Longterm Poverty Reduction through Boreholes Provision in Rural Communities – The Quality Education Platform: Practical Insights from the Atebubu and Afram Plains Districts of Ghana

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This study essentially indicates how boreholes provision facilitated effective school attendance to reduce poverty in rural communities in the long term. The sample size of 1200 household respondents was selected by simple random sampling technique. Primary data was collected from the Atebubu and Afram Plains Districts in Ghana through the use of quantitative and qualitative research instruments. In the study area the lack of potable water prevented the achievement of quality education objectives because school children trekked long distances in search of water daily for their households. However, results from this study shows 91.3% of survey respondents indicated boreholes provided facilitated improvements in quality education delivery; 83.9% indicated boreholes helped to check frequent absenteeism at school; 79.0% indicated boreholes provided helped to check high level of dropouts; and 87.7% indicated boreholes provided helped to improve punctuality at school. Thus, this powerful intervention in rural communities fostered a holistic and effective education delivery at the foundational level with trends showing as 71.0% increase in school enrollment in the Afram Plains District from 1992 to 2000, and a 29.0% increase in the Atebubu District from 1998 to 2006. Boreholes provision therefore constitutes a very powerful intervention for facilitating time gains that enabled children in rural households to actively attend school consistently. Through such regular school attendance children could eventually access education up to tertiary level and eventually obtain highly paid jobs to break from poverty.

Keywords: boreholes provision; reducing poverty; quality education; school attendance; empowerment; rural communities.

INTRODUCTION

Short and medium-term poverty reduction strategies most often focus on income earnings and wealth creation to empower people to emerge from poverty – that is, giving people the capacity to be able to generate the means to
afford the basic necessities of life on a continual basis beyond poverty thresholds [1-2]. Conversely, long term poverty reduction strategies aimed at reducing poverty however targets human capital formation through access to education and providing quality education for self-actualization and being able to live above poverty through gainful access to the national and international labour markets [3-4]. Based on these premises, the study examines the impact of boreholes provision as a pathway for facilitating quality education delivery towards long-term poverty reduction in rural communities in the Atebubu and Afram Plains Districts in Ghana. The Atebubu and Afram Plains Districts are located in the Brong Ahafo and Eastern Regions of Ghana respectively. Though both districts have very fertile lands supportive of agrarian livelihoods their levels of poverty were very high [5]. Both districts also lacked basic socio-economic infrastructure such as potable water facilities, good educational infrastructure, electricity, access roads to communities, and good markets, among others.

In terms of commonality of adverse geography, these districts were the most guinea worm endemic in the country as at 1990 prior to the provision of boreholes. Their geographical location is primarily rural and the two districts share almost the same climatic types. Under the influence of the South West Trade Winds, both districts experience the monsoon rains from May to August each year. The two districts both have dry Guinea savannah woodland landscape typically characterized by baobab and acacia plants which are suited to the long dry season, along with thorny bushes and grasses. The two districts also have non-perennial rivers and streams which easily dry up during the dry season spanning November to March [6]. The rocks underlying the two District are part of the “Voltaian formation” which covers about two-fifths of the surface area of Ghana. The rocks belonging to this formation are mainly sedimentary and exhibit horizontal alignments, which are very suitable for boreholes provision. Stones, slate, mudstones and limestone are the principal examples of the rocks. Soils in the District belong to a group called “groundwater lateritic soils”. Though this formation has a demerit of posing difficulty in terms of underground water exploitation, it has so far supported the provision of several boreholes in the two Districts as evidenced in this study [7]. In terms of geographical space and locations however, the two districts are almost 312 kilometres apart.

Basic education is the learning foundation for all citizens, in which the tools of reading, writing, and numeracy, as well as fundamental knowledge and skills for life, are acquired. It is the foundation on which societies, depending on their resources and needs, build further learning opportunities for as many people as possible, and at levels as high as possible, up to tertiary level [8]. Basic education therefore constitutes a critical part of the human development process which begins in early childhood. It is known that a society that ignores this potential, fails to preserve and enhance the very human resources it should be able to call upon in its continuing efforts to overcome problems such as economic stagnation, social disintegration, and environmental degradation [9].

