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A Livelihood Asset Status Tracking Method for the assessment of the effects of a development programme on agricultural productivity and poverty reduction: evidence from the Ejisu-Juaben District, Ghana

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Abstract This paper advances and discusses an innovative Livelihood Asset Status Tracking (LAST) computational method based on the sustainable livelihoods analytical framework. It then uses the method to offer a theoretically informed empirical assessment of the effects of Ghana's Growth and Poverty Reduction Strategy II (GPRS II – 2006-2009) on smallholder farmers' ability to develop sustainable livelihoods in the face of changing environmental and socio-economic conditions of production. Often, variability in climatic conditions interacts with adverse socio-economic conditions such as disadvantageous terms of trade and poor agricultural infrastructure to undermine agricultural productivity and by extension, Ghanaian smallholder farmers' livelihoods (Sagoe, 2006). In this study, developing sustainable livelihoods is defined by a quantitative assessment of the development of 5 key livelihood capital assets – financial capital, social capital, natural capital, physical capital and human capital. Among others, the LAST analysis reveals that although a few smallholder farmers were able to develop productive capital assets and to build viable and sustainable livelihoods through the activities of the GPRS II, a greater majority of smallholder farmers in the municipality have not been able to adequately develop capital assets for more productivity, hence maintaining extremely poor and vulnerable livelihoods.

Keywords: sustainable livelihoods, agriculture, poverty reduction, resilience

Introduction

The World Bank and its allied institutions, including the International Monetary Fund, have been championing the Poverty Reduction Strategy approach to

development planning and poverty reduction in developing countries since the 1990s. Indeed the Poverty Reduction Strategy approach is entrenched in the global organisation's Monetary Consensus and Rome Declaration (Driscoll, 2004), a reference point for implementing bilateral and multilateral agreements on debt relief, development assistance, and development planning. Ghana first implemented a Poverty Reduction Strategy (i.e. the Ghana Poverty Reduction Strategy I, 2003 – 2005), followed by a second programme – the Growth and Poverty Reduction Strategy II (GPRS II) – from 2006 to 2009. While similar in outlook and scope, the first programme differs from the second in a certain aspects. For instance, the former focussed on project areas that were intended to reduce poverty, while the former sought to improve on the achievements of the latter by implementing that induce growth and have the potential to create wealth (Boateng, 2011).

This paper focuses on the second programme - the GPRS II. Specifically, it advances and discusses an innovative Livelihood Asset Status Tracking (LAST) computational method based on the sustainable livelihoods analytical framework. The LAST method is used to assess the effects of Ghana's Growth and Poverty Reduction Strategy II (GPRS II – 2006-2009) on vulnerable smallholder farmers' ability to develop sustainable livelihoods in the face of changing environmental and socio-economic conditions of production. Often, variability in climatic conditions interacts with adverse socio-economic conditions such as disadvantageous terms of trade and poor agricultural infrastructure to undermine agricultural productivity and by extension, Ghanaian smallholder farmers' livelihoods (Sagoe, 2006). In this study, developing sustainable livelihoods is measured by a quantitative assessment of the development of 5 key livelihood capital assets – financial capital, social capital, natural capital, physical capital and human capital.

The agriculture sector in Ghana continues to be one of the largest contributors to Ghana's GDP, and employs a large share of the population. In fact agriculture currently accounts for about 22.7% of the GDP but absorbs 54% of the labour force (Ghana Statistical Service, 2013). This reveals the poorly developed nature of agriculture in that country, with vast majority of farmers in the poorest group and usually practising small rain-fed farming systems. These farm systems are highly vulnerable and exposed to environmental and socio-economic adversaries in conditions and relations of production, such as climate variability and adverse terms of input and output trade.

There has been a knowledge gap concerning micro-level analysis of programmes rolled out to address the situation described above. This is because whilst there have been a number of studies commissioned by the Ghanaian government to assess the implementation of the GPPRS programme nationally (see e.g. National Development Planning Commission 2009, IMF 2009, Ankomah 2005, World Bank 2007, Wolter 2008), little or no empirical studies at the district or micro level backed by rigorous theory exist. Yet still, most of those national level studies have looked at the theoretical

underpinnings and policy design of the GPRS but only a have attempted to importantly assess sustainable livelihoods development effects of the programme. This paper attempts to respond to that knowledge gap at the district level.
The paper is divided into 7 sections. Sections 1 and 2 describe the general introduction and GPRS programme. Section 3 presents the study area while section 4 discusses some pertinent aspects of the literature on sustainable agrarian livelihoods. Section 5 is dedicated to explanation of the LAST method and other methods used in the analysis. Section 6 presents the discussions and analyses, while section 7 discusses some gender considerations and concludes the paper.

The Growth and Poverty Reduction Strategy II (GPRS II 2006-2009)

The GPRS I and GPRS II outlined Ghana's medium-term development strategy under the then government of President John Agyekum Kuffor of Ghana (who was President from 2001 to 2008). The GPRS I (2003 – 2005) outlined a general programme that enabled Ghana to primarily receive substantial debt relief and other development assistance from the World Bank under the Highly Indebted Poor Countries (HIPC) mechanism. It was designed as an emergency plan to help put the economy back on track after decades of woeful structural positioning and performance of the Ghanaian economy. Thus, there was a need to reposition Ghana's macroeconomic environment in a manner that will improve the implementation of sectoral policies that promoted sustained economic growth and reduce high poverty levels in Ghana at the time (Adutwum, 2006).

The GPRS II (2006 – 2009) was designed and intended to consolidate the achievements of the GPRS I by outlining a policy framework that sought to accelerate economic growth and achieve middle income status within the shortest possible time. Policies to achieve this objective were directed at structural macroeconomic transformations to develop the private sector and increase agricultural productivity. Designed to be implemented within a decentralised framework, various district assemblies/councils were tasked to design contextual projects that meet their sustainable development needs along the lines of the national level plans. These programmes were also designed in relation to achievement of global development initiatives such as the Millennium Development Goals. The agriculture sector was envisioned to lead and accelerate the path towards private sector growth and attainment of middle income status (with a per capita income of not less than US$1000). Specific priority intervention areas included; rehabilitation of degraded land; improving access to credit and inputs for agriculture; land acquisition and property rights reforms; provision and redevelopment of irrigation infrastructure; improving access to mechanized agriculture with modernized extension services; and accelerated infrastructure for aquaculture (NDPC 2006).

There are considerable debates and uncertainties shrouding the issue of whether these objectives were or have been met. But surely the Ghanaian economy continues to be largely agrarian in terms of occupational engagement but not output. The sector lags behind the services sector (which employs fewer) in income generation, and agriculture remains dominated by traditional, smallholding, and rain-fed systems, with little optimal productivity prospects.

