UK Department for International Development

THE IMPACT EVALUATION OF THE MILLENNIUM VILLAGES PROJECT:

ANNEX F: CAUSAL CHAIN ANALYSIS

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Millennium Villages Evaluation: Sectoral Causal Chains

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Acronyms

AEAs	Agricultural Extension Agents
CC	Causal Chain
CEW	Community Education Worker
CHPS	Community Health Planning Services
CHN	Community Health Nurse
CHW	Community Health Worker
CLTS	Community-Led Total Sanitation
DFID	UK's Department for International Development
GES	Ghana Education Service
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome
ICT	Information Communication Technology
IET	Independent Evaluation Team
KVIP	Kumasi Ventilated Improved Pit
M&E	Monitoring and Evaluation
MDGs	Millennium Development Goals
MoU	Memorandum of Understanding
MV	Millennium Village
MVP	Millennium Villages Project
NHIS	National Health Insurance Scheme
ORT	Oral Rehydration Therapy
PTA	Parent-Teacher Association
RDT	Rapid Diagnostic Test
SADA	Savannah Accelerated Development Authority
SMC	School Management Committee
TB	Tuberculosis
TBIE	Theory-Based Impact Evaluation
WASH	Water Sanitation and Hygiene

Introduction

Background to the project

The Millennium Villages Project (MVP) was created to explicitly demonstrate how the Millennium Development Goals (MDGs) could be achieved at the local level by using an integrated and scaled-up set of targeted investments based on the recommendations of the United Nations' Millennium Project. The interventions within the MVP cover food production, nutrition, education, health services, roads, energy, communications, water supply and sanitation, enterprise diversification, environmental management and business development. The initiative makes use of community decision making and uses science-based technologies and techniques, such as insecticide-treated malaria bed nets, vaccines, antiretroviral drugs, and de-worming tablets. The stated aim of the MVP in northern Ghana is the achievement of the MDGs. The overall goal is that there will be a regional impact on poverty in the Northern/Upper East regions, with the proportion of the population living below the extreme poverty line dropping from 52.3% (Northern region) and 70% (Upper East region) to 33% overall by the end of 2016. The target for under-5 mortality rates is that they will fall from 124 deaths per 1,000 (Northern) and 98 deaths per 1,000 (Upper East), to 54 by the end of 2016. This is to be achieved through the '*accelerated progress towards the MDGs for up to 30,000 people in the MV site*'.[1]

The MVP theory of change

At the core of the Millennium Villages impact evaluation is a difference-in-difference design based on a statistical analysis of the quantitative dataset. Alongside this is a mix of other methods, drawing on a 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.

The northern Ghana MVP does not, however, have a single overarching theory of change underpinning the programme logic that outlines how the inputs-to-outputs-to-outcomes achievements ultimately result in MDG-level impacts. This is partly because of the complexity of the programme (multiple interventions designed to lead to multiple outcomes), but also because MVP adjusts its interventions each year and is not a fixed package. At the baseline, the evaluation team attempted to reconstruct the theory of change based on a series of detailed, generic 'intervention logics' from the Earth Institute.[2] While these 'intervention logics' provide a basic understanding about the causal chains (CCs) and assumptions in a select number of MVP sub-components, they did not accurately represent the interventions that have been implemented in northern Ghana. They also lack sufficient detail about how activities are sequenced and interlinked, such as how vaccines might improve health or increase labour availability for farming. Instead, the evaluation has focused on testing the overarching economic theory about the poverty trap and is based on theoretical and empirical research that does exist, as outlined in the Initial Design Document (Masset et al. 2013).

[1] Outcome objective of the Department for International Development (DFID) Logframe for the Millennium Village in Northern Ghana, 2016.

[2] See the Initial Design Document, Appendix B. http://www.ids.ac.uk/publication/an-impact-evaluation-design-for-the-millennium-village-project-in-northern-ghana

Purpose of this paper

This paper on sectoral CCs aims to resolve some data limitations faced during the analysis of the quantitative and qualitative datasets. There are key methodological barriers to drawing out related findings from four different datasets that vary in size and scope. To date, the evaluation team has attempted to find common findings by sequencing the qualitative studies after a preliminary analysis of the quantitative (largely household survey) dataset. This, however, has proven challenging due to the logistical challenges of sequencing data collection activities, including the time lag between the studies, variability in the studies' geographical coverage, and each study's different sample size. As the project is in its final year, the evaluation team is now able to construct CCs for various parts of the project's implementation using information from reports, field visits and survey work.[3] The sectoral CCs set out in this document will be used to inform the sequencing of the qualitative work in 2017, help with the analysis of anomalous quantitative results and also texture and deepen understanding of key findings. The CCs have been split sectorally for clarity and ease of interpretation. These sectoral CCs will be used to help frame the analysis, test programme theory, attempt to understand how and why changes did, or did not occur, and impact on the MDGs. The CCs presented in this paper were validated by the Savannah Accelerated Development Authority (SADA) transition team during a workshop in February 2017. Most of SADA's comments have been integrated into the narrative and CC diagrams (see Annex C for full list of comments and amendments made). All the figures are reconstructions of the underlying or assumed theory, developed from data in the SADA reports, evaluation reports (e.g. baseline, midterm), field visits, academic literature relevant to the MVP's interventions, and interviews with the evaluation team. The diagrams clearly distinguish between theory and assumptions extracted directly from MVP and SADA narratives, and those components of the CC that have been inferred from the wider literature.

Lastly, it is understood that this approach has limitations and does fully not take into account the complexity of an integrated programme such as MVP and the added value of multi-sectoral implementation. The complex interactions and benefits of an integrated, multi-sectoral approach will therefore be further investigated as a part of the cost-effectiveness analysis in the Endline Report. In this analysis, cost-effectiveness ratios for each of the different interventions will be calculated and, where possible, compared to those achieved in other projects or programmes. It is hypothesised that MVP interventions achieve higher cost-effectiveness ratios – highlighting the increased benefits of simultaneous intervention and contribution of each intervention to a wider range of outcomes, even when the complex nature of all these interactions is not fully known.

[3] As set out in the Analysis Plan, Masset. 2015.

Agriculture causal chain

The first output of the MVP aims to achieve '*improved food and nutrition security and development of agricultural value chain.*'[4] By improving food and nutrition security, the project expects to '*increase incomes … of farming households in the SADA MVP cluster*'.[5]

The MVP aims to achieve these goals by investing in five key areas in the agriculture sector:[6]

1. Improving delivery of agricultural extension services
2. Improving access to physical agricultural inputs
3. Enhancing agronomic practices
4. Increasing access to agricultural credit
5. Strengthening farmer-based organisations and their linkages to markets

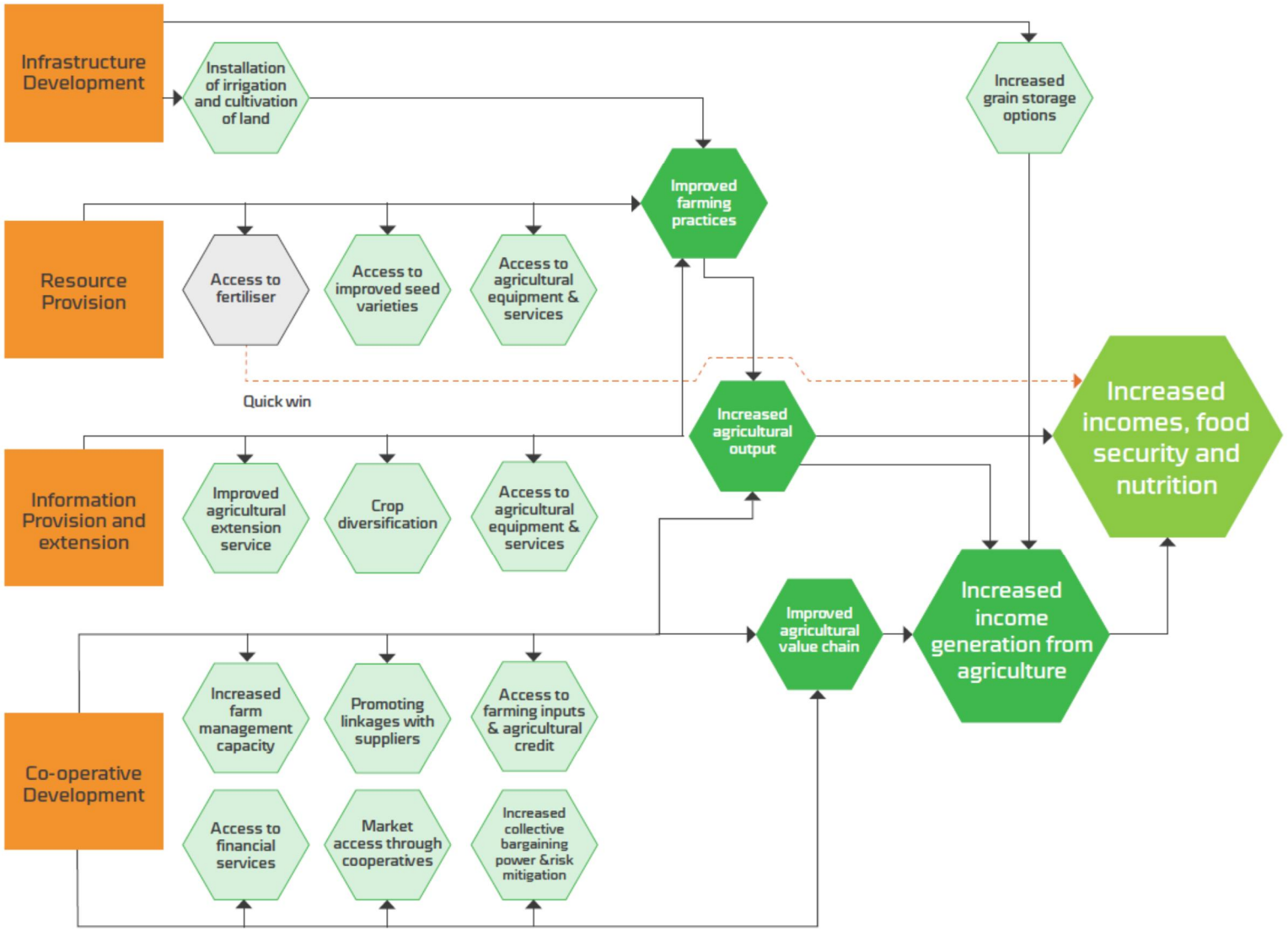
Achievement of these outputs is measured through three indicators in the Ghana MVP logframe:[7]

- Total number of farmers that are participating in the MVP agricultural inputs credit programme (Output indicator 1.1)
- Total number of smallholder farmers registered to any cooperatives or farmer-based organisations (Output indicator 1.2)
- Total number of farmers trained in good agronomic practices by MVP supported staff (Output indicator 1.3)

The CC presented in Figure 1 is a reconstruction of the theory as understood by the evaluation team and validated by the SADA MVP team.