In terms of geography or spatial analysis, education provision constitutes the ability of governments to harness and develop the young human resources within communities over a timeframe, as spelt-out in Government policy annually. The aggregate of which determines the capacity and capability of a country’s human resource or manpower base to sustain the national development agenda over a timeframe before another generation takes over. From the economic perspective, society benefits from investing in child education through increased productivity and the savings associated with reductions in school repetition and dropout rates, social vices, and illiteracy [10-11]. In poor rural communities without boreholes, participating effectively in school is out of the question. Waterborne/related illness such as diarrhea and guinea worm infections used to incapacitate children so much that they were unable to attend school [12-13]. Even when they are in school, they are pulled-out by parents to respond to the urgent need to go in search of water for their households, as aptly captured by Sachs [2005:7]: “Attending school now is a hit-and-miss affair. Children are in and out of school with illness. Their attendance depends on how urgently they are needed at home to fetch water and firewood and on the safety of walking several kilometers to school itself” [14].

In relation to education quality delivery in rural communities, there is the need to provide very powerful reversal tools to rectify place-of-birth disadvantages. So that education as an opportunity equalizer in the long-term could lead to higher income earnings and the gaining of strong economic capacity as children access the tertiary levels of education, flow into high income levels of the job market, and eventually make poverty anachronistic in their lives.

Children’s poor health due to extensive trekking (over 16km a day) to search for water also compromises school attendance. There are records of high rates of absenteeism, very high attention deficits and very low pass rates at national basic school examinations. It has also been indicated that some rural districts endemic with guinea worm, prior to boreholes provision, persistently
recorded zero percentage at national basic school examinations [15-17]. While quality education delivery is centrally linked to other key factors such as educational inputs, trained teachers availability, an enabling teaching and learning environment through good educational infrastructure provision, and the characteristics of learners, this study focuses primarily on the context aspect. This is in relation to other factors in the physical environment in rural areas facilitating or impeding quality education delivery. This study carries a singular focus on the provision of boreholes as a remedial intervention and process to arrest the lack of access to potable water and its concomitant effect on fostering endemic poverty.

METHODOLOGY

For this study the population of interest was drawn from rural communities where World Vision Ghana Rural Water Project drilled 363 boreholes in 249 communities in the Atebubu and Afram Plains Districts from 1990 to 2003. The sampling frame was thus based on the database of boreholes drilled. The probability sampling technique was employed to obtain the sample needed for the study. This technique allowed for each individual unit in the population universe to have a chance or probability of being included in the sample. Specifically, the probability technique - Simple Random Sample (SRS), was used to select the samples (communities and respondents) for this study [18].

Thirty-two per cent of communities with boreholes (Programme communities) were sampled. This gave a total of eighty (80) communities with boreholes (Atebubu - 41; Afram Plains - 39). Thirty-four (34) communities in the same geographical area without boreholes were also selected as Control communities (Atebubu – 20; Afram Plains – 14). Large communities with populations over 5,000 were not included in the sampling frame so as to minimize biases. Fifteen respondents were selected from each programme community to arrive at a households respondents sample size of 1,200. Six hundred (600) respondents were also sampled by the simple random technique from the 34 Control communities.

Primary data were collected from communities sampled using an integrated approach of quantitative and qualitative data collection methods. The data collected from the Control communities located in the study area served as the counterfactual evidence for effective comparative analyses. Information were collected on the situation before and after boreholes were provided, in terms of the sources of water, the availability and access to potable water, the status of school enrollment and attendance by children, as well as the capacity for engaging in livelihoods occupations.