Study Area

The study was conducted in the Ejisu-Juaben Municipality in the Ashanti Region of Ghana. 10 predominantly farming communities were selected for fieldwork. The district stretches over an area of 637.2 km^2, lying within Latitude 1°15'N and 1°45'N

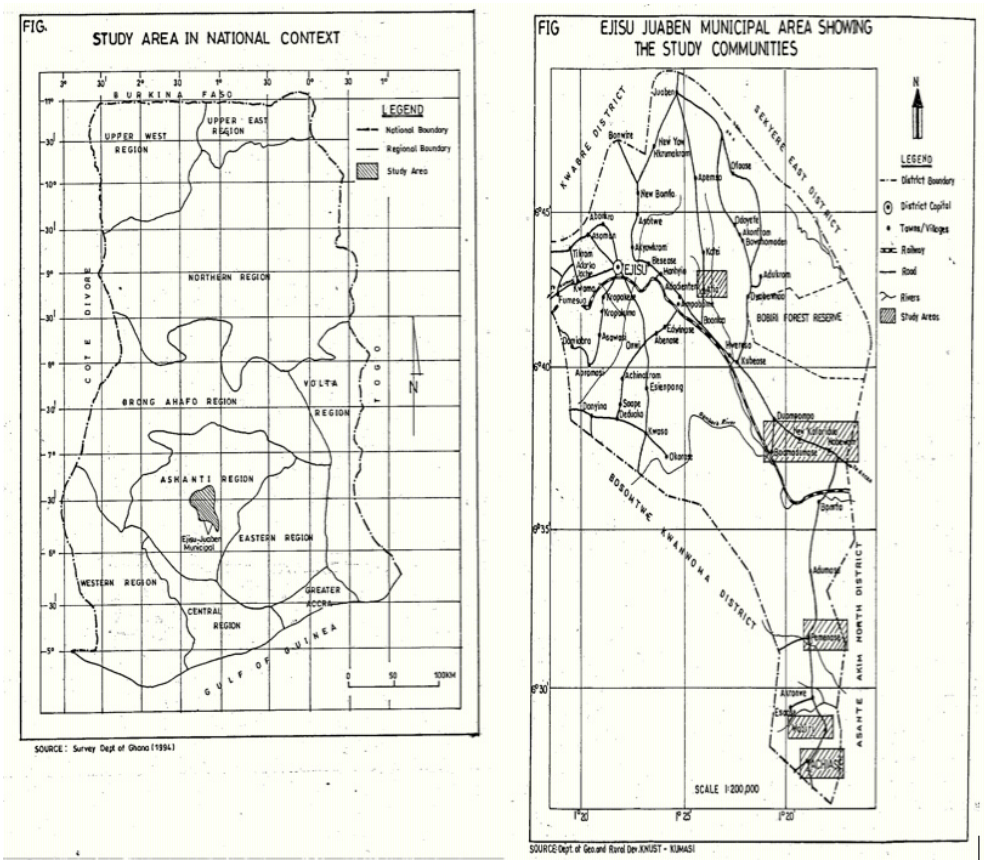

Figure 1 - Study Area in National (Ghana) and District (Ejisu-Juaben) Contexts Showing Sampled Communities.

and Longitude 6°15'W and 7°00'W (Ghanadistricts.com, 2013). Agriculture continues to be the mainstay of the district in terms of occupational engagement, absorbing about 55.6% of the total labour force (Ghanadistricts.com, 2013).

Two major types of agriculture could be identified in the district – crop farming and animal husbandry. Mixed farming is also practised by a few. Majority of the farmers (94.1%) are crop farmers, with the remaining 5.9% practising mixed farming (Ministry of Local Government and Rural Development, 2006). This is partly as a result of generally favourable weather conditions and presence of arable land. Main food crops grown include cassava, vegetables, maize, cocoyam, plantain, whilst tree/cash crops include oil palm and cocoa. Whilst some of the farm produce are consumed at home, majority are sold on the market to generate income for obtaining other needs and/or reinvestment into the farm. Figure 1 show the study area in national and district contexts respectively.

What Makes an Agricultural Livelihood Sustainable

It is important to operationalize the key concepts and terms that guide this paper's assessment of sustainable agricultural livelihoods development. The concept of livelihoods has been discussed extensively in the literature. Ellis (2000) suggests that livelihoods encompass "the activities, assets, and the access that jointly determine the living gained by an individual or household" (pp.28). Others such as Wallman (1984) envision the concept of livelihood as beyond just providing for the basic necessities of shelter and food, and transacting money. Wallman stresses that livelihood is also accessing and development of what I term "soft intangible assets, such as access to information, management of social relationships, and maintenance of personal or group significance in social relations of production, among others. Carney (1998) also provides an interesting definition;

"A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capacities and assets both now and in the future, while not undermining the natural resource base" (pp.4).

While these definitions are useful, they have been criticised on several grounds. Most importantly, they are criticised that they do not incorporate differential levels of access by various social groups to resources that structure the organisation of product ion for instance. Closely related to this is the issue of cultural practises in influencing the social relations of livelihoods development. A redefinition of the concept of livelihoods could therefore be helpful here. A livelihood comprises capabilities for individuals and households to access assets and activities that generates resources for a living, and that such a livelihood is sustainable if it adapts and cope with vulnerabilities within a socio-cultural context while maximising opportunities

for capital asset accumulation and use. In this paper's context, five key livelihood capital assets are essential to the development of sustainable livelihoods – natural capital, physical capital, human capital, financial capital, and social capital.

The importance that individuals or households attach to the attainment and accumulation of these individual capital assets may differ, so as the asset access base of individuals and households and even within individuals in same households (i.e. social group access differentials). For instance, some cultural practises do not encourage asset ownership by females while others favour older members of the society in asset access and ownership over the younger ones. It is also obvious, however, that the levels of importance in accessing and using these individual assets in the sustainable livelihood of households differ within and between various contexts. The following measures will define each of the individual assets in the analysis;

Natural capital: This is mainly related to environmental resources for agricultural livelihoods, comprising land, rainfall/water, local flora and fauna. The improvement or otherwise of this capital asset is partly a function of human management.

Financial capital: This is mainly related to monetary resources, such as cash, credit facilities and any other resource which could readily be disposed off for cash, such as insurance policies and sellable stock.

Physical capital: This is also mainly related to physical infrastructure whose access enhances access to and production of resources for a living, such as road networks, storage facilities, irrigation facilities, farm machinery, etc.

Human capital: This includes labour availability, and the skill and quality levels of the labour.

Social capital: This is the 'soft intangible asset', such as influence/position of an individual or household in the social relations of agrarian production. Social relations of producing a living also encompass ability to organise labour and support from social groups as and when needed.

Methods

This paper is mainly based on a conceptual understanding of the role and significance of the provision and development of 5 essential capital assets in promoting sustainable livelihoods within a decentralised state provision arrangement. This was substantiated through an in-depth case study exploring the nature and levels of productive capital asset development in the context of the agricultural development component of the GPRS II. A choice of case study research design was carefully made and adapted to provide a coherent framework for the collection and analysis of empirical data. The choice of case study design fits into the study's occupation with a detailed and intensive analysis of a single case with the objective of consciously enhancing the reliability, replicability, and validity of the research findings so as to

generalise to a wider population.

This research concurrently used a mixed methods research strategy, which is a combination of quantitative and qualitative research approaches within different phases of the research to collect and analyse data. Qualitative and quantitative data were collected concurrently, as in the triangulation and offset approach of the mixed research method strategy (Bryman, 2008), to analyse, converge, and validate findings from data in a complementary manner.

There is a need to select a representative sample from the population of the study area for collection of relevant data. The respondents included officials of the municipal directorate of the Ministry of Food and Agriculture and sampled smallholder farmers distributed in the municipality. Some concerned civil society groups working in the field of agricultural development in the study area were also consulted. 10 typical farming communities evenly distributed in the Ejisu-Juaben municipality were selected as study sites based on advice from local inhabitants with no influence or interest in the study's outcome. 10 farmers were randomly sampled from each of the 10 communities so that a total of 100 respondents provided the sample population. This arrangement was made not only to ensure that sample units cover the entire geographical space of the municipality but also that it ensures the conclusions drawn for such sample can have a higher degree of generalisation.

Specifically, stratified sampling, involving a statistical division of the population of interest in the various communities into strata of farmers in different suburbs in each of the 10 communities, and a further selection of units within these strata using simple random sample was used to form samples to be interviewed and for discussions from each stratum. The use of stratified sampling complemented with random sampling implies that each farming household has an equal probability of selection in the sample. Fieldwork was conducted between January and March 2011.

