nets (9% lower in MVs), and haemoglobin levels (0.3 standard deviations higher in the MVs). It is difficult, without further data analysis, to tell whether they are the result of chance, seasonality, or structural differences between the areas.
124. The second question was addressed by running some matching experiments using the baseline data. Successful matching of observations in impact analysis rests on the ability to identify the main observable determinants of participation into a specific intervention. The first stage of analysis consists of developing a behavioural model that explains participation in a project activity using a series of 'determinants of participation.' The list of these determinants will vary depending on the level at which the outcome is observed. For example, different factors will explain the selection of villages and households. Secondly, the determinants should be able to capture the targeting rules and self-selection processes. For example, different determinants will be employed for explaining child participation in the supplementation of vitamin A and for farmers joining cooperatives promoted by the MVP. Finally, the determinants must not be influenced by project operations. If this happens, matching fails as the matched observations are similar to the project observations only after the intervention. The MVP consists of a large number of activities targeted to different groups: households, children under five, pregnant mothers, maize farmers, school children, and so forth. In this experiment we decided to perform matching at the most general level. The household as a unit

was used for observation and the ultimate goal of poverty reduction was considered in setting up the participation model so as to exclude any targeting and self-selection rules.

125. At the analysis stage matching will be conducted employing a richer set of variables depending on the specific outcomes investigated. For example, in the estimation of nutritional impacts the characteristics of the child, such as age and gender, will be included in the participation model but they are not included in the more general model below looking at household-level poverty. A probit selection equation was conducted at the household level using household and village-level variables. Some variables are statistically significant pointing to differences between the MV and CV samples that were observed in Section 5.1. Households in MVs are preponderantly of Builsa ethnic group, are more likely to be headed by a female, are less likely to be farming, and are less likely to be food insecure. They are more likely to rely on social networks, but are also more likely to be member of *susu* groups. MVs are more likely to lack a JHS and a market. Male agricultural wages tend to be lower in MVs and the areas are less visited by government agricultural extensionists. Finally, MVs are more likely to have an NGO operating in the area. The picture emerging from this model is that there are obvious differences between MVs and CVs that suggest MVs are worse off compared to CVs in some respects.

Table 29. Probit selection equation for household participation in MV

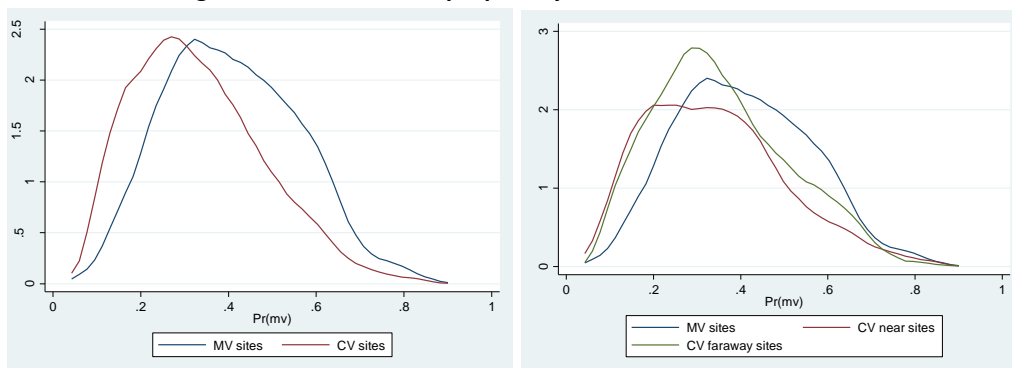
Variable	Coefficient	P-value
Household size	0.004	0.720
Number of children	-0.004	0.906
Female headed household	-0.260**	0.010
Polygamous household	0.128	0.131
Age of head of household	0.001	0.674
Builsa ethnicity	0.409**	0.017
Mampruli ethnicity	-0.454**	0.005
Education of head of household (years)	-0.005	0.647
Value of household assets	<0.000	0.111
Value of animal stock	<0.000	0.685
Farmer head of household	-0.218**	0.039
Household owns a microenterprise	0.016	0.839
Land owned	0.002	0.439
Household food insecure (self-reported)	-0.232**	0.006
Improved drinking water	0.074	0.276
Improved sanitation facility	0.014	0.891
Finished walls	-0.097	0.224
Finished floors	0.129	0.105
Finished roof	-0.006	0.934
Solid social networks	-0.307***	0.000
Member of <i>susu</i> group	0.304***	0.001
Affected by drought	-0.131*	0.081
Affected by flood	0.035	0.561
Primary school in the locality	0.275	0.104
JHS in the locality	-0.420***	0.000
Market in the locality	-0.158*	0.061
Distance to market	-0.056***	0.000
Male wage in the locality	-0.126***	0.000
Agricultural extensionist in the locality	-0.174**	0.013
NGO in the locality	0.402***	0.000
Constant	1.072	0.001
Pseudo R-square		0.107
Observations		2173

126. The predicted values of the probit regression (the propensity score) were used to match project households to control households using a kernel algorithm (using the *psmatch2* command in stata); the matching was very successful. A t-test after matching over the determinants in Table 30 shows that matching removed all statistically significant differences between the two samples with the exception of the presence of a market in the locality, which is still significantly different at 0.070 after matching. The average absolute bias is reduced from 11.3 before matching to 3.5 after matching, and

the same probit regression as in Table 30 on the matched samples returns a Pseudo R2 of 0.008 (P-value=0.981) from a value of 0.107 (P-value=0.000).

- 127. No observation in either sample is extraordinarily different and not comparable to the observations in the other sample. Based on the propensity scores obtained in Table 29, no observation falls outside the region of common support (see Figure 6). This suggests that no observation has to be removed from the data before comparing the two samples to analyse differences.

Figure 6. Distribution of propensity scores in MV and CV sites



- 128. Finally, matched samples were used to evaluate differences in outcome indicators before and after matching. Three general household-level indicators were selected: poverty, the average number of out-migrants per households, and the availability of mosquito nets in the home. Other outcome indicators, such as children’s test scores or anthropometrics, would require different selection models and cannot be compared after matching over the propensity score calculated in Table 30. Balancing on matched characteristics reduces the differences in poverty rates, slightly reduces the difference in the number of out-migrants, and has no effect on the difference in reported availability of mosquito nets.

Table 30. Differences in outcomes before and after matching

Outcome		MV	CV	Difference	St. error	t-test
Poverty headcount	Unmatched	0.740	0.719	0.021	0.020	1.04
	Matched	0.740	0.750	-0.009	0.022	-0.41
Out-migrants	Unmatched	0.458	0.302	0.156	0.039	3.98
	Matched	0.458	0.334	0.124	0.044	2.81
Mosquito nets	Unmatched	0.814	0.902	-0.089	0.015	-5.86
	Matched	0.814	0.904	-0.090	0.018	-5.10

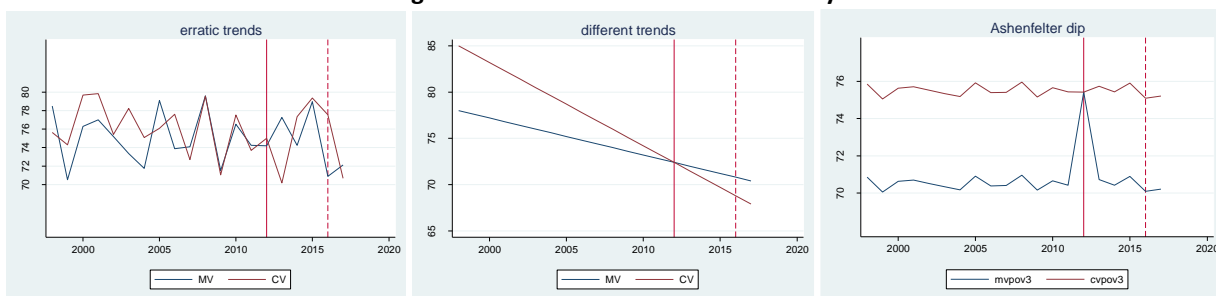
- 129. In conclusion, there are few differences in observed characteristics between the MV and CV groups. Matching removes these differences, at least at the most aggregate level when comparisons are performed across all households and when there is no targeting or self-selection. All observations are in the region of common support and there is no need to remove observations from the data when conducting the analysis. Yet, it must be recognised that matching was not able to substantially remove baseline differences for two of the variables used in this preliminary experiment: the number

of out-migrants in the household and the availability of mosquito nets. This suggests that other relevant qualifying characteristics of the MVs should be included in the selection model. Inevitably some of these characteristics are not observable, namely seasonality (there is no temporal overlap between the MV and CV samples). Seasonality issues will be discussed in Section 5.4, whilst the validity of the DD estimator with a potentially unbalanced sample because of what is unobservable will be discussed in the next section.

5.3 Difference-in-differences and trend analysis

130. The evaluation design is based on a DD approach comparing the changes in the outcomes in the project villages over time to the same changes observed in a sample of control villages. The validity of this approach rests on the similarity between the project and control observations. The approach is valid if the changes in the outcomes observed in the control villages offer a good description of what would have happened in the MVs without the project. If the outcomes behave erratically in the absence of the programme or if there are strong and different trends in operation in the project and control areas, then DD analysis is no longer valid. In the presence of erratic behaviour of the outcomes or of different trends in the MVs and CVs, DD may find an impact when there is none as well as not finding an impact when there is one. Moreover, the selection of the project sites may be due to more specific reasons, for example because the selected areas had been affected by a drought in the previous year, so that the following natural recovery of the target outcomes is erroneously attributed to the project.
131. A comparison of outcomes and determinants of the outcomes at the baseline may help identify the presence of selection bias. If outcome indicators and their determinants are very different at the baseline then there is a risk that project and control areas are structurally different and that outcome indicators follow different patterns over time. Our analysis of the differences between project and control villages has found that differences are few and small. There are however some differences in outcomes and determinants of the outcomes in the health and education domains, which suggest the presence of structural differences determining different patterns. It should also be observed that balanced project and control samples at the baseline are not guarantees that there is no selection bias. First, differences may exist in the unobservable determinants of the outcomes that will not be removed by DD or matching. Second, the three threats to the validity of the DD estimators outlined above: erratic outcomes, different trends, and Ashenfelter's dip, may occur even when project and control observations are balanced at the baseline. The charts in Figure 7 illustrate this.

Figure 7. Potential DD threats to validity



132. The first chart on the left illustrates the case where poverty rates in project and control villages follow an erratic behaviour because households are affected, for example, by different covariate shocks. Poverty rates happen to be equal in project and control areas at the baseline (solid vertical

line in year 2012) but the DD difference observed at the follow-up (dashed vertical line) would be misleading. The chart in the middle of Figure 7 shows the case in which project and control areas have different trends in poverty reduction. The lines happen to cross at the time of the baseline but the DD estimator based on the follow-up survey would be again very misleading. In this specific case, the project would be shown to have no impact (or a negative impact) when in fact the two areas are not comparable because they are structurally different despite their similarity at the baseline. The chart to the right of Figure 7 shows the Ashenfelter's dip case. For this, suppose that the project areas are definitively better off. Nevertheless, the government selected these particular areas because they had been affected, for example, by a severe drought the year before the intervention. Again the DD estimator would be misleading. It would find a large programme impact whilst in fact the programme has no effect and the project communities are simply naturally reaching at the follow-up their normal status.

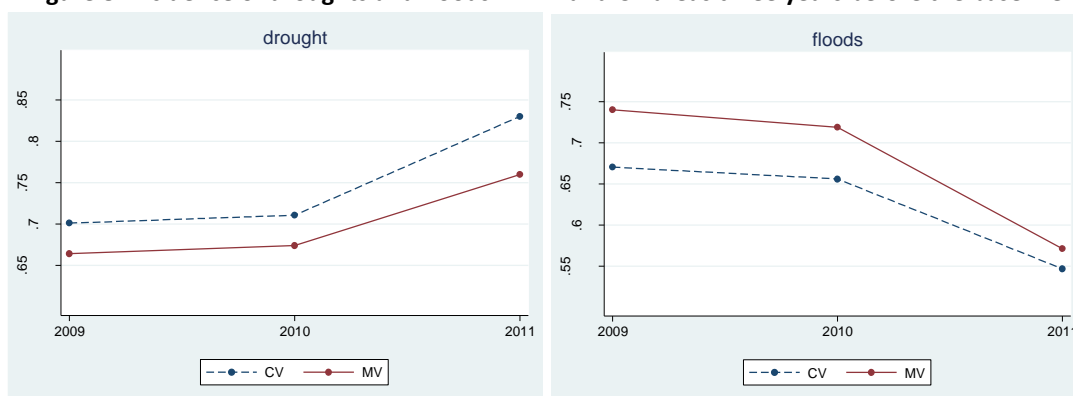
133. Data relating to the years before the baseline are rarely available. In order to build a tentative dataset of trends in the determinants of the outcomes before the baseline retrospective information was collected on household-level sources of incomes (wages, agricultural production, business incomes), animal and land holdings, and covariate shocks. In addition, retrospective baselines can be built for mortality and education outcomes by using birth histories and highest grades achieved that were reported in the questionnaires. Additional village-level trend information on prices and covariate shock was collected in the village questionnaire. Table 31 illustrates the trend variables that can be analysed.

Table 31. Trend data collected by the household and community surveys

Variable	Recall period
Wage income	Each of previous 2 years
Microenterprise profits	Each of previous 2 years
Agricultural output and sales	Each of previous 2 years
Animal holdings	Each of previous 2 years
Land holdings	Each of previous 2 years
Prices (land, animals, fertiliser, labour, and consumer goods)	Previous 2 years and 5 years
Covariate shocks	Each of previous 2 years
Mortality rates by cohorts	Previous 15 years
Education attainment by cohorts	Previous 15 years

134. Trends of most household-level and village-level variables in Table 31 were inspected but evidence could not be found of the erratic behaviour depicted in the left chart of Figure 7, so that this potential source of bias can probably be excluded. Similarly, village-level prices and household-level indicators were inspected in the year before the survey and there were no signs that the MVs were affected by negative shocks in the period before the selection of the intervention areas. The charts in Figure 8 show the incidence of droughts and floods in the MV and CV areas three years before the baseline. In an economy based on rainfed subsistence agriculture, covariate shocks of this type are the main cause of fluctuations in output and related variables. It appears that the MVs are more likely to be affected by floods whilst CVs are more likely to be affected by droughts. However, there is no sign that MVs were more severely affected by any shock before the survey and, more importantly, though the two areas are affected with different intensity, the trends are similar suggesting that the two areas are subjected to the same covariate shocks though in slightly different severity.

Figure 8. Incidence of droughts and floods in MV and CV areas three years before the baseline



- 135. The occurrence of the bias depicted in the middle of Figure 7 is more problematic and more likely to occur. There is a possibility that the MV and CV areas show different trends in some of the outcome variables. The comparative analysis of the baseline data suggests that education and health outcomes in particular might be differently determined in the two areas.
- 136. Different trends could not be found in the MV and CV areas in the evolution of household-level incomes and village-level prices. Table 32 shows regressions of income variables on time and time interacted with a dummy for the MV areas. As usual, the regression includes a dummy variable for the Builsa districts and the standard errors (in parentheses) are adjusted for cluster effects. The coefficient for time shows that nominal wage, enterprise income, and the total value of livestock assets increased over the period. The goal of the regression is to test whether this growth was different in MV areas compared to CV areas, which is tested by a statistically significant coefficient for the interaction of MV and time. Trends show that the increase in wage and enterprise income and in the value of the animal stock was smaller in the MV communities. The differences, however, are not statistically significant.

Table 32. Income trends (\$PPP) standard errors in parenthesis

	Wage income	Enterprise income	Animal holdings
Builsa	-27 (87)	-5 (27)	-19 (138)
MV areas	77 (57)	29 (41)	62 (137)
Time	65** (20)	84** (28)	183*** (32)
Time*MV areas	-27 (24)	-17 (30)	17 (60)

*Difference statistically significant at 10%, ** significant at 5%, *** significant at 1%

- 137. We also tested differential price trends by regressing prices in the logs on time and time interacted. This was done by using a dummy for the MV areas for some prices where complete data are available. Consumer goods are available for sale in few communities and prices were not reported in the community questionnaire. The regression coefficients represent yearly percentage rates of change. The interest in the model is in the interaction between time and the dummy testing in the MV area in regards to whether the price trend is different in the MVs compared to the CV. The only statistically significant difference was found in nominal wages that appear to have grown more slowly

in the MV areas over the last four years, whilst no statistically significant differences were found for the price of fertiliser, goats, and guinea fowl.

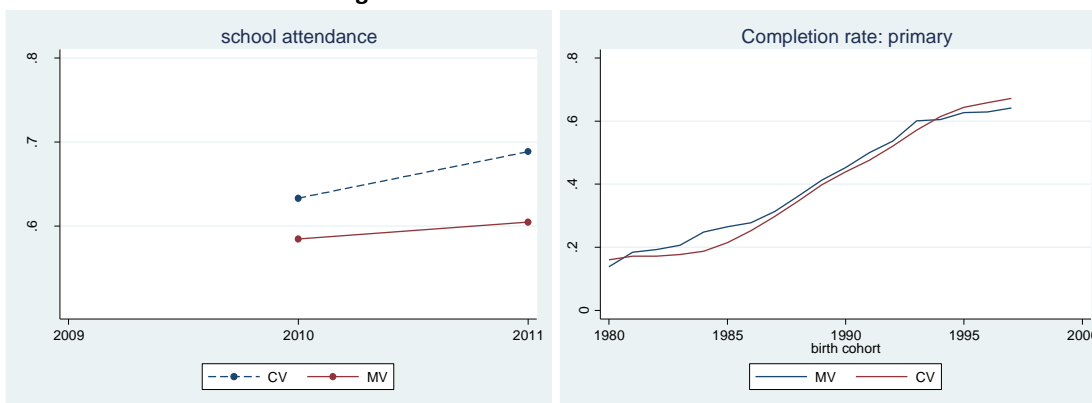
Table 33. Price trends, standard errors in parenthesis

	Male wage	NPK fertiliser	Goats	Guinea fowl
Builsa	0.03 (0.04)	0.01 (0.02)	-0.17*** (0.050)	0.17*** (0.038)
MV localities	0.55** (0.21)	-0.39** (0.1)	0.04 (0.272)	-0.18 (0.208)

*Difference statistically significant at 10%, ** significant at 5%, *** significant at 1%

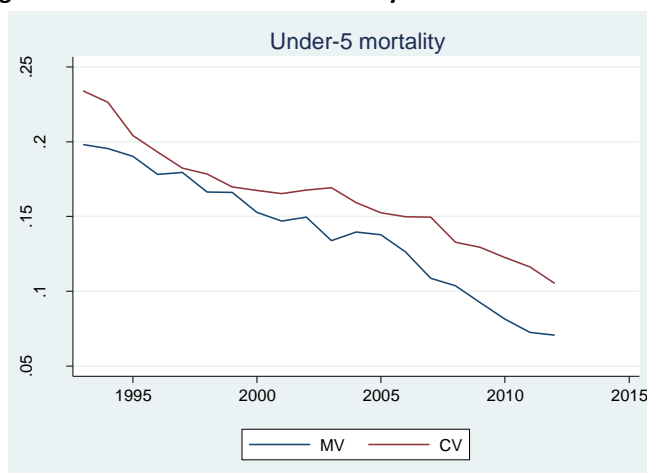
138. The analysis of education trends produces less clear results. In the household survey, respondents reported school attendance in the current and previous year. Whilst there is a sizable and statistically significant difference in attendance rates in primary school at the baseline, the difference is reduced by half and no longer statistically significant in the year before the survey (left chart of Figure 9). We also computed retrospective primary completion rates by birth cohorts (right chart of Figure 9). The birth cohort analysis cannot cover more recent years but the two areas display remarkably similar trends in completion rate up to very recently.

Figure 9. Trends in education indicators



139. In the case of child mortality rates, the differences between MV and CV areas are more interesting and also more difficult to interpret. These rates, built retrospectively using the birth history section of the questionnaire, are displayed in Figure 10 for the 20 years before the survey. There was a remarkable decrease in mortality rates that were cut by half over the period considered in both MV and CV areas. Note also that mortality rates were quite similar in the two areas in the late 1990s, but that they started to diverge in the last decade as the reduction was steeper in MVs compared to CVs. This type of trend is particularly dangerous in DD analysis. If the forces driving the trends operate over the long term and are still in operation, they can easily bias the results. In this particular case a ‘programme effect’ might be observed even in the absence of the programme.

Figure 10. Trends in under-5 mortality rates in MV and CV areas



140. DD analysis can be affected by the biases described above. It can be observed that case biases could emerge in the analysis of education and particularly health outcomes. The estimation of programme impact can be improved by combining DD with matching, particularly by matching observations using village-level historical trends in the data. In addition, further analysis of the trend data will shed more light on the potential biases and will help establish the proper level of confidence in the results obtained.

5.4 Seasonality

141. The survey questionnaires were administered at different times of the year. For each survey there are gaps of different size between project and control areas: (i) Four-month gap in the community questionnaire; (ii) Eight months for the facility questionnaire; (iii) Two to three months for the household questionnaire; (iv) Three to four months for the adult questionnaire; (v) Two to three months for anthropometric measurements and blood test; (vi) No gap in cognitive and education tests or the expectation tests conducted by the Institute of Statistical, Social and Economic Research (ISSER). Tables 34 and 35 show the percentage of surveys by month in the project and control areas separately.

Table 34. Surveys in the MV areas

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Community						100%							
Facilities	30%	60%	10%										
Households					66%	25%	5%	4%					
Adults				42%	40%	16%	1%			1%			
Anthropometry					71%	29%							
Blood tests					68%	32%							
Education tests											90%	10%	

Table 35. Surveys in the control areas

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Community											100%		
Facilities										5%	60%	10%	25%
Households								22%	77%	1%			
Adults									92%	7%	1%		
Anthropometry								25%	69%	6%			
Blood tests								32%	52%	16%			
Education tests											90%	10%	

Note: Percentages for the Facility and Community surveys are approximations.

142. In the study area, there is only one rainy season occurring irregularly between June and September, which influences the following variables: (i) Production and consumption patterns; (ii) Morbidity; and (iii) Other behaviours such as, for example, migration. Some of the variables collected by the survey are known to be highly sensitive to seasonal variations such as incidence of diarrhoea and malaria. In addition, even for those variables that are not seasonally sensitive, reporting can be affected by recall bias. For example, respondents' consumption of soft drinks over the previous 12 months may be reported very differently in the dry and the rainy seasons. There is therefore a possibility that some differences observed between project and control areas are the result of the two surveys being administered in different seasons. The questionnaires were designed in such a way to prevent the emergence of a seasonal bias as much as possible. For example, expenditure data were collected with reference to the previous 12 months rather than the previous month as is standard in similar surveys. The agricultural production data were collected with explicit reference to the agricultural year from May 2011 to April 2012. School attendance was reported with reference to the 2011-2012 school year. Despite these efforts a seasonal bias cannot be excluded.
143. Ignoring seasonality in the DD analysis might have disastrous consequences. For example, consider the seasonal patterns of malaria incidence observed by Cairns et al. (2011) in the Navrongo study in the Upper East of Ghana, a region very close to the MV and CV areas. Suppose that, as in the case of the MVP survey, baseline data are collected in May 2002 in project areas (lowest malaria incidence in the year with near to zero incidence) and in September 2002 in control areas (when malaria peaks). Suppose now that data are collected again after one year in May 2003 in both project and control areas. A DD analysis would estimate a negative impact of MV as the control areas are registering a large drop in malaria incidence, though this is simply generated by the seasonal cycle of rains and infection. Note also that repeating the follow-up survey in the same months as in the baseline (i.e. survey in May 2003 in project areas and survey in September 2003 in control areas) would be of little help. The DD estimator would still find a large drop in malaria incidence in control areas. This occurs because there is no regularity in the starting time of rainy seasons and in their intensity from year-to-year. Therefore, all variables influenced by rainfall and seasonal patterns run the risk of being erroneously estimated by a DD analysis. Even variables that are not directly influenced by rainfall and seasons can be erroneously estimated because, as observed above, people's responses to questions can be biased by the time of the year in which the interviews take place.

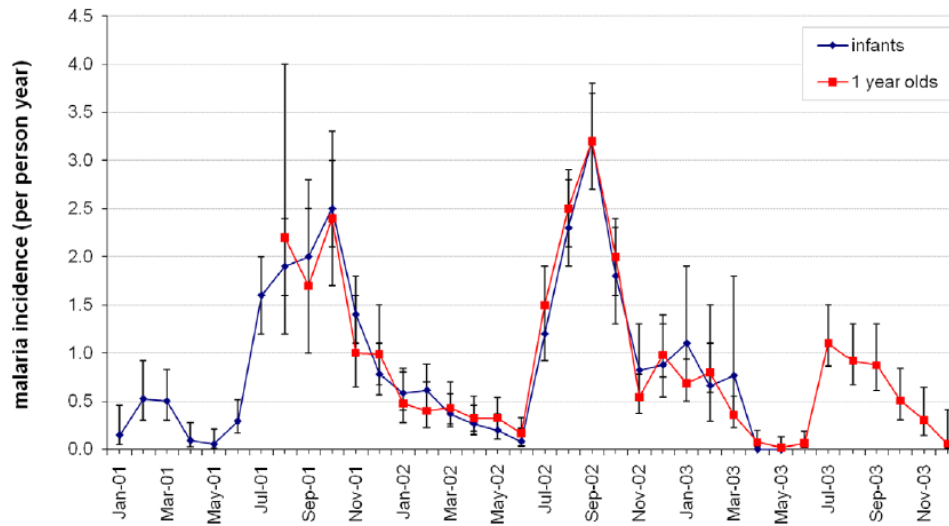
Figure 11. Seasonal pattern in malaria incidence from Cairns et al. (2011)

Figure 3. Incidence of clinical malaria in the Navrongo IPTi trial. Incidence of clinical malaria between January 2001 and December 2003 is shown for infants and children 12–23 months of age in the placebo group of the IPTi trial. Error bars indicate 95% confidence interval. Children were enrolled between September 2000– June 2002. Completion of 24 months follow-up ended in June 2004.
doi:10.1371/journal.pone.0018947.g003

144. A number of analyses were conducted using secondary data and a small literature review in order to assess the relevance of seasonality for the outcome variables observed in the study. This work suggested that anaemia, malaria, and self-reported health were likely to be affected whilst anthropometric measurements, income, and consumption were less likely to be affected. The presence of seasonality was tested in the MV and CV data for all the variables for which the presence of seasonality was suspected. This exercise was conducted by running regressions of outcome variables on monthly dummies for the months of May to September and including a control variable for the district surveyed to remove effects related to the survey's geographical roll-out over time. If seasonal effects are found for a variable, it is likely that the difference observed between project and control areas for the same variable is the result of these seasonal effects rather than structural differences between project and control areas.
145. A seasonal pattern in enrolment rates was found: school attendance is lower in the month of July (corresponding to the school break) and increases gradually from September to November. There are at least two explanations for this. The first is censoring. For a given age, children interviewed in November are more likely to have attended school anytime over the previous year. The second is recall bias, which could explain the drop in reported attendance during the school break. The questionnaire asked parents to report school attendance over the school year of 2011-2012, but it is possible that parents interpreted the question differently as, for example, whether the child is currently in school or not.
146. There is a seasonal pattern in time spent on household chores such as collecting wood and childcare. The overall household time spent on these tasks decreases in July and then gradually increases over the following months. This pattern is probably the result of varying degrees of labour use over the dry and rainy seasons and of the varying workload allocation within the family. Among shocks

affecting households, only drought appears to have a seasonal pattern with higher reporting in August and September.

147. There is a strong seasonal pattern in the levels of haemoglobin and related incidence of anaemia. Haemoglobin decreases in the rainy season, reaching its lowest point in July and August after which it increases again. This is consistent with the malaria peak observed in the literature from August to September. There is also an obvious seasonal pattern in using mosquito nets, which is higher in the rainy season compared to the months of May and June. Survey respondents explicitly report not using mosquito nets in the dry season because of the absence of mosquitoes.
148. There is a small seasonal pattern in nutrition indicators. Weight-for-age and weight-for-height are consistently higher in September, which could be related to patterns of food intake after the first harvest. The effect however is small and does not compromise the general comparability of anthropometric data between project and control areas. No seasonal pattern was found in income and expenditure data. These data were collected with reference to the previous 12 months and therefore de-seasonalised. Recall bias seems not to have affected expenditure and production reporting over the previous 12 months. Finally, the cognitive and education tests, survival, and income expectations and preference scores were not affected by seasonal bias because data collection took place simultaneously in all areas in November.
149. The seasonal analysis of the data suggests that many of the characteristic differences between project and control areas are the result of seasonality rather than structural differences between the project and the control communities. The variables affected by seasonality are school attendance, time use, anaemia, and some health-related behaviour such as the use of mosquito nets and incidence of diarrhoea. If these seasonally-affected variables were removed from the balancing test of Section 5.1, there would be only four statistically significant differences, which is well below the acceptable 10% of the sample of variables considered. This in turn suggests that the strategy adopted to select the control communities was valid although the decision to conduct surveys in the project and control communities in different seasons was a very unfortunate one.
150. There are several ways in which the seasonal bias in the data can be assessed and addressed, however none of these procedures can confidently and entirely remove a bias, if present. One option consists of modelling seasonality directly using rainfall data. If the outcome variable response (for example malaria) to rainfall can be precisely estimated using historical data by season, then rainfall data from the project and control sites would allow an estimation of seasonal bias. Unfortunately, similar data are unlikely to be available. A second option consists of estimating seasonal bias by employing a Oaxaca-Blinder decomposition. If the outcome variable of interest can be modelled and no determinants are omitted, then the seasonal bias can be measured directly. This type of analysis is based on the assumption that no determinants of the outcome variable (observable or unobservable) are omitted from the model, which is a strong assumption. A third option consists of conducting the estimation separately for subgroups of the population, some of which are known to be unaffected by seasonality. For example, malaria appears to be seasonal for infants but not for older children. If a similar pattern is found, this provides evidence of a seasonal bias. A fourth option consists of exploiting the survey timing and comparing groups of households interviewed at different times of the year. As the time gap between the groups grows, the difference in the outcome variable should also increase following the expected seasonal trend, which thus provides seasonal bias evidence. Finally, an overall assessment of the size of the bias can be obtained by comparing the DD impact results calculated separately by using the unadjusted data, data adjusted by propensity score

matching, data adjusted by a Oaxaca correction, and data limited to subgroups of the whole population (see Appendix C for further information about this procedure).

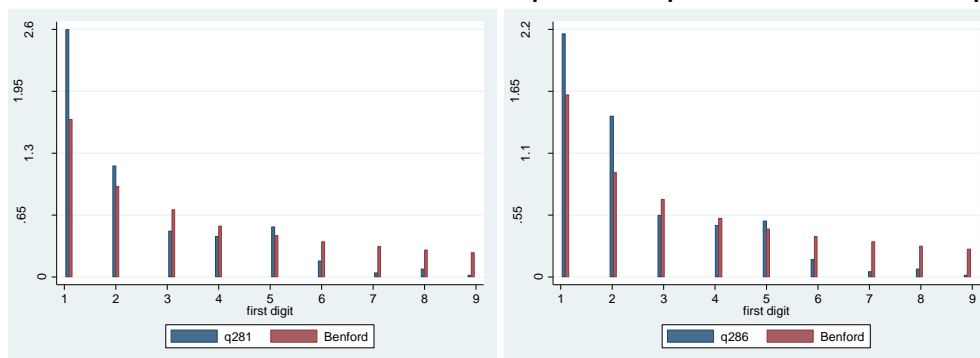
151. As the project was not randomly allocated to a locality and because there is no time overlap between the surveys conducted in project and control villages, it is extremely difficult to define with certainty to what extent the differences observed are the result of seasonal bias or of underlying structural differences in the populations. Ultimately, the evaluation team will have to rely on well-reasoned assumptions in their efforts to correct for the seasonality issue, alongside employing all of the strategies outlined above in order to detect the size of the bias. Additional information for testing the presence of a bias will become available with the first and second follow-up rounds. For example, variables that are known not to be affected, or poorly affected, by the project should show no differences at follow-ups because they are simultaneously conducted in the MV and CV areas. For this reason and for the general uncertainty regarding the size of the seasonal bias it is recommended that the survey continue as planned in the next follow-up rounds even for those variables, such as use of mosquito nets and malaria incidence, whose validity is more questionable.

5.5 Data quality and Benford's Law

152. The survey data suffer problems typical of data collection in developing countries: age heaping, unreasonably large values of goods purchased and produced, and standard deviations larger than the typical norm (e.g. nutrition). There is no obvious indication that these problems are larger in the MVP survey than in comparable surveys conducted in Ghana. To better assess the quality of the data we decided to check their reliability using Benford's Law. First digits of many social as well as natural phenomena do not follow a uniform distribution. A larger proportion of numbers have one as first digit and then two, three to nine in decreasing proportions (Benford's Law). This regularity has led some researchers to use the distance between observed data and the theoretical Benford's distribution as a tool for detecting fraudulent data fabrications. Judge et al. (2009) apply Benford's Law to a number of datasets from developing countries and what follows is an application of the metrics and statistical tests they developed.
153. We applied Benford's Law to purchases and own consumption figures from the expenditure file and to quantities of agricultural output produced from the farm income data. These quantities were looked at in a comparative way by calculating the same metrics and statistical tests for comparable datasets collected in Ghana: the GLSS collected by the GSS in 2005/2006 and the Yale/ISSER panel dataset of 2009. This type of analysis can only be applied to variables whose numbers are reported in large amounts and whose first digits do not follow any particular distribution. For example, first digits of age data are largely determined by survival patterns. Additional variables that could be tested using these datasets include the number of animals owned and possibly land size.
154. Differences between the observed distribution of first digits and the theoretical Benford distribution were looked at. These differences are tested using a chi-square test and a Kuiper's test. Unfortunately, the formulae for the tests calculations included a term for the size of the sample. As a result, the size of the test simply increases with the sample size. Hence, whilst the test is useful to assess the conformity to the Benford distribution it does not measure the distance from the distribution. It would be an error to interpret a larger value of the test as a larger distance from the theoretical Benford distribution. For this reason, the size of the test cannot be used to make comparisons across surveys to say, for example, that survey A is more accurate because Kuiper's test is 1,000 whilst survey B is 1,500. In order to make comparisons across surveys, we also report a

number of distance measurements between the observed distribution and the Benford distribution. These are the M and D distances in Tables 36 and 37 that will be used to evaluate the surveys in a comparative way.

Figure 12. Observed and Benford distributions compared: food purchases and own consumption



Note: Calculated using methodology in Judge et al. (2009) stata do-files available with the authors.
 Note: q281 and q286 are the names employed in the survey data for the value amounts of food purchases (q281) and the value amount of consumption of foods produced by the household (q286).

- 155. Table 36 compares the tests of equality of the two distributions of the MV data with data collected by the ISSER survey in 2009 and by GSS in 2005. Only observations from rural households from the Northern, Upper East, and Upper West regions were considered in order to make them more comparable with the MV datasets. Similar to the MV datasets, the expenditure modules of ISSER and GSS also employ a variety of local units of measurement for the item purchased. The recall periods used however are very different. The GSS employed diaries with repeat visits and a recall of 15 days, whilst the ISSER questionnaire employed a 30-day recall. The MV questionnaire employed a recall consisting of the quantity purchased and consumed in a typical month for the months it was purchased or consumed.

Table 36. Quality analysis of expenditure data based on Benford’s Law of three different datasets

	Obs	M distance	D* distance	Chi-square	Kuiper’s test
<i>Purchases</i>					
GSS 2005	-			-	-
ISSER 2009	12,585	0.093	0.124	2,110.2***	16.9***
MVP 2012	29,298	0.201	0.171	7,414.0***	36.1***
MV areas	9,282	0.170	0.183	2,272.8***	19.3***
CV areas	6,108	0.172	0.187	5,181.2***	30.5***
<i>Own consumption</i>					
GSS 2005	4,769	0.104	0.146	1,095.0***	11.3***
ISSER 2009	3,679	0.044	0.092	455.7***	7.6***
MVP 2012	19,107	0.101	0.151	4,222.0***	26.9***
MV areas	6,108	0.117	0.156	1,516.8***	14.9***
CV areas	12,999	0.115	0.153	2,794.2***	22.3***

*Difference statistically significant at 10%, ** significant at 5%, *** significant at 1%
 Note: Calculated using methodology in Judge et al. (2009) stata do-files available with the authors.

- 156. In all cases, the Benford distribution and the observed distributions are very different at 1% statistical significance. For comparative purposes, the maximum distance (M) and the Euclidean distance (D*)

were used. Based on these two measurements, the MV data appear to be less accurate than the ISSER data but of comparable quality to the GSS data. More importantly, the different measure is calculated separately for the MV and CV sites of the MVP survey because the surveys were conducted at different times of the year and by slightly different teams of enumerators. No differences in the quality of MV and CV data are found based on these measures. The analysis of agricultural production data leads to a similar conclusion. By an application of Benford’s Law, the data collected by the MVP do not appear to be of inferior quality to those collected by ISSER or GSS nor do large differences appear between data collected in the project and control communities.

Figure 13. Observed and Benford distributions compared: agricultural production

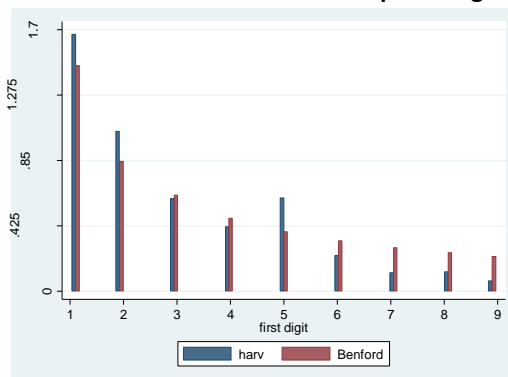


Table 37. Quality analysis of expenditure data based on Benford’s Law of three different datasets

	Obs	M distance	D* distance	Chi-square	Kuiper’s test
<i>Harvested q</i>					
GSS 2005	8,254	0.028	0.041	257.2***	4.2***
ISSER 2009	3,327	0.033	0.070	223.5***	5.6***
MVP 2012	7,528	0.045	0.086	761.6***	9.7***
MV areas	2,651	0.048	0.084	280.7***	5.9***
CV areas	4,877	0.057	0.092	509.9***	7.7***

*Difference statistically significant at 10%, ** significant at 5%, *** significant at 1%

5.6 Post-hoc power calculations

157. The sample size of the baseline household survey was set based on power calculations looking at three main outcome indicators: per-capita expenditure, height-for-age Z-scores of children under 5, and maths test scores among children of primary school age. These calculations led to the selection of 35 clusters, with 20 households per cluster, for the project group and for each of the comparator groups. The power calculations conducted at the design stage were based on parameters obtained from available household surveys of Ghanaian households. The data collected at the baseline offer the opportunity to validate the parameters used at the design stage and to recalculate the power of the sample with respect to the same indicators.
158. The analysis of the baseline data reveals that the parameters employed at the design stage were largely similar to those obtainable from the baseline data (see Table 38). At the baseline, the sample size turned out to be slightly larger because it was purposely decided to oversample households in order to account for the occurrence of attrition. This had the effect of increasing the power of the sample with respect to estimates at the design stage. The standard deviations of the variables at the baseline are very similar to those assumed at the design stage and slightly larger only in the case of

per capita expenditure. This also had the effect of increasing the power of the sample with respect to the estimate at the design stage.⁴⁰ Finally, the intra-cluster correlation coefficients are much larger at the baseline than what were assumed at the design stage, though per capita expenditure is an exception.⁴¹ Larger intra-cluster correlation coefficients have the effect of reducing power.

Table 38. Parameters employed in the post-hoc power calculations

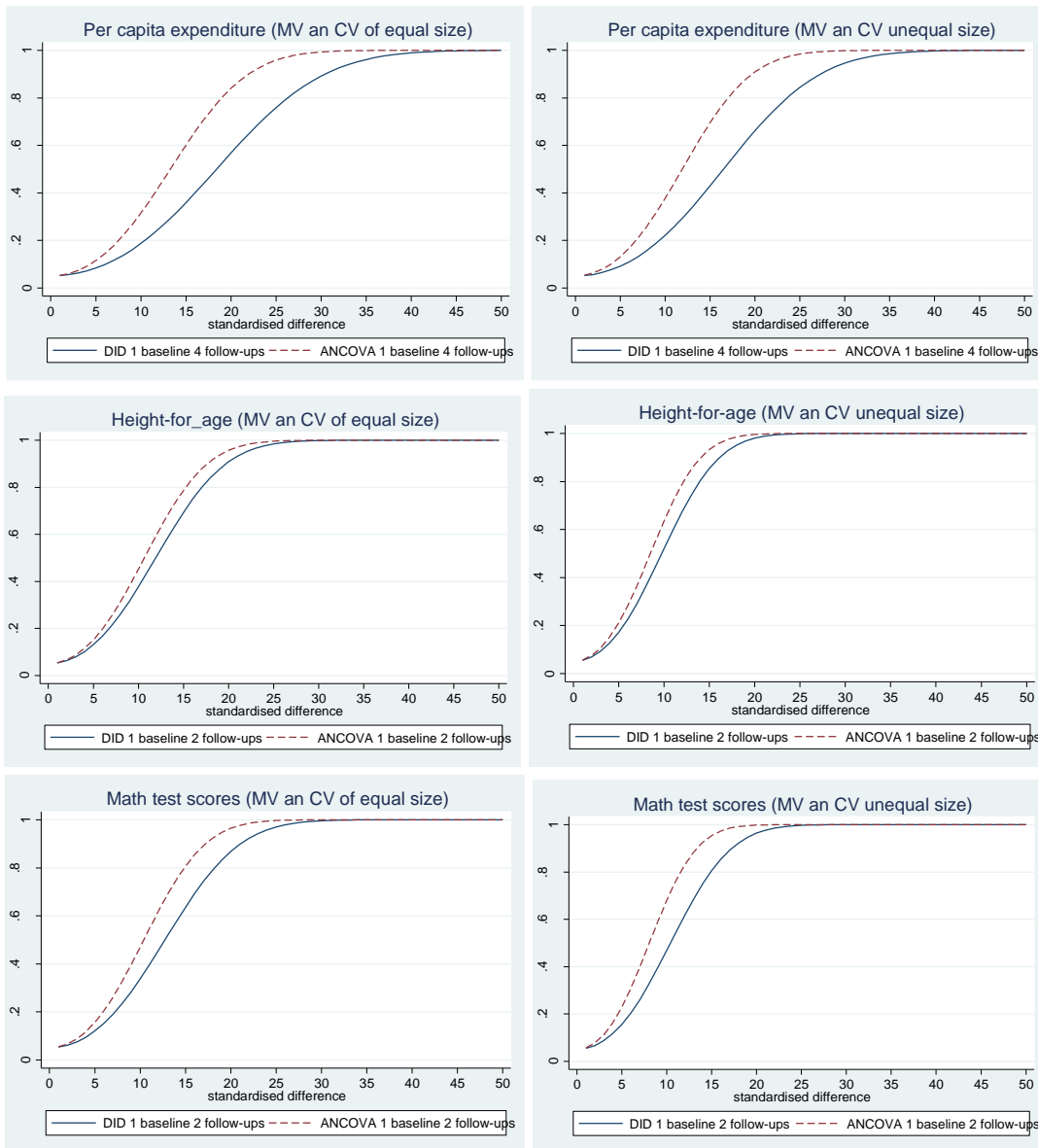
Variable	Cluster size	Ratio mean to standard deviation	Intra-cluster correlation coefficient	Autocorrelation coefficient
Per capita expenditure	21	1.5	0.17	0.40
Height-for-age Z-score	19	0.7	0.10	0.70
Easy maths test score	51	2.4	0.08	0.50

159. It is difficult to predict the overall change in the power of the sample by simply looking at Table 38, as while some parameters suggest an increase in power others suggest a decrease. Hence, it was decided to perform the same power calculations conducted at the design stage over the same indicators and then compare the results. Two study designs are considered: a DD design and an analysis of covariance (ANCOVA) design consisting of one baseline and two follow-ups with the exception of per capita expenditure for which four follow-ups are available in both cases. The autocorrelation parameters for the power calculations are reported in Table 38 and are the same employed at the design stage. The results of these power calculations are shown as power against standardised differences (Figure 14). The charts on the left side calculate power when the MV sample is compared to a CV sample of the same size whilst the charts on the right side calculate power when the MV sample is compared to the combined sample of near and far CV sites.

⁴⁰ For comparative purposes, the ratios of means to standard deviations for the three indicators in Table 38 at the design stage were set at 1.7 for per capita expenditure, 0.7 for height-for-age Z-scores and 2.0 for math test scores.

⁴¹ For comparative purposes, the intra-cluster correlation coefficients for the three indicators in Table 38 at the design stage were set at 0.23 for per capita expenditure, 0.03 for height-for-age Z-scores and 0.02 for math test scores.

Figure 14. Power against standardised effect size



160. The results show that in all cases the detectable difference at 80% power is below the critical threshold of 0.2 standard deviations. The sample will be able to detect ‘small’ impacts. In the case of per capita expenditure the study will exploit four follow-ups and will be able to detect an impact of 0.15 standard deviations, which is roughly equivalent to an increase in per capita expenditure by 11%. In the case of height-for-age Z-scores and of maths test the study will be able to detect an impact in the range of 0.1-0.15 standard deviations. The power of the samples turned out to be larger at the baseline in the case of per capita expenditure (detectable difference was 0.2-0.3 standard deviations at the design stage) but slightly lower in the case of height-for-age and easy maths test scores (detectable differences of about 0.1 and 0.08-0.10, respectively).

161. In conclusion, the power calculations performed using baseline parameter data do not differ substantially from those conducted at the design stage. The study is found to be better powered to assess the impact on poverty but less powered to observe impact on nutritional and educational

outcome than was originally thought. However, it should be acknowledged that the study has in all cases sufficient power to detect impacts below the critical threshold of 0.2 standard deviations, which is often classified as 'small' impact. The study is therefore sufficiently powered to detect a small impact on the three indicators considered.

6. Summary and conclusions

162. The baseline report is a summary of the data collected during 2012 and early 2013. It provides an overview of the MVP area at the start of the project and summarises key variables across poverty, health, education, etc. that will be used to measure impact at the end of the evaluation in 2016/17. For this reason, this report is mainly summative and focuses on ensuring that the data are consistent and of high quality whilst observing any interesting or unusual deviations (e.g. between MV and CV datasets, through comparisons with national datasets, and other known phenomenon such as the Engel Curve).

6.1 Characteristics of the study population

163. The overarching goal of the MVP is to make progress against the MDGs in Northern Ghana. Unsurprisingly, income poverty and inequality is much higher in the study area than compared with the rest of the country, and indicators for educational attainment and maternal health are all lower. The overall picture is one of a deprived area where economic, education, and health conditions are very poor. Nonetheless there are some surprising facts. The under-five mortality rates and undernutrition rates are comparable to national averages, and gender differences in education indicate under-enrolment and participation by boys.

164. In terms of household characteristics, the average size in the study population is seven members. Women head around 10% of households and around 20% are polygamous. About 1 household in 10 hosts a migrant, whilst around half of households have a member who has temporarily migrated away. Poverty rates in the MV sites are very high (around 60%) and, surprisingly, inequality indicators are higher than the rest of the country. Nonetheless, despite a large proportion of imputed expenditure devoted to food, households are not able to meet their food requirements as some 80% of households report months when they did not have enough food to meet their family's needs. There is also a strong seasonal pattern to food availability with only one cropping season.

165. The majority (90%) of households across the study area are farmers, cultivating an average of three hectares of land scattered across an average of three different plots. Most farming is subsistence based, and only around 20% of agricultural produce is sold on the market. Farming in the area operates under risky circumstances, with all households having been affected by a 'shock' of some kind in the preceding year. Very few households save and the most common form of 'savings' consists of animal holdings.

166. In terms of education, primary school attendance is lower than in comparison to the rest of Ghana, but not by a large margin. Attendance at JHS and SHS is very low and according to the surveys there are more girls than boys in school at all grades. The quality of schooling is poor, as is apparent in the results of the maths and English tests conducted by the survey team.

167. Mortality rates in the study area are high by international standards, but not in comparison with the rest of Ghana and are considerably lower than those calculated by the DHS in the northern regions in 2008. This may be because mortality rates have been declining since the figures were reported in 2008 or because the DHS estimates are valid at the national level (i.e. regional level estimates tend to be more inaccurate). Undernutrition rates are high and very similar to malnutrition rates observed for the whole of Ghana by the DHS in 2008.

168. There are extensive social networks across communities in the study area with around 80% of households reporting having relatives or friends living in another village and approximately 50% of those relatives or friends having asked for or provided help in the previous 12 months.

6.2 Characteristics of the data – balance tests

169. The DD evaluation design rests on the assumption of parallel trends. For comparisons in the changes in the outcomes in the project and control group to be valid, the pre-interventions trends of the outcome variables should be similar. For many outcome variables however differences in the levels may suggest differences in the trends as well. For example, the demographic transition to smaller families is not a linear process and differences in the average levels would suggest differences in the trends as well. The selection of control communities was done by matching rather than by random selection, which was deemed infeasible for the MVP. To assess whether there are statistically significant differences between project and control villages, there is a list of variables against which comparisons are made between both the size of the difference and the statistical significance.
170. For the household data, of the 52 variables considered, 11 were found to be different at a 10% statistical level of confidence, representing around 20% of all variables (which is similar to the differences found in the community-level data). A large number of differences are found among seasonally sensitive variables (e.g. episodes of diarrhoea), and some differences could be a reflection of differences in socio-economic characteristics of the two areas. The faraway control communities are not more different than nearby communities, as the number of statistically significant differences is the same for both groups.
171. DD analysis also rests on the hypothesis of parallel trends. The trends show that the increase in wage and enterprise income was smaller in MV communities, whilst the reduction in the value of animal stock was larger. The differences were not however statistically significant. For price trends, nominal wages appear to have grown more slowly in MV areas over the last four years with no statistically significant differences in the price of fertiliser, goats, and guinea fowl.

6.3 Characteristics of the data – seasonality

172. The survey was administered at different times of the year with gaps of different sizes for the same survey between project and control groups. There is one rainy season occurring irregularly between June and September, which influences production and consumption patterns, morbidity, and other behaviours such as migration. Some of the variables collected by the survey are known to be sensitive to seasonal variations, such as the incidence of diarrhoea and malaria. For other variables, reporting can be affected by recall bias.
173. The presence of seasonality in the data was tested by running regressions of dependent variables on month dummies from May to September with a control variable for the district surveyed in order to remove effects related to the geographic roll-out of the survey over time. The analysis suggests that many of the differences in characteristics between project and control areas observed are the result of seasonality rather than structural differences between project and control communities. The variables affected are school attendance, time use, anaemia, and some health related behaviour such as the use of mosquito nets and incidence of diarrhoea. This suggests that the strategy adopted to select the control communities was valid.

6.4 Characteristics of the data – quality

174. The data suffer from typical data collection problems in developing countries, such as age heaping, unreasonably large values of goods purchased and produced, and standard deviations larger than the typical norm. There is however no obvious indication that these problems are larger in the MVP survey than in comparable surveys conducted in Ghana. The evaluation also tested the reliability of the dataset by using Benford's Law. In all cases, the Benford distribution and the observed distributions are very different at 1% statistical significance. Based on these tests, the MV dataset appears to be less accurate than the ISSER data but of comparable quality to the GSS data. Also, no differences have been found in the quality of MV and CV data based on these measures.
175. Overall, the strategy adopted to select the control communities is valid, and the quality of the dataset appears to be no less accurate than comparable datasets collected in Ghana. The time difference in the collection of baseline data in the project and control communities does however mean that some variables are particularly sensitive to seasonal differences.

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APPENDIX A. TERMS OF REFERENCE

PO 5603 MV-EVALUATION: TERMS OF REFERENCE

Title:	Impact Evaluation of a New Millennium Village in Northern Ghana
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1. Introduction

- 1.1. The UK government's Department for International Development (DFID) manages Britain's development assistance to poor countries and works to eradicate extreme poverty. We are led by a cabinet minister, one of the senior ministers in the government. This in itself is a sign of how determined the UK government is to tackle poverty around the world. Guided by these principles, DFID works across the world on a bilateral basis with partner countries, with multilateral organisations, and with civil society.
- 1.2. The Government of Ghana and DFID will be working with the Millennium Promise Alliance (MPA) to implement a Millennium Village (MV) in Northern Ghana. The MV project will commence in late 2011 and will last five years. The MV model is already being implemented in a range of sites across Sub-Saharan Africa, where it is now entering a second five-year phase.
- 1.3. The MV model provides an integrated package of interventions to lift a rural community out of poverty. Its central hypothesis is that a local 'big push' addressing the most immediate capital deficiencies in communities and households is a necessary condition for reaching a threshold required to move towards local resilience and self-sustaining economic growth. Key to this is improved agricultural productivity and market development, enabling people in rural areas to save and accumulate wealth, stimulating investment and diversification into non-farm work.
- 1.4. The MV projects across Africa have set up comprehensive Monitoring and Evaluation (M&E) systems. These are used to continually assess progress and adapt implementation mechanisms. The datasets produced have also fed into MV reports, including on results achieved. However, there is a noticeable gap in evidence of the model's overall effectiveness. A key MV report of results achieved was based on before-and-after analysis within the MV sitesⁱ, leading to criticism of the results attributed to the MVs and the lack of independent rigorous evaluationⁱⁱ. DFID has agreed with MPA that funding for a new MV in Northern Ghana will be accompanied by such an independent evaluation, to provide robust evidence on the effectiveness of the MV approach.

2. Objectives

- 2.1. DFID wishes to invite suitably qualified organisations to implement a robust independent evaluation of the new MV in Northern Ghana. The evaluation will cover

up to a 10-year period – subject to programme renewal – to answer evaluation questions of importance to the Government of Ghana, its Savannah Accelerated Development Authority (SADA), local stakeholders, DFID, and the international development community.

2.2. The evaluation will cover the costs of generating, analysing and quality assuring data, producing reports, and widely disseminating the results of the evaluation. The independent evaluation will build on, expand and validate the MV project's own M&E of the MV site and their selected comparison site. It will include establishing baselines, ongoing evaluation during the implementation phase and, subject to further agreement, continued evaluation after completion of the five years of direct implementation by the MV project.

3. Recipient

3.1. The recipient is DFID, with the project being managed by the DFID Ghana office.

4. Scope of Services

4.1. Appropriate methodologies will be used to answer the four key questions underpinning the evaluation of the MV in Northern Ghana:

- i. Does the MV deliver on promises to reach the Millennium Development Goals (MDGs) within the MV site?
- ii. Are the positive impacts of the MV sustainable after direct implementation of the MV project has ended?
- iii. Is the MV intervention package cost-effective in the results it achieves, compared with possible alternatives?
- iv. What externalities or spillover effects does the MV generate, and do they significantly add to or detract from the positive impacts that might be achieved within the MV site?

4.2. Besides the four main evaluation questions listed above, key stakeholders have also raised other issues that need to be explored in the evaluation. In particular, the methodology and evaluation will aim to also examine:

- a. Does the MV package empower disadvantaged or marginalised groups (e.g. females, the disabled, or the elderly)?
- b. Does the MV achieve additional benefits arising from synergies across implementation of an integrated package of interventions?
- c. Does the MV address common issues relating to agriculture, infrastructure, or social and economic concerns?⁴²

⁴² Examples of questions relating to agriculture, infrastructure, and social and economic concerns are in the field visit report included in the list of documents.

- 4.3. Given the aim of evaluating the MV model as it will be applied in Northern Ghana, the evaluation methodologies employed will not require a change in MV implementation. This is likely to preclude the use of randomised control trials, due to the nature of the MV's integrated package of interventions across a single site. However, proposal of any evaluation methodologies, including randomised approaches, will be considered if they are feasible, cost-effective, and able to answer the key evaluation questions.
- 4.4. At this point in time, the Evaluation Advisory Group for this independent MV evaluation considers that a difference-in-differences approach with mixed methods is the most likely approach to be able to meet the criteria.⁴³
- 4.5. The independent evaluation will work with the MV project to identify appropriate comparison sites, and may need to suggest additional variables to be used in the village matching process.⁴⁴
- 4.6. Surveys at the MV site and comparison sites will take place in year 1 (baseline) and at least twice more during the five-year MV direct implementation period.
- 4.7. Spillover effects in areas adjacent to the MV (and possibly beyond) will need to be assessed. Various methods could be employed for this, but must be cost-effective given the primary emphasis on evaluation of impacts within the MV site.
- 4.8. DFID's funding to the MV in Northern Ghana will be subject to a mid-term review in year three. This will determine if there is sufficient evidence of progress against its objectives to justify completing the full funding to year five. The independent evaluation will play an integral role in this mid-term review, providing a report on progress, assessing cost-effectiveness, and producing a cost-benefit analysis of the MV in Northern Ghana based on the evidence available at that point.

5. The Requirements

- 5.1. The evaluation must be carried out by researchers with a recognised international reputation and practical experience of rigorous impact evaluation. The evaluation must reflect the local context. It must be independent, robust, and credible. Findings of the evaluation should be published in standalone reports and through peer-reviewed journals.
- 5.2. The independent evaluation is being funded, sourced, and delivered separately from:
- The main project under which DFID will fund the implementation of a new MV in Northern Ghana.

⁴³ A DFID team visited the proposed MV site in Northern Ghana and compiled a description of the site and a potential evaluation approach. Selected sections of the Visit Report are included in the accompanying documents.

⁴⁴ The field report contains the current village matching checklist used by the MVP.

- The MV project's own internal arrangements for monitoring and evaluation. These will continue during the MV project period. They are essential for the MV's own management and implementation, and will also provide a major portion of the data required for this independent evaluation.

- 5.3. Where data generated internally by the MV project are used, independent verification is required, if necessary on a sampling basis. The independent evaluation will need to verify the accuracy of surveys conducted by the MV project. The independent evaluation will be responsible for choosing the scale of surveys and the degree of sampling required, but methodologies must comply with generally accepted best practice. The independent evaluation will also review all survey instruments before they are sent to the field.
- 5.4. Additional survey modules or data collection methods may be required to address the key evaluation questions listed above.⁴⁵ The independent evaluation may need to work with the MV project to include additional modules in their surveys.
- 5.5. All findings, datasets, and methods for the evaluation component project must be published and made available to allow researchers to replicate findings. Publication in peer-reviewed journals should be an objective.
- 5.6. Participation will be expected in various fora, including international and national conferences, particularly in latter years as evidence emerges. This will require high calibre expertise in presenting and debating findings. Costs of participation in such events will be borne by DFID or other parties.

6. Constraints and Dependencies

- 6.1. DFID Ghana will provide a grant totalling \$18.1 million USD over five years for implementation of the new Millennium Village in northern Ghana. This includes resources for the implementation of the MV, as well as technical support required to run the MV project's own M&E systems. The scale of the independent evaluation of the MV project will need to reflect the size of the MV, the degree to which the MV project's own M&E systems can be used and the extent to which their data will need to be validated, the need for any comparison sites in addition to the single comparison site to be selected and monitored by the MV project, and the intended 10-year period of the evaluation. The timeframe for the initial provision of independent evaluation services will be for five years, but the evaluation framework that is designed should be for a full 10-year period.
- 6.2. The evaluation must remain independent of the MV project's own M&E processes but, at the same time, the evaluation team must work closely with – and can expect full cooperation from – the MV project, including the team working specifically on

⁴⁵ A draft of the current survey tools that are used by the MVP is included in the accompanying documents.

M&E for the northern Ghana site, and associated MV organisations.⁴⁶ Consistency is crucial between information collected from within the MV and MV-comparison site led by the MV project, and any additional comparison sites that might be led by the independent evaluation. It may be possible to contract the MV project's M&E resources to carry out data collection in additional comparison sites. It may or may not be possible to utilise M&E resources associated with the MVs during the five-year period after direct implementation of the MV in northern Ghana ends.