Most questions were structured in the form of Likert scale, while other questions asked respondents were structured with responses in basic ‘Yes’ or ‘No’ formats. The quantitative data were analyzed through the use of SPSS computer-based analysis applications to generate the results. The unit of analysis was ‘households’. Non-parametric data analysis methods, especially descriptive statistics were employed to analyze data.

Statement of the Problem

Prior to the provision of boreholes in the Atebubu and Afram Plains Districts schools were available but the quality of education delivery was very poor due to several environmental constraints [15-16]. The poor quality of education was characterized by low school attendance, high levels of absenteeism, lack of trained teachers, poor examination pass rate, and children’s inability to proceed to senior secondary and tertiary levels of education [17]. The major constraint was the lack of potable water infrastructure in the two districts, especially during the almost five months dry, harmattan season which spans November through to March [19-20]. In such times, school-age children had no option than join their mothers and older siblings in trekking across the geographical terrain, searching for water of any sort for their households. As a result, school attendance suffered much and though schools did not shut down attendance was very irregular in both districts. Such a situation eventually compromised the long term aspirations and potentials of school children to emerge from the poverty status quo into which they were born due to place-of-birth disadvantage. With the advent of the provision of 363 boreholes in 249 rural communities in both districts however, the scenario in education enrolment and quality took a turn for the better. In terms of trends in enrollment and effective participation in school, from 1992 to 2006 the Afram Plains District showed a 71.0% increase and the Atebubu District indicated a 29.0% increase from 1998 to 2006 [15-16].

The priority for basic education (Primary and Junior Secondary) should be to increase children’s learning in school so that most children master the curriculum and complete the basic education cycle [21]. This study therefore explores how instrumental boreholes provided for access to potable water in rural communities facilitated and promoted quality education delivery. It also examines the pathways created to foster access to higher education through time savings for regular attendance and effective participation in school at the basic school
level towards long-term poverty reduction.

Theoretical/Conceptual Framework

The theory and conceptual framework guiding this study, as depicted in Figures 1 and 2 shows the status of education delivery before and after the provision of boreholes in rural communities. Figure 1 reflects the impact on children’s education in the absence of boreholes with the impact showing as: daily trekking long distances in search of water of any quality; poor, dilapidated school infrastructure; low school enrollment and patronage; participation in school unattractive; very low punctuality and regularity; high level absenteeism and drop-outs; children often sick and unable to attend and participate in school fully; and high repetition levels. The impact on teachers and its effect on children’s education reflect as: teachers refusing postings to rural communities; high teacher absenteeism from schools; low teacher-children contact hours; children experiencing low concentration and high attention deficits in class; very poor academic achievements by children; and children unable to pass their examinations to senior secondary level. These factors further result in children unable to access tertiary level education. They also experience very low beneficial access to the labour market and settle at the level of very low income earning occupations. Poverty is thus perpetuated in the lives of the next generation and, hence their inability to contribute financial support to enhance the well-being of their households and communities.

Figure 2, on the other hand, depicts a theory of change, showing post-borehole provision and the education factor as an intermediary variable facilitating poverty reduction in rural communities. The inputs are boreholes provided in beneficiary communities, backed by borehole sustainability measures and practices. The model depicts school-age children in rural communities consistently patronizing boreholes and actively participating in school due to time savings from searching for water. Outputs are shown as: time gains, which facilitate improved punctuality and regular school attendance; improved health of children for sustained school attendance; child absenteeism from school ceased; drop-outs ceased; and, improved teaching and learning. Outcomes are indicated as: more teachers accepting posting to schools in the rural communities; improved teacher-child contact hours; higher retention rates; effective and quality teaching emerges; improved academic achievements of children; children able to pass well national basic school examinations and transit to senior secondary and tertiary levels of education. Impacts are shown as: quality education delivery positively impacting children in rural communities as evident in very good final examination grades; and higher access to tertiary levels of the education system. Opportunities equalization show as: developing skilled labour for transitions into professions and for entering highly paid livelihood occupations. There is also professional capacity development, while competencies and specialized skills are established and practiced within national and international labour systems for high financial compensations. Through quality and high level education therefore such high earnings helps people distance themselves from poverty.