An adapted multidimensional Livelihood Asset Status Tracking (LAST) method was developed to measure the changes in five capital asset groups as a proxy for impact assessment of the GPRS II (see appendix 1). In this method, indicators of five capital assets (social, financial, human, physical, and natural assets) needed by local farmers to develop sustainable livelihoods were measured using a custom-made and contextually specific LAST sheet (see appendix 2). The LAST sheet is developed from locally generated interpretations of criteria and indicators around the 5 capital assets and used to assess the success or otherwise, on beneficiaries' livelihoods, of the GPRS between specific time periods (i.e. pre and post- project intervention). For each capital a different range of word pictures, scenarios, or indicators are determined by the relevant stakeholders to represent the best and worst scenarios in their views. Word pictures are generated in a participatory manner through focus group discussions with the community in question, and they are respondents' responses describing household circumstances (in relation to specific capital assets) pre and post

Table 1 - Dimensions, Criteria, and Indicators for the LAST Assessment.

Capital Assets	Dimension	Criteria	Iindicators
Natural Capital	*Productivity*	Land area and productivity Farm output production	Area of improved/rehabilitated farmland Average ton of farm produce per hectare yearly
	Equity	Access of farmers to farmlands	
	Sustainability	Farmland quality	Abundance of desirable farm produce from farm
Financial Capital	*Productivity*	Household income Farm produce effectively marketed	Household income levels, sources, stability, and sufficiency Amount of farm output sold/marketed
	Equity	Equitable access to cash credit and other farm insurance	Percentage of farmers receiving credit, ability of women to obtain credit, Insurance products
	Sustainability	Economic stability of income generating activities	Availability of information on weather forecast, Institutional support (eg. subsidies)
Human Capital	*Productivity*	State of social services	Availability of quality socio-economic amenities, Accessibility of extension officers
	Equity	Membership of local unions for social capital development	Percentage of farmers who have membership in effective co-operatives
	Sustainability	Level of environmental awareness (conservation measures)	Rate of adoption of environmentally sound farming practises by households
Physical Capital	*Productivity*	Farm produce storage capacities Access to modern technologies such as irrigation facilities	Quality of storage systems used Number and functionality of irrigation systems
	Equity	Coverage of access roads and other marketing facilities in local communities	All weather road coverage in communities, Time and cost to reach nearest market
	Sustainability	Training of workers (capacity building)	Humber of trained workers for doing routine maintenance of physical facilities (eg.irrigation
Social Capital	*Productivity*	Role of local committees on the organisation and promotion of farmers' interests	Percentage of farmers who participate in farmers' and communal mobilisation activities

programme intervention period. These "word pictures" and other verbal descriptions of the asset status of households were then combined in a matrix to assist in scoring a balance of aspects for each type of capital asset i.e. relating to production, equity, sustainability. Table 1 summarises the development of criteria and indicators around the capital assets.

This process develops a local worldview, and score intervals ranging from 0% (worse case) to 100% (best case) are assigned to responses based on the researcher's observation and interviewees' responses to semi-structured interviews on a locally meaningful scale. The purpose of scoring the "word pictures" is to convert qualitative data into measureable quantitative data. In converting qualitative data into measureable quantitative scores, the five (5) columns of probable responses as measures of indicators for each of the five capital assets in the LAST sheet were assigned score intervals of 0 – 20, 20 – 40, 40 – 60, 60 – 80, and 80 – 100. For each question, the interviewee simultaneously gave one response to indicate their circumstances/experience *prior* to the project, and one response to indicate their circumstances/experience *after* the project. At present no official statistical profile such as income poverty status of farmers in the municipality exists to possibly crosscheck some of the respondents' answers. However, responses were compared with objective observations and other information obtained from further probing where necessary, which sought to make the index more valid and reliable. Also, some results were compared with official general statistical data on issues such as income levels, land sizes, among others. With each response corresponding to a particular score interval, a specific absolute score will then be obtained by determining the middle value of the interval score corresponding to that response (see LAST sheet in *appendix 2*). The avoidance of absolute values by scaling from 0 per cent worst to 100 per cent best is an already established technique in, for example, the UNDP Human Development Index (UNDP, 1990). Another reason is to avoid the occurrence of perfect index score of 1.00, which may send a signal (of false confidence) that the GPRS II was a "magic bullet" in hammering out poverty entirely. This is also to make a case along an arguable issue that human intervention, no matter how expertly designed and executed, may not be perfectly able to meet all the increasingly unlimited and dynamic wants and needs of humans.

Obtained data from this process is used to produce a LAST matrix. An adapted LAST index was then used to measure the overall impact of the GPRS II. In arriving at this LAST index, I first determine the product of the score for each response in the LAST sheet (see *appendices 1and 2*) to the total number of questions (indicators) in the LAST matrix, assuming that each response scored 100% to produce a "Perfect Summation". This figure will then be used as a *predetermined baseline denominator* to determine a LAST index for each household. In this case, a Perfect Score Index of 1.00 will be obtained.

To accurately determine the index for each household, the sum of total percentile scores from responses in the LAST sheet for each household will be divided by the predetermined baseline denominator. This can be represented as follows:

$$\sum \frac{Y1+Y2+\cdots n}{M} \qquad (1)$$

From equation 1, Y is the percentile score of responses for each of the elements (indicators) comprising the capital asset of households up to the n^{th} last response score for a capital asset. The summation of response scores divided by the "Perfect Summation" – M – provides the LAST index for each of the households. The process can then be repeated to produce a LAST index separately for each of the capital assets for each household prior to and before the GPRS II programme. The specific LAST formula for each of the capital assets is summarised in *appendix 1*. It must be noted, however, that this method does not include measurement of statistical significance, and validity of the results must therefore be seen in light of the objective observations and other qualitative findings that the calculation seeks to compliment.

Therefore, using LAST index data from the analysis, it is possible to categorize the respondent households into the following four groups:

Category 1: *Extreme poor* = LAST index score of between 0.01 and 0.30

Category 2: *Vulnerable households* = LAST index score of between 0.31 and 0.59

Category 3: *Viable households* = LAST index score of between 0.60 and 0.79

Category 4: *Sustainable livelihoods* = LAST index score of between 0.80 and 1.00

At Category 1, it means that a LAST response score of between 0 – 20 and 20 – 40 on the LAST Sheet may have predominantly applied to the respondent's (household's) situation. At Category 2, the predominant LAST response applying to that household is 40 – 60. Similarly, Category 3 reflect the circumstances of household whose predominant LAST response score was between 60 – 80 while Category 4 will capture the circumstances of a household whose LAST response score mainly fell in the range of 80 – 100. However, a fluctuating mix of low value and high value scores on the LAST sheet may produce a LAST index falling into any of the four categories stated above. In such circumstances, it means the rate of development of all 5 capital assets is (largely) polarised and unequal.

In the next step I examine the movement (transition) between these four categories from 2006 to 2009. The aim is to estimate a transition matrix. This helps to determine what effect, if any, the GPRS II has had on its beneficiaries over its 4 year implementation period.

Based on calculations obtained for the LAST index of the households, I also categorize smallholder farmers into unsuccessful, struggling, successful and most successful groups (Table 2) based on the direction of the transition ("economic mobility") of livelihood categories from PRIOR and AFTER the GPRS II period (i.e. before 2006 and after 2006-2009) between extreme poor, vulnerable households, viable

Table 2 - Categorisation of Household Groups Based on the Direction of the Transition between Poverty Categories PRIOR and AFTER the GPRS II Period.

HOUSEHOLDS GROUP	DIRECTION OF THE TRANSITION
Unsuccessful	From viable/sustainable To Vulnerable From vulnerable/viable To extreme poor Or Remained in extreme poverty
Struggling	Remained in vulnerable
Successful	From extreme poverty To vulnerable/viable Or From vulnerable To viable
Most successful	From extreme/vulnerable/viable To sustainable Or Remained in viable/sustainable

households and sustainable livelihoods. A summary of the criteria for categorisation based on the 4 categories described in Table 2.