[4] Logframe for the Millennium Villages Accountable Grant Programme, DFID, 2016.
[5] 2015 Mid-Year Report on the Millennium Villages Project in Northern Ghana, p. 7.
[6] Logframe for the Millennium Villages Accountable Grant Programme, DFID, 2016.
[7] Ibid.

Figure 1. Causal chain for the MVP's anticipated agricultural impacts



The Ghana MVP agriculture causal chain narrative

The business case for the northern Ghana Millennium Villages (MVs) identified the following agricultural **problems**: crop yields, prices and market access are subject to uncertainty and seasonal variability; low agricultural productivity; poor access to markets; farmers are unable to increase their income through agricultural inputs because they lack finance of their own and it is not possible to access credit from commercial lenders; and lack of inputs leading to soil nutrients becoming depleted after repeated cropping (environmental degradation).[8]

The MVP anticipates several **changes** will result from the activities to improve livelihoods, agriculture and food security in the Millennium Villages (MVs). By implementing multiple interventions generating impacts at various levels, a range of **outputs** are expected, including: ensuring the availability of water for the dry season, providing agricultural extension services, increasing access to farming inputs, strengthening market linkages, reducing pre- and post-harvest losses, building strong cooperatives[9] and ensuring access to financial services. As a result of these outputs, several results will be achieved that will improve crop production, develop markets for agricultural products, and build the capacity of agro dealers, storage facility owners and civil society organisations to provide reliable products and services to all actors in the agricultural value chain. These in turn will increase agricultural output and improve value chains, which will have a positive impact on food security and increasing incomes in the MVs. The agricultural interventions, integrated with activities delivered across other sectors to generate synergies, will then enable people in rural areas to save and accumulate wealth, stimulating investment and diversification into non-farm work.[10]

To tackle the agricultural problems faced in northern Ghana, the MVP employed a generic set of **activities** aimed at achieving 'quick wins' by delivering inputs, subsidising improved seeds of high yielding crop varieties or hybrids, training farmers on agronomic practices to eliminate 'hunger months', forming cooperatives, and developing food storage options and markets.[11,12] The interventions are not connected to each other in a CC form, though they do contribute to improving profits in various ways. Each intervention affects profits under particular conditions and for particular farmer groups.

- **Resource provision:** The MVP provides farmers with agricultural inputs such as seeds, fertiliser, water, tractor services and land preparation. In particular, the project provides improved seeds for the production of maize, soy, rice and fertiliser. Seeds and fertiliser are either donated or provided through loans[13] made on concessional terms or with very low repayment rates (i.e. heavily subsidised). Farmers are allowed to rent small tractors at below market rates, but only 10 tractors are available to loan and the subsidy amounts to 20% of the market cost. The project helps farmers prepare land for cultivation, but only for a limited number of rice plots. Finally, studies were

[8] Business Case: Millennium Village in Northern Ghana, DFID, 2011.
[9] Farmer-based organisations (FBOs) operate at the community level and comprise between 25–30 peer farmers involved in similar agricultural activities and who have come together to form a group. They serve as the platform for organising farmer field schools and a conduit for the provision of extension services. Cooperatives are typically district-level federations of FBOs which focus on issues of marketing, finance and inputs, when the challenges or potential benefits extend beyond the FBOs at community level.
[10] Ibid.
[11] Business Case: Millennium Village in Northern Ghana, DFID, 2011.
[12] Preliminary Report on the Fourth Round of Data: Northern Ghana Millennium Village Project, 2017.
[13] Loans refer to regular cash credits, usually from rural banks.

conducted for micro-irrigation projects but never implemented because they were made redundant by government plans to build a new dam on the White Volta river that will positively affect the whole area under the MVP.[14] Additionally, to ensure agricultural extension agents (AEAs) can access the rural communities they serve, the MVP provides motorbikes and fuel stipends.[15]

- **Information provision and extension:** The MVP helped hire eight new AEAs, adding to the 14 that were already employed by the government. In addition, AEAs are given training and basic tools. They are supervised to increase efficiency and the time actually spent in the communities. AEAs work through more than 150 'lead farmers,' who are selected in each community based on skills and motivation and are in charge of managing farmer groups of 15–20 members. Lead farmers are equipped with tools and training and charged with the task of training their farmers' group. Training relies heavily on farm visits and demonstration plots and includes sessions on planting, land preparation, weed control, harvesting, integrated soil fertility management and post-harvest management. The MVP expects training to increase profits by increasing farm productivity through increased production quantities.[16]

- **Cooperative development:** The MVP conducted a number of studies on agricultural systems and value chains to inform the selection of promising new crops and improve market access. Large buyers for farmers' produce were identified and farmers receive training on market quality standards and requirements. Mango, maize, millet and acacia were identified as promising new crops for which farmers are given saplings and seeds and the training to grow them. Market development initiatives are expected to improve profits by giving farmers access to better prices and promoting the production of higher value crops. As a vehicle to achieving this objective, the project has given great attention to organising farmers through the formation and capacity-building cooperatives. Farmers' cooperatives were formed in each community at the onset of the project and two cooperative officers were hired to support them. Cooperative members are trained by the project and the cooperative structure is used to channel agricultural loans (e.g. non-cash goods and services such as ploughing or agrochemicals) to farmers. The expected benefits to be generated by the cooperatives include the opportunity for farmers to spread agricultural risk among members, increased access to credit via collective responsibility of loans, and increased negotiating power with traders in determining input and output prices. Cooperatives are seen as means for farmers to increase profits.[17]

- **Infrastructure development:** The project addresses how to minimise post-harvest losses. Some of the losses are resolved by training farmers on proper harvest times. However, other losses are the result of improper storage methods or the absence of storage facilities. The project therefore rehabilitates warehouses or builds entirely new storage facilities. Improved storage has an immediate impact on quantities of output sold, as losses are reduced, but also helps prices as farmers have the opportunity to sell their produce when prices are more favourable. This intervention therefore helps profits by positively affecting output quantities and prices.[18]

A summary of the MVP's known agricultural activities and achievements are detailed in Table 1. Where possible, MVP inputs or activities have been quantified (in orange text), based on SADA/ MVP's self-

[14] Ibid.
[15] 2014 Annual Report on the Millennium Villages Project in Northern Ghana.
[16] Preliminary Report on the Fourth Round of Data: Northern Ghana Millennium Village Project, 2017.
[17] Ibid.
[18] Ibid.

reported figures in the 2015–17 Annual Reports.[19] It should be noted that not all the activities may fit within the allocated categorisation since each output may contribute to multiple agricultural outcomes. Despite the complexities in specifying which outputs lead to various outcomes within the intervention logic, Table 1 attempts to group activities together according to where they are most relevant.

Table 1. Summary of MVP's agricultural activities[20]

Infrastructure	Resource provision	Information provision	Cooperative development
Demonstration plots (400)	Seeds (9,000 mange, 3,000 acacia)	Outreach services (23 AEAs appointed)	Cooperatives for farmer groups
Construction or rehabiliation of grain storage and warehouses	Fertilisers (112 tons donated by Mosaic)	Training (e.g. on financial management, conservation, using improved seeds, husbandry, good agronomic practices, land preparation) (400 lead farmer trained)	Training (e.g. on market quality standards) (10 community entrepreneurs trained)
Land irrigation	Tractors (10 available to rent)	MoUs signed with Ministry of Agriculture to provide services	Setting up Village Savings and Loan Associations (50 groups with membership of 1,425)
Land cultivation (230 hectare paddy rice cultivated)	Motorbikes and fuel stipends for AEAs		

Review of the MVP agriculture causal chain

Assumptions

- Farmers and communities are open to new ideas and ways of working and living
- Increased income gained from increased production, greater market access, etc. will translate into reinvestment to sustain income increases into the next years
- Training, incentives, structures and systems created will be used effectively and taken up by the host communities in sufficient volume to realise change
- Interventions will empower the communities to participate and run groups, projects, businesses, be involved in decision making, etc. both during and after the intervention
- The new crops, other agricultural activities, ways of working promoted by MVP are appropriate to the local context, farming systems, cultural norms, etc.
- Targeted communities are motivated to concentrate their efforts on agriculture as opposed to other income generating activities

[19] Project Completion Report on the Millennium Village Project in Northern Ghana (January 2012–March 2017).
[20] Numbers in brackets are the indicative number of achievements over the course of the project and documented in the 2016 SADA Mid-Year Report and 2017 Project Completion Report.

Education causal chain

The second output of the MVP aims to achieve '*enhanced access to quality primary education*.'[21] By improving access to primary education, the project expects to reach intermediate outcomes that '*ensure universal primary education, increase the quality of education overall and increase access to secondary education, especially for girls*'.[22] By reference to quality education, it is assumed that the project anticipates having a positive impact on learning outcomes for children in northern Ghana.

The MVP aims to achieve these goals through five output areas:[23]

1. Improving education quality
2. Increasing primary school enrolment
3. Increasing participation in secondary education
4. Improving gender parity
5. Engaging communities in education