- 6.3. There are numerous factors that could have implications for the independent evaluation. For instance, the migration of households into and out of the MV site, and exogenous shocks within the MV site, nearby, or at a national scale. Such problems need to be considered and mitigating actions proposed; for instance, maintaining a statistically valid sample size in the MV and comparison sites will be crucial.
- 6.4. We do not want to be overly prescriptive on staffing arrangements but expect the evaluation team to put forward a highly experienced small core team of international and national experts, and a network of local field workers, who will be present at the site during key stages. It is also natural to expect a turnover of personnel during the life of the evaluation. Plans and mitigation measures need to be outlined.
- 6.5. The site is situated in a remote part of northern Ghana, two hours drive from Tamale, the capital of Northern Region (which itself is 10 hours by road, or a 75 minute flight, from Accra). Local access is via basic non-paved roads. Movement across the middle of the proposed site can become restricted in the rainy season when the White Volta River floods, which is why a portion of the site is referred to locally as "the overseas."
- 6.6. In addition to developing a strong working relationship with the MV project at the site and with MV organisations outside Ghana, the evaluation team will need to engage with other stakeholders. For instance with local communities, district and regional officials, the SADA, national government agencies such as the National Development Planning Commission and the Ghana Statistical Service, and other organisations providing and assessing the impact of external assistance to the area (for example, the Millennium Challenge Corporation, CARE, and IPA/JPAL).

7. Reporting

- 7.1. The independent evaluation will report regularly to DFID Ghana's MV Adviser.
- 7.2. Annual reviews of the independent evaluation will be conducted by DFID, which will require full cooperation from the independent evaluation team, including providing an annual progress report against the logframe. These annual reviews will be determined by DFID's internal reporting requirements and may not fit with the schedule of MV surveys.

⁴⁶ Such as the Millennium Promise Alliance based in New York, the Earth Institute at Columbia University, and the MDG Centre for West and Central Africa based in Mali.

7.3. An Evaluation Advisory Group, organised by DFID, will guide the strategic direction of the independent evaluation, signing-off on key reports and outputs. This Advisory Group will include representatives of DFID, Government of Ghana, the MV project team, and other key stakeholders. The Advisory Group will play a key role in agreeing the final design for the independent evaluation, and is expected to meet at least before and after each major survey event (including initial establishment of baselines).

8. Timeframe

8.1. The independent evaluation will be designed for a 10-year period, to allow for assessment of sustainability of the MV's impacts, but will be contracted initially for a five-year period.

8.2. The five-year MV intervention is scheduled to start its set-up phase in late 2011, with a detailed design phase of up to six months. All subsequent interventions will be sequenced according to the needs of local circumstances, as determined by the MV project. The MV project's own M&E, establishing detailed baselines, will commence during the design phase.

8.3. The parallel implementation of the Millennium Village and the independent evaluation is critical. Therefore, thorough baselines need to be established very rapidly. Major MV interventions are likely to start in the first few months of 2012. The independent evaluation needs to finalise its approach, identify survey locations and methods, and commence validation of MV baselines and/or establish additional data collection early in 2012. An indicative initial timeline is outlined below.

Date	Output
w/c 3 October	Pre-bid workshop. A half-day conference will be held in East Kilbride, Scotland, organised by DFID, for the MV project to outline their approach to implementation and to M&E, and to enable potential bidders to ask questions of the MV team and of DFID, for instance on survey methods and how new modules could be incorporated.
7 November	Deadline for bid submission.
w/c 21 November	Notification to all candidates of ITT outcome. (NB there is a chance bidders are expected to be invited for follow-up interviews in the up to this point)
December 2011	Contract signed. Initial design of the evaluation commenced.
By end January 2012	Detailed design agreed with the Evaluation Advisory Group.
February 2012	Baseline field activities completed.

8.4. In view of the long time horizon and to allow for changes during the lifetime of the contract, annual review points will be planned. The initial evaluation contract will be let for a period of up to five years in the first instance, and will include break points at

the end of Year 1 and Year 3. Progression from one period to the next will be subject to the satisfactory performance of the Service Provider (SP), the continuing requirement for the services, and agreement on work plans and budgets for the following period.

8.5. At the end of Year 5 DFID will review the requirement, the performance up to that point, and the future scope – to determine whether the independent evaluation should continue to be conducted by the service provider. The contract could then be extended for a period of up to five years, with timing of break points for that extension agreed at that time.

9. Outputs

9.1. The independent evaluation will produce the following outputs:

- I. An initial design document within the first six weeks of contract exchange, outlining features of the proposed evaluation framework including key evaluation questions, methodologies to be employed, selection of comparison sites, and ways of working with the MV project and other key stakeholders. Key critics of the MV approach will be consulted on proposed evaluation design options before they are finalised.
- II. Baseline surveys completed within the first six months of the implementation of the MV project.
- III. Annual Progress Reports, based on DFID's logframe for the independent evaluation, to fit into DFID's internal reporting schedule.
- IV. After each survey round, an initial report on evaluation approaches and data issues, and a detailed report following analysis of the data and other information.
- V. Mid-term report on the northern Ghana MV, assessing cost-effectiveness, and a cost-benefit analysis based on the evidence available at that point.
- VI. 'Final Report' on the northern Ghana MV in Year 5, including answers to the key evaluation questions. A separate, easily understood summary of the evaluation findings.
- VII. Data and reports available in the public domain, as quickly as possible.

10. DFID Coordination

10.1. The DFID Ghana MV Adviser will be the direct point of contact in DFID for the independent evaluation, and will arrange meetings of the Evaluation Advisory Group.

11. Background

- 11.1. Ghana has succeeded in reducing the national rate of poverty from 52% in 1992 to less than 29% in 2006.ⁱⁱⁱ This national-level improvement, however, has not been spread evenly. The dry northern savannah in particular experiences persistently high levels of poverty, estimated to be 69% in 2006.^{iv} There have been concerted efforts for decades to reduce the stubbornly high rates of poverty in the North^v but with little success.^{vi} The region exhibits the characteristics of what Jeffrey Sachs calls a 'poverty trap' deriving from a paucity of various forms of capital.^{vii} The Government of Ghana acknowledges the particular challenges faced by the North, and in 2010 created the semi-autonomous Savannah Accelerated Development Authority (SADA).^{viii} The associated SADA Strategy, 'A Sustainable Development Initiative for the Northern Savannah', emphasises "transforming the northern Ghanaian economy and society into a regional nexus of increased productivity of food and a buffer against persistent droughts and sporadic floods."^{ix}
- 11.2. Sachs's ideas for tackling the 'poverty trap' have been taken forward in the form of Millennium Villages (MV's), through the non-profit organisation Millennium Promise.^x There are currently 12 MV sites being implemented across Africa, assisting communities to lift themselves out of extreme poverty. This is a 'big push' approach, providing an integrated and intensive programme of support and community development to people within a defined area, seeking to show how the Millennium Development Goals (MDGs) can be achieved by 2015, even in very poor rural areas of Africa.
- 11.3. The first MVs commenced in 2006.^{xi} Their average results are reported as including a seven-fold increase in the use of bed nets among children, maize yields having tripled, and access to improved drinking water higher by 50 percentage points.^{xii} However, the MVs have been subject to criticism, particularly related to the lack of rigorous independent evaluation of their impact. For instance, some results reported for MVs based on before-and-after comparison were found to have occurred to a similar degree in other sites within the same country.^{xiii} Critics suggest that it is unsurprising that channelling significant resources to a relatively small population will have some beneficial impact. Key questions, however, are around the **cost-effectiveness** and the **sustainability** of this approach. For instance, could the impacts achieved at MV sites be achieved at a lower cost through alternative approaches? And are the impacts sustained once the substantial pulse of increased resources to the area comes to an end? This independent evaluation project aims to provide evidence to help answer these questions.
- 11.4. The MV would represent an innovative approach to addressing the chronic poverty that afflicts North Ghana. It fits well with DFID's increased emphasis on innovation and on achieving real development results.^{xiv} And it would be in line with DFID Ghana's new Operational Plan that proposes increased focus on the poor north of the country.^{xv} The proposed MV is being closely coordinated with the SADA, to which DFID is providing institutional support in order to create an effective vehicle for

facilitating and coordinating just this sort of development initiative. A separate Business Case is being developed in parallel for funding of the MV site in northern Ghana. However, given the innovative nature of the approach, and the high-profile debate that has surrounded it,^{xvi} DFID has agreed with the MV Project that any support to a new MV would be accompanied by rigorous independent evaluation of the approach.

11.5. The aim of the independent evaluation is to strengthen the evidence base around MV interventions to inform decisions on possible scaling up, and to assess value for money from the use of UK taxpayer resources. The objectives of the evaluation are therefore to use rigorous and credible methods to:

- a. Estimate the impact of the MV package of interventions within a cluster in northern Ghana over a 10-year period, reporting at regular intervals as data become available; and
- b. Assess its cost-effectiveness compared with credible alternative uses of the resources.

11.6. The MV project team has produced a detailed discussion paper on how evaluation could be conducted of the proposed MV in northern Ghana.^{xvii} It notes that random sampling across a set of MV sites and control sites is not possible, given that this is effectively a single community-level intervention, with interventions delivered across the cluster, so that it is difficult to split part of the MV site to assess various interventions. However, the paper notes that key evaluation questions can be answered by employing a mix of evaluation methods, including:

- longitudinal household-level assessments over time;
- periodic assessment of impacts against interventions;
- non-randomised ‘plausibility’ evaluation against a separate local matched comparison group;
- comparison against a separate intervention such as cash transfers;
- comparison against regional trends;
- “stepped-wedge” assessment of interventions introduced sequentially within parts of the MV.

11.7. These various options, and others, will be considered during the initial determination of feasibility and key design features of the independent evaluation.

12. Competition Criteria

12.1. The consultants need to demonstrate proven experience in working on monitoring and impact assessment comparable to that of rural Ghana, including fieldwork. They need to demonstrate a thorough grasp of the issues and present realistic monitoring and evaluation solutions directly related to the MV in northern Ghana.

12.2. Bids will be reviewed according to the following criteria (and weightings):

- Quality of Personnel (including, but not limited to, appropriate seniority/expertise, appropriate mix of skills, contacts/networks) **(30%)**
- Evidence of capacity to undertake work as set out in TORs **(20%)**
- Methodology (including use/numbers of days input) to develop cost-efficient innovative solutions to answer the evaluation questions **(25%)**
- Commercial **(25%)**

13. Performance Requirements

13.1. The impact of the project will be better informed, evidence-based decision-making that increases the effectiveness of future development interventions, based on improved understanding of the effectiveness of the MV model and integrated rural development approaches, and how to evaluate them. The success of the project will be determined by progress against the logical framework (included in the annex pack).

14. Format and Content of Responses

14.1. Bid responses should not exceed 50 pages (size 12 font, single-spaced lines), excluding CVs and other annexes. There is no obligation for evaluators of the bids to read the latter.

14.2. The Invitation to Tender documentation contains full guidance for suppliers. Suppliers must raise any questions relating to the TORs using the process for tender clarification set out.

22 September 2011

APPENDIX B. BALANCING TESTS

Community-level variables

	MV	CV-MV	P-value	CVN-MV	P-value	CVF-MV	P-value	CVF-CVN	P-value
Hand dug wells (number)	6.9	0.5	0.751	0.2	0.901	0.8	0.674	0.5	0.779
Borehole wells (number)	2.6	0.3	0.591	0.2	0.801	0.5	0.502	0.3	0.668
Primary school %	86.7	6.9	0.271	8.3	0.250	5.4	0.455	-2.9	0.650
JHS %	65.7	7.5	0.429	7.5	0.496	7.5	0.496	0.0	0.999
SHS %	22.9	-1.3*	0.079	-1.4*	0.092	-1.1	0.180	2.9	0.689
Health centre %	25.7	-14.1*	0.069	-22.9**	0.010	-5.3	0.549	17.6**	0.025
CHPS %	40.0	8.8	0.306	11.8	0.241	5.9	0.556	-5.9	0.566
Market %	51.4	-3.1	0.772	-4.5	0.721	-1.6	0.897	2.9**	0.008
Distance nearest market (Km)	7.1	2.5	0.170	3.9*	0.065	1.1	0.594	-2.8	0.226
Population with health insurance %	47.8	16.7***	0.000	7.1	0.260	26.1***	0.000	19.1***	0.000
Children vaccinated against measles %	80.8	5.2	0.216	1.2	0.807	9.2*	0.057	8.1*	0.063
Farming main activity %	100.0	-1.5	0.457	0.0	0.981	-3.0	0.207	2.9	0.317
Maize main crop %	45.7	-16.2**	0.020	-14.7*	0.069	-17.8**	0.029	-3.0	0.637
Millet main crop %	51.4	12.9**	0.039	14.5**	0.047	11.4	0.116	-3.0	0.565
Shea butter main non-agricultural activity %	87.5	-4.4	0.583	-7.4	0.433	-1.4	0.881	6.6	0.511
Extension officer visits the community %	62.9	-12.6	0.226	-21.5*	0.075	-3.8	0.750	17.6	0.152
Cooperative %	28.6	-22.6**	0.002	-28.6**	0.001	-16.4**	0.043	12.1**	0.018
NPK fertiliser price (Cedis)	41.7	-0.4	0.707	-1.8	0.135	0.9	0.421	2.7**	0.017
Male wage (Cedis)	4.8	-0.1	0.750	-0.4	0.101	0.3	0.281	0.6**	0.013
Cow price (Cedis)	673.4	-6.8	0.880	-45.1	0.423	31.4	0.577	76.5	0.145
Goat price (Cedis)	63.7	8.4*	0.078	8.3	0.135	8.6	0.122	0.3	0.961
Guinea fowl price (Cedis)	12.2	0.1	0.904	-0.6	0.461	0.7	0.344	1.3	0.135
Chicken price (Cedis)	10.9	-1.5**	0.020	-1.6**	0.032	-1.4*	0.064	0.2	0.772
Gari price (Cedis)	2.4	0.3	0.206	0.5	0.104	0.2	0.515	-0.3	0.396
Rice price (Cedis)	4.4	-0.3	0.425	-0.4	0.446	-0.3	0.538	0.1	0.805
Major drought (% affected)	60.0	-0.3	0.971	-0.3	0.975	-0.3	0.975	0.0	0.999
Major floods (% affected)	11.4	10.9	0.172	9.5	0.308	12.4	0.182	2.9	0.769
CBO/NGO (% presence)	25.7	-6.1	0.470	-12.9	0.186	1.7	0.861	15.5	0.138

	MV	CV-MV	P-value	CVN-MV	P-value	CVF-MV	P-value	CVF-CVN	P-value
Women's Group (% presence)	48.6	26.7**	0.006	19.3*	0.078	34.0**	0.002	14.7	0.155
Parent-Teacher Assoc. (% presence)	51.4	13.2	0.169	11.4	0.299	15.9	0.151	4.5	0.684

Household and individual level variables (community-level averages)

	MV average	CV-MV	P-value	CVN-MV	P-value	CVF-MV	P-value	CVF-CVN	P-value
Demographics									
Household size	6.9	-0.13	0.692	-0.44	0.249	0.18	0.641	0.62	0.127
Female-headed household %	0.12	0.03	0.412	0.02	0.660	0.04	0.331	0.02	0.571
Polygamous	0.20	-0.04	0.110	-0.06**	0.038	-0.02	0.487	0.04	0.119
Migration									
Number of in-migrants per HH	0.37	-0.14*	0.073	-0.20**	0.029	-0.08	0.360	0.11	0.231
Number of out-migrants per HH	0.07	-0.01	0.785	0.02	0.733	0.01	0.794	0.00	0.946
Education									
Average years of schooling	1.8	0.25	0.228	0.01	0.974	0.41*	0.086	0.41	0.119
NAR primary	0.60	0.09*	0.062	0.08	0.154	0.10*	0.069	0.02	0.697
NAR JHS	0.09	0.05	0.110	0.04	0.317	0.07*	0.074	0.03	0.465
NAR SHS	0.05	0.01	0.768	0.00	0.865	0.01	0.736	0.00	0.809
Time use in the household									
Fetching wood (minutes)	152	0.62**	0.038	0.50	0.152	0.75**	0.032	0.25	0.544
Collecting water (minutes)	175	0.22	0.396	0.15	0.619	0.29	0.335	0.14	0.660
Shocks									
Affected by drought %	0.77	0.03	0.503	0.06	0.300	-0.01	0.930	-0.07	0.302
Affected by floods %	0.57	0.01	0.919	0.10	0.130	-0.09	0.182	-0.19**	0.008
Water and sanitation									
Improved water %	0.69	0.03	0.603	0.02	0.765	0.04	0.551	0.02	0.771
Improved sanitation facility %	0.08	-0.01	0.632	0.00	0.954	-0.03	0.443	-0.02	0.450
Assets									
Asset index (0,1)	2.26	-0.14	0.112	-0.15	0.148	-0.13	0.197	0.02	0.889
Credit and savings									
Member of <i>susu</i> %	0.16	-0.07**	0.013	-0.06*	0.070	-0.08**	0.013	-0.02	0.494
Any loan over last year %	0.06	-0.03**	0.046	-0.03*	0.057	-0.03	0.124	0.01	0.617
Land									
Land owned (hectares)	4.2	-0.44	0.325	-0.34	0.515	-0.54	0.302	-0.18	0.755

Household and individual level variables (community-level averages)

	MV average	CV-MV	P-value	CVN-MV	P-value	CVF-MV	P-value	CVF-CVN	P-value
Food security									
Not enough food in any month over last year %	0.86	0.01	0.764	-0.03	0.462	0.05	0.209	0.08*	0.068
Expenditure									
Per capita expenditure (standardised)	0.94	0.05	0.586	0.00	0.963	0.09	0.373	0.08	0.448
Poverty headcount	0.75	-0.01	0.844	0.02	0.751	-0.03	0.511	-0.05	0.346
Expenditure share of own produced food	0.51	0.00	0.951	-0.01	0.702	0.02	0.625	0.03	0.400
Employment									
Employment rate % (age 15 to 59)	0.78	-0.03	0.265	-0.02	0.613	-0.05	0.156	-0.03	0.401
Farmers %	0.90	0.04*	0.080	0.05	0.111	0.04	0.157	0.00	0.870
Doing paid work %	0.02	0.00	0.916	0.00	0.785	0.00	0.650	0.01	0.504
Owning a microenterprise %	0.19	-0.02	0.532	-0.07	0.122	0.02	0.645	0.08**	0.042
Income									
Agricultural profits (standardised)	0.34	-0.09	0.15	-0.07	0.118	-0.12**	0.008	-0.05	0.220
Marketed surplus %	0.21	-0.01	0.600	-0.03	0.264	0.01	0.835	0.04	0.194
Social networks									
Any important people living elsewhere? %	0.74	0.09**	0.034	0.06	0.246	0.13**	0.012	0.07	0.199
Asked for any help over last 12 months? %	0.44	0.06	0.255	-0.06	0.331	0.18**	0.003	0.24***	0.000
Provided any help over last 12 months? %	0.46	0.04	0.479	-0.08	0.199	0.16	0.011	0.25***	0.001
Mosquito nets									
Household has a mosquito net %	0.86	0.07*	0.055	0.10**	0.009	0.03	0.458	-0.07**	0.019
Anaemia									
Haemoglobin	10.1	-0.84***	0.000	-0.89***	0.000	-0.78**	0.001	0.12	0.601
Mild anaemia %	0.72	0.13**	0.003	0.12**	0.016	0.14**	0.006	0.02	0.710

Household and individual level variables (community-level averages)

	MV average	CV-MV	P-value	CVN-MV	P-value	CVF-MV	P-value	CVF-CVN	P-value
Malaria (children under 5)									
Malaria incidence %	-0.24	0.02	0.730	0.05	0.455	-0.01	0.853	-0.06	0.402
Nutrition (children 6 to 59 months)									
Height-for-age (Z-score)	-1.28	0.20	0.146	0.22	0.183	0.19	0.236	-0.03	0.874
Weight-for-age (Z-score)	-0.85	0.17	0.231	0.21	0.201	0.13	0.426	-0.08	0.656
Weight-for-height (Z-score)	-0.25	0.05	0.583	0.09	0.379	0.01	0.940	-0.08	0.442
Family planning and child care									
Using any birth control method %	0.10	0.02	0.418	0.00	0.961	0.04	0.182	0.04	0.188
Visited a health facility for own care or children %	0.36	0.06	0.207	-0.02	0.692	0.14**	0.003	0.16**	0.002
Child health									
Diarrhoea last 2 weeks %	0.20	0.02	0.539	0.07*	0.089	-0.03	0.408	-0.10**	0.010
Fever last 2 weeks %	0.28	0.01	0.691	0.04	0.350	-0.03	0.515	-0.06	0.144
Standardised test scores									
Raven's matrices	1.92	0.04	0.677	-0.01	0.906	0.12	0.259	0.14	0.281
Forward digit span	1.44	0.07	0.535	0.02	0.881	0.15	0.224	0.13	0.309
Backward digit span	0.93	0.05	0.613	0.00	0.985	0.13	0.249	0.13	0.293
Easy Maths	2.38	0.08	0.475	0.10	0.429	0.09	0.461	-0.01	0.947
Easy English	1.78	0.35**	0.006	0.39**	0.010	0.37**	0.013	-0.01	0.930
Advanced Maths	1.84	0.21	0.235	0.28	0.180	0.23	0.269	-0.05	0.764
Advanced English	2.17	0.08	0.555	0.07	0.634	0.13	0.375	0.06	0.655
Expected wages (parents)									
Wage primary (Cedis per day)	4.8	2.00***	0.001	1.77**	0.007	2.44***	0.000	0.67	0.402
Survival expectations									
Up to age 80	0.73	-0.01	0.644	-0.03	0.429	0.00	0.981	0.03	0.463
Time discount rates									
1-month horizon	0.11	-0.02	0.293	-0.04**	0.039	0.00	0.997	0.04**	0.042

Household and individual level variables (household-level averages)

	MV average	CV-MV	P-value	CVN-MV	P-value	CVF-MV	P-value	CVF-CVN	P-value
Demographics									
Household size	7.2	-0.19	0.502	-0.46	0.120	0.07	0.847	0.53	0.127
Female-headed household %	0.09	0.02	0.175	0.02	0.404	0.03	0.134	0.01	0.650
Polygamous	0.22	-0.02	0.599	-0.04	0.231	0.01	0.779	0.05*	0.090
Migration									
Number of in-migrants per HH	0.10	-0.03	0.270	-0.03	0.353	-0.03	0.382	0.00	0.941
Number of out-migrants per HH	0.46	-0.16*	0.058	-0.18*	0.042	-0.14	0.189	0.03	0.737
Education									
Average years of schooling	1.9	0.06	0.767	-0.16	0.476	0.28	0.237	0.44**	0.024
NAR primary	0.61	0.08*	0.085	0.05	0.445	0.12**	0.007	0.07	0.175
NAR JHS	0.10	0.06**	0.028	0.04	0.183	0.07**	0.034	0.03	0.349
NAR SHS	0.05	0.02	0.259	0.02	0.251	0.01	0.458	-0.01	0.590
Time use in the household									
Fetching wood (minutes)	170	41*	0.058	27	0.317	56*	0.059	29	0.432
Collecting water (minutes)	182	4	0.868	-9	0.682	17	0.614	26	0.424
Shocks									
Affected by drought %	0.76	0.07*	0.090	0.11**	0.021	0.03	0.577	-0.08	0.147
Affected by floods %	0.57	-0.02	0.640	0.06	0.346	-0.11*	0.083	-0.17**	0.019
Water and sanitation									
Improved water %	0.73	-0.01	0.855	-0.03	0.708	0.01	0.919	0.03	0.701
Improved sanitation facility %	0.10	0.00	0.943	0.02	0.534	-0.02	0.507	-0.04	0.260
Assets									
Asset index (0,1)	2.4	-0.11	0.229	-0.07	0.523	-0.15	0.171	-0.07	0.596
Credit and savings									
Member of <i>susu</i> %	0.15	-0.07**	0.001	-0.06**	0.007	-0.07**	0.003	-0.01	0.786
Any loan over last year %	0.05	-0.01	0.521	-0.01	0.521	-0.02	0.215	-0.01	0.603
Land									
Land owned (hectares)	4.8	-0.28	0.695	-4.8	0.441	-0.10	0.923	0.39	0.754

Household and individual level variables (household-level averages)

	MV average	CV-MV	P-value	CVN-MV	P-value	CVF-MV	P-value	CVF-CVN	P-value
Food security									
Not enough food in any month over last year %	0.82	0.02	0.404	-0.02	0.640	0.07**	0.040	0.09**	0.047
Expenditure									
Per capita expenditure (standardised)	1.02	0.01	0.862	0.05	0.581	-0.02	0.781	-0.07	0.522
Poverty headcount	74.0	-0.02	0.524	-0.03	0.458	-0.01	0.831	0.02	0.653
Expenditure share of own produced food	51.4	-0.02	0.581	-0.04	0.240	0.01	0.782	0.05	0.170
Employment									
Employment rate % (age 15 to 59)	0.78	0.01	0.797	0.01	0.582	0.00	0.889	-0.02	0.549
Farmers %	0.91	0.04**	0.040	0.03	0.241	0.05**	0.007	0.03	0.164
Doing paid work %	0.03	-0.01	0.292	-0.01	0.455	-0.01	0.261	0.00	0.705
Owning a microenterprise %	0.20	-0.02	0.434	-0.06**	0.034	0.01	0.733	0.007	0.123
Income									
Agricultural profits (standardised)	0.35	-0.06	0.241	0.00	0.949	-0.12**	0.003	-0.13**	0.040
Marketed surplus %	0.22	0.03	0.325	0.02	0.497	0.03	0.281	0.00	0.905
Social networks									
Any important people living elsewhere? %	0.76	0.08**	0.044	0.02	0.681	0.13***	0.000	0.11**	0.026
Asked for any help over last 12 months? %	0.45	0.01	0.891	-0.06	0.323	0.08	0.157	0.14*	0.062
Provided any help over last 12 months? %	0.53	-0.03	0.497	-0.11*	0.065	0.06	0.241	0.17**	0.013
Mosquito nets									
Household has a mosquito net %	0.81	0.09**	0.009	0.13***	0.000	0.04	0.272	-0.09**	0.017
Anaemia									
Haemoglobin	10.0	-0.47**	0.003	-0.55**	0.002	-0.44**	0.017	0.10	0.571
Mild anaemia %	0.74	0.10**	0.004	0.10**	0.005	0.09**	0.031	-0.01	0.793

Household and individual level variables (household-level averages)

	MV average	CV-MV	P-value	CVN-MV	P-value	CVF-MV	P-value	CVF-CVN	P-value
Malaria (children under 5)									
Malaria incidence %	0.22	0.01	0.764	0.01	0.787	0.01	0.818	0.00	0.961
Nutrition (children 6 to 59 months)									
Height-for-age (Z-score)	-1.29	0.05	0.623	0.08	0.497	0.03	0.841	-0.03	0.828
Weight-for-age (Z-score)	-0.89	0.03	0.745	0.10	0.378	-0.03	0.725	-0.12	0.325
Weight-for-height (Z-score)	-0.29	0.06	0.420	0.13	0.146	0.00	0.964	-0.12	0.126
Family planning and child care									
Using any birth control method %	0.10	0.01	0.698	0.00	0.909	0.02	0.510	0.02	0.368
Visited a health facility for own care or children %	0.35	0.04	0.114	-0.01	0.808	0.12**	0.001	0.13**	0.002
Child health									
Diarrhoea last 2 weeks %	0.18	0.05*	0.055	0.07**	0.011	0.03	0.300	-0.04	0.191
Fever last 2 weeks %	0.27	0.02	0.393	0.04	0.266	0.00	0.963	-0.04	0.283
Standardised test scores									
Raven's matrices	1.91	0.03	0.781	-0.03	0.813	0.09	0.464	0.12	0.354
Forward digit span	1.48	0.01	0.916	-0.09	0.370	0.10	0.235	0.19*	0.056
Backward digit span	0.92	-0.03	0.764	-0.10	0.368	0.04	0.655	0.14	0.149
Easy Maths	2.40	0.05	0.549	0.04	0.715	0.06	0.501	0.03	0.725
Easy English	1.65	0.15*	0.089	0.18*	0.094	0.14	0.191	-0.05	0.665
Advanced Maths	1.90	0.14	0.211	0.09	0.500	0.19	0.147	0.10	0.407
Advanced English	2.08	0.15	0.103	0.14	0.212	0.17	0.151	0.03	0.835
Expected wages (parents)									
Wage primary (Cedis per day)	4.94	1.9***	0.000	1.7**	0.016	2.2***	0.000	0.4	0.629
Survival expectations									
Up to age 80	0.73	-0.03	0.304	-0.04	0.181	-0.1	0.755	0.03	0.299
Time discount rates									
1-month horizon	0.10	-0.02	0.126	-0.03**	0.023	-0.1	0.513	0.02	0.127

ⁱ Millennium Promise (2010), “Harvests of Development in Rural Africa: The Millennium Villages After Three Years.”

ⁱⁱ For example, Michael Clemens and Gabriel Demombynes (November 2010), “When Does Rigorous Impact Evaluation Make a Difference? The Case of the Millennium Villages,” World Bank Policy Research Working Paper 5477.

ⁱⁱⁱ See for instance, DFID (2011), “UK Aid: Changing lives, delivering results.”

^{iv} Ghana Living Standard Surveys (GLSS) 3 and 5, conducted in 1992 and 2006.

^v World Bank staff calculations, based on GLSS5 in 2006.

^{vi} CEPA and ODI (October 2005), “Economic Growth in Northern Ghana,” for DFID.

^{vii} World Bank (March 2010), “Tackling Poverty in the Northern Ghana.”

^{viii} Jeffrey Sachs (2005), “The End of Poverty: Economic Policies For Our Time.”

^{ix} Government of Ghana (2010), SADA Act Number 805.

^x SADA (2010), “SADA Strategy and Work Plan 2010 - 2013: A Sustainable Development Initiative for the Northern Savannah”, Savannah Accelerated Development Authority.

^{xi} www.millenniumvillages.org

^{xii} The first Millennium Village was launched (in Sauri, Kenya) in 2004 and the next (Koraro, Ethiopia) the following year. Both these sites were expanded to current scale and the other sites launched in 2006.

^{xiii} Millennium Promise (2010), “Harvests of Development in Rural Africa: The Millennium Villages After Three Years.”

^{xiv} Michael Clemens and Gabriel Demombynes (November 2010), “When Does Rigorous Impact Evaluation Make a Difference? The Case of the Millennium Villages,” World Bank Policy Research Working Paper 5477.

^{xv} See for instance, DFID (2011), “UK Aid: Changing lives, delivering results.”

^{xvi} DFID (April 2011), “DFID-Ghana Operational Plan 2011 – 2015.”

^{xvii} The debate has been conducted primarily on the blog sites of the Center for Global Development (<http://www.cgdev.org/section/opinions/blogs>), Millennium Promise (<http://blogs.millenniumpromise.org/>) and AidWatch (<http://aidwatchers.com/tag/millennium-villages-project/>).

^{xviii} The Earth Institute, Columbia University, and Millennium Promise (January 2011), “The Savannah Accelerated Development Authority – accelerating and sustaining development in Northern Ghana: Monitoring and Evaluation discussion paper.”

Baseline Report: Quantitative Analysis

EXTERNAL IMPACT EVALUATION OF THE
MILLENNIUM VILLAGES PROJECT,
NORTHERN GHANA

Date: February 2014

Submitted by Itad
In association with:



Results in development



Report

Baseline Report – Quantitative Data Analysis

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The Household Count

A 'Household Count' was performed on all households in the project and control clusters before the Household Survey. Data were collected using android phones and then exported into a database for sampling purposes. The household count module collects the following information: number of households, total population, under five population, and geographic location of households. This information was used to design the sampling frame of the survey. The data also includes an ID for the household, which is a randomised number assigned to mask the original household identifier. The original census data, prior to anonymisation, also contains names of head of households and geographic GPS coordinates of the house where the interview took place.

From this household listing, 750 households were randomly selected proportionally to village population size in the MV areas. Similarly, 750 households were selected in the near CV areas and another 750 in the far CV areas.

People in Northern Ghana often live in households that live in compounds with other related households. The definition of households in the household count is the restricted household, which consists of a nuclear family with its head separately considered from other households in the same compound.

Note that the information captured in the household count data was collected by enumerators in a rapid assessment and is not as accurate as the information collected in the household roster section of the household questionnaire. However, we compared mean household size and number of children as reported in the census count and in the household roster and found small differences. The average number of household members is 7.15 in the census against 6.74 for the same households in the household roster (P-value=0.004). The average number of children is larger in the census (1.29) compared to the roster (1.09) (P-value=0.000). It is reasonable that a more accurate and larger average is found in the household roster compared to the census. The difference is small and there appears to be no difference when data from the MV and CV sites are compared.

The number of listed households was 12,005, of which 3,901 were listed in the project areas and 8,104 in the control areas.

Note that only 712 of the selected 750 households were interviewed in the project areas. After several attempts and repeated visits to interview the originally selected households, the team decided to collect data only on the available 712 households and no replacement strategy was implemented. Similarly, only 1,466 of the originally selected 1,500 households in the control group were found at the time of the interviews. The total sample size of the survey therefore stands at 2,178 households, of which 32.7% resides in the project areas.

This means that 18.2% and 18.1% of all households were interviewed in project and control areas, respectively.

The vast majority of households have less than 10 members (80%). There are however some very large households and despite the restricted household definition adopted, there are 473 households with more than 15 members.

Table 1. Average household size and number of children under 5 in the household count

	Project	Control	Near control	Far control
Household size	6.80	6.71 (0.269)	6.45*** (0.000)	6.98* (0.069)
Children under 5	1.33	1.18*** (0.000)	1.11*** (0.000)	1.25** (0.010)

Timing of Data Collection

The survey questionnaires were conducted at different time of the year. Table 2 and Table 3 were built using the date of the interview reported in the data file for each interview. Note that the data files on education tests conducted by ISSER do not report the date of interview. However, ISSER reports that data collection took place over just two weeks between 14 November and 2 December 2012. Prior to data collection, the household count and detailed household member listings took place in order to establish sampling frames and identify eligible/target beneficiaries for the household, adult, and blood/anthropometric surveys. The timing was as follows: MV HH Count was conducted between January and February 2012, the MV Detailed Household Member Listings/Registers was conducted in March 2012; the household count for the control localities in the Builsa District was conducted in June 2012; the Detailed Household Member Listings/Registers in Builsa District was conducted over June and July 2012; the household count in the control localities of West Mamprusi was conducted over June and July 2012; finally the Detailed Household Member Listings/Registers in West Mamprusi was conducted in July 2012.

Table 2. Surveys in the MV areas

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Community						100%							
Facilities	30%	60%	10%										
Households					66%	25%	5%	4%					
Adults				42%	40%	16%	1%			1%			
Anthropometry					71%	29%							
Blood tests					68%	32%							
Education tests											90%	10%	

Table 3. Surveys in the Control areas

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Community											100%		
Facilities										5%	60%	10%	25%
Households								22%	77%	1%			
Adults								40%	53%	6%			
Anthropometry								25%	69%	6%			
Blood tests								32%	52%	16%			
Education tests											90%	10%	

Note: percentages for the facility and community surveys are approximations.

We observe several gaps in the data collection in the project and control areas. Several of the outcome variables considered by the evaluation are seasonal in the sense that they are affected directly or indirectly by rainfall patterns. In the MV and CV areas, there is only one rainy season occurring between June and September. Patterns of production and consumption, infection, and disease change considerably during the rainy season. It is therefore unfortunate that, particularly for the household and adult surveys, anthropometric tests and blood tests, were conducted before the rainy season in the project areas and then during or after the rainy season in the control areas.

Household Interviews

The evaluation design set the sample size to 750 households in the MV sites and 1,500 households in the CV sites for a total of 2,250 households. Household interviews took place from May to December 2012 after conducting a household census in the selected sites. The survey team led by the Earth Institute (EI) followed a protocol whereby households not found are visited up to three times before being dropped out of the sample but no replacements are made for those households that are not eventually found. This resulted in a reduction of the baseline sample size to 5.1% in the project group and to 2.3% in the control group. Table 4 reports the number of individuals covered by the survey and only considers household members to be individuals who have lived in the household for at least six months over the last year.

Table 4. Planned and actual household interviews

	MV	CV	CV Near	CV Far	ALL
Planned interviews	750	1500	750	750	2250
Actual interviews	712	1466	738	728	2178
Individuals	5,059	10,120	5,006	5,331	15,179

Note that the data provided by the EI do not report information on the households that were not interviewed and the reasons for not interviewing them, despite the fact that some information should have been collected in the cover page or the household questionnaire.

Demographic Characteristics

Table 5. Demographic characteristics

	MV	CV	CV Near	CV Far
Household size	7.1 (0.135)	6.9 (0.103)	6.6** (0.126)	7.2 (0.163)
Number of under-5	1.0	1.0	0.9	1.1
Female-headed household	0.09 (0.011)	0.12 (0.008)	0.11 (0.011)	0.12* (0.012)
Polygamous	0.22 (0.016)	0.21 (0.011)	0.18* (0.014)	0.23 (0.016)

Migration

We found that of all individuals interviewed only 170 (1.1%) of the whole population had moved at anytime in the past year. The reason for moving was marriage in 80% of cases whilst work and school were also mentioned. The average number of individuals moved in the household was statistically significantly larger in MV areas but the differences are very small.

Table 6. Average number of individuals moving in the household

	MV	CV	CV Near	CV Far
Number of in-migrants per household	0.10 (0.53)	0.07** (0.31)	0.07* (0.29)	0.07 (0.32)

Nearly 5% of individuals moved out of the household for some time during the year preceding the interview. In 50% of cases, they moved for working reasons and in 20% of cases to attend school. There is a slightly larger number of migrants from the MV areas. The characteristics and reasons for migrating from the two areas are almost identical.

Table 7. Number and type of out-migrants

	MV	CV	CV Near	CV Far
Number of out-migrants per house	0.46 (0.93)	0.30** (0.83)	0.28** (0.76)	0.32** (0.89)
Percentage female	52.6 (50.0)	55.5 (49.7)	58.1 (49.5)	53.2 (50.0)
Average age	22.3 (12.2)	23.4 (13.4)	23.6 (12.8)	23.2 (14.0)
Percentage migrating for work	51.4 (50.1)	48.8 (50.0)	54.8 (49.9)	43.3 (49.7)
Percentage migrating for schooling	18.5 (38.9)	18.2 (38.7)	19.0 (39.4)	17.6 (38.2)

Education

We look at the following variables: the percentage of the population over five years of age who ever attended school; average number of school years for all population over five years of age; average number of school years for population over five years of age that ever attended school; net attendance in primary school; net attendance in Junior High School (JHS); net attendance in Senior High School (SHS); whether the school provided meals; and the average distance to school in minutes. Net attendance rates are calculated using a denominator for the children in the age range of the official school age for each school level and a denominator for the number

of children within the age range attending that school level. For example, the NAR in primary is the number of children age six to 11 attending primary divided by the number of children age six to 11 in the population. Note that the use of other indicators such as GER or general attendance rate would produce different figures because of the large numbers of late entrants and repeaters.

There are significant differences in attendance rates. These differences are likely to be the results of the data being collected at different times of the year. The school calendar in basic education normally states that school starts in early September. Interviews in control villages were conducted mostly in September whilst they were mostly conducted in May and June in the MVP areas. This implies that for a given age range, children in control areas had more opportunity to start schooling and be in schools.

Table 8. Summary of education indicators

	MV	CV	CV Near	CV Far
% over-5 ever attended school	49.9 (50.0)	53.5*** (49.9)	57.1*** (49.5)	50.1 (50.0)
Average years of schooling	1.9 (3.0)	1.9 (3.2)	1.7** (3.0)	2.2** (3.4)
Average years of schooling (ever attending school pop.)	3.9 (3.4)	4.3*** (3.6)	4.1** (3.5)	4.5*** (3.6)
NAR primary	60.5 (48.9)	68.9*** (46.3)	65.3** (47.6)	72.4*** (44.7)
NAR JHS	9.7 (29.7)	15.4** (36.1)	13.9 (34.3)	17.0** (37.6)
NAR SHS	5.0 (21.9)	6.8 (25.2)	7.4 (26.2)	6.3 (24.3)
Percentage school meals	33.5 (47.1)	19.9*** (40.0)	16.2*** (36.9)	23.4*** (42.1)
Average distance to school (minutes)	33.1 (38.0)	31.8 (35.9)	28.1*** (27.8)	34.9 (41.2)

Time Use

The questionnaire collected information on the time spent on a series of household chores by each household member over the week preceding the interview. We added the time spent by all household members and compared the averages across the groups. Water collection is the only task for which there are no differences across groups. There are large differences in caring for children and the elderly and moderate differences for fetching wood and cooking, and then minor differences in cleaning. Some of these results might be driven by outliers or errors in reporting, but seasonal patterns may also be at play.

Table 9. Total household time spent on task (minutes per day)

	MV	CV	CV Near	CV Far
Fetching wood	170 (214)	211** (265)	197** (263)	225*** (266)
Collecting water	182 (246)	185 (230)	173 (182)	198 (270)
Cleaning	106 (138)	126** (176)	118* (122)	134** (218)
Cooking	191 (201)	235*** (239)	233** (215)	238** (261)
Taking care of children	172 (282)	251*** (425)	254*** (433)	248*** (416)
Taking care of elderly and sick relatives	61 (273)	144*** (559)	199*** (700)	89* (356)

Economic Shocks

Table 10. Households affected by economic shocks

	MV	CV	CV Near	CV Far
Drought %	76.0 (42.7)	83.0** (37.6)	86.4*** (33.8)	79.1 (40.7)
Floods %	57.2 (49.5)	54.7 (49.8)	63.0** (48.3)	46.3*** (49.9)
Severe storm %	63.2 (48.3)	62.3 (48.5)	65.9 (47.5)	58.8* (49.3)
Livestock death %	86.5 (34.2)	73.6*** (44.1)	75.7*** (42.9)	71.4*** (45.2)
Crop failure %	72.5 (44.7)	63.2*** (48.2)	64.6** (47.8)	61.8*** (48.6)

Water, Sanitation, and Energy

We adopted the Millennium Development Goals (MDG) definition of access to safe drinking water as the proportion of the population using an improved drinking water source. Water sources include: piped water into dwelling, plot or yard; public tap/standpipe; borehole/tube well; protected dug well; protected spring; rainwater collection, and bottled water. It does not include unprotected wells, unprotected springs, water provided by carts with small tanks/drums, tanker truck-provided water, and bottled water or surface water taken directly from rivers, ponds, streams, lakes, dams, or irrigation channels.

Table 11. Water access

	MV	CV	CV Near	CV Far
Households with improved water %	73.2 (44.3)	72.2 (44.8)	70.6 (45.6)	73.9 (43.9)
Distance to water source (minutes)	32 (42)	27** (31)	29* (35)	25** (26)
Households treating water %	11.7 (32.1)	15.8** (36.5)	16.0** (36.7)	15.7** (36.4)

We adopt the MDG definition of improved sanitation facility. The proportion of the population using an improved sanitation facility is the percentage of the population with access to facilities that hygienically separate human excreta from human contact. Improved facilities include flush/pour flush toilets or latrines connected to a sewer, septic tank or pit; ventilated improved

pit latrines; pit latrines with a slab or platform of any material which covers the pit entirely, except for the drop hole, and composting toilets/latrines. Unimproved facilities include public or shared facilities of an otherwise acceptable type, flush/pour flush toilets or latrines which discharge directly into an open sewer or ditch, pit latrines without a slab, bucket latrines, hanging toilets or latrines which directly discharge in water bodies or in the open and the practise of open defecation in the bush, field or bodies or water.

Table 12. Sanitation facilities

	MV	CV	CV Near	CV Far
Improved sanitation facility %	10.1 (30.2)	10.4 (30.5)	12.5 (33.1)	8.2 (27.5)

Table 13. Energy use

	MV	CV	CV Near	CV Far
Households using firewood for cooking %	98.5 (12.3)	98.0 (14.2)	98.0 (14.2)	97.9 (14.2)
Households using batteries for lighting %	88.6 (31.8)	84.7** (36.1)	87.4 (33.2)	81.9** (38.6)

Housing Conditions and Assets

We looked at the percentage of houses with finished walls (cement, stone, bricks, or wood planks), finished floors (wood, vinyl, asphalt, ceramic, cement, and carpets), and finished roofs (metal, wood, cement, ceramic, and shingles).

Table 14. Housing conditions

	MV	CV	CV Near	CV Far
Finished walls %	20.2 (40.2)	20.8 (40.6)	25.5** (43.6)	18.1** (36.8)
Finished floors %	42.1 (49.4)	50.1** (50.0)	47.4** (50.0)	52.9*** (50.0)
Finished roofs %	36.7 (48.2)	38.5 (48.7)	45.1** (49.8)	31.9* (46.6)

We considered a limited number of household assets. Several household assets such as computers, cameras, televisions, generators, refrigerators, and vehicles were not considered because very few households own them.

Table 15. Housing conditions

	MV	CV	CV Near	CV Far
Table	61.9 (48.8)	51.8*** (50.0)	48.6*** (50.0)	55.1** (50.0)
Bed	41.1 (49.2)	43.1 (49.5)	43.6 (49.6)	42.6 (49.5)
Kerosene lamp	21.6 (41.2)	20.0 (40.0)	17.9* (38.3)	22.1 (41.5)
Radio	48.6 (50.0)	48.4 (50.0)	45.0 (49.8)	51.9 (50.0)
Mobile phone	58.7 (49.3)	49.0*** (50.0)	52.6** (50.0)	45.3*** (49.8)
Animal cart	16.9 (37.5)	10.6** (30.8)	10.7** (30.9)	10.6** (30.8)
Bicycle	81.3 (39.0)	75.9** (42.8)	75.9** (42.8)	76.0** (42.7)
Motorbike	10.9 (31.3)	10.7 (30.9)	12.7 (33.4)	8.7 (28.1)
Total value of assets (\$PPP)	183 (328)	156* (353)	154* (241)	160 (438)

Savings**Table 16. Household savings**

	MV	CV	CV Near	CV Far
Household has a bank account %	15.6 (36.3)	10.8** (31.0)	11.4** (31.8)	10.2** (30.2)
Household is member of <i>susu</i> %	15.0 (35.8)	8.5*** (27.8)	8.8** (28.4)	8.1*** (27.3)
Average savings (\$PPP)	23 (116)	15* (93)	11** (55)	19 (120)

Credit**Table 17. Loans, credit sources, and use**

	MV	CV	CV Near	CV Far
Any loan over last 12 months %	4.9 (2.2)	3.3* (1.8)	3.8 (1.9)	2.9** (1.7)
Loan size (\$PPP)	200 (198)	258 (421)	135* (93)	388* (574)
Microfinance source	2.9 (1.1)	1.2** (1.7)	1.2** (1.1)	1.2** (1.1)
Informal source	0.8 (1.4)	2.1** (0.9)	1.9* (1.4)	2.3** (1.5)
Agricultural use	1.8 (1.3)	1.4 (1.2)	1.7 (1.3)	1.1 (1.0)
Business use	2.5 (1.6)	1.8 (1.3)	1.9 (1.4)	1.8 (1.3)

Land and Agriculture

Table 18. Land and land use

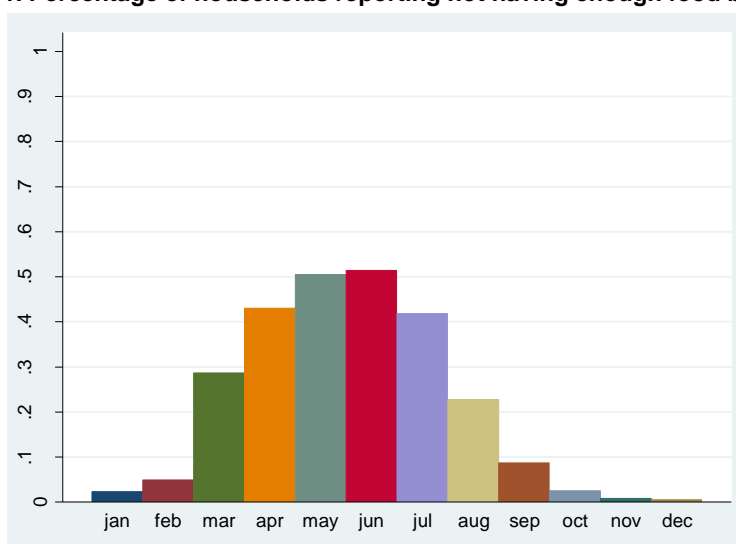
	MV	CV	CV Near	CV Far
Land owned (hectares)	4.8 (6.5)	4.5 (6.0)	4.4 (4.7)	4.7 (7.0)
Cultivated land (hectares)	3.4 (2.7)	3.0** (2.5)	3.2 (2.3)	2.7*** (2.7)
Number of plots	2.9 (1.2)	2.6*** (1.2)	2.5*** (1.2)	2.7** (1.2)

Expenditure Data

Food security

Figure 1 shows the percentage of households reporting not having enough food to meet family needs by month. The period from April to July is the ‘hungry’ period. The bias introduced by interviewing households at different time of the year is obvious in this figure.

Figure 1. Percentage of households reporting not having enough food by month



Despite the pattern above, quite remarkably there are no large differences in the answers to food security questions even though the surveys were conducted in the hungry and the harvest periods, respectively, in the project and control areas. This is particularly remarkable in the case of the following question: How many days in the last 30 days did you not have enough food to meet your family’s needs? This obtained very similar responses in the project and control areas despite being asked in the ‘hungry’ and in the ‘harvest’ seasons, respectively (also contrasts with the results of Figure 1 – MV survey was in May-June and CV survey was in August-September).

Table 19. Food security

	MV	CV	CV Near	CV Far
Not enough food in any month over last year %	82.2 (38.3)	84.6 (36.1)	80.4 (39.8)	88.9** (31.5)
Days with not enough food over last 30 days	12.2 (10.4)	13.1 (10.5)	12.8 (10.2)	13.3* (10.8)
Any day a child went hungry the whole day %	16.4 (37.1)	14.8 (35.5)	12.2** (32.7)	17.4 (38.0)
Ever reduced meal size %	74.4 (43.7)	75.9 (42.8)	68.6** (46.5)	83.4*** (37.4)

Benford's Law and expenditure

We compared the patterns of first digits of quantities of purchased and own-consumed food items to a theoretical Benford distribution. First digits tend to follow the distribution quite closely when quantities of consumed or produced food items are considered. The difference between the observed distribution and the theoretical Benford distribution is tested using a chi-square test and a Kuiper's test. Additionally, a number of measures of the distance of the empirical distribution to the Benford distribution are presented.

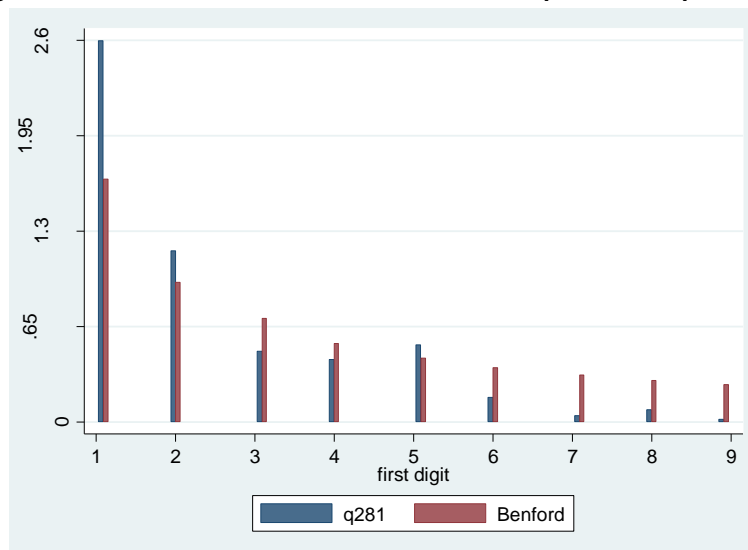
Figure 2. Observed and Benford distributions compared: food purchases

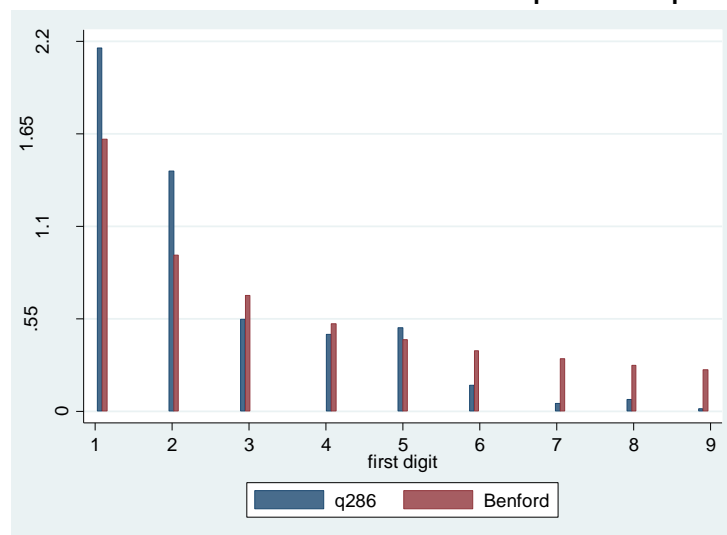
Figure 3. Observed and Benford distributions compared: food purchases

Table 20 compares the tests of equality of the two distributions of the MV data with data collected by the ISSER survey in 2009 and by the GSS in 2005. Only observations from rural households from the Northern, Upper East, and Upper West regions were considered in order to make them more comparable with the MV datasets. Similar to the MV datasets, the expenditure modules of ISSER and GSS also employ a variety of local units of measurement for the items purchased. The recall periods used however are very different. The GSS employed diaries with repeated visits and a recall of 15 days. We only used data from the first visit. The GSS did not collect food quantities purchased but only their value. The ISSER questionnaire employed a 30-day recall. The MV questionnaire employed a recall consisting of the quantity purchased and consumed in a typical month for the months it was purchased or consumed.

Table 20. Quality analysis of expenditure data based on Benford's Law of three different datasets

	Obs	M distance	D* distance	Chi-square	Kuiper's test
<i>Purchases</i>					
GSS 2005	-			-	-
ISSER 2009	12,585	0.093	0.124	2,110.2***	16.9***
EI 2012	29,298	0.201	0.171	7,414.0***	36.1***
MV areas	9,282	0.170	0.183	2,272.8***	19.3***
CV areas	6,108	0.172	0.187	5,181.2***	30.5***
<i>Own consumption</i>					
GSS 2005	4,769	0.104	0.146	1,095.0***	11.3***
ISSER 2009	3,679	0.044	0.092	455.7***	7.6***
EI 2012	19,107	0.101	0.151	4,222.0***	26.9***
MV areas	6,108	0.117	0.156	1,516.8***	14.9***
CV areas	12,999	0.115	0.153	2,794.2***	22.3***

In all cases, the Benford and observed distributions are very different at 1% statistical significance. Values of statistical tests increase with sample sizes and therefore cannot be used to compare the quality of the different datasets against the Benford's benchmark. For comparison purposes, we use the maximum distance (m) and the Euclidean distance (D*). Based on these two measures, the MV data appear to be less accurate than the ISSER data but of

comparable quality to the GSS data. More importantly, we calculate the different measures separately for the MV and CV sites of the EI survey because the surveys were conducted at different times of the year and by slightly different teams of enumerators. We find no differences in the quality of MV and CV data based on these measurements.

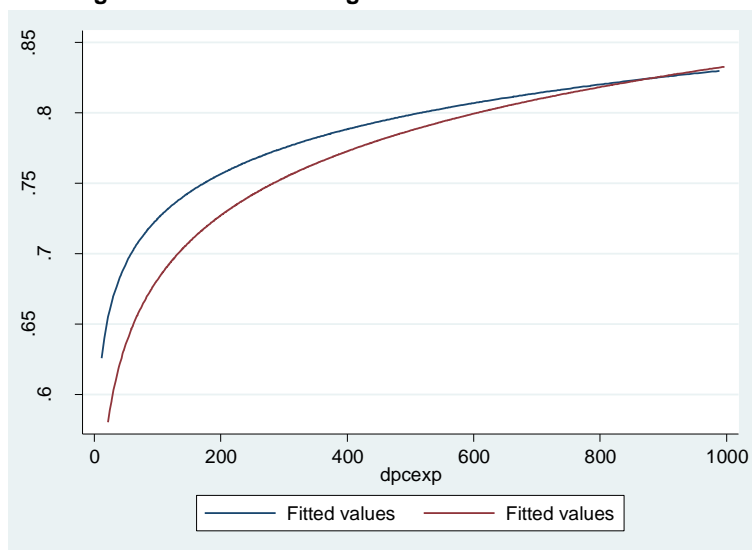
Table 21. Poverty indicators

	Poverty headcount	Poverty gap	Squared poverty gap	Gini coefficient
EI survey	56.6	26.2	15.6	0.46
MV villages	59.7	28.8	17.6	0.48
CV villages	55.1	25.0	14.7	0.44
CV Near	53.4	24.5	14.4	0.45
CV Far	56.8	25.4	15.0	0.43

Table 22. Expenditure variables

	MV	CV	CV Near	CV Far
Per capita expenditure (\$PPP)	549 (653)	564 (529)	585 (558)	542 (497)
Food share	0.78 (0.17)	0.77 (0.17)	0.77 (0.17)	0.77 (0.18)
Share of own produced food	0.65 (0.27)	0.66 (0.25)	0.65 (0.26)	0.68 (0.23)

Figure 4. Food share Engel curves in MV and CV areas



F-test 5.43**

Income data

Employment Rates

Table 23. Main occupation of household members

	MV	CV	CV Near	CV Far
Employment rate % (age 15 to 59)	77.5 (41.8)	78.1 (41.3)	79.1 (40.7)	77.2 (41.9)
Child employment % rate (age 6 to 14)	24.2 (42.8)	20.0** (40.0)	22.0 (41.4)	18.0*** (38.4)
Farmers %	91.0 (28.6)	95.2*** (21.3)	93.8** (24.1)	96.6*** (18.2)
% doing paid work	2.8 (16.6)	2.1** (14.4)	2.3* (14.8)	2.0** (13.9)

Micro enterprises

Table 24 reports the percentage of household running a microenterprise and the three main enterprise types.

Table 24. Household enterprises

	MV	CV	CV Near	CV Far
% of households with a microenterprise	20.4 (40.3)	18.2 (38.6)	14.6** (35.4)	21.8 (41.3)
Of which trading %	46.6 (50.0)	40.2 (49.1)	36.9* (48.4)	42.0 (49.5)
Of which retailing and services %	19.3 (39.8)	17.1 (37.7)	20.8 (40.7)	15.0 (35.8)
Of which agricultural processing %	20.5 (40.5)	22.5 (41.8)	26.9 (44.5)	19.9 (40.0)

Note: agricultural processing refers to agroprocessing codes in the household questionnaire including the processing of cassava, oils, and other grains.

Figure 5. Observed and Benford distributions compared: food purchases

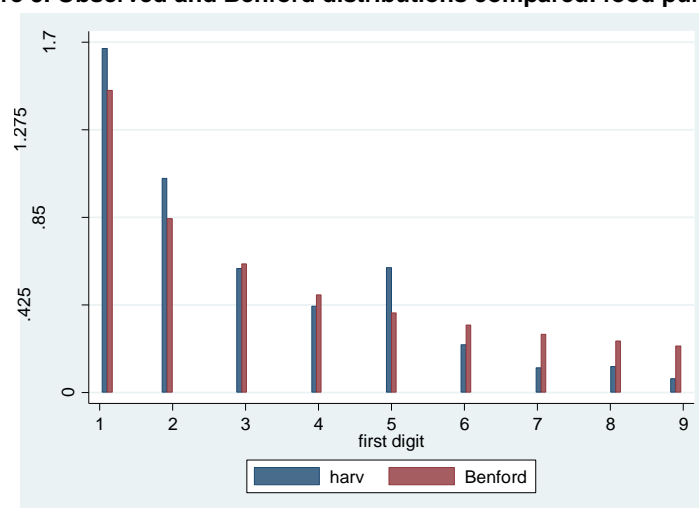


Table 25. Quality analysis of expenditure data based on Benford's Law of three different datasets

	Obs	M distance	D* distance	Chi-square	Kuiper's test
<i>Harvested q</i>					
GSS 2005	8,254	0.028	0.041	257.2***	4.2***
ISSER 2009	3,327	0.033	0.070	223.5***	5.6***
EI 2012	7,528	0.045	0.086	761.6***	9.7***
MV areas	2,651	0.048	0.084	280.7***	5.9***
CV areas	4,877	0.057	0.092	509.9***	7.7***

Table 26. Income

	MV	CV	CV Near	CV Far
Per capita income (\$PPP)	157 (466)	151 (742)	131 (431)	171 (959)
Farming share	61.3 (33.9)	66.0** (32.9)	68.8** (31.2)	63.5 (34.2)
Livestock share	26.3 (30.4)	21.2*** (26.5)	21.1** (26.6)	21.4** (26.5)
Labour share	4.9 (17.5)	4.3 (16.6)	3.8 (14.8)	4.9 (18.3)
Business share	6.3 (18.9)	6.4 (18.5)	4.5** (15.2)	8.4* (21.2)
Transfers share	0.8 (6.5)	0.6 (3.8)	0.4* (2.9)	0.9 (4.6)

Note: negative shares and shares above 1 were dropped before calculating averages.