Discussion and Results

It is interesting to analyse the status of farmers on each of the individual capital assets development, from which an aggregated categorisation based on a combined LAST index score of all capital assets for each household will be made to obtain a general idea of vulnerability or resilience level of famers' livelihoods in the study area.

Natural Capital

As farming is a natural resource-based activity, availability and access to natural capital for farmers is important for helping build better livelihoods, resilience and to reduce vulnerability. Through the participatory processes of identifying locally meaningful indicators (see *appendix 1*) for the capital asset assessments, natural capital in this context consisted of land size and corresponding production levels, water availability and other biological resources such as biodiversity. The productivity of these resources may be degraded or improved by human management both on the part of farmers themselves and/or the local MOFA directorate and other concerned

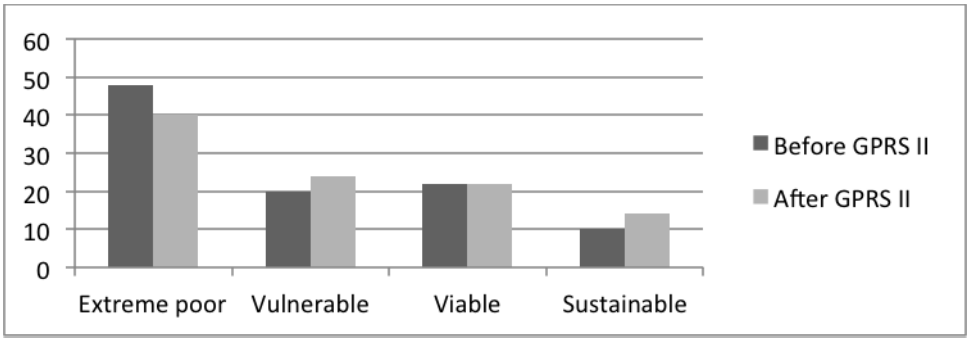

Figure 2 - Natural Capital Development Status of Interviewed Farmers Source: Fieldwork returns, 2011.

stakeholders**.** Figure 2 shows the percentage categorisation of sampled farmers into extreme poor, vulnerable, viable, and sustainable before and after GPRS II inception for natural capital development.

From figure 2, while about 48% of farmers were extremely poor in natural capital development before the GPRS II, the figure reduced to 40% after GPRS II inception. Also, about 20% of farmers were in the vulnerable category before GPRS II whereas the aftermath of the GPRS II saw an increase in the figure to 24%. For the viable category, proportion of farmers remained the same at 22% before and after the inception of the GPRS II. Lastly, only 10% of farmers were considered to have sustainable natural capital development before the GPRS II, which increased to about 14% after the inception of the GPRS II.

It is observable from these results that the majority of farmers have very low natural capital development status given the fact that many farmers still are extremely poor in their natural capital status. However, a few farmers were able to transit from extreme poor to vulnerable and from vulnerable to sustainable. Further investigations revealed that the few farmers who constituted this category were actually those farmers who had inherited larger tracts of highly arable land in the recent past, so inflated their score on the LAST sheet for farm plot sizers and quality of plot for farming. This is because in the municipality's context, access to, ownership of, and size of arable land is a key element of achieving sustainable livelihoods as there existed a positive correlation between land ownership, land size, and farmers' incomes. Table 3 summarises farmers' land sizes, corresponding annual income levels, and number of farmers in each of the land size-income level cross tabulations.

Table 3 shows the relationship between farmers' land sizes and their corresponding annual income levels during the GPRS II period. It could be seen that the few number of farmers who had relatively higher annual incomes of GH¢800 or more had farm sizes ranging from 10 to 20 hectares or larger whereas farmers with relatively lower

Table 3 - Annual Income Levels

Farmers' Land Size	Number of Farmers in Annual Income Groups						
	GH¢90 and below	Between GH¢91 and GH¢200	Between GH¢201 and GH¢500	Between GH¢501 and GH¢800	Between GH¢801 and GH¢1000	Between GH¢1001 and GH¢1500	More than GH¢1501
Less than 1.2 hectares	3	12	-	-	-	-	-
Between 1.2 and 5 hectares	-	9	21	4	-	-	-
Between 5 and 10 hectares	-	-	7	17	3	-	-
Between 10 and 20	-	-	-	-	8	3	2
Over 20 hectares	-	-	-	-	-	4	7

Source: Fieldwork returns (2011)

incomes had smaller sizes of farmland, ranging from 1.2 to 5 hectares. This also implies that, among others, those farmers with larger farmlands are able to grow more produce for more income provided there is availability of labour and other necessary farming inputs. Interestingly, interviews with the farmers also revealed that majority of the farmers with larger farmlands actually owned the land outright through inheritance and/or purchase, and were in a better position to invest time and other resources in maintaining the farmlands' quality over longer periods.

Another explanatory factor which suggests there existed a positive correlation between land ownership, land size, and farmers' incomes was the issue of land tenure and costs. A socio-economic survey in 2006 revealed, for instance, that about 81.2% of farmers in the municipality cultivated less than 10 acres of land, and this reflects the existing low output levels as well as impedes efforts to commercialise production (Ministry of Local Government and Rural Development, 2006). Costs of land have been 'sky-rocketing' due mainly to land-use interests from developers and their willingness to pay more. Added to this, poor farmers who are able to acquire land through tenure arrangements only acquire very small units, often less than 1.2 hectares. Other resources such as irrigated water for farming is poorly developed to the extent that the only irrigation facility in the entire municipality is that constructed by a Chinese farming company for a rice farming project before they left in 2006.

The effects of these conditions is that many poor farmers often loose in the power play for ownership and use of such valuable assets as land for expanding their farming activities. Additionally, some farmers, especially those who inherited land, also lay claim to their land customarily without any formal document to claim legal ownership. There had been reported instances where some developers had some farmers ejected from their farmlands because such land had been sold to them with the proper documentations either by an elder of the village or a landowner who resides in urban centres.

Financial Capital

Based on the participatory processes of identifying locally meaningful indicators for the assessment, financial capital consists of stocks of money or other savings in liquid form such as insurance policies, changing income levels over time, credit access, and debt levels. Using the LAST index, it was possible to categorise sampled farmers based on their financial capital asset development status.

From figure 3, about 29% of farmers were extremely poor in financial capital development before the GPRS II, and increased slightly to 31% after GPRS II inception. This implied improvement stems mainly from some relative increases in productivity and income levels especially by those farmers who were able to access extension services and seeds of new improved crop varieties. Also, about 43% of

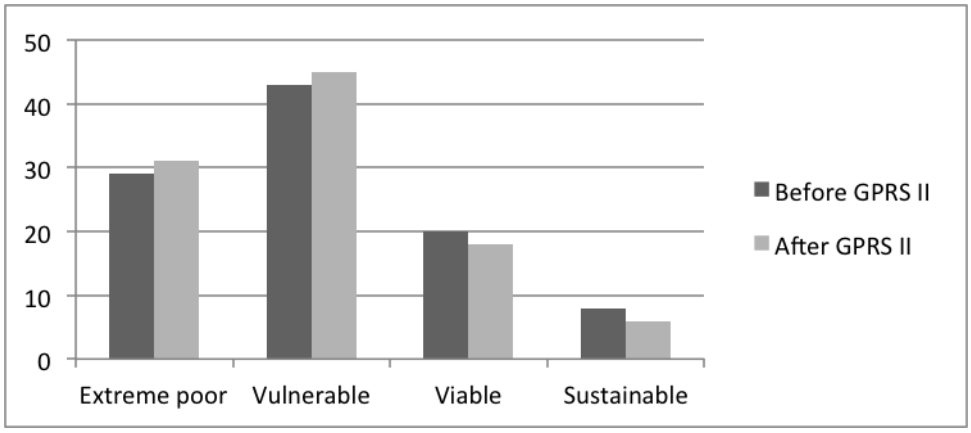

Figure 3 - Financial Capital Development Status of Interviewed Farmers. *Source: Fieldwork returns, 2011*

farmers were in the vulnerable category before GPRS II whereas the aftermath of the GPRS II saw an increase in the figure to 45%. This increase could be accounted for by the transition of farmers who were hitherto in the extreme poor category before the GPRS II into the vulnerable category after the GPRS II. For the viable category, proportion of farmers was about 20% before GPRS II while it reduced to about 18% after the inception of the GPRS II. Lastly, only 8% of farmers were considered to have sustainable financial capital development before the GPRS II, which decreased to about 6% after the inception of the GPRS II. It is seen that financial capital development status of farmers in the relatively well-to-do viable and sustainable categories fell in proportion after the GPRS II. This could be attributed to the fact that many farmers in those categories complained of increasing costs of inputs (such as labour) and production, higher dependency from having to cater for large families, and falling prices their bumper agricultural produce are fetching on the market.