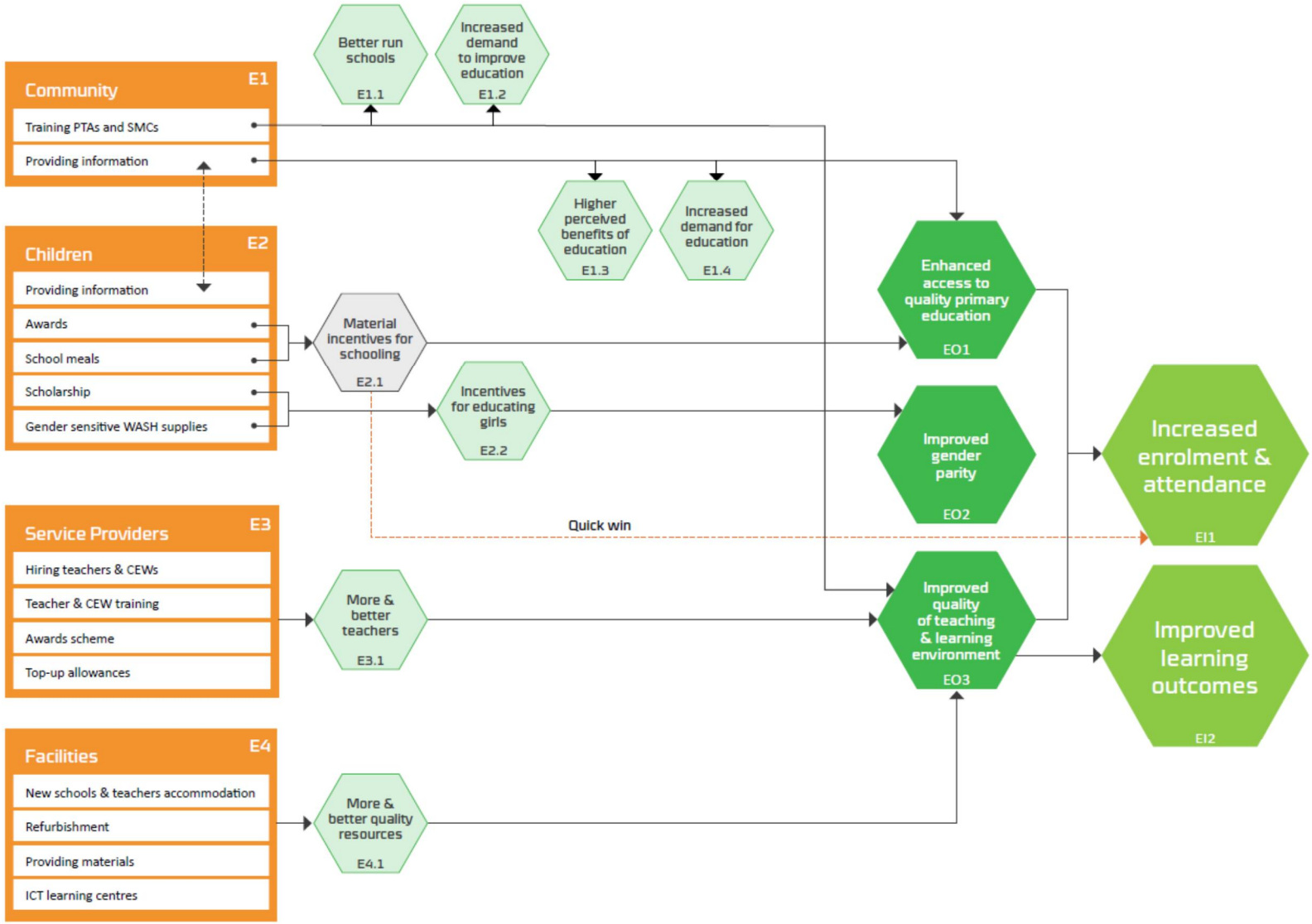
Achievement of these outputs is measured through three indicators:[24]

- Pupil to classroom ratio in primary schools (Output indicator 2.1)
- Pupils to trained teacher ratio in primary schools (Output indicator 2.2)
- Primary school completion rate within the MV site (male/female) (Outcome Indicator 3)

The CC presented in Figure 2 is a reconstruction of the theory as understood by the evaluation team and validated by the SADA MVP team.

[21] 2014 Annual Report on the Millennium Villages Project in Northern Ghana, p. 17.
[22] Logframe for the Millennium Villages Accountable Grant Programme, DFID, 2016.
[23] 2012 Annual Report on the Millennium Villages Project in Northern Ghana, p. 10.
[24] Logframe for the Millennium Villages Accountable Grant Programme, DFID, 2016.

Figure 2. Causal chain for the MVP's anticipated education impacts



The MVP anticipates that several **changes** will result from the activities to improve learning outcomes in the MVs. By implementing multiple interventions generating impacts at various levels, it is expected that there will be a range of **outputs**, such as: greater demand for education by both children and parents; schools managed more effectively; additional and better quality resources to facilitate learning are available; and parents have greater incentives to send children to school, particularly girls. As a result of these outputs, improving children's access to formal education will be achieved and motivate parents to educate their daughters. At the same time, the education that children access will be of better quality both in terms of teaching and the learning environment. These results are expected to increase both enrolment and classroom attendance, which will have a positive impact on improving learning outcomes in the MVs, and therefore the achievement of the MDGs.

The Ghana MVP education causal chain narrative

The MVP aims to achieve the anticipated results through a range of activities delivered across the education sector. In the first year of operation, project staff conducted several needs assessments with the communities, Parent-Teacher Associations (PTAs), School Management Committees (SMCs), and district education directorates. The meetings revealed the scale and variety of **problems** faced by the education system in the north: inadequate buildings and teaching materials, teacher absenteeism, poor teacher qualifications, high teacher turnover, language barriers to learning, economic and social constraints to school attendance such as long distances to school, absence of toilets for girls and the value parents place on schooling.[25]

The project devised an overall strategy to tackle these problems with the main goal of increasing school attendance. The strategy is based on delivering **activities** within three main pillars: (a) improving school quality; (b) sensitising communities and parents; and (c) enrolling more girls in school. Additional interventions aimed at bringing more children to school were attempted, but on a much smaller scale.[26]

- **Schooling quality:** It was thought that one of the main factors behind low school attendance was the poor quality of instruction. This in turn was the result of poor school infrastructure and poor teaching (including the intimidation of children). Hence, the project invests heavily in the construction and rehabilitation of classrooms, school toilets and playgrounds, and refurbishes schools with sporting equipment, teaching materials, books and computers. In order to increase the *quality of teaching*, the project builds teacher quarters and provides other incentives for teachers to live in the communities. The project trains teachers on teaching methods and provides salary top-ups to staff of the Ghanaian Education Service (GES) to supervise teachers' work.[27] Monitoring of children's/student's numeracy and literacy; pupil attendance; teacher attendance and water, sanitation and hygiene (WASH) conditions was carried out in all project schools.

- **Community:** The aim of the community sensitisation work is to strengthen communities' understanding of the role they can play in advancing children's education (e.g. by ensuring children get to school on time, holding schools, head teachers and teachers accountable for children's performance, the school holding the community members accountable for their responsibilities to children, etc.). The project hires and trains community education workers (CEWs) with the goal that they will hold meetings and workshops with the communities, PTAs and SMCs to sensitise

[25] Preliminary Report on the Fourth Round of Data: Northern Ghana Millennium Village Project, 2017.
[26] Ibid.
[27] Ibid.

parents about the benefits of education. In addition, CEWs visit families of children not attending school and families of children who dropped out of school to get more children in school.[28]

- **Gender parity:** In order to boost girls' school attendance, the project put in place a varied set of initiatives, including: school toilets for girls, delivery of sanitary pads to prevent absence from school during menstruation, community and parents' sensitisation[29] on the benefits of girls' schooling and scholarships for girls attending senior secondary schools.[30]

In addition to these broad packages of initiatives, the project also tries to increase school attendance directly by supporting the provision of school meals and establishing a real-time monitoring system in schools to improve learning. Real-time monitoring is performed by CEWs using mobile technology. CEWs assess children's' reading skills on a regular basis in order to inform project staff and education authorities about progress made and to establish areas in which remedial education was needed.

The MVP's education interventions are delivered through various settings or 'levels' based on the barriers each activity aims to address. In the case of Ghana's SADA MVP, the intervention levels are grouped into child (children) level, school (facility) level, teacher (service provider) level and community level. At the child level, interventions focus on improving children's ability to benefit from schooling or their incentives for investing time and resources in their own education (e.g. activities such as school feeding or merit-based scholarships). School level interventions aim to improve the quality of the learning environment in schools and classrooms (e.g. resource provision, building new schools or infrastructure, refurbishing existing infrastructure). Teacher level interventions target teachers directly (e.g. hiring teachers directly, hiring CEWs, decreasing pupil-teacher ratios, provide teachers with new skills, and provide performance related incentives).[31] Finally, at the community level interventions focus on creating demand for education and supporting parental engagement in school management functions through SMCs and PTAs.

A summary of the MVP's known educational activities and achievements are detailed in Table 2, with the quantification of MVP activities and outputs based on the Annual SADA Reports (2015–17). It should be noted that not all the activities may fit within the allocated categorisation since each output may contribute to multiple educational outcomes. Despite the complexities in specifying which outputs lead to various outcomes within the intervention logic, Table 2 attempts to group activities together according to where they are most relevant.

[28] Ibid.
[29] Community sensitisation activities took place at community meetings, mother-to-mother support groups, and VSLAs.
[30] Ibid.
[31] Stevenson et al., *Interventions for improving learning outcomes and access to education in low and middle-income countries: a systematic review*, 2015.

Table 2. Summary of MVP's education activities[32]

Community	Children		Service providers	Facilities	
Community sensitisation	**Gender parity**	**Resource provision**	**Teaching quality**	**Infrastructure**	**Resource provision**
Training PTAs and SMCs	Gender-based violence awareness and Gender clubs in schools (482 school girls trained on sexual and reproductive health)	School meals	Teacher training (120 teachers trained in jolly phonic; 174 teachers trained in numeracy, literacy, etc.)	Provision of school furniture	Providing school supplies (10,000 exercise books supplied; 3,000 pens and pencils; 16,800 text books)
Radio programmes	Community education worker (CEW) sensitise on girl education	CEW visit out of school children	Awards scheme for teachers and students	School construction (8 school buildings, 4 refurbished)	Student scholarships
Funding CEWs	Provision of sanitary pads for girls (3,200 sanitary pads in 20 MV schools)		CEWs trained as teachers (45 CEWs teach in primary schools)	Classroom construction and refurbishment (174 classrooms constructed in 20 cluster schools)	Provision of sports materials
	Running mentor girls camps		Lobbying GES for investment in teachers	Playground construction	Learning materials distributed
	Gender sensitive WASH facilities		Solar lamps	Construction of early child development centres	ICT learning centres
	Gender-specific safety programmes		CEWs provided with solar	Lobbying District Assemblies for school repairs	
	Creation or identification of scholarships for girls		Curriculum printed	Building teacher accommodation (4 teachers quarters constructed, 12 teachers quarters updated)	
			Top up allowances (10 GES staff)		
			Curriculum training for head teachers, circuit supervisors, gender facilitators, and district supervisors		

[32] Numbers in brackets are the indicative number of achievements over the course of the project documented in the 2016 SADA Mid-Year Report, 2017 Project Completion Report and 2015 SADA Annual Report.