Table 27. Agricultural income and input use

	MV	CV	CV Near	CV Far
Agricultural profits (\$PPP)	600 (1827)	501 (1617)	608 (2203)	392 (569)
Marketed surplus %	21.9 (23.4)	24.6** (27.0)	24.2* (28.5)	24.9** (25.5)
Seeds inputs (\$PPP)	13.4 (45.2)	14.1 (68.6)	13.5 (90.9)	14.7 (33.3)
Chemical fertiliser (\$PPP)	28.8 (77.5)	34.7* (72.0)	29.6 (69.7)	39.8** (74.0)
Herbicides and pesticides (\$PPP)	24.8 (39.0)	15.7*** (28.4)	17.7** (31.9)	13.7*** (24.3)
Labour inputs (\$PPP)	25.8 (71.1)	9.6*** (22.1)	10.1*** (25.5)	9.1*** (18.3)

Social Networks

In 50% of cases when help is sought or provided, it consists of advice in general or in relation to farming. In 30% of cases, it consists of giving or receiving gifts. In only a few cases it consists of borrowing or other economic related reasons.

Table 28. Social networks

	MV	CV	CV Near	CV Far
Any important people living elsewhere? %	76.0 (37.1)	83.5*** (42.7)	78.0 (41.4)	89.0*** (31.3)
Of which distant relatives %	55.2 (49.7)	64.6*** (47.8)	68.1*** (46.6)	60.9** (48.8)
Of which friends %	21.2 (40.8)	20.6 (40.5)	14.9** (35.6)	26.5** (44.2)
Asked for any help over last 12 months? %	45.0 (49.0)	45.7 (49.8)	38.7** (48.7)	53.0** (50.0)
Provided any help over last 12 months? %	53.0 (50.0)	50.4 (50.0)	41.8*** (49.3)	59.3** (49.1)

Trends Analysis**Table 29. Trends in employment income (\$PPP)**

	MV	CV	CV Near	CV Far
Employment income at baseline	218 (1916)	226 (1791)	136 (1548)	317 (2004)
Employment income at baseline -1	164 (1032)	132 (1476)	59* (471)	205 (1382)
Employment income at baseline -2	140 (1541)	95 (864)	40* (393)	151 (1158)

Table 30. Trends in enterprises income (\$PPP)

	MV	CV	CV Near	CV Far
Enterprise income at baseline	750 (2445)	1001 (1459)	591 (1284)	1279* (2984)
Enterprise income at baseline -1	266 (318)	284 (377)	248 (398)	308 (365)
Enterprise income at baseline -2	192 (219)	262 (392)	212 (412)	296* (370)

Data on agricultural production could not be used because they are not sufficiently clean. There are a lot of incongruent values among prices and quantities.

Note that cows include local and improved cows. Similarly, goats include local and improved goats, whilst chicken includes chicken and guinea fowls. Note also that these are the most common animals and that the trend data were not collected for all animals as in the case of the baseline.

Table 31. Trends animal holdings and value

	MV	CV	CV Near	CV Far
Cows at baseline	3.2 (7.3)	2.6* (5.9)	2.7 (5.8)	2.5* (6.0)
Cows at baseline -1	3.8 (11.5)	2.7** (6.8)	2.6** (6.2)	2.9 (7.4)
Cows at baseline -2	3.2 (12.5)	2.3 (10.7)	2.0** (6.2)	2.7 (14.0)
Goats at baseline	4.4 (4.9)	4.3 (4.8)	4.6 (4.6)	4.0 (4.9)
Goats at baseline -1	5.7 (7.7)	4.7** (6.9)	4.9* (7.3)	4.3** (6.4)
Goats at baseline -2	4.5 (6.6)	3.5** (7.1)	3.3** (6.9)	3.7* (7.4)
Chickens at baseline	12.2 (12.2)	12.5 (14.7)	12.2 (13.9)	12.9 (15.4)
Chickens at baseline -1	15.4 (22.6)	14.6 (20.8)	13.0** (18.0)	16.2 (23.3)
Chickens at baseline -2	12.6 (26.6)	9.7** (18.8)	8.0** (15.2)	11.5 (21.8)
Value at baseline (\$PPP)	1,209 (3501)	1,136 (2673)	1,226 (2862)	1,041 (2458)
Value at baseline -1 (\$PPP)	1,028 (2284)	1,005 (2548)	1,068 (2583)	938 (2511)
Value at baseline -2 (\$PPP)	744 (2130)	683 (2447)	706 (2542)	660 (2345)

Malaria and Anaemia

Mosquito nets

The table below reports the share of households having at least one mosquito net, the average number of mosquito nets among those households having a mosquito net, and the fraction of sample households whose walls were sprayed using insecticide.

Table 32. Mosquito nets

	MV	CV	CV Near	CV Far
Household has a mosquito net %	81.3 (39.0)	90.2 (29.7)	94.7 (27.4)	85.7 (35.0)
Average number of mosquito nets	2.9 (1.5)	2.8 (1.4)	2.8 (1.4)	2.8 (1.4)
Someone sprayed the walls %	41.1 (49.2)	50.1 (50.0)	49.3 (50.0)	50.8 (50.0)

Anaemia

Blood samples were taken from 381 children in MV areas and 409 children in CV areas representing 53% and 28% of children in MV and CV areas, respectively. Following DHS standards, mild anaemia is calculated as the ratio of children with haemoglobin below 11 g/dL, moderate anaemia is haemoglobin below 10 g/dL, and severe anaemia is haemoglobin below 7 g/dL.

Table 33. Prevalence of anaemia among children under 5

	MV	CV	CV Near	CV Far
Haemoglobin	10.0 (1.51)	9.5*** (1.41)	9.4*** (1.52)	9.5*** (1.30)
Mild anaemia	74.0 (0.44)	84.3*** (0.36)	84.8** (0.36)	83.7** (0.37)
Moderate anaemia	45.7 (0.50)	61.9*** (0.49)	63.1*** (0.48)	60.6*** (0.49)
Severe anaemia	3.9 (0.19)	5.2 (0.22)	6.9* (0.25)	3.4 (0.18)
Observations	385	420	217	203

^a Haemoglobin is a protein in blood cells carrying oxygen and is measured in grams per decilitre (g/dL).

^b Prevalence rates. The DHS classifies anaemia as mild (<11 g/dL), moderate (<10 g/dL), and severe (<7 g/dL).

Table 34. Haemoglobin by age

	MV	CV
Age 0	9.8 (1.45)	9.7 (1.20)
Age 1	9.3 (1.55)	9.3 (1.38)
Age 2	10.0 (1.42)	9.2*** (1.43)
Age 3	10.3 (1.41)	9.5*** (1.47)
Age 4	10.4 (1.54)	9.6** (1.39)

Malaria

Blood samples were taken from 805 children under the age of five (385 from the MV villages and 420 from the control villages). Thick and thin smear tests were performed to assess for the presence or absence of infection, parasite species, and parasite density.

The protocols for the tests are as follows:

1. Each subject's blood sample is drawn by finger or heel prick with a lancet. Blood is transferred directly to one Hemocue microcuvette for haemoglobin quantification and to two microscopy slides. Two slides per subject are prepared, one thick and one thin. The slides are stained using Giemsa.
2. Each thick smear slide is examined by two independent readers at 100x magnification, looking for the asexual blood stage form of the malaria parasite. The presence of any parasites makes the slide positive. A minimum of 100 microscopy fields needs to be counted on the thick smear before classifying a slide as negative. If there is discordance between the two readings (one is negative and one is positive), a third independent reader examines the smear. These readings are recorded as the variables positive_1, negative_1, positive_2, negative_2, positive_3, negative_3.
3. If a thick slide is positive, the corresponding thin slide is examined for species identification and parasite count. Thus, all thin slides that are examined are already known to be positive.
4. If a smear is positive, the lab technician will count the number of parasites per number of white blood cells or leukocytes. This is done to measure the density of parasites in a standard volume of blood, and can often be correlated with the presence and severity of

malaria symptoms. Low-density parasitemia is frequently asymptomatic in areas of intense malaria transmission. This parasite count is done following the steps below:

- a. The number of parasites is counted on one tally counter and the number of white blood cells on the other, field by field.
- b. If after counting 200 white blood cells less than 10 parasites have been found, counting should continue up to 500 white blood cells.
- c. The number of parasites is registered in the 'leukocytescount200' or 'leukocytescount500' variables, depending on the number of white cells counted.
- d. Once counting is completed, the number of parasites relative to the number of white blood cells is calculated and expressed as 'parasites per microlitre of blood' using the following formula:

$$\frac{\text{Number of parasite counted} \times 8000}{\text{Number of white blood cells}} = \text{parasites per microlitre}$$

5. The positive thin slide is also examined to determine which species of malaria parasites are found in the blood sample (*Plasmodium falciparum*, *Plasmodium vivax*, *Plasmodium ovale*, *Plasmodium malariae*). A sample can have more than one type of malaria species (mixed infection). *P. vivax* is extremely rare in West Africa. The parasite species is recorded as a binary variable (pfalciparum, pmalariae, povale, pvivax).
6. In addition to the blood stage asexual forms of the parasite, or trophozoites, sometimes the sexual forms or gametocytes can be seen in thin blood smears. If they are identified, a slide is classified as positive for gametocytes, and the examiner proceeds to count the number of gametocytes against the number of white blood cells, and the density expressed as a ratio in the same way as it is done with the asexual forms of the parasite. Gametocyte density is an indication of the degree of infectiveness of a subject for the Anopheles mosquito, and consequently to other humans. The results are recorded in the variables (gametocytes_plus_ve, gametocytes_minus_ve, gametocytescount).

Table 35 reports malaria incidence and the severity of malaria for affected children as measured by the standardised difference (standardised by the standard deviation) in the count of parasites per blood microlitre. A child is classified as affected by malaria if the first and second tests are positive or if the third test is positive (malaria incidence). We calculated the severity of malaria using the formula above to calculate the number of parasites per microlitre in those cases where the test is positive. We then standardised the parasite count by the standard deviation in the sample in order to calculate the difference in standard deviations between the MV and CV areas.

Table 35. Incidence and severity of malaria among children under 5

	MV	CV	CV Near	CV Far
Malaria incidence	0.223 (0.417)	0.249 (0.433)	251 (0.435)	.246 (0.432)
Observations	381	410	215	195
Severity of malaria among the infected	0.231 (0.713)	0.508* (0.178)	0.428 (0.827)	0.600* (0.827)
Observations	85	101	54	47

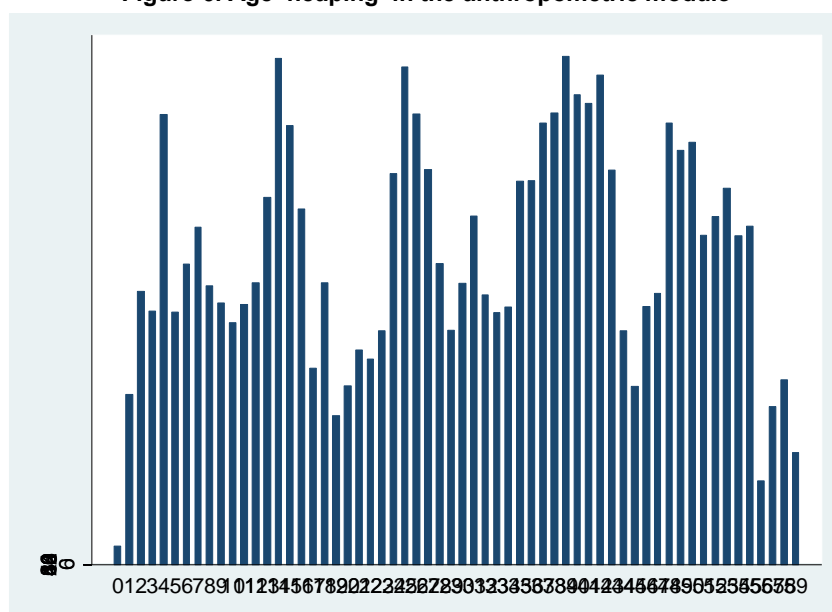
Malaria incidence is slightly large in the control group, which could be the result of a seasonal bias. The difference however is small and not statistically significant, which could be the result of a small sample size. There is a small difference in the severity of malaria (measured by parasites per microlitre of blood), which is 0.3 standard deviations larger in the control group with respect to the project group.

Anthropometrics

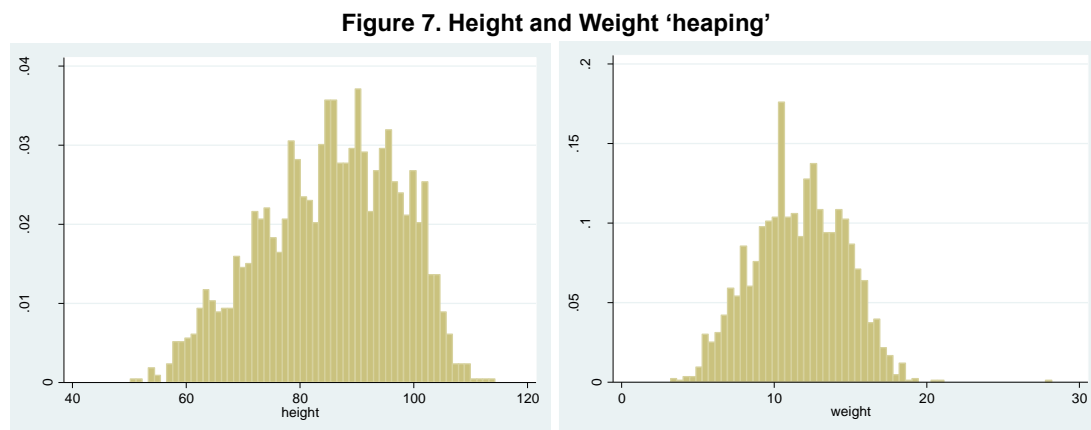
Data quality

The survey measured more than 2,000 children from project and control villages corresponding to about 8% of eligible children in MV areas and 90% of eligible children in CV areas.

We follow the recommendations of the World Health Organisation (WHO) for data quality analysis of anthropometric data. First, the data show considerable age heaping. This is rather surprising because age is calculated from the date of birth. One possibility is that respondents do not know dates of birth. They provide an age for the child and work backward, possibly with the help of the enumerator, to provide the month and year of birth. Figure 6 shows the strong preference for reporting ages such as 3, 12, and 24. Because Z-scores are calculated in reference to a population of a given age, the misreporting of age results in a miscalculation of the Z-scores.

Figure 6. Age 'heaping' in the anthropometric module

Another source of error is height and weight heaping, which is the result of reporting measurements with values ending in .0 or .5. Measurements were taken twice for the same child and the average of the two measurements is reported. Despite the double measurement, the histograms of Figure 7 shows there was considerable heaping in reporting height and weight.



One indicator of quality is the proportion of observations with Z-scores above six or below six, where a fraction of 1% is seen as an indicator of poor quality. Height-for-age and weight-for-age are slightly above this benchmark. There are no significant differences between the project and the control groups.

Another indicator of quality is the percentage of observations above admissible ranges set by the WHO (-5/3 for HAZ; -5/5 for WAZ; and -4/5 for WHAZ). This percentage does not appear to be particularly large with the exception of HAZ. In the case of HAZ the proportion is larger in the CV areas.

Table 36. Proportions of observations with inadmissible values

	MV	CV	CV Near	CV Far
HAZ	0.014	0.013	0.008	0.018
Proportion <-6 and >6	(0.121)	(0.115)	(0.089)	(0.133)
HAZ proportion outside WHO values	0.039	0.070**	0.071**	0.069**
WAZ	0.005	0.008	0.005	0.011
Proportion <-6 and >6	(0.070)	(0.090)	(0.069)	(0.105)
WAZ proportion outside WHO values	0.008	0.013	0.008	0.018
WHZ	0.015	0.011	0.005*	0.017
Proportion <-6 and >6	(0.121)	(0.105)	(0.069)	(0.128)
WHZ proportion outside WHO values	0.021	0.021	0.010*	0.032
Observations	608	1,353	630	723

A final indicator of data quality is the standard deviation of the Z-scores against standard observed values (1.10-1.30 for HAZ; 1.00-1.20 for WAZ; and 0.85-1.10 for WHZ). All standard deviations are larger than the benchmarks though not by large amounts and are always larger in the CV areas.

Average Z-scores are always larger in the CV area, a factor that could be explained by seasonality. The difference is statistically significant only in the case of weight-for-age. Strangely, the percentage of severely malnourished children is larger in the control areas but no significant difference exists in prevalence rate of moderate undernutrition.

Table 37. Z-scores across MV and CV areas

	MV	CV	CV Near	CV Far
Height-for-age Z-score	-1.22	-1.29	-1.17	-1.27
	(1.64)	(1.39)	(1.67)	(1.61)
Moderate malnutrition	0.27	0.28	0.28	0.27
<-2	(0.44)	(0.45)	(0.45)	(0.44)
Severe malnutrition <-3	0.07	0.13***	0.13**	0.13***
	(0.26)	(0.34)	(0.33)	(0.34)
Weight-for-age Z-score	-0.89	-0.85	-0.76*	-0.92
	(1.26)	(1.36)	(1.36)	(1.36)
Moderate malnutrition	0.14	0.16	0.16	0.17
<-2	(0.35)	(0.37)	(0.37)	(0.37)
Severe malnutrition <-3	0.03	0.05**	0.05	0.06*
	(0.23)	(0.17)	(0.21)	(0.24)
Weight-for-height Z-score	-0.29	-0.23	-0.16*	-0.29
	(1.11)	(1.19)	(1.23)	(1.15)
Moderate malnutrition	0.04	0.05	0.05	0.06
<-2	(0.21)	(0.23)	(0.21)	(0.24)
Severe malnutrition <-3	0.00	0.01*	0.01**	0.01
	(0.04)	(0.09)	(0.10)	(0.08)

ISSER Data

Background

At the initial stages of the design of the MV evaluation, the independent evaluation team observed that the EI questionnaires did not contain any education outcomes beyond attendance and completion. It was suggested that test scores on basic reading and arithmetic skills should be obtained in addition to cognitive tests. This suggestion was supported by the PRG who also recommended conducting field experiments to collect data on time preferences and risk attitudes. Itad sub-contracted the Institute of Statistical, Social and Economic Research (ISSER) for this task. Collaboration with ISSER was sought because several of the survey instruments had been previously designed, tested, and administered by ISSER/Yale for their panel study.

Some of the instruments however were developed jointly by ISSER and the evaluation team, namely a questionnaire on income expectations, time preferences, reading, and maths tests for children who ever attended JHS. The final instruments comprised of the following modules:

- Adult wage expectations (from ISSER)
- Adult survival expectations (from ISSER)
- Farmers income expectations (new)
- Farmers time preferences (new)
- Children wage expectations (from ISSER)
- Children cognitive tests:
 - Digit Span exercises (forward and backward) (from ISSER)
 - Raven's matrices (from ISSER)

- Children test scores:
 - Easy Maths (from ISSER)
 - Easy English (from ISSER)
 - Advanced Maths (new)
 - Advanced English (new)

Field operations

Survey fieldwork took place in November 2012. A total of 40 enumerators were recruited and trained from a pool of experienced field enumerators. Efforts were made to recruit enumerators speaking the local languages but in some cases enumerators had to rely on interpreters and the help of EI staff in order to localise households and conduct the interviews. Training took place from 7-12 November and involved presentations, role plays, and mock interviews. A pre-test was conducted as part of the training and the challenges faced were helpful in clarifying the final field protocol for the study. Enumerators were taken through the ethical requirements of the survey and signed all the necessary confidentiality forms in accordance with IRB requirements.

The enumerators were divided into eight groups of four enumerators and one supervisor. Four teams were assigned to each district and the total workload was allocated almost equally to the teams. Each team was provided with the household listing of all assigned households as well as maps to aid with locating the communities. In addition, enumerators were given toffees and pens as token gifts for the children after interviews. The fieldwork took a total of 18 days for all teams from 14 November to 2 December 2012. Additional days were allocated for mop up for teams that did not complete the interviews within the allocated days.

Dr Paul Issahaku was hired as a survey monitoring consultant and made a number of interesting qualitative observations about the survey work:

- Communities were cooperative with enumerators, there was a warm reception by the chiefs and elders, and respondents eagerly participated in the surveys, with a number of isolated individuals very willing to assist enumerators identify households for the interviews and mothers wanting their children to be tested.
- The timing of the survey was not particularly good because it occurred during the heat of electioneering campaigns when politicians were in the villages competing with enumerators for people's time and attention. In some villages, despite several explanations about the survey, some people took enumerators for politicians' foot soldiers and wanted to find out whether they belonged to Party A or Party B.
- The education test seemed difficult for a sizable proportion of children. A good number of children had delayed entry to school and felt blocked during the interviews.
- Some household heads stopped farming and, as a result, they claimed not to be able to respond to the crop production and sale module of the income expectation questionnaire.
- A good number of individuals found it near impossible to guess daily wages for rural and urban workers with different educational qualifications. They seemed out of touch with the concept of wage labour and its rural-urban disparities as they never travelled outside their communities and never engaged in wage work.
- In some cases, it was difficult to determine or confirm the ages of some individuals.

- Due to illiteracy, some individuals had little grasp of the concept of probability or proportionality used in the expectations questions. Other respondents felt that they were only subsistence farmers but not large-scale commercial farmers and that expectations and time preference questions do not apply to them because they do not produce to sell. They also expressed the belief that their yield is determined by natural factors over which they have little control. So, although they attempted to answer the questions, some did not see the need to guess the yield whether in a good or bad year.
- In a pilot exercise, we tested instruments to measure risk attitudes by employing hypothetical gambles. We eventually decided not to collect data on risk attitudes because most respondents were strongly opposed to the idea of, even hypothetically, gambling.

The household roster

The EI provided information on geographical identification of 2,206 households with name, age, and sex of all household members resulting from the listing exercise in both project and control areas. Out of the 2,206 households targeted, 2,146 were successfully interviewed, representing a response rate of 97.3%. Reasons why the 60 households were not interviewed include permanent relocation, death of the household head leading to dissolution of the household, temporal absence of the household, and reintegration of split households. The distribution of the household response rates by the status of village is shown in Table 38. The distribution shows no systematic differentials in the response rates.

Table 38. Completion rates of ISSER survey

Status of village	Survey completed	Survey not completed	Total
Treatment (West Mamprusi)	98.6	1.4	100.0
Control (West Mamprusi)	96.3	3.7	100.0
Treatment (Builsa)	97.2	2.8	100.0
Control (Builsa)	97.7	2.3	100.0
Total	97.3	2.7	100.0

Also note that ISSER interviewed 29 households in the control areas that were not interviewed by the EI survey. As a result, there is full information (ISSER survey and EI survey) for 2,120 of the originally selected 2,256 households and for a total of 14,899 individuals.

Education and cognitive tests

Cognitive tests consisted of:

- A short set of 12 Raven's coloured progressive matrices of varying, but not increasing, difficulty.
- A digit span test (forward and backward) consisting of the following:
 - The enumerator reads each digit span only once at an even rate of one digit per second
 - The child repeats the sequence of numbers exactly

- There are eight sets of two digits of increasing difficulty and children can score a maximum of 16
- After scoring in steps of two the test stops if the child misses both digits
- In the backward test the child has to repeat the series in reverse and there are only seven sets of two for a maximum score of 14

The education tests consisted of:

- An easy maths test based on eight arithmetic questions of increasing difficulty that included simple additions, subtractions, divisions, and multiplications. The questions are multiple answers and the student circles the right answer among four different options.
- An easy English test consisting of eight multiple answer questions related to a three-line story the child reads before taking the test.
- An advanced maths test consisting of 25 multiple answer questions of increasing difficulty. The test was designed based on the JHS teaching syllabus for mathematics of the Ghanaian Ministry of Education. The test was largely based on the syllabus for the first grade of JHS. Topics include: numbers and numerals, fractions, sets, shapes, perimeters and areas, powers, algebraic expressions, measures of time, money and capacity, percentages, averages, and probability. The test is designed in such a way that a student who completed JHS1 should be able to answer most, if not all, the questions in the test.
- An advanced English test consisting of 20 questions. The test was designed based on the Junior High School teaching syllabus for English language of the Ghanaian Ministry of Education. The test was largely based on the syllabus for the first grade of JHS and student having completed JHS1 should be able to pass the test comfortably. Questions cover English grammar, understanding of a story on mosquitoes and malaria, and the ability to complete sentences.

Not all household individuals took the tests. The eligibility criteria by age and schooling level of the various tests are in Table 39.

Table 39. Eligibility conditions for education tests

Module	Eligibility
Raven's Matrices	All children aged 5-19 years
Digit Span (Backward and Forward)	All children aged 5-19 years
Easy Maths and Easy English test	All children aged 9-19 years who ever attended primary school
Advance Maths and Advance English test	All children aged 12-19 years who ever attended Junior High School

Based on the EI census list of 2,206 households, there were 6,128 eligible children aged 5 to 19. However, it was agreed that in cases where there were more than five eligible children in the household, the interview was to be restricted to the five youngest children in order of availability. This reduced the number of eligible children to 4,815. Further adjustments following a number of households that could not be interviewed and revisions of ages reported by the EI led to a final sample of 4,821 eligible children.

Not all children were interviewed for a number of reasons, which were categorised as the following: travelling or not available, test attempted but interrupted because too difficult, child refused, child was ill, and other reasons. Valid tests and reasons for not taking the test are reported in Table 40. Means calculated from the valid tests are likely to be biased because of the censoring occurring as many children (up to 20% of the eligible) did not complete the test or refused to take it. Both cases are likely to represent zero or near zero scores. One option is considering these values as zeros in calculating the overall means. Another option is modelling self-selection into the test based on covariates and then adjusting the means by the inverse Mill's ratio.

Table 40. Response rates by test (percentages over the sample in brackets)

	Eligible children	Valid tests	Not available	Interrupted	Refused	Ill	Other
Raven's	4821	3502 (72.6)	837 (17.4)	112 (2.3)	254 (5.3)	54 (1.1)	62 (1.3)
Digit span forward	4821	3390 (70.3)	837 (17.4)	97 (2.0)	362 (7.5)	54 (1.1)	81 (1.7)
Digit span backward	4821	3387 (70.3)	837 (17.4)	118 (2.5)	377 (7.8)	54 (1.1)	48 (1.0)
Easy Maths	2768	1762 (63.7)	647 (23.4)	158 (5.7)	136 (4.9)	29 (1.1)	36 (1.3)
Easy English	2768	1343 (48.5)	647 (23.4)	432 (15.6)	183 (6.6)	29 (1.1)	134 (4.8)
Advanced Maths	880	411 (46.7)	399 (45.3)	21 (1.4)	6 (0.7)	16 (1.8)	27 (3.1)
Advanced English	880	421 (47.8)	399 (45.3)	11 (1.3)	18 (1.8)	18 (1.8)	27 (3.1)

The distributions of the three cognitive tests are very different and show increasing difficulty. The Raven's scores are normally distributed and a small fraction of children are able to complete more than 50% of the test successfully. Some 15% of children are scoring zero on the forward digit span – the distribution is otherwise normal. Again, few children are able to complete more than 50% of the test. The backward digit span is heavily skewed to the left with more than 40% of children scoring zero and virtually no children able to complete more than 50% of the test.

Figure 8. Distribution of cognitive tests scores

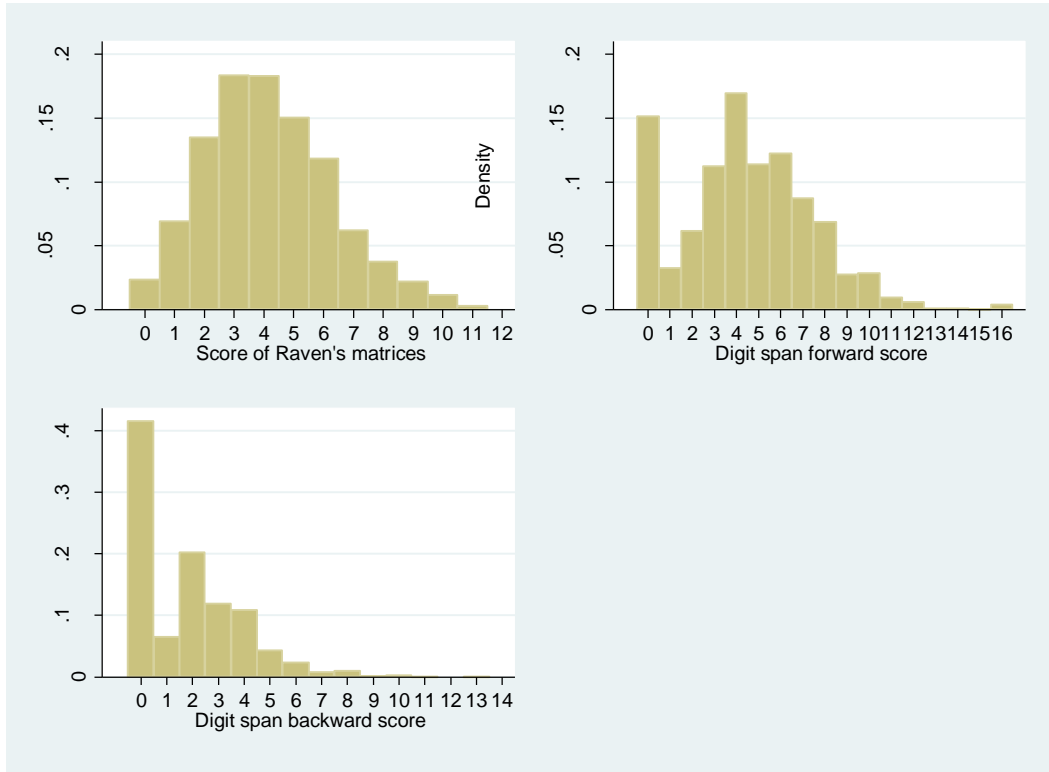
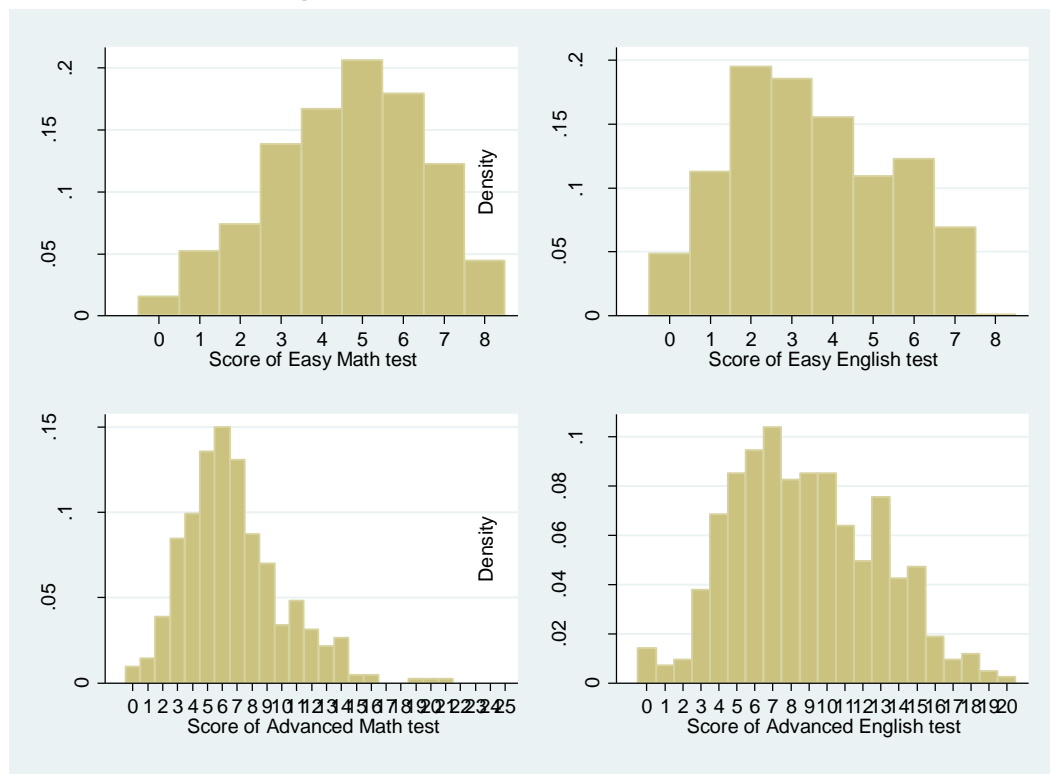


Table 41. Cognitive test scores

	MV	CV	CV Near	CV Far
Raven's matrices (min 0 – max 12)	4.1 (2.1)	4.2 (2.2)	4.0 (2.2)	4.3** (2.2)
Observations	1177	2319	1124	1195
Forward digits span (min 0 – max 16)	4.4 (3.0)	4.5 (3.0)	4.2** (3.0)	4.7** (3.0)
Observations	1083	2278	1074	1083
Backward digits span (min 0 – max 14)	1.8 (1.8)	1.8 (2.0)	1.6** (2.0)	1.9 (2.0)
Observations	1102	2259	1088	1171

The distributions of test scores are well shaped. The simple maths and English tests are clearly accessible as most students score more than the random score of two (if students answered two questions randomly then they should get on average a score of two). The advanced maths test is clearly the most difficult with a distribution skewed towards zero.

Figure 9. Distribution of education test scores**Table 42. Education test scores**

	MV	CV	CV Near	CV Far
Easy maths test (min 0 – max 8)	4.5 (1.8)	4.6 (1.9)	4.6 (1.9)	4.6 (1.9)
Observations	580	1168	546	622
Easy English test (min 0 – max 8)	3.2 (1.9)	3.6** (1.9)	3.6** (2.0)	3.5** (1.9)
Observations	452	880	400	480
Advanced maths (min 0 – max 25)	6.3 (3.4)	6.9 (3.3)	6.7 (3.5)	7.0 (3.1)
Observations	110	292	136	156
Advanced English (min 0 – max 20)	8.3 (4.0)	9.0 (3.9)	8.9 (3.9)	9.0 (4.0)
Observations	112	300	141	159

Wage expectations

Wage expectation questions were originally designed for adults having a household decision model in mind where parents decided on the education of their children by considering wage opportunities both in and outside the area for different levels of education. It was decided to administer the same questions to a sample of children aged 12 to 19 that took the cognitive and education tests. There are a total of 1,178 valid responses on wage expectations.

As in the case for adults, many children showed little understanding of wages in their areas as they are not engaged in wage work and do not travel to other areas. Many children provided

unreasonable responses such as 500 cedis when the mean wage is between 5 and 10 cedis. We dropped some of these very extreme values from the sample by dropping all observations that were four standard deviations further from the mean after a logarithmic transformation.

The uncertainties of expectations can be seen in the high values of the standard deviations. The variance also increases as the expectation becomes more uncertain as it enquires about Accra rather than the local market. Interestingly, children in the control groups have expected wages that are twice the size of those in the project group. This could be partly a result of different wage structure in the two areas, but the differences are visible also for Accra wages which suggests this is a true difference in expectations based on different information sources.

Table 43. Wage expectations (children)

	MV	CV	CV Near	CV Far
Daily wage primary	4.42 (2.82)	7.93*** (13.02)	7.26*** (11.18)	8.54*** (14.15)
Daily wage secondary	6.01 (3.68)	15.68*** (28.07)	15.11*** (29.13)	16.21*** (27.08)
Daily wage primary Accra	12.00 (11.75)	17.50** (25.48)	18.74*** (27.09)	16.41** (23.96)
Daily wage secondary Accra	17.04 (11.29)	33.07*** (51.09)	37.45*** (60.43)	29.27*** (41.03)

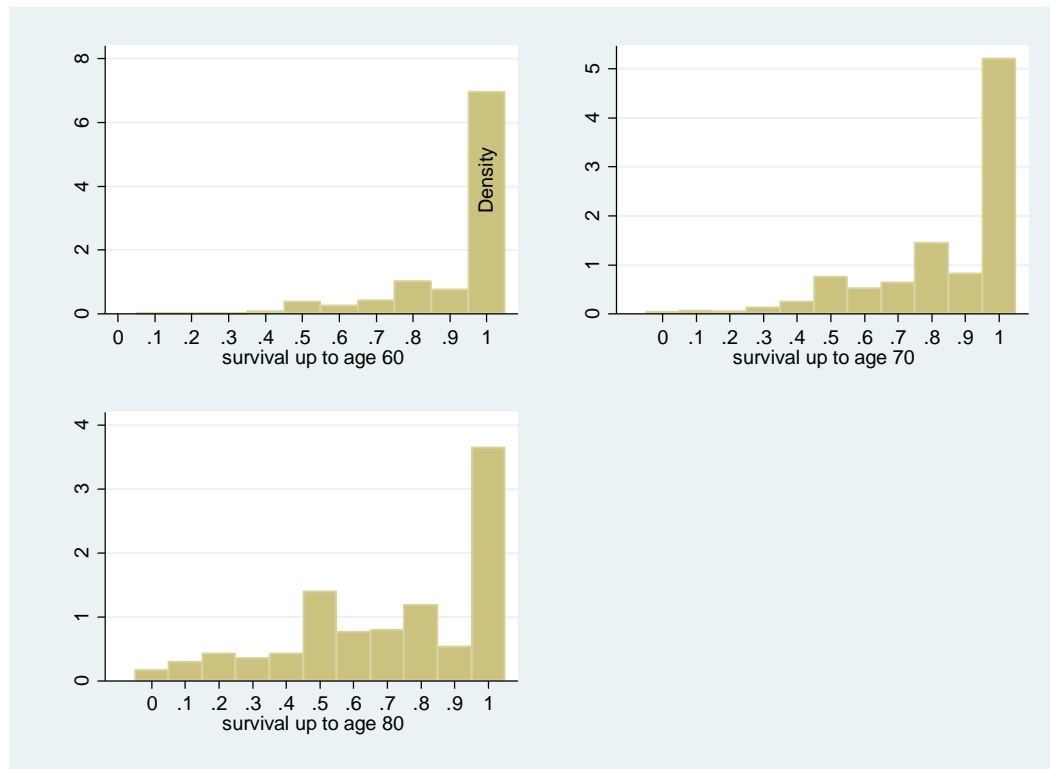
The survey protocols recommended that in each household the head of household should be interviewed and that in his/her absence any other adult who was involved in generating income through farming. Not all adults interviewed were able to provide a response to the wage expectations questions. Only about 95% of adults were able to provide an expectation for the wages in their area and 88% for wages in Accra. The differences in expectations and the standard deviations of the expectations are smaller for adults. Control areas consistently display much higher wage expectations.

Table 44. Wage expectations (parents)

	MV	CV	CV Near	CV Far
Daily wage primary	4.94 (3.06)	6.91*** (8.24)	6.68*** (7.84)	7.15*** (8.65)
Daily wage secondary	6.72 (5.53)	13.13*** (20.43)	12.28*** (20.54)	14.03*** (20.29)
Daily wage primary Accra	12.26 (10.77)	18.80*** (25.96)	18.07*** (24.32)	19.57*** (27.57)
Daily wage secondary Accra	18.19 (16.73)	30.49*** (42.79)	30.14*** (44.20)	30.85*** (41.30)

Survival expectations

Each adult respondent interviewed was asked to rate on a scale from 0 to 10 the likelihood of being alive at age 60, 70, and 80. Respondents older than 59 would only express probabilities of surviving age 70 and 80, whilst respondents older than 70 would only express the likelihood of surviving until age 80. Respondents aged 79 and above would not answer this question. Interestingly, female respondents, after controlling for age, express a survival expectation which is 4-5% less than male respondents. This could be explained by selectivity issues related to the circumstances of the interview.

Figure 10. Distribution of survival expectations

Strangely there are differences, albeit small, between survival expectations in project and control villages, which are mainly driven by lower survival expectations from nearby control villages.

Table 45. Survival expectations

	MV	CV	CV Near	CV Far
Up to age 60	0.93 (0.14)	0.91*** (0.16)	0.89*** (0.17)	0.92 (0.14)
Up to age 70	0.87 (0.18)	0.83*** (0.23)	0.81*** (0.24)	0.84** (0.21)
Up to age 80	0.74 (0.28)	0.71* (0.29)	0.69** (0.29)	0.73 (0.28)

Time preferences and income expectations

The MVP could affect time preferences in different ways. Overall the project should decrease 'impatience' by:

- Increasing the investment and bequest motives for saving (investment motivations may make people less impatient).
- Improving survival expectations (people who live longer are less impatient).
- Increasing income and wealth (poorer people are more impatient because need to satisfy basic needs).

- Improving education (foresight and planning skills are correlated with education).

We opted for using hypothetical lotteries rather than real rewards because hypothetical rewards have the advantage of allowing the interviewer to play with several amounts, large amounts, and different time horizons at the same time. Hypothetical lotteries have the disadvantage of not providing incentives for the respondent to focus on the game, however reviews comparing the results of hypothetical and real lotteries have not found significant differences (Frederick, Loewenstein et al. 2002).

We opted for employing the ‘matching task’ method rather than the more common ‘choice task’ method. Whilst in the choice task method respondents are presented with alternative choices, in the matching task method the respondent fills the blank to equate two inter-temporal choices. For example, the respondent will state the amount of money in three months that is equivalent to a given amount of money now. This method has a number of advantages. First, with just one answer the indifference point is identified (rather than employing multiple questions as in the choice task). Second, there is no anchoring problem because it is the respondent that provides the initial amount. Anchoring occurs when a choice is affected by the previous choice, which is a common problem of choice task experiments (Frederick, Loewenstein et al. 2002).

There is a risk in employing the matching task method of obtaining ‘coarse’ answers whereby the respondent responds quickly by applying simple heuristic rules to the sum initially offered. We avoided this effect by designing a game that simulates a real life situation. The time preference game is based on a hypothetical transaction of agricultural output. The amount involved in the transaction is the expected amount as stated by the respondent. This makes the game realistic and removes the ‘magnitude effect’ by basing the game on an amount that is meaningful to the respondent (the magnitude effect is the bias produced by the fact that people tend to apply larger discount rates to smaller amounts – the reasons for this behaviour are not well understood). The amount initially stated will be probed by bargaining. The interviewer will encourage the respondent to accept a smaller amount until an agreement between the two is reached. This responds to the need of approximating real life price negotiations and to the need of removing unrealistic initial responses. The respondent will be forced to find the minimum amount he is willing to accept in exchange for a delayed payment.

The game was conducted over four different time horizons: one month, three months, six months, and one year. Different time horizons were used to detect hyperbolic discounting: people’s tendency to discount more heavily choices that are made over time horizons that are closer in time to the time of the interview. Heavy hyperbolic discounting is a sign of impatience and of poor saving/planning skills (Ashraf, Karlan et al. 2006). In order to avoid that the respondent applies simple heuristics to the different choices made (for example preferring 110 to 100 over a month and 130 to 100 over three months) we used a titration procedure, whereby the different time horizon is not presented in an ordered fashion, but follows the pattern: three months, one month, six months, and one year.

Income expectations

We employed income expectation questions for two reasons. First, by asking the expected agricultural output we obtain a starting amount to be used in the time preference game that is sufficiently large and meaningful to the respondent. Secondly, we want to be able to disentangle

the effect of income expectations from stated time preferences. We calculated income expectations by eliciting subjective probabilities.

Respondents were asked to answer the following two questions:

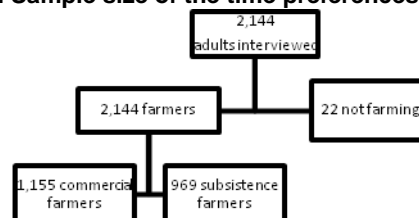
1. Suppose this is a very bad year. What is the minimum quantity that you expect to produce?
2. Now suppose this is a very good year. What is the maximum quantity that you expect to produce?

At this point the enumerator would calculate the midpoint of the quantities expressed above (the difference between the maximum and minimum amounts divided by two). The respondent was then asked the following question:

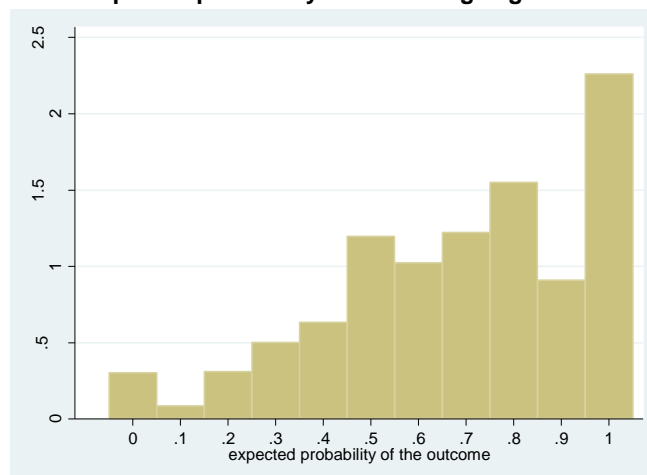
3. On a scale from 0 to 10 (where 0 is ‘no chance’ and 10 is ‘absolutely certain’) how likely is it that you will produce at least the midpoint quantity this year?

There were two problems in conducting this exercise. First, the question applies only to farmers, which excludes some 1% of the sample that does not do any farming. In addition, the expectations were elicited for crops that are sold, in a context where up to 50% of farmers are subsistence farmers and do not sell any crop. As a result, while one adult was selected for the interview from each household, only about half of commercial farmers responded to the expectation and time preference game. We are left therefore with a sample of 1,155 commercial farmers’ expectations and time preferences (Figure 11). Note also that 60 farmers did not respond to the time preferences interviews, so that we are left with a sample of 1,095 valid time preferences responses.

Figure 11. Sample size of the time preferences experiment



The second problem is that the household survey was conducted in November when many of the crops produced and sold by the farmers had already been realised. The survey had been planned for the month of August, but when Edoardo Masset and the ISSER team visited the area to conduct the education survey it was found that the EI had not yet started the household survey in the control communities, which was a prerequisite for conducting the ISSER survey. The EI survey was eventually conducted over the months of September-October and the ISSER survey was conducted soon after in the month of November. Because many of the farmers had already realised their cash crop at the time of the interview many responses are unlikely to be ‘probabilities’ but certainties. This explains for example the large number of zero and 100% expectations in Figure 12.

Figure 12. Expected probability of the average agricultural output

Farmers in MV areas have obviously higher expectations compared to farmers in the control areas. There are a number of possible explanations. First, cropping patterns in the areas may differ (for example millets in MV and beans in CV) which could result in different harvest times and therefore suffer the ‘certainty’ bias discussed above. Second, different crops have different variances: for example millet is less risky than rice, which again could explain the difference. Third, since the expectation survey was conducted after the programme had started some of the activities, such as the formation of cooperatives and the distribution of fertiliser, there is a possibility that farmers’ expectations in MV areas were positively affected.

Table 46. Income expectations

	MV	CV	CV Near	CV Far
Subjective probability of midpoint outcome	0.74 (0.22)	0.65*** (0.28)	0.67*** (0.27)	0.63*** (0.30)

Time preferences

We obtained time preferences from commercial farmers by asking the following questions: Suppose that you are selling the midpoint amount of your production (reported in the income expectation section), what payment would you accept if the trader asked you to delay payment by one month? The same question was then repeated for three months, six months, and one year. The initial response was not accepted by the enumerators who would bargain on the amount until reaching the minimum acceptable amount for delaying. Hence, for each farmer (and time horizon) there is an immediate response and a response obtained after bargaining.

Note also that some farmers responded only for some of the time horizon questions, probably showing signs of fatigue. There were 1,124 respondents for the first question (out of the 1,155 interviewed); 1,121 for the second question; 1,113 for the third; and 1,095 for the fourth question.

The responses were used to calculate implicit discount rates. If a is the initial amount (the midpoint value of the agricultural product) and b is the amount claimed by the respondent to accept a delay of n months, then the discount rate ρ can be calculated from the following expression:

$$a = \frac{b}{(1 + \rho)^n}$$

The monthly discount rate is: $\rho = e^{\frac{\ln b - \ln a}{n}} - 1.$

We removed outliers by dropping those observations larger than four times the standard deviation after a logarithmic transformation of ρ . The poor households do not appear to be too impatient. First, many households report zero discount rates by accepting the offer made or accepting it after bargaining with the enumerator. Table 47 shows the percentages of zero discount rates (only for the agreed final amount but the difference with the first offer is not large). The fraction of farmers with zero discount rate however decreases with the time horizon. Second, discount rates are not very high as can be seen in the table. There seem to be evidence of hyperbolic discounting as households are discounting at a decreasing rate as the time horizon increases.

Table 47. Discount rates and 0 discount rates for the whole sample

	% Monthly discount rate is zero	Monthly discount rate
1-month horizon	0.33	0.087
3-month horizon	0.14	0.075
6-month horizon	0.07	0.071
12-month horizon	0.06	0.055

The first question administered employed a three-month horizon and no differences are visible across groups. When other horizons are used there are higher discount rates in MV areas compared to project areas that are mostly driven by differences with the nearby control villages.

Table 48. Time discount rates

	MV	CV	CV Near	CV Far
1-month horizon	0.101 (0.138)	0.080** (0.132)	0.071** (0.106)	0.089 (0.153)
3-month horizon	0.088 (0.088)	0.073 (0.132)	0.072 (0.136)	0.073 (0.128)
6-month horizon	0.081 (0.097)	0.066** (0.085)	0.063** (0.080)	0.070 (0.060)
12-month horizon	0.060 (0.049)	0.052** (0.047)	0.050** (0.046)	0.054 (0.048)

The Community Questionnaire

	MV	CV	P-value	CVN	P-value	CVF	P-value
Hand dug wells No.	6.9	7.4	0.746	7.1	0.893	7.6	0.667
Bore hole wells No.	2.6	2.9	0.655	2.8	0.856	3.1	0.548
Dug out wells No.	0.3	0.4	0.492	0.4	0.672	0.4	0.390
Electricity %	0.0	0.0		0.0		0.0	
Irrigated land %	1.0	1.1	0.187	1.2	0.154	1.1	0.173
Primary school	85.7	92.6	0.265	94.1	0.254	91.2	0.486
Distance to nearest primary Km	2.1	2.4	0.596	2.5	0.523	2.2	0.814
JHS	65.7	73.5	0.413	73.2	0.488	73.5	0.488

Distance to nearest JHS Km	4.1	5.3	0.321	6.0	0.189	4.6	0.675
SHS	22.9	10.3*	0.089	8.8	0.115	11.8	0.230
Distance to nearest primary Km	16.9	17.7	0.774	20.4	0.328	15.0	0.575
Health centre	25.7	11.8*	0.072	2.3**	0.007	20.6	0.620
Distance to nearest health centre Km	10.5	19.0**	0.003	21.7***	0.000	16.5*	0.072
CHPS	40.0	50.0	0.340	52.9	0.286	47.1	0.561
Distance to nearest CHPS Km	8.3	8.1	0.943	8.0	0.893	8.3	0.998
Market	51.4	48.5	0.783	47.1	0.722	50.0	0.907
Distance to nearest market Km	7.1	9.6	0.172	11.0	0.089	8.2	0.509
Motorable road	57.1	73.5*	0.093	70.6	0.252	76.5	0.091
Distance to nearest road Km	13.1	5.6**	0.015	8.2	0.232	3.4**	0.007
Bank	31.4	10.3**	0.007	8.8**	0.019	11.8**	0.049
Distance to nearest bank Km	19.5	22.9	0.427	22.0	0.553	23.8	0.424

	MV	CV	P-value	CVN	P-value	CVF	P-value
Population with health insurance %	47.8	64.6**	0.001	55.1	0.148	74.1***	0.000
Children vaccinated against tuberculosis (BCG) %	80.2	82.8	0.537	79.4	0.886	86.2	0.270
Children vaccinated against whooping cough (DPT) %	87.3	83.3	0.274	79.0**	0.040	87.6	0.936
Children vaccinated against polio (OPV) %	88.9	85.9	0.316	82.1**	0.029	89.7	0.819
Children vaccinated against measles	80.8	86.1	0.208	82.1	0.802	90.1*	0.066
Children vaccinated against yellow fever %	77.9	82.8	0.399	76.2	0.771	87.4	0.074

	MV	CV	P-value	CVN	P-value	CVF	P-value
Farming main activity %	100.0	98.5	0.476	100.0	.	97.1	0.314
Maize main crop %	45.7	28.8*	0.091	30.3	0.197	27.3	0.118
Millet main crop %	51.4	65.2	0.183	66.7	0.208	63.6	0.316
Shea butter main non agricultural activity %	87.5	83.1	0.579	80.0	0.431	86.2	0.884
Extension officer visits the community %	62.3	50.0	0.219	41.2*	0.073	58.8	0.736
Cooperative in the community %	26.6	6.0**	0.001	0.0***	0.000*	12.1	0.096

	MV	CV	P-value	CVN	P-value	CVF	P-value
NPK fertiliser	41.7	42.3	0.607	40.9	0.440	43.6	0.122
Sulphate fertiliser	37.8	37.6	0.858	37.0	0.491	38.2	0.723
Male wage	4.7	4.7	0.781	4.4*	0.075	5.0	0.302

Female wage	4.4	4.1	0.171	3.7**	0.007	4.4	0.989
Child wage	3.3	2.9	0.167	3.0	0.240	2.9	0.173
Cow	67.3	665	0.860	626	0.410	702	0.611
Sheep	124	104	0.500	102	0.604	105	0.659
Goat	64	72	0.081	72	0.114	72	0.125
Guinea fowl	12	12	0.872	12	0.468	13	0.323
Chicken	10.9	9.5	0.019	9.4	0.475	9.6**	0.031
Gari	2.4	2.7	0.268	2.9	0.155	2.6	0.571
Rice	4.4	4.0	0.329	3.9	0.184	4.1	0.535
Beans	8.2	5.0**	0.011	5.5*	0.075	4.6**	0.025
Groundnut	8.0	8.0	0.997	6.5	0.321	9.1	0.660
Okra	4.7	4.3	0.718	4.4	0.851	4.2	0.626
Milk	1.5	1.2	0.228	1.1	0.317	1.2	0.417
Eggs	5.3	4.9	0.723	5.1	0.846	4.9	0.727

Trends

	MV	CV	P-value	CVN	P-value	CVF	P-value
NPK fertiliser	0.146	0.126*	0.088	0.124*	0.078	0.128	0.211
Sulphate fertiliser	0.134	0.133	0.948	0.137	0.770	0.129	0.757
Male wage	0.199	0.244**	0.039	0.247**	0.032	0.233	0.143
Female wage	0.212	0.246*	0.081	0.251	0.100	0.240	0.196
Child wage	0.222	0.227	0.847	0.212	0.698	0.242	0.410
Cow	0.211	0.168*	0.054	0.178	0.256	0.158*	0.064
Sheep	0.178	0.187	0.610	0.200	0.256	0.174	0.856
Goat	0.163	0.177	0.387	0.197**	0.042	0.158	0.754
Guinea fowl	0.210	0.195	0.440	0.208	0.939	0.183	0.242
Chicken	0.212	0.199	0.243	0.202	0.621	0.183	0.141
Gari	0.204	0.217	0.575	0.223	0.535	0.212	0.763
Rice	0.147	0.200*	0.038	0.203*	0.081	0.198	0.105
Beans	0.204	0.198	0.760	0.236	0.184	0.157*	0.053
Groundnut	0.202	0.183	0.424	0.212	0.757	0.161	0.138
Okra	0.215	0.184	0.438	0.246	0.545	0.130**	0.027
Milk	0.235	0.163	0.162	0.193	0.447	0.140	0.099
Eggs	0.173	0.210	0.232	0.179	0.846	0.222	0.159

	MV	CV	P-value	CVN	P-value	CVF	P-value
Major drought affecting crops/animals %	60.0	58.8	0.910	58.8	0.922	58.8	0.922
Major floods %	11.4	22.1	0.191	20.6	0.306	23.5	0.190
Disease/epidemic affecting a large number of people %	11.4	30.9**	0.029	32.3**	0.036	29.4*	0.065
Major interruption in water supply (wells drying up, etc.) %	65.7	67.6	0.845	73.5	0.488	62.8	0.738
Insects destroying crops %	48.6	49.9	0.973	52.9	0.722	50.0	0.907
Major animal disease/epidemic %	71.4	78.3	0.422	73.5	0.848	79.4	0.479
Major epidemic affecting crops %	25.7	30.4	0.604	38.2	0.271	23.5	0.836

	MV	CV	P-value	CVN	P-value	CVF	P-value
CBO/NGO	25.7	16.5	0.241	12.1	0.159	26.5	0.944
Church/Prayer Group or Burial Society	57.1	52.2	0.619	50.0	0.559	61.8	0.701
Women's Group	48.6	69.6**	0.028	67.6	0.112	82.3**	0.003
Saving group	31.4	26.1	0.551	23.5	0.470	26.5	0.656
Youth Group	45.7	50.0	0.669	47.1	0.913	61.8	0.187
Political Group	40.0	58.7*	0.050	70.6**	0.010	55.9	0.192
Health Committee	17.1	23.9	0.415	20.6	0.719	35.3*	0.088
School Committee	51.4	47.8	0.419	52.9	0.902	52.9	0.901
Parent-Teacher Assoc.	51.4	58.2	0.494	62.8	0.394	66.7	0.208
Sports Club	34.3	35.9	0.869	44.1	0.410	26.5	0.488

The Adult Questionnaire

The adult survey followed the DHS approach of interviewing women of reproductive age from each sampled household. The protocols establish that the target population is every woman aged 15-49 plus one randomly selected male in each household. The adult surveys were conducted prior to the household survey both in the project and the control areas. As a result, some households and adults interviewed by the adult survey were not interviewed by the household survey and vice versa. Table 49 illustrates reporting the numbers of households and individuals covered by the adult survey by group.

Table 49. Households where the adult interviews were conducted

	MV	CVN	CVF	TOTAL
Adults and households interviewed	616	693	672	1977
Adults interviewed but not the households	8	7	17	32
Total households interviewed	624	700	689	2013
Households not interviewed	96	45	56	197

Table 50. Adult interviews

	MV	CVN	CVF	TOTAL
Number of males interviewed whose household was also interviewed	503	581	542	1626
Male adults interviewed but not the households	5	10	15	30
Total male interviews	508	591	557	1656
Number of females interviewed whose household was also interviewed	847	985	999	2831
Female adults interviewed but not the households	10	11	42	63
Total female interviews	857	996	1041	2896

Table 51. Contraception and health visits

	MV	CV	CV Near	CV Far
% using any contraceptive method ^a	0.10 (0.30)	0.10 (0.30)	0.09 (0.29)	0.11 (0.32)
% visited for family planning	0.25 (0.43)	0.30** (0.46)	0.23 (0.42)	0.36*** (0.48)
% visited by health visitor for care	0.35 (0.48)	0.40** (0.49)	0.34 (0.47)	0.46*** (0.50)

^a Note that the percentage includes pregnant women as well, if these women are removed the percentage using contraceptives is larger.