The latter issue is even more interesting as general prices for particular crops reduce drastically on the market whenever there is abundance of that product on the market. However, many farmers have deviced mechanisms such as only harvesting strategic quantities of certain crops such as oil palm such that there are no abundance on the market to be forced to sell them at very low prices. Therefore, when asked to comment on the stability and sufficiency of their incomes in terms of adequately meeting household and farming expenditures, farmers in those categories complained that their current income from farming is just enough to meet very basic needs. In smallholder systems highly susceptible to vulnerabilities such as low prices and low productivity, financial capital in the form of cash is severely constrained; cash received is soon allocated and spent (Mortimore 1998), with very little or none left to re-invest

into the farming venture. A comparison of incomes of various sectors of the Ejisu-Juaben economy reveal, for instance, that although as many as 68.2% of the population are employed in the agricultural sector, they received only 30.1% of incomes in the municipality while industry and services sector receive 32.6% and 37.3% respectively (Ministry of Local Government and Rural Development, 2006).

The generally low income status of farmers in the municipality also reinforces the dire situation where farmers are unable to obtain adequate credit and capital to improve their farming operations and meet their pressing needs and wants sufficiently. A survey by the Ministry of Local Government and Rural Development (2006), for instance, concludes that most (about 88%) farmers in the Ejisu-Juaben municipality finance their farming activities through personal savings whiles 3% obtain moneys from money lenders. The remaining 9% obtain finances through family members. The situation gives an idea of the number of farmers having access to credit. From that survey, it was also realized that majority (87.2%) of the farmers do not have access to credit.

Physical Capital

Physical capital is essentially creation or outcome of economic production. From the participatory processes of indicator identification, physical capital included infrastructure such as roads, irrigation facilities, electricity, equipments such as storage facilities, and housing.

From figure 4, about 41% of farmers were extremely poor in physical capital development before the GPRS II, reducing considerably to 31% after GPRS II inception. Also, about 46% of farmers were in the vulnerable category before GPRS II whereas the aftermath of the GPRS II saw another reduction in the figure to 40%. For the viable category, proportion of farmers was only 8% before GPRS II while it increased impressively to about 15% after the inception of the GPRS II. Lastly, only

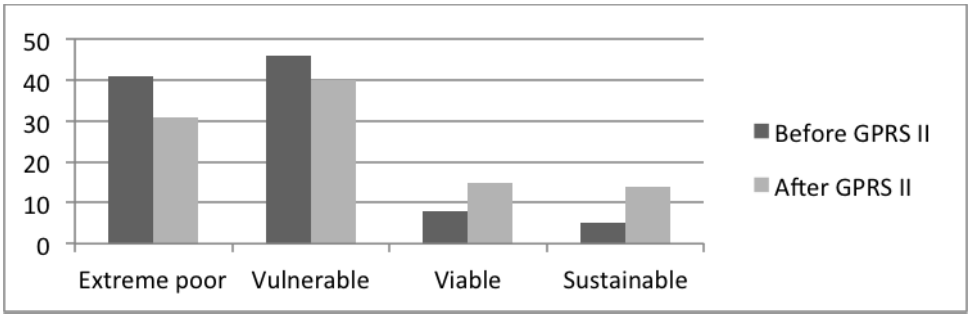

Figure 4 - Physical Capital Development Status of Interviewed Farmers. *Source: Fieldwork returns, 2011*

5% of farmers were considered to have sustainable physical capital development before the GPRS II, which also increased impressively to about 14% after the inception of the GPRS II.

From hindsight, it is reasonable to suggest a good, yet unsatisfactory, impact of the GPRS II interventions on developing farmers' physical capital assets to some extent. This improvement has largely been due to the free distribution of new varieties of certain crops to farmers, and provision of technical advisory services to some farmers or building appropriate storehouses for agricultural produce using readily available and inexpensive technology.

Another factor for relatively higher physical capital development levels was that many farmers now lived in cemented/bricked houses with appropriate ventilation and/or two or more rooms. However, regarding provision and access to other physical farming inputs such as motorised water pumping machines for year-round farming, and all-weather road coverage linking farming communities to market sources, the majority of farmers recorded very low scores on the LAST sheet. Many farmers complained of poor road networks, especially when it rains, to convey their products to market centres. At some instances, poor nature of roads is even deterring bulk buyers from bringing their own vehicles to cart agricultural produce from the farms, thereby saving farmers transportation costs.

This suggests that efforts into providing physical facilities such as all-weather motorable road networks and water pumps could greatly enhance farmers' physical capital development and help reduce some of the vulnerabilities farmers' in the municipality are presently facing.

Photo 1 - Third class (graded earth) road linking one of the Communities to the main highway. Source: Author (2011)

Human Capital

Human capital is mainly constituted by the quantity and quality of labour available. In this assessment, human capital constitutes farmers' information, knowledge, and skills level acquired through accessibility to well-trained extension agents. It is also determined by household size, but also by education, skills, and health of both the farmers and those they work with, which could be household members or hired labour. From this context and set of indicators, it could be seen that a measure of human capital (development) is invariably a measure of physical well-being and capacity to lobby for one's priorities (Rouse and Ali, 2000). For instance, on days in farming seasons when the poor smallholder cannot work on his/her farm or sell his/her produce on the open market due to ill health, s(he) is doubly penalised since s(he) have to forego the opportunity to generate income and may well incur healthcare costs.

From figure 5, while about 39% of farmers were extremely poor in human capital development before the GPRS II, the figure decreased very slightly to 38% after GPRS II inception. Also, about 52% of farmers were in the vulnerable category before GPRS II whereas the aftermath of the GPRS II saw decrease in the figure to 43%. For the viable category, proportion of farmers was about 9% before GPRS II while it increased to about 18% after the inception of the GPRS II. Lastly and worryingly, none of the interviewed farmers had developed any human capital prior to or after the inception of the GPRS II.