Review of the MVP education causal chain

The education directorates lacked the resources to hire new teachers and indeed struggled with maintaining the existing teaching stock because of a lack of government funds. As a result, the MVP employed the CEWs as teachers to supplement the absence of government teachers. This, however, reduced the CEWs' sensitisation work considerably and resources had to be invested in training CEWs in addition to teachers.[33]

Attempts to bring more girls to school were limited in scope and partially misguided. Early data collected revealed that far more girls attend school than boys. While bringing more girls to school can only be beneficial, gender parity in education is not a core issue in the area as more girls are attending school in primary, junior high school and secondary school. In addition, the MVP interventions were limited in scope. Only about 30 scholarships were given to girls attending secondary school through the externally funded 'Connect to Learn' project, and sanitary pads were distributed to only a fraction of the female school population.[34]

Real-time monitoring of literacy achievement alerted project staff and the education directorate to the lack of progress in learning, but this did not result in remedial education activities and did little more than stimulate debates on the right pedagogical approaches to follow.[35]

In the end, the project relied heavily on improving school quality. It constructed and rehabilitated a large number of classrooms and provided teaching and learning materials at a relatively high cost. However, less effort was spent on increasing the demand for schooling in other direct ways. In some or many cases teaching was conducted by newly trained CEWs. One would expect this package of interventions to have a moderate impact on attendance and very little impact on learning outcomes.[36]

Assumptions

- Access to schools, infrastructure and school materials are necessary to improve education quality
- There are sufficient untapped resources to ensure that teacher shortages can be addressed
- Children and young people are willing to engage in the educational programmes envisaged for example mentoring, enrichment, life skills or problem solving programmes
- Teachers are receptive to new teaching methods, programmes and meeting the needs of different vulnerable groups
- The Ministry of Education and the Ghana Education Service are willing partners, alongside non-governmental organisations and partners
- The community is open to changing attitudes towards pre-existing gender norms – for example early marriage for females, role of education for females, etc.

[33] 2017 Preliminary Report on the Fourth Round of Data: Northern Ghana Millennium Village Project.
[34] Ibid.
[35] Ibid.
[36] Ibid.

Health causal chain

The third output of the MVP aims to achieve '*enhanced access to health services provided by skilled personnel and trained community health workers (CHWs) providers in the Millennium Villages site*.'[37] By improving access to health services, the project expects to '*reduce common causes of morbidity and mortality*'.[38] The MVP's strategic health objective is to reduce death rates and incidence of HIV, malaria, TB and other tropical diseases, reduce the mortality rate of children under-5 and improve nutrition and maternal health.[39]

The MVP aims to achieve these goals by investing in seven key areas in the health sector:[40]

1. Improving access to care
2. Reducing incidence of infectious diseases
3. Improving health information systems
4. Increasing community health workers
5. Improving child health
6. Improving maternal health
7. Reducing under-nutrition

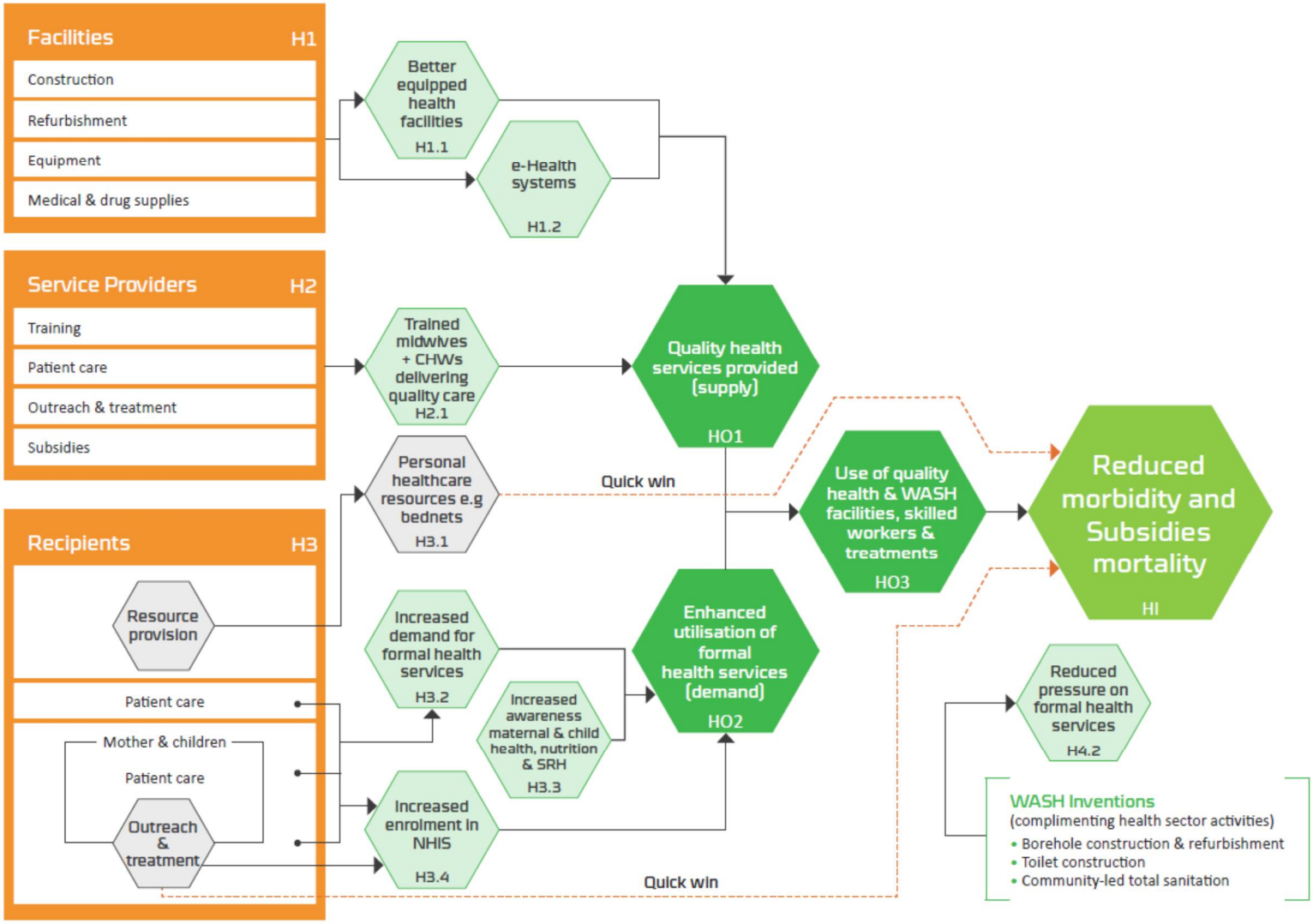
Achievement of these outputs and outcomes is measured through three indicators in the Ghana MVP logframe:[41]

- Number of skilled health professionals (doctor or midwife) working at the health facility to population ratio (Output indicator 3.1)
- Proportion of population with access to nearby health facility staffed with at least one skilled staff (less than 10 kilometres) (Output indicator 3.2)
- Number of trained community health workers by population ratio (Output indicator 3.3)

The CC presented in Figure 3 is a reconstruction of the theory as understood by the evaluation team and validated by the SADA MVP team.

[37] Logframe for the Millennium Villages Accountable Grant Programme, DFID, 2016.
[38] 2012 Annual Report on the Millennium Villages Project in Northern Ghana, p. 5.
[39] Ibid.
[40] Ibid.
[41] Logframe for the Millennium Villages Accountable Grant Programme, DFID, 2016.

Figure 3. Causal chain for the MVP's anticipated health impacts



The Ghana MVP health causal chain narrative

In the business case, the following health related **problems** in northern Ghana were identified: high incidences of maternal mortality, lack of availability of free health care at the point of delivery and a lack of skilled health workers.[42]

The MVP anticipated that several **changes** would result from activities to improve health services in the MVs. By implementing multiple interventions generating impacts at various levels, it is expected that there will be a range of **outputs**, such as: skilled staff delivering improved basic services (e.g. increasing the proportion of births attended by skilled health workers); and women, men and young people face fewer barriers to accessing services (e.g. aiming to increase contraceptive prevalence).[43] As a result of these outputs, several results will be achieved around increased use of facilities, drug treatments and care by trained skilled health workers. These outcomes are expected to improve health, which will have a positive **impact** on reducing morbidity and mortality in the MVs.[44]

To tackle the health problems faced in the MVs, the MVP employed a generic set of **activities** aimed at achieving 'quick wins' through immunisation and de-worming campaigns;[45] distributing bed nets; constructing and renovating health facilities and referral hospitals; recruiting staff and providing training; and subsidising salaries for CHWs, community health nurses (CHNs), medical assistants, clinical staff (such as state registered nurses) and midwives.[46] These activities expect to translate into functional clinics at the village level[47] staffed by government and workers to provide basic clinical services for infectious diseases, nutritional deficiencies, antenatal care and attended births; expanded health services including malaria control through indoor residual spraying, family planning, micronutrient supplementation for vulnerable groups, treatment and prevention of HIV/AIDS and TB; and improvements in the nearby referral hospital, including emergency obstetric care.[48]

- **Facilities:** In the project's first year, the MVP procured critical drugs and supplies, including laboratory equipment, nutritional supplements, drug therapies, contraceptives, vaccinations and HIV tests. Two ambulances were procured and drivers were recruited to use them. The MVP developed an e-Health system called CommCare that enables real-time patient tracking and referrals through Android phones. CommCare aims to improve point of care service through decision-making guidance and collects regular data that can easily be accessed by CHW managers through a cloud-based system. In order to get this system off the ground, the MVP hired an e-Health manager, procured phones and trained staff.[49] The MVP has also constructed and refurbished community health planning services (CHPS) compounds, health centres, maternity wards and staff quarters.[50]

- **Service providers:** The CHW programme is described as 'the cornerstone of the MVP's health sector.' During the first year, the MVP recruited key clinical staff such as health nurses, physicians'

[42] Business Case: Millennium Village in Northern Ghana, DFID, 2011.
[43] Ibid.
[44] 2012 Annual Report on the Millennium Village Project in Northern Ghana.
[45] De-worming campaigns take place at both schools (for children in schools) and at the household level (for children who are not yet old enough to attend school).
[46] There is a written understanding between SADA MVP and District Health Management Team specifying clear roles of the different actors, and based on which allowances are paid.
[47] NB: MVP's super-CHPS compounds do not align with the government's policy.
[48] 2012 Annual Report on the Millennium Village Project in Northern Ghana.
[49] Ibid.
[50] 2014 Annual Report on the Millennium Village Project in Northern Ghana.

assistants, midwives, laboratory technicians and other specialists. Each CHW cares for approximately 100–200 households and visits them at least every 90 days. They have a range of responsibilities including conducting rapid diagnostic tests (RDTs) to detect malaria at the household, referring patients, administering or recommending treatments, vaccinating children, distributing medication such as vitamin A supplements and de-worming tablets, providing information to household members (e.g. on preventing and treating diarrhoea), conducting information sessions (e.g. on good hygiene practices like hand washing with soap), collecting data on children's health (e.g. middle upper arm circumferences, height and weight for age) and educating communities about nutrition.[51] Community health nurses are currently employed at the facilities in the cluster and support the work of CHWs.[52]

- **Recipients:** The MVP runs several outreach initiatives to disseminate information about health issues such as information sessions on infectious diseases and HIV prevention. CHWs distribute bed nets to households and provide them with information about malaria prevention.[53] Outreach efforts also included informing residents about their rights to the National Health Insurance Scheme (NHIS) and helps register children under-5 and adults.[54]

- **Mothers and children under-5:** A key aim for the MVP is to improve maternal health by ensuring that more women give birth at clinics with skilled birth attendants rather than at home using traditional birth attendants.[55] Pregnant women are monitored by CHWs every six weeks and attend to new-borns until they reach five years of age. Comprehensive antenatal care services are provided that include disease screening and prevention, pregnancy monitoring, tetanus toxoid immunisation and micronutrient supplementation.[56] The MVP also funds community-based mother support groups to provide nutrition and water, sanitation and hygiene education to women of fertility age.[57]

A summary of the MVP's known health activities and achievements are detailed in Table 3, with the quantification of MVP inputs and activities based on SADA Annual Reports (2015–17). It should be noted that not all the activities may fit within the allocated categorisation since each output may contribute to multiple health results. Despite the complexities in specifying which outputs lead to various outcomes within the intervention logic, Table 3 attempts to group activities together according to where they are most relevant.