Table 52. Child health

	MV	CV	CV Near	CV Far
% taking vitamin A last 6 months	0.62 (0.48)	0.63 (0.49)	0.57** (0.50)	0.67** (0.47)
% taking deworming treatment last 6 months	0.34 (0.47)	0.33 (0.47)	0.28** (0.45)	0.38* (0.48)
Diarrhoea last 2 weeks	0.18 (0.39)	0.23** (0.42)	0.25** (0.44)	0.22* (0.41)
Fever last 2 weeks	0.27 (0.44)	0.28 (0.45)	0.30 (0.46)	0.26 (0.44)
Cough last 2 weeks	0.23 (0.42)	0.25 (0.43)	0.24 (0.43)	0.25 (0.43)
% tested for malaria if ill	0.44 (0.50)	0.38 (0.49)	0.47 (0.50)	0.31** (0.46)

Table 53. Malaria knowledge

	MV	CV	CV Near	CV Far
% believes mosquito bites	0.95 (0.21)	0.97*** (0.16)	0.97** (0.17)	0.98*** (0.15)
% believes drinking unsafe water	0.76 (0.92)	0.79** (0.40)	0.77 (0.42)	0.82*** (0.38)
% believes standing in the sun	0.78 (0.42)	0.80** (0.40)	0.78 (0.41)	0.83*** (0.38)
% believes witchcraft	0.45 (0.50)	0.49** (0.50)	0.52*** (0.50)	0.46 (0.50)
% believes eating sweets	0.55 (0.50)	0.62*** (0.49)	0.61*** (0.49)	0.62*** (0.48)

Table 54. Literacy

	MV	CV	CV Near	CV Far
Can read 'The child is playing with the ball'	0.17 (0.38)	0.18 (0.38)	0.18 (0.39)	0.18 (0.39)
Can read 'Farming is hard work'	0.17 (0.37)	0.18 (0.38)	0.18 (0.39)	0.18 (0.38)
Can answer 9+4	0.90 (0.30)	0.94*** (0.24)	0.94*** (0.24)	0.94*** (0.24)
Can answer 4*5	0.85 (0.36)	0.88** (0.32)	0.89*** (0.31)	0.86 (0.34)

Table 55. Mortality rates

	All	MV	CV	CV Near	CV Far
Neonatal	35.9	28.8	39.5	52.4	28.1
Post-neonatal	25.5	17.0	30.1	35.5	25.5
Infant	61.4	45.9	69.6	87.9	53.6
Child	22.9	17.1	24.5	26.5	22.8
Under-5	82.8	62.2	92.4	112.1	75.1

Seasonality

The balance tests show several statistically significant differences between project and control groups. As anticipated, these differences are in many cases the result of a seasonal bias arising from conducting the surveys in the project area in the dry season and in the control area in the

rainy season. Regressions were run of the outcome indicators on monthly dummies ignoring the project/control divide thus looking for obvious seasonal patterns. The output of this work is omitted because the monthly dummies vary by survey and would deserve a lengthy separate discussion. The following observations were made:

- There are seasonal differences in education. Attendance rates are higher in the control group. These differences are not easy to explain. Censoring is one possibility. For a given age, children in the control group had a higher chance of attending school because they were interviewed two or three months later and, more importantly, were interviewed at the beginning of the new school year (September and October). Another possibility is the way the question was framed by enumerators. Questions explicitly ask for attendance during the academic year over the period 2011-2012. This should leave no room for misunderstandings, but enumerators may have asked something different or respondents could have interpreted the question differently. This seems to be the case as reported attendance becomes particularly low during the school break time (July and August).
- There are large differences in time spent in collecting water, cleaning, cooking, and care. Time spent is much larger in the control areas. Differences are very large and follow a clear pattern. Most likely these differences are the result of the school break and resulting employment of children in household chores and the seasonal working patterns for adults.
- Income and expenditure data are not affected by seasonal patterns. Fortunately, the de-seasonalised questions prevented this.
- Results on food security are puzzling. Households consistently report that the months of the MV survey are the hungry months, whilst in the months of the CV survey food security is not an issue. However, when responding to the question of days with insufficient food over the last month there are no differences between the project and the control group.
- There are differences in the use of mosquito nets. Use is much larger in the control villages. This is likely to be a seasonal effect because there are fewer mosquitoes in the dry season of the MV survey and therefore households do not see the need for bed nets as in the rainy season.
- There are significant differences in anaemia levels. This is in line with the seasonal analysis of secondary data. We tried to model malaria in order to account for the seasonal effect. After accounting for characteristics using a Oaxaca decomposition, the difference between project and control villages is even larger. Anaemia levels are difficult to model however and it is unlikely that these differences can be adjusted.
- There are differences in the incidence of malaria. However, the differences are not large and not statistically significant. This could be a consequence of the small size of the sample.
- Anthropometric indicators are slightly better, as expected, in the control areas, however, the differences are never statistically significant.

Balance Tests

	MV	CV-MV	P-value	CVN-MV	P-value	CVF-MV	P-value	CVN-CVF	P-value
Demographics									
Household size	7.1	-0.20	0.250	-0.46**	0.023	0.06	0.779	-0.51**	0.013
Number of under-5	1.0	0.01	0.912	-0.07	0.204	0.08	0.140	-0.16***	0.006
Female-headed household	0.09	0.02	0.101	0.02	0.260	0.03*	0.086	-0.01	0.560
Polygamous	0.22	-0.01	0.436	-0.04*	0.070	0.01	0.637	-0.05**	0.020
Migration									
Number of in-migrants per household	0.10	-0.03*	0.059	-0.03*	0.094	-0.03	0.137	0.00	0.817
Number of out-migrants per house	0.46	-0.16***	0.000	-0.18***	0.000	-0.14**	0.002	-0.04	0.412
Percentage female	0.53	0.03	0.417	0.06	0.211	0.01	0.882	0.05	0.304
Average age	0.22	1.13	0.232	1.32	0.251	0.96	0.387	0.35	0.782
Percentage migrating for work	0.51	-0.03	0.474	0.03	0.441	-0.08*	0.061	0.11**	0.016
Percentage migrating for schooling	0.19	0.00	0.928	0.01	0.883	0.00	0.776	0.18	0.694
Education									
% over-5 ever attended school	0.50	0.04***	0.000	0.07***	0.000	0.00	0.845	0.54***	0.000
Average years of schooling	1.9	0.06	0.305	-0.17**	0.015	0.27***	0.000	-0.44***	0.000
Average years of schooling (ever attending school pop.)	3.9	0.43***	0.000	0.24**	0.035	0.60***	0.000	-0.36**	0.002
NER primary	0.61	0.08***	0.000	0.05**	0.028	0.12***	0.000	-0.07**	0.001
NER JHS	0.10	0.06**	0.009	0.04	0.125	0.07**	0.003	-0.03	0.202
NER SSS	0.05	0.02	0.202	0.02	0.146	0.01	0.419	0.01	0.501
Percentage school meals	0.34	-0.14***	0.000	-0.17***	0.000	-0.10***	0.000	-0.07***	0.000
Average distance to school (minutes)	33.1	-1.26	0.243	-4.99***	0.000	1.86	0.127	-6.85***	0.000
Time use in the household (minutes)									
Fetching wood	170	41.30***	0.000	27.13**	0.039	55.62***	0.000	-29.50**	0.040
Collecting water	182	3.52	0.744	-8.99	0.468	16.17	0.193	-25.16**	0.037

	MV	CV-MV	P-value	CVN-MV	P-value	CVF-MV	P-value	CVN-CVF	P-value
Cleaning	106	19.71**	0.009	11.64	0.180	27.87**	0.001	-16.22*	0.079
Cooking	191	44.10***	0.000	41.36**	0.001	46.87***	0.000	-5.51	0.660
Taking care of children	172	79.62***	0.000	82.43***	0.000	76.79***	0.000	5.64	0.780
Taking care of elderly and sick relatives	61	83.3***	0.000	138.07***	0.000	28.00	0.271	110.08***	0.000
Shocks									
Drought %	0.76	0.07***	0.000	0.11***	0.000	0.03	0.129	0.08***	0.000
Floods %	0.57	-0.02	0.279	0.06**	0.024	-0.11***	0.000	0.17***	0.000
Severe storm %	0.63	-0.01	0.699	0.03	0.296	-0.04*	0.083	0.07**	0.005
Livestock death %	0.87	-0.13***	0.000	-0.11***	0.000	-0.15***	0.000	0.04*	0.061
Crop failure %	0.73	-0.09***	0.000	-0.08**	0.002	-0.11***	0.000	0.03	0.263
Water and sanitation									
Households with improved water %	0.73	-0.01	0.646	-0.03	0.272	0.01	0.757	-0.03	0.158
Distance to water source (minutes)	32	-5.45**	0.001	-3.66**	0.047	-7.27***	0.000	3.61**	0.026
Households treating water %	0.12	0.04**	0.009	0.04**	0.019	0.04**	0.031	0.00	0.863
Improved sanitation facility %	0.10	0.00	0.854	0.02	0.140	-0.02	0.242	0.10**	0.008
Energy use									
Households using firewood for cooking %	0.99	-0.01	0.419	0.00	0.495	-0.01	0.472	0.00	0.970
Households using batteries for lighting %	0.87	-0.04**	0.012	-0.01	0.501	-0.07***	0.000	0.06**	0.003
Housing conditions									
Finished walls %	0.20	0.01	0.754	0.05**	0.013	-0.04*	0.051	0.09***	0.000
Finished floors %	0.42	0.08***	0.000	0.05**	0.043	0.11***	0.000	-0.05**	0.037
Finished roofs %	0.37	0.02	0.396	0.08**	0.001	-0.05*	0.060	0.13***	0.000
Assets									
Table	0.62	-0.09***	0.000	-0.12***	0.000	-0.06**	0.021	-0.06**	0.014
Bed	0.41	0.02	0.386	0.02	0.340	0.01	0.583	0.01	0.685
Kerosene lamp	0.23	-0.02	0.373	-0.04*	0.078	0.00	0.819	-0.04**	0.043
Radio	0.49	0.00	0.943	-0.04	0.169	0.03	0.206	-0.07**	0.008
Mobile phone	0.59	-0.10***	0.000	-0.06**	0.019	-0.13***	0.000	0.07**	0.006
Animal cart	0.17	-0.06***	0.000	-0.06***	0.000	-0.06***	0.000	0.10	0.940

	MV	CV-MV	P-value	CVN-MV	P-value	CVF-MV	P-value	CVN-CVF	P-value
Bicycle	0.81	-0.05**	0.005	-0.05**	0.013	-0.05**	0.015	0.00	0.972
Motorbike	0.11	0.00	0.862	0.02	0.274	-0.02	0.159	0.04**	0.012
Total value of assets (\$PPP)	183	-26.73*	0.090	-29.63	0.103	-23.81	0.191	-5.82	0.753
Credit and savings									
Household has a bank account %	0.16	-0.05**	0.001	-0.04**	0.015	-0.05**	0.002	0.01	0.453
Household is member of <i>susu</i> %	0.15	-0.07***	0.000	-0.06***	0.000	-0.07***	0.000	0.01	0.629
Average savings (\$PPP)	23	-8.15*	0.078	-12.11**	0.023	-4.14**	0.437	-7.97	0.100
Any loan over last 12 months %	0.05	-0.02*	0.074	-0.01	0.267	-0.02**	0.045	0.01	0.333
Loan size (\$PPP)	200	58.07	0.432	-64.89	0.431	188.71**	0.026	-253.00**	0.014
Microfinance loan	0.03	-0.02**	0.004	-0.02**	0.012	-0.02**	0.013	0.00	0.989
Informal loan	0.01	0.01**	0.033	0.01	0.122	0.01**	0.031	0.00	0.573
Agricultural use	0.02	0.00	0.472	0.00	0.910	0.00	0.255	0.01	0.279
Business use	0.03	-0.01	0.278	-0.01	0.389	-0.01	0.306	0.00	0.860
Land									
Land owned (hectares)	4.8	-0.25	0.394	-0.40	0.241	-0.11	0.745	-0.30	0.372
Cultivated land (hectares)	3.4	-0.43***	0.000	-0.18	0.185	-0.68***	0.000	0.50***	0.000
Number of plots	2.9	-0.28***	0.000	-0.39***	0.000	-0.17**	0.008	-0.22**	0.001
Food security									
Not enough food in any month over last year %	0.82	0.02	0.151	-0.02	0.348	0.07**	0.001	-0.09***	0.000
Days with not enough food over last 30 days	12.2	0.88	0.103	0.62	0.322	1.10*	0.071	-0.48	0.434
Any day a child went hungry the whole day %	0.16	-0.02	0.322	-0.04**	0.025	0.01	0.594	-0.05**	0.005
Ever reduced meal size %	0.74	0.01	0.451	-0.06**	0.009	0.09***	0.000	-0.015***	0.000
Expenditure									
Per capita expenditure (\$PPP)	549	14.18	0.585	35.55	0.237	-7.52	0.803	43.06	0.120
Food share	0.78	-0.01	0.168	-0.01	0.343	-0.01	0.148	0.00	0.621
Share of own produced food	0.65	0.02	0.184	0.00	0.754	0.03**	0.045	-0.02*	0.078
Employment									

	MV	CV-MV	P-value	CVN-MV	P-value	CVF-MV	P-value	CVN-CVF	P-value
Employment rate % (age 15 to 59)	0.78	0.01	0.515	0.02	0.162	0.00	0.814	0.02**	0.010
Child employment % rate (age 6 to 14)	0.24	-0.04**	0.003	-0.02	0.175	-0.06***	0.000	0.04**	0.012
Farmers %	0.91	0.04***	0.000	0.03***	0.000	0.06***	0.000	-0.03***	0.000
% doing paid work	0.03	-0.01**	0.006	-0.01*	0.058	-0.01**	0.005	0.00	0.358
% of households with a microenterprise	0.20	-0.02	0.229	-0.06**	0.005	0.01	0.474	-0.07***	0.000
Of which trading %	0.47	-0.06	0.159	-0.10*	0.091	-0.05	0.359	-0.05	0.345
Of which retailing and services %	0.19	-0.02	0.537	0.01	0.744	-0.04	0.268	0.06	0.168
Of which agricultural processing %	0.21	0.02	0.597	0.06	0.176	-0.01	0.896	0.07	0.128
Income									
Per capita income (\$PPP)	157	-17.94	0.545	-36.92	0.290	1.33	0.970	-38.26	0.323
Agricultural profits (\$PPP)	600	-98.95	0.203	8.13	0.927	207.52**	0.021	501.46**	0.011
Marketed surplus %	0.22	0.03	0.260	0.02*	0.089	0.03**	0.031	0.00	0.653
Seeds inputs (\$PPP)	0.13	0.73	0.795	0.16	0.960	1.31	0.687	14.12	0.748
Chemical fertiliser (\$PPP)	28.8	5.92*	0.081	0.84	0.831	11.09**	0.005	-10.25**	0.007
Herbicides and pesticides (\$PPP)	24.8	-9.16***	0.000	-7.18***	0.000	-11.17***	0.000	3.99**	0.007
Labour inputs (\$PPP)	25.8	-16.25***	0.000	15.73***	0.000	-16.75***	0.000	1.02	0.401
Social networks									
Any important people living elsewhere? %	0.76	0.08***	0.000	0.02	0.311	0.13***	0.000	-0.11***	0.000
Of which distant relatives %	0.55	0.09***	0.000	0.13***	0.000	0.06**	0.004	0.07***	0.000
Of which friends %	0.21	0.00	0.713	-0.06***	0.000	0.05**	0.001	-0.12***	0.000
Asked for any help over last 12 months? %	0.45	0.01	0.694	-0.06**	0.002	0.080***	0.000	-0.14***	0.000
Provided any help over last 12 months? %	0.53	-0.03	0.133	-0.11***	0.000	0.063**	0.002	-0.18***	0.000
Mosquito nets									
Household has a mosquito net %	0.81	0.09***	0.000	0.13***	0.000	0.04**	0.011	0.09***	0.000
Average number of	2.9	-0.15**	0.040	-0.14*	0.069	-0.15*	0.075	0.00	0.990

	MV	CV-MV	P-value	CVN-MV	P-value	CVF-MV	P-value	CVN-CVF	P-value
mosquito nets %									
Someone sprayed the walls %	0.41	0.09***	0.000	0.08**	0.002	0.10***	0.000	-0.02	0.566
Anaemia									
Haemoglobin	10.0	-0.48***	0.000	-0.57***	0.000	-0.46***	0.000	-0.11	0.434
Mild anaemia	0.74	0.10***	0.000	0.11**	0.002	0.10**	0.007	0.01	0.769
Moderate anaemia	0.46	0.15***	0.000	0.17***	0.000	0.15**	0.001	0.03	0.593
Severe anaemia	0.04	0.02	0.282	0.03*	0.066	0.00	0.900	0.03	0.112
Malaria (children under-5)									
Malaria incidence %	0.22	0.03	0.396	0.03	0.440	0.02	0.538	0.00	0.907
Standardised severity among the infected	0.23	0.28*	0.060	0.20	0.255	0.37**	0.043	-0.17	0.470
Nutrition (children 6 to 59 months)									
Height-for-age Z-score	-1.29	0.06	0.427	0.12	0.217	0.02	0.841	0.10	0.307
Moderate malnutrition <-2	0.27	0.01	0.671	0.02	0.525	0.00	0.894	0.01	0.599
Severe malnutrition <-3	0.07	0.06***	0.000	0.05**	0.003	0.06**	0.001	-0.01	0.698
Weight-for-age Z-score	-0.89	0.04	0.557	0.13	0.104	-0.04	0.617	0.17	0.033
Moderate malnutrition <-2	0.14	0.02	0.255	0.02	0.405	0.02	0.253	-0.01	0.779
Severe malnutrition <-3	0.03	0.02**	0.028	0.01	0.219	0.03**	0.011	-0.01	0.229
Weight-for-height Z-score	-0.29	0.06	0.281	0.13*	0.055	0.00	0.960	0.23*	0.059
Moderate malnutrition <-2	0.04	0.01	0.341	0.00	0.798	0.02	0.170	-0.01	0.286
Severe malnutrition <-3	0.00	0.01*	0.068	0.01**	0.040	0.01	0.238	0.00	0.412
Family planning and child care									
Currently using any birth control method	0.10	0.00	0.726	0.00	0.628	0.01	0.386	-0.02	0.158
Visited by health worker for family planning	0.25	0.04**	0.013	-0.02	0.369	0.11***	0.000	-0.13***	0.000
Visited a health facility for own care or children	0.35	0.04**	0.042	-0.01	0.559	0.12***	0.000	-0.13***	0.000
Vitamin A last 6 months	0.62	0.02	0.404	-0.05**	0.042	0.05**	0.026	0.10***	0.000
Deworming last 6 months	0.34	-0.01	0.503	-0.06**	0.022	0.04*	0.089	-0.09***	0.000
Child health									
Diarrhoea last 2 weeks	0.18	0.05**	0.009	0.07**	0.001	0.04*	0.084	0.04*	0.070
Fever last 2 weeks	0.27	0.02	0.425	0.03	0.142	-0.01	0.769	0.04*	0.063
Cough last 2 weeks	0.23	0.02	0.328	0.02	0.328	0.02	0.456	0.01	0.782

	MV	CV-MV	P-value	CVN-MV	P-value	CVF-MV	P-value	CVN-CVF	P-value
Malaria tested if ill	0.44	-0.08*	0.076	0.03	0.602	-0.13**	0.015	0.16**	0.001
Knowledge of causes of malaria									
Mosquito bites	0.95	0.02**	0.001	0.02**	0.014	0.02***	0.000	-0.01	0.213
Drinking unsafe water	0.76	0.03	0.29	0.01	0.623	0.06***	0.000	-0.05**	0.003
Standing in the sun	0.78	0.03**	0.039	0.01	0.722	0.05**	0.001	-0.05**	0.001
Witchcraft	0.45	0.04**	0.008	0.07***	0.000	0.01	0.437	0.05**	0.003
Eating sweets	0.55	0.06***	0.000	0.06**	0.001	0.07***	0.000	-0.01	0.617
Literacy tests									
Can read 'The child is playing with the ball'	0.17	0.01	0.456	0.01	0.448	0.01	0.447	0.00	0.997
Can read 'Farming is hard work'	0.17	0.01	0.339	0.01	0.298	0.01	0.492	0.00	0.713
Can answer 9+4	0.90	0.04***	0.000	0.04***	0.000	0.04***	0.000	0.00	0.676
Can answer 4*5	0.85	0.03**	0.002	0.04**	0.001	0.01	0.228	0.03**	0.018
Standardised test scores									
Raven's matrices	1.91	0.03	0.386	-0.03	0.474	0.09	0.031	-0.12**	0.005
Forward digit span	1.48	0.01	0.725	-0.09	0.045	0.10**	0.015	-0.19***	0.000
Backward digit span	0.92	-0.01	0.693	-0.08*	0.052	0.05	0.240	-0.13**	0.002
Easy Maths	2.40	0.07	0.191	0.06	0.332	0.07	0.200	-0.02	0.787
Easy English	1.65	0.20***	0.000	0.23**	0.001	0.18**	0.006	0.05	0.439
Advanced Maths	1.90	0.16	0.117	0.10	0.419	0.21	0.100	-0.10	0.380
Advanced English	2.08	0.17	0.117	0.16	0.210	0.19	0.131	-0.03	0.808
Expected wages (children)									
Wage primary	4.42	3.51***	0.000	2.85***	0.000	4.13***	0.000	-1.28	0.174
Wage secondary	6.01	9.67***	0.000	9.10***	0.000	10.20***	0.000	-1.09	0.592
Wage primary Accra	11.99	5.51***	0.000	6.75***	0.000	4.42**	0.007	2.33	0.222
Wage secondary Accra	17.04	16.03***	0.000	20.41***	0.000	12.23***	0.000	8.18**	0.032
Expected wages (parents)									
Wage primary	4.94	1.96***	0.000	1.73***	0.000	2.21***	0.000	-0.48	0.296
Wage secondary	6.72	6.40***	0.000	5.56***	0.000	7.31***	0.000	-1.75	0.123
Wage primary Accra	12.26	6.55***	0.000	5.81***	0.000	7.31***	0.000	-1.49	0.314
Wage secondary Accra	18.19	12.30***	0.000	11.95***	0.000	12.66***	0.000	-0.71	0.773
Survival expectations									
Up to age 60	0.93	-0.03**	0.002	-0.04***	0.000	-0.01	0.309	-0.03**	0.002
Up to age 70	0.87	-0.04***	0.000	-0.06***	0.000	-0.03**	0.028	-0.03**	0.010

	MV	CV-MV	P-value	CVN-MV	P-value	CVF-MV	P-value	CVN-CVF	P-value
Up to age 80	0.73	-0.02*	0.068	-0.04**	0.008	-0.01	0.606	-0.03**	0.036
Income expectations									
Subjective probability	0.74	-0.09***	0.000	-0.07***	0.000	-0.11	0.000	0.04*	0.060
Time discount rates									
1-month horizon	0.101	-0.021**	0.011	-0.030**	0.002	-0.012	0.212	-0.018*	0.080
3-month horizon	0.081	-0.009	0.221	-0.009	0.298	-0.009	0.313	0.000	0.984
6-month horizon	0.081	-0.014**	0.011	-0.018**	0.006	-0.010	0.115	-0.008	0.238
12-month horizon	0.060	-0.008	0.009	-0.010**	0.004	-0.005	0.128	-0.005	0.187

APPENDIX D. BASELINE REPORT – WELL-BEING AND FOCUS GROUP
DISCUSSIONS ASSESSMENT

Well-being and Focus Group Discussions Assessment:
Baseline Study

DFID

EXTERNAL IMPACT EVALUATION OF THE
MILLENNIUM VILLAGES PROJECT,
NORTHERN GHANA

Date: February 2014

Submitted by Itad
In association with:



Results in development



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Acronyms

AFCON	African Cup of Nations
AIDS	Acquired Immune Deficiency Syndrome
CBPP	Contagious Bovine Pleuropneumonia
CHPS	Community-based Health and Planning Services
CSM	Cerebrospinal Meningitis
CWC	Community Welfare Clinic
CWSA	Community Water and Sanitation Agency
DCE	District Chief Executive
DFID	Department for International Development (UK)
FBO	Farmer-Based Organisation
FGM	Female Genital Mutilation
GES	Ghana Education Service
GHC	Ghana Cedi
GHS	Ghana Health Service
IE	Independent Evaluation
JHS	Junior High School
MiDA	Millennium Development Authority
MOFA	Ministry of Food and Agriculture
MP	Member of Parliament
MV	Millennium Village
MVP	Millennium Villages Project
NGO	Non-Governmental Organisation
PAS	Presbyterian Agricultural Station
PDA	Participatory Development Associates Ltd
PRG	Peer Review Group
P/VP	Poor/Very Poor

R/AR	Rich/Averagely Rich
SADA	Savannah Accelerated Development Authority
SHS	Senior High School
TBA	Traditional Birth Attendant
TENI	Tackling Education Needs Inclusively
VSO	Voluntary Service Overseas
WVG	World Vision Ghana

1. Introduction

Purpose

This report presents a synthesis of a qualitative focus group based baseline study undertaken as part of an independent impact evaluation of the Millennium Villages Project (MVP). The independent evaluation (IE) was commissioned by the UK Department for International Development (DFID) and the baseline phase was undertaken by Participatory Development Associates (PDA) Ltd with a team of one lead writer, one research coordinator, four researchers, and 15 research assistants under a consortium led by Itad Ltd. The report is intended to augment (not substitute for) the more detailed site-specific reports from 21 field sites sampled for the baseline. Ultimately, this component of the IE seeks to assess and understand the extent to which the package of ‘big push’ interventions, championed by the Millennium Promise and delivered through the MVP in Ghana’s Savannah Accelerated Development Authority (SADA) region, do indeed result in improved and sustainable development outcomes for the poor.

The qualitative component of the evaluation will primarily qualify and interpret the quantified changes expected in mid- and end-term rounds of the evaluation. Qualifying the quantitative findings will assist in explaining how and why change has or has not occurred as well as what change means to the individuals, households, and communities it affects, particularly in their governance and decision-making processes. At the baseline, the qualitative component focuses on profiling existing livelihood characteristics, identifying the underlying shocks and stresses that consign citizens in the Millennium Villages (MVs) to poverty, understanding the value that citizens place on their institutions, and explaining their perceptions of local decision-making dynamics. The baseline further attempts to explore, from the unique perspective of poor citizens, the varied and complex responses (including cultural processes and migration), which they deploy in order to counter the diverse vulnerabilities they are exposed to.

Overtime, one would expect to see a decline in the incidence of adverse coping strategies, a rise in the sustainability of livelihoods, and an increase in resilience to vulnerability as the MVP’s ‘big push’ theory takes root. The research also explores citizens’ perceptions of who the primary targets of the interventions have been thus far.

Fieldwork process

A preliminary research protocol outlining proposed areas of conversation was developed by PDA. Following extensive review by Itad and a Peer Review Group (PRG) constituted by DFID, the protocol was expanded to include more direct information on social services such as health, education, and agriculture.

The draft version of the research protocol was pre-tested at BNCN1 prior to its finalisation. The field test also served as a hands-on training experience for the researchers, enabling them to engage with the tools in order to more accurately estimate the duration of interviews, identify and reflect on the likely challenges, and hone their facilitation skills. Throughout the process, the field teams sought to be sensitive to the needs of participants. As a result, meeting times frequently had to be adjusted to suit participants’ schedules. The field teams were supported by two senior researchers, whose main inputs were ensuring quality in the data collection process, analysing field findings, and writing up the synthesis.

Within each of the field teams, routine reflection and analysis enabled them to explore common threads and interrogate conflicting information. The reflection sessions also provided opportunities for team members to learn from each other’s experiences, identify gaps in the dataset, and strategise about addressing emerging challenges. Based on the in-team reflections, the research team leader then aggregated the daily reports into a single site report per community. These site reports were shared with the lead writer and research manager who sought clarifications and additional detail. Two major review workshops were also built into the research programme, one after the field test and another after the draft site reports had been compiled, to share and interrogate the findings from each field team. These synthesis workshops were attended by two representatives

from each of the four site teams. For each significant finding, each of the research teams took turns to recap and explain their findings. This allowed the common threads as well as the key differences to be captured in the consolidated PRA report and subsequently compared with the RCA and quantitative findings.

The baseline took place in seven MVP communities that were selected in consultation with the SADA MVP team in Bolgatanga as well as with the four participating districts: Builsa North and Builsa South, Mamprugu Moaduri, and Mamprusi West.¹ Key staff consulted at the district level included Planning Officers, Coordinating Directors, and Budget Officers. Among the main criteria prioritised in the sampling process were levels of deprivation, population size, migration patterns, and the presence of minority ethnic groups. For each of the seven MVP communities selected, another two quasi-identical control communities were included in the sample. The purpose of using control groups is to enhance the robustness of the evaluation, especially in future rounds. Seven of these control communities were designated as ‘near’ the selected MVP communities and the other seven as ‘far’ from the MVP communities. In practise, the differentiation between the notionally near and distant communities was not always clear to the field research team.

Table 1. Distribution of sampled sites

MVP Community	Non-MVP/Control Community I (“Near”)	Non-MVP/Control Community II (“Far”)	Research Team’s Comments ²
Buili Sites			
BSMV1	BNCN1	BNCF1	BSMV1 is a section of Uwasi; BNCN1 is a community; BNCF1 is a section of Sandema
BSMV2	BSCN1	BNCF2	BSMV2 is a section of Wiaga; BSCN1 is a section of Chamsa; BNCF2 is a section of BNCN1
BSMV3 ³	BSCN2	BSCF1	BSMV3 is a community; BSCF1 is a section of Wiaga; BSCN2 is a section of Kaadema
BSCF1	BSCN3	BSCF2	BSCF1 is a community; BSCN3 is a section of Gbedema; BSCF2 is a section of BNCN1
BSMV5	BSCN4	BNCF3	BSMV5 is a community; BSCN4 is a section of Chansa; BNCF3 is a section of Chuchuliga
Mampruli Sites			
MWMV1	MWCN1	MMCF1	MWMV1 is a community; MMCF1 is a community; MWCN1 is a section of Kunamoari
MMMV1	MMCN2	MMCF2	MMMV1 is a Buili community in a Mampruli district (Mamprugu Moaduri District); MMCN2 is a community; MMCF2 is a community

Duration of fieldwork

The work on well-being categorisation took place from 12-30 November 2012, with the focus group fieldwork during January to February 2013. In hindsight, time allocated for the fieldwork ought to have been more liberal. It would have allowed for more time to be spent at each site, building the trust that is essential to quality participatory research, and to better accommodate participants’ need to attend to their multiple social and livelihood agendas. It would also have enhanced opportunities for further triangulation of information obtained from the interviews.

¹ At the time of commissioning the impact evaluation, these would have been two districts – Mamprusi West (now reconfigured as Mamprusi West and Mamprugu Moaduri) and Builsa (now subdivided into Builsa North and Builsa South).

² See also Definitional Issues, below.

³ Also spelled Naandima.

Analysis and synthesis of data

Several purposive steps were taken to systematically capture, manage, analyse, and synthesise the information from the focus group interviews. The sequencing of research activities, proactive involvement of the focus groups in analysing their responses in situ, and feeding back our interpretations for their validation/review all contributed to ensuring that participants' realities were correctly interpreted. Further, the research teams prepared detailed daily reports and held regular evening/weekend meetings to compare and reflect on their findings, and to identify gaps and areas lacking further clarification. These were then factored into the revised planning of the following days' schedules.

Based on the internal team reflections, the research team leader then aggregated the daily reports into a single site report per community. These site reports were shared with the lead writer and research manager who sought clarifications and additional detail. Finally, the site reports were systematically interrogated during a dedicated three-day synthesis workshop attended by two representatives from each of the four site teams. For each significant finding, each of the research teams took turns to recap and explain their findings. This allowed the common threads as well as the key differences to be captured in the consolidated PRA report and subsequently compared with the RCA and quantitative findings.

2. Well-being

In order to properly identify the poor, the engagement with the participating communities commenced with an exercise to characterise well-being/wealth and differentiate individuals and households by wealth/well-being status. Participants were encouraged to share their own categorisations of poverty and well-being and to identify households matching the respective categories. The recurring metrics by which participants distinguished poverty from wealth (if subjectively) were:

- Annual harvest volumes; the well-off are those perceived to have year-round food security
- Range and quantum of physical assets; the well-to-do have a wider array of capital assets and in more substantial amounts
- Various norms and cultural practices; e.g. widows are largely considered to be poor mainly because they tend to lack control over their deceased husbands assets and because women lack decision-making power
- Health and educational status
- Participation in community life

Four broad levels of well-being were generated through the exercise. These are, in descending order of well-being:

- Those perceived to be clearly rich/well-to-do
- The moderately rich/moderately well-to-do
- The poor
- The very poor

The categorisation often takes the form of a simple bifurcation: well-to-do and poor. These are sometimes identified in the site reports as rich/averagely rich (R/AR) and poor/very poor (P/VP), respectively.

Particularly in the Builsa communities and MMCF1, the field teams observed that the poor groups often lacked self-confidence and had difficulty understanding the issues being discussed. In contrast, the well-to-do were confident, could appreciate the issues more easily, and were more articulate. This may be in part a reflection of differing levels of exposure and interaction with urban people. The local names for each of the four categories are indicated in Table 2.

Table 2: Local categorisation of well-being cohorts

Language group	Rich/well-to-do	Moderately rich	Poor	Very poor
Mampruli (spatial area: Mamprusi)	<i>Bundana</i> (rich person)	<i>Wahaladana/Waradana</i> ⁴ (one who is struggling but managing)	<i>Faradana,</i> <i>Onsoa,</i> <i>Janjen,</i> <i>Nongu</i> (poor person, one who has nothing)	<i>Nondana</i> (extremely poor)
	<i>Bundan-tiri</i> (rich person who has everything)			<i>Nambo</i> (extremely poor)
Buili (spatial area: Builsa)	<i>Jigsura</i> (wealthy person) <i>Dobroa</i> (weighty, heavy); at some sites (BNCF1 and BSMV2), variations include: <i>Ghantanyona</i> and <i>Pagroa/Pagra</i> (all meaning rich); at BSCN4 and BSCF1, the rich are referred to as: <i>Pagrim</i> (strong) or <i>Nyontanyona</i> (property owner)	<i>Azunchonga</i> or <i>Zunchong</i> (well-to-do person)	<i>Jajak</i> (poor person) At BNCF1, there is also <i>Jajakpiak</i> (harsh poverty); another variation at BSCN4 is <i>Nuwoba</i> (weak person)	<i>Nubowa,</i> <i>Akanuroa;</i> at BSCF2 and BSCN4, there is also <i>Jajak silinyieng</i> (no hope poverty, most used in reference to poor people who are disabled); another expression used at BNCF1 is <i>Nuwobataaling</i>

Livelihoods

In all of the 21 communities, farming is the major livelihood. Poor women and men are mainly involved in subsistence farming of food crops and, to a lesser extent, livestock. Farm sizes were cited as being between one and three acres.⁵ Poor women's farms tend to be the smallest and are dominated by vegetables, legumes, and groundnuts requiring relatively less labour and/or other inputs. In contrast, men cultivate mainly carbohydrates (maize, millet, and guinea corn), with legumes and pulses as supplementary crops. In many cases, women do not have full control over the plots they farm as they are considered to be visitors (if married) in their adopted households or as temporary members of the household (if unmarried). In a focus group discussion in BSMV5, a poor woman noted how "members of the household are the main source of agricultural labour, [with] everybody, including children, playing a very important role." She further observed that, "if you have a large family, it means you can sow and harvest more."

Richer men tend to have the largest farms (supposedly over six 'acres,' see preceding footnote) and keep the larger ruminants. They generally do not use their own labour and employ members of other households. They have greater access to inputs such as land, seeds, fertiliser, labour, tractors, ploughs, and other equipment. Though they generally farm the same crops, their farms tend to be of commercial scale and are more diverse

⁴ In several of the interviews, individuals reversed the terms *wahaladana* and *faradana*, as is reflected in some of the site reports.

⁵ However, it is known that farm sizes tend to be hugely inflated (not uncommonly, by two to three times) by illiterate participants during qualitative studies.

and dispersed. Richer women’s farms are somewhat smaller than those of the rich men and are dominated by legumes, beans, pulses, groundnuts, and bambara beans.

Other livelihoods

Rich men may also participate in trading, often as middlemen, in cereals (maize, millet, and guinea corn), livestock, and some agrochemicals such as fertilisers and weedicides. In the Builsa communities of BSMV2, BSCN4, and BSCF1, rich men also finance artisanal mining activities though these are mostly illegal.

Poor young men provide labour particularly in the form of digging in the mining pits. In BNCF1, young men also participate in sand mining and stone quarrying⁶ (e.g. in BNCF3, BSMV2, and BSCF1) (Figure 1).

Figure 1. A household by their quarried stones, BSCF1



The poor also hunt game and harvest roofing thatch, which the rich purchase from them. Both the poor and the rich are involved in charcoal production, but the rich have larger operations. Poor men engage in by-day labour,⁷ and weave ropes from *kenaf* fibre and produce baskets/*zaana*⁸ mats from guinea corn stalks. Poor young men are also involved in loading luggage and providing services as head porters in the markets.

Some poor women are involved in retailing cereals, typically in meal-size portions. They also produce charcoal and gather *tama* (shea nuts) for sale to the richer women. They sell their labour for farming, quarrying stones, plastering mud walls, and providing household chores for the rich. In a few communities such as BSCF1 and BSCN4, they also make and sell clay water storage jars and cooking pots. Other women rear fowls and the occasional small ruminant, only to be liquidated in an emergency.⁹ Indeed, in spite of nutritional challenges which many households face, domestic fowls are not routinely used in the cuisine of poor households. While

⁶ So-called “single-axle” truckload (4-6 m³) is sold for GHC 75-80, with GHC 30 going to the chief and another GHC 30 to the immediate landholder.

⁷ Wage labour with payment typically made on the same day.

⁸ Straw.

⁹ Only a few decades ago, women were largely prohibited from keeping any livestock form that was more substantial than a fowl. Though women’s involvement in raising small ruminants (mainly goats, but also sheep) is increasing, a married woman must still seek her husband’s consent before she can dispose of it. In the words of one woman during an interview, “they [the men] own us and everything of ours.”

the well-to-do may slaughter them on festive occasions, the poor generally hold onto their livestock almost exclusively as security rather than for their nutritional value.

In contrast, rich women may cultivate wholesale grains, shea nuts, and pulses. They are also more likely to process and trade in shea butter. Others are involved in trading provisions, alcoholic beverages, and smoked meats. Male and female salaried workers in the formal sector tend to be considered the rich.

Sustainability of livelihoods

In BSCF1, hunting is banned between January and February to protect wildlife stocks from becoming extinct. Similarly, in order to sustain their shea harvesting and processing livelihoods, some Buili communities such as BSMV2, BSCF2, BSCF1, BNCF1, BSMV3, and BSMV1 have formed watchdog committees to police the fields to prevent shea trees from being chopped down for fuel wood, charcoal, and fodder. The fluctuating yields present a challenge to the sustainability of the shea processing industry. The availability of alternative cooking fats and skin creams creates competition to shea butter locally. However, those able to access export markets through non-governmental organisation (NGO)-supported processing and marketing interventions are generally able to make adequate incomes.

The rich tend to use agrochemicals whereas the poor depend on animal droppings. Because the poor have fewer animals, they have less access to these opportunities despite the increasing depletion of their soils. At several sites, poor farmers also complain that they are unable to access government subsidised fertilisers. Even when subsidised fertiliser and traction services are available, they tend to arrive too late in the farming cycle. Access to veterinary services is perceived as important to livestock survival, but is difficult to access, especially by the poor. This undermines the sustainability of the local livestock industry with knock-on effects on access to animal traction services.

Poor households sometimes employ rotating pooled labour arrangements for maintaining their farms and harvesting crops. In the agricultural slack season, the practise is extended to include house construction. Somewhat comparable to the pooled labour arrangement for men, women are used in some communities by the Builsa Community Bank or from their own initiative to mobilise thrift savings in groups. These savings assist women in financing their micro-enterprises.

Constrained access to productive water resources in the form of dugouts/dams undermines the sustainability of agricultural production, particularly in the dry season. This is because the northern savannah has a single rainy season. Those who farm the fertile areas around the existing dams often lose their crops to livestock because the areas are not fenced.

Owing to the increasingly volatile climate and the overexploitation of the same lands without any form of crop rotation, many yields are declining. In the Mampruli sites, groundnut yields have been badly affected, compelling many farmers to shift attention to cultivating beans. Buili communities also report that millet yields are dropping. However, their staple foods are so dependent on millet that they are unable to make an equivalent shift to other crops. Decreasing yields and rising food insecurity are also making dry season gardening a greater priority.

The increasing demand for cash to finance needs such as the National Health Insurance Scheme (NHIS), school supplies, migration, and petty supplies such as dry-cell batteries and lighting fuel is forcing farming households to sell a larger proportion of their harvests. The commoditisation of marriage and funeral rites, festivities, and sacrifices are other contributing factors. The monetisation of the local economy was also reported to account as a preference to do 'by-day' work among young men.

Assets and opportunities

In most communities, land availability is not an issue. The lack of access to other relevant farming inputs such as labour, water, equipment, and agrochemicals prevents the poor from farming larger lots.

Dawadawa and shea nut trees are perceived as important communal assets. However, processing and marketing remain challenges that undermine the ability to extract optimal value from these microenterprises. For now, poor women are obliged to sell their shea nuts for very little income.

Some communities have building sand or construction-quality stone. Whilst labour is abundant, the constraints in accessing the other factors of production result in communities being unable to use them. High rents further undermine the poor in their bid to use these resources.

Some communities identified their shrines and inanimate deities or hippos as potential revenue-mobilising assets. They believe that the communities could benefit more if the spiritual consultation and tourist services were better organised. Currently, patronage is poor because of the influence of Christianity and Islam, which abhor idols.

Functional dams appear to make a difference in the well-being of those who can access the service. SADA is seen as constituting an opportunity both for developing water resources as well as for exploring and developing market centres that serve whole clusters of communities by lowering transport costs.

Cultural practices that facilitate exit from poverty

Men use labour cooperatives in some communities as a way of mobilising labour to perform critical farm tasks and to save on labour costs. The collective spirit motivates the group to work harder. Further, different households plant at slightly different times, thus staggering the community's labour resources. Women use such arrangements for plastering floors and walls during home construction and renovation.

The extended family system provides support to the poorest members of the lineage and helps reduce the incidence of destitution. This can also be a drain on relatively well-to-do members.

Traditionally, funeral rites and ceremonies (*kuunakumsa* in Buili) are suspended during the farming season. In the savannah where there is a single rainy season, this allows communities to focus energy on farming and to conserve food and other assets that would have been spent on funerals.

Cultural practices that hinder exit from poverty

The section below on vulnerability provides a description of traditions that keep poor people trapped in poverty. Additionally, female genital mutilation (FGM) is still common in some communities and can result in infections, long-term morbidity, or even mortality. The persistence of unorthodox and dishonest scales¹⁰ in wholesaling businesses exploits poor traders and keeps them in poverty.

¹⁰ The standard bowl used in measuring cereals is called *kaaroo ka beruk* in Buili, meaning "the farmer is a fool."

3. Vulnerability

Shocks

In almost all of the focus groups interviewed, chronic illnesses such as blindness, AIDS, tuberculosis, and stroke/paralysis were cited as major causes of poverty. Participants often described these as ‘mysterious illnesses’ because they tend to defy treatment. Chronic diseases render those affected unable to work effectively and also deplete household savings, leaving the entire household poor. When a member of a household is afflicted by a chronic illness, it may also require some able-bodied members to devote their energies to caring for that person, further depleting the labour force available.

At every site visited by the research team, death, especially of the male breadwinner/head of household, was a serious source of vulnerability. Death of any household member can be detrimental because of the high costs associated with funerals. Funerals have financial implications (e.g. paying undertakers/gravediggers) as well as cultural implications such as the practise of feeding large numbers of mourners over several weeks. When the main breadwinner dies, the impact can be particularly devastating. The breadwinner could be either a husband or a member of the household who has migrated out of the community but regularly sends remittances.

Box 1: Funerals in BNCF2

Observing a funeral (*kuunakumsa*) can be a costly affair in BNCF2. In this community, funeral rites tend to be performed during the ‘lean’ or ‘hungry’ season, when household food stocks are at their lowest. This means that bereaved households often have to buy the food needed to serve their guests. Lamenting this cultural practise, one rich man observed, “you don’t have, yet you are compelled to waste the little food or resources you have on funerals.”

Women suffer disproportionately in comparison with men as widowhood rites add to the cost. In order to give her husband a ‘fitting’ funeral, a widow must provide the utensils such as gourds and pots as well as foodstuffs (typically yam, bonbota fish, millet, rice, and bambara beans) and drinks (*pito*¹¹ and *akpeteshie*¹²) with which to prepare the funeral meals. Additionally, a widow may also be compelled to finance the cost of transporting guests from her husband’s side of the family to the funeral.

Mortality among livestock such as goats, guinea fowls, and working donkeys can be devastating for the poor. Livestock deaths tend to result from livestock diseases (e.g. CBPP¹³) but also from the collapse of animal housing during rainstorms or floods. Access to veterinarians and wider agricultural extension services is not reliable and even when they are vets will generally not go to vaccinate animals unless there are large numbers. This is because once a vial is opened to inject an animal it cannot be resealed and used again. According to a vet officer interviewed, vaccination and treatment of livestock diseases can be expensive for the poor and cost as much as GH¢ 4 per animal.

Livestock theft is another vulnerability mentioned by poorer men. The majority of theft tends to be attributed to rustling by nomadic Fulani herdsmen. Livestock loss increased in the dry season when animals travel long distances from the farmstead to graze and find water. The risk of losing livestock to thieves also arises when entire households leave the village to attend night-time funerals outside their community.

In BSCN3 and BNCF2, poverty created tension and conflict arising from suspicions and accusations. These perceptions are fuelled by NGOs and state agencies that identify project beneficiaries without using transparent approaches, giving the impression of favouritism and unequal access to goods and services.

¹¹ *Pito* is an indigenous savannah beer of varying strength brewed from millet or, less frequently, sorghum (<http://en.wikipedia.org/wiki/Pito>) and is typically served without chilling.

¹² *Akpeteshie* is a local spirit with an alcohol content of between 40% and 50% by volume (<http://en.wikipedia.org/wiki/Akpeteshie>). It is also known in the savannah by the corrupted name *apataasi* (or, in some cases, *petesi*).

¹³ Contagious bovine pleuropneumonia.

Communities also perceived spiritual factors as another cause of poverty. Spiritual forces were felt to cause chronic illness or prevent hardworking people from prospering. Less directly, sacrifices to the local deities (*bogta kaabka*¹⁴) were also cited as having impoverishing consequences. It was observed in BSCN4 that “a lot of animals are [slaughtered] and plenty of food prepared,” with much of it uneaten. Sacrifices are routinely prescribed by soothsayers when consulted by the sick. The BNCF2 field team noted that, “when ... the soothsayer ... says a sheep or goat must be offered to the gods in order to be well, one must do it even if that is his last animal.” This comment was echoed in interviews in BSCN4, BSCF1, BSCF2, BNCF1, and many of the other communities. In BSCN4, chronic sickness is interpreted to mean that “your ancestors are not happy with you [and] that is why such a sickness has befallen you; therefore you need to appease the gods.” In BSMV2, a household “may not eat [meat] for a whole year unless [an animal] dies ... and sometimes, only undertakers are allowed to eat the meat [sacrifices].”

Some festivals and sacrifices were reported to be obligatory. These include the *feok bogta*,¹⁵ an annual animal and food crop sacrifice to thank the deities for a successful harvest. The BNCF2 field team was told, “whether you had a good harvest or not, you still need to [sacrifice to] the gods and ask [them] for long life.” Households also make costly sacrifices to thank the gods for the successful return of a migrant member of the household or other blessings. Other spiritual sacrifices include ancestral tributes and death rites.

In households lacking labour, the situation is worsened by out-migration of able-bodied males in search of work. This affects households’ capacity for crop production and to tend to their livestock. Poor households frequently complained of losing their animals due to youth migrating away from the communities.

Sudden, lump sum educational expenditures, especially at the secondary level, also contribute to poverty. Other factors perceived as contributing to poverty include divorce and the expectation of alcoholic refreshments during funerals. In light of declining soil fertility, polygamy and adultery create additional stresses on the household budget and make it harder to finance household needs. In MMCN2, insensitive grazing practises where cattle drift onto cropped lands was identified as a cause of poverty.

Cyclical factors and trends

Dry season wildfires were identified as drivers of poverty. The November and December fires have the most devastating effects as they destroy entire harvests. Often, fires are caused by poor people hunting for bush rodents, the Fulani clearing pathways for cattle, recklessness, and even envy. Rice, which tends to be harvested late, is disproportionately affected. Maize, millet, and groundnuts are also lost when grown far from the homesteads. The rich often own large farms in distant, forested locations and thus are disproportionately affected by wildfires. Shea trees are also affected and tend to suffer poor fruit yields after repeated fires.

Floods are a cyclic phenomenon that affects the poor. Floods occur mostly around August to September when rivers overflow in BNCF1, MWCN1, and BSMV5, or when excess water is deliberately spilt from the Bagri Dam upstream in Burkina Faso. The poor tend to be disproportionately affected because the walls of their homes are built less robustly with unreinforced earth and their small farms are in low-lying, flood-prone areas. The poor often farm along the flood-prone riverbanks because the lands are more fertile and require less fertiliser. The crops most affected in these low-lying areas are maize, groundnuts, and fish.

Participants complained about more droughts and capricious weather patterns. Rains are starting later and stopping earlier, shortening the fertile season. Lamenting the challenge, a man observed in BSCF1 that, “you may sow your crops early this year based on the experience of the previous year and [then] the pattern changes. Two years ago, at some time it was drought [but] there were floods the next year at that same time. Sowing ... is a hit-and miss affair in this community.” Though widespread, poor/very poor men tend to be most

¹⁴ Literally “sacrifice to the gods.”

¹⁵ “Feast [to the] gods.”

affected by the changing climate. Crops most affected by droughts include rice, groundnuts, millet, and bambara beans. The effects include low yields and difficulty harvesting ground pulses when the ground is too dry. Droughts also affect access to harvested rainwater for domestic use.

Among the Buili-speaking communities, alcohol abuse tends to peak in the post-harvest festive period when freshly harvested farm produce is sold. Profits are sometimes used to buy alcohol and thus contribute to impoverishment. Followers of Islam and Pentecostalism reported lower levels of alcohol abuse in the Mampruli-speaking communities, as both religions abhor alcohol intake.

The growing commoditisation and cost of marriage rites were cited as contributing to poverty in some Buili-speaking communities. Grooms have to sell prized assets to finance the high bride wealth of goats, guinea fowls, and dogs.¹⁶ The BSMV1 field team found that “the [groom] and his family ... sell almost all of their assets to pay the [bride price], and return with their wives in hunger.” Before, only a gallon of local gin, a small quantity of tobacco, and some salt as a gift to the bride’s father was required.

Impacts of vulnerabilities

Impacts at the community level. Fires and droughts do not just destroy farms but also leave many people idle, fuelling potential conflicts. On top of destroying the environment, particularly fodder, windbreaks, and loss of soil nutrients and fertility, fires also force livestock to travel longer distances to graze, increasing their risk of getting lost through theft or hunting by predatory animals. In addition, fires lead to reduced yields and higher production costs with a heavier reliance on fertilisers. The accompanying loss of fuel wood and building timbers means that households have to travel longer distances to get these.

Similarly, floods wipe away assets and slow down the implementation of community action plans. When adversity strikes, the community has less ability to perform ceremonies and are less able to support ill or disabled community members, feeding disunity, and increasing tensions.

In close-knit communities, the death of a rich person often affects other households who would ordinarily benefit from his/her largesse. A rich person’s death also imposes additional burdens on ‘average’ households to fill the void.

In MWCN1, violent crimes are often attributed to Fulani and were said to force people to relocate away from the community out of fear. It appears that it is the nomadic Fulani (as opposed to Fulani settlers) who may be responsible for destroying farmers’ crops when they graze their cattle. The members of the MWCN1 community live in fear of these nomadic Fulani, who they accuse of raping their women and stealing animals and motorbikes.

Impacts at the household level. The onset of poverty was said to weaken marriage bonds. When men are unable to fulfil their traditional roles of providing for the home, women sometimes respond by making excuses to deny them sex out of fear of getting pregnant. Petty quarrelling can quickly degenerate, leading women to divorce their husbands and remarry men they perceive to be more capable of financially supporting them. In a focus group discussion with poor men in BSCF1, a participant shared that, “when we face drought and our harvest is poor, our wives divorce us because we don’t have enough food to take care of them and the children.”

Crime is a further consequence of destitution. In some communities, young members leave to find work elsewhere. For example, the youth in BSCN4 may go to Kaadema to participate in *galamsey* (illegal gold mining), leaving their households short of farm labour. Less commonly reported is the practise of child trafficking. In

¹⁶ The total cost is easily in the region of GHC 500. As part of the bride-wealth package, dogs are intended as meat, not as pets.

BSCF1, itinerant women traders who visit from the south to buy foodstuffs in bulk were said to lure young girls away with them.

Another adverse outcome at the household level is that children sometimes become disrespectful towards their parents, perceiving them to be irresponsible when they are unable to provide for the family. In BSCF1, such reports were associated with children who have alternative ways of getting money. For example, a boy may get a share of the proceeds from a stolen goat (Figure 2), a girl may receive monetary gifts from her boyfriend(s), and either may earn small amounts from piecework.¹⁷ It is not uncommon for such children to venture on migrant journeys without informing their parents.

Figure 2. Remains of a stolen goat, BSCF1



When desperate households are compelled to borrow from moneylenders, they easily become entrapped in unsustainable debt.

Impacts at the individual level. Children suffer most when there are inadequate food stocks. They fall ill more easily and it affects their participation at school. In households with livestock, boys have to travel longer distances to graze the animals, affecting their school attendance. Girls from poor households may also fall into premature pregnancy or be given away to marriage at an early age in exchange for the bride wealth that the father is entitled to. When girls are unwillingly confronted with this prospect, some decide to leave the community even with the huge insecurities such a decision entails.

Women often have to work harder when a household loses the breadwinner. Some women choose to migrate and end up neglecting their children. Both situations may also force children into migrant child labour to supplement the household's livelihood. In some cases, this takes the form of 'fostering' with urban-based

¹⁷ In some communities (e.g. BSCF1), children participate in stone quarrying and in crushing rocks for use as coarse aggregates in the construction industry. Boys may help herd cattle. Children may also hawk foods/ice water or carry head loads for a small tip.

relatives. However, such children are often abused and not allowed to continue their schooling as they have to care for the children of the nuclear family and/or help with the household's economic activities. This practise is reportedly declining in MWMV1, BSCF2, and MMCF2, where parents now attach greater priority to children's schooling. This practise is more common in large households.

In Buili communities, some citizens turn to alcohol and hard drugs when they lose their livelihoods or suffer major adversities.¹⁸ Alcohol abuse was reported for both men and women. Desperation also increases the risk of children becoming exposed to vices as they lose faith in their parents and turn elsewhere for advice and solace. In one community suicide was cited as a response to destitution.

Coping strategies

Between the end of October and the end of March, after households have harvested their own crops, men and women participate in savannah-based migration to more fertile 'overseas' areas or to the river valleys where they participate in production processes.

All year round, older and younger poor men and women produce charcoal and harvest fuel wood, which women sell to middlemen. This strategy is more lucrative during the rainy season though it is harder work.

Poor households, especially women and children, may also feed on the pulp of various fruits and berries such as shea from May to August, dawadawa from mid-March to May, or passion fruit, blackberries, ebony, sunsuma, vuungsa, koglogsa, and swalinpiak, often scavenged from the wild. The baobab fruit may also be used for porridge and in the rainy season baobab leaves (*kooka*) are used for preparing soups. Between April and August, kampuork and gora are other wild leaves that households use as vegetables to accompany their carbohydrate dishes.

Poor households also rely on local herbs and traditional knowledge to treat livestock diseases during the lean months. They prefer this to relying on formal veterinary services in February to March for fowls and June to August for ruminants. Many households reduce their nutritional intake both in terms of quantity (energy) and quality (especially protein) during the hungry season. When this happens, children are less likely to have breakfast before school.

Hunting for both domestic consumption and to sell on the market increases during this period. Wildlife hunted ranges from partridges and wild fowls to reptiles (alligators, crocodiles, snakes, and monitor lizards) to rodents (rats and greater cane rats) to guinea fowl eggs and fish. Deer, antelopes, hares, warthogs, monkeys, and rabbits are also hunted.

The poor 'beg'¹⁹ for foodstuffs and planting seeds from the rich. Out of desperation, some move between compounds where funerals are taking place with the hope of getting a free meal as compensation for commiserating with the bereaved family. When all else fails, some poor people are compelled to steal foodstuffs from their neighbours to survive.

Child poverty

In MMCN2, children from poor homes were described as "look[ing] dirty; they wear dirty clothes and look thin and sickly. Some wear slippers to school or go barefoot." Poor children were described in MMCF2 as looking "dirty ... wretched" and malnourished, causing some to resort to stealing. They were portrayed as having a "sorrowful" countenance. A respondent in BNCF2 observed that poor children "cry a lot due to lack of food" whilst informants in MMCF1 noted that children from poor homes do not merely "look sick" but that the experience of hunger actually "results in sickness." In that community, children themselves felt that "those from

¹⁸ The research team encountered numerous cases of drunken men in the fieldwork. This was attributed, in part, to a bad harvest in late 2012.

¹⁹ Begging in this context includes borrowing.

rich homes easily pass their exams” and walk with a firm gait unlike their counterparts from poor homes. In several communities, orphans and children with disabilities were seen as being particularly disadvantaged.

Overall, the most recurrent manifestations of child poverty are hunger/malnutrition and schooling deficits, which the groups interviewed made links between the two. Hunger prevents children from the poorest households from attending school regularly or participating effectively in class. Children who have not been fed in the morning are reluctant to go to school. In the ‘hungry season,’ some loiter or scavenge in the fields for food whilst others migrate to find work. It is revealing that in BSCN1, every child interviewed had experienced such labour migration. They explained how they were compelled, by lack of choice, to sleep on shop fronts at the destination localities, exposed to the cold and rain. Girls are prone to rape during such missions.

In farming households that experience labour deficits, parents may force their children to join them in the fields as a condition of being fed. A girl in BSCF1 explained about girls who leave the community to find menial work in the southern markets: “We go to look for money to buy school items such as books, school uniforms, school bags, and pens. Some of us travel on our own while others are sent by their parents to wash dishes in chop bars [or to work as] head porters. Some get pregnant while others get married and stop school. We have [some] married pupils [in the] school here. Their parents were not able to look after them so they got married but they still see the need for an education.”

In the rainy season, there may also be opportunities for poor children to work locally on farms. Others support themselves by helping to herd cattle, hawking foods/ice water or offering themselves as head porters in the larger markets. Some children engage in more hazardous work such as quarrying and crushing stones for use on construction sites.

Figure 3. Empty desks vacated by girls who have gone to sell at the market, BSMV5



Figures 4 and 5. Stone quarrying at BNCF3**Figure 6. Schoolboys transporting harvested beans while school is in session**

Poor children find it difficult to concentrate at school if they are hungry. Such children tend to return home more frequently during the daily breaks in search of food. This, in turn, contributes to losses in learning time. In the worst cases when children frequently miss classes or are routinely late, they end up dropping out because they cannot keep pace with the lessons. Another contributing factor to the dropout rate is that teachers often flog schoolchildren when they are late to school. Large numbers of children routinely face this risk because they have to look for food or money or because they have to finish chores at home before setting off for school. Children may also be subject to verbal abuse or corporal punishment if they come to school in tattered uniforms or without proper footwear. This practise instils fear in the children and leads to them to leave their education early.²⁰

²⁰ As shown above, poor children are the ones who tend to have problems with school uniforms and to be routinely late to school.

Figure 7. Girls drawing water for domestic use while school is in session, MMMV1



Figure 8. Hungry schoolchildren harvesting baobab fruits, BSMV5



Among the specific expenditures that keep poor children out of school are the cost of school uniforms, sandals, books, and a range of school-based levies. Echoing the link between household poverty and children's schooling, a poor woman in MMCF2 noted, "my daughter was selected [to attend] SHS...but was unable to...due to lack of money." In communities where few children ever make the grades needed to move beyond JHS, parents begin to feel that it is not worth the sacrifice it takes to keep their children in school. Long distances to school can also be a disincentive to regular attendance.

Box 2: Baba, an 11 year old drop out in MMCF1

Baba²¹ stopped attending school several months ago when his only pair of the state prescribed school shorts were torn. His peers ridiculed him any time he wore those shorts. Because he knew his father was facing financial challenges at the time, he did not bother mentioning to him that he was dropping out of school. Prior to that, his father had struggled to pay the school-based levies that were sometimes imposed by the school. Baba also skipped school when there was no breakfast at home. Teachers at Baba's school typically attended only four days a week, with no explanation for the lost day. His teacher has not followed up to find out why Baba no longer attends classes.

According to Baba, he is not pleased to be out of school because he knows that he is missing out on acquiring an education. He also misses the football games that school would have provided the opportunity for him to play. Since dropping out, he has continued to read and his father has promised to get him a new pair of shorts once he can afford the cost.

Baba cited faintness as a common result of hunger. He also observes that, "when you don't eat...you easily become angry and...want to fight...at the least [provocation]. [And] when the master teaches, you get some and you don't get some." He also confirmed that children are more prone to being pulled out of school during the farming season to help out on the family fields.