Low human capital development levels could be attributed to working relationships between the local MOFA directorate and farmers on the ground in information exchange, skills and knowledge dissemination. For instance, given limited

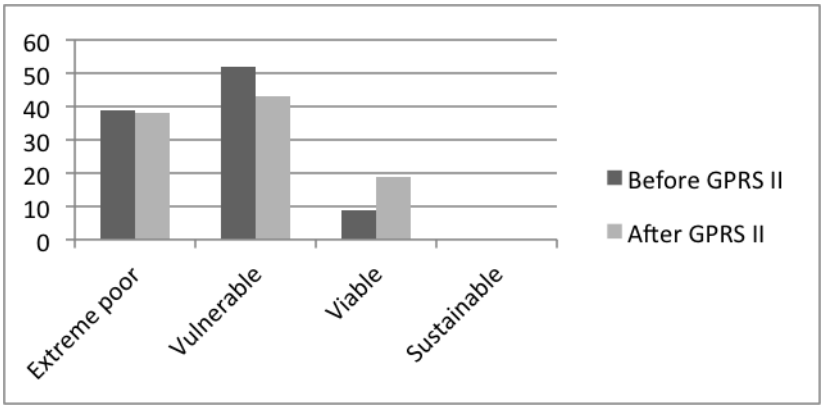

Figure 5 - Human Capital Development Status of Interviewed Farmers. Source: Fieldwork returns, 2011-03-14

resources for extension, the local MOFA directorate has adopted a strategy predicated on training a cadre of key farmers in each village to diffuse agricultural techniques. Under these conditions, it is natural to select the most enthusiastic and willing trainees, as these figures are more likely to be effective extension agents. In doing so, however, MOFA not only escapes directly training the more hesitant farmers, but also misses the opportunity to learn about the constraints facing those farmers, and as a result many farmers are unable to effectively develop their human capital further. As the director of the local MOFA office commented to me, "we tell our staff to look to the potential, to focus on, engage with, and learn from, successful participants and successful examples of their work, rather than dwelling on difficult or intractable issues." Whilst this might generally appear to be a good operational strategy, it becomes problematic if it results in field staffs systematically escaping healthy confrontation with challenges to their model. The latter is actually the case in the municipality. This over-exposure to a self-selected group of willing participants creates an artificial and often false sense of achievement. These findings also confirms a Ministry of Local Government and Rural Development (2006) report which found that only about 26.8% of farmers in the Ejisu-Juaben municipality use the services of Agricultural Extension Agents while the majority 73.2% did not. That survey however attributed this situation on the inadequacy of extension officers (the frontline officers) who assist farmers to address emerging problems and introduce them to new techniques.

Social Capital

This is the 'soft intangible asset', such as influence/position of an individual or household in the social relations of agrarian production. Social relations of producing

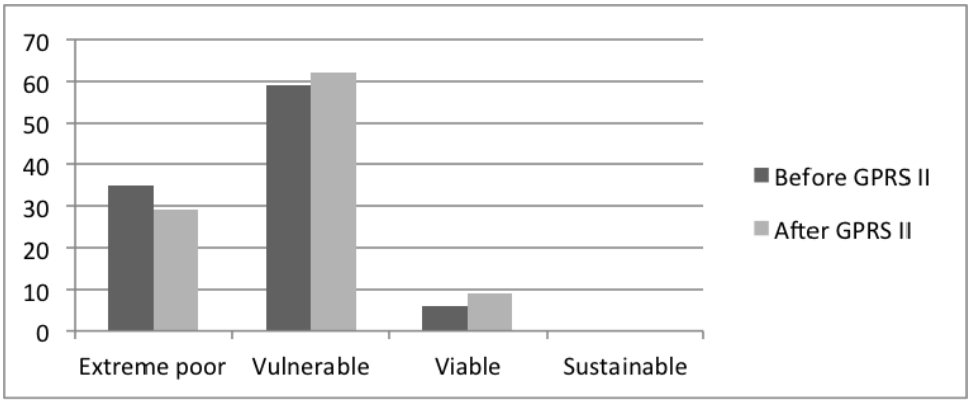

Figure 6 - Social Capital Development Status of Interviewed Farmers. Source: *Fieldwork returns, 2011*

a living also encompass ability to organise labour and support from social groups (e.g. friends and kinsmen, farmers' associations) and state bureaucrats (e.g. district agriculture departments) as and when needed.

From figure 6, it is evident that about 35% of farmers were extremely poor in social capital development before the GPRS II, with the figure decreasing to about 29% after GPRS II inception. Also, a staggering 59% of farmers were in the vulnerable category before GPRS II whereas the aftermath of the GPRS II saw a further increase in the figure to about 62%. For the viable category, proportion of farmers was only about 6% before GPRS II while it increased marginally to about 9% after the inception of the GPRS II. Unfortunately, none of the interviewed farmers had developed any social capital prior to or after the inception of the GPRS II.

The extremely low rate of social capital development could be accounted for by cultural factors. As discussed in the theoritical framework, intervening factors such as culture (way of life) also influences the sucess or failure of poverty reduction interventions. Two interesting observations pertaining to ways of life of farmers in the municipality were made; first that community members were at times scpetical to new ideas emannating from 'outsiders'; in other words, a culture of high resistance to change. This has proved problematic in the past in ensuring that through some interventions of the GPRS II, farmers are introduced to new varieties of seeds or new methods of cultivation. For instance, there was a situation where some farmers recounted that they stopped cultivating a new high-yielding, disease resistant, and early maturing variety they were introduced to and returned to their indigenous lower yielding variety because the former produced fruit which was too hard and starchy for their preference. Farmers also recounted that it was difficult to market them.

Second, the culture of strong community ties based on shared norms and networks of organisation in information and knowledge sharing to develop social capital was virtually non-existent in the communities. Especially when it came to forming groups to offer a position in accessing financial credits or group contributions to purchase farming inputs, the farmers were reluctant and did not have capacities to organise themselves into groups. A contributory factor is also the gradual decay of the communal life and extended family system of mutual help and rise of individualism as a result of distrust and/or avoidance of clash of conflicting preferences. According to one respondent, for example, farmers had been grouped into associations by a local NGO in the past but eventually dissolved because not all farmers in the groups were willing to contribute fairly in group loan repayments or sharing some benefits or working on group projects. This fear about unequal distribution of work and benefits was expressed by several farmers, acknowledging that within the past associations, people had different attitudes towards work. Simply, some were free-riders.

As a means to bring farmers together, a system of block farming involving developing very large acreages of land and distributing to farmers have been planned. However, since the municipality is located in a densely forested region of Ghana, staff

complained of difficulty in acquiring these larger tracts of land solely for farming purposes.

When farmers are able to form credit-worthy groups and organise themselves effectively, they could for instance afford to acquire inputs such as motorised water pumps to supply water to ensure all-year farming of crops of crops with fetch premium prices. However, the only farmers' group encountered in the municipality was a pig farmers' association and a rice farmers' association (which included many smallholders) at Nobewam. Even the rice farmers' association was formed principally to negotiate for prices of paddy rice with a local mill they supply rice to, and to distribute suitably irrigated fields for paddy cultivation among smallholders on a rotational hiring scheme.

In development circles, those communities with a rich stock of social networks and civic associations have been shown to be in a stronger position to confront poverty and vulnerability, resolve disputes, share beneficial information, provide informal insurance mechanisms to each other, and have important impacts on the success of development interventions (Galasso and Ravallion, 2000). However, social capital, and for that matter societal efforts, also have costs and can be a liability. Not all social networks and associations are for just courses. At times, social networks and personal connections, even at the institutional level, can be used to unfairly discriminate, distort, and corrupt (Woolcock, 2002) in terms of only targeting interventions at those beneficiaries who have direct links with the authorities. This highlights the importance of institutional leveraging, mainly by the local MOFA directorate, to eschew such negative tendencies and support positive social capital development based on ethical working relationships and enhance cordial state bureaucrat-society relations.

Evans (1996) makes a case that when sustainable improvements in the welfare of ordinary citizens is the aim, social capital development is a crucial ingredient. In fact without social capital, physical and human capitals are easily squandered, partly because informed social capital help share knowledge, skills, and other resources on comparative advantage basis and to make the local MOFA directorate accountable. Social capital is not a panacea, and more of it is not necessarily better. But the broader message is that how farmers are able to associate with others, and on what terms, has enormous implications for their well-being (Woolcock, 2002), thus the need for stronger social capital to mutually engage and to demand accountable service delivery for sustainable development. It is therefore important that positive energies in social capital be complemented and embedded by the activities of the local MOFA directorate.