RESULTS

In most rural communities where boreholes have been provided “Basic access” is the prevalent standard (when time spent is between 5-30 minutes or travel distance is between 100 and 1,000m to access water) and conducive for fostering effective participation in school by children. Prior to the provision of boreholes rural communities were at the level of “No access” (more than 30 minutes spent searching for water) with adverse effects on the rural populations and children’s school attendance [22]. Access to potable water saves time and keeps children healthy so that they can attend school regularly.

In this study, 79.3% of survey respondents indicated borehole provision has freed girl-children in particular from the drudgery of fetching water and enabled them attend school, thus increasing school enrollment and their effective participation in school. As shown in Figure 3, 89.6% of survey respondents in this study (Strongly Agree 21.9% and 67.7% Agree) indicated that boreholes provided in or near communities enabled access for water fetching before and after school hours. The implication of access for effective school participation is obvious where boreholes are without reach, and children and teachers can easily access it for their households and still get to school on time and attend school regularly. Households, and especially children, can also fetch water after school and store for early morning use and get to school early. Consequently, there is much teacher-child contact hours in teaching and learning which does result in a high number of children graduating to higher levels of the education ladder, and possibly entering the labour force at higher levels of income earnings, and can escape poverty for the rest of their lives [23-24].

In contrast, where there is “No Access” as was depicted in Control communities, children and teachers
Figure 1. Status of Education Delivery Prior To Boreholes Provision.
Source. Author’s Elaboration.
Figure 2. Borehole provision and Education Delivery towards Poverty Reduction.
Source: Author’s Elaboration.
lost much time in fetching water, return home exhausted and participation at school is greatly compromised. For instance, results from this study indicate that 81.6% of respondents in Control communities indicated lateness to school by children and increasing children’s absenteeism from school. Also, as a result of the long hours of searching for water for their households, children’s attention during teaching time at school is weakened as they experience tiredness from the burden of searching for and carrying water home. Other children succumb to water-borne and water-related illnesses such as guinea worm, and thus become absent from school for several days during the school calendar year [13]. The performance of such children usually falls below average. Some are repeated and some drop out of school and never return. The high attrition rate of children due to lack of access to potable water eventually consigns them to low literacy levels and the lack of ability to reach tertiary education level. Such children grow into adults and most often end up in low levels of the labour force, earn low incomes and find themselves unable to break out from poverty [25-27]. Within the context of rural communities and not being able to have the benefit of higher education, many parents tend to have a low appreciation of the value of education and some would not even put their children in school or encourage them to go further than they themselves did, and as such, poverty becomes cyclical, generational and endemic in their lives [28-30].

As indicated in Figure 4, 95.8% of respondents (20.2% Strongly Agree, 75.6% Agree) in the Atebubu and Afram Plains Districts indicated boreholes provision in their communities as having improved and continuing to improve school attendance. This is a high impact poverty indicator on future poverty reduction and a critical pathway for poverty eradication ultimately. In spatial terms, improvements in the consistency of punctuality and regularity in school attendance in rural communities will eventually lead to improved progression of children to the higher levels of the education system. This will prepare and equip them to join the labour force and earn incomes that will eventually distance them from poverty [31]. As to whether borehole provision was enabling children to be regular and punctual at school, 95.2% of respondents (28.4% strongly Agree, 66.8% Agree), as indicated in Figure 5, gave affirmative indication. This is a key indicator of the potential improvement in quality education, improved literacy and poverty reduction in the long term.

In Figure 6, 70.9% of survey respondents (20.6% Strongly Agree, 50.3% Agree) indicated the availability of trained teachers in Programme communities since boreholes were provided. This promotes quality education as teacher-child contact time increases and teachers are able to do effective teaching and complete the school curricula [25].
Figure 5. Boreholes provision enabling children to be regular and punctual at school in communities. Source: Fieldwork, 2006.