Baba has mixed feelings about the impact of migration. On the one hand, "when our parents migrate we are not able to get money to pay contributions in school." On the other hand, his mother's migrant remittances have bought him a range of needs such as "pens, footwear, books, shorts, food, and water."

Girls from poor homes tend to be prone to dropping out of school. The causes are varied but largely rooted in poverty. Whilst some migrate to find work, others are thrust prematurely into unequal marriages. Others fall into the teenage pregnancy trap through similarly unbalanced experiences with transactional sex. In an interview in BNCF2, the men observed how poor girls "sell their bodies to men in return for money or favours, as a way of coping with the situation." Child fostering is when parents are unable to provide for their children and give them away to better off urban households as unpaid house helps. This is another common consequence of child poverty, especially among girls.

Children from poor households migrate more readily than their counterparts from well-to-do households. Poor children also miss school in order to help on the household farms and fields. According to the head teacher in MMCF1, "children absent themselves for...three days [at a stretch]...during the farming season," sometimes to harvest beans or to do other farm work. In BSMV1, the field research team noted that it is common "in hard times, [for] female pupils [to be] compelled to marry early [i.e. under age] just to bring some money or favours from their husbands' homes [to their parents' homes]." Girls may also be compelled to stay at home to look after their younger siblings to allow their mothers to pursue their livelihoods in the markets or elsewhere.

²¹ The names of informants have been changed in this report to protect their identity.

4. Migration

Poor men and women appear to migrate more than their wealthier counterparts. It is quite possible, however, that this appears so because there are many more poor people in the communities. The wealthier are also more likely to have well-to-do relatives or friends in the destination cities and towns, thus their experiences when they migrate are not as challenging.

In most of the communities sampled, there is a sense that more people are migrating, including children migrating independently. Much of the migration is seasonal. Many of those who migrate long-term do not actually set out to be away for long, but get trapped by the relatively better conditions or by constraints in accumulating the resources they set out to acquire.

The children and women from poorer homes often end up in southern cities and big towns such as Tamale, Kumasi, and Accra to provide head portage services, assist in the local culinary industry, sell traditional snacks, or draw pushcarts.

The young men tend to migrate seasonally to more fertile farming areas to hire out their labour. Those who go specifically to find farm work stay away for three to six months, often returning in time to prepare the land ahead of the savannah's rainy season. There is greater variability in the durations that others stay away.

Schoolchildren from poor households migrate seasonally for short periods to find work. This generally occurs during their transition from JHS to SHS or vacation periods so that they can buy schooling supplies such as books, mattresses, and chop boxes.

Many people use dry season migration as a way of escaping idleness and the associated temptations such as drinking alcohol. Some also use the migration experience to gain exposure to other places. Except when women are pregnant, men in Siniesi-BNCF2 will not permit their wives or partners to engage in short-term migration for fear that they will engage in extramarital sex.

Benefits of migration

Poor households and nuclear family members benefit more from migrant remittances than rich households and extended families. Remittances do not only come from adult migrants but also from children compelled to leave home in search of a more secure life. This helps households meet their needs during the lean season or to finance important expenditures relating to healthcare, children's education, agriculture, and renovating their compounds. The poorest members who are unable to migrate may also benefit from the farmlands and rooms vacated by those who migrate for long periods. When the able-bodied leave to farm elsewhere after the harvest, it eases pressure on the remaining food stocks as there are fewer mouths to feed.

It was sometimes observed that migrants return with new or different varieties of seeds and crops, diversifying their households' crop portfolios.

Costs of migration

Schoolchildren reported suffering emotionally when their parents leave home. Some may drop out of school or their nutritional needs may be compromised if their parents fail to remit money. Girls appear to be affected more adversely and sometimes have unintended pregnancies. Often children who join their parents on short migration stints end up suspending their education until they return.

When youth migrate for long periods, households may suffer from the unavailability of prime farm labour and labour to address other vital household needs such as housing maintenance. Livestock become harder to care for and result in losses due to theft and death. Furthermore, older and chronically ill members can be severely disadvantaged when they have to access healthcare services alone if the stronger youth have left the community.

Older men and women interviewed reported that migrants sometimes return with unsociable habits such as stealing livestock. Respondents perceived that most community members with so-called ‘strange diseases’ such as AIDS and TB acquired them whilst on migration stints. Informants also noted that households often have to incur financial costs to bring back sick or deceased migrant members or to care for them when they contract ‘strange diseases.’

In-migration

The main in-migrants are teachers and nurses who provide services in schools and health centres. Fulanis come to tend livestock and wealthier farmers commute from nearby towns and districts to undertake commercial farming. Some not-so-well-off households stay for four to five months to farm for themselves. Wealthy women from the south spend up to two weeks at a time several times each year to do bulk shopping for farm produce.

In-migration enables community members with financial resources to access farming labour on large rice and bean farms for commercial purposes. In other communities such as MWMV1, community members can hire out their labour to richer in-migrant farmers. Some communities also benefit from Fulani settlers who take care of their livestock and supply milk. Where relationships with the settler Fulanis are cordial, settler Fulanis help keep nomadic Fulanis away from the community. In-migrants also benefit from access to fertile lands.

There are disadvantages of in-migration as well. Under-age schoolgirls sometimes get lured into sex by migrant teachers and artisans. Livestock get stolen by nomadic Fulanis feigning an interest in settling to look after cattle for local households. These Fulanis were also accused of being responsible for rapes and other violent crimes.

Enablers of migration

Migration is facilitated by access to long-distance transport services. The mobile phone has also made it easier to communicate with kith and kin in the south.

Having a reasonable education and relatives in the destination town also provides better prospects for a decent migration experience. Those without a good education can migrate if they can communicate in the languages used at the destination, however they may find it more difficult to find non-exploitative work and decent accommodation.

Constraints to migration

Those afflicted by chronic poor health, disability, and old age face greater hindrances if they wish to migrate. People are also constrained if they have social and community responsibilities that are difficult to delegate. In particular, not having someone reliable to take care of one’s dependants or land assets is a real hindrance. The inability to speak the southern languages also makes migration more difficult.

Married women and older girls may be prevented by their husbands/fathers or lineage heads from migrating if it is believed that they may not return. The increasing awareness of thwarting child trafficking is, in some cases, causing the security agencies to prevent children from travelling unaccompanied.

Seasonality of remittances

Migrants often send remittances at the start of the farming season in April,²² either to support their families to procure relevant inputs or to assist with routine household provisioning. Other peak periods are the feok festival just before Christmas as well as New Year, Easter, and funerals when long-term migrants visit home.

²² In the Mampruli areas, this tends to be March.

How migration decisions are taken

Men may seek the opinion of the local soothsayer after which they will ask permission from the head of the lineage. If married, a woman will generally seek permission from her husband after which she also needs to get the consent of the lineage head. Traditionally, children between the ages of 10 and 17 are expected to seek their parents' consent. However most do not ask if they believe they will be denied. In most communities, older dependents are still required to abide by this requirement so long as they continue to live under the roof of their parents. Depending on how desperate one is to migrate, these traditional arrangements may be circumvented. For example, when girls face a forced marriage, they may flee without asking for permission.

5. Institutions of governance and service provision

Indigenous community institutions

Below are the important/influential traditional institutions:

Soothsayers. They provide spiritual divination services that enable people to identify solutions to problems. They offer spiritual counselling and therapy and mediate with the local deities when citizens offend them. While they do not charge fees, they do demand a range of sacrifices to be made to the gods and ancestors that can be quite expensive (described in Section 3, under the discussion of shocks).

Chiefs/sub-chiefs. They tend to be exclusively male. They settle disputes and have a major role in maintaining peace in their areas of authority. Together with councils, chiefs lead communities in decision-making. In Buili areas, the chief oversees the feok festival and the sub-chief of a section of a community/chiefdom is the link between the section and the chief. This institution often came up as the most trusted of all institutions.

Chiefs are the first port of call for visitors, including development missions and state delegations, and deliver information to their communities. Some provide food aid to families hit by drought or food deficits. In some communities sub-chiefs conduct independent school monitoring.

Tindana²³ (in Mampruli areas) or the sub-chief (in Buili areas) is responsible for declaring the start of the farming season, instructing the community to tether their animals, and announcing when to suspend funeral celebrations. The *tindana* superintends processes involving the allocation of communal lands and also performs thanksgiving rites to deities on behalf of citizens.

Teng nyona.²⁴ For land held by families/lineages, the *teng nyona* performs some of the functions that the *tindana* would perform in Mampruli areas. In Buili chiefdoms, each section has a spiritual *teng nyona* who collaborates with the sub-chief in performing rites associated with the farming season. Lineage heads also resolve intra-lineage disputes by providing advice and permissions.

Magazia.²⁵ They settle disputes among women and organise women for development purposes. In Mampruli areas, she represents the womenfolk on the sub-chief's council. In both areas, *magazias* also represent their sections' women and sub-chief. Through the influence of NGOs, the institution is being exported to areas that did not previously have *magazias* and the functions are being enlarged to include more developmental and representational roles.

²³ Literally meaning "owner of the land."

²⁴ Again, literally, "owner of the land." However, the context determines whether the term refers to the lineage head or a spiritual head.

²⁵ Women's leader.

Box 3: Fati, a *magazia* in MMCF2

Fati is a widow and uncertain of her age. She was born in MMCF2 and had nine children; five died and now four are living with her.

As a farmer, Fati cultivates maize and groundnuts, which she describes as “now very lucrative.” She also rears goats and fowls for savings.

Fati was chosen by her community to lead its women as a *magazia* due to her community-spiritedness, high attendance at communal functions, and the support she gives to the needy. The community’s women bring domestic issues to Fati for counselling and resolution, a task which she says she performs “with God’s help.”

She receives no direct pecuniary reward for the “many responsibilities” of *magazia*, but feels fulfilled when she sees improvements in the lives of the community’s women. Having served as *magazia* for eight years, Fati now looks forward to someone younger taking over so that she can get some rest.

Youth leaders. They are common in several sites, particularly in the Mampruli area. Their roles are similar to those played by the *magazia*.

Herbalists. They provide services for various diseases (usually medical, but also metaphysical), particularly those perceived by citizens to be beyond the capability of formal health centres. Some herbalists have specialisations such as bone-setting whilst others consult on a variety of ailments. In some localities, the roles of herbalist and soothsayer are combined whereas the roles are separated in other areas. A community may have multiple herbalists and/or soothsayers. Generally herbalists do not require payment, but it is normal for the treated patient to offer a tribute in-kind.

Box 4: Musa, herbalist in MMCF2

Musa is a 53-year-old male herbalist in MMCF2 whose services are sought for a wide range of ailments. Alongside the local *magazia*, Musa has received training from World Vision Ghana (WVG). Topics covered in the training included HIV/AIDS and epilepsy.

Musa routinely attends to health problems such as stomach aches, snake bites, dumbness, and wounds that appear to defy conventional treatment. At the time of the interview (February 2013), Musa had a patient who had been nursing a wound for 10 years. Musa says that he also tries to cure serious mental illnesses through prayer.

His clients come from nearby settlements such as Jangna as well as from farther afield in Tamale. He used to visit patients personally but does not do so anymore after having an accident that affected his mobility.

He does not charge for his services but accepts whatever ‘gift’ a patient is able to offer. Musa says he sometimes collaborates with ‘doctors’ (presumably meaning healthcare workers)²⁶ by referring some cases to the formal healthcare facilities for further assessment or by sharing his diagnosis with the medical team at the hospital. According to Musa, there are also times when “you see [a] sick person and spiritually, [their] life is already ended...so you give [them] medicine and ask the relatives...to send the patient [back] home.”

Historically, traditional birth attendants (TBAs) provide prenatal, delivery, and postpartum services and are still valued by women for their accessibility, proximity, familiarity, low cost, and approachability. Like herbalists, some TBAs offer multiple services. For example, a TBA in BNCF2 said he “treats...miscarriages, breast milk [insufficiency], whitlow [and] boils,” and stitches wounds as well. In some places, TBAs also serve as links between their communities’ pregnant women and the formal health facilities. In BNCN1, for example, a health officer confirmed that TBAs are “sometimes asked to assist the nurse in deliveries when there are no midwives at the health centre.”

There is a high level of trust in this institution. Even city dwellers were reported to use their services. Among the West Mamprusi sites, only MWCN1 (a dispersed control community of seasonal migrant farmers) did not have one and interpreted this as evidence of their deprivation. In BSCF1, the TBA’s services are highly patronised due to the long distance to the nearest clinic in Wiaga. Even though a particular TBA in the BSCF1 community has been banned from practising by the Wiaga health facility, local women still prefer her services due to the reasons above.

In several other communities, TBAs are more highly regarded than local formal health facilities. TBAs are one of the most valued institutions, often second to the sub-chief. They are widely perceived as having a better record than the formal health facilities and losing fewer children during the delivery process. They were said to demonstrate greater willingness to visit households where they are needed, in spite of the time of day and even if it inconveniences them. Nurses at formal institutions were perceived to be less friendly and services at the facilities are characterised by delays and long queues. In some cases, nurses at the Uwasi CHPS²⁷ compound were said to excuse themselves for hours to run private errands. Often health workers are not at their post when expectant mothers visit the health facility and women also complained of being shouted at.

During the rainy season, formal healthcare centres can become even more difficult to reach. For example, citizens of MMCF2 and MWCN1 have to travel over 12 kilometres to the nearest health facility across seasonal streams. In BSCN4, where reliance on TBAs has declined because of the NHIS, women still rely on TBAs during emergencies and when access to the facility is disrupted by seasonal water crossings.

²⁶ The word “doctor” is commonly used among the illiterate and semi-literate to mean health worker.

²⁷ Community-based Health and Planning Services.

Box 5: Issaka, a 42-year-old male TBA in MMCF1

Until the day of the interview, Issaka was one of two traditional birth attendants in the MMCF1 community. Being the junior of the two, he often referred difficult cases to the other TBA. The most challenging cases are referred to the hospital and even when deliveries are assisted by the TBA, the mother and baby are referred to the hospital one month after delivery for routine checks.

According to Issaka, “when a woman is pregnant, it is sickness.” For that reason, Issaka routinely advises his ‘patients’ to desist from carrying heavy loads. He also prescribes a course of 20 eggs with a daily dosage of one egg. His ‘patients’ are further advised to have *bangu* soup made with a range of leafy vegetables such as *nkontomire*,²⁸ alefu, and bean leaves. Issaka added that, “after the woman has given birth and...passed all the water and blood, we repeat the meal of eggs, alefu, bean leaves, and *nkontomire* to replenish the blood and water lost.”

Previously, the hospital had an ambulance that was used to pick pregnant women up whenever they needed to get to the hospital. But now it has broken down.

Issaka acquired his skills from his paternal and maternal grandmothers as well as from his mother, all of whom were TBAs. He honed those skills after their death based on a prophecy instructing him to become a practitioner.

Along with other TBAs, Issaka received supplementary training from WVG three years ago. Among his lessons, Issaka recalls the importance of not delaying referring complicated cases and that a TBA could be arrested and prosecuted in the event of a death.

Upon successful delivery, a woman’s family presents a tribute in the form of one fowl, some soap, and GH¢ 4 to Issaka. The soap he would use to wash the clothing he wore to deliver the baby but the fowl and money he would pass on to the senior TBA. In reciprocation, the senior TBA would give him some herbs to wash his face with as protection from blindness, a situation that Issaka attributes to the ‘bad’ fluid that is spilled when a woman’s water breaks during labour. Now that the senior TBA has passed, Issaka will use the fowl and money to acquire the herbs he needs to wash his face.

Issaka acknowledges the need for further training “to increase my capacity because I am still learning.”

Communities will typically first consult the soothsayer to determine whether the problem has spiritual or corporeal origins. Often, no further intervention is sought if the soothsayer or traditional healer declares a case to be beyond cure and the patient would simply be left to die (Box 4).

An array of home remedies was mentioned in the communities such as daubing the forehead with dung from cows or donkeys as treatment for headaches or coating other body parts with similar preparations as a cure for pains.

Self-help institutions. Farmer groups exist in the majority of communities, some through the encouragement of MOFA,²⁹ SADA, and NGOs. Others have a long history, having evolved from the traditional cooperative arrangements and established with the purpose of accessing public/formal services. Whilst most of the farmer-based organisations (FBOs) are mixed-sex groups, men and women have separate groups in a few communities.

²⁸ *Nkontomire* is the broad leaf of the cocoyam plant.

²⁹ Ministry of Food and Agriculture.

It appears that the very poor have difficulty being accepted in the collateral groups, as nobody wants them. Even where the poor are involved in the FBOs, the core benefits tend to be captured by the rich.

Widows groups exist in a few communities supported by the Friends of Widows Foundation. Youth groups are also common with a mix of developmental and socialising agendas.

Religious institutions. The main religious institutions are soothsayers, shrines (a relative minority, which also offer sacrifices to the deities on behalf of clients who specifically request their services for economic and other favours), and imams (in Islamic communities).³⁰ Imams provide spiritual services at naming, marriage, and funeral services. Churches (particularly the Catholic Church and the Church of Pentecost) are common in the Buili sites. The churches were said to offer a diverse portfolio of spiritual, financial, nutritional, and other forms of support. Their services are also targeted in a more focused way at needy members of their congregations. Several of the groups interviewed are unhappy with what they described as ‘noise-making’ by some churches and with the church’s undermining effect on traditional beliefs.

Faith-based NGOs. The Presbyterian Agricultural Station at Sandema (PAS-S) and the Friends of Widows Foundation are well regarded in several of the Buili sites visited. PAS-S provides extension services to large-scale farmers as well as small ruminants and fowls to disabled persons and poor households. WVG also provides support in the areas of health, agriculture, education, infrastructure, and also education finance and supplies to poor children.

Other projects. In MWMV1 and MMCN2, the Millennium Development Authority (MiDA) project supported poor men and women with agricultural credit and training in improved farming techniques. VSO’s³¹ TENI³² project has also provided some education support to underprivileged schools in MMCF2. SADA was mentioned mainly in the MVP communities as having provided agricultural support in the form of motorised rural transport (a.k.a. ‘motorking’), tractor services, insecticide-treated bed nets, fertiliser, teak seedlings, maize, rice seeds, and some primary healthcare training together with first-aid kits and monthly allowances of GH¢ 150³³ to community health volunteers. SADA also supported poor households to register or renew their NHS subscriptions.

Inputs distributed by SADA such as subsidised seeds and fertiliser and ploughing services were said to have been late. As a result, some farmers rejected the support for fear that it would not be beneficial. Another outcome of the late delivery of SADA’s fertiliser credits is that it did not achieve the desired impact on productivity. In spite of this, farmers said they are still expected to pay back the credits in-kind to SADA, leaving them with very little after harvesting. Those unable to repay in-kind said they are being asked to pay cash of GH¢ 122. Those with the smallest farms also complained that they are denied access to ploughing services. In BSCF2, it was the influential members of the community who received the subsidised tractor services. Poor women in BSMV1 said the ‘motorking’ has made it easier to transport seriously ill people to the referral facilities in Wiaga and Fumbisi. SADA’s support to agricultural development was commended in BSMV1.

State service provision institutions. The key state institutions providing services to the communities visited are Ghana Health Service (GHS), Ghana Education Service (GES), MOFA, and the District Assemblies. Conspicuously absent is the Community Water and Sanitation Agency (CWSA).

MOFA provides extension services in pest control, fertiliser application, new varieties of seeds, plant spacing, compost preparation, advice on livestock management, and the development of farmer organisations. The extension workers were described as largely invisible to most community members. Women’s farms appear to

³⁰ Islam is the majority religion in the Mampruli areas whereas traditional religion dominates in the Buili sites.

³¹ Volunteer Services Overseas.

³² Tackling Education Needs Inclusively.

³³ By contrast, volunteers in non-MVP communities are not paid (except for incentives during training sessions). This is creating some tensions in the ranks of the larger community health volunteer cohort.

receive the least visits. Generally, state support to agricultural development seems negligible by comparison with education and healthcare.

Several dugouts are not being used in BSMV2. Apart from drying up during the dry season, the adjoining land is reported to be rocky. The dams in BSCF1 and BNCF1 too are not very effective. The latter is unable to hold water and is now filled with weeds. In BSCF2, lands close to the dam are rocky and infested with insects making farming ineffective. Unaware of the challenges associated with the dam, nearby communities brand the people of BSCF2 as lazy because they are not using the dam. The research team's investigations suggest two worrying details. First, most of the dams were built by road contractors who were awarded the contracts to develop the dugouts, and second, the communities were typically not consulted in the selection of the sites for the dugouts.

Figure 8. State of a community dugout in the dry season, Kaadema



Ghana Education Service (GES) services are felt mainly by teachers in local public schools. An exception is in BSMV1, where children have to commute long distances, sometimes across a seasonal stream, to school in Uwasi. Children receive free exercise books and school uniforms. In the process, the neediest children often do not have sufficient quantities. Quality is a concern in several communities where teachers prefer to live in distant locations better served with social amenities such as Fumbisi, Walewale, and Sandema/Fumbisi. Where there is no JHS, children sometimes have to walk very long distances, contributing to an increased dropout rate at the transitional point from primary school to JHS.

Deficits in teacher supply and commitment also contribute to children's lack of fulfilment at school and influence schooling attrition in communities such as MMCF1. The temptation to drop out of school is exacerbated by tardiness among many school authorities. Poor women reported that teachers frequently do not show up during the rainy season and during major football festivals such as AFCON. Well-to-do parents in BSMV5 take their children to school in Fumbisi because of what they perceive to be the poor quality of education in the local school. Describing the situation in BSCF1, a man reported in one focus group discussion that, "they (i.e. teachers) sit and chat, leaving the children on their own."

Figure 9. Abandoned teachers' housing, BSMV5

The poor state of education resourcing in the rural savannah is reflected in Box 6.

Box 6: Schooling in MMCN2

The public school in MMCN2 was built by the community with their womenfolk providing water for the task. The community had observed that the distribution of public support for education tended to be restricted to children from the neighbouring community, Jaadema, where children of MMCN2 enrolled for school. The school's construction was thus a communal strategy to compel the state to reverse this perceived injustice. Many girls from the community still attend school in the larger towns of Walewale and Fumbisi where they have to rent rooms.

The school only has one teacher. Water is also a challenge on the premises and children have to make the long journey back home when they are thirsty. Not all of the school's population have uniforms as the government's ostensibly universal 'free school uniform programme' has not been extended to the community school.

Children refuse to go to school when households are unable to provide them with breakfast. Previously, young women in MMCN2 settled for a stint in *kaya yoo* work as a way of raising petty finance, but education is now perceived as offering greater prospects. The head of a Fulani settler household explained, "there was no school in the community and so my children don't go to school. But now they have established [one] in the community and so I would send the young ones to school." In another interview, the importance attached to schooling was noted as preventing some mothers from migrating on *kaya yoo* voyages, owing to the adverse effect it has on the education of the children they would have to leave behind.

Figure 10. Some classes have to be held outdoors, BSCF2



The services of the GHS are provided in the areas of immunisation at the child welfare clinics (CWCs), school health promotion (including de-worming), and community-wide vaccination (yellow fever and CSM).³⁴ The service also has trained community health volunteers to administer deworming and first-aid, facilitate bed net usage, assist outreach nurses, and keep records in a range of fields such as births, deaths, diseases, and exclusive breastfeeding. GHS also provides health education. Both poor and non-poor groups interviewed, and in particular participants who are enrolled on the NHIS, spoke highly of the accessibility of GHS services. However, the poor complained about abuses they endure at the larger/district/referral health facilities.

In the Builsa area, there appears to be a move by the state to encourage institutional deliveries and TBAs are being motivated by the district health directorates to redirect pregnant women to the facilities. To facilitate this, they are being motivated with small incentives such as soap and dry food rations. Some health facilities in the Builsa South District are also offering TBAs between GH¢ 5 and GH¢ 15 for each referral they make. It appears that both the state and NGO sectors now encourage TBAs to see the formal facilities as the preferred option and to intervene under only certain circumstances such as when formal health services are not immediately accessible due to challenges with transportation. Some TBAs complained about being dissuaded from performing deliveries after having been trained by formal healthcare providers. In some Mampruli communities, training provided by WVG included guidance on which cases to refer upwards to the formal sector.

The District Assemblies are felt most in the areas of school infrastructure, boreholes, construction, rehabilitation of dams, and the rehabilitation of roads and culverts. In a minority of sites, the District Assembly was cited for providing solar panels, school feeding, and relief items during disasters such as floods. Participants routinely complained about being made to make numerous journeys to the Assembly whenever they have a need. Others in the newly created Mamprugu Moaduri District Assembly said they were completely neglected by the previous Assembly in the West Mamprusi District. Residents of MMMV1 similarly feel completely neglected owing to the language barriers.

³⁴ Cerebrospinal meningitis.

State institutions of governance

Overall, communities feel neglected by the District Assemblies in terms of services, feedback, and visits. In MMCN2, the poor men felt that, “we don’t know those at the Assembly and they too don’t know us.” Similar sentiments were expressed. In BNCF1 and BSCF2, citizens do not perceive assembly projects to be transparent and they find it difficult holding the Assembly accountable because of the distance to the district capital. Poor people were often aware that the District Assembly has developmental responsibilities, but had very little knowledge about how the Assembly functions. Others alleged discrimination by the Assembly in the distribution of development benefits such as the school feeding programme and access to youth employment services.

Virtually everywhere there was a general sentiment that Members of Parliament (MPs) are only visible during the election season. The focus group of poor men at MMCN2 observed, “we voted for the MP and he won; [he] did not do anything for us...and we did not vote for him again so he told us if our children are sick we would carry [them] on a donkey to Walewale.” Poor women in that community expressed similar sentiments, “our MP is not effective at all. Some of us don’t even know him because he does not come here. The DCE too is like the MP; he doesn’t come here.” Several other communities acknowledged experiencing the efforts of the MP for Builsa South in particular (presumably through his share of the so-called “MPs Common Fund”³⁵) in forms such as support to paying school fees, school uniforms, boreholes, and solar lighting.

Most trusted community institution

In the overwhelming majority of communities, sub-chiefs were ranked as the most responsive community governance institution. Women mentioned that they sometimes fall on the sub-chief when they are subject to domestic violence by their husbands. During the construction of a school in BSCF2, the sub-chief lobbied the contractor for women to be included in the workforce. In several communities, the Assemblyman was ranked next whereas it was the TBA in the Mampruli communities; Assemblypersons ranked very low. Other relatively high mentions include the youth leaders and, in BNCF1, a particular individual.

Decision-making and power relations at the household level

Overall, it is a father’s prerogative to make decisions for his household. He is not obliged to consult his wives or any other woman. As a result, women are consistently sidelined in household decision-making. Men suggested that women have a higher propensity to be emotional and compulsive thereby undermining their ability to keep secrets. In an interview with a group of poor men in BSMV1, one opined that, “women are very volatile and unfaithful; unlike [men], they can leave the community at any time and...share our community’s secrets...with our enemies. Although we do not involve women, whether old or young, we however involve our young [sons] in decisions concerning our community... They are our future.” At several sites, women appeared to confirm this perception about not being dependable with secrets. Another reason why females are generally left out is fear that young women will carry their family secrets to their husbands’ homes when they leave for marriage. Some exceptions to this cultural construct were mentioned in MWMV1 and BSMV1. At the latter, “a woman may be allowed to take part in decision-making and...[be] considered as a man if she [remains in the marriage for a long time] and they...trust that she will not leave to re-marry.”

Anecdotally, a woman can only win an election if she contests in her father’s home area rather than in her husband’s home area. It is said that “a woman cannot come from somewhere else to make a sacrifice in her husband’s home.”

Children generally have no say in household decision-making. Boys from about 15 years of age are often invited to meetings in the compound whereas even the mother of the house tends to be denied participation in such meetings. One girl shared her experience during a discussion in BSCF1: “Some [fathers] don’t even believe we

³⁵ Across Ghana, MPs commonly invest part of this fund in paying for roofing sheets and cement to facilitate the completion and rehabilitation of schooling and other community infrastructure projects.

[children] can make meaningful contributions [to discussions]. Our mothers are not the problem...it's the fathers. Our mothers sometimes prefer [for us to] sit and listen but [that] idea is always rejected by the fathers. They say our lips are light and easily open.”

Men typically have control over the use and disposal of the more valuable assets within the household. These include farmland, housing, ruminants, farm equipment, food stocks, and household goods. Women have some control over selected assets such as farm produce from their own farms, fowls, pots and pans they brought into the marriage, self-acquired bicycles, money generated from capital given to them by their brothers, and assets they have brought into the marriage. Women are also adopting strategies to buy livestock in the names of their eldest sons as tradition grants some exclusive rights/control over these assets. Doing so on the blind side of their husbands makes it easier for women to dispose of their assets without having to seek their permission.

How to enhance the involvement of the poor in decision-making

- Participants are content to leave decision-making in the hands of the sub-chiefs because of the high level of trust
- In the Buuli areas, NGOs were seen as effective partners in channelling the voice of the poor upwards
- Assemblypersons were perceived to be more accessible than chiefs via mobile phones. People were generally reluctant to call chiefs on their phones
- Participants from the poor believed that greater access to information and engagements with community radio would enhance inclusivity
- Illiteracy was identified as a barrier to effective participation
- In a minority of communities, the poor have lost confidence in the formal governance system and have given up on trying to be heard. At some sites the poor felt that efforts to consult directly with them (e.g. by educating their leaders and by securing direct representation of the poor in meetings of the traditional council) would facilitate their participation in decision-making
- Some opined that community fora would be helpful in holding their MPs to account and contributing to decision-making

Annex 1. Profile of Communities

Key to the coding of communities:

BS = Builsa South

BN = Builsa North

MW = Mamprusi West

MM = Mamprugu Moaduri

MV = Millennium Village

CF = Control Far

CN = Control Near

Community	Kind of community	Estimated number of households	Estimated population	Languages	Health	Education	Electricity	Water and Sanitation	Other Amenities	Distance to the nearest major market	Nature of road linking major township	Comments
MWMV1	Community on its own	90 houses and four sections – namely Nayilifong, Somafong, Yezogiri, and Yelipali	3,745 persons - 2,220 females and 1,525 males	Main language Mampruli. Other minor ones include Kantosi, Guruni, Busansi, and Fulani.	No health facility. Health services accessed at Walewale, Wulugu, and Bolgatanga	Infrastructure from pre-school to the JHS with a library under construction.	Not connected to the national grid but have 8 solar lamps provided by the Cocoa Marketing Board (CMB)	Three boreholes and four functional wells	There is a dam for agricultural purposes	5 km to Wulugu market	All the road to Wulugu is motorable even in the rainy season.	Charcoal burning is one of the most lucrative income sources in the community. People are not complaining of environmental pollution.
MMCN2	Community	48 houses and four sections – Tindaayili, Lori-Laanyili and Nanchin-Naayili	766 persons - 452 females and 314 males	Main language Mampruli Other minor languages are Frafra, Buili	No health facility, health is accessed at Walewale, Fumbisi, and Sandema	School under construction through community initiative. Only one teacher at the moment taking care of 3 classes	Not connected to the national grid but eight solar street lamps on one of which has been working since	Five open wells three of which are salty and two non-functional boreholes.		7 km to Djardima market	The road linking to the major town of Djadema is not tarred. Its gets flooded during the rainy season	

Community	Kind of community	Estimated number of households	Estimated population	Languages	Health	Education	Electricity	Water and Sanitation	Other Amenities	Distance to the nearest major market	Nature of road linking major township	Comments
							installation.					
MWCN1	Section of Kunamoari	Est. 63 households		Main language is Mampruli Other minor languages are Dagomba, Dagaare, Frafra, Ewe	There is no health facility in the community. People largely depend on herbs. Health services accessed at Wulugu and Walewale	There is no school in the community. Children living with parents in the community do not attend school.	There is no electricity in the community.	There is no borehole or well. People depend on a stream for drinking water.		18 km to Walewale market 14 km to Wugulu market	The large proportion of the road is rocky and sandy which makes it difficult to access especially during the rainy season.	All inhabitants are settlers who have their families in other communities
MMCF1	Community	Est. 25		Only language is Mampruli	No health facility. Health services accessed at Yagaba	There is no school. Children attend school at MMCF2	The community is not connected to the national grid	There are two open wells in the community.		6 km to Kubori	Community lies within the flood zone. This has compelled a lot of people to migrate with their entire families to other communities including MMCF2	All the remaining 25 households are members of the same family
MMCF2	Community	Est. 238 households	1,568	Main language is Mampruli. Other minor languages include Gruni, Buili	There is no health centre in the community. Health is accessed at Kubori	There is a school from pre-school up to JHS.	There is no electricity. There are nine solar lamps scattered in the community.	There are seven boreholes in the community		5 km to Kubori	The road to the nearest major towns of Yagaba and Kubori are not tarred. But it is motorable even in the dry season.	
MMMV1	Community	Over 400 estimated		Main language is	No health facility.	Infrastructure from pre-	The community	All thirteen sections		5 km to Kpasenkpe	The road linking Kpasenkpe is not	There are 3 churches and

Community	Kind of community	Estimated number of households	Estimated population	Languages	Health	Education	Electricity	Water and Sanitation	Other Amenities	Distance to the nearest major market	Nature of road linking major township	Comments
		households spread across 13 sections		Buili. Other minor languages are Mamprusi, Frafra, Kantosi	Health services accessed at Kpasenpke, Walewale, Yuasi, Gbedembilisi, and Fumbisi	school to JHS 3. There are two teachers' quarters, one of which is under construction. There is a solar panel that powers the solar lamps at the teachers' quarters.	is not connected to the national grid but plans are far advance in that regard as electric poles have already been erected.	have wells. The chiefs section and the school however have a mechanised borehole.		market 7 km to Djadema market	tarred but motorable in the rainy and dry season.	one mosque in the community
BSMV5	Community	There are currently 48 households and sections – Nayiri, Bazeesa, Yipala, and Dalaasa		Main language is Buili. Other minor languages are Gruni, Kantosi, and Fulani	There is a health post and a community health nurse stationed in the community.	Educational infrastructure includes pre-school and class 1-6. A five-bedroom teacher's bungalow has been abandoned.	There is no electricity. However, there are 4 solar street lamps positioned at vantage points including the chief's palace and the school.	There are 2 open wells that are complemented by a stream.	An office space and accommodation for the agric. officer has been abandoned for years.	About 18 km to Fumbisi market 8 km to Djardema market	The road to the major towns of Djadema and Wiesi are not tarred. The community is cut off during rainy season.	The community is currently headed by a regent. New chief will be in place after the final funeral of the late chief.
BNCF3	Section of Chuchuliga	Est. 97 households		Major language is Buili. Other minor languages include Kassen, Gruni	There is no health facility. Health is accessed at Chuchuliga Health Centre	There is no school. School is accessed at Chuchuliga	There is no electricity and no solar panels.	There are two open hand dug wells.		About 10 km to Navrongo market 10 km to Sandema Market	The road linking Chuchuliga is in good shape and motorable throughout the year.	

Community	Kind of community	Estimated number of households	Estimated population	Languages	Health	Education	Electricity	Water and Sanitation	Other Amenities	Distance to the nearest major market	Nature of road linking major township	Comments
BSCN1	Section of Chansa	Est. 31 households		Main language is Buili. Other minor languages are Gruni, Kassen	There is a health centre with 3 stationed community health nurses. There is also a com health volunteer under the MVP.	Infrastructure from pre-school to JHS 3.	There is no electricity. However there are some few solar lights in the community.	There are 2 mechanised boreholes in the community.	The community houses the area council office of the district.	About 12 km to Fumbisi market 2 km to Kaadema market 12 km to Wiaga market 22 km to Sandema market	The road to Kaadema is not tarred but motorable. Portions of the road get flooded by spill over from the Kaadema dam.	
BSCN2	Section of Kaadema	Est. 122 households		Main language is Buili	Health is accessed at Kaadema	There is no school. School is accessed at Kaadema	There is no electricity or solar lamps in the community	There are no boreholes in the community.	The community houses the area council office.	The community has its own weekly market. 10 km to Wiga market 15 km to Fumbisi market 20 km to Sandema market	Road linking to Wiaga is not tarred but it is in good shape. Motorable throughout the year.	
BSMV1	Section of Uwasi	Est. 140 households	746 persons	Major language is Buili. Other minor languages include Kasen,	There is no health facility. Health service is accessed at CHP centre	There is no school. Children go to school at Uwasi about 1 km away	There is no electricity or solar street lamps.	There is only one borehole in the community.		About 15 km to Fumbisi market.		

Community	Kind of community	Estimated number of households	Estimated population	Languages	Health	Education	Electricity	Water and Sanitation	Other Amenities	Distance to the nearest major market	Nature of road linking major township	Comments
				Gruni	at Uwasi. There is also a TBA in the next community							
BSMV2	Section of Wiaga	Est. 138 households		Major language is Buili	There is a completed CHP compound but yet to commence operation. Health is currently accessed at Kadema. Outreach nurses visit the community on a regular basis.	Infrastructure from pre-school to JHS 1. Classrooms for JHS 2 and 3 are under construction.	There is no electricity in the community.	There are 3 boreholes in the community.		Zamsa to Kaadema is 3 km and 15 km to Wiaga market.	With the exception of some portion of the road to Kaadema that gets flooded during the rainy season, the road is motorable throughout the year.	
BNCF1	Section of Sandema	Est. 164 households and 50 houses.	600 people	Main language is Buili	There is no health facility in the community. Health is accessed at Sandema	There is a day care and primary school. JHS is accessed at Sandema	There is no electricity in the community			3 km to Sandema market	Though very close to Sandema, the community is totally cut off by flood during rainy season.	
BSCF2	Section of BNCN1	Est. 319 households		Main languages are Buili, Kasen,	There is a child welfare clinic.	Infrastructure from pre-school to JHS 1.	There is no electricity	There are 2 mechanized borehole in the	There is a dam for farming and animal	12 km to Sandema market	Greater portion of the road is in good shape. People still manage to use it	

Community	Kind of community	Estimated number of households	Estimated population	Languages	Health	Education	Electricity	Water and Sanitation	Other Amenities	Distance to the nearest major market	Nature of road linking major township	Comments
				Gruni	Community health nurses make periodic visits to the community.			community	watering.		during the dry season.	
BSCF1	Section of Wiaga	Est. 147 households		Main language is Buili	The community has a health centre but midwife is stationed at Kaadema health centre.	There is no school in the community.	There is no electricity	There are two mechanised boreholes in the community	The community shares a dam with Bachinsa community. Dam is currently broken.	5 km to Wiaga market and 15 km to Sandema market	Road linking Wiaga and Sandema is motorable throughout the year.	
BNCF2	Section of BNCN1	Est. 107 households and three sections – Aduak-yeri, Tinyansa-yeri, and Apanga-yeri		Main language is Buili	There is no health facility in the community. Health is accessed at BNCN1	There is no school in the community	The community is connected to the national grid	There are four boreholes and six open wells.	Most of the houses in this community have their own toilet facility.	12 km to Sandema market	One of the best feeder roads in the district, it is motorable throughout the year.	
BSCN4	Section of Chansa	Est. 109 households , 31 houses and five sections- Nayengsa, Nangangdem, BNCF2, Singasa, and		Main language is Buili	There is no health facility. Health is accessed at BSCN1	There is only kindergarten in the community. Children go to school at BSCN1	There is no electricity.	There is only one borehole in the community.		6 km to Kaadema market 16 km to Wiaga market 25 km to Sandema	BSCN4 and BSCN1 use the same road.	

Community	Kind of community	Estimated number of households	Estimated population	Languages	Health	Education	Electricity	Water and Sanitation	Other Amenities	Distance to the nearest major market	Nature of road linking major township	Comments
		Kumlabasa								market		
BSMV3	Community	Est. 120 households and six sections- Poodema, BNCF2, Yipaala, Kumpilinsa, Maansa, and Talisa		Main languages are Buili and Kantosi	There is a CHP centre in the community	Infrastructure from pre-school to JHS 3	There is no electricity	There are four mechanised boreholes and 14 fully functional hand dug wells.	The community is multi-religious, made up of traditional African religion, Christianity, and Islam.	6 km to Fumbisi market	Road is very sandy making it difficult to use in both rainy and dry seasons.	
BSMV4	Community	Est. 186 households and four sections- Yiemonna, Gongdom, Gunta, and Yipaala.		Main language is Buili	There is no health facility	Infrastructure from pre-school to JHS. School also has teacher's quarters, urinal and toilet facility for boys, girls and teachers.	Community is connected to national grid.	There are five mechanised boreholes in the community.	2 km to Fumbisi	2 km to Fumbisi market	Road to Fumbisi is not tarred but in good shape.	
BNCN1	Community	Est. 129 households		Main language is Buili	There is a health centre in the community	Infrastructure from pre-school to JHS.	Community got connected to the national grid less than a year ago.		It houses the area council and the health insurance office.	12 km to Sandema market	BNCN1 and BNCF2 use the same road, which is regarded as one of the best feeder roads in the district.	
BSCN3	BSCN3 is a section of Gbedemah (not MVP community)	158 estimated households The community	Estimated 751 people	Main language is Buili	There is a newly constructed CHP centre, which has	There are primary schools in three of the four sections	Not connected to the national electricity	There are four functioning boreholes distributed		12 km to Fumbisi market	The roads linking to the major markets of Wiaga, Sandema, and Fumbisi are not	

Community	Kind of community	Estimated number of households	Estimated population	Languages	Health	Education	Electricity	Water and Sanitation	Other Amenities	Distance to the nearest major market	Nature of road linking major township	Comments
		consist of four sections i.e. BNCF2, Balerinsa, Garibiensa, and Gbenaasa			yet to commence operation. Currently healthcare is accessed at Gbedemah CHP centre.	i.e. BNCF2, Balerinsa, and Garibiensa. JHS in two sections i.e. BNCF2 and Balensia	grid.	across the community One additional borehole is under construction			tarred.	

Annex 2. PRA Focus Group and Key Informant Interviews

COMMUNITY	FOCUS GROUP DISCUSSIONS					KEY INFORMANT INTERVIEWS					OTHER
	MEN		WOMEN		SCHOOL CHILDREN	ASSEMBLY MAN/UNIT COM.	HEALTH WORKER	BONE SETTERS/SOOTHSAYERS/HERBALISTS	TEACHERS AND HEAD TEACHERS	EXPERIENCED FARMERS	
	RAR	PVP	RAR	PVP	BOYS & GIRLS						
MMMV1	11	13	11	10	10	1	X	1	3	1	
BSMV5	10	10	10	12	10	X	1	X	4	X	Migrant workers
BNCF3	10	10	10	10	10	X	X	1	0	1	
BSCN2	11	13	10	11	10	1	3	X	4	1	Galamsey workers
BSCN1	10	8	10	10	10	X	3	1	4	1	Spiritual church leader
BSMV2	10	11	10	10	10	1	3	1	3	1	
BNCF1	12	12	13	11	10	1	X	1	3	1	
BSCF2	10	11	10	13	10	1	2	1	3	1	
BSCF1	13	12	12	12	10	1	3	1	X	1	Stone quarry workers
BSMV1	12	12	11	10	10	1	X	1	X	1	
BSMV4	10	10	10	10	10	1	X	1	3	1	
BSCN4	10	12	10	10	10	X	3	1	2	1	
BSCN3	10	10	10	10	10	1	X	1	3	1	
BSMV3	15	15	12	14	10	1	1	1	4	1	
BNCF2	17	17	14	13	10	1	1	1	X	1	
MWMV1	12	10	10	10	10	1	1	1	4	1	Returnee migrants
MMCF2	10	10	10	10	10	1	X	1	3	1	
MMCN2	10	10	10	10	10	X	X	1	1	X	
MMCF1	10		10		X	X	X	X	X	1	
MWCN1	10		10		X	X	X	X	X	X	

COMMUNITY	FOCUS GROUP DISCUSSIONS					KEY INFORMANT INTERVIEWS					OTHER
	MEN		WOMEN		SCHOOL CHILDREN	ASSEMBLY MAN/UNIT COM.	HEALTH WORKER	BONE SETTERS/SOOTHSAYERS/HERBALISTS	TEACHERS AND HEAD TEACHERS	EXPERIENCE D FARMERS	
	RAR	PVP	RAR	PVP	BOYS & GIRLS						
MMMV1	11	13	11	10	10	1	X	1	3	1	
BNCN1	14	15	15	12	12	X	3	1	4	1	
TOTAL	217	241	208	218	192	13	15	16	45	18	

NOTES:

1. Focus group discussions took place with all pre-identified groups i.e. rich/averagely rich (RAR), both men and women, and poor/very poor (PVP), both men and women, in all communities except MMCF1 and MWCN1 where local population was not large enough to generate more than two FGD groups for the purpose of our discussions. In these two communities, the discussions took place with only one male and one female group.
2. The agreed arrangement was to have discussions with 10 people in each well-being category. However in many of these communities, the attendance exceeded 10. The highest number of attendance recorded was 17 with the PVP and RAR men at BNCF2. However, for the purpose of controlling the process, the discussions were limited to the original 10 people invited with occasional input from the observers. Overall, the number of FGD participants for both male and female was more than the 400 recorded in the table.
3. At the time of the fieldwork, school and academic work was in full session. As a result of that it was difficult to organize teachers for a focus group discussion. At the schools, the field team had access to not more than four teachers (including headmaster) for the FGD. Communities MMCN2 and BSMV5 recorded the least amount of teachers with one and three, respectively.
4. Even though it is recorded in the table that 11 health officials were interviewed, the actual people interviewed was 8. This is because some communities were sharing the same facility. For example, BNCF2 and BNCN1, BSCN1 and BSCN4, MMCF2 and MMCF1, respectively.
5. At the district level, extensive interviews were conducted with district agricultural officers to clarify issues with regards to agricultural intervention programs, credit schemes, input supplies, extension services as well as veterinary services.

Reality Check Approach: Baseline Study

EXTERNAL IMPACT EVALUATION OF THE
MILLENNIUM VILLAGES PROJECT,
NORTHERN GHANA

Date: February 2014

Submitted by Itad
In association with:



Results in development



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Acronyms

CHPS	Community-Based Health Planning and Services
DFID	UK Department for International Development
FHH	Focal Household
F/HHH	Focal and Host Households
HHH	Host Households
INGO	International Non-Governmental Organisation
JHS	Junior High School
MiDA	Millennium Development Authority
MOFA	Ministry of Food and Agriculture
MVP	Millennium Villages Project
NGO	Non-Governmental Organisation
PDA	Participatory Development Associates Ltd.
PRA	Participatory Rural Appraisal
PTA	Parent-Teacher Association
RCA	Reality Check Approach
SADA	Savannah Accelerated Development Authority
STD	Sexually Transmitted Disease
TBA	Traditional Birth Attendant
TZ	Tuozaafi (a thick cooked porridge of maize and water)

1. Introduction

This report presents the main findings of the baseline Reality Check Approach (RCA) that was conducted in February and March 2013 as part of the qualitative element of the Independent Impact Evaluation of the Millennium Villages Project (MVP). The Independent Evaluation has been commissioned by the UK Department for International Development (DFID).

The study was undertaken by a team of 10 Ghanaian researchers under the guidance of an international team leader, who also undertook some field research directly. Three specially trained translators supported the non-Mampruli and Buili speakers. Overall management of the team and logistical arrangements were made by Participatory Development Associates Ltd (PDA).

The report summarises field debriefings gathered during the fieldwork and will form the basis to an open access database that will be available following the mid-term evaluation. The findings are intended to provide insights into the attitudes, opinions, and behaviours of families living in poverty in the MVP and non-MVP ‘control’ villages selected. Therefore, the findings are expected to complement the participatory rural appraisal (PRA) study and findings from the quantitative surveys.

2. Methodology

2.1 Reality Check Approach

The Reality Check Approach (RCA) extends the tradition of listening studies and beneficiary assessments by combining elements of these approaches through living with people, usually those directly experiencing poverty. It could be likened to 'light touch' participant observation. Participant observation involves entering the lives of research subjects and both participating in and observing their normal everyday activities. It usually entails extensive and detailed research into behaviour, understanding people's perceptions, and their actions over long periods of time. The RCA is similar in that it requires participation in everyday life within people's own environment, but differs by being comparatively quick and emphasising informal, relaxed, and insightful conversations rather than observing behaviour and the complexities of relationships.

Important characteristics of the RCA include:

- **Living with** rather than visiting; thereby meeting the family in their own environment, understanding family dynamics, how days and nights are spent, etc.
- **Conversations** rather than interviews; there is no note taking thereby putting people at ease and on an equal footing with the outsider
- **Learning** rather than finding out; suspending judgement, letting people who experience poverty define the agenda and what is important
- **Household-centred**; interacting with families rather than users, communities, and groups
- **Experiential** in that the researcher takes part in daily activities such as collecting water, cooking, cultivation, accompanying household members to school and the market, etc.
- **Inclusion** of all household members
- **Private space** rather than public space disclosure to emphasise normal, ordinary lives
- **Multiple realities** rather than public consensus to gathering diversity of opinion, including 'smaller voices'
- **Ordinary interaction** with front line service providers; accompanying host household members in their interactions with local service providers and meeting service providers as they go about their usual routines
- **Cross-sectoral**; although each RCA may have a special focus, the enquiry is situated within the context of everyday life rather than simply looking at one aspect of people's lives
- **Longitudinal** change by understanding how change happens over time

This approach was used as a part of the qualitative mix of approaches in the baseline study. Training and orientation was provided in December 2012 to a team of Ghanaians who mostly live and work in northern Ghana and are fluent in the languages used in the study area. The training took place over five days and

included a two-night immersion living with families in the Millennium Villages Project (MVP) villages.¹ This served as a training opportunity and as a means to pilot and test the RCA for the first time in Ghana.

Figures 1 and 2. Informal conversations between RCA researchers and MVP community members



The emphasis on informal conversations (Figures 1 and 2) and observation allowed for openness and insights into the difference between what people say and what they do. The RCA team found the families they stayed with to be very accepting, quickly relaxed, and at ease in talking openly. The RCA team members engaged with all members of the family as well as neighbours (focal households [FHH]) in conversations. They accompanied them to fields, markets, health visits, water collection, firewood collection, and assisted with household chores in order to minimise disruption in their daily routine as well as to ensure the most relaxed conditions for conversations. The RCA team members also interacted with local power holders (Chiefs, Unit Committee members, and Assembly members) as well as local service providers (health workers, traditional birth attendants, spiritual healers, mill operators, school teachers, religious leaders, shop and market stall owners, community volunteers, and Parent-Teacher Association [PTA] Chairs) through informal conversations.

Each RCA team member left behind a selection of household goods (rice, sugar, salt, oil, matches, crayons, torches, and batteries) for each family with whom they stayed with upon leaving as compensation for any costs incurred by hosting the researcher. Timing was an important consideration so that families did not feel that they were expected to provide better food for the RCA members or that they were being paid for their participation. Each team member kept discrete field notes by never writing in front of people with whom they were conversing. These formed the basis of detailed debriefing sessions held with each sub-team immediately after finishing each round of the study. A final whole team workshop was undertaken over two days to reflect on the findings and identify commonalities and differences across villages and households.

2.2 Selection of locations

The six RCA study villages were selected from a longer list negotiated with Savannah Accelerated Development Authority (SADA) MVP headquarters and in consultation with the research team undertaking the Participatory Rural Appraisal (PRA) study so that the two studies would not overlap.² Two of these six villages were designated ‘controls’ by the SADA MVP where MVP interventions would not be directed. Both of these were selected from the list of ‘controls’ used in the quantitative study: one designated as ‘near’ (i.e. close to an MVP location and where spill-over effects are anticipated) and the other was selected from the ‘far away’ category. The villages are not named in this report in order to protect the identity, anonymity, and confidentiality of participants in what is intended to be a longitudinal study. The controls are not noted in the following table in

¹ Families visited during the pilot RCA study in December 2012 were not used in the baseline study during February and March 2013.

² One location partially overlaps in that the RCA selected a sub-community of a larger community selected by the PRA study. This may provide useful opportunities for triangulation in the two further phases of the evaluation.

order to maintain unbiasedness within the research team. Only the team leader and two other members of the team are aware of which locations are controls.

Table 1: Locations of study villages

VILLAGE CODE	LOCATION	LANGUAGE	REMOTENESS	ETHNIC MIX
A1	Mamprusi	Mampruli	1 hour drive to nearest town Poor access to transport except on market day	2/3 Muslim, 1/3 Christian. Traditionally Mampruli but now mixed with Buili (including mixed marriages). Small population of Fulani (settled 9 years ago).
A3	Mamprusi	Mampruli	4 hour drive or 2.5 hour motorbike/river crossing trip to nearest town	Mampruli speakers. 80% Muslim, 15% traditionalist and 5% Christian. Very small Fulani community on the outskirts.
B1	Builsa	Buili	35 minute drive on good road to nearest town but poor access to transport	All Buili speakers except Fulani (settled 14 years ago). Mix of traditionalists, Muslim and Christian.
B2a	Builsa	Buili	2.5 hour walk to nearest town	Buili speakers. Mostly traditionalists with 25% Christians. No Muslims.
B2b	Builsa	Buili	Few minutes from thriving market and transport access to a variety of small towns	Mostly Builsa comprised of traditionalists and some Christians. Few Muslims.
B3	Builsa	Buili	30 minutes from major town with good transport access	Buili speaking. Mostly traditionalists with a few Muslims and Christians. Two communities of Fulani.

2.3 Selection of households

Members of the RCA team who had participated in the RCA training and pilot in December 2012 selected households using the following criteria in consultation with ordinary people in the villages selected:

- Poorer households
- Different generations living in the house including, where possible, school-age children
- Be at least 10 minutes walk from each other
- Households at the centre of the village as well as the periphery

- Have a number of close neighbours to enable interaction with them

The advance teams entered villages independently either on foot or by motorbike to keep the process ‘low key.’ They met with the chiefs or sub-chiefs³ first and explained the purpose of the RCA study in great detail to ensure that they understood that the researchers needed to stay with poorer families and should not be afforded guest status. This latter requirement was emphasised to get closer to the ‘reality’ of people’s lives and also to minimise the burden associated with having outsiders stay in their homes. Only when this was clear did the team accept assistance in finding suitable households. Other people in the community were consulted as the advance team walked through the village. This remained a negotiated process so that no imposition of inappropriate households could be made by village power holders.

By using local knowledge, the selection of poorer households was facilitated. The households in fact all belong to the categories determined by the PRA study as ‘poor’ and ‘very poor’ (especially widows or persons with disabilities), i.e. using locally generated criteria for determining poverty. More than 50% of the RCA study households had at least one person with a disability and four households were widows or widowers.

2.4 Timing

The RCA study was conducted in two parts with two teams as described in the following table:

Table 2: Timing of the RCA study

Dates	Team A	Team B
24 February – 2 March 2013	Location A1	Location B1
3-7 March 2013		Location B2a
		Location B2b
17-24 March 2013	Location A3	Location B3

Each RCA team member spent a minimum of four nights with their host families, returning early on the final morning for a day and a half of debriefing.

2.5 Limitations

There were some problems with the selection of households in B2a and B2b as the criteria to stay with families was not adhered to and some of the household heads (HHH) were destitute people living on their own or in twos. There were also some misunderstandings among the neighbours that they had been selected because they needed help. However, the RCA team members managed to contain these misunderstandings and, where possible, spent considerable time with neighbours (FHH) to compensate for the limited people in their own HHH. In subsequent rounds of the RCA, the neighbours will be included as proxy HHH even though the RCA team members will continue to stay with the original HHH.

As the season was very hot and dry, the team found that HHH members were less engaged during the middle of the day than they had been during the pilot in December. This meant that some conversations were less fruitful than anticipated although early mornings and late evenings proved to be good opportunities for more interactive conversations.

Three of the RCA team members required translators. All translators received RCA training, which minimised problems during the immersion process. They were particularly vigilant in ensuring that they provided a translation service for both the researcher and the HHH members. Nevertheless, hosting two people and the inherent difficulties of translation like missing some important ‘side talk’ may have limited the possibilities for

³ Small gifts of kola nut were exchanged “*he who brings kola brings life*”.

interaction. This situation was limited to only four of the 20 households and we anticipate that it will be less of a limitation during subsequent phases of the RCA study in 2014/15 and 2017.

2.6 Context

Whilst all the villages are considered poor, they vary in terms of manifestations and degrees of poverty. Following the fieldwork, team members were asked to rank the villages in terms of poverty (Table 3), which served as universally accepted rankings based on the criteria considered relevant.

Table 3: Poverty ranking of villages

Village	Criteria								
Ranking (poorest last)	Economic activities	Education	Access to water	Population size in relation to resources	Physical accessibility	Access to health services	Active market/ Commercial centre	Electricity	Social capital (bridging)
B3	Commercial farming (beans), fishing for sale, grinding mill. HH own large numbers of livestock	New school with facilities	Boreholes and dam	Good-small population for resources (800)	Close to six markets and excellent road network	Health clinic and good access for referral	Well linked	Solar panels and grid links planned	Well linked
B2a	Irrigated land enabling surplus for sale (especially vegetables)	Choices of school	Boreholes	Modest population (900)	Near town	Health clinic 2 km away	Large market accessible	None	Fair
A1	Subsistence farming	Primary and JHS	Boreholes	Very high growth potential problems	Transport to town available	No health clinic	Small market in village, access to others	Few solar panels only	World Vision used to work here
B1	Subsistence but increasingly beans for sale	Nearest primary 2 km	Boreholes inadequate	Modest (800)	Motorkings and donkey carts to larger market	Health clinic 2 km away	No market but a few 'shops' selling drugs, fuel etc.	Few solar panels	People come in to buy beans
B2b	Subsistence. Low livestock ownership. No grain mills	Chronic absence of teachers	Only 3 boreholes for a population of over 1000	Large (1000)	No transport based in village	No health clinic	No provisions available in village. No businesses	Only one solar panel	Low
A3	Subsistence	Very poor	Waterhole and one borehole-mostly collect from over 1 hour away	Growing and high population	Bikes only Very remote	No health clinic	None	Four solar panels	Very rare visits from outsiders

Table 4 provides some data on the state of village assets as described by people living in poverty and observed first hand by the RCA team.