[51] 2012 Annual Report on the Millennium Village Project in Northern Ghana.
[52] 2014 Annual Report on the Millennium Villages Project in Northern Ghana.
[53] 2012 Annual Report on the Millennium Village Project in Northern Ghana.
[54] 2014 Annual Report on the Millennium Village Project in Northern Ghana.
[55] 2012 Annual Report on the Millennium Village Project in Northern Ghana.
[56] 2014 Annual Report on the Millennium Village Project in Northern Ghana.
[57] 2015 Annual Report on the Millennium Village Project in Northern Ghana.

Table 3. Summary of MVP's health activities[58]

Facilities	Service providers	Recipients	Maternal health and under 5s
Constructing and refurbishing CHPS compounds, medical laboratory, incinerators, health centres and staff quarters, well-equipped and accessible maternity wards	Subsidising and topping up salaries for CHWs and CHNs (53 CHWs employed)	Outreach visits, including identification and support of vulnerable individuals	Antenatal and post-natal care
Drug storage	Training (midwives, etc.) (8 students trained in midwifery; 66 CHWS, 98 cluster staff and 26 referral staff trained in Telemedicine)	Funding NHIS membership during first year	Outreach and education sessions (e.g. breastfeeding, child nutrition)
Well-equipped laboratory	Home visits and tests (RDTs for malaria)	Resource distribution (e.g. contraception, bed nets, vitamin A, de-worming tablets, medication, anti-malarials, immunisations, paracetamol, supplementary food)	Awareness of skilled birth attendants
	Skilled birth attendants (employment of retired midwives) (12 midwives stationed at 9 facilities)	Awareness raising (e.g. contraception, NHIS) (1,500 children under-5 and 300 mothers registered with NHIS; 185 citizens participated in focus groups on malnutrition)	
e-health systems (i.e. CommCare) tracking patient health, identifying mothers and children at risk of HIV transmission	Collect data via e-Health		
Provision of ambulances and motor kings (2 ambulances)			

A number of positions were linked to the MVP's health activities. The known roles and their responsibilities are documented in Table 4.[59]

[58] Numbers in brackets are the indicative number of achievements over the course of the project documented in the 2016 SADA Mid-Year Report, 2017 Project Completion Report and 2015 SADA Annual Report.

[59] Janitors, senior CHWs, health professionals and clinical staff were identified in the SADA Annual Reports, but no further information was provided on their roles and responsibilities so they are not included in the table.

Table 4. Roles and responsibilities of health intervention actors

CHNs	CHWs	Midwives	Community-based surveillance volunteers	Verbal autopsy administrator
Provide higher level of care	Rapid diagnostic testing for malaria	Receive training	National immunisation days	Record death data on e-health
Serve as mentors, coaches and supervisors to CHWs	Oral Rehydration Therapy (ORT)	Ante and post-natal services,		
Infant resuscitation techniques (helping babies to breathe)	Diarrhoea counselling	Skilled deliveries		
Delivering outreach sessions (e.g. child nutrition, available services, preventing mother to child HIV transmission)	Child nutrition	Distributing medication to prevent mother to child HIV transmission		
	Breastfeeding info			
	Monitor bed net use			
	Identify and support needy community members			
	Collect community health data using CommCare			
	Deliver outreach sessions on available services			

Review of the MVP health causal chain

Assumptions

- Sufficient staff can be recruited for Village Health Worker roles and other health personnel roles
- The community is receptive and open to increasing awareness raising activities and changing their attitudes and behaviours to the messages conveyed via the MVP programme (public awareness raising actions)
- Health sector stakeholders and partners (such as district hospitals) co-operate effectively with MVP to ensure joined up access to health care services
- Cooperation with other partners such as schools, farmers, etc. to ensure provision of more nutritious foods
- CHWs will deliver quality care
- The e-Health system will be able to function, which is dependent on aspects of the infrastructure interventions (e.g. mobile phone masts, connectivity to the electricity grid)
- Propagation effects

Infrastructure causal chain

The fourth output of the MVP aims to achieve '*improved access to electricity, roads and transportation, improved water and sanitation facilities*.'[60] By improving infrastructure across the MVs, the project hopes to '*foster development across all sectors*'.[61]

The MVP aims to achieve these goals by investing in infrastructural developments in four key areas:[62]

1. Expanding road networks and transport services
2. Expanding electricity
3. Increasing access to and usage of information communication technologies (ICT)
4. Improving water and sanitation facilities[63]

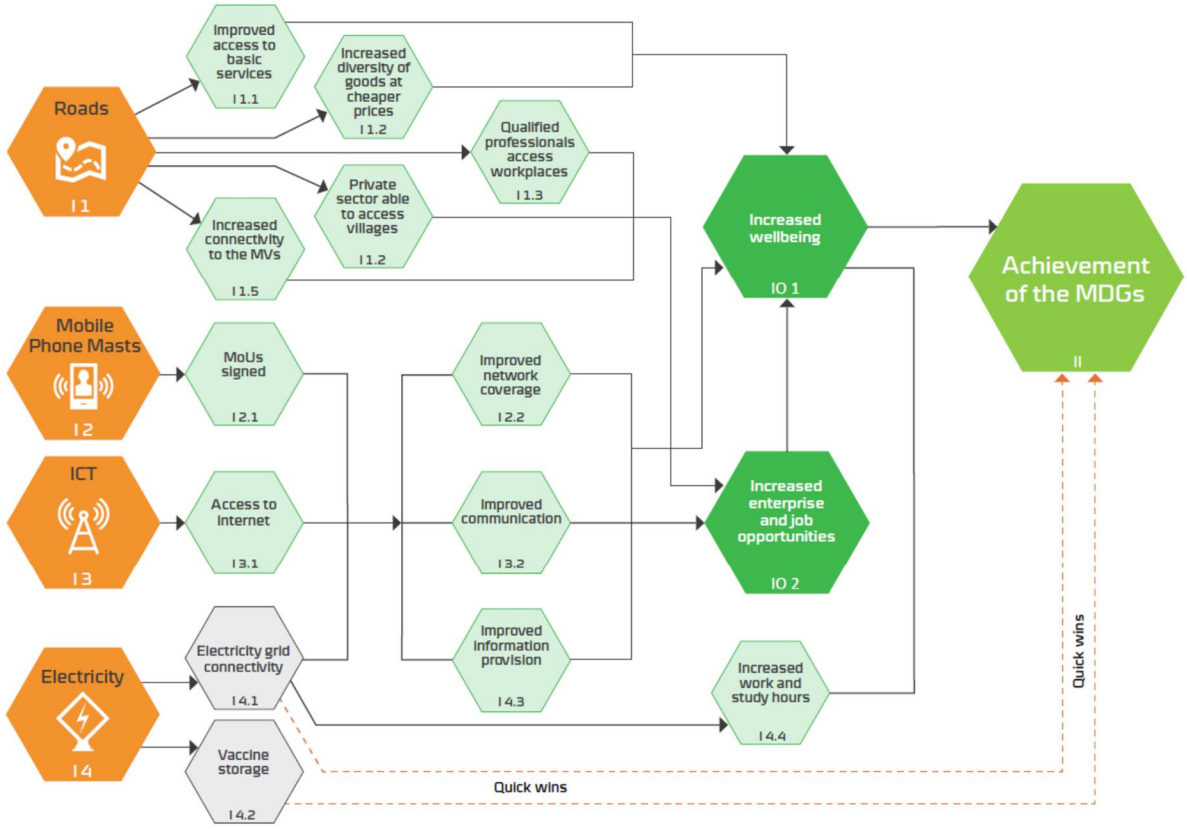
Achievement of these outputs is measured through five indicators in the Ghana MVP logframe:[64]

- Number of households with electricity connection within the MV site (Output indicator 4.1)
- Length of roads built, upgraded or rehabilitated to basic minimum (all-weather) standard (kilometre) (Output indicator 4.2)
- Number of new and refurbished 'improved' water points provided by MVP (Output indicator 4.3)
- Number of new household sanitation facilities constructed by MVP (Output indicator 4.4)
- Proportion of population with access to an improved drinking water source in the MV site (year-round: during both wet and dry seasons) (Outcome indicator 5)

The causal chain presented in Figure 4 is a reconstruction of the theory as understood by the evaluation team.

[60] Logframe for the Millennium Villages Accountable Grant Programme, DFID, 2016.
[61] 2012 Annual Report on the Millennium Villages Project in Northern Ghana, p. 19.
[62] Ibid.
[63] While water, sanitation and hygiene (WASH) is discussed in the infrastructure causal chain paper, the evaluation team is including WASH activities in the health diagram since it is more directly linked to outcomes and impacts in that sector.
[64] Logframe for the Millennium Villages Accountable Grant Programme, DFID, 2016.

Figure 4. Causal chain for the MVP's anticipated infrastructural impacts



The Ghana MVP infrastructure causal chain narrative

The following infrastructure-related **problems** in northern Ghana were identified in the business case: lack of effective irrigation, year-round roads, and electricity; inadequate infrastructure; the western part of West Mamprusi is cut off from the rest of the district during the rainy season, severely limiting movement, access to markets, and the delivery of public services; and most people are dependent on surface water sources.[65]

The MVP anticipated several **changes** would result from the activities to improve infrastructural developments in the MVs. By implementing multiple interventions generating impacts at various levels, it was expected that there would be a range of **outputs**, such as: improved access to roads; electricity grid connectivity; access to the internet; better access to clean water; access to improved sanitation; and access to basic services. As a result of these outputs, several results will be achieved around enabling improved sanitation and personal hygiene; use of basic services; access to electricity can support local business operations, as well improve livelihoods for instance through household lighting; better transport connections to the rest of the district (leading to indirect benefits such as improved access to health clinics and schools, and increased engagement with local government). Internet connectivity and increased mobile phone connectivity can have various benefits, for instance, in the health sector, mobile phones can be used for consultations, for making and following-up referrals, improving the response to emergencies, and reducing isolation for those who work in rural areas and in the education sector. Mobile phones can facilitate communications between parents and teachers, and assist management in schools. These outcomes are expected to increase agricultural

[65] Business Case: Millennium Village in Northern Ghana, DFID, 2011.

output and improve value chains, which would have a positive **impact** on improving connectivity to, from and within the MVs.[66]

To tackle the infrastructure problems faced in northern Ghana, the MVP employs a generic set of **activities** aimed at achieving 'quick wins' through upgrading local roads and improving access roads; connecting to the electricity grid; constructing safe drinking water points with the aim of having access within one kilometre of each household; and constructing pit latrines at the household level.[67] The interventions implemented were not connected to each other in a causal chain form.