Figure 6. Availability of Teachers in community with the provision of borehole. Source: Fieldwork, 2006.

The regular school attendance due to boreholes provision adds up to the teachers’ efforts to enable children learn well and be able to move to the tertiary level of education and prepare them to enter the job market and earn higher incomes to enable them break from poverty [32]. Ultimately, quality education delivery positions children in their adult life to be able to command the resources they need to extricate themselves from poverty [33]. Also, the presence of teachers in rural schools promotes enrollment and children’s continual attendance. This helps limit child absenteeism and truancy. The teacher’s presence and effective performance is also a powerful determinant of quality education delivery [34]. Therefore when an environmental factor such as lack of access to potable water is resolved it enables teachers stay in the communities. Thus, trained teachers in schools are a direct function of quality education in as much as good classrooms and availability of teaching and learning materials. This brings much hope for potential poverty reduction in the lives of children living in the Atebubu and Afram Plains Districts. It is obvious from the results of this study that but for the provision of boreholes in the two Districts, children being deprived of access to education and quality education would have been consigned to generational poverty attributable to place-of-birth disadvantage [11].

This study has revealed that in both the Atebubu and the Afram Plains Districts, time spent by school children, especially the girl child and women in fetching water, has reduced drastically. Children are now able to enroll and go to school on time. The opportunity cost also faced especially by children in households is very substantial in relation to time spent in search of and to fetch water, and as shown in Figure 7, 83.9% of respondents in this study...
an development of potable water sent - such as fatal diarrhoeal diseases. The lack of potable water in rural communities and governments ability to address them. The lack of potable water in rural communities for instance, greatly compromises both demand and supply factors in education delivery. For example, the hardships teachers and children have to endure searching for water consumes much time each day and compromises the quality of education delivery as children continually absented themselves from school. Lack of boreholes in rural communities is thus not conducive for teaching and learning as people are constantly limited by lack of water, which limits human freedoms and the attainment of their aspirations.

The goal of the Government of Ghana’s Education Strategic Plan, 2010 – 2020 affirms the need to mitigate the lower participation rate of children in basic schools and eradicate the incidence of water-borne diseases within the school and community environment and thereby rescue the basic educational system from lower performance.

The role potable water availability plays in this respect is cardinal to school enrollment and continual effective participation in school. While access to basic education has been continuously improving over the years in Ghana, there exists the prevalent problem of shortage of potable water in many rural communities. This places heavy challenges on the smooth functioning of the school environment and also compromises quality of education delivery. In the study area for instance, this situation was aggravated when the lack of potable water sent both teachers and households out for days in search of water, especially in the dry seasons spanning November to March each year. Also, lack of boreholes in rural communities constantly exposed school children to waterborne/related diseases such as fatal diarrhoeal illnesses and guinea worm infections. These diseases incapacitates children and prevented them from regular school attendance and effective participation in school. That condition further dictates their poor academic performance and inability to advance into the tertiary level of the education system and subsequently into the highly paid job market. Their potential of earning higher income in the future to break from poverty is therefore compromised at the foundations of their development. For investments in education to yield fruitful dividends for rural households and society in general, they should lead to higher levels of labour force participation and more productive occupations. Traditionally in Ghana, as a person’s education increases so does the chance of being in the higher paid levels of the labour market. With quality education, a person is able to acquire the skill-set that will be demanded by the labour market and well-paid for. Providing quality basic education therefore constitutes a critical part of the human development process which begins in early childhood. Again, a society that ignores this potential mortgages its children’s future to live out of poverty. When this potential is compromised in the early stages of human life, children grow to inherit the poverty status of their parents and consequentially poverty becomes a generational phenomenon.