Table 4: Village Assets (March 2013)

Village code (listed in descending order from least poor to poorest)	Primary School	Junior High School (JHS)	Health Clinic/providers	Market	Local government
B3	<p>Newly constructed Government Primary School including new toilets.</p> <p>Good teacher accommodation.</p> <p>Solar lighting, own borehole (but dry some periods of year).</p> <p>Furniture in all classrooms but some in poor condition.</p> <p>x13 teachers (but only x3 are full govt. teachers, rest are volunteers, temporary or youth employment teachers).</p> <p>School feeding programme.</p> <p>PTA inactive.</p>	<p>JHS newly constructed.</p> <p>Computer facilities.</p> <p>x3 teachers.</p>	<p>Health post comprising consulting room, store and pharmacy. Nurses' accommodation for x3 nurses, recently re-occupied having been empty.</p> <p>People complain that "<i>nurse often not there (especially at weekends).</i>"</p> <p>House to house visits. Motorbike recently delivered.</p> <p>Very low numbers use the clinic.</p> <p>Community health volunteers (x3) just started.</p>	<p>No formal market, some informal stalls in village centre.</p>	<p>Chief does not live in community.</p> <p>Good connections with national and local government.</p>
B2a	<p>Primary school KG-P6, about 260 students, x10 teachers (x4 are volunteer or temporarily employed) but no teachers for KG1 and 2. Very high teacher absenteeism.</p> <p>8 classrooms, x2 teachers office, x2 borehole – one is</p>	<p>No JHS.</p>	<p>Earlier plans to have health centre here never materialised.</p>	<p>No market.</p>	<p>Sub-chief respected for dispute resolution.</p> <p>Assemblyman rarely visits. In fact many said they did not even know who was their Assembly representative.</p>

	<p>solar powered to a poly-tank recently installed but already needing maintenance. Solar power in classrooms and solar powered streetlight. Have sufficient furniture.</p> <p>No teachers' houses.</p> <p>School feeding programme.</p> <p>PTA not functioning- parents worried they will be asked for contributions so stay away.</p>				
A1	<p>Government Primary School with six classrooms but not all used (shortage of teachers). No furniture in KG, limited furniture in other classes <i>"children sit on the floor."</i> Rainwater tank only and was empty at RCA time so used borehole nearby. Toilets old and unused. New teachers quarters.</p> <p>x1 government teacher and x4 volunteer teachers. People say <i>'teachers often absent or leave early.'</i></p> <p>Often short of basics such as paper: <i>"children write on the floor then."</i></p> <p>School feeding programme.</p> <p>PTA in name only- parents called to school when</p>	<p>Three class JHS with x2 teachers. Desks and benches.</p> <p>Solar light in one classroom.</p>	<p>No health clinic though <i>"one has been promised."</i></p>	<p>Small weekly market with no permanent structures.</p> <p>Some small shops.</p>	<p>Chief since the 1980s, active in dispute resolution.</p> <p>Assemblyman holds three village meetings per year to provide information (not consult).</p> <p>People feel <i>"not told things."</i></p>

	teachers need to inform them of something.				
B1	<p>Government Primary School which recently expanded to Class 5.</p> <p>Three classrooms (P1 and 2 share, P3 and 4 share) No classroom for KG.</p> <p>Solar lighting. No borehole. No toilets.</p> <p>x6 teachers appointed but only one in evidence during RCA. People complain about teacher absenteeism.</p> <p>School feeding programme but no kitchen (PTA has started to make foundations).</p> <p>Active PTA.</p>	No JHS.	<p>CHPS nearby, functioning for last 5 years. It is very basic and comprises a single consulting room.</p> <p>x2 male nurses (one temporary intern arrived the week of the RCA). Nurses complain of irregular supply of medicines and people say services are very poor although since the new nurses arrived in January some improvements noted e.g. always a nurse on duty, more drugs, <i>“good because they are friendly and I feel at ease.”</i></p> <p>Home visits being made. x3 community health volunteers meeting people where they gather e.g. borehole and promote vitamin and immunisation.</p>	No market.	<p>Chief died two years ago and acting Chief does not live in community.</p> <p>People do not feel involved in community decisions and do not know what is going on.</p> <p>Assembly representative rarely visits but runs the school feeding programme by proxy.</p>
B2b	<p>Government primary school comprising one new block (with new borehole & toilets) and one old classroom block <i>“falling down.... When it rains it is unusable so children crowd into new block.”</i> Furniture in all classes but much in poor condition. No</p>	Three class JHS (closed during RCA).	<p>Health Clinic comprising consulting room, ward and nurses residence. No water at the centre. Serious shortage of drugs.</p> <p>20 staff (including x3 youth employment nurses).</p>	Cement structures for daily market and small stores.	<p>Acting Chief.</p> <p>Unit Committee not active: <i>“do not know what they are doing.”</i></p> <p>Feel Assembly Member does very little for the community.</p>

	<p>electricity.</p> <p>15 teachers but absenteeism noted by community <i>“involved in their own businesses... as long as they have lesson plans then that is all the supervisors are interested in.”</i></p> <p>2 shifts.</p> <p>No school feeding programme.</p> <p>Relatively active PTA.</p>		<p>20-80 patients per day (seasonal differences).</p> <p>Home visits.</p> <p><i>“Sometimes they are good and other times they have no medicine and only give paracetamol.”</i></p>		
A3	<p>Government Primary school in very poor condition, formerly NGO run. Furniture in very poor condition. Some classrooms without furniture. All dirty on visit. Abandoned new block. Unused teachers’ quarters built by community.</p> <p>4 teachers allocated (x2 are youth employment teachers) but all absent during RCA: <i>“they do not come for weeks at a time.”</i></p> <p>No school feeding programme.</p> <p>PTA <i>“not active.”</i></p>	No JHS.	<p>Construction of health centre abandoned.</p> <p>Mobile community based health worker whom people think is <i>“enlightened”</i> provides primary health care.</p>	No market.	<p>Acting Chief.</p> <p>Unit Committee meets all the outsiders and does not consult with community.</p> <p><i>“Do not trust Assemblyman.”</i></p>

2.7 Agriculture

Summary baseline:

- HHH are farmers cultivating less than five acres (three HHH comprised of elderly persons living off neighbours’ and relatives’ charity).

- HHH felt farming was increasingly costly, hard work, and risky but their upbringing and lack of education prevented them doing anything else. HHH say they cannot make a profit nowadays and supplement their farming with a range of off-farm activities.
- There are no reliable agricultural advisory services and HHH rely on their own experience, word of mouth, and suggestions of commercial agriculture inputs of shopkeepers on the use of insecticides, fertilisers, and new seed varieties.
- The increasingly unpredictable climate is confusing and concerning to HHH engaged in farming.
- Bambara beans are becoming the crop of choice with relatively good profitability.
- With the exception of the Fulani households, the HHH keep very small numbers of livestock (chickens, guinea fowl, and goats) primarily to be used as easily liquefiable assets and are not for consumption. The HHH are predominantly cashless and these small animals represent their savings.

Figure 3. Plentiful crop yields in some areas



All the HHH are primarily farmers (or in the case of widows, their husbands were farmers). Most are subsistence farmers or have small surpluses to sell. They farm between one to five acres of land though the accuracy of their estimates is queried. They grow maize, millet, rice, sorghum, groundnuts, and beans. Beans are becoming the crop of choice⁴ as these are most profitable, particularly if one has land near the river. In the rainy season, some HHH are able to grow vegetables such as okra, tomatoes, onions, and chillies. In village B2b, they have had access to a large irrigated area for more than 40 years and those who were allocated plots there have been able to make a good profit (Figure 3). However, since road access has deteriorated as a result of floods, the international non-governmental organisation (INGO) that used to support them with inputs and markets has withdrawn. Additionally, cheaper produce available from Burkina Faso means their former profits are now in jeopardy.

People in A1 and A3 made it clear that all members of the household (men, women, and youth) involved in farming get their own share of the harvest, which they can sell for their own needs when they want to. Women in A1 indicated that they buy soap, seasonings, and occasional tinned foods from the sale of 'their' part of the harvest. If there is any cash left over they will buy clothes and skin and hair products.

Many shared that they were fed up with farming, but it was all they knew how to do. They felt it was hard work, increasingly costly, and risky (e.g. "you can lose your investment too easily," (woman, A1) or "only those farming on a large scale make a profit these days," (man, B2b). Some want to increase productivity because "it is the

⁴ Mostly Bambara beans but also, in some areas, chameleon tail beans, which we were told have come from Burkina Faso (e.g. B1). People said they are relatively easy to grow (less demanding for weeding compared to rice) and they have low losses. They previously grew watermelon and rice near rivers but are switching to beans).

only hope we have in life as we have no other means of survival,” (HHH, A1) while others are philosophical, “you are born into it. Without education you cannot do anything else but farming,” (man, B3). Similarly, HHH in village B1 lamented that farming was their only option as they were not educated. Others have reduced the amount of land farmed because it is hard and less productive. Generally, these small farmers said they could not make profits and were often forced to sell at low prices during times of need.

Yields

HHH told us that the climate was less predictable than in the past. The dry seasons are lasting longer and the onset of rains is delayed so the main growing season has contracted. “Rains do not come the way they are supposed to. When I was young they came in late March now they come in May or June and stop by September,” (man, B2b). “Sometimes the rains start, we plant and then they stop and the seedlings dry up... other times the rains are very heavy and they wash away the crop,” (woman, A1). Flooding badly affected crops last year, especially maize and millet (e.g. in B1 and B3) whilst drought affected B1.

The decreasing soil fertility is of concern to Focal and Host Households (F/HHH) and the following is a typical sentiment in most villages: “Only the rich will be able to continue farming because they can afford fertiliser,” (man, A1).

The Fulani are widely blamed for crop losses, especially the beans grown near riverbanks that people claim are trampled by cattle being taken to the water.

Inputs

In general, F/HHH complained that the cost of inputs continues to rise and many attribute their low yields to the fact that they cannot afford the needed inputs. HHH complained that government coupons for fertiliser are not available to them because of corruption and they are forced to buy at the open market rate. Typical of other comments, one HHH head said, “if you are not related to a politician then you don’t get,” (village, B2a). People in villages near the border claimed that subsidised fertiliser is being smuggled out to neighbouring countries.

Insect damage can be quite high as one HHH explained they could not afford multiple doses of insecticide. “I hope for heavy rain to wash caterpillars off,” (man, B2b) was a typical comment on the lack of money to buy insecticides. HHH go to agricultural supplies shops in towns, explain the symptoms, and then buy whatever is recommended. However, “sometimes it does not work – the insects hide underground and attack the plants in the evenings,” (woman, A1), and “when we apply the medicine it seems to destroy the whole crop,” (man, A3). The HHH told us that if they complain to the shopkeeper he is not interested and is “even happy that it has not worked because they we have to buy more,” (man, A3). Some people purchase insecticides in town to sell in the village.

The RCA HHH rely mostly on manual labour since their land is too small for tractors and they cannot afford the rental (around 30-40 cedis per acre). They operate a reciprocal labour arrangement where labour is short in the household or pay for labour with shares of the harvest. People feel the old reciprocal system is breaking down and nowadays labourers demand drinks, food, and sometimes clothes making it difficult for the poor to afford their input. Some complained that their harvest is delayed or has yet to be transported to their homes due to a lack of labour force.

Loans for tractor use and other inputs are skewed in favour of larger farmers with collateral and bank accounts. For example, the Millennium Development Authority (MiDA) provided loans in village A1 in March 2012, but required group members who were ‘middle sized farmers’ to open bank accounts and pay a fixed 15% interest rate. None of our F/HHH were able to afford this. “We poor never get,” (man, B2a). Small loans are arranged between neighbours and relatives to purchase inputs. Typically, these are for 30-80 cedis where repayment is equivalent to a bag of maize (valued at 50 cedis) or to bag of beans (valued at 150 cedis), respectively.

In several of the study villages, we heard the same, but independently reported, concerns about the SADA programme last year (2012). Farmers were encouraged to form groups with the intention that each member

would be provided maize seeds and fertilisers to be repaid with bags of harvested maize at the end of the growing season. However, the inputs came far too late and the harvests were very poor. HHH involved said they do not have enough surpluses to pay back the loan. SADA has now suggested that they pay in cash (122 cedis) but families who experienced poor harvests and have few other income earning possibilities find this impossible to do. In some cases, both husband and wife were given seeds and fertiliser so their debt is 244 cedis. People complained that the cost of inputs received was closer to 70 cedis. In village A1, two of the three HHH had very bad experiences and the FHH were also bitter and would not participate in the programme again. They indicated that the promise of inputs last year had diverted them from seeking out loans⁵ and purchasing inputs in time, but that they would not take the same risk this year. In B3, people described a similar situation and one HHH told us, “I would rather go to prison than pay with the few bags of maize I have at home.” While the RCA team was in the villages, SADA officials came to persuade the group members to repay in cash but “we cannot afford to.”

Another scheme for larger farmers (also attributed to SADA) involved a registration fee and then the free use of tractors, but the tractors were located too far away and the group members were forced to rent tractors locally at the usual rate of 40 cedis per acre. Several people talked about “people from outside coming to the village to offer loans,” but never came back, leaving them very suspicious (A1 and B1). In one case, people were asked to form groups and contribute 8 cedis, but the organisation never came back: “outside people come to deceive us, get what they want and nobody can trace them,” (woman, A1). In one control village, it was noted that people came last year and promised seeds and fertiliser at the same time as the SADA programme but then never returned. However, they have heard from other villages that the scheme did not work well and so “people are running away from forming groups now... If they came back we would not be interested,” (man).

In the other control village, a similar programme had been running for the last two years. Despite the stated intention that the groups should be poor farmers, we were told that “only friends and relatives of the Unit Committee member got inputs and they were not even poor.” The harvest was poor here too and “people came to take photographs of the crop” and it was decided that each group member had to pay 20 cedis instead of the required bags of maize. This example illustrates how difficult it will be to claim attribution to the MVP intervention since a similar scheme is operating in the control villages, albeit with different (and in this case better) conditions.

None of the villages receive agricultural extension advice and instead rely on word of mouth and information from agricultural input shopkeepers. In village A3, farmers explained that they work out the right doses for insecticides by trial and error, copying the one that worked best the next time. In village B3, they have been promised that a SADA agricultural officer will visit but they have not seen him yet. They spoke disparagingly about previous Ministry of Food and Agriculture (MOFA) programmes: “Agriculture people do the work in the office, they do their farming on paper and say everything will work but we know it will not work in reality,” (man, B3). In B1 and B2a, people remember “some big meetings in the past” concerning crop management but these were very rare.

⁵ HHH shared that this is very difficult as many moneylenders only give loans to family members. To secure an informal loan usually takes some time and many personal visits.

Storage

Figures 4 and 5. Food storage



There were no community seed storage facilities in any of the study villages although there appear to be plans to convert an old building into a seed storage facility in village B3. Crops are mostly stored inside the home. Those stored for sowing the following season are tied up in bags or bottles (Figure 5) with a tablet of insecticide, contained in used weed killer or insecticide tins. For maize, cobs are hung up from the rafters (Figure 4), often in the kitchen area. In some HHH, there seemed to be much insect activity in the stored maize and millet with ants and weevils present during the night. Some families store their harvest on *gbong* (special ledges on the roof of their houses). There are a number of superstitions around storage that persist such as, “if you store produce in the early morning on an empty stomach, it will store well,” (woman, B1).

Perishable produce such as tomatoes are sold immediately but chillies are dried and can be quite profitable.

Livestock

With the exception of the Fulani families included in the study, the RCA study families had only goats and poultry (chickens and guinea fowl). Where families owned goats, the numbers were modest (between two to three).⁶ All livestock is kept for ready cash purposes or sacrifices and are not eaten by the family.

The Fulani, on the other hand, primarily rear cattle but like the farmers they too are increasingly disenchanted with this occupation: “Come rain or shine we always have to look after the animals, watch they do not stray, there is never any holiday,” (Fulani herdsman, B1). Another noted that, “if there was any other opportunity of employment with a steady income we would opt for it.” Younger men indicated that they had aspirations to work in town.

There are very few vets and only those in village B3 talked about getting routine vaccinations for goats and chickens, mainly because two vets reside nearby. HHH only take the ‘good chickens’ for vaccination as it costs 40 or 50 pesewas depending if they take them to the vet or he makes a home visit. In other villages, the costs of vaccinations are considered too high and people doubt the efficacy (e.g. “vaccines don’t work,” (man, B2a), “my goats were healthy before the vet injected them and then they all died,” (woman, B2a). There is also suspicion that vets are only interested in making money. Since the livestock is primarily regarded as a form of a savings bank, further costs are minimised and vaccination is avoided. Only the Fulani families are really conscientious about vaccinating their cattle (as confirmed through discussions with the vet “others see livestock as a pastime and leave them to providence”) and take trouble to prepare them and call the vet regularly.

⁶ One HHH (A3) had tried to rear goats but all 25 died so now only has a couple for ready cash purposes.

There are concerns in some villages about the rise in livestock theft (especially B2a and B3⁷).

Off-farm occupations

A number of the HHH supplement their farming with non-farm activities, the most common being seasonal work in the dry season. People explained that this used to be unnecessary but since farming has become so expensive some family members have to seek farm or portering work in the south to supplement their incomes.

Figure 6. Charcoal burning



Charcoal burning is also common (five of the 20 HHH were involved in this) but demand is said to be dwindling (Figure 6). In B3, fishing and growing beans are considered lucrative and people have sufficient profits to purchase motorbikes.

Some women collect fruits such as mangoes or other forest products such as shea nuts (*dawadawa*) to sell. In two HHH, the women make masa and kosi to sell in the mornings at the roadside. Another wife buys and sells local gin (*Kpeteshi*). Another wife buys and sells yam and the second wife in the same family sells sugar, chips, and porridge. Other HHH weave ropes from waste materials or local vegetation whilst in one HHH the family makes mats, baskets, and twine, which they exchange for manual labour.

There was little evidence of remittances and relatives who had left home were said to be “busy with supporting their own families,” (old man, A1) or had left home with no trace. Where remittances were sent, they were occasional and small, generally in the form of gifts rather than a source of income.

Some elderly HHH received weekly cash transfers from a non-governmental organisation (NGO), but since the project has stopped these payments have discontinued. The same NGO had begun (and then stopped) a number of projects with the elderly, such as sewing bags for export, and asset transfer programmes, such as providing goats and chickens. One HHH had received four goats and eight chickens, but all but one goat had died. This has had kids but the woman is concerned about the increase in livestock theft. A new programme has begun in B2a that provides the elderly with monthly pensions.

⁷ These are the least remote villages and so may provide easier opportunities for unrecognised people to enter the village as well as easier transport access.

2.8 Health

Summary baseline:

- Three (of six) villages had Community-Based Health Planning and Services (CHPS) or Health Centres but opening times were unclear, medicine supplies erratic, and services limited. New staff recently in post in all three
- Preference for self-prescribed medicines or traditional health providers because they are more convenient and cheaper than seeking health services from government health centres. F/HHH only consider formal health services if an ailment is 'serious'
- All but one HHH had mosquito nets, but only 25% use them during the hot season
- Preference for home births. Confusion about costs of institutional delivery and apparent 'informal payments.' They were regarded as only necessary if 'at risk'
- Only in one village is the practise of feeding colostrum to newborn babies common
- Most mothers give babies under six months water and introduce solids by three months
- Very little interest in family planning. Strong social norm is to have as many children as possible and spacing out pregnancies subjects the couple to ridicule. Some women seek injections secretly but most endorse the idea of having many children
- Poor diet of staple (usually tuozaafi [TZ]) and leafy soup with occasional beans and dried fish eaten once or twice each day

Box 1: Course of action for coping with illness

"The HHH daughter-in-law arrived with her twins aged about nine months and her young son aged about 18 months. She came especially to stay because one of the twins was very ill with diarrhoea and losing weight and she did not know what to do. The older people immediately suggested the baby should be bathed in river water that is sacred and given an herbal enema. Some bark was gathered by the grandfather and boiled into a tea coloured liquid, which was then used as an enema while still hot. Later in the day, they went to the nearby medicine shop and bought amoxicillin suspension and administered this to the sickly twin and the well one ('need to treat the same'). That night I tried to sleep next to the family but was woken regularly as the twin continued to vomit and have diarrhoea. The next morning the mother said the baby was getting better and everyone attributed it to the herbal enema."

Field notes, village A1

Health seeking behaviour

Most of the families claimed to have very good health and few needed to seek medical attention in the last few years. In the most remote village (A3) people said they felt "God had blessed us with good health because we live in such a remote place." Most families said they adopt a 'wait and see' approach to their illnesses. If they do not get better, many indicated they will then consult traditional health providers and make spiritual sacrifices

before buying medicines from the market or going to government health centres. The most common ailments are headaches, unspecified ‘body aches,’ and stomach problems (including diarrhoea, especially in the rainy season), which families regularly self-medicate with Paracetamol and Flagyl. Box 1 describes a typical decision making path for dealing with an illness. Only when illnesses are considered ‘critical’ or persist⁸ do families attend the Health Centres. At this stage, they often circumvent the intermediary Health Centre and go directly to the District Hospital, knowing that they will probably get referred there anyway. Not only does visiting the Health Centre cost money (transport and drugs⁹) but it also entails long waiting times, especially on market days when people take advantage of their regular trip to market to consult on their health.

Health facilities

Our HHH had had very little experience of government health services since they had either never been or rarely visited health centres. Those that had been felt that they were often shouted at by staff and felt embarrassed and awkward about the way they looked. Several commented that going was a waste of time as the Health Centre never had the necessary medicines anyway. They also said that there were usually long queues and the nurse provided each patient very little time and “were quick to write out the prescription,” (man, A3).

Table 5. Views on the nearest Government Health Facilities

Village code	Nearest Government facilities	Views of these facilities
A1	No clinic in village. Health Centre 1 hour away.	Rarely use because of distance. Rely on traditional medicine and drugs bought from seller in village and picked up on market day.
A3	Health clinic construction abandoned.	People say they are ‘ <i>blessed with good health</i> ’ and rarely go to Health Centres. Rely on traditional medicine and the Unit Chair who keeps a limited range of medicines.
B1	Very basic one room CHPS which on-refers serious cases to the District Hospital.	People say service very poor but optimistic since new staff arrived but they do not speak Buili. Irregular supply of medicines and not clear when open.
B2a	Abandoned semi-derelict Health post. Nearest health Centre 2.5 hour walk.	Only use the Health Centre if ailment serious. Very busy on market days so use medicine shops in town.
B2b	Health Centre with limited residential facilities and 20 staff.	Serious shortage of drugs. No water at the Health Centre so nurses collect. About 50-80 patients seen per day in rainy season, 20 in the dry season.
B3	CHPS some 30 minutes walk from sector.	Recently re-opened after many years abandonment. Very low numbers use. People say they often come and no staff there and, if there, there are no drugs.

⁸ People said they are never told by nurses what is wrong with them; they are only given medicines.

⁹ Hiring motorbike or ‘motorking.’

⁹ People complain that even with Health Insurance if the Health Centre does not have stocks of the prescribed drug they have to buy from outside.

Community-based health providers

In Village A3, the Unit Committee Chair maintains a medicine box (Figure 7) and has received some training from the Health Centre some years ago. After selling the medicines, he gets replenishment and a commission for selling. Since the sub-chief in B3 has started to keep a medicine box, families here are beginning to turn to him. He is one of three male community volunteers trained by SADA in 2012. Paid monthly, they have been provided with bicycles and make house-to-house visits, which we observed. None of the other villages had a similar scheme, but private entrepreneurs in some villages were buying common medicines and family planning materials in town and selling them from little shops or market stalls in the villages. Staff of one of the Health Clinics has recently resumed making house-to-house visits.

Figure 7. Medicine box



Health insurance

Despite the apparent low cost of health insurance, most¹⁰ of our F/HHH have either never taken out insurance or have let it expire. “I don’t bother because I am never sick,” (woman, B2b) or “we do not have insurance as there is no need” (Fulani young men, B1). For some, even one cedi¹¹ is prohibitive (e.g. the elderly widow living on her own is waiting on infrequent visits from her daughter-in-law to get this done). A few families who have experienced a number of ailments and the benefits of insurance have their entire families covered but this was very rare among the F/HHH we interacted with. For example, one elderly man had a health scare last year and noted, “if not for this (insurance) I would not be living right now” and is very keen to keep his family’s insurance up-to-date.

Some families told us that they were healthy and thus did not need health insurance, but nevertheless took it out for their children on their own initiative (A3). Others said they felt that, “the scheme is a cheat because you might never fall sick,” (woman, B3). Several told us that they felt that with health insurance “you do not get proper treatment...they will only give you Paracetamol,” (man, B3) or “have to pay for drugs anyway as they do not have them in stock.”

Use of mosquito nets

All but one of the RCA HHH had mosquito nets, which had been provided by a variety of different organisations (some had received them from more than one organisation). The numbers distributed varied from one to seven per family and did not always seem to relate to the number of members living in the household (e.g. in village B3, one family had three for a family of four but another had only one for a family of five; the Fulani family in B1 had so many nets that some had not been unpacked yet).

¹⁰ Only 5 of 20 HHH had health insurance and one was for the children only.

¹¹ There was much confusion about the actual costs of the initial health insurance card, renewal, and how long it was valid for. People were either confused about or not aware that the costs were subsidised or free for some groups. This was further confused in some areas where three-month insurance had been issued over the election period and people had not realised that this was so short lived. In village B2a people said they felt “fooled” as they had not realised the insurance they were given was only for three months: “Leaders fool us and take us for granted.”

Figure 8. Mosquito net at HHH

Of the 20 HHH, only five used mosquito nets during our stay. It was exceedingly hot at night and most families slept outside. They said they only use them in the rainy season or “when the mosquitoes are many and become a nuisance.” It was considered too much trouble to string them up outside and since the mosquitoes do not disturb their sleep it is felt to be unnecessary. The issue of disturbed sleep was the only motivating factor for using nets and none of our F/HHH connected the use with protection against malaria. One family (B1) refuses to use the black mosquito net they were given since after the first night they all suffered from itching. Another (B2a) said that they did not use the nets all year because they were worried it would get spoilt and they were not sure when they might get a replacement.

Maternal health

Antenatal clinics are held in most villages each month, although in A3 they complain that they have stopped since the last election and in B2b it had “not happened for about 10 years.”¹² A team member observed the session in A1 and all the women with young children we spoke to felt obliged to come. A volunteer went house-to-house to remind them to come and there were at least 40 mothers in attendance. Two health workers were present and weighed all the babies and completed the record books kept by the mothers, but did not provide any training. After asking what the nurses told a mother who had returned from the sessions, the mother replied, “they told us to get there earlier and clean the place before they come,” “Nothing else?” “Nothing else.” None of the women who shared their babies’ record with us knew what it meant.¹³

There is a strong preference for home deliveries with traditional birth attendants (TBAs) if they can be contacted in time.¹⁴ As pointed out in the PRA study, TBAs are highly regarded in the community. The reasons for the preference include trust, less cost, they come quickly (day or night), they know the family, and the mother can stay at home. Discussions with TBAs themselves and the F/HHH suggests that they had faced very few problems. For example, one male TBA said that in 15 years he had only had to refer mothers three times to Health Centres. On these occasions, they commissioned motorbikes to convey them to town (two hours away) and in all cases mothers and babies survived. He delivers as many as two babies per day with the help of two others in the community who have received training from Ghana Health and know how to cut the umbilical cord safely. Of the thousands he has delivered only three have died.

In village B3, the TBAs have been officially told to stop assisting at births and mothers threatened that they will be charged 20 cedis by the Health Clinic if they do not comply. One of our HHH was a former TBA who had

¹² When the now abandoned health post was first built.

¹³ The booklet is in English and they could not explain the pictures.

¹⁴ Three HHH mothers told us they had given birth on their own because it was at night or the TBA came late.

received training but has stopped working and is not interested in the ‘meagre’ incentives to bring mothers to the clinic.

A minority have a preference for institutional birth based on personal experience. One young mother (B2b) said, “I think it is best, it feels safe and they take proper care; they prepare tea for you afterwards.” Another mother (B1) had experienced complications and was referred to Fumbisi Hospital and since then says she will always use the Health Centre “where blood is available if I need [it].” On the whole, the idea of an institutional birth is only considered if the mother is told she is at risk and they then go to the health centre a week before the due date. Mothers said that although the delivery was free they had to provide Giesha soap (and detol) to each of the nurses for their personal use, “I thought it was for the baby but the nurses took it for themselves,” (mother, B2b). Some mothers were not aware that delivery was free in government hospitals and others said “nothing is free, people pay cash,” (FHH women, B2b) and others thought it was only free if you had health insurance.

“This is the first thing they tell you when you give birth at the clinic,” says a mother (A1) about feeding the baby colostrum. Another (mother, B2b) said they prescribe it like ‘a medicine’ but although this is well known it is not well practised. “We express this out but if you go to the clinic they will tell you not to do it,” another mother (A1) explained, “I was told to but did not want to. It is dirty.” So she, like many others we spoke with, gives water to the baby until the “clean milk comes through.” Another mother said the first milk has “worms in it so we throw it away” (mother, B1). In A3, a team member observed a new mother painfully expressing the colostrum with shea butter. The mother explained it was ‘dirty’ and buried it. It was clear in conversations that because they knew the nurses and health workers would scold them, they did not tell them they threw the colostrum away or that they gave them water in the first few days. However, a very few had different experiences to share; one HHH mother (B2b) said she provided colostrum and breastfed her two children and pointed out that her first daughter of 10 years is ‘fat’ and healthy as a result. In village B3, where there has been an active health worker for many years, the HHH said they do give colostrum, “it is not true it has worms in it- my child will be stronger,” (young woman, B3) and “nurses tell mothers to do this... it is now common whereas in my day we used black ants to prove the milk was still bad and then gave mothers boiled herbs to purify the milk,” (old woman, B3). Her daughter-in-law added, it will help the “child to fight diseases.”

Few mothers practise exclusive breastfeeding for the first six months. Many said that babies must take additional water, particularly in hot weather (e.g. “if we walk to the farm in the hot wind the baby will be thirsty,” [mother, B3]). Some have heard exclusive breastfeeding messages on the radio but do not agree: “You can’t deny that living (bodies) needs water,” (older woman, B2a). Although we observed very young babies being given porridge, mothers told us that they usually start giving this and flour water from about three months: “The baby will be hungry by then and the breast milk is not enough,” (mother, B1). The Fulani families told us they have traditionally practised exclusive breastfeeding for the first three to four months, provide the colostrum, and will continue breastfeeding for up to three years. They said they never give babies water as it gives them stomach cramps.

Diet and nutrition

The diets of all the HHH families were poor, comprised of TZ with leafy¹⁵ soup and/or beans, occasionally supplemented with small amounts of dried fish (Figure 9). A few took rice perhaps once or twice per week, cooking it with seasoning, chilli, beans, and dried fish. Some families ate uncooked millet in water on some days. The HHH mostly cooked once per day, usually in the afternoon or early evening and ate leftovers in the morning, if at all. The households did not eat meat and it was explained that meat was only eaten at festivals, funerals, or possibly if a guest visits. Depending on the proximity of the river, some households ate fish or sun-dried or smoked it for consumption in the rainy season. In village B1, the children collected frogs to add to the soup (Figure 10). There were few set times for eating and the RCA teams mostly observed people eating when they were hungry and not together as a family. They never ate more than twice per day and mostly once per

¹⁵ Often okra or baobab.

day, though the timing of this meal varied a lot. This means that the food was prepared and often stood around for hours before consumption. Only the Fulani families took milk each day, often mashed with TZ, as well as milky tea each morning. Fruits were foraged occasionally by children and adults on the way to collect water or charcoal.

Figures 9 and 10. Soups eaten at HHH; Children collecting frogs



Water and sanitation

None¹⁶ of the HHH had toilets nor did they use communal toilets.¹⁷ Women rose early in the morning and defecated in the nearby bush. Children and men defecated at all times of the day usually in the bush but sometimes more openly. In villages A3 and B3, defecation was near the house and pigs and dogs were actively encouraged to eat the faeces. In other villages, people said it was “better to defecate out in the open, tomorrow the pigs and dogs will eat and clean up,” (woman, B2b). The faeces of babies were generally gathered up in a cloth and thrown outside the house, the cloths were piled up awaiting washing and the spot where the toddler had defecated cursorily washed down. In some HHH we observed older children defecating inside the compound. Very few ventilated pit latrines were observed in the study villages and there was little evidence of use (Figure 12). Toilets at schools, which in some villages were the only ones, were little used as children preferred outside.

¹⁶ One family (B2b) is currently digging a pit to install a latrine from experience of the son who has returned from working outside.

¹⁷ In village B1, the public toilet is referred to as the Chief’s Palace toilet and they do not use it, but also because it is an enclosed space and smelly. One team member resided close by and never saw it being used in the entire four-day stay.

Figure 11. Unused latrine



Urination was either in the bathroom or in the open. All HHH had very simple bathing areas, some with only half walls and little privacy. Because they were used for urination these invariably smelt bad and drainage comprised shallow and short mud ditches, which spilt out onto the paths outside the house. In some houses water lay stagnant.

Water sources

All HHH had access¹⁸ to water from wells or boreholes. Some preferred wells, if available, as they complained that the water smelt bad or tasted ‘salty’ from boreholes (“it makes the TZ and porridge taste bad,” (woman, A1). The Fulani families preferred the stream as the “water is sweeter” and they drink this when accompanying the cattle to drink.

Some boreholes are broken or in bad condition and these have either been abandoned or the community is trying (unsuccessfully) to raise money house-to-house for repair (e.g. villages B1, B2b, A3, and B3). Most of the HHH do not face too many problems getting water, but in village A3 only one of the three boreholes installed by World Vision is still working so there are very long waiting times, “by the time you get water others have finished cooking,” (woman at borehole, Box 2). In village B3, people complained that they have been paying 50 pesewas per week for what they assumed was a maintenance fund for the borehole but when the pump broke down they have been asked for a further two cedis. One of the RCA HHH said they could not pay this and have been banned from using the pump. She now walks 40 minutes to the dam and collects water from there. Sometimes this is dry so, as observed one night of our stay, she slept by the dam to collect water early next morning.

Box 2. Problems with water access

There were three boreholes, all of which were installed in 2004, but only one works. People do not know to whom to report the broken one and the elders closed down one of the others because women were fighting over the access to water. It now takes a very long time to collect water and many prefer to walk to the waterhole, which is about three miles away, to avoid the queues.

Field notes, village A3

¹⁸ The maximum distance to reach water was one hour’s walk (village B2b) because a nearer borehole was not working and people who had collected money to repair it from villagers has absconded with the money. One of the HHH boys collects two gallons on his bike every morning before going to school. The HHH take measures to conserve the little water they have.

The wells yielded water, which was usually very murky. However, this water was usually preferred because of the taste. Borehole water was often used for washing and to give to livestock (or to provide the RCA team because it was assumed we would not like the look of the well water). Children used dirty cups, rusty cans, and calabash which had been left lying on the ground to drink from. These had often been used by animals, too.

Hygiene

Hand washing or wiping was more often observed after eating rather than before. Cleanliness varied considerably. The Fulani families washed hands before every meal. Many families left the dirty or in-use cooking pots and utensils lying around on the ground all day and chickens and goats pecked and licked these.

Most household members bathed at least once per day with cold water either in the bathroom or outside. Some members of the family, especially the elderly, did not wash at all during our four days with them. Most members of the families rarely changed clothes. Both these behaviours were dictated by desire to conserve water. A few members of the families used chew sticks to clean their teeth but no brushing was observed, although some toothbrushes were stashed away in roof thatch.

Village B3 was conspicuously cleaner than all the others, the only place where soap was used in the HHH, where bathing was regular, and where there was less standing rubbish (especially plastic bags) in the public areas of the community. There has been a health worker at the CHPS for some years and she has been active in visiting households and providing talks on hygiene and sanitation at the school or the community square. This was the only community where rubbish was collected up and burned routinely.

Generally, there was little knowledge of good hygiene practises and disease prevention. Some HHH had heard messages on the radio and younger members of the family had some understanding of the risks of HIV/AIDS. In villages B1 and B3, nurses from the CHPS had made home visits and conducted meetings at the boreholes or in the village square. In village B2b where there is a Health Centre, health workers make occasional unannounced home visits to discuss 'hygiene.' There is no such programme in the villages without Health Centres.

Family planning

"We do not listen to what the health workers are saying as we are not interested in hearing," (woman, A3). There is strong social norm in both of the Mamprusi villages (A1 and A3) to produce as many children as possible. "My mother has four and I want to overtake her by having at least seven or eight," (mother, A3). "My brother has six sets of twins and two other children. That is fourteen. I want to be like him," (young mother, A1). "I have 27 children," said an older man in village A1, who had plans to continue. Even the Chief of village A1 was delighted at the prospect of increasing the size of the village by several hundred before our next RCA visit.

Apparently health workers came to village A1 two weeks before our study and tried to talk about family planning to the men of the village, but they refused to listen and sent them out of the village ("God wants them to give birth to as many as they can"). Women explained that if the mother does not keep producing babies the neighbours jibe and tease, suggesting the husband is impotent or she is barren. However, once "the eldest son is married then the husband and wife stop sleeping together; to have a baby then is not right and people will call you names," (older woman, A1). In the Buili communities, there was also a sense that "God will decide the number and we will take" (woman, B3). Besides, "you can die at any time, better to give birth to as many children as possible first," (woman, B3). Several mothers told us they "enjoy giving birth to many children." Furthermore, as the Fulani men explained, "children are a gift of God; you might block an important person coming into the world," (men, B1).

Men told us that women do not like them to use condoms as they fear them getting left inside. Some men told us they reuse condoms after washing. But our conversations indicated that there is poor access to condoms and disposal problems in the villages indicated that condoms are rarely used. Only in village B3, where community health volunteers are publicising the fact that they have condoms available, was there any sense of uptake and

this was primarily by young men who were concerned about sexually transmitted diseases (STDs) and HIV/AIDS rather than unwanted pregnancies. The health volunteers shared they are concerned that they cannot motivate married couples.

None of our HHH women said they were taking the contraceptive pill. Women said they had heard you could die from it, become infertile, and that taking it “affects your health.” Some said it made you fat and pointed out the nurses who were promoting it as proof. However, the injection was preferred because it can be done discretely and without husbands knowing, (“the nurses do it for us in the clinic in secret,” (women, B2b) and nurses at Health Centres confirmed this subterfuge. One woman (A3) had kept it secret but then became very ill (“heavy heartbeat and shivering, pains in the thigh.. I thought I was going to die”) and blames the injection and tells others not to use it.

One HHH father said that contraception was a good thing as school fees are very costly (B3) and another said, “if you give birth to many you cannot afford school,” (B2b). But these views were very much in the minority.

Lifestyle

In three of the HHH, there were members of the household with serious drink problems where they got drunk on a daily basis. Others, including youth, drank less frequently and in particular the small alcohol sachets which could be drunk discretely. There were many empty sachets littering villages. Smoking was prevalent among the Fulani young men in B1 and A1 and mostly older men (and some women) in some other F/HHH. In one HHH the mother was a regular smoker.

2.8 Education

Summary baseline:

- Education (at least to standard six) valued by parents and children
- Teacher shortages in all villages but B3
- Teacher absenteeism complaints in all villages but B3
- Student absenteeism high in all (even in B3 as self-earning opportunities lure children to meet consumerism wants). Self-agency decisions to avoid school dominate; most parents oppose children dropping out. Reasons given by children are mostly ‘falling behind,’ corporal punishment, opportunities to earn for themselves and/or leave home
- School feeding programmes in four out of six villages. Students go for the programme even where no teachers are teaching (A3 and B1) and we noted high motivation to attend school in B2b without a feeding programme
- High drop out after primary school because of costs of Junior High School (JHS) and will only invest if the child shows potential; children are often old for grade and ready for employment/marriage/want to leave home

Very few of the parents in our H/FHH had received any education but they were nevertheless motivated to send their children to school at least to standard six and beyond where possible. The RCA team observed parents hurrying their children to get ready for school and relieving them of chores so that they were not late in the mornings and could study in the evenings. “If you can read and write you will not be tricked,” (grandfather, B2a), “without school you cannot mix with some people,” (mother, A1) and “even if I have to sell my last goods I will make sure my child goes to school,” (father, B2b) captures the rationale and motivation of other parents to send their children to school.

“A time will come when you will not even get a job as a cleaner without a certificate,” (JHS boy, 18 years old) and many parents are concerned that farming is becoming increasingly difficult. “It is better they get a job,”

(father, B2a) was typical of many parents' sentiments in those villages where there had been examples of people leaving and getting better jobs. Children too were quite motivated at primary level and this age group often told the team members that they wanted to be teachers, nurses, and doctors and serve their villages when they grew up. However, it was evident that if the JHS was some distance from the village, only those 'gifted' or 'school type' children would continue. Parents make clear choices between their children and will invest in those with potential (have a 'calling'), mostly irrespective of their gender¹⁹ but withdraw support for those they consider 'lazy' or 'struggling' or 'who refuse to go' and expect them to contribute to the family subsistence farming or seek waged work outside the community. Going to JHS incurs costs; uniforms and additional exercise books contribute to households accommodating the students and (if no JHS in vicinity) travel costs. In cashless societies as these villages mostly are, these costs are difficult to meet. Even if there is a JHS in the village, terminal exams have to be taken in central examination centres, which is considered costly for families living in poverty.

The motivation for schooling is frustrated by the lack of teachers and teacher absenteeism. In five of the six villages, teacher absenteeism was mentioned by parents as a problem. The only village where this was not mentioned was the one near town, which has a full range of teachers (B3). Children from the other villages told us that they often go to school and there are no classes, "we go to school but only to play as the teachers are not there," (six-year-old girl, B1). Parents feel that the best teachers do not stay in the village schools ("teaching in villages is not effective compared to town," (mother, B2a) and our observations revealed that trained teachers comprised of less than one-third of the teaching staff in the study sites. Parents were frustrated that even where there were teachers' houses, they did not stay in them, "making poor excuses that there is no electricity or water is not available." The main reason cited for teacher absenteeism was long and difficult road journeys, exacerbated in the rainy season, but also parents complained that teachers were engaged in their own businesses. The presence of housing for teachers did not solve these problems.

The low teacher-student contact hours, the lack of trained teachers, and the lack of textbooks are the main reasons families feel that education attainment is low. Basic materials such as pens and paper are lacking and we observed children writing directly on the floor in class in order to practise their writing skills.

Regular school attendance is a problem in most of the schools except the one nearest the town (B3, though even here the lure of lucrative work in cultivating beans and fishing leads to seasonal absenteeism). Children exercise a high level of self-agency regarding their attendance at school. Parents complained to us that they tried to motivate them but they would not go.²⁰ It was clear that some parents were not aware that their children were playing truant (leaving home in uniform but not actually going to school). The children themselves, though often shy to explain this, indicated that the main reasons for non-attendance were that they did not understand the lessons or were frightened of corporal punishment. We observed much evidence of corporal punishment suggesting that this was not just used as "an acceptable excuse" to garner sympathy from mothers, in particular, but a reality. Children in village A1, for example, we observed running to school in the early morning and after mid-morning break were clearly in panic and breathlessly told us that they would be caned if they were late. We observed teachers slapping children in classrooms and in recreation breaks and boys being made to kneel on the hot ground in full sun as a punishment for 'fighting.' An HHH with two sons aged nine and 12 explained that the younger one only went to school once for three days and refuses to return after a beating by the teacher, while the older brother rushed off each morning without eating breakfast and still buttoning his shirt on the way in order to avoid the morning "caning if I am late for numbers."²¹

¹⁹ Very rarely we heard sentiments suggesting that it was a "waste of money" to educate girls "because they move away and stay with someone else, get pregnant and drop school... so better to invest in boys."

²⁰ One HHH mother was so upset that she had not been able to persuade her two children to continue in school she would stop eating when discussing it with the RCA team member.

²¹ (Father, b2a) there were also some conversations in B2b that educated children will turn against their parents and the investment in their education will be lost.

Discussions with teachers and observations of classes at different times of the day indicated that girls outnumber boys in primary classes. Interactions with children suggest that this is because boys are (i) more likely to suffer punishment and become-de-motivated; and (ii) are eager to engage in paid labour or earning for themselves²² as soon as they are physically strong enough, not so much to supplement the family income or because they are expected to but to pay for their own snacks, clothes and, with time, mobile phones, and phone credit. During the dry season many young people move in search of employment, often portering in large urban markets.

Mothers, in particular, sometimes collude with their children's decisions not to attend school. For example one HHH mother (B1) bought her sons fishing nets and chided the older son for taking the younger one to school as "it is too far and he will get ill walking in the sun." Some children complain they get bullied or teased on the way to school and mothers keep them home.

However, post-primary the situation changes with boys outnumbering girls. We were told the factors are many but include the problem girls face in travelling and finding accommodation where they are enrolled in JHS as well as the fact that large numbers of girls graduating at primary level are already in their mid to late teens and choose to raise families or migrate for work rather than continue to JHS. A daughter of one of the HHH in A1 said she missed school for several years and when she returned she suffered daily teasing because she was so much older than the others in the class. "She wept every day – teachers came to the house to try to persuade her to ignore the teasing. She could not and packed her bag one day and fled to Kumasi for work in the market."

School feeding programmes were operating in most of the schools. Teachers told us that the food attracts children in the lower classes (kindergarten and standard one and two), but has 'little pulling power' at higher classes. Teachers in B2a said that children will come to school "with their bowls but without pencils." We observed under-school aged children waiting all morning with their older siblings to receive the midday meal. In two villages (B1 and B2a), although the teachers are frequently absent, children were still going to school just for the lunch. Typical of others, one parent commented on the pointlessness of this incentive programme, "why provide food if there are no teachers?" In others (A1 and B2a) people think the school feeding should be stopped as portions are too small and the cooks are accused of siphoning off the supplies. Cooks told us that the pay for cooking was very low.

We heard in several locations that the distribution of uniforms was inadequate, "there are never enough." In B2b, only nine children out of nearly 500 received free uniforms in 2012. In B2a all the uniforms provided in 2012 were small sizes and were only enough for about 10% of those needing new uniforms. One of our HHH daughters (nine years old, B1) refuses to go to school because her uniform is too big for her. Teachers are said to make the decisions about who gets uniforms using regular attendance, the poor state of current uniforms, and orphaned status as the criteria. In one village (B2a), parents were asked to make a contribution towards the uniforms and warned that the charge would double if not paid within three months. Parents questioned this as they knew the uniforms were supposed to be free and were told the money was "for the school." Distribution of exercise books is considered widely as inadequate. In two places, World Vision used to provide uniforms, exercise books, and shoes for needy students but this has ceased this year.

The school resources vary enormously among the study villages. The worst is the primary school in village A3 (the village ranked most poor) where teachers "do not come for weeks at a time," (PTA Chair). There are supposed to be two government trained teachers and two youth employment teachers. The former live long

²² E.g. in B3 where fishing is lucrative, boys are attracted into this. Older boys told us they want to buy motorbikes. The nearby market has many opportunities for income earning and both boys and girls are attracted to this.

distances from the school²³ and the contracts of the latter have recently expired so throughout the four-day stay of the RCA team there were no teachers present although the classrooms were open and some students came daily. Typical of the frustration expressed in the village, one of our HHH families explained that their second daughter stopped going to school after standard five because the teachers were never there, “even when they came, by the time I got home I had forgotten what they taught me,” and the third daughter says she always comes home when the teachers are not there, “there is no point... I want to go away to be a head porter.” The friend of her twin brother explained he stopped school because he was caned often and says, “what’s the point? I don’t need school if I am going to be a farmer.” Only the youngest daughter (nine years old) is still keen to go. She is in class one and has to sit on a branch for lessons because there are no chairs and says “the teachers don’t teach properly.”

In contrast, the best school is in village B3 (the village ranked least poor). The primary school has 12 teachers making a teacher pupil ratio of 1:34. Because this school is easily accessible all the teachers live nearby and absenteeism is minimal. The school has new premises and resources including an almost daily feeding programme for all primary school children sponsored by the government feeding programme and the World Food Programme, as well as provision of free exercise books and uniforms. There is a fully staffed JHS beside the primary. Nevertheless, several of our F/HHH children have dropped out after primary school against their parents’ wishes. Some girls wanted to leave home and become pregnant rather than continue schooling.

2.9 Infrastructure

Baseline summary:

- Lighting in HHH homes is exclusively with torches, cooking is done by firewood or charcoal
- Rural roads to the villages are potholed and often impassable in rainy season but everyone believes maintenance is the sole responsibility of government
- New forms of transport in the last two years; motorkings and increasing ownership of Chinese manufactured motorbikes are making transportation easier
- 50% HHH have their own mobile phones and others largely have access to those of neighbours
- 50% HHH have radios and listen exclusively to local radio stations and mostly music

Power

All HHH use torches rather than kerosene lamps. Kerosene is problematic to purchase and is considered unsafe and troublesome so the cheap Chinese torches are preferred. Several people made similar comments to this one, “one cedi of kerosene will last for two nights while an 80 pesewas battery will last at least a month and often six weeks,” (woman, B2a). One of our HHH has a single solar panel but this has been purchased primarily as an income source as he charges people’s mobile phones for a small fee. A few solar panels were observed in villages. In B2a there are solar streetlights, which were located “close to someone powerful... I don’t dream of getting one,” (man, B2a). Poles for mains electricity have been delivered in village B2b and B3 in 2012 but sceptical inhabitants think this was simply an election ruse and do not expect the electrification programme to proceed.

All but one of the HHH use firewood all year round for cooking. This is sometimes supplemented by dried millet stalks and charcoal. In the rainy season HHH may switch to using charcoal. HHH often go to neighbours to get fire as they do not keep (cannot afford) matches. None of the HHH know about or use improved stoves.

²³ One has a 1.5-hour motorbike ride.

Roads and transport

The two villages near urban centres (B2a and B3) have relatively good roads which are part gravelled. Village B2b is adjacent to a small thriving market centre which holds regular markets three days per week and has good road access to larger towns. All the other villages are accessed by red mud roads which are dusty and potholed and difficult to pass in places, especially in the rainy season. In all villages people indicated that maintenance of the roads was the government's responsibility and did not undertake any community initiatives to fill potholes. Motorkings have appeared in the last two years and are providing much needed transport solutions. Access to Chinese manufactured motorbikes, which are relatively affordable (equivalent to seven bags of harvested beans²⁴), has meant that increasing numbers of men have these, which has freed the bicycles for children and women to use.

Table 6. Transport available

Locations	Motorkings	Trucks (market day)	Other
B3 (peri-urban)	Many	Yes	Many motorbikes
B2a (peri-urban)	Comes from town	No	Very few motorbikes
B2b (near thriving market)	Many	No	Many forms of transport including buses, minibuses
B1 (35 mins by transport)	1	Yes	Some motorbikes
A1 (50 mins by transport)	2	Yes	Some motorbikes
A3 (most remote)	No	No	Only bikes

Telephones

More than 50% of the HHH had mobile phones and three of these had more than one phone. These were mostly owned by young men. Server access was intermittent. Although mostly used for calling friends and relatives and listening to music, some told us that it had “added something important to their lives.... We can find out the price we should get for our produce,” (farmer, B2b). In village B2b, there is an established system whereby buyers contact the broker in the village and explain the quantity and rate they are willing to pay. The broker then texts this to the farmers and they are in turn able to respond if they want to. The Fulani, especially the young men, in B1 had many phones and used them for playing music, calling friends, contacting the vet and cattle dealers, and obtaining salt cake. Everywhere people charge their phones in the market (50 pesewas) or at the homes of villagers who have solar panels. Those who do not own mobiles usually can have access to ones owned by neighbours.

Radio

50% of the HHH had radios which were mostly owned and controlled by men in the household. They are mostly tuned in to local stations (Radio Walewale or Radio Builsa) to listen to music, but news programmes were also listened to in some HHH. Some HHH indicated that they had heard health messages on the radio, especially ones related to HIV/AIDS.

2.10 Other Organisations

Very little NGO support has been provided for any of the study villages and what was there has largely terminated recently (B2b and A1 being examples of recent exits). Local village churches and mosques, with the exception of B2a, are only concerned with religious services and do not have welfare programmes. F/HHH mention examples of people from outside coming and promising support, notably loans and inputs but not returning. SADA was mentioned by name in A1, B2a, and B3, otherwise government interventions were referred to as “people from outside.”

²⁴ About USD 700.

Table 7. Reported organisations and projects in study villages

Village	Other organisations	Current projects
A1	World Vision 15 years support to school, TBA training, water and sanitation, etc., but finished 2012	None
B1	None	None
B2a	Mission – actively run by minister and his wife for past 8 years	Ongoing education and welfare
B2b	Technoserve (INGO) 5-year project to help farmers groups with inputs, marketing, and storage but closed	None
A3	World Vision but left 'long ago'	
B3	'Presby' Community based rehabilitation programme of the Presbyterian Church of Ghana World Food Programme (school feeding) Ameer Waheed Water for Life-installation of boreholes	Projects for the elderly WFP continuing school feeding None

2.11 Local Governance

All eligible HHH voted in the last national elections (December 2012) despite the long queues. There was cynicism in most villages shared about the way in which projects were started in 2012 and have stopped since the election (e.g. electricity poles abandoned, school building construction halted, short-term health insurance provided).

There was much frustration vented regarding Assembly Members who are “not trusted,” “not transparent,” and “never give us feedback.” Some have never seen the Assembly member and do not know their name (e.g. in B2a people said “we don’t have an Assemblyman because if we did we would know him”). Others said they rarely visit and live in town.

The Unit Committee was also often criticised as not being very active (e.g. “we voted for them but do now know what they are doing” (man, B2b). But mostly the HHH felt marginalised from community decision-making and felt they had very little voice.

Chiefs and sub-chiefs are respected and are most active in solving local disputes. Three villages are awaiting appointment of new chiefs following the death of the previous incumbent, and one has an absent chief whom they distrust since he is “being made rich by the Fulani...and we want them to go,” (B3). They are regarded as a link between the community and external people as they all go through the chiefs.

It was very apparent that there is a strong correlation between connectedness to power holders outside the village and the level of development of the village. Table 3 shows this clearly in terms of bridging social capital.²⁵ All villages seemed to have a PTA but their role and effectiveness varied considerably. In B1, it was claimed that the PTA works well and is currently constructing a new kitchen for the school funded by parental contributions, and in B2b, they have organised the installation of speed bumps to control the traffic around the school. In B2a, parents are afraid to attend because they cannot afford the contributions requested. In A1 the PTA only meets when the schoolteachers request it in order to convey important messages to parents. In A3 the PTA has a

²⁵ Details of these connections are not included here as they may compromise the confidentiality of the villages.

chairperson but people do not come to meetings because they are worried that if they raise their concerns about teacher absenteeism, it may be used against them and women say they are too busy to attend. In B3, the PTA exists but it not very active and our F/HHH were not really sure of its role or activities.

APPENDIX F. BASELINE REPORT – INSTITUTIONAL ANALYSIS OF THE BUILSA DISTRICTS

Institutional Analysis of the Builsa Districts
**EXTERNAL IMPACT EVALUATION OF THE
MILLENNIUM VILLAGES PROJECT,
NORTHERN GHANA**

Date: February 2014

Submitted by Itad in association
with:



Results in development

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Acronyms

AEAs	Agricultural Extension Approaches
BECE	Basic Education Certificate Examination
CAMFED	Campaign for Female Education
CHPS	Community-based Health Planning Services
CLTS	Community Led Total Sanitation
CWSA	Community Water and Sanitation Agency
DA	District Assembly
DACF	District Assembly Common Fund
DANIDA	Danish International Development Agency
DCD	District Coordinating Director
DCE	District Chief Executive
DFID	Department for International Development
DSW	Department of Social Welfare
DWAP	District-Wide Assistance Project
EPI	Expanded Programme on Immunisation
FBO	Farmer-Based Organisation
GES	Ghana Education Service
GHS	Ghana Health Service
GoG	Government of Ghana
GSOP	Ghana Social Opportunities Project
GWCL	Ghana Water Company Limited
IFAD	International Fund for Agricultural Development
KG	Kindergarten
MOFA	Ministry of Food and Agriculture
MVP	Millennium Villages Project
NGO	Non-Governmental Organisation
NHIS	National Health Insurance Scheme
PDA	Participatory Development Associates Ltd
PPLG	Participatory Program in Local Government
SADA	Savannah Accelerated Development Authority
SHS	Senior High School
SRWSP	Sustainable Rural Water and Sanitation Project
UNICEF	United Nations Children’s Fund
WAAP	West Africa Agriculture Productivity Program
WFP	World Food Program

1. Qualitative Baseline Institutional Assessment at the District Level – Builsa Districts

1.1 Introduction

Sustaining the investment into the Millennium Villages Project (MVP) communities at the end of the project depends on institutional arrangements at various levels: national, regional, district, and community. For this reason, it is important to understand the institutional, financial, and governance arrangements that have been put in place for the management and implementation of the MVP and to track their effectiveness over the implementation period. It is also important to understand how the relationships between institutions/organisations at various levels have evolved as a result of the project and why. It was for this reason that this baseline study was undertaken.

The study was undertaken by Participatory Development Associates (PDA) Ltd, led by Tony Dogbe with the assistance of Beatrice Sarpong, also of PDA. It was conducted on 16 November 2012, at the tail end of a nationwide strike by the staff of the Local Government Service. The team was scheduled to meet the staff of the West Mamprusi and the newly created Mamprugu-Moaduri Districts the previous day, 15 November, but this was cancelled because most of the staff were not available due to the strike. However, the staff of Builsa North and South Districts were willing to meet the team.

The objective of the study was to document:

- The level of involvement of district institutions and actors in the decision-making process of projects like the MVP and what they know about the MVP
- Contributions of the districts and their departments to projects like the MVP
- The perspectives of these district actors and what they think makes projects like the MVP cost-effective and sustainable
- Expectations of these district actors of the MVP and the possible impact at district and community levels

1.2 Organisation of the Study

At the start of the MVP in the Savannah Accelerated Development Authority (SADA) area at the beginning of 2012 there were two districts. Over the course of 2012, they were both split into two, making a total of four districts. At the time of the study, some staff for the two new districts had been recruited but did not have functioning offices and the majority were new to the region. As most of the engagement between the SADA MVP and the district officials had been with the staff of the old districts, the District Coordinating Director, the District Planning Officer, and the District Budget Officer thought it best to bring the staff of the two districts together for a focus group discussion. This was because in the two Builsa districts all the MVP communities were in the newly created Builsa South District. For this reason, in the case of Builsa, subsequent studies of the impact of the MVP on district-level institutions in years three and five would be mostly felt in Builsa South. It was therefore important that, for this baseline study, the newly recruited staff of Builsa South were present to hear from the staff of Builsa North on how the project had been designed and their involvement to date compared to other projects being implemented in the district.

Furthermore, the core staff of the district administration, namely, the District Chief Executive, the District Planning Officer, the District Finance Officer, the District Budget Officer, etc., play different roles from the heads of departments and agencies in the district and therefore experience projects like the MVP differently. For this reason, the study team met with the two groups separately.

2. Baseline Study with the District Administration of the Builsa North and South Districts

2.1 Involvement of District Leadership/Administration in Decision-Making in the MVP

According to the District Chief Executive (DCE) of the Builsa North District (the DCE of Builsa South was not present), the focal person for the MVP is the Planning Officer, who is assisted by the Budget Officer. Also, the Internal Audit Unit has some level of responsibility in MVP. The roles and responsibilities of some Builsa District administration staff in the MVP as they are perceived are in Table 1.

Table 1. Roles and responsibilities of some District Administration Staff in the MVP

District Planning Officer

- Provide secondary data to the MVP office
- Liaise with the concerned decentralised departments in the district (e.g. health, education, and agriculture)
- Liaise with external bodies that need information or data regarding the MVP
- Assist in organising MVP related workshops and trainings in the district
- Assist all external evaluators that require information or data

District Budget Officer

- Ensure that resources are effectively and efficiently allocated to the intended beneficiaries or communities
- Translate the plan of action developed by the Planning Officer into quantitative analysis
- Make decisions with respect to the implementation of the MVP

Internal Audit Unit (Builsa South)

- Ensure that the MVP encompasses all deprived communities so that needed support can be allocated to them efficiently
- Establish a platform where members of the communities can express their challenges which can in turn be addressed by the MVP
- Help distribute resources to the rightful beneficiaries
- Ensure that the goals of the MVP are achieved

Internal Auditor (Builsa North)

- Monitor the overall performance of the MVP in terms of its efficiency and effectiveness
- Ensure the judicious use of the resources provided by the MVP
- Ensure that the activities carried out under the MVP are in line with the guidelines, laws, rules, and regulations governing the implementation of the project

With regards to what they know about the MVP, they said the rationale behind the MVP is that by providing resources like farming inputs, proper health delivery, improving access to clean water, sanitation, education, food production, and by focusing on environment sustainability that extreme poverty will end. The MVP seeks to provide a holistic package of interventions to keep villages out of extreme poverty and also meet the Millennium Development Goals.

According to the administration staff, some departments were provided with the MVP documents whilst others in the central administration obtained information about the project through workshops attended at the Amansie-West District Assembly in the Ashanti Region. The departments are updated periodically on the progress of MVP implementation by the District Planning Officer.

According to the Budget Officer, the leadership of the district, particularly the DCE and District Coordinating Director (DCD), were involved in the formulation and design of the MVP. The DCD indicated that he was shown the design of the project during a workshop at the Amansie-West District and given the opportunity to have input and comment on the project. However, according to the DCE, as they were only informed of the design of the project during the workshop, they were not aware of the project's implementation phase.

The DCE and DCD approved of the project design and intervention areas. A workshop was organised where agencies and departments met to discuss the provision of services and facilities to ascertain what were deemed community and district priorities. However, they disapproved of the selection of the beneficiary communities. The MVP team selected the beneficiary communities without consulting the leadership of the District Assembly. Upon several inferences to the selected communities in meetings by the MVP team, the DCE said he requested a copy of the list. He reviewed the list of communities with the MVP team and some of the communities were removed. However, he did not receive any feedback regarding the final list of communities that were approved.

According to the Internal Auditor of Builsa North, the selection of the beneficiary communities was done using the poverty profile of the district. He indicated that this profile has not been reviewed in a long while. As such, the situation of some of the communities had changed and hence the communities might not fully benefit from interventions targeted at them.

The central administration of the district was unhappy with the implementation phase of the project. In their view, the MVP has its own organisational structure which does not involve the District Assembly in decision-making processes. They indicated that their level of involvement has been limited and felt that some staff were even unaware that fertilisers had been distributed. With the distribution of the fertiliser, the DCE was phoned to witness the handover. Also, because the administration was only marginally involved in the implementation of the project, scheduling for use of the District Assembly Hall for workshops and meetings by the MVP sometimes clashes with other district activities, which also require the hall. The group suggested that the DCE and DCD be actively involved in the implementation of the project.