Aggregated Assessment

An aggregated LAST index calculation for each farming household interviewed was also based on combined responses to questions and indicators of all five sets of

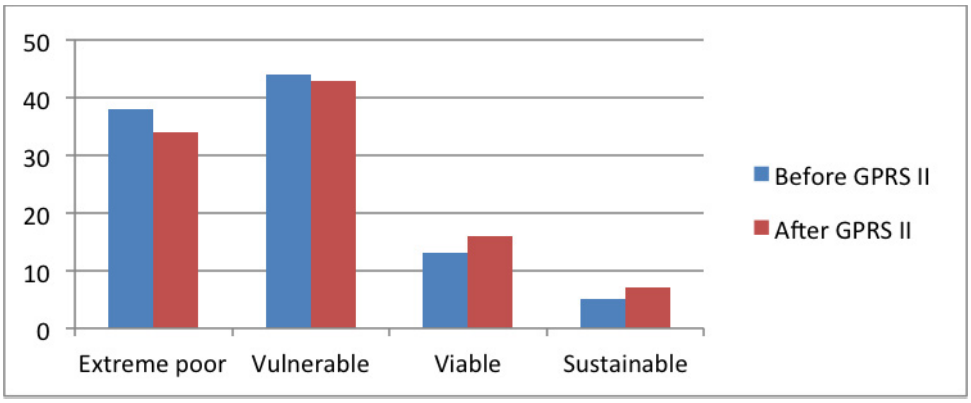

Figure 7 - Aggregated Livelihood Capital Assets Development Status of Local Farmers
Source: Fieldwork returns, 2011

livelihood capital assets. This was done to provide a general categorisation of farming households based on multidimensional factors from which to systematically conclude the vulnerability or resilient livelihoods or stages in-between of farmers' livelihoods.

By using the LAST index methodology, results will show a percentage categorisation of farmers' livelihoods based on multi-dimensional factors of natural, physical, financial, human, and social capital development is summarised in Figure 7

Figure 7 shows the livelihood resilience status of beneficiary farmers of the GPRS before and after inception according to farmers' responses and critical observations. Accordingly, while there were 38% of farming households being extreme poor before the GPRS II and prior to 2006, there was a slight reduction to 34% of farming households in the municipality being extreme poor after the GPRS II in 2009. This means the livelihoods of farmers in the extreme poor category do not have the capacity to be very productive in a changing vulnerability context. The percentage of vulnerable households also did decline very marginally from 44% before the GPRS II to 43% after the GPRS II. The majority of households in the sample are still vulnerable. Here again, it could be inferred that farming households belonging to those categories were barely able to access many of the interventions of the local MOFA directorate.

There are also marginal increases of viable and sustainable farming households from 13% to 16% and 5% to 7% respectively before and after the GPRS II. This implies that the GPRS II has only marginally contributed to the reduction of poverty and development of resilient livelihoods over the initiation period to date (March 17 2011). This confirms findings and analysis in previous sections of the research as to participatory, management, and funding issues why the GPRS II has not duly benefited the greater majority of farmers in the municipality, and thus been very slow in progress made in its poverty reduction processes.

The Ghanaian Ministry of Local Government and Rural Development (2006), using the official upper poverty line of GH¢90.00 as the unit of measurement reports that about 37% of farmers in the Ejisu-Juaben municipality are extremely poor, with annual incomes below GH¢90.00 per annum. Considering inflation rates of about 10% and generally higher costs of living, even those farmers who earn up to GH¢500.00 per annum may even struggle to make ends meet. The relatively high proportion of farmers in the *extreme poor* and *vulnerable* categories affirms the findings of the Ghana Living Standards Survey 4 and Participatory Poverty Assessments Survey which identified the extreme poor or vulnerable and the excluded in Ghana to mainly include rural agricultural producers, particularly food crop farmers (Ghana Statistical Service, 2000). In more recent terms, an IFAD study revealed that in Ghana poverty is deepest among food crop farmers, who are mainly traditional small-scale producers (IFAD, 2010). This is despite the fact that national poverty rates have been cut almost in half, from approximately 51.7% in 1991-1992 to 28.5% in 2005-2006, and poverty decreased by about 17 percentage points in urban areas and by 24 points in rural areas (IFAD, 2010). Thus, it is confirmable that deliberate government interventions such as the GPRS have also had positive impacts in poverty reduction among farmers, at least from the marginal decreases in proportion of *extremely poor* or *vulnerable* groups and marginal increases in proportion of *viable* or *sustainable* livelihood groups as depicted by Figure 7.

But for the few beneficiaries of interventions who moved between categories, majority of farmers, especially those in the *extreme poor* and *vulnerable* categories before the inception of the GPRS II interventions remained there. Within this context, it is useful to examine the movement (transition) between the four categories outlined in Figure 7 from 2006 to 2009 to determine the extent which, if any, the GPRS II has helped farming households to transit to better and resilient livelihoods. To this end, farming households have been identified as being 'unsuccessful', 'struggling', 'successful' and 'most successful' households based on their directions of transition on the LAST aggregated multidimensional indicators (see *appendix 2*) before and after the GPRS II.

Table 4 shows the further categorisation of identified households groups and how. According to the above categorisation of households shown in Table 4, there are about 34% of farming households who have been unsuccessful in developing resilient livelihoods and improving their standards of living either because they transited from viable/sustainable livelihoods to vulnerable livelihoods or being extremely poor or remained extremely poor before and after the GPRS II. The table also shows that about 43% of farming households continued struggling to achieve resilient livelihoods and better living standards, and thus remained being vulnerable.

However, there are about 5% and 18% of farming households who have been relatively 'successful' and 'most successful' in their resilient livelihoods development

Table 4 - Estimation of Transition Matrix

Farming Household Group	Direction of the Transition	Results	
		Number	Valid %
Unsuccessful	From viable/sustainable to vulnerable or from vulnerable/viable to extreme poor or remained in extreme poverty	34	34%
Struggling	Remained in vulnerable	43	43%
Successful	From extreme poverty to vulnerable/viable or from vulnerable to viable	5	5%
Most successful	From extreme/vulnerable/viable to sustainable or remained in viable/ sustainable	18	18%
Total		100	100%

Source: Fieldwork returns, 2011

attempts respectively. It should however be noted that among the 18% of 'most successful' farming households, only 1 (one) each transited from the extreme poverty and vulnerable household categories to the sustainable livelihood category. The vast remainder transited from viable livelihoods to sustainable livelihoods. This could be because some hitherto viable households already had some significant amounts of productive assets which the GPRS II helped enhance for ensuring better livelihoods. As much as it is commendable that 5% and 18% of farming households in the municipality were 'successful' and 'most successful' respectively, the larger percentage of farming households still 'unsuccessful' (34%) and 'struggling' (43%) to become 'successful' or 'most successful' makes it increasingly difficult to argue, on the whole, that the GPRS II have been implemented successfully in manners to enable hitherto poor smallholder farmers in the municipality to develop viable, sustainable and/or resilient livelihoods *en masse*.

Generally, this evaluation however seems to contrast the Ghana National Development Planning Commission's (NDPC) reports of highly successful impacts of the policies and programmes under the improving agricultural productivity sub-sector of the GPRS II on agricultural output, household incomes and food security (NDPC, 2009). For instance, it states that overall agricultural output in 2008 recorded an increase in growth rate from 2.5% in 2007 to 5.1% in 2008, whereas total domestic production of major staple foods like rice, maize, and cassava recorded significant increases of 13.4%. It is important to note that while the NDPC's analysis are based on very broad macro-level evaluations involving a mix of cases where the relatively

Table 5 - Detailed Gender Break-down of Interviewed Farmers.