From this study the evidence on improved quality education as a result of boreholes provision constitute the palpable heritage for continual poverty reduction which will definitely outlast the boreholes provided in the rural communities in the Atebudu and Afram Plains Districts. This finding from the study is strongly supported by the World Bank’s view indicating that University education must lead to poverty eradication, and that access to higher education should be interlinked with the solid economic growth and sharp declines in poverty. However, access to university education for rural children can become feasible only when quality at the foundational level – basic education, is guaranteed by mitigating the effects of place-of-birth disadvantage by

DISCUSSION

King, is of the view that the process of education is fundamental to human development from childhood and that basic human development skills children acquire early in their lives enables them patronize learning their whole lifetime. She indicates further that knowledge and skills acquisition prepares children to be employable, productive, healthy and enjoy well-being in future years. By implication, the prerequisite and conducive environmental congenialities such as making available potable water infrastructure (especially boreholes) in rural communities are absolutely necessary and not negotiable. The lack of potable water should not be a constraint to prevent children from participating in and benefitting from schooling since such environmentally deterministic or place-of-birth disadvantage can be surmounted by just providing boreholes.

In Sub-Saharan Africa, over ninety per cent of school-age children participate in school but only two-thirds complete. Thus, the extent to which countries in Africa can resolve the problems of improving education quality in rural schools largely centers on the capacity rural communities and governments ability to address them. The lack of potable water in rural communities for instance, greatly compromises both demand and supply factors in education delivery. For example, the hardships teachers and children have to endure searching for water consumes much time each day and compromises the quality of education delivery as children continually absented themselves from school. Lack of boreholes in rural communities is thus not conducive for teaching and learning as people are constantly limited by lack of water, which limits human freedoms and the attainment of their aspirations.

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providing infrastructure such as boreholes to facilitate access to potable water and time savings to enable children attend school effectively.

CONCLUSION

From this study it has been noted that the absence of boreholes adversely impacted school-age children, as they bore the daily burden of searching for and providing water for their households. This translated into lost time in schooling and millions of such children were never able to catch-up on their education [13]. Having been so denied, they consign themselves to the lower levels of the labour market and flow through life listlessly without any challenging aspirations. However one of the greatest benefits of having boreholes in rural communities (as indicated in the Conceptual framework – Figure 2), is the value of avoided days lost at school through time gains from not going in search of water. Effective basic education has the great potential for poverty reduction as beneficiaries emerge and flow into the tertiary education level and then join professional associations where they are able to compete on the labour market effectively. A poor quality basic education system compromises the entire system of human capital development and becomes a life-cycle disadvantage. The provision of boreholes, as shown by results from this study, effectively and efficiently resolves this issue permanently.

Further, this study has further revealed that quality education, in its totality and effect, produces national human capital which accrues and adds to the national wealth or asset base [36]. Governments subsequently tap into this technically enlightened and capable manpower resource and engage them to propel the national growth agenda, create employment and enable people live beyond poverty levels. All of these processes happen within geographic space in situ or as people migrate and reposition themselves to practice their skills and professions outside the locations of their birth.

The results from this study shows 91.3% of survey respondents indicated boreholes provided facilitated improvements in quality education delivery; 83.9% indicated boreholes helped to check frequent absenteeism at school; 79.0% indicated boreholes provided helped to check high level of dropouts; and 87.7% indicated boreholes provided helped to improve punctuality at school. Thus, this powerful intervention in rural communities fostered a holistic and effective education delivery at the foundational level with trends showing as 71.0% increase in school enrollment in the Afram Plains District from 1992 to 2000, and a 29.0% increase in the Atebubu District from 1998 to 2006.

Boreholes provision have also promoted effective school participation by checking children’s absenteeism from school; minimized teacher absenteeism, and stopped school hours being used for searching for water even under the permission of school authorities. The quality of basic education is assured because constraints to effective teaching have been reversed with the provision of boreholes. Children are able to move on to higher levels of education with the high potential of moving on into fields of career/professional specializations. This enables them effectively engage in the national labour force and earn incomes far beyond the poverty threshold and thus become permanently disengaged from the cyclical, generational and endemic poverty endured by their parents.

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