The District Planning Officer was not available at the time of the focus group discussion at the district and was therefore interviewed separately. He explained that he is not directly involved in the implementation, monitoring, and evaluation of the project because from the start they were told the MVP secretariat would be in charge of the implementation through the decentralised departments. However, he participated in the initial feasibility studies in 2010 when various teams from SADA, Columbia University, the MVP office in Mali, the UK Department for International Development (DFID), etc. visited the district and toured the communities. He also had input in the process in selecting the beneficiary communities, and participated in validation of the final selection of the communities.

To get a sense of the involvement of the district leadership in other current donor-assisted projects to compare with the MVP in subsequent studies, the staff of the administrative arm of the district were asked to list the current projects and rank their involvement in design, implementation, monitoring, and evaluation on a scale of 1 (low) to 10 (high). The outcome is reflected in Table 2 and the explanation follows.

Table 2. Level of involvement of District Administration in current donor-assisted projects in the district

Project	Design	Implementation	Monitoring	Evaluation
District Wide Assistant Project (DWAP)	10	10	9	4
Sustainable Rural Water and Sanitation Project (SRWSP)	10	10	9	4
Ghana Social Opportunities Project (G-SOP)	10	10	9	4
Participatory Program in Local Government (PPLG)	10	10	9	4

They explained that all four projects scored a 10 on the design and implementation phases because the District Assembly decided which projects to undertake. They then developed and implemented these projects. They also indicated that the donors understand the District Assembly concept and involved them heavily in the design and implementation. As a decentralised body, the District Assembly has the duty to take initiatives on programmes and projects needed for district development. The monitoring and evaluation stages of the various projects scored 9 and 4, respectively. This was because evaluation of the projects was mainly undertaken by the donors to examine the outcome of the project and to further draw lessons for future project implementation. In addition, the donors had to ensure that funds were used judiciously and channelled to the right activities.

2.2 The District Administration's Contribution to the MVP

The District Administration contributes personnel and logistics in the form of a vehicle and the assembly hall hire when needed by the MVP. The District Assembly has allocated personnel within the various departments to represent it with regard to the MVP. The Budget Officer and DCD said that when the personnel go for meetings and to the communities to monitor the MVP activities they use District Assembly vehicles. Also, the MVP team uses the District Assembly hall for its meetings. The team also assists in the dissemination of information by distributing letters from MVP to the departments.

With regard to whether the central government's overall resource allocation to the district has changed over the past year or if they envisage this happening, the DCD felt that there have been changes in the allocation of financial resources to the assembly. For instance, District Assembly Common Fund (DACF) funding has reduced since some of the district's responsibilities, in terms of the provision of facilities and services, will lessen with the creation of the Builsa South District. It is envisaged that government commitments will also change with respect to the provision of facilities to the district. The District Administration staff felt that it is going to be difficult to request financial resources from the government to undertake projects because of the provision of such services and facilities by the MVP.

As for who decides on the resource allocation to beneficiary communities, the staff felt that since government is operating a decentralised system, any intervention targeted at a community must be channelled through the District Assembly to bring a sense of ownership within the Assembly and communities. However, currently the MVP Secretariat and SADA make these decisions when it comes to the MVP. Ideally, an exit strategy needs to be in place for project donors so that the developments undertaken in the communities do not collapse when the project ends.

With regard to sustainability of MVP investments in the communities, the staff said the Assembly has a maintenance plan and facilities management operation that deals with actual repairs and the resources needed to perform routine maintenance.

2.3 Cost-Effectiveness and Sustainability of the MVP

Since cost-effectiveness and sustainability are critical to any project, the team considered it relevant to get the perspectives of the district actors and what they think makes projects like the MVP cost-effective and sustainable. The District Administration noted that sustaining projects is often a challenge because most

projects do not have existing strategies or plans for longevity. The DCE believes that the projects should not rely entirely on donor funds but that the community members themselves should be encouraged to make some financial commitments in order to sustain the project. He gave the ambulance service and sustainable water project as examples. He indicated that if community members used the ambulance without charge, it would be difficult to maintain the vehicle or acquire new ones when the project ended. In contrast, the Sustainable Rural Water and Sanitation Project (SRWSP) was cost-effective and sustainable. The SRWSP provided the communities with one of their most basic needs.

Additionally, there was a component under this project dedicated to building the capacities of the community members. For instance, the training of the Water and Sanitation (WATSAN) committees equipped the community members with the knowledge and skills on how to maintain the boreholes for maximum benefit to the community. This has reduced the rate at which people call on the Assembly for borehole maintenance. The assembly is only called upon for assistance when there are major faults with the facility. Also, leadership and managerial skills were taught to the WATSAN committee members. Due to the training, the committee is now able to manage the funds it accrues from contributions of users of the facility. In their opinion, a cost-effective and sustainable project is the District-Wide Assistance Project (DWAP), however they did not elaborate on the project's details.

Furthermore, the DCD mentioned that if the MVP team does not involve the District Assembly actively in the project, it will be difficult to sustain it since they might have little or no knowledge of how they operate.

2.4 Anticipated Impacts of the MVP

According to the district administration, the impacts they anticipate the MVP will have on the district institutions, departments, and beneficiary communities are the following:

2.4.1 Beneficiary Communities

- Improved service delivery in the communities
- Increased productivity due to improved health
- Reduction in poverty levels as income levels increase
- Improved standards of living due to improved productivity
- Increased school enrolment levels as parents can afford to send their children to school and pay for other educational expenses
- Increased awareness about the practises that hamper the health and development of people

2.4.2 District

- Reducing pressure on the District Assembly to provide facilities and services to the communities
- Channelling district resources to the non-beneficiary communities
- Learning from the success stories of the MVP and replicating best practises in other communities
- Improving infrastructural facilities in the district

2.4.3 Departments

- The trainings organised by the MVP will enhance the capacities of department personnel
- Improved service delivery as personnel will be supplied with equipment such as motorbikes and computers

3. Baseline Study with Representatives of Departments and Agencies of the Builsa North and South Districts

3.1 Involvement of the Departments and Agencies in Decision-Making in the MVP

Nine out of 13 representatives of the various government departments and agencies present at the meeting were completely unaware of the MVP and did not have copies of the project document. The departments that were identified as having roles within the MVP included the cooperative, agriculture, works, and Ghana Education Service (GES). The roles and responsibilities of these departments in the MVP are listed in Table 3.

Table 3. Roles and responsibilities of departments in the MVP

Cooperative Department

- Locate or make contact with the MVP communities and form farmer-based organisations (FBOs)
- Sensitise the groups on group dynamics and introduce them to a financial institution; open bank accounts for them
- Assist the group to register and be certified as a legal entity under the department

Agriculture Department

- Provide extension services to farmers in the communities

Works Department

- Supervise the construction of classroom blocks and other infrastructural facilities such as roads
- Monitor and oversee construction projects
- Assist in designing and drawing up plans for construction projects

Ghana Education Service

- Ensure that teaching and learning is effective

In terms of their involvement, some of the representatives of the departments and agencies said they were shown the MVP design during a meeting in Fumbisi, in the Builsa South District. According to them, the MVP team elaborated on objectives and the various components of the project. The representatives of the various departments were allowed to review the MVP to ensure that the projects implemented are aligned with the development plan of the district.

In addition, according to the representative of the Health Department, they assisted in training volunteers for the project. Some of the training focused on administering basic medication at the community level in order to reduce the pressure on district health facilities.

The Health Department is enthusiastic about the prospects for improvement in health delivery in the district. The provision of ambulance services will enable people from far away communities to access hospitals especially during emergencies, thereby reducing fatalities in the district. Also, the project involves enrolling people in the National Health Insurance Scheme (NHIS) as well as renewing membership. This will make healthcare more accessible and affordable, especially for pregnant women. The representative of the district office of the GES said they are satisfied with the project's plans to provide educational facilities such as

classroom blocks with toilets, solar lights, other educational equipment like laptops, and ICT training. These facilities will enhance the capacity of teachers to educate effectively. Children in turn can access resources and materials needed to enhance the quality of learning.

The departments were however dissatisfied with the following components of the project design:

- The Health Department was not happy that the Health Centres were not included for support because they are critical in the health delivery system, serving as referral points.
- In general, they were not happy that some communities near the MVP communities were not selected and they now have to explain the reason to these communities.

The institutional arrangements in place for the departments to participate in decisions relating to the MVP include:

- **Personnel.** Each department has a focal person participating in the activities of the MVP. For instance, the Agricultural Department has a desk officer at the district office who is responsible for the MVP and there are agricultural extension agents (AEAs) in the field. AEAs can provide extension services and technical advice to the farmers on good farming practises to enhance productivity. Also, staff members of some departments are appointed to attend meetings and training related to their units. For example, the Director for Works under the GES attends meetings related to education and the Budget Office prepares budgets relating to the MVP.
- **Periodic meetings.** MVP meetings are organised with the focal people or representatives of the departments. They are usually held on a quarterly basis to update the representatives of the departments on the progress of the projects.

These enable the departments to make inputs into decisions related to the MVP communities. For instance, the Ministry of Food and Agriculture (MOFA) identified local input dealers to serve as agents for the sale and distribution of fertilisers and to assess farmers willingness to work and pay back loaned inputs. MOFA again identified community structures that could be rehabilitated for warehousing. They also assisted in the distribution of motorbikes. The Health Department identified volunteers and gave input into the training content for volunteers.

The participants indicated that the MVP team undertakes certain activities in the communities without involving the departments. For example, the representative of the Health Department indicated that the distribution of bed nets was done without involving her department.

Regarding the issue of sustainability, according to the MOFA representatives, some training has been instituted to develop the community-based groups. In their view, if the groups put the knowledge they will acquire from training into practise, then the projects can be sustained. Also, sustainability of the projects can be reinforced if the community members and departments are heavily involved in the project and see it as their own. Further, the Environmental, Health, and Sanitation Department mentioned that if natural leader groups are formed and trained on the concept of sustainability, the groups will be able to maintain and sustain the projects.

To get a sense of the involvement of the various departments in other donor-assisted projects for comparison with MVP in subsequent studies, the representatives of the departments in the two districts were asked to list the current donor-assisted projects in their departments and rank their involvement in the design, implementation, monitoring, and evaluation on a scale of 1 (low) to 10 (high). The outcome is reflected in Table 4.

Table 4: Level of involvement of departments in current donor-assisted projects in the district

Departments	Projects	Design	Implementation	Monitoring	Evaluation
Community Development	Child Rights Promotion and Protection (UNICEF)	10	10	8	8
	Re-bagging of iodised salt and food fortification (World Food Program – WFP)	8	10	10	8
Health	UNICEF – Expanded Programme on Immunisation (EPI)	4	8	9	
	Global Fund – Expanded Programme on Immunisation (EPI)	5	9	9	
	GEHIP – EPI	4	8	9	
Works	GSOP – Ghana Social Opportunity Project (construction of classroom blocks, dams, and tree planting)	10	10	9	8
	CWSA – DANIDA sponsored projects – boreholes, extension of GWCL water to communities, health and sanitation	9	9	10	9
Environmental Health and Sanitation Unit	UNICEF – Sensitised selected Community-Led Total Sanitation (CLTS) communities	8	8	10	10
Social Welfare	Child Rights Promotion and Protection	10	10	9	9
	Livelihood Empowerment Against Poverty (GoG/World Bank)	10	10	8	8
GES	DFIS	8	6	5	5
	CAMFED – Girl	4	1	1	1
	UNICEF – Promote effective teaching and learning in Maths, Science at Basic level of education (KG and P1 – P3 classes)	5	0	0	0
MOFA	Rice subsector support (French Embassy)	7	7	3	3
	Northern Rural Growth Programme (IFAD)	7	4	4	4
	West Africa Agriculture Productivity Program (WAAP)	3	3	3	3
	Sustainable Land and Water Management Project	6	1	1	1

Most of the departments pointed out that projects undertaken at the district level are usually designed, implemented, and monitored internally.

Representatives of the Community Development and Social Welfare Departments indicated that where the departments designed and implemented the projects mentioned above, they were given a score of 10. On the other hand, monitoring and evaluation of the projects are normally a collaboration between departments and donor agencies to assess the projects' efficiency and effectiveness.

However, the projects implemented by the Health Department are designed by the regional and national offices and this was reflected in the scores of four and five for design. These projects are implemented and monitored by the Health Department at the district level and scored eight and nine, respectively. Also, according to the representative of MOFA, the district department was not involved in designing some of the projects they implemented. For instance, the district was not involved in the design of the West Africa Agriculture Productivity Program (WAAP). Also, the district did not receive funds promptly from the donors to implement the project. Monitoring and evaluation of the project was done once a year, hence the score of three for each of the stages – the design, implementation, monitoring, and evaluation of the project.

3.2 Contribution of Districts' Departments to the MVP

The various forms in which the departments contribute to the MVP include the following:

- **Personnel:** All the departments (GES, Health, MOFA, Environment, Cooperative and the Community Development, etc.) currently involved in the MVP contribute staff to undertake various activities under the project. For example, GES contributed staff to participate in the baseline data collection for the project. Circuit supervisors from GES are also likely to be monitoring education outcomes in the MVP. In addition, staff members from the Health Department are in charge of the disease control and Community-based Health Planning and Services (CHPS) compound under the health components of the project. Some of the personnel are also involved in training and sensitisation of community members on modules like Child Rights Promotion and Protection.
- **Logistics:** The departments also provide motorbikes for staff members to be used for MVP training and sensitisation programmes. However, fuel for the motorbikes is usually provided by the MVP.

With regard to sustainability of the MVP in the beneficiary communities, the view was that it can be enhanced by:

- Effectively monitoring the projects to ensure that interventions get to the targeted communities
- Charging user fees on some services or facilities provided under the project so that funds can be recouped and invested in other projects
- Ownership of the projects: this can be enhanced by actively involving the stakeholders such as the beneficiary communities, departments, and institutions in the design and implementation of the projects. Also, the District Assembly sub-structures like the Area Councils can play a role in the maintenance and management of these projects
- Culture of maintenance: measures need to be put in place to ensure that the facilities provided are properly maintained. For example, some built-in user fees can be incorporated into the ambulance services to generate revenue to maintain the vehicles and acquire new ones
- Sensitising people on the need to sustain these projects and project benefits
- Building solid and durable physical structures like schools and clinics that can endure over the years. Thus, materials used for the construction of the facilities must be of good quality

3.3 Cost-Effectiveness and Sustainability of the MVP

According to the department representatives, cost-effective projects implemented at the community level include:

- For health, training volunteers to administer simple medications to patients thereby saving travel time and the time patients spend at health centres. This has contributed to a reduction in the pressure on the health care facilities in the district
- For the Department of Social Welfare, Child Rights Promotion and Protection Project: sensitising community members on the promotion and protection of child rights has led to a reduction in teenage pregnancies and child abuse cases like forced and early marriages of children
- Livestock Development Project: group management and responsibility for the livestock – livestock offspring is given to a member of the group to rear. When the offspring matures and reproduces, the new offspring is given to another member of the group
- Boreholes: training of community members on the management and maintenance of the borehole thereby reducing the rate at which community leaders rely on the District Assembly (DA) for assistance in maintaining the boreholes

In the view of the representatives of departments, maintaining the services and facilities provided by the MVP is essential to their continuous use by and benefit to the communities.

3.4 Anticipated Impacts of the MVP

According to the department representatives, the MVP will impact the district institutions, departments, and beneficiary communities in the following ways:

3.4.1 Beneficiary Communities

- The project will build competitive business minded farmer groups. Currently, farmers in the north are not business minded like those in the south
- Negative cultural beliefs and practises that hamper health seeking behaviours will be reduced
- People will be educated to understand the benefits of not defecating in open spaces
- Improved performance in the Basic Education Certificate Examination (BECE) and Senior High School (SHS) so that students can progress to the tertiary level
- Livelihood at the family level will improve greatly (e.g. impact on their income levels and livelihood patterns)
- Improvement in gender relations and equality

3.4.2 Departments

- Enhanced capacity of department personnel (e.g. in agriculture, the capacity of staff to enhance commodity value chain and management of groups as business outfits)
- Improved coordination and collaboration among the departments within the districts
- Reduction in the pressure on the scarce resources of the districts
- Training and education for personnel, both formal and informal
- Improvement in logistics such as vehicles, computers, internet, etc.

3.4.3 District Assembly

- Assistance in providing housing stock for workers
- Improved road networks
- Increased capacity of human resources and staff development
- The Assembly will be provided with enough experience and skill knowledge to replicate the project in other communities in the district
- Build capacity of the Assembly to facilitate the ownership of projects among the community and their understanding of community development

4. The Human and Financial Status of Key Departments in the District at the Start of the MVP

The representatives of the departments of health, education, and food and agriculture were asked to provide the study team with the following information:

- Number of staff in the department and distribution as of 31 December 2011
- Department's expenditure as of 31 December 2011
- Department's budget as of 1 January 2012
- Number of non-governmental organisations (NGOs) department works with as of 31 December 2011

The district administration was also to provide information on the number and names of NGOs operating in the District as at 1 January 2012. A table and analysis of the information are provided in Table 5.

Table 5. The financial and human resources of Government Departments in Builsa North and South

DEPARTMENT S	No OF STAFF	NGOs		ANNUAL BUDGET			EXPENDITURE GH¢
		Internal	External	Goods and services GH¢	Assets GH¢	Compensation GH¢	
MOFA (Builsa North and South)	38	3	-	37,100	-	-	39,287
Health (Builsa South)	44	2	2	-	-	-	104,235.85
Education (Builsa North and South)	1,376	-	-	451,700,000	53,540,000	1,279,220,000	21,398453.04

The District MOFA representative said it was difficult to separate the information for North and South, as they have operated as one district since the end of 2012. The representative of the Health Department from Builsa South sent information to the team, but all attempts to get information from the North failed.

There are a total of 10 NGOs working in the Builsa North and South Districts as at 1 January 2012. Out of 10, three work with the MOFA Department whilst the Health Department works with four of the NGOs. Two out of the four NGOs working with the Health Department are external NGOs operating in the district.

The MOFA Department in the Builsa District (both North and South) had 38 staff members as of 1 January 2012, 26 of which are Extension Agents (see Annex 1 for the distribution of staff). Builsa District is predominantly agrarian hence the need for extension agents to be able to assist and educate the farmers on relevant agricultural information, farm management, and production.

The MOFA Department's budget as at 1 January 2012 for Goods and Services was GHS 37,100, whilst its total expenditure as at 31 December 2011 was GHS 39,287. The expenditure and budget exclude personnel emoluments, as these are paid directly from central government into the accounts of the staff. The expenditure

for the month of December 2011 recorded the highest amount of GHS 8,780 with the month of May recording the lowest at GHS 170.00. No expenditures were noted down for January, February, or August.

There are 44 staff and technical personnel at the Ghana Health Service (GHS) at the Builsa South District. Ten of these personnel/staff are located at the Fumbisi Health Centre, which serves a large number of people due to the size of the community. Six each of the staff/technical personnel are based at the Kunkwa/Gbedema, Kanjaga, and Doninga Health Centre, whilst two of each are also located at Chansa, Bachongsa, Gbedembilisi, Wiesi, and Uwasi community-based health planning services (CHPS).

The total expenditure as at 1 January 2012 for the Health Department of the Builsa South District was GHS 104,235.85. The expenditure item that recorded the highest was drugs at GHS 56,433.45. Travelling and Transport (T&T) expenses recorded the second highest at GHS 20,569.42 whilst financial charges recorded the lowest at GHS 520.98 (see Annex A for the breakdown of expenditure items).

There is a total 1,376 staff at the Education Department of the Builsa South District, out of which the non-teaching staff (administrative and supporting staff) constitute 119. The teaching staff at the kindergarten level is 342 and 467 at the primary level. The teaching staff at the Junior and Senior High levels constitutes 250 and 198, respectively.

The Department's budget as at 1 January 2012 for Goods and Services was GHS 451.7 million whilst Assets was GHS 53.54 million. The budget component on compensation (which includes wages, salaries, and allowances) was GHS 1,279.22 million. The total expenditure including emoluments for the Department of Education as at 31 December 2011 was GHS 21,398,453.04.

Annex 1. Information provided by the departments of health, education, and food and agriculture

Ministry of Food and Agriculture – Builsa District (includes the South)

Staff distribution as at 31 December 2011

S/N	SCHEDULE	NUMBER
1	District Director of Agriculture (DDA)	1
2	District Development Officer (DDO)	5
3	Agricultural Extension Agents (AEA)	26
4	Plough Man	2
5	Driver	1
6	Watchman	2
7	Cleaner	1

Department's Expenditure as at 31 December 2011 (Excluding personnel emoluments)

S/N	MONTH	EXPENDITURE
1	JANUARY	-
2	FEBRUARY	-
3	MARCH	7,942
4	APRIL	1,483
5	MAY	170
6	JUNE	7,628
7	JULY	2,472
8	AUGUST	-
9	SEPTEMBER	375
10	OCTOBER	7,490
11	NOVEMBER	2,947
12	DECEMBER	8,780
	TOTAL EXPENDITURE	39,287

1. Department's budget as at 1 January 2012

Goods and services GHS 37,100

1. Number of NGOs the department works with as of 31 December 2011: 3

Ghana Education Service – Builsa District (North and South)

1. STAFF DISTRIBUTION AS OF 31 DECEMBER 2011

S/N	SCHEDULE	NUMBER
1	TEACHERS	
	KINDERGARTEN	342
	PRIMARY	467
	JUNIOR HIGH	250
	SENIOR HIGH	198
2	ADMINISTRATIVE AND SUPPORTING STAFF	119

2. DEPARTMENT'S EXPENDITURE AS OF 31 DECEMBER 2011

EXCLUDING EMOLUMENTS	GHS 4,024,891.04
INCLUDING EMOLUMENTS	GHS 21,398,453.04

3. DEPARTMENT'S BUDGET AS OF 1 JANUARY 2012

GOODS AND SERVICES	GHS 451.7 MILLION
ASSETS	GHS 53.54 MILLION
SALARIES, WAGES, AND ALLOWANCES	GHS 1,279.22 MILLION

Number and names of NGOs operating in the district as at 1 January 2012, as provided by the District Administration

S/N	NAME OF NGO
1	Presbyterian Agricultural and Rural Integrated Programme
2	Presbyterian Rural Health
3	Presbyterian C.B.R.
4	FISTRAD
5	Horizon Children's Centre
6	The Catholic Mission
7	Buili Literacy Project
8	Ghana Red Cross Society
9	Action Aid Ghana
10	Builsa Civic Union

GHANA HEALTH SERVICE BUILSA SOUTH DISTRICT

TOTAL NUMBER OF HEALTH STAFF AT BUILSA SOUTH AS OF 31/12/11.....38

EXPENDITURE OF SERVICE/BUDGET AS AT 1/1/2012

FUMBISI/KARI	Non Salary	Office consumables	Printing & stationery	Building maintenance	Financial charges	Training & conference	T&T	Non drug	Drug	Total
	4520.00	7709.54	8126.33	4339.57	520.98	1105.00	20569.42	911.56	56433.45	104235.85

Number of NGOs operating in the District as of 1/1/2012.....2

External NGOs operating in the District on 1/1/2012.....2

Staff strength/Technical personnel

Facility	Fumbisi H/C	Kanjaga H/C	Doninga H/C	Uwasi CHPS	Wiesi CHPS	Gbedembilisi CHPS	Bachongsa	Wupiensa	Gbedema/Kunkwak	Chansa	Total
No.	10	6	6	2	2	2	2	6	6	2	44

Annex 2. Questions for the baseline qualitative study at the district level

Introduction

Sustaining the investment into the MVP communities at the end of the project depends on institutional arrangements at various levels: national, regional, district, and community. For this reason, it is important to understand institutional, financial, and governance arrangements that have been put in place for the management and implementation of MVP and to track their effectiveness over the period of implementation. It is also important to understand how the relationships between institutions/organisations at various levels have evolved as a result of the project and why.

This baseline assessment is focusing on the district level. Below are the four main questions/issues around which the discussion will focus.

(i) To what extent have the district leadership/administration and the various departments/institutions been involved in decision-making in MVP?

- Who in the district/your department takes responsibility for the MVP?
- What are their roles and responsibilities in the MVP?
- What do those at the district/your department responsible for the MVP know about it? Do they have copies of the project document?
- To what extent was the leadership of the district/your department involved in the design of the MVP?
- Which aspects of the MVP design are you happy with and which would you like changed?
- What structures/institutional arrangements have been put in place for the leadership of the district(s)/your departments to participate in decisions relating to the MVP?
- How do government agencies in the district responsible for agriculture, education, water and sanitation, health, infrastructure like roads, etc. participate in decisions relating to services or provision of facilities in MVP communities?
- What decisions have the leadership of the districts and departments been involved in so far?
- What structures/mechanisms are in place for sustaining the projects, services, facilities, etc. that would be implemented in the MVP communities when the project ends?
- What are the current donor-assisted projects in the district that the DA/your department is actively involved in? In which of these does the department have the greatest say in design, implementation, monitoring, and evaluation? What accounts for that?

(ii) What is the district's and departments' (i.e. government's) contribution to the MVP?

- In what form are district/departments (government) contributing to the MVP?
- To what extent has the central government's overall resource allocation (human, financial, material, projects, services, etc.) to the district changed over the past year? If not, is this envisaged? What accounts for the change?
- Who makes the decision to allocate more resources (human, financial, material, projects, services, etc.) to MVP communities? Is it the district administration/departments or central government?

- How are the investments in MVP communities in the district going to be sustained after the project?

(iii) From your experience what makes a project cost-effective? What makes a project sustainable?

- From your experience, which projects, past and present, would you say were cost-effective? Why? What criteria did you use?
- From your experience, which projects, past and present, would you say were sustained or would be sustained long after the end of the project? What made or would make that possible?

(iv) What impact will the MVP have on the beneficiary communities and on the district institutions and departments?

- What impact is the district administration or department expecting MVP to have on the beneficiary communities and on the district as a whole?
- What impact will the MVP have on the department, the DA, and other institutions in the district?

**APPENDIX G. BASELINE REPORT – INSTITUTIONAL ANALYSIS OF THE WEST
MAMPRUSI DISTRICTS**

Institutional Study of the Participation of the District
Administration and Key District Departments and
Agencies in the West Mamprusi and Mamprugu-Moaduri
Districts in SADA MVP

**EXTERNAL IMPACT EVALUATION OF THE
MILLENNIUM VILLAGES PROJECT,
NORTHERN GHANA**

Date: **February 2014**

Report by:
Tony Dogbe
Beatrice Sarpong

Submitted by Itad
In association with:



Results in development



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Acronyms

ACDEP	Association of Church Development Projects
AEAs	Agricultural Extension Approaches
CAMFED	Campaign for Female Education
CHPS	Community-based Health Planning Systems
DADU	District Agricultural Development Unit
DPO	District Planning Officer
DWAP/CIDA	District Wide Assistance Project of the Canadian International Development Agency
DCE	District Chief Executive
FBOs	Farmer-Based Organisations
GES	Ghana Education Service
GHS	Ghana Health Service
GSOP	Ghana Social Opportunities Project
IDA	International Development Agency
JICA	Japanese International Children’s Agency
LSDGP	Local Service Delivery Governance Programme
MiDA	Millennium Development Authority
MOFA	Ministry of Food and Agriculture
MOU	Memorandum of Understanding
MVP	Millennium Villages Project
NGO	Non-Governmental Organisation
NORPREP	Northern Regional Programme on Rural Enterprises Project
NORST	Northern Regional Small Town Water System

NRGP	Northern Rural Growth Programme
RSSP	Rice Sector Support Project
SADA	Savannah Agricultural Development Authority
SRWP	Sustainable Rural Water Project
UNICEF	United Nations International Children’s Fund
WFP	World Food Programme
WMDA	West Mamprusi District Assembly

1. Qualitative Baseline Institutional Assessment at the District Level

1.1 Introduction

Sustaining the investment into the Millennium Villages Project (MVP) communities at the end of the project depends on institutional arrangements at various levels: national, regional, district, and community. For this reason, it is important to understand institutional, financial, and governance arrangements that have been put in place for the management and implementation of the MVP and to track their effectiveness over the implementation period. It is also important to understand how the relationships between institutions/organisations at various levels have evolved as a result of the project and why. It was for this reason that this baseline study was undertaken.

The study was undertaken by Participatory Development Associates (PDA) Ltd, led by Tony Dogbe with the assistance of Beatrice Sarpong, also of PDA. The study was undertaken with the staff of the West Mamprusi and the newly created, Mamprugu-Moaduri Districts on 22 February 2013 after the nationwide strike by the Local Government Service.

The objective of the study was to document:

- The level of involvement of district institutions and actors in the decision-making process of projects like the MVP and what they know about the MVP
- Contributions of the districts and their departments to projects like the MVP
- The perspectives of these district actors and they think what makes projects like the MVP cost-effective and sustainable
- Expectations of these district actors of the MVP and possible impact at district and community levels

1.2 Organisation of the Study

At the start of the MVP in the Savannah Agricultural Development Authority (SADA) area in 2012, there were two project districts. Over the course of 2012, they were both split into two, making a total of four districts. At the time of the study, some staff for the two new districts had been recruited but did not have functioning offices and most were new to the new districts. Considering that most of the engagement between the SADA MVP and the district officials had been with the staff of the old districts, the District Coordinating Director, the District Planning Officer, and the District Budget Officer thought it best to bring the staff of the two districts together for a focus group discussion. This was to enable the newly recruited staff of Mamprugu-Moaduri District to hear from the staff of West Mamprusi on how the project had been designed and their involvement to date compared to other projects being implemented in the district.

In the light of this, the study team organised two focus group discussions. One with the core staff of the district administration, namely, the District Chief Executive, the District Planning Officer, the District Coordinating Director, the District Budget Officer, etc. and the other with the heads of departments and agencies. They play different roles in the MVP and in projects in general, and hence experience projects differently.

2. Baseline Study with the District Administration of West Mamprusi and Mamprugu-Moaduri Districts

2.1 Involvement of District Leadership/Administration in Decision-Making in the MVP

According to the District Chief Executive (DCE) of the Mamprugu-Moaduri District (the DCE of West Mamprusi District was not present), whose District is one of the newly created ones, he and his team have only availed themselves to learn more about the MVP for the sake of continuity. Since the district did not exist at the start of the MVP, they were not involved in decision-making for the project. He therefore instructed the Planning Officer of the West Mamprusi District, who doubles as the focal person for the MVP, and his cohorts to do more of the talking. The roles and responsibilities of some West Mamprusi District Assembly Staff in the MVP in their own estimation are compiled in Table 1.

Table 1. Roles and responsibilities of some District Administration Staff in the MVP

District Planning Officer

- Member of the external evaluation team
- Part of the team that put up the design for the MVP area in the District
- Focal person in the Assembly for the MVP
- Responsible for data gathering, field survey work, and compilation of reports for the project
- Serves as a coordinator between the project and the various decentralised departments concerned with the project, like health, education, and agriculture
- Participated in civil workshops as part of the project consultation process from inception to completion

District Coordinating Director

- Programme monitoring and evaluation
- Impact Assessment
- Identifying challenges

In the West Mamprusi District, the Assembly draws on the expertise of departments like the District Agricultural Development Unit (DADU), Health, and Education Departments. These departments have been invited to the MVP workshops. The District Planning Officer has also periodically relayed information to these departments regarding MVP activities. The departments are therefore the most involved and well informed about the progress of the project. However, the District Planning Officer admitted not to have received copies of the MVP documents although he was promised one.

On the issue of involvement of the District Leadership in the design of the MVP, the District Planning Officer (DPO) said he was directly involved in the formulation and design of the project from its inception. He also indicated that the health outfit is included in implementing their health interventions

while the Ministry of Food and Agriculture (MOFA) is critical in the implementation of agricultural interventions. The DPO further explained that the design of the MVP was around agriculture, education, infrastructure, health, and ICT. In his view, the district is happy with the agricultural component of the project since over 70% of the population counts on agriculture as their main source of livelihood, and that the percentage may be higher for the newly created Mamprugu-Moaduri District. The aspects of the agricultural component they are enthused about are the supply of inputs and the provision of extension officers. He mentioned that previously the ‘overseas’ (Mamprusi Moaduri District) only had two extension officers, one of which was not fully qualified. However, currently the area has more than 10 extension officers and with the proposed road rehabilitation, access to these communities will improve.

The aspect of the MVP design that the DPO was not happy with, in his own words, is “looking at the value chain of agriculture, supply of inputs to the door steps of the people is very critical.” Unfortunately, this demand has not been realised over the years by various actors, including the MVP, due to the poor road network to the project communities. He hinted that improvement in accessibility was critical to service providers moving into the area or in preventing people from migrating from the area. The District Planner also added that they face the challenge of inadequate staffing.

Another area of dissatisfaction, according to the DPO, is the coverage of the project. In his view, all the project communities are in a line and close to the main road, ignoring the off-track and ‘deeper overseas’ communities such as Bugyinga, Bulbiya, Dindigni, Sakpaaba, and Lichin, among others. In the DPO’s own estimation, supported by the other members present, the communities he mentioned are really poor; “the poverty in these areas is deeper,” he asserted. The roads to the deeper overseas communities are inaccessible due to perennial flooding, especially during the rainy season, making it difficult, and sometimes impossible, to use transport (e.g. canoes, motorcycles, bicycles, walking, etc.).

The Planning Officer was also unhappy about SADA’s unilateral selection criteria where they had their own indicators in the selection of the beneficiary communities. He recalled that he was a mere participant (describing himself as a ‘zombie’) when he joined the team for the community selection. With this, the DPO from the Mamprusi Moaduri District expressed his dissatisfaction that the district was not fully involved in the selection process. He explained that the Assembly knows the poverty pockets of these areas and as such the beneficiary communities should have been selected using the poverty profile of the district.

The district is not happy with some aspects of the MVP health and infrastructural components. For instance, the Wulugu-Fumbisi stretch has only Wulugu and Fumbisi connected to the national electricity grid, but the MVP has no plans to connect the other communities. In terms of health facilities, the Kunkwa area to Kpasinkpe had one referral area, Walewale. Although the road network is good, the roads themselves are full of potholes and very dusty during the dry season. The DPO joked that when you ply the stretch between Kunkwa and Yaadima you get “free powder” (meaning dust). He explained that the proposed road rehabilitation in the MVP is not the best in that some of the roads should at least be tarred thereby relieving community members of some of the stress they go through when accessing these roads.

The Planning Officer from West Mamprusi District Assembly (WMDA) explained that the Upper West Region (which initially was part of the project) was disqualified from the MVP because there are big rivers with no bridges, hence they could not be crossed. He said the MVP design does not include a

component that supports the construction of bridges. The team on their tour changed their route to the ‘overseas’ area, hence Kunkwa and Yizesi area council was ‘discovered’ and included in the project.

The Planner maintained that because they are not adequately involved in the activities of the MVP, the assembly could not ascertain the decentralised departments’ level of participation in decisions relating to the MVP. This is because some of the departments are mostly contacted by the MVP directly without informing the Assembly.

Some of the specific decisions the Assembly has been involved in with the MVP include the citing of health posts and CHPS compound at Kunkwa and Yaadima.

The Planners have enquired to the MVP authorities about the structures and mechanisms that are in place to sustain the MVP. The MVP authorities confirmed that there were exit strategies and sustainability arrangements although these were unclear to the Planning Officers. They tied it to the fact that the involvement of the decentralised departments was enough since they can take over the management of the facilities when the project phases out. He added that the district has plans to operationalise the area councils to sustain the project. The District Coordinating Director was of the opinion that any good thing is worth sustaining so they have also directed the area councils to supervise and oversee the management of the projects undertaken in the MVP communities. He said the District Assembly was aware that the area councils were not functioning as expected. Thus, they have plans in place to resource the councils by providing them with staff and logistics. The Planning Officer for the Mamprugu-Moaduri District, commenting on the operationalisation of area councils, said sometimes area councils are unable to function due to the failure of the Assemblies to provide the necessary support.

In regards to donor-assisted projects and the Assembly’s involvement, the Planning Officer for West Mamprusi said the District Assembly system has its own structures that every donor uses. He explained that the district’s level of participation in a project depends on the project’s design. However, the Assembly is responsible for the project’s planning and coordination.

The administrative arm of the district was asked to list the current projects in the district and rank their involvement in the design, implementation, monitoring, and evaluation to get a sense of the involvement of the district leadership in other donor-assisted projects. The ranking was done on a scale of 1 (low) to 10 (high). The outcome is reflected in Table 2.

Table 2. Level of involvement of District Administration in current donor-assisted projects in the district

Project	Design	Implementation	Monitoring	Evaluation
International Development Agency (IDA)	4	9	9	9
Northern Regional Small Town Water and Sanitation Project (NORST)	4	9	9	9
Millennium Villages Project	1	9	9	9

The administrative staff agreed that when it comes to the implementation, monitoring, and evaluation of district projects, they score a high mark of 9, including the MVP. Their only challenge is during the

design stages when donors come with their own ideas and do not seek input from the Assembly. They were particularly unhappy and critical of the lack of Assembly involvement in the MVP design, hence a low mark of 1.

2.2 The District Administration’s Contribution to the MVP

The District administrative staff catalogued areas where they have contributed to the project. Among others, the DADU is the department that is most involved in the implementation. This is because of the dominance of agriculture in the District and thus this unit deals with many farmers. The project also makes good use of the existing structures and logistics readily available. Natural infrastructure such as land is often provided for free to the MVP. Worth noting is the human resource contribution in terms of technical assistance provided by District staff. This has saved the project from recruiting new employees for the project. For instance, a number of boreholes have been sunk by the MVP in partnership with the District Water and Sanitation Unit.

In commenting on whether central government’s resource allocation to the district has changed or if it will change, the Coordinating Director believed that resources will “silently be saved” as the Assembly wants to avoid duplicating projects that the MVP has already started in a community. According to the Planning Officer, although the Assembly cannot catch up with the MVP, they are going to challenge them in infrastructural development in non-MVP communities.

2.3 Cost-Effectiveness and Sustainability of the MVP

Since cost-effectiveness and sustainability are critical to any project, the team considered it relevant to get the perspectives of the district actors and what they think makes projects like the MVP cost-effective and sustainable. While the District appreciates the development initiatives undertaken by international non-governmental organisations (INGOs), the issue of sustainability is always a concern.

The Planning Officer for Mamprugu-Moaduri cited an example of a cost-effective project in his former district of Saboba, the Ghana Social Opportunities Project (GSOP). The project had a budgeted amount of GHS 240,000, yet the district only spent GHS 150,000. The Planning Officer for West Mamprusi added another example of a cost-effective project, the European Union micro-resource project. This project only utilised 50-60% of its budget. These projects have been cost-effective because community members were involved in the project implementation by contributing labour and artisan abilities. Apart from its cost-effectiveness, the people take pride in the project; they consider it as their own property and are therefore ready to protect and maintain the project at all costs.

2.4 Anticipated Impacts of the MVP

The administrative staff of the West Mamprusi and Mamprugu-Moaduri Districts anticipated the following impacts of the MVP:

Anticipated impacts on the community:

- The contributions made in the areas of health, ICT, and agriculture will greatly impact the lives of the people
- Agri-business will improve family incomes and livelihood of the people, with this, parents will be able to perform better their parenting role

Anticipated impacts on departments:

- Build the capacity in terms of knowledge and staff capacity and also an increase in logistics

Anticipated impacts on the Assembly:

- It will relieve the Assembly of the cost that otherwise would have been borne out of the provision of these social interventions
- The project also comes with new ideas and the staff of the Assembly stand the chance of benefitting from these new ideas

3. Baseline Study with Representatives of Departments and Agencies of the West Mamprusi and Mamprugu-Moaduri Districts

3.1 Involvement of the Departments and Agencies in Decision-Making in the MVP

All 11 representatives of the various government departments and agencies present at the meeting were aware of the MVP although they did not have copies of the project document. The representative of the Ghana Health Service (GHS) (West Mamprusi) said he requested the project document but had not received it yet. The departments that were identified as having roles within the MVP included the cooperative, agriculture, works, GHS, and Ghana Education Service (GES). The roles and responsibilities envisaged for these departments in the MVP include:

Cooperative Department

- Formation and registration of cooperative societies
- Audit, inspection, and enquiry
- Settlement of disputes among the cooperative societies
- Formation of farmer-based organisations (FBOs)
- Strengthen the management and governance of the cooperatives

Agriculture Department

- Identify FBOs
- Registration of cooperatives
- Extend technical know-how to FBOs

Ghana Education Service

- Circuit supervisors monitor teaching and learning to ensure effectiveness in the MVP communities
- Identify needs of brilliant students/pupils and offer support
- Identify and offer support to children with disabilities

Works Department

- Provision of boreholes
- Road construction

According to the representative of the Agriculture Department, his outfit was involved in the design of the MVP and also made inputs into the design of the Memorandum of Understanding (MOU) between the MVP and the department. They also assisted in recruiting MVP staff. On the other hand, some of the departments were not involved in the design of the MVP, but indicated that they have been involved in the provision of certain MVP facilities and services. According to the representative of the District Works Department, the department was involved in the provision of boreholes, road construction, and involving regional engineers. In order to improve the quality of teaching and learning in the district, circuit supervisors from the Education Department attended workshops on capacity building.

The representatives of the departments and agencies were happy with some aspects of the MVP. Some departments such as public works, community development, and agriculture were happy with the general design of the MVP. According to the Health Department representative, the MVP components they are pleased with are the monitoring and evaluation of community health workers and volunteers. Also, the department is happy about the capacity building for community health workers to improve their service delivery.

The aspect of the MVP that the departments are not happy with is the poor involvement of the departments in the project. As pointed out by the Community Development Department, although the department interacts directly with the communities, their involvement in the MVP is limited. The Department of Public Works also expressed their dissatisfaction of not being involved in site meetings and monitoring projects. The representative of the Agriculture Department also pointed out that the department is not enthused with the MVP's direct involvement with the Agriculture Extension Agents (AEAs) without their knowledge and also the poor flow of information between the department and the MVP. The GHS representative said the department is not happy about the allowance payments by MVP to community health volunteers in the MVP communities since the GHS, as a policy, does not pay allowances to volunteers. This is creating a problem for them in the non-MVP communities.

The structural/institutional arrangements in place for department heads to participate in MVP related decisions include:

Personnel. Each core department under the MVP has a focal person participating in the activities of the MVP. The Agriculture Department for instance has the District Director, the District Agriculture Extension Officer, and the District Agriculture Information Officer who are actively involved in the MVP's activities. The District Medical Superintendent (who doubles as the focal person under the MVP) and community nurses play roles in decision-making for the MVP. These people provide technical support and advice to the beneficiary groups or communities to improve their well-being and productivity.

Periodic meetings. There are regular consultations between the departments and the MVP. These consultations are normally organised on quarterly basis to enable the departments to be well informed about the activities and progress of the MVP. As pointed out by health and education representatives, their department directors meet regularly with MVP officials to discuss the project. These periodic consultations enable the departments to contribute to decisions about the MVP. As pointed out by the Education Department representative, the department helps to identify needy school pupils through the use of the various Circuit Supervisors in the District. The Agriculture Department also assists farmers to form FBOs, which in turn will be assisted in carrying out their farming activities. The department also helps in the distribution of farm inputs and gives support in the area of capacity building to farmers as well as the implementation of farm cultural practises.

The Health Department also identified abandoned health facilities for the MVP to help provide health facilities. According to the representative of the Public Works Department, the department helps identify project sites and is also involved in procurement. The Cooperative Department assists in identifying existing cooperative unions, FBOs, forms new groups, and trains existing farmer groups.

Regarding the sustainability of the MVP project, some of the departments indicated that exit strategies have been devised so that projects implemented under the MVP do not collapse when it phases out. The periodic training of personnel from the various departments helps build capacity and confidence of the personnel. These personnel practise what they learn at the trainings so that they will remain at post even when the MVP phases out. Also, the revenue generated from the operation of the community-based health planning systems (CHPS) compounds will be used to maintain the facilities.

Again, according to the representative of the Agriculture Department, sustainability of technology is necessary. This can be done by helping farmers adopt technologies introduced by the project and recovering input loans provided to farmers to help implement projects. Efforts are being made to absorb MVP staff by MOFA onto the government's payroll. Providing demonstration blocks/farms to train farmers to adopt technologies is another structure in place to sustain the MVP.

However, some of the departments mentioned that no mechanisms or structures have been put in place to sustain the projects. As pointed out by the Public Works representative, there is no mechanism or structure for the maintenance or sustainability of the MVP facilities. According to the representative from the Education Department, sustaining the volunteer teachers will be difficult since they are not enrolled in any professional teacher training programme, hence they cannot be retained when the MVP is phased out. Also, the absence of a system at the community level to support girls in need puts this aspect of the MVP interventions at risk of being phased out when the project ends.

On the other hand, the representative from the Agriculture Department felt that the agricultural projects can be sustained if farmers are encouraged to adopt technologies associated with the project. Also, if farmers are provided with farming inputs and other improved methods of production, they can become self-reliant when the project phases out. The farmers can impart the knowledge they acquired from the project to other farmers after the project ends.

The department representatives present were asked to list the current projects their departments are engaged in and rank their involvement in the design, implementation, monitoring, and evaluation to get a sense of the involvement of the departments in other current donor-assisted projects. The ranking was done on a scale of 1 (low) to 10 (high). The outcome is displayed in Table 3.

Table 3. Level of involvement of departments in current donor-assisted projects in the district

Department	Project	Design	Implementation	Monitoring	Evaluation
Community Development	World Food Programme (WFP) – Iodised salt re-bagging	6	9	9	8
	UNICEF (Child Protection Team (CPT)	7	9	10	8
	Word Vision (Child Protection Team)	5	7	8	8
	NORPREP: Water And Sanitation Development	2	5	7	7
	MVP	0	1	0	0
MOFA	Northern Rural Growth Programme (NRGP)	2	8	7	5
	Sustainable Land and Water Management Project (SLWP)	2	8	8	6
	Japanese International Cooperation Agency (JICA)	2	9	8	7
	Millennium Villages Project (MVP)	2	7	7	6
	Rice Sector Support Project (RSSP)	2	7	7	6
GES	TENI Project	0	10	5	5
	CAMFED Projects	0	10	5	5
	World Vision Project	0	4	5	5
	RAINS (Supply of bicycles to school children)	0	5	5	5
	SADA, MVP	Not certain	5	5	5
	School for Life Project	0	5	5	5
GHS	Community Case Management	1	10	10	10
	Notation Malaria Control for Child Survival	1	10	10	10
	National Control Programme	1	10	10	10
	Tuberculosis Control Programme	1	10	10	10
	Millennium Villages Project (MVP)	7	10	10	10
Cooperative	NRGP/ACDEP	0	2	0	0
	SADA – MVP	0	6	6	0
	New Energy Jatropha Project	0	2	0	0
	Farmer Training Centre	0	2	0	0
District Works Department	Northern Region Small Town Water System (NORST)	4	6	6	8
	District Development Facility (DDF)	10	10	10	10
	Sustainable Rural Water Project (SRWP)	4	6	6	8
	Millennium Villages Project (MVP)	6	4	4	6
	Local Service Delivery Governance Program (LSDGP)	10	10	10	10

Most of the departments pointed out that the projects undertaken at the district level are usually designed by the projects' sponsors without the involvement of the departments. However these departments are fully involved in the implementation, and in the monitoring and evaluation to some extent, as reflected in the scores assigned to these aspects of the projects undertaken in the districts.

Two projects of the Department of Works were fully designed, implemented, monitored, and evaluated and so each of these aspects of the projects' development had scores of 10 out of 10. Almost all the projects of the GES, MOFA, and GHS had scores of 0 out of 10 at the design stage because these departments were not consulted during that stage of development.

MOFA and GHS, which have played some role in the MVP, are happy with the level of involvement in the implementation and monitoring. Only GES and the District Works Department seem happy with the level of involvement in the design. The Department of Community Development feels completely left out of the MVP.

3.2 Contribution of Departments and Agencies to the MVP

Personnel. All the departments, especially the core departments (agriculture, health, and education) contribute staff to carry out certain activities under the MVP. For instance, staff in the cooperative department assist farmers to come together to form cooperative groups and sensitise them on group dynamics and management. The MVP usually employs the services of department personnel in their training and sensitisation programmes for the beneficiary communities.

Technical advice. The departments also provide technical advice and support to the MVP to enhance the successful implementation of the project. As mentioned by the health representatives, the Sub-District Health management teams help train the MVP health volunteers. The Education Department also provides professional advice on the educational component of the project so that the interventions targeted at the communities can be achieved. The Agricultural Department educates farmers on crop yield estimation and recovery of farm produce, which eventually builds up the capacity of the farmers as well as their crop yields.

Logistics. Some departments also make their facilities available for use by the MVP. The Health Department for instance helps in making existing health facilities available to the MVP to run its courses on capacity building and provision of logistics like safety boxes for disposal of sharp objects.

The department representatives indicated that there has been a drastic reduction of government resources to the departments. According to the representative of the Health Department, the quarterly allocation of resources has been reduced to once a year. Allocation of resources under the MVP is done through the MVP with support from the UK Department for International Development.

3.3 Cost-Effectiveness and Sustainability of the MVP

According to department representatives, the MVP will be cost-effective because the project makes use of existing structures and thus will not incur much cost in putting up new structures. As pointed out by the representative of the Health Department, some of the structures the MVP plans to use already exist, but need renovations.

They also indicated that the projects can be sustained if the people are encouraged to have a strong sense of ownership of the projects, which can be done by training people on how to manage and maintain the facilities provided. However, according to the GES representative, the recruitment of volunteer teachers will only be sustainable if they are trained to become professional teachers. In the view of the MOFA district representative, building the capacity of farmers in terms of business management (e.g. record keeping and preparing farm budgets) can make them more reliant when the project phases out.

3.4 Anticipated Impacts of the MVP

3.4.1 Beneficiary Communities

- Improved educational levels as teaching and learning in schools will be enhanced due to the facilities and materials provided
- Improved literacy rates
- Ability to cover or access more communities which hitherto could not be accessed because of the poor road conditions
- Farmers' knowledge on good agricultural practices will improve
- Enhanced food security at the community level (e.g. people will have enough to eat, store, and sell)
- The capacity of people, especially farmers, will improve and they will then see farming as a business
- Income levels of farmers will improve and consequently their living conditions
- Improved health of the people since they can have access to vaccination or immunisation for preventable diseases
- Education will ultimately impact on the poverty level due to access to better opportunities

3.4.2 Departments

- Ease in movement of staff because of logistics like motorbikes
- Improved coverage of communities
- Increase in logistics like computers, personal digital assistants that take coordinates, and GPS (used to take the acreage of farm land) that will enhance the efficiency of staff
- Improved accommodation for staff, hence staff will not feel reluctant to go to remote communities
- Capacity building for staff, especially circuit supervisors to be more efficient in their supervisory roles

3.4.3 District Assembly

- The MVP will contribute towards the district achieving Millennium Development Goals 4, 5, and 6
- A reduction in maternal death
- Better health outcomes and improvement in the profile of the district
- The Assembly will be relieved of the burden of providing for the needs of the people in the target communities

Annex 1. Questions for the baseline qualitative study at district level

Introduction

Sustaining the investment into MVP communities at the end of the project depends on institutional arrangements at various levels: national, regional, district and community. For this reason, it is important to understand institutional, financial, and governance arrangements that have been put in place for the management and implementation of the MVP and to track their effectiveness over the period of implementation. It is also important to understand how the relationships between institutions/organisations at various levels have evolved as a result of the project and why.

This baseline assessment is focusing on the district level. Below are the four main questions/issues around which the discussion will focus.

(i) To what extent have the district leadership/administration and the various departments/institutions been involved in decision making in MVP?

- Who in the district/your department takes responsibility for the MVP?
- What are their roles and responsibilities in the MVP?
- What do those at the district/your department responsible for the MVP know about it? Do they have copies of the project document?
- To what extent was the leadership of the district/your department involved in the design of the MVP?
- Which aspects of the MVP design are you happy with and which would you like changed?
- What structures/institutional arrangements have been put in place for the leadership of the district(s)/your departments to participate in decisions relating to MVP?
- How do government agencies at the district responsible for agriculture, education, water and sanitation, health, infrastructure like roads, etc. participate in decisions relating to services or provision of facilities in MVP communities?
- What decisions have the leadership of the districts and departments been involved in so far?
- What structures/mechanisms are in place for sustaining the projects, services, facilities, etc. that would be implemented in the MVP communities when the project ends?
- What are the current donor-assisted projects in the district that the DA/your department is actively involved? In which of these does the department have the greatest say in design, implementation, monitoring, and evaluation? What accounts for that?

(ii) What is the district's and departments' (i.e. government's) contribution to the MVP?

- In what form are district/departments (government) contributing to the MVP?
- To what extent has the central government's overall resource allocation (human, financial, material, projects, services, etc.) to the district changed over the past year? If not, is this envisaged? What accounts for the change?

- Who makes the decision to allocate more resources (human, financial, material, projects, services, etc.) to MVP communities? Is it the district administration/departments or central government?
- How are the investments in MVP communities in the district going to be sustained after the project?

(iii) From your experience what makes a project cost-effective? What makes a project sustainable?

- From your experience, which projects, past and present, would you say were cost-effective? Why? What criteria did you use?
- From your experience, which projects, past and present, would you say were sustained or would be sustained long after the end of the project? What made or would make that possible?

(iv) What impact will the MVP have on the beneficiary communities and on the district institutions and departments?

- What impact is the district administration or department expecting MVP to have on the beneficiary communities and on the district as a whole?
- What impact will the MVP have on the department, the DA, and other institutions in the district?

Seasonality

EXTERNAL IMPACT EVALUATION OF THE
MILLENNIUM VILLAGES PROJECT,
NORTHERN GHANA

Date: **February 2014**



Results in development



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Acronyms

CPI	Consumer Price Index
CV	Control Village
DD	Difference-in-Differences
DHS	Demographic and Health Surveys
DFID	Department for International Development
HFA	Height-for-Age
GSS	Ghana Statistical Service
GLSS	Ghana Living Standards Survey
LSHTM	London School of Hygiene & Tropical Medicine
MV	Millennium Village
MVP	Millennium Villages Project
PRG	Peer Review Group
PSM	Propensity Score Matching
WFA	Weight-for-Age
WFH	Weight-for-Height

Appendix on seasonality¹

The baseline survey, anthropometric data, and medical data were collected at different periods in the Millennium Village (MV) and control village (CV) sites. Data were collected in the MVs between 16 April until 14 June 2012 and in the CV areas from 1 August until 18 September 2012. The time lag is worrying because in Northern Ghana May is typically the height of the dry season and September is the height of the rainy season.² Therefore, differences in baseline characteristics between the control and treatment sites may be due to seasonal effects. Given that the methodology for identifying the effects of the Millennium Villages Project (MVP) depends on propensity score matching (PSM) and difference-in-differences (DD), any initial differences (or lack thereof) are problematic because it cannot determine if observed differences (or lack thereof) are due to seasonal effects or static underlying differences that would be controlled for using the DD approach.

After reviewing questions in the baseline survey and a discussion between representatives of the MV peer review group (PRG), Itad, and the UK Department for International Development (DFID), the following groups of variables were highlighted as being most susceptible to seasonality concerns:

- a) Anthropometric data (e.g. height-for-weight, weight-for-age, height for age)
- b) Measures of anaemia
- c) Malaria measurements
- d) Income and expenditure data

This document will attempt to examine how much of an issue, if any, seasonality is when looking at variables associated with variables a-c. We will analyse available data and review the relevant papers in the background section. Then we will provide options for dealing with seasonality concerns (the list of options will not be exhaustive) before outlining our preferred approach.

Anthropometry, malaria, and anaemia

There are two main sources of data for anthropometric measurements in Northern Ghana: the Demographic and Health Survey (DHS) and the Ghana Living Standards Survey (GLSS). The GLSS cannot be used because the number of observations is too small. Only the 1988 and 1989 surveys collected anthropometric data and the final sample of children under five years of age was less than 30, which is spread over 12 months and thus does not allow a monthly disaggregated analysis. The DHS collects data on anthropometrics, in addition to fever and anaemia.³ DHS surveys are conducted on large samples of children, but over a limited number of months (typically three or four months). It is unfortunate that the calendar period of the survey does not coincide with any of the time periods for data collection adopted by the DHS (see Table 1).

¹ This document was prepared by Edoardo Masset and Patrick Nolen with assistance from Edgar Salgado.

² The seasonal description is based on field visits by Itad and DFID staff. Furthermore, Koram et al. (2003) discusses the seasonal patterns in North Ghana.

³ In fact, the MV adult surveys designed by the Earth Institute were modeled on the DHS surveys and contain the same type of questions.

Table 1. Characteristics of DHS surveys in Ghana

Year	Months	Sample size (households)	North Region (households)	Malaria/fever reporting	Anthropometrics	Iron/anaemia
1988	Feb-May	4,966	571	Yes	Yes	No
1993	Oct-Jan	5,822	952	Yes	Yes	No
1999	Nov-Feb	6,003	1,395	Yes	Yes	No
2003	Aug-Oct	6,251	1,428	Yes	Yes	Yes
2008	Sep-Nov	11,778	2,750	Yes	Yes	Yes

Anthropometric data

We used the DHS data to calculate mean Z-scores for the months that data are available (see Tables 2-4). Based on these tables, the main conclusions that can be drawn are the following:

- There appear to be month-to-month differences in all three anthropometric indices for almost all periods considered. However, regressions of anthropometric indicators over seasonal dummies rarely find significant coefficients and an F-test of the joint significance of the seasonal coefficients (reported at the bottom of each table) reveals statistically significant differences only in one case. The lack of significance may be due to the small number of observations in each cell.
- The point estimates in the table do not present a clear pattern on how anthropometric measures change over the year: weight-for-age is not steadily decreasing until the height of the dry season for instance. Furthermore, the time period where the differences in the MVs and CVs took place is rarely covered in the datasets.
- We would expect short-term indicators of malnutrition, such as weight-for-age, to be more sensitive to seasonal fluctuations. However, the data do not show higher seasonal variability in weights compared to heights.

Table 2. Average weight-for-age Z-scores among rural children under 5 in Northern Ghana

	DHS 88			DHS 93			DHS 99			DHS 03			DHS 08		
	Av.	sd	ob	Av.	sd	ob	Av.	sd	ob	Av.	sd	ob	Av.	sd	ob
Jan				-	1.21	15	-	1.29	280						
Feb	-	1.38	28	1.66			1.48	1.27	66						
Mar	0.95	1.17	42				1.42								
Apr	-	1.18	47												
May	1.44	1.37	63												
Jun	1.54														
Jul	-														
Aug	1.47									-	1.23	362			
Sep										1.38	1.24	356	-	1.23	238
Oct				-	1.50	118				1.33	1.26	131	1.11	1.20	222
Nov				1.33			-	1.21	183	1.47			1.23	1.07	175
Dec				-	1.31	165	1.55	1.23	180				1.23		
				1.63	1.16	33	-								
				1.57			1.44								
Ft	0.07			1.71			0.47			1.19			0.00		
Pv	0.933			0.182			0.623			0.276			0.991		

Note: Ft and Pv are values of an F-test and the P-value of the joint significance of seasonal dummies.

Table 3. Average height-for-age Z-scores among rural children under 5 in Northern Ghana

	DHS 88			DHS 93			DHS 99			DHS 03			DHS 08		
	Av.	sd	ob	Av.	sd	ob	Av.	sd	obs	Av.	sd	ob	Av.	sd	ob
Jan				-	1.54	15	-	1.66	274						
Feb	-	1.54	27	1.74			1.49	1.73	63						
Mar	-	1.33	41				1.28								
Apr	-	1.64	47												
May	-	1.44	61												
Jun															
Jul															
Aug										-	1.39	362			
Sep										1.55					
										-	1.50	358	-	1.62	237
Oct				-	1.55	117				1.51	1.44	131	0.99	1.72	224
Nov				1.34			-	1.62	181	-			0.94		
				-	1.44	160	1.45			-			-	1.43	173
Dec				1.60			-	1.49	179	1.96			1.14		
				-	1.62	33									
				1.75			1.49								
Ft	0.19			1.37			0.44			8.91**			1.53		
Pv	0.826			0.256			0.646			0.003			0.21		

Note: Ft and Pv are values of an F-test and the P-value of the joint significance of seasonal dummies.