FARMING HOUSEHOLD HEAD	NUMBER
De facto female-headed households	3
De jure female-headed households	24
Male-headed households	73

Source: Fieldwork returns, 2011

high performance (production levels) of certain traditionally 'bread basket' districts overshadow the realities of poor performing ones, the validity of the findings of this independent study lies in its empiricist and detailed micro-level approach to data collection, analysis, and interpretation.

With this knowledge in mind, it is also interesting to discuss gender-based comparisons in the contribution of the GPRS II to resilient livelihoods, and by extension incomes. Table 5 shows a gender breakdown of interviewed farming household heads for this study. Since random probability sampling was used, the researcher had very little or no control over proportion of gender representation of respondents, hence the situation where males highly outnumber females. For majority of women, it was found that they engaged in other economic ventures aside farming, such as trading and/or other female dominated vocations such as dressmaking, hairdressing, among others.

Table 5 shows that the sample included 3 *de facto* female-headed household – where the male (husband) is working away from the home, usually in another community – and 24 *de jure* female-headed household – where the female is the sole head because of death of male spouse or divorce. The remaining majority of 73 farmers in the sample were males. As has been already established that capital asset development status of farming households directly affect farmers' incomes, Table 6 presents gender-based differentiations in income as a proxy for assessing household head gender differences in access to and utilisation of productive capital assets.

Table 6 shows clearly that *de facto* female-headed households had the lowest total mean income of GH¢176.7 for the four-year GPRS II implementation period. Also, *de jur*e female-headed households had total mean income of GH¢320.8 for the same period. Unsurprisingly, the highest total mean income among the categories was male-headed farming households, with total mean income of GH¢532.5 for the 4-year GPRS II implementation period. It is important to note, however, that higher proportion of male-headed households in the sample may also contribute to the higher mean income for males. This is even more so as about 34% of male-headed households had 'outlier' income levels compared to their calculated total mean income. For instance, the total mean income for some individual male-headed households were around GH¢200 or less whilst others had around GH¢850 or more.

Table 6 - Annual Incomes of Gender Groups Interviewed

Gender of Household Head	Frequency	(GH¢) 2006 Mean Income	(GH¢) 2007 Mean Income	(GH¢) 2008 Mean Income	(GH¢) 2009 Mean Income	Total Mean Income
De facto female headed	3	150	163.3	160	233.3	176.7
De jure female headed	24	361.6	280	370.9	270.7	320.8
Male headed	73	655	409.2	499.4	565.6	532.5

Source: Fieldwork returns, 2011

De jure female household heads interviewed mainly practised agriculture of smaller scales compared to the other two categories, but received remittances from their spouses who reside in other towns and/or undertook petty trading as extra income sources. This may explain why they have relatively lower wages among the three categories. However, considering regular remittances from spouses and other income from petty trading, the few farmers in the *de facto* category are relatively less vulnerable than *de jure* female-head who will have to rely solely on their meagre incomes in their attempts to strengthen their livelihoods and provide for their households.

Conclusively, the result in Table 6 has shown that male-headed households are less vulnerable than female-headed households. The vulnerability which women face is in part due to cultural reasons and social norms. Such social norms among rural farming communities in the municipality, at times rooted in culture, include predominant male ownership of resources, some prevalence of matrilineal system of inheritance among the Ashanti tribe requiring the nephew (sister's son) of a deceased man to inherit his properties, restricting women to domestic upkeep such as raising children, cooking, fetching water, among others. This empirical evidence reinforces the theory that culture (including gender-based discrimination and access to productive resources) and household dynamics can also cause risk and vulnerability (Cahn, 2002).

In such contexts where many women are usually accorded statutory status as minors, for instance, they are unable to own property or to obtain loans to build resilient livelihoods and property. Such bottlenecks can however be reduced drastically by legislative reform which could begin to address the challenge by removing institutionalised discrimination against women. An example of such legislative reforms had been the passage of the Interstate Succession Law, 1985 (PNDC Law 111)

in Ghana, which however has had a slower progress due to implementation and enforcement challenges and also that many Ghanaian families do not follow the provisions of the law. This situation is however changing for the better though.

In addition to the hazards which all smallholder farmers in the municipality face, many female-headed households face the "double burden of being poor and being women" (World Bank, 2000). As Lowe and Schilderman (2001:18) report, "assault, divorce, abandonment, social disgrace, pregnancy and the reproductive responsibilities of child rearing all impact upon women's livelihood options, strategies and outcomes". The rights of women to own livelihood assets and property may be denied and held by someone elsewhere without their voluntary consent, and their plight may not necessarily be sympathised with by resource-owning men. Additional responsibilities of a female household head, such as managing domestic chores at home, may also relatively expose those households more to livelihood-threatening vulnerabilities like high climate variability and adversely changing socio-economic work conditions. But for livelihood development interventions to yield sustainable results, this study adds to the sustainable livelihoods literature that not only should capabilities and access of individuals and households to assets and activities that provide a means of living improved, but also those interventions be made to operate within the specific contours of the traditional and cultural context adapting to and coping with vulnerabilities in that context. Therefore, it is reasonable to suggest that future interventions at livelihoods development for poverty reduction better incorporate and address socio-economic issues and other contextual factors rooted in the culture of beneficiary groups/communities. This is because the processes of poverty reduction systems do not operate in isolation from influences (such as culture) that condition the flows of benefits through the livelihood, the choices available and the overall outcomes of the livelihood (Cahn, 2000).

Conclusions: Links between Farmers' Capital Asset Development and Livelihood Resilience

From hindsight and based on the review of related literature, effective development of the five capital assets directly enhances ability of farmers to increase production and to acquire higher incomes for re-investments into their farming ventures and to provide for their household needs (Ellis 2000, Carney 1998, Scoones 1998). Similarly, the analysis has also shown that with adequate financial resources, farmers are – or will – be able to access inputs and other resources such as more labour, accessing improved crop varieties and irrigation, among others, to adapt their livelihoods and adequately cope with vulnerabilities they may face.

Unsurprisingly, comparing high income earning farmers to the type of capital asset developed, the results showed that about 91% of farmers with annual income of

GH¢800 and above had high LAST Index scores of between 0.70 and 0.93 for financial, physical, and natural capital. This evidence suggests a positive correlation between financial, physical, and natural capital development and income levels of farmers, and that perhaps special effort should be directed at assisting farmers, those in the *extreme poor* and *vulnerable* categories to develop financial, physical, and natural capital.

For one, access to credit is a significant factor in smallholder farmers' ability to smooth income flows. This is not to downgrade the importance of social and human capital as farmers also need those capital asset types to, for instance, update their knowledge and skills and information and to access participatory opportunities in decision-making processes that affect their means of livelihood. In other words, human capital, for instance, is seen as critical in a farmer's ability to manage risks and shocks since education, skill, and information levels will influence the adaptation management options available to farmers.

Conclusively, the sort of social safety nets and other specialised assistance provided to farmers in the rich economies of Europe, North America, and Australia are seldom provided by developing countries governments such as Ghana to their farmers. Therefore many smallholder farmers in such developing countries – especially like those in the *extreme poor* and *vulnerable* categories in this study – have had to depend upon their own resources which, in terms of livelihood development and risk minimization, tend to be focused on social capital, lines of influence and membership of social groups of which farmers can expect assistance to provide some form of assistance against vulnerabilities. However, social capital and linkages between relatively more successful and less successful smallholder farmers in the municipality is quite low to provide significant forms of networking and knowledge sharing to help other struggling farmers to improve on their productivity. Overall, the very low rates of social and human capital development means that many poor farmers are denied of such resources for their adaptation strategies, hence the high proportion of smallholder farmers whose livelihoods are either extremely poor or vulnerable even a few years after the GPRS II programme ended.

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