- **Roads:** The MVP worked closely with the government to develop plans to rehabilitate roads and build culverts and drainage canals to bring roads to all-weather standards. The MVP also solicited bids and awarded contracts for some of the construction work. In order to ensure sustainability of the roads, the government of Ghana, through the District Assemblies, has periodic maintenance planned for all the roads in each district.[68] Memorandums of Understanding (MoUs) to this effect were signed with the Department of Feeder Roads, which passes on the responsibility of maintenance to the District Assemblies.[69]

- **Electricity:** The MVP strategy for expanding the current national grid to the cluster is to provide technical and financial support to 'top up' existing government services. During the first year the MVP lobbied the Ministry of Energy to expand services, and submitted an official proposal for extending the grid into the cluster. It was successful in securing government agreement to extend the national grid to 32 of the 35 SADA MVP communities.[70] While the MVP itself did not have the capacity to invest directly in grid expansion, it is working to address the energy gap in rural communities by investing in small-scale solar projects. Medium to large size panels were installed in a central location in the community where multiple households can hook into the system.[71] In 2014 the project engaged Trade AID Integrated, a cook stove expert agency, to sensitise the 35 communities on the use of energy saving cook stoves. Following that, 50 pilot cook stoves were constructed, and five people at each location were trained on how to construct the cook stoves themselves. Thus the project has rolled out this pilot to all communities on the assumption that there will be replication among all communities.[72]

- **WASH:** The MVP's water and sanitation interventions aimed to increase access to safer water and improved sanitation for households and public institutions, while also building the local capacity to maintain and manage facilities. The MVP hired a dedicated WASH facilitator to manage water and sanitation activities, and liaise with all other sectors to ensure hygiene and sanitation issues are addressed in interventions across the project. The project worked with the three District Environmental Health and Sanitation Units to implement the Community-Led Total Sanitation (CLTS) programme in all 35 communities in the cluster. Contracts were awarded to construct 29 boreholes and rehabilitate 49 existing water points, of which 20 boreholes were reportedly constructed. In order to promote hand washing and sanitation activities in schools, the MVP helped to form MDG Clubs in seven pilot schools where students regularly participated in educational

[66] Ibid.
[67] Business Case: Millennium Village in Northern Ghana, DFID, 2011.
[68] 2013 Annual Report on the Millennium Villages Project in Northern Ghana.
[69] 2014 Annual Report on the Millennium Villages Project in Northern Ghana.
[70] 2012 Annual Report on the Millennium Villages Project in Northern Ghana.
[71] 2013 Annual Report on the Millennium Villages Project in Northern Ghana.
[72] 2015 Annual Report on the Millennium Villages Project in Northern Ghana.

activities to promote health seeking behaviours.[73] Schools were supported with acquiring hand washing stations, soap, detergents for cleaning water and sanitation facilities. The project also constructed gender sensitive latrines in schools that did not have them.[74]

- **ICTs:** The MVP installed ICT centres in selected primary schools. Solar equipment and low energy computers were purchased and installed at the schools, and ICT facilitators were recruited from among the teachers at each school. These ICT teachers and facilitators in schools were trained in computer hardware and management of ICT facilities and laboratories.[75]

- **Mobile phone masts:** The MVP lobbied telecom operators to expand mobile data connectivity to the cluster. The ICT Coordinator was in contact with Tigo/Ericsson to advocate for expansion of mobile voice and data services throughout the cluster[76] (Tigo eventually pulled out of this partnership in 2016).[77]

A summary of the MVP's known infrastructure activities and achievements are detailed in Table 5, with the quantification of MVP inputs and activities (orange highlight) based on the SADA Annual Reports (2012–17). It should be noted that not all the activities may fit within the allocated categorisation since each output may contribute to multiple infrastructure outcomes. Despite the complexities in specifying which outputs lead to various outcomes within the intervention logic, Table 5 attempts to group activities together according to where they are most relevant.

[73] 2013 Annual Report on the Millennium Villages Project in Northern Ghana.
[74] 2014 Annual Report on the Millennium Villages Project in Northern Ghana.
[75] 2013 Annual Report on the Millennium Villages Project in Northern Ghana.
[76] Ibid.
[77] 2016 Mid-Year Report on the Millennium Villages Project in Northern Ghana.

Table 5. Summary of MVP's infrastructure activities[78]

Roads	Mobile phone masts	Electricity	WASH	ICT
Road rehabilitation (11 roads rehabilitated; 79km new or improved roads completed; 70 culverts constructed)	Lobbying telecom operators (8 Tigo masts installed)	Lobbying the Minister of Energy to expand services (3,149 households connected in 26 communities; grid extended to 31 of 35 communities)	Workshops	Installing ICT centres (16)
Awarding contracts		MoUs	Construction and rehabilitation boreholes (41 boreholes rehabilitated, 23 boreholes constructed)	Solar equipment
		Solar lamps and solar power (19 photovoltaic 500W solar systems installed in 10 schools and 9 health centres)	Constructing small town mechanised water systems (2)	Computers (96)
		Improved Cook stoves (50)	Conducting water sampling tests	Training (42 teachers trained on ICT)
		Tigo masts (8)	CLTS	e-learning tools
		Mobile phones distributed (100)	Hired WASH Facilitator	Solar photovoltaic systems (19 solar systems in 10 schools and 9 health centres)
		Prepaid sim cards (90)	Community education	
			Training (72 pump maintenance volunteers; 144 local artisans volunteers)	
			Awarding contracts	
			MDG clubs	
			Hygiene resources	

[78] Numbers in brackets are the indicative number of achievements over the course of the project documented in the 2016 SADA Mid-Year Report, 2017 Project Completion Report and 2015 SADA Annual Report.

Roads	Mobile phone masts	Electricity	WASH	ICT
			Gender sensitive latrines	
			Refurbishing water points	
			Pump repair toolkits	
			Latrines (2,287; 4 KVIPs in 9 health facilities)	

Local institutions causal chain

The fifth output of the MVP aims to achieve '*strengthened local institutions and community capacity to secure sustainability of MV gains*.'[79] By strengthening local institutions across the MVs, the project hopes to '*empower people to advance the MDGs within their own communities, increase the participation of vulnerable and minority groups in decision making and governance, and build the capacity of local government to sustain project gains in the long term*'.[80]

The MVP aims to achieve these goals by investing in the development of local institutions in two key areas:[81]

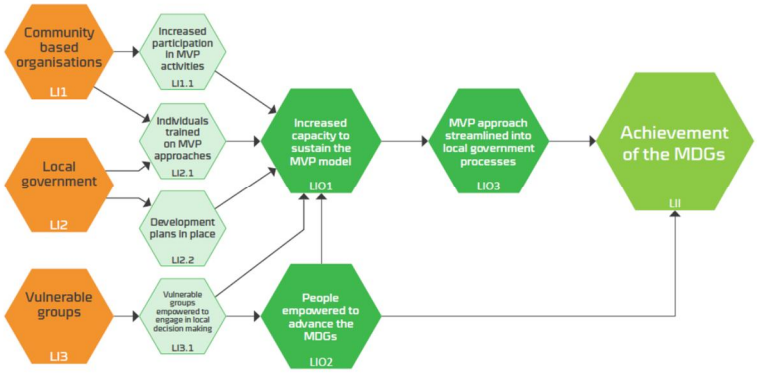
1. Building community capacity and institutions
2. Improving community and government capacity to sustain project gains

Achievement of these outputs is measured through two indicators in the Ghana MVP logframe:[82]

- Number of local government and traditional institutions' staff who receive training in leadership, planning and advocacy in the MV site (Output 5.1)
- Number of community-based organisations developed and actively advocating on behalf of communities (cumulative) in the MV site (Output 5.2)

The causal chain presented in Figure 5 is a reconstruction of the theory as understood by the evaluation team.

Figure 5. Causal chain for the MVP's anticipated local institutions impacts[83]



[79] Logframe for the Millennium Villages Accountable Grant Programme, DFID, 2016.
[80] 2013 Annual Report on the Millennium Villages Project in Northern Ghana, p. 39.
[81] Ibid.
[82] Logframe for the Millennium Villages Accountable Grant Programme, DFID, 2016.
[83] The evaluation team's interpretations of the MVP interventions on local institutions are about sustaining the achievement of the MDGs beyond the project.

The Ghana MVP local institutions causal chain narrative

The MVP anticipated several **changes** would result from the activities to strengthen local institutions in the MVs. By implementing multiple interventions generating impacts at various levels, it is expected that there will be a range of **outputs**, such as: increased involvement and commitment by the local community and officials, and help to secure sustainability of the impacts; building capacity of local government through technical assistance to regional and district officials, by including them within implementation teams, and by involving them in assessments including the initial needs assessment exercise; and expanded links with government and other development partners, including steering groups that coordinate local and district-level activities, planning, and cost-sharing. As a result of these outputs, several results will be achieved around increased participation in project activities. These outcomes are expected to have a positive impact on institution building and community empowerment.[84]

The MVP employed a generic set of **activities** aimed at achieving 'quick wins' through community capacity-building processes to empower villagers to manage their own development more effectively and to enhance the sustainability of interventions.[85] The interventions implemented are not connected to each other in a causal chain form.