Table 4. Average weight-for-height Z-scores among rural children under 5 in Northern Ghana

	DHS 88			DHS 93			DHS 99			DHS 03			DHS 08		
	Av.	sd	ob	Av.	sd	ob	Av.	sd	obs	Av.	sd	ob	Av.	sd	ob
Jan				-	1.31	14	-	0.99	298						
Feb	-	1.31	29	0.58			0.66	1.06	72						
Mar	0.17	1.14	42				0.70								
Apr	-	1.06	47												
May	0.74	1.17	63												
Jun	-														
Jul	0.81														
Aug	-									-	1.28	365			
Sep	0.56									0.48	1.31	361	-	1.14	238
Oct				-	1.33	116				0.38	1.21	131	0.61	1.22	225
Nov				0.82	1.21	164	-	1.09	192	-			-	1.01	175
Dec				0.90	1.01	33	0.82	1.08	190	0.36			0.75		
				-			-						0.74		
Ft	0.68			0.13			1.66			0.04			0.02		
Pv	0.501			0.888			0.191			0.847			0.876		

Note: Ft and Pv are values of an F-test and the P-value of the joint significance of seasonal dummies.

Anaemia

Anaemia in children is associated with impaired mental and physical development and increased morbidity and mortality. Determinants of anaemia in children include a nutrition-related poor iron intake, iron absorption for physical growth, parasitic infections, and malaria (DHS 2008). Given that diets vary during the rainy and dry season it is expected that levels of anaemia and haemoglobin will vary with seasonality.

The DHS collected blood samples only in 2003 and 2008 and did not cover the period of the MV baseline survey (April to June 2012).

Table 5. Haemoglobin and prevalence of severe anaemia in rural children of Northern Ghana (DHS)

	DHS 2003					DHS 2008				
	Haemoglobin ^a		Severe anaemia ^b		Obs.	Haemoglobin ^a		Severe anaemia ^b		Obs.
	Av.	SD	Av.	SD		Av.	SD	Av.	SD	
Aug	9.8	2.1	0.061	0.24	423					
Sep	9.5	1.9	0.042	0.20	378	9.2	1.7	0.10	0.31	223
Oct	9.2	1.8	0.099	0.30	131	8.8	1.9	0.14	0.34	216
Nov						8.9	1.5	0.09	0.29	155
F-test	2.96*		5.69**			0.93		1.56		
P-value	0.085		0.017			0.337		0.213		

^a Haemoglobin is a protein in blood cells carrying oxygen and is measured in grams per decilitre (g/dL).

^b Prevalence rates. The DHS classifies anaemia as mild (<11 g/dL), moderate (<10 g/dL), and severe (<7 g/dL).

A regression of haemoglobin and severe anaemia on seasonal (monthly dummies) finds statistically significant coefficients (at 5%) in 2003 but not in 2008, though the 2008 sample has over 30% fewer observations. Similarly, the F-tests show that the seasonal averages are jointly different in 2003 but not in 2008. It hard to discern a pattern based on the data of Table 5.

- As the month approaches the height of the rainy season, average haemoglobin levels decrease slightly.
- There is no clear pattern in severe anaemia.
 - In 2003, the per cent of the population with severe anaemia decreases from August to September (height of the rainy season) then increases again. In 2008, it increases from September to October (as in 2003) but then decreases.
 - In 2003, as average levels of haemoglobin decrease, severe anaemia *increases* whilst in 2008 as average levels of haemoglobin decrease, severe anaemia *decreases*.

Secondary Sources: Anaemia and Malaria

The work of Koram et al. (2000) provides insight on patterns we might have expected to find in the data if we had more observations, at least in regards to anaemia. Koram et al. (2000) measured haemoglobin levels, prevalence of fever, and malaria parasite infection among children aged 6 to 24 months in the Kasena-Nangana District of the Upper East Region in Northern Ghana. Data were collected from two random cross-sectional samples of 347 and 286 children. The two samples were collected six months apart: at the end of the low malaria season (May 1997) and at the end of the high malaria season (November 1996). Significant differences were found and are displayed in Table 6 below.

Table 6. Haemoglobin, Malaria, and Anaemia reported in Koram et al. (2000)

	May	November	P-value
Haemoglobin	8.9	7.2	0.000
Severe anaemia HG <6.0	1.4	22.1	0.000
Malaria parasite rate	54.3	70.0	0.001
Proportion with fever	3.3	10.8	0.000

Koram et al. (2003) in another study randomly sampled 2,286 individuals of all ages in May 2001 and 1,673 individuals in November 2001. The seasonal differences found in anaemia prevalence and malaria infection are less dramatic but still large and statistically significant. Results on haemoglobin are reported by age group in Figure 1. Interestingly, the seasonal effect seems to only affect children under the age of five, particularly infants. There is no visible difference between high and low season for adults. Given that the baseline data for the MVs and CVs were collected only for children under the age of five, this suggests that there are likely to be differences due to seasonality.

Figure 1. Seasonal pattern of haemoglobin in Koram et al. (2003)

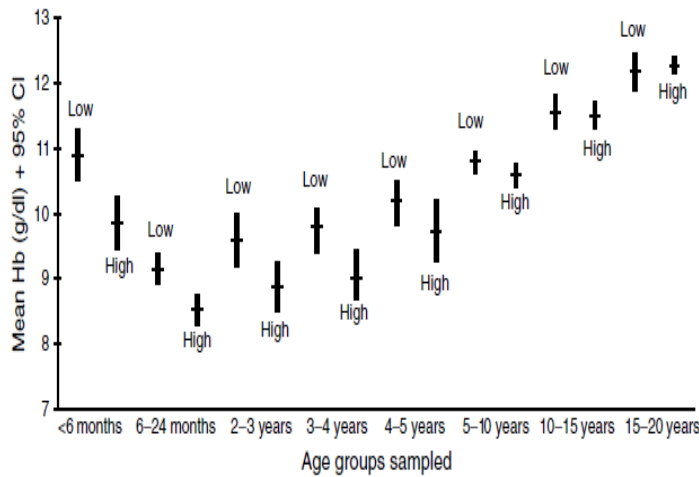


Figure 1 Paired comparison by age group of haemoglobin levels (mean, 95% CI) measured at the end of low (May 2001) and high (November 2001) malaria transmission seasons.

Cairns et al. (2011) used data from Kasena-Nangana District to analyse seasonal patterns of clinical malaria among infants and one-year-olds. The results are in Figure 2, which shows incidence rates close to zero in the month of May and reaching a peak from July-October.

Figure 2. Seasonal pattern in malaria incidence in Cairns et al. (2011)

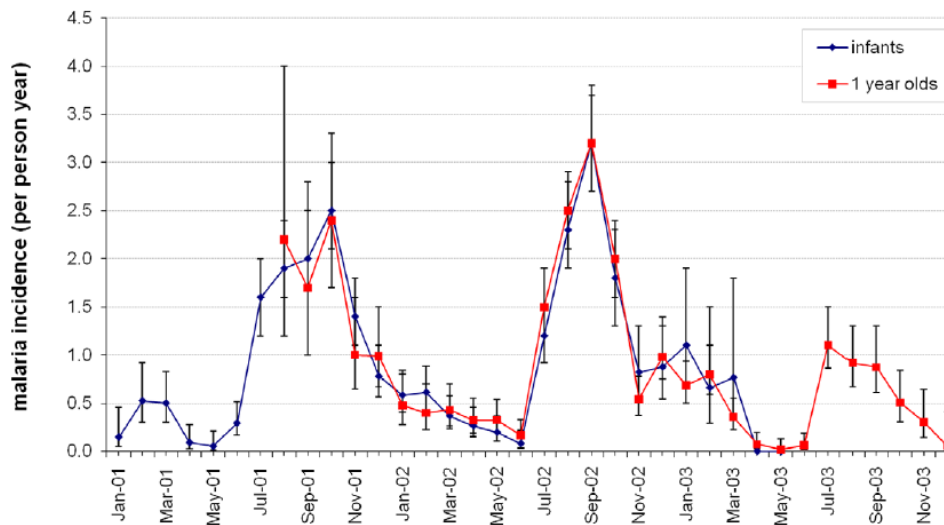
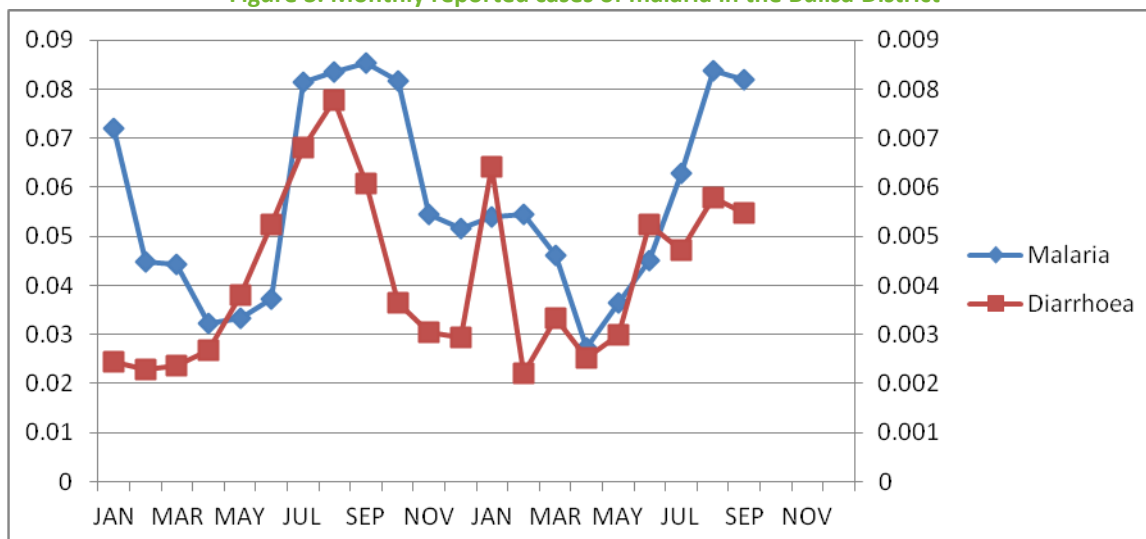


Figure 3. Incidence of clinical malaria in the Navrongo IPTi trial. Incidence of clinical malaria between January 2001 and December 2003 is shown for infants and children 12–23 months of age in the placebo group of the IPTi trial. Error bars indicate 95% confidence interval. Children were enrolled between September 2000– June 2002. Completion of 24 months follow-up ended in June 2004. doi:10.1371/journal.pone.0018947.g003

Figure 3 is based on data of malaria cases (population level prevalence rates) reported to clinics in the Builsa District between January 2011 and September 2012. Data are from reported cases and do not represent real prevalence. Reporting could be correlated with seasonality, for example if in the rainy season clinics become inaccessible thus reducing the number of reported cases. The change in prevalence before and after the rainy season however is clear.

Figure 3. Monthly reported cases of malaria in the Builsa District



From the secondary analysis we are able to conclude the following:

- Malaria and anaemia incidence are highly seasonal.
 - Malaria and anaemia levels are likely to be highly correlated with rainfall levels.
 - The seasonality effects are especially acute for our group of interest, children under the age of five.
- Over the period of the MV and CV baseline surveys, malaria incidence has a clear pattern, at least for children.
 - The incidence of malaria increases rapidly from April to September.
- Differences in reported fever and haemoglobin levels between May (before rains) and September (after rains) are likely to be large.
 - There appears to be a clear pattern of average haemoglobin levels though decreasing until November.
 - Average haemoglobin levels and severe anaemia appear not to be strongly correlated.
 - There does not appear to be a clear pattern in the proportion of severe anaemia cases over time within a year.
- Seasonal differences are larger among children compared to adults and the gap decreases with age among children.

Income and consumption

In this section we analyse seasonal patterns of income and consumption of Ghanaian households. The goal of this exercise is to assess whether income and expenditure vary across seasons. The MVP survey collected data in MV and CV communities at different times of the year (Table 7) and there is a risk that the comparison is biased by seasonal patterns.

We find that there are substantial seasonal patterns in income and consumption but we conclude that seasonality will not affect the measurement of poverty and income, with the possible exception of a minor bias produced by recall effects. However, we observe a risk of bias in the measurement of health-related outcomes that are affected by food intake, such as anthropometric measurements, anaemia, and reported fever.

Table 7. Percentage of surveys conducted in project and control villages by month

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
MV Households					66%	25%	5%	4%				
CV households								22%	77%	1%		

Income and consumption seasonality

In Northern Ghana there is only one cropping season for main staples (such as rice and maize) and the majority of households obtain their largest income share from agriculture. Harvesting occurs in the months following the rainy season for staple crops (September to November) and agricultural incomes are likely to be highly seasonal with a peak in the post-harvest months. Total household income can be less dependent on the agricultural cycle depending on the share of non-agricultural income sources on total income.

In principle, expenditure should not be affected by seasonality. Lean and harvest seasons are highly predictable and households are well aware of their occurrence every year. Standard economic theory predicts that households smooth consumption by saving in good times and dis-saving in poor times. However, households may be prevented from doing so by a number of constraints. First, households can be desperately poor and consume all their income at any time. Second, households may be unable to borrow in the lean season and repay in the harvest seasons because of the way rural financial markets operate. Finally, households might be unable to save at harvest time either in-kind or cash because of backwardness of storage and financial systems. We can therefore expect some seasonality in consumption though the seasonal pattern of expenditure should be smoother than the seasonal pattern of income.

In addition, seasonal patterns in the data may emerge as a result of how the questionnaire is structured and how questions are phrased, particularly with respect to the recall period of items produced and consumed. We observe that the following biases can emerge when interviews are conducted at different times of the year:

- **Time shift bias.** Real incomes and expenditure tend to increase over time.
- **Projection bias.** People tend to forget past events or extrapolate the present to the past. For example: ‘How many ice creams did you consume in the last 12 months?’ will produce different answers in August and January.
- **Recall bias.** In contexts of high seasonality, short recall questions are biased. For example: ‘How many ice creams did you consume in the last 30 days?’ will produce very different answers in August and January.

Data and methods

We use data from three rounds of the Ghana Living Standards Surveys (GLSS) collected by the Ghanaian Statistical Service (GSS) in 1991/92 (GLSS3), 1997/98 (GLSS4), and 2005/06 (GLSS5). We only use data on rural households residing in the Northern region, the Upper East, and the Upper West in order to work on a sample that is comparable to the MVP sample.

We use the data to construct the following variables: agricultural incomes, total household incomes, food expenditure, and total household expenditure. Expenditures were collected by GSS over one year's time in each survey with the use of diaries and repeated visits to each household by enumerators over a two-week period. Income was collected on an annual basis (within the previous 12 months) at the time of the interview, with the exception of income for own consumption, which was collected in the same way as expenditures using diaries.

Data were deflated by the monthly consumer price index (CPI) in order to remove price effects from monthly variations in expenditure. Note that we used the national CPI for food items because no other CPI was available at a more disaggregated level.

In order to detect seasonal patterns, we ran the following regressions using the pooled three datasets together:

$$\ln x_i = \alpha + \sum_{i=2}^{12} b_i M_i + \sum_j^n c_j x_{ji} + e_i$$

M_i are seasonal dummies for each month of the year (with January as the base year). The dependent variable is household per capita expenditure and it is expressed in logs so that the b coefficients of the seasonal dummies represent percentage changes in consumption with respect to the base month (January). X_i are control variables. For simplicity we only included household size, age of the head of household, and survey dummies.

Results

Regression results are presented in Table 8 and displayed again in the charts of Figure 4. We observe the following:

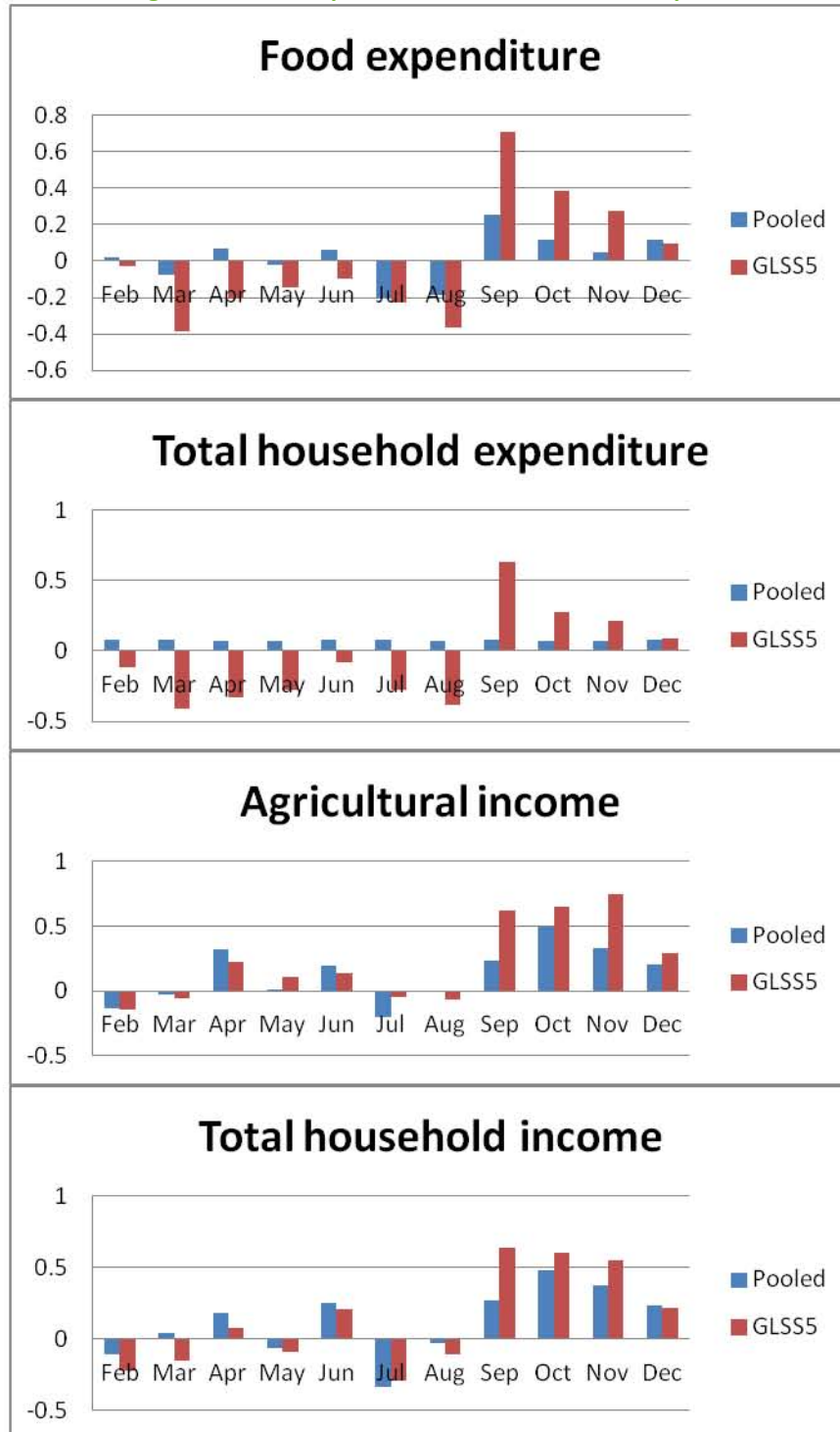
- There is seasonality in income and expenditure, which is clearly related to the agricultural cycle. Incomes and consumption increase in the harvest and post-harvest season in the months of September, October, and November.
- Seasonal fluctuations are stronger for income than for consumption consistently with households' ability to smooth part of the agricultural cycle by saving and dis-saving.
- The monthly expenditure coefficients are quite large (above 20% change in monthly expenditure) suggesting a very limited ability to smooth consumption. This is probably a consequence of extreme poverty and inability to borrow or store food. For these households, consumption follows income very closely and there is limited opportunity to borrow or save.

The largest seasonal effect is observed in September after which expenditure decreases slowly but steadily until March. After March, expenditure becomes more stable before increasing again in September.

Table 8. Seasonal income and expenditure models

	Food expenditure		Total expenditure		Agricultural income		Total income	
	Coeff.	P-value	Coeff.	P-value	Coeff.	P-value	Coeff.	P-value
February	0.02	0.804	-0.01	0.944	-0.13	0.440	-0.11	0.436
March	-0.08	0.379	-0.07	0.390	-0.03	0.854	0.04	0.772
April	0.07	0.382	0.00	0.966	0.32**	0.028	0.18	0.138
May	-0.02	0.818	-0.08	0.255	0.00	0.991	-0.06	0.613
June	0.06	0.466	0.10	0.204	0.20	0.227	0.25*	0.057
July	-0.21**	0.013	-0.20*	0.009	-0.20	0.218	-0.33**	0.010
August	-0.19**	0.016	-0.15**	0.035	0.00	0.983	-0.03	0.799
September	0.26**	0.004	0.30***	0.000	0.23	0.186	0.27*	0.056
October	0.11	0.154	0.12	0.111	0.50**	0.001	0.48***	0.000
November	0.05	0.518	0.08	0.266	0.33**	0.025	0.38**	0.002
December	0.12	0.163	0.11	0.171	0.20	0.211	0.23*	0.078
Household size	-0.07***	0.000	-0.07	0.000	-0.04	0.000	-0.05***	0.000
GLSS4	-0.07	0.125	-0.01	0.851	0.01	0.944	0.07	0.330
GLSS5	0.05	0.187	0.14***	0.000	0.39***	0.000	0.43***	0.000
Age of household head	0.00**	0.029	0.00**	0.001	-0.01***	0.000	-0.01***	0.000
Constant	13.69***	0.000	14.05***	0.000	12.6***	0.000	13.1***	0.000
R-square		0.12		0.15		0.05		0.08
Observations		2,681		2,682		2,383		2,635

Figure 4. Seasonal patterns of income and consumption



What are the main implications of these seasonal patterns for the analysis of the MVP survey data? We observe the following:

- Most of the MV baseline data were collected in May 2012, when consumption is at its lowest point in the year. On the other hand, the CV data were collected mostly in September, which is the month of the year in which consumption is at its peak and the peak is quite high.
- It would have been disastrous for the study if the survey had adopted a monthly recall for food expenditure. Luckily, we designed an expenditure questionnaire employing an unusual 12-month recall precisely with the goal of de-seasonalising the data. A 12-month recall is less precise than a one-month recall, but is not affected by seasonal patterns.
- Similarly, the agricultural income data were collected with reference to a 12-month period from harvest-to-harvest and therefore shielded against seasonality effects.
- It is likely that data are affected by the three types of recall bias outlined above. However, because of the way in which the questionnaire was designed we expect this bias to be small.
- The largest levels of food expenditure in the month of data collection in the CVs may have a negative impact on variables whose values are affected by food intake. Weight-for-age and weight-for-height are clearly sensitive to level of food intake and to the composition of the diet. But also anaemia and other health-related indicators such as the occurrence of fever may be affected by food intake because a better nourished body is more likely to overcome the stress caused by infectious diseases.

Our analysis concludes that money metric measurements of welfare, such as poverty and household income and consumption, are unlikely to be affected by seasonal patterns because of the peculiar way in which the survey was designed. However, there is a risk that variables correlated with food intake, such as anthropometrics and anaemia, will show more positive values in the CVs because data were collected in these villages at a time when food intake reaches its peak. Methods to test and adjust for this type of difference are discussed in another note on seasonality of health-related outcomes.

Options for adjusting the seasonal bias

Modelling anaemia using rainfall data

One possible solution would be testing how strongly malaria, diarrhoea, and anaemia are correlated with rainfall in the area. If the relationship is strong and can be modelled with existing data, then rainfall data could be used to predict the required seasonal adjustment. This approach requires time series data on anaemia and rainfall in the project area. The only longitudinal data on anaemia available from the area are those collected by the London School of Hygiene & Tropical Medicine (LSHTM) in the Navrongo experiment funded by DFID. Rainfall data could be obtained from local weather stations. The strengths of this option would depend on the available data and the strength of the correlation between rainfall and anaemia/malaria.

Using a Blinder-Oaxaca decomposition approach

Once the baseline data of the project and control groups become available, the question will arise whether the observed differences in haemoglobin levels, anaemia prevalence, or any of the four groups of variables discussed above are the result of underlying differences between the project and control groups or a result of having interviewed the two groups in different seasons.

One way of addressing this question is by using the standard Blinder-Oaxaca decomposition that has been widely used in labour economics to decompose wage differences between, for example, unionised and non-unionised workers, in differences resulting from characteristics of members of the two groups and unexplained characteristics. The latter is also called the ‘union effect’ which in our case is the ‘season effect.’

One way to accomplish this is by estimating two different equations explaining haemoglobin (h) for the project (p) and the control (c) groups, respectively (J. Johnston and John DiNardo, 1997):

$$\begin{aligned} h_p &= X_p \beta_p + \epsilon_p \\ h_c &= X_c \beta_c + \epsilon_c \end{aligned}$$

The estimated parameter of the first equation can be used to generate the counterfactual:

$$\widetilde{h}_c^p$$

The haemoglobin level of control individuals had they not been exposed to the seasonal shock (had the interviews been carried out in May):

$$\widetilde{h}_c^p = X_c \widetilde{\beta}_p$$

The seasonal effect on the mean haemoglobin in the control group can thus be calculated as:

$$\text{Season effect} = \overline{h}_c - \widetilde{h}_c^p$$

The advantage of this formulation is that it allows the decomposition of the difference in the mean haemoglobin levels in the project and control groups into differences in characteristics and in unexplained (seasonal) differences:

$$\overline{h}_c - \overline{h}_p = (\widehat{\alpha}_c - \widehat{\alpha}_p) + \overline{X}_c (\widehat{\beta}_c - \widehat{\beta}_p) + (\overline{X}_c - \overline{X}_p) \widehat{\beta}_p$$

The last term is the difference in haemoglobin explained by differences in characteristics whilst the first two terms represent the difference resulting from a seasonal effect. This seasonal effect can be given a causal interpretation after imposing a number of strong assumptions that are very similar to the assumptions normally imposed in the evaluation literature for the estimation of treatment effects by using, for example, matching methods (N Fortin et al. 2011).

The overall difference in the means of the two samples can be attributed to four differences:

- a) **D1.** Differences in returns to the observables
- b) **D2.** Differences in returns to the unobservables
- c) **D3.** Differences in the distribution of observables
- d) **D4.** Differences in the distribution of unobservables

D1 and D2 must be collapsed in a single term because they cannot be separated out. Suppose, for example, that haemoglobin is explained by education (observable) and access to media messages (unobservable). Returns to media messages are likely to be higher for highly educated individuals. This means that an interaction term between X and e is needed that make the separation of D1 and D2 hard.

The difference in D4 is ignored by adopting the usual *unconfoundness* (or *ignorability* or *conditional independence*) assumption. We assume that unobservables other than the seasonal effect are equally distributed in the two groups. This is the standard assumption adopted in PSM methods. The Oaxaca method clearly fails if there are unobservable determinants of haemoglobin that are differently distributed in the two samples.

Two more adjustments to calculations are needed that are again similar to those adopted in standard PSM approaches. First, the vectors of covariates in the project and control equations should overlap. There should be no covariate (or value of the covariate) that is observed in one group but not in the other. This could be obtained by dropping communities or individuals outside the region of common support. Second, covariates and unobservables can be functions of seasonal factors. The unobservables are assumed to be equally distributed and equally affected by seasonal factors. However, if the covariates are affected by seasonal factors the seasonal effect is no longer identified. The covariates X therefore have to be chosen among those that are not affected by seasonal factors.

Conclusions and recommendations

The analysis above suggests that there are likely to be strong seasonal effects for three of the variables of concern: anthropometric data, malaria, and anaemia. However, that is based on secondary data so we would like to suggest that the PRG consider a two pronged approach when considering what to do with the issues of seasonality in the MV baseline data: (i) analyse the data to see if seasonality is present; and (ii) consider correcting the data to adjust for seasonality concerns. With regards to point (ii) we would suggest that the Oaxaca method be used in combination with focusing on specific subgroups for specific variables of interest.

Examining seasonality concerns in MV data

The secondary analysis above suggests one might be able to find effects of seasonality in the MV baseline data if specific subgroups are considered.

- The malaria prevalence amongst infants changes rapidly from April to September, the period when the MV baseline data was collected. Therefore, one could examine how correlated the prevalence of malaria is for infants (or young children) with the date of collection. If seasonality is present then there should be a strong linear trend for both MV and CV data.

- Average levels of haemoglobin seem to decrease linearly from the dry season to end of the rainy season. Therefore, we can see if there is a trend in the average level of haemoglobin with the date the data was collected.
- Despite the lack of a clear pattern for anthropometric data based on the analysis above, it could be examined if there are significant differences in the data based on the collection date. However, there is no hypothesis on what pattern should be seen.

The ability of the three suggested approaches to enlighten discussions on whether there are seasonality concerns in the baseline data will depend on how the sample was collected over time (i.e. were data collected uniformly over the period or primarily on one or two days).

With the analysis of seasonality conducted on the baseline data, we propose that the PRG consider four approaches to deal with correcting for seasonality or examining how big of a bias seasonality might have on the regression results.

Anthropometric analysis

Once two waves of data have been collected, we suggest that the following set of regressions be considered together:

- a) DD regression results on weight-for-height (WFH), height-for-age (HFA), and weight-for-age (WFA).
- b) DD regression results on subset of samples selected using standard PSM techniques:
 - i. Make sure the underlying sample is as similar based on observables.⁴
- c) DD regression on data where the Oaxaca estimated seasonality effect⁵ has been removed.
- d) DD regressions on the subset sampled in April in the MV and September in the CVs:
 - i. This sample will have the largest difference in time between data collection.

Under ideal conditions the estimate from (a) would be ‘correct.’ Therefore, comparing the results of (a) to the other sets of regressions will allow the researchers to determine how much of an issue baseline differences might be when estimating the effect of the MV. For instance, conditional on observables, the estimates from (a) and (b) should be similar, if they are not that suggests that underlying difference – such as timing – might affect the estimate. The estimate from (c) should be corrected based on the discussion above. This method primarily corrects for observable differences in the distribution just as in (b). Therefore, comparing (a) to (c) should provide an indication regarding how potentially biased (a) is. Note that one needs to consider issues of standard errors in any regression where data has been corrected; the bootstrap method would be appropriate to use here.

The estimate from (d) should be ‘most biased’ due to seasonality. Therefore, comparing the estimate from (a) to that of (b), (c), and (d) should provide some estimate on the size of the bias.

⁴ One would have to be careful to make sure variables used in matching are not also affected by seasonality.

⁵ One would have to assume the entire effect due to unobservables estimated under Oaxaca was because of seasonality for the data to be corrected in this manner.

Anaemia and malaria

Given that anaemia and malaria data are collected only for children under five years of age, we suggest the following set of regressions be considered together:

- a) DD regression results on malaria and anaemia.
- b) DD regression results on subset of sample selected using standard PSM techniques:
 - I. Ensure the underlying sample is as similar based on observables.
- c) DD regression on data where the Oaxaca estimated seasonality effect has been removed.
- d) DD regressions on the subset sampled in April in the MV and September in the CVs:
 - I. This sample will have the largest difference in time between data collection.
- e) DD regressions for malaria on the subset sampled in June in the MV and August in the CVs because this sample will have the smallest difference in time between data collection.
- f) Calculate the difference in anaemia for children under one year of age and children who are four or five in the:
 - I. MV area
 - II. CV area

The estimates in (a), (b), (c), and (d) can all be compared as above.

Malaria is particularly sensitive to seasonal considerations and has a clear pattern, at least for children, as time moves towards the rainy season (refer to the table from Cairns et al. (2011) above), therefore the estimates in (d) should be 'very' different from those in (e) if seasonality is causing large differences. In fact, the estimate from (e) should be the minimal seasonal effect and those from (d) should be the largest seasonal effect. The data can then be corrected appropriately.

The difference in the level of anaemia between infants is larger than for children. Therefore if the estimated difference in (f)(i) is significantly different than (f)(ii), that would suggest that there is an effect of seasonality. Under strong assumptions, one could then correct the data based on the difference in the difference of (f)(i) and (f)(ii).

Please note that when data is corrected for potential seasonality effects it is not immediately clear how the standard errors of the regressions should be corrected.

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Millennium Engel Curves

EXTERNAL IMPACT EVALUATION OF THE
MILLENNIUM VILLAGES PROJECT,
NORTHERN GHANA

Date: February 2014

Submitted by Itad
In association with:



Report

Millennium Engel Curves

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Introduction

The estimation of Engel curves is a powerful tool of economic analysis. Engel curves describe the relationship between household expenditure on particular items and total household expenditure. Of particular interest are food Engel curves, which describe how food expenditure increases as total expenditure increases. Studies of food Engel curves have discovered an empirical regularity – also known as Engel’s Law – according to which food consumption increases less than proportionally with income, and food expenditure as a share of total expenditure decreases as income increases.

The observation of this regularity has a number of useful practical implications. First, Engel curves can be used in welfare analysis. Engel’s Law states that the food share decreases as living standards increase and high food shares can therefore be used as indicators of poverty. Second, Engel curves can be used to predict how food expenditure will change as income changes. These predictions can be used to simulate the impact of policies on consumers and the local economy. Third, the regularity of Engel curves can be exploited to assess the quality of the data collected and the extent of measurement error. Expenditure figures are collected with considerable error by household survey and the regularity of theoretical Engel curves offer a standard against which to test the accuracy of the data.

The analysis of Engel curves is not a simple task. First, it is difficult to choose the right functional form. We would like the Engel curve to adhere to basic requirements of demand theory such as adding-up. Adding-up requires that consumption not increase more than income, which implies that the change in expenditure of all goods as income change cannot exceed the increase in income. We would also like Engel curves to be able to capture a variety of demand behaviours such as elasticities that vary with income. In some contexts food can be a luxury for the poor – consumption increases more than proportionally with income – and a necessity for the rich – consumption increases less than proportionally with income. The number of theoretical and behavioural requirements that we would like to impose is such that the number of valid functional forms for the estimation of Engel curves is limited. This has sometimes led researchers to abandon the search for the ideal functional form and to leave the identification of the curves to the data themselves using non-parametric methods – an approach which we also follow in this paper.

A second difficulty of Engel curves is that expenditures are often measured with error. The problem is particularly serious in datasets, such as ours, that collect information from very deprived households. A very large fraction of household expenditure (up to 80%) is devoted to the consumption of food and only one-third of food consumption consists of monetary expenditures. The fact that few households sell or purchase foods on the market implies that the quantities consumed have to be imputed using different sets of prices. In our survey we employ – in this order – prices at the household, community, and regional level. The widespread use of imputations in the calculation of expenditures adds an additional layer of error to standard reporting errors made by respondents and interviewers.

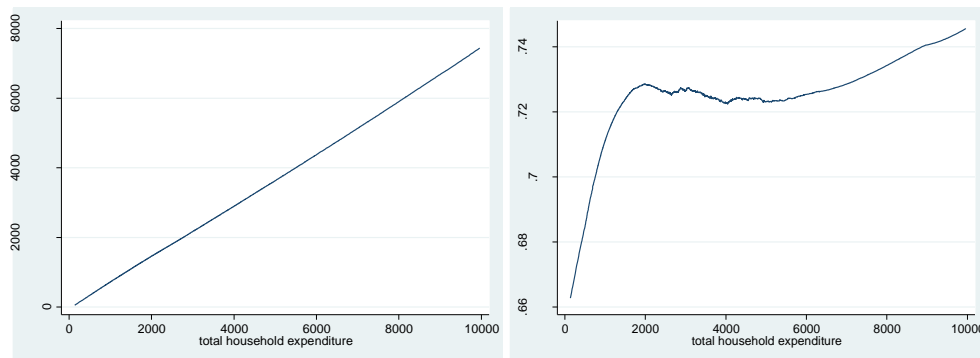
A third difficulty in the use of Engel curves is that policy simulations based on Engel curves are based on the assumption that changes in expenditure patterns observed in a cross-section are a good prediction of how expenditure patterns change for the same person *over time*. But the

prediction that a person will increase food consumption as their income increases in the same way as we observe different levels of consumption for two people with different incomes is a very strong one. Expectations change in the distribution of income and persistence of consumption habits may complicate the analysis considerably. In other words, elasticities and other relationships estimated via cross-sectional Engel curve should be interpreted as *long-term responses* to income changes and policy simulations should take this into account.

Empirical food Engel curves

The analysis of expenditure data from household surveys normally finds the following patterns: First, food consumption increases less than proportionally with income and, in a non-linear fashion, at a decreasing rate. Second, the share of food expenditure on food consumption decreases with total expenditure, though it is sometimes found that the food share increases with total expenditure for very poor households. The Millennium Village data however seem to defy Engel's Law and show a very different pattern (Figure 1). Food expenditure increases linearly, though not proportionally, with total expenditure. The share of expenditure on food *increases* sharply with total household expenditure for the first tercile of the expenditure distribution and the pattern becomes unclear afterwards, but never substantially decreases as we would expect.

Figure 1. Empirical food Engel curves in the study area



Figures were obtained applying a simple non-parametric smoother (lowess) to the data.

It is difficult to provide a reasonable explanation for the patterns of Figure 1 without further investigation of the data. If we accept the data as they are and the Engel curves they generate in Figure 1, then we must conclude that food is a luxury for a large fraction of the population in the study area. As income increases the consumption of food increases linearly and the food share increases. This is a plausible explanation. It has been found that in very poor areas, for example Pakistan (Bhalotra and Attfield 1998) and Ethiopia (Kedir and Girma 2007), the income elasticity of consumption can be larger than one and therefore the food share increases with income at least over the lower section of the income distribution.

However, this interpretation cannot be accepted before probing for the presence of measurement error. Expenditure data are reported with poor accuracy in household surveys and there are many opportunities for both respondents and interviewers to make mistakes. It is also possible that reported expenditures are 'correct' in the sense that respondents do really mean what they say and that interviewers report the information correctly, and yet do not

capture actual household consumption. For example, respondents might be reporting not the actual expenditure on food but the expenditure that appears to be socially acceptable (Udry and Woo 2007) or expenditures incurred by individuals that are not part of their ‘survey household’ (Guyer 2004) as in the case of funerals and other celebrations.

Below we investigate the presence of measurement error and estimate Engel curves after adjusting for the presence of error. The error considered is standard error in the reporting of expenditure figures. This type of error has serious consequences in the estimation of Engel curves particularly when estimation employs share form equations (Lewbel 1996) (the most popular type of which is discussed below). When Engel curves are estimated using the food share as the independent variable and total expenditure as the dependent variable, the same measurement error may appear on both sides of the equation – because food share equals food expenditure divided by total expenditure. The correlation between the errors in the measurement of food expenditure and total expenditure may create a spurious correlation between total expenditure and the food share. This problem could be particularly serious in our data because much of food expenditure is obtained by imputation and, given that food is a large fraction of total expenditure and composed of a limited number of items (mostly cereals), errors in the reporting of food expenditures end up being strongly correlated with errors in total expenditure.

Engel curves adjusted by measurement error

We estimate Engel curves using the most common functional forms employed in the literature: the Working-Leser form popularised by Deaton and Muellbauer (1980) (the ‘almost ideal demand system’) and the quadratic version of this model introduced by Banks et al. (1997) (the ‘quadratic almost ideal demand system’). Because we are focusing on food expenditure the ‘system’ reduces to just one equation. Following Attanasio et al. (2011) we introduce price variation in the data by including dummy variables for each locality in which data were collected. The Working-Leser equation has the form:

$$w_i = a + b \ln x_i + cX + e$$

Where w is the share of expenditure on food for household i , x is total household expenditure and X is a vector of village dummies and other covariates. Our sample of households is relatively homogeneous in many social characteristics and in order to simplify we only include two demographic variables among the covariates: the age of the household head and household size.

The quadratic form simply adds a quadratic term for the log of total household expenditure to the Working-Leser form above:

$$w_i = a + b \ln x_i + c(\ln x_i)^2 + cX + e$$

We estimate these equations with and without adjusting for measurement error. We adjust for measurement error using the standard two-step simultaneous equation procedure. First, we find an exogenous variable that is well correlated with total household expenditure and is not correlated with measurement error in the dependent variable (food expenditure). Next, we use

this variable as an instrument to correct the estimates of food share equations by two-stage least squares (using the *ivregress* command in stata). In the case of equation (1) we also experiment with the use of the Lewbel (1996) estimator (using the *ivreg2* command in stata). In the case of equation (2) the instrumentation of total household expenditure using two-stage least squares is more complicated because of the presence of the quadratic term in the log of total household expenditure. In this case we employ the standard two-step procedure of simultaneous equation models. We first run a regression of total expenditure on the selected instruments and then we employ the residuals and, following Attanasio et al. (2011), their square and cubes in the estimation of equation (2).

Table 1. Estimation of parametric Engel curves

	Standard share form			Quadratic form		
	Unadjusted	Adjusted by income	Adjusted by wealth	Unadjusted	Adjusted by income	Adjusted by wealth
Log of expenditure	0.022**	-0.204**	-0.152***	-0.064	-0.222**	-0.183**
Log of expenditure squares	0.010	0.086	0.028	0.081	0.106	0.077
				0.005	0.002	0.005
				0.005	0.005	0.005
<i>Elasticities</i>						
1 st quintile	1.031	0.79	0.83	0.89	0.76	0.77
2 nd quintile	1.031	0.75	0.81	0.90	0.72	0.76
3 rd quintile	1.030	0.72	0.79	0.91	0.69	0.75
4 th quintile	1.030	0.69	0.77	0.92	0.66	0.74
5 th quintile	1.029	0.61	0.74	0.93	0.60	0.72

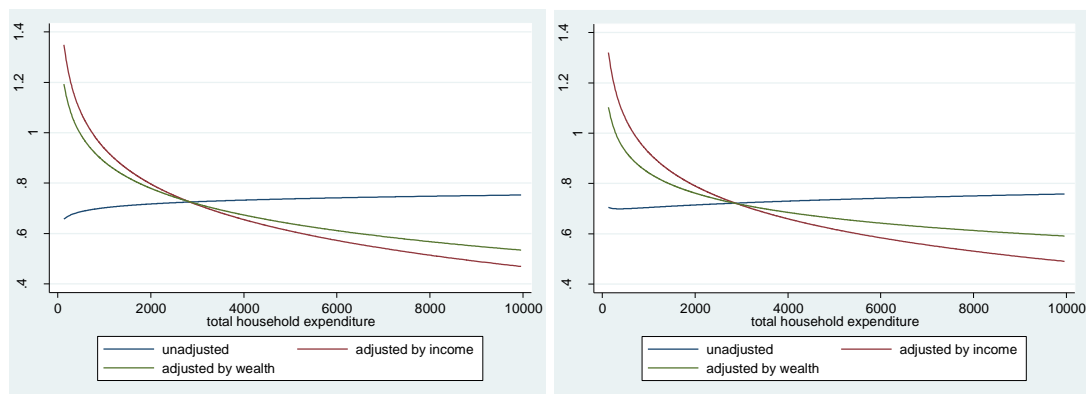
Note: 1) All regressions include the following covariates: age of head of household, household size, and dummy variables for 103 localities. 2) Instruments of models 'adjusted by income' are income and the square of income. Instruments of models 'adjusted by wealth' are the value of the stock of wealth and its square. 3) The estimation of the adjusted standard share forms was performed using the *ivregress* command in stata. The estimation of the adjusted quadratic forms was performed running regressions of total household expenditure on the instruments, calculating the residuals and including the residuals, their squares and cubes in the second stage. 4) The calculation of elasticities was performed at the mean values of the *estimated* expenditure share for each quintile of the expenditure distribution. 5) The use of the Lewbel method to adjust for measurement error in the standard share form (*ivreg2* command in stata) produced similar results: a coefficient of -0.130 with the income instrument and of -0.121 with the wealth instrument.

As usual, the main problem in instrumental variable estimation is finding a valid instrument. A standard choice in similar studies has been household income. We follow this practice by using income and income squared as instruments (because about 10% of households report negative incomes, the use of logs is not possible). In addition, we report estimates obtained using as instrument the stock of wealth held by each household. We calculate the stock of wealth as the value of all durables and production assets, including animals, owned by the households (but excluding land whose value was not reported by respondents). The stock of wealth has two advantages over income as an instrument for total expenditure. First, reporting of animal holdings and other assets occurs with much less error than reporting of income. Indeed income is normally reported with more error than expenditure and the relationship between expenditure and income is often a very weak one, thus leading to the potential problem of the 'weak instrument' (Angrist and Pischke 2009). The explanatory power of the stock of wealth is much higher. The R-square is 0.02 for a regression of total household expenditure on income and income squared while it is 0.12 for a regression of total household expenditure on the log of

the stock of wealth. Second, wealth is a good approximation of long-term household income and well represents permanent income.

Table 1 reports the results of estimating the standard and the quadratic share form Engel equations with and without adjustment for measurement error. The adjustment for measurement error has the remarkable effect of reversing the sign of the relationship between food share and total expenditure. As appears in Figure 2, after adjusting for measurement error, food expenditure decreases as income increases (left chart). The quadratic form does not improve goodness of fit (right chart). In fact, the standard form appears to represent the data better than the quadratic form. The quadratic term in the log of household expenditure is never statistically significant and the shape described by the quadratic form is the same as the one described by the standard form. Income and wealth instruments appear to produce very similar results. Elasticities of the adjusted models are decreasing in total household expenditure: poorer households spend more on food as income increases than richer ones.

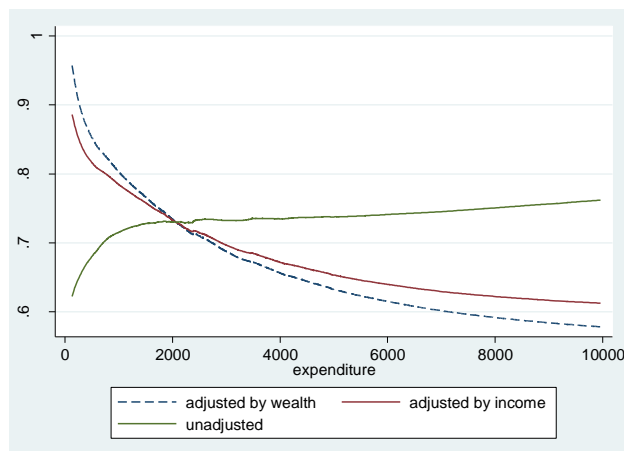
Figure 2. Engel curves corrected for measurement error (standard form on the left and quadratic form on the right)



The results of adjusting for measurement error are truly remarkable as they produce food Engel curves of the standard type that are decreasing in total expenditure. On the other hand, the use of a quadratic form fails to find non-linearities in the relationship between food expenditure and total expenditure. Poorer households have higher food expenditure elasticity but the value of the elasticity is always below one: food is a necessity for all households in the study.

Because we are considering a very deprived population we further investigate whether the food share increases as total expenditure increases, at least for some households, using non-parametric methods. Non-parametric methods obtain curves generated by the data without imposing an assumption or particular form. In order to control for measurement error we need to employ a semi-parametric model. Semi-parametric regressions of food share over total food expenditure adjusted for measurement error produce curves that are very similar to those produced by the standard share form (Figure 3).

Figure 3. Semi-parametric Engel curves (adjusted and unadjusted)



Note. The curves were obtained by semi-parametric regression using the simple method of differencing described by Johnston and DiNardo (1997) and Yatchew (2003). First, the observations in the sample are sorted in ascending order of the logarithm of per capita expenditure. Second, all variables are first differenced using optimum weights. Third, differenced food shares are regressed on all differenced covariates (age of household head, household size, locality dummies and first, second and third order residuals from a regression of the log of expenditure on the instruments). Fourth, the estimated coefficients obtained from this regression are then multiplied by the original values of the explanatory variables, and their product is subtracted from the non-differenced food share. Finally, the food share so adjusted is regressed non-parametrically on total household expenditure using locally weighted regressions (lowsess command in stata).

Conclusions

The empirical analysis of this paper finds that food Engel curves in the study area have the usual shape, whereby the share of household food expenditure decreases as total household expenditure increases. The opposite relationship observed in the data – an increasing food share as expenditure increases – appears to be the result of measurement error. The reasons for such large errors in the data are not explored but are likely due to a combination of reporting errors by respondents and the imputation of quantities of food produced by households for their own consumption. One concrete possibility is that errors in reporting and imputing some expenditure categories like cereals have the effect of generating a spurious correlation between food expenditure and total expenditure in the case of positive errors (overestimation of expenditures). In the case of negative errors (underestimation of expenditures) the underreporting of any specific expenditure (for example maize) does not generate the same spurious correlation between food expenditure and total expenditure, which could be the result of generalised underreporting of food expenditure by some households. This and other issues would require further investigation.

The main conclusions of this paper are the following:

- Food Engel curves in the study area have the usual shape: the share of food expenditure decreases as total household expenditure increases.
- Food is a necessity for all households (elasticity <1) and there is no sign that food could be a luxury for very poor households.

- Elasticities are decreasing with total household expenditure: poor households will spend more on food as their income increases.
- The estimated food shares and elasticities can be used to perform simulations of the impact of income changes on expenditure patterns and prices, but it should be kept in mind that the elasticities obtained in this way should be interpreted as long-term elasticities and are probably inadequate to simulate changes occurring in the short run.
- The widespread measurement error in expenditure data casts some doubts on the validity of poverty estimates based on consumption data, but the size and the direction of the bias are not investigated.

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APPENDIX J. METHODOLOGY EMPLOYED IN THE CALCULATION OF
AGGREGATE EXPENDITURE

Methodology Employed in the Calculation of Aggregate
Expenditure

EXTERNAL IMPACT EVALUATION OF THE
MILLENNIUM VILLAGES PROJECT,
NORTHERN GHANA

Date: February 2014

Submitted by Itad
In association with:



Results in development



Introduction

Expenditure was calculated using the same methodology employed by GSS for the calculation of poverty measures from GLSS3, GLSS4, and GLSS5. This methodology was largely designed by McKay and Coulombe and building on previous work by Glewwe and Twumba for the poverty analysis of GLSS1 and GLSS2. In some cases we could not use either of the two methodologies because our questionnaire differs from those employed by GSS in some respects and hence we referred to the paper by Deaton and Zaidi as the ‘best practice’ in the calculation of consumption figures.

The motivation for using the same methodology employed by the GSS is that our questionnaires are fairly similar to those employed by the GSS and secondly because we want to obtain poverty estimates that are as comparable as possible to those presented in the official country statistics.

Outliers

The procedure for dealing with the outliers is the following:

- Outliers are found by taking the natural logs of expenditure on each item and classifying as outliers all those observations whose values are three standard deviations above the mean.
- Outliers are replaced by the average expenditure for that item (after removing the outlier) in each of the four regions separately (Builsa MV, Builsa CV, West Mamprusi MV, and West Mamprusi CV – this follows GSS practice of replacing outliers within three macro-regions with urban/rural split).
- In the case of food items, expenditures are first divided by household size in order not to classify as outliers large food expenditures made by large households.
- This operation is conducted two times sequentially for each variable.

Missing values

Some households report purchasing items but are not able to report the amount spent. We interpreted these cases as missing values rather than zero expenditures.

In the case of non-food expenditures we replaced the missing expenditures by the mean household expenditure for that item in each of the four regions separately. We did this after replacing outliers using the methodology above in order to obtain a representative mean.

In the case of food expenditure, we adopted the following approach:

- When value of purchase is missing but quantities and units of measurements are available: we applied survey prices (calculated in the way illustrated below) to the quantities purchased.
- When value of purchase and the quantity purchased are missing but the unit of measurement is reported: we set the quantity purchased to one unit of the reported unit of measurement.

- When quantity consumed from own production is missing but the unit of measurement is reported: we set the quantity consumed to one unit of the reported unit of measurement.

Housing

Housing conditions in the study area are generally poor. Only five households report paying any rent and estimating the rental values of property for all households using these observations (as performed by GSS) is impossible. This means that the service value of houses is not included in the expenditure figures.

Household size

Following GSS practice we coded as non-household member any individual who was away from the household for six or more months over the previous 12 months (equivalent to being away for at least five months in question a014) UNLESS the individual is the head of household or a child less than 9 months old.

Durable goods

We calculated the user value of durable goods. Following Deaton and Zaidi this can be obtained as the annual cost of holding a particular asset:

$$uv = SP_{t1}(\delta + r - i)$$

Where:

SP is the current value of the asset (asset stock (S) times its price (P))

Delta is the annual depreciation rate of the item

r is the nominal annual interest rate

i is the annual inflation rate

The user value can be thought of as the annual cost required for replacing the item inclusive of the opportunity cost of not investing money in an alternative use (captured by the real interest rate).

SP is known from the data and estimated by the respondent directly. The real interest rate is an arbitrary value assumed to be 0.02. Finally the depreciation rate is calculated from the data in the following way:

$$\delta + i = 1 - \left(\frac{SP_{t1}}{SP_{t0}} \right)^{1/T}$$

This quantity is calculated for each asset in the dataset using information on present value, value at purchase, and the number of years it has been used. In order to remove outliers, a median depreciation rate specific to each asset is calculated from the sample and used to estimate the user value of the item. These are the depreciation rates calculated from the data.

Q270.NM. Asset Item	Mean	Std. Dev.	Freq.
Animal-drawn cart (wheels)	.11583459	0	239
Any other motor vehicle (car	.16077702	0	13
Bed	.19340217	0	846
Bicycle	.21610561	0	1562
Bucket	.24611455	0	1751
Camera	.16698791	0	5
Chair	.197869	0	779
Computer	.21610561	0	3
Engine / generator (includes	.23205692	0	42
Kerosene Lamp	.21610563	0	409
Mobile / cellular phone	.27005354	0	1024
Motorcycle or scooter	.24937615	0	219
Radio	.24611455	0	964
Refrigerator	.14821093	0	13
Sofa (pieces)	.18471698	0	187
Table	.18519226	0	1074
Tape Recorder / Cassette Play	.21007282	0	346
Television	.2129083	0	66
Three stone stove/fire	.1661931	0	401
Torch / Lamp	.37390429	0	1935
Wall Clock	.24937615	0	93
Wardrobe	.1761689	0	21
Watch	.31129476	0	250
Total	.24514145	.06478336	12242

High frequency expenditure

Outliers and missing values are replaced following the procedure outlined above.

Low frequency expenditure

Outliers and missing values are replaced following the procedure outlined above.

The following items were excluded from the computation because their user value was already obtained from the asset ownership lists: mobile phones, furniture, motorised vehicles, non-motorised vehicles. Agricultural tools were excluded from the durables list because they are not consumption items.

The following items were retained in the form of user values: home repairs, power equipment, PCs, appliances. Their user value was obtained by multiplying their purchase value by the average annual depreciation values calculated for household assets (0.25) and then dividing the figure by two, because on average purchases over the last year were used only for six months.

We also excluded the payment of tax and cash losses but we included transfers made to other households and payments for funerals, dowries, and marriages.

Food consumption

Outliers and missing values are replaced following the procedure outlined above. It is important to bear in mind that in the case of food items all expenditures are divided by household size before identifying the outliers.

Households report the value of each purchase and the calculation of food expenditures is straightforward. The valuation of the consumption of food produced by the household is more complicated because it needs to be imputed. The best practice in this case is employing farm-

gate prices at the household, locality or area level from the income section of the questionnaire, because these prices better reflect the quality and the value of the item consumed.

Unfortunately, only a few farm-gate prices can be effectively calculated from the income section of the questionnaire. Everything from the number of reported cases, the variety of items consumed, and the cases reported per items suggests that there is under-reporting of own-consumption and production in the agricultural production section of the questionnaire.

Reported cases of own-produced foods from the expenditure section.

Q278.NM. Consumption Products Name	Freq.	Per cent	Cum.
Alcohol	22	0.10	0.10
Avocado	6	0.03	0.13
Bambaram beans	899	4.03	4.15
Beans	1,130	5.06	9.21
Berries	505	2.26	11.47
Bread	1	0.00	11.48
Butter	131	0.59	12.06
Cassava	49	0.22	12.28
Cooking Oil	185	0.83	13.11
Cooking fat and margarine	2	0.01	13.12
Cream	1	0.00	13.12
Dawadawa Fruits	1,154	5.17	18.29
Eggs	678	3.04	21.33
Fish	237	1.06	22.39
Grapes	133	0.60	22.98
Green Maize	1,187	5.32	28.30
Groundnuts	1,270	5.69	33.99
Guavas	8	0.04	34.02
Irish Potatoes	29	0.13	34.15
Kerref-bra/bitto	1,330	5.96	40.11
Kola Nut	15	0.07	40.18
Lettuce	4	0.02	40.19
Maize Grain(kernels/seeds)	1,460	6.54	46.73
Maize Meal/flour(after milling or grind	1,239	5.55	52.28
Mangoes	382	1.71	53.99
Meat	501	2.24	56.23
Milk(any)	226	1.01	57.25
Millet	1,449	6.49	63.73
Okra	988	4.42	68.16
Onions	22	0.10	68.26
Oranges	15	0.07	68.32
Other Fruits	113	0.51	68.83
Other Nuts/Seeds	20	0.09	68.92
Other flours	34	0.15	69.07
Other grains	60	0.27	69.34
Other green leafy vegetables	577	2.58	71.92
Other legumes/Pulses	9	0.04	71.96
Other tubers/roots	20	0.09	72.05
Other vegetables	309	1.38	73.44
Papaya(PawPaw)	36	0.16	73.60
Peas/Cowpeas	141	0.63	74.23
Pigeon beans	16	0.07	74.30
Plantains	2	0.01	74.31
Poultry	675	3.02	77.33
Pumpkin	102	0.46	77.79
Rice	878	3.93	81.72
Salt	7	0.03	81.75
Shea Fruits	1,272	5.70	87.45
Snacks	1	0.00	87.45
Sorghum	1,117	5.00	92.45
Soya beans	166	0.74	93.20
Sugar	7	0.03	93.23
Sumsume/Nasulga	598	2.68	95.91
Sweet Bananas	1	0.00	95.91

Sweet Potatoes	248	1.11	97.02
Tea	24	0.11	97.13
Tobacco/Cigarettes	41	0.18	97.31
Tomatoes	252	1.13	98.44
Water Melon	196	0.88	99.32
Yams	129	0.58	99.90
Yellow Melon	23	0.10	100.00

Total	22,332	100.00	

These are the reported cases of own-consumed food from the production section of the questionnaire.

Q330.NM. Crop	Freq.	Per cent	Cum.
AGUISHI	1	0.06	0.06
AGUISHIE	1	0.06	0.11
B, BEANS	1	0.06	0.17
BAMABARAM BEANS	1	0.06	0.23
BAMABRA BEANS	1	0.06	0.29
BAMBARA BEANS	146	8.37	8.66
BAMBARA NEANS	1	0.06	8.72
BAMBARABEANS	3	0.17	8.89
BAMBARAM BEANS	45	2.58	11.47
BAMBARAMBEANS	3	0.17	11.64
BAMBARBEANS	1	0.06	11.70
BEANS	284	16.28	27.98
CASSAVA	2	0.11	28.10
COWPEA	9	0.52	28.61
GROUNDNUT	106	6.08	34.69
GROUNDNUTS	214	12.27	46.96
GROUNDUTS	2	0.11	47.08
KENNEF	4	0.23	47.31
MAIZE	151	8.66	55.96
MILLE	1	0.06	56.02
MILLET	314	18.00	74.03
OKRA	9	0.52	74.54
OKRO	1	0.06	74.60
OTHER GREEN LEAFY VEGETABLES	1	0.06	74.66
RICE	161	9.23	83.89
SORGHUM	207	11.87	95.76
SOYA BEANS	39	2.24	97.99
SOYA-BEANS	1	0.06	98.05
SOYABEANS	3	0.17	98.22
SWEET POTATOES	1	0.06	98.28
VEGETABLE	2	0.11	98.39
VEGETABLES	7	0.40	98.80
WATER MELON	1	0.06	98.85
WATERMELON	9	0.52	99.37
YAM	9	0.52	99.89
YAMS	2	0.11	100.00

Total	1,744	100.00	

Farm-gate prices can be obtained only for the main cereals (maize, rice, sorghum, and millet) and beans. For reasons of simplicity and consistency we decided to calculate prices from the consumption section of the questionnaire rather than employing farm-gate prices.

For each item we calculated four different sets of prices: household-level prices (the 'unit value' obtained by dividing the value of purchases by the quantity purchased); village-level prices (the median unit value in each locality); area prices (the median unit value in each of the four areas considered); all sample price (the median unit value across the entire sample). Prices were calculated for 21 different units of measurement because we were not able to convert all measurements in kg. So the total number of prices calculated is 63(food items)*21(units of measurement)*4(levels of measurement).

We applied this set of prices sequentially to consumption of own production:

- Household unit values, when available (note that household unit values were applied only in those cases for which the unit of measurement of purchases and own consumption were the same – unit values are noisy and hence we applied a routine that replaced unit value outliers by the median observed across the whole sample, outlier being defined as a unit value larger or smaller than 1.28 standard deviations from the log mean).
- Village median of unit values when household unit values were not available.
- Area median of unit values when village unit values were not available.
- All sample median of unit values when area median values were not available.