- **Community-based organisations:** The MVP team attends community meetings (*durbars*) whenever possible to discuss the project objectives, progress, and challenges, and better define the roles of all stakeholders. The community development team at MVP has mapped and profiled existing community institutions and governance structures and set strategies for how to engage them in project activities. Community meetings were also organised to review and take stock of the project implementation in each community to date, so that the community may collectively agree on how to improve upon its role in the project implementation and engagement.[86] The MVP placed a high priority on equipping community based organisations with the skills and resources to help devise and execute advocacy strategy plans targeted at service providers and policy makers, in order to help them overcome community challenges. Initiatives that enhance community engagement and participation were undertaken such as constructing and furnishing a Community Centre in Kunkua.[87]

- **Vulnerable groups:** The MVP identified vulnerable groups in the cluster and worked with each sector coordinator to ensure that interventions reached these groups. The MVP made a concerted effort to recruit and train female interns with an aim to provide support to technical leads and coordinators, acting as a backup for staff, and create a pool of advocates for the MVP concept and its integrated approach to achieving the MDGs.[88]

- **Local government:** To develop a clear framework for partnership and sustainability, the MVP Community and Governance team secured the signing of MoUs with the three District Assemblies where the project was implemented. These MoUs clearly state the roles and responsibilities of the assemblies and MVP in terms of project implementation and outline how MVP will contribute to the assemblies' medium-term development plans. The MVP published and shared lessons learned

[84] Business Case: Millennium Village in Northern Ghana, DFID, 2011.
[85] Ibid.
[86] 2014 Annual Report on the Millennium Villages Project in Northern Ghana.
[87] 2016 Mid-Year Report on the Millennium Villages Project in Northern Ghana.
[88] Ibid.

via annual reports and articles.[89] The project held a training on leadership, planning and advocacy for local government staff including district chief executives, coordinating directors, planning and budget officers drawn from the project implementing districts.[90]

A summary of the MVP's known intuitional activities and achievements are detailed in Table 6, with the quantification of MVP inputs and activities (orange highlight) based on the SADA Annual Reports (2015–17). Despite the complexities in specifying which outputs lead to various outcomes within the intervention logic, Table 6 attempts to group activities together according to where they are most relevant.

Table 6. Summary of MVP's institutional activities[91]

Community-based organisations	Vulnerable groups	Local government
Meetings (409 community members attended citizen engagement sessions)	Sector coordination	Capacity building
Workshops		MoUs
Press coverage		Inputting into planning sessions
Advocacy strategy plans		Publishing reports
Community Centre		Training (35 officials of District Assemblies trained in project management and environmental impact assessments)
Training (60 community-based organisations trained in advocacy)		MVP documentary (1)

[89] Ibid.
[90] 2015 Annual Report on the Millennium Villages Project in Northern Ghana.
[91] Numbers in brackets are the indicative number of achievements over the course of the project documented in the 2016 SADA Mid-Year Report, 2017 Project Completion Report and 2015 SADA Annual Report.

Conclusions

The CCs provide insight into the MVP's programme theory and anticipated outcomes in the target sectors. The agricultural and education CCs are included in the Preliminary Report on the Fourth Round of Data[92] to elaborate on the assumptions and mechanisms behind key services provided by the MVP. Additionally, they will be used to help frame the analysis, test programme theory, attempt to understand how and why changes did, or did not occur, and impact on the MDGs in the endline analysis.

The workshop with the SADA MVP team validated the work of the evaluation team, filled in gaps where elements of the interventions was unclear and provided further information that has since been integrated into CCs. The SADA MVP team felt that overall the evaluation's interpretations were valid, particularly the representation of the 'quick wins'. There were some areas where they felt that the construction of the sectoral CCs differed somewhat from the logic intended by the SADA MVP team, which are now included in the report.

[92] 2016, Preliminary Report on the Fourth Round of Data: Northern Ghana Millennium Village Project.

Annex A. Methodology

Development of causal chains

The CCs were developed using a mix of document review (see Annex B for a complete list of documents) and a consultative workshop with the evaluation team. The team began by reviewing documents authored by both the MVP and the evaluation to capture information detailing the context, achievements, challenges, findings and gaps about interventions implemented by the programme. The supporting evidence for the interventions was mapped against each sectoral area of work and information source. Based on the evidence map, the team grouped the interventions into broad categories and depicted a high level causal chain for each sector.

A two day consultative workshop was held with the broader evaluation team, including the Project Director, Principle Investigator, Reality Check lead researcher, Participatory Rural Appraisal lead researcher and Institutional Assessment lead researcher. The workshop was an opportunity to ensure the CCs reflected the understanding of the MVP by the evaluation team. After the workshop, the CCs and accompanying narrative were updated in line with discussions.

In February 2017, two members of the evaluation team met with five members of the SADA MVP Transition Team in Ghana, namely: David Sumbo (Team Leader), Joseph Asampana Akolgo (M&E Coordinator), Edwin Batiir (Community Mobilisation and Institutional Coordinator), Amaan David Victor (ICT Coordinator). The meeting aimed to validate the sectoral CCs based on the evaluation team's understanding of the MVP's programme logic. The full list of the SADA MVP team's suggested changes and the evaluation's response is documented in Annex C. Based on the SADA MVP team suggestions, there have been amendments to the narrative and diagrams in the revised version of the report (May 2017).

Annex B. Documents reviewed

(2003). *Reaching underserved populations with basic education in deprived areas of Ghana: Emerging good practices*. CARE International.

Acharya, A. and McDonnell-Lenoach, V. Millennium Village Project, Trip Report. 2012.

Adongo, P., Kirkwood, B. and Kendall, C. (2005). How local community knowledge about malaria affects insecticide-treated net use in northern Ghana. *Tropical Medicine and International Health*, 10(4), 366–78.

Arhin, D. C., Ross, D. A. and Kufour, F. (1993). Costs of vitamin a supplementation: the opportunity for integration with immunization in Ghana. *Health Policy and Planning*, 8(4), 339–48.

Akyeampong, K. (2004). Aid for self-help effort? a sustainable alternate route to basic education in northern Ghana. *Journal of International Cooperation in Education*, 7(1), 41–52.

Al-Hassan, R. and Poulton, C. (2009). *Agriculture and Social Protection in Ghana*. Future Agricultures, Centre for Social Protection.

Andersen, H. M. (2004). 'Villagers': Differential treatment in a Ghanaian hospital. *Social Science & Medicine*, 59, 2003–12.

Appawu, M., Owusu-Agyei, S., Dadzie, S., Asoala, V., Anto, F., Koram, K., Rogers, W. and Nkrumah, F. (2004). Malaria transmission dynamics at a site in northern Ghana proposed for testing malaria vaccines. *Tropical Medicine and International Health*, 9(1), 164–70.

Baiden, F., Hodgson, A., Adjuik, M., Adongo, P., Ayaga, B. and Binka, F. (2006). Trend and causes of neonatal mortality in the Kassena-Nankana district of northern Ghana, 1995–2002, *Tropical Medicine and International Health*. 11(4), 532–9.

Bawah, A., Philips, J. F., Adjuik, M. and Vaughn-Smith, M. (2010). The impact of immunization on the association between poverty and child survival: Evidence from Kassena-Nankana district of northern Ghana. *Scandinavian Journal of Public Health*, 38, 95–103.

Bernhard, B. (1999). Sacrifice, plants, and western pharmaceuticals: Money and health care in northern Ghana. *Medical Anthropology Quarterly*, 13(3), 316–37.

Binka, F. N. and Adongo, P. (1997). Acceptability and use of insecticide impregnated bed nets in northern Ghana. *Tropical Medicine and International Health*, 2(5), 499–507.

Binka, F. N., Indome, F. and Smith, T. (1998). Impact of spatial distribution of permethrin-impregnated bed nets on child mortality in rural northern Ghana. *American Journal of Tropical Medicine and Hygiene*, 59(1), 80–85.

Binka, F. N., Maude, G. H., Gyapong, M., Ross, D. A. and Smith, P. G. (1995). Risk factors for child mortality in northern Ghana: a case-control study. *International Journal of Epidemiology*, 24(1), 127–135.

Binka, F. N., Ross, D. A., Morris, S. S., Kirkwood, B. R., Arthur, P., Dollimore, N., Gyapong, J. O. and Smith, P. G. (1995). Vitamin A supplementation and childhood malaria in northern Ghana. *American Society for Clinical Nutrition*, 61, 853–59.

Browne, E. N. L., Maude, G. H. and Binka, F. N. (2001). The impact of insecticide-treated bed nets on malaria and anaemia in pregnancy in Kassena-Nankana district, Ghana: a randomized controlled trial. *Tropical Medicine and International Health*, 6(9), 667–76.

de Hoop, T. and Kempen, L. V. (2010). Trust in health providers as a catalyst for malaria prevention: Heterogeneous impacts of health education in rural Ghana. The Developing Economies, 48(3), 376–404.

Dowswell, C. SG2000, (2003). Fertilizer toolkit: Promoting efficient and sustainable fertilizer use in Africa.

Future Agricultures, (2009). Agriculture and social protection in Ghana: A leap in the dark?

International Fund for Agricultural Development, (2006). Upper east region land conservation and smallholder rehabilitation project (lacosrep) – phase II.

Koram, K. A., Owusu-Agyei, S., Utz, G., Binka, F. N., Baird, K. J., Hoffman, S. L. and Nkruhman, F. K. (2000). Severe anemia in young children after high and low malaria transmission seasons in the Kassena-Nankana district of northern Ghana. *The American Society of Tropical Medicine and Hygiene*, 62(6), 670–674.

Masset, E., C. Barnett, A. Archarya and T. Dogbe. (2013a). An impact evaluation design for the Millennium Villages Project in northern Ghana. *Journal of Development Effectiveness*, 5(2): 137–57.

Masset, E. (2012). Back to office report of a mission to Ghana for the MV project from 13 to 21 August.

Masset, E (2013). Back to office report of a mission to Ghana from 12 to 17 February.

Masset, E. Korboe, D. and Dogbe, T. (2013). Back to office report of a visit to the MV sites between 30 July and 3 August 2013.

McDonnell-Lenoach, V. (2012). Back to office report – Mission to Ghana 10–14 September 2012.

McDonnell-Lenoach, V. (2012) Back to office report – Valerie McDonnell, Ghana 30 Oct – 4 Nov.

Meij, J. J., de Craen, A. J. M., Agana, J., Plug, D. and Westendorp, R. G. J. (2009). Low-cost interventions accelerate epidemiological transition in upper east Ghana. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 103, 173–8.

Mfum-Mensah, O. (2003). Fostering educational participation in pastoral communities through non-formal education: the Ghanaian perspective. *International Journal of Educational Development*, 23, 661–7.

Mfum-Mensah, O. (2005). The impact of colonial and postcolonial Ghanaian language policies on vernacular use in schools in two northern Ghanaian communities. *Comparative Education*, 41(1), 71–85.

Mills, S. and Bertrand, J. (2005). Use of health professions for obstetric care in northern Ghana. *Studies in Family Planning*, 36(1), 45–56.

Naylor, R. (1999). Women farmers and economic change in northern Ghana. *Gender and Development*, 7(3), 39–48.

Nazzar, A., Adongo, P. B., Binka, F. N., Philips, J. F. and Debpuur, C. (1995). Developing a Culturally Appropriate Family Planning Program for the Navrongo Experiment. *Family planning*, 26(6), 307–24.

Ngom, P., Debpuur, C., Akweongo, P., Adongo, P. and Binka, F. N. (2003). Gate-keeping and women's health seeking behaviour in Navrongo, northern Ghana. *African Journal of Reproductive Health*, 7(1), 17–26.

Nketiah-Amponsah, E. (2010). Mothers' demand for preventive healthcare for children aged under-five years: The case of utilization of insecticide-treated bed nets in Ghana. *Journal of Sustainable Development*, 3(2), 98–106.

Pryor, J. (2005). Can community participation mobilise social capital for improvement of rural schooling? A case study from Ghana. *Compare*, 35(2), 193–203.

Reconnaissance Trip – meeting with MVP M&E Team.

Roberts, L. (2007). Battling over bed nets. *Science*, 318(5850), 556–9.

Ross, D. A., Binka, F. N., Dollimore, N., Smith, P. G., Hutton, A. A. and Tomkins, A. N. (1993). Vitamin A supplementation in northern Ghana: effects on clinic attendances, hospital admissions, and child mortality. *The Lancet*, 342, 7–12.

Ross, D. A., Kirkwood, B. R., Binka, F. N., Arthur, P., Dollimore, N., Morris, S. S., Shier, R. P. and Gyapong, J. O. (1995). Child morbidity and mortality following vitamin a supplementation in Ghana: Time since dosing, number of doses, and time of year. *American Journal of Public Health*, 85(9), 1246–51.

SADA (2012) *Millennium Promise Q1 & Q2 Narrative Report to DFID on SADA MVP* 1 January 2012 – 30 June 2012.

SADA (2012) 2012 Annual Report on the Millennium Village Project in Northern Ghana.

SADA (2013) 2013 Mid-year Report on the Millennium Village Project in Northern Ghana.

SADA (2013) 2013 Annual Report on the Millennium Village Project in Northern Ghana.

SADA (2014) 2014 Mid-year Report on the Millennium Village Project in Northern Ghana.

SADA (2014) 2014 Annual Report on the Millennium Village Project in Northern Ghana.

SADA (2015) 2015 Mid-Year Report on the Millennium Village Project in Northern Ghana.

SADA (2015) 2015 Annual Report on the Millennium Village Project in Northern Ghana.

SADA (2016) 2016 Mid-Year Report on the Millennium Village Project in Northern Ghana.

SADA (2017) Project Completion Report.

Smith, F. (2004). Community pharmacy in Ghana: enhancing the contribution to primary health care. *Health and Policy Planning*, 19(4), 234–41.

Snilstveit, B, Stevenson, J, Phillips, D, Vojtkova, M, Gallagher, E, Schmidt, T, Jobse, H, Geelen, M, Pastorello, M, and Eyers, J, 2015. *Interventions for improving learning outcomes and access to education in low- and middle-income countries: a systematic review, 3ie Final Review.* London: International Initiative for Impact Evaluation (3ie).

Stephens, D. (2000). Girls and basic education in Ghana: a cultural enquiry*. International Journal of Educational Development*, 20, 29–47.

Wiggan, G. A. and Hutchison, C. B. (2009). *Global Issues in Education Pedagogy, Policy, Practices, and the Minority Experience*. (pp. 131–149). Lanham, MD: Rowman & Littlefield Education.

White, H. (2009) Theory-based Impact Evaluation: Principles and Perspectives. Working Paper 3, International Initiative for Impact Evaluation, New Delhi, India, June.

Whitehead, A. (2002). Tracking livelihood change: Theoretical, methodological and empirical perspectives from north-east Ghana. *Journal of Southern African Studies*, 28(3), 575–95.

Yaro, J. A. (2006). Is deagrarianisation real? A study of livelihood activities in rural northern Ghana. *Journal of Modern African Studies*, 44(1), 125–156.

Yaro, J. A. (2012). Re-inventing traditional land tenure in the era of land commoditization: some consequences in periurban northern Ghana. *Human Geography*, 94(4), 351–368.

Zimon, H. (1989). Guinea corn harvest rituals among the Konkomba of northern Ghana. *Anthropos*, 84, 447–58.

Annex C. SADA MVP team comments and evaluation team responses to the CCs

MV response table to SADA comments on causal chains

#	SADA comment	Independent evaluation team's response
1	With regard to the visuals (Figs 1–5) developed by the IET, the transition team noted that virtually all of the material in the boxes with dotted outlines (supposedly indicating inferences from the wider literature) was actually part of the logic that has been documented by the project	Dotted lines have been removed. It should be noted that the IET did not find the intervention logic denoted in the boxes that previously had dotted lines explicitly expressed in the SADA reports, which is why they there considered inferred steps in the causal chain
2	With regard to Fig1, some members of the transition team wondered whether Box A1.2 (increased food storage options) would not fit more logically beneath Box A1.1. Some also felt that the content of that Box A1.2 could be reworded to focus more narrowly on the construction of grain storage/warehouses rather than on storage options, if brought under Box A1.2	This has not been changed. 'Increased food storage options' is the intended outcome of the outputs such as the construction of grain storage facilities, so we have left it as an outcome level change. We would be happy to discuss this with SADA to clarify if our understanding of it being an outcome level change is incorrect
3	In any case, they felt that the IET ought to clarify what we mean by 'increased food storage options' and why it has been placed where it is	See above
4	Fig 2: 'Facilities' should include ICT learning centres	Added
5	Table 2: Similarly, 'Resource provision' should specify ICT learning centres	Added
6	The transition team disagreed with the last sentence of the third paragraph on page 13: 'Additional interventions aimed at bringing more children to school and monitoring children's/students' learning were attempted, but on a much smaller scale'. They were of the view that the first part of the sentence, *Additional interventions …* should stand on its own. They disagreed with the second part of the sentence, *…monitoring children…* because in their view monitoring children's/students' learning was done on a large scale and monthly. Outcome monitoring to assess the numeracy and literacy level of pupils, pupil attendance, teacher attendance, WASH conditions in the schools were done in all the project schools	Additional interventions sentence modified to stand alone. Information on pupil, teacher monitoring added to 'school quality' paragraph.
7	P 15, para 1: Sentence reading 'This however reduced the CEWs' sensitisation work considerably and resources had to be invested in training CEWs rather than teachers.' The transition team noted that ***both*** CEWs ***and*** teachers were trained, not 'CEWs rather than teachers'	Amended
8	P 15: The third paragraph on this page was contested by the transition team: 'Other initiatives were weakly implemented. For example, real-time monitoring of literacy	Would be useful to see documentation of these amendments

#	SADA comment	Independent evaluation team's response
	achievement alerted project staff and the education directorate to the lack of progress in learning, but this did not result in remedial education activities and did little more than stimulate debates on the right pedagogical approaches to follow.' They contended that the results of the monitoring led to remedial actions being taken, leading to noticeable improvements in test results. They often met with the education providers who took remedial measures, sometimes with the support of the project and on subsequent monitoring, they notice improvement in performance	
9	Where does the expected '*community decision making*' (which is an element of the MVP initiative) feature in the causal chain? × The PTAs and SMCs were the instruments of community decision making. Should be stated as E1.4	Added a new box E1.2 'Increased demand to improve education'
	The PTAs and SMCs were the instruments of community decision making. Should be stated as E1.4	Would be useful to understand how this should be reflected in the CC as we are unclear which outcome it relates to. Could this be embodied in the new E1.2?
10	Fig 3: Box HO2, 'Enhanced availability of formal health services (demand)' should read 'Enhanced ***utilisation*** ….'	Amended
11	Fig 3: The transition team argued that investments in WASH (H4) should rather result in less stress on health facilities (i.e. that Outcome H4.1 should be rephrased to something like 'Reduced pressure on formal health services')	Amended
12	Fig 3: The transition team also noted that the Emergency Referral System (provision of ambulance and tricycles) has not been reflected. They were, however, not certain if it should be under Box H1 (Facilities) or Box H2 (Service Providers). They were also of the view that 'Treatment of malnourished children' (supplementary foods) should also be shown in Box H3 (Recipients)	The provision of ambulances and tricycles is included under facilities, as indicated in Table 3. In the diagram it is aggregated into 'equipment.' In recipients, supplementary foods is reflected under 'resource provision' connected to H3.1. This has been made explicit in Table 3 to demonstrate where it is captured in the diagram
13	P 19, under Facilities, last sentence: Revise 'refurbished hospitals …' to 'refurbished CHPS compounds, health centres, maternity ward …'	Amended
14	P 19: under Service providers, sentence reading 'They have a range of responsibilities including conducting rapid diagnostic tests (RDTs) to detect malaria and HIV …': The team asked HIV to be deleted	Amended
15	P 20, Table 3, under Service Providers: delete HIV and TB from 'Home visits and tests (HIV, RDTs for malaria, TB)'	Amended

#	SADA comment	Independent evaluation team's response
16	Table 3: Under Facilities: 'Constructing well-equipped and accessible maternity wards': add CHPS compounds. They also suggested combining the content of the first two cells under Facilities. The way they are separated makes them seem they stand alone	Amended
17	P 22, Table 4: Delete HIV from roles of CHWs	Amended
18	P 22, under Midwives: The MVP team wondered, since deliveries are performed by midwives, whether the text should read '*supervised* deliveries,' '*skilled* deliveries' or '*attended* deliveries'	Amended to 'skilled deliveries'
19	P 22, under CHNs: CHNs did not deliver outreach sessions on HIV. Add child nutrition	Amended
20	Fig 4: P 25: WASH hardware like boreholes, toilets, etc. was delivered under 'Infrastructure' so the transition team suggested that it be indicated as I5 in Fig 4) while the soft aspects (WASH Education) were delivered under 'Health'	The evaluation team understood the WASH infrastructure to more directly linked to health outcomes and impacts rather than broad infrastructural impacts. If WASH hardware should also be part of the infrastructure causal chain, please indicate which non-health outcomes they link to that can be included in the diagram
21	P 26: The text on WASH should reflect the correction in the preceding point	Not amended, see above
22	Pp 25 & 26, under Electricity: The solar panel intervention (intended for storing vaccines in health facilities in the initial stages – quick win) was separate from the investment in connecting health facilities and schools to the national electricity grid. It should therefore be reflected in Fig 4	New box I4.2 added on vaccine storage leading to a quick win. It would be useful to understand the scale and scope of the intervention as it was not included in the programme documentation reviewed
23	P 27, under Phone masts: Correct the erroneous impression created by the sentence 'Tigo eventually *pulled out* of this partnership in 2016.' The partnership ended, rather than Tigo pulling out	'Tigo has currently also pulled out of the partnership with Ericsson and MV' is directly quoted from the MVP SADA 2016 Mid-Year Report
24	Fig. 5: The statement in Box L103, 'MVP Approach streamlined …' could be expressed along the following line: 'Local government planning process strengthened to capture the MVP outcomes and used for resource mobilisation'	It would be good to discuss this suggestion in more detail as we are unclear whether the suggested rephrasing indicates the project intends to leverage additional resources or is able to monitor MVP outcomes