



COMPARATIVE ANALYSIS OF FOOD SECURITY STATUS OF PARTICIPANTS AND NON-PARTICIPANT FARMERS IN MILLENNIUM VILLAGE PROJECTS IN IKARA LOCAL GOVERNMENT AREA OF KADUNA, NIGERIA

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ABSTRACT

This study was carried out to compare the food security status of participants and Non-participant farmers in millennium village projects in Ikara Local Government Area of Kaduna State, Nigeria. A multi-stage sampling procedure was adopted to determine the sample size of 320 for the study. The statistical tools used to analyze the data were descriptive statistics and the United States cost-of-calorie index. The results revealed aggregate income gap (G) of -61.228, -62.012 and -185.775 for MVPI, MVP II and non-participant, respectively, indicating that food insecure households would need 61.228, 62.012 and 185.775 per adult equivalent to meet their daily basic food requirements for MVPI, MVP II and non-participant, respectively. The results showed that participant farmers of the projects were more food secured (62%) than the non-participant (16%). Also, more participants with food insecurity without hunger (33%) were reported than their counterparts but fewer than their counterparts in terms of insecurity with moderate hunger (20.6%) and food insecurity with severe hunger. The findings further indicates that majority (61%) of the respondents were food secured than the non-participant farmers (16%). The mean food security index for food secured and food insecure households were 1.43 and 0.81, respectively. The food insecurity gap of 0.19 and 0.43 implies that on the average, the food insecure households consumed 19% less than their daily calorie requirements whilst food secured households consumed 43% in excess of their daily calorie requirements. The participants and non-participants were faced with challenges of stringent rules and regulations, and inadequate capital. The study recommended that the respondents should scale up own food production (cereals, legumes and tubers, home gardens, livestock, poultry and fishing) in order to ensure sustainability of food security in the study area.

Keywords: Food, hunger, Project, Respondents, Security.

INTRODUCTION

Agricultural projects are meant to attain self-sufficiency in food production as well as guarantee food security of the farmers. Participation means that people are closely involved in the economic, social, cultural and political process that affects their lives United Nation Human Development Report [UNHDR] (UNHDR, 2000). Several studies revealed a long history of people participation in agricultural development and wide range of development agencies have attempted to involve people in some aspect of planning and implementation. Essentially, participation is all about involving a significant number of people in one way or the other to enhance their wellbeing (Oakely, 2002). Douglah (1997) reported that poor adoption and failure of agricultural projects are result of lack of participation. The author maintained that people are not given chance to participation in all decision that affects their lives directly. It is expected that individual characteristics such as age education and number



of dependents positively influences participation of farmers in agricultural project. Age is associated with higher experiences and better access to established networks which may stimulate participation in an income generating project (Barret and Carter, 2005; Abdullahi and CroleRees, 2001).

The first of the MVPs was identified in Sauri, Kenya, in 2004. Since then, Type 1 Millennium Villages have been identified in 11 new communities throughout Sub-Saharan Africa. Type 1 villages, in which interventions and outcomes are closely monitored to establish proof-of-concept for the project, were selected on the basis of four criteria. First, the prospective village should be located in a hunger hotspot, which is characterized by a high prevalence of hunger, which indicates deep poverty usually accompanied by poor health, water, sanitation and a degrading natural environment. Second, prospective villages should be located in countries that are reasonably well-governed at peace and have governments seriously committed to achieving the MDGs. Thirdly; these villages should be located in communities where the residents have successful on-going activities, well-established relationships and mutual trust, with development organizations, including non-governmental organizations and the United Nation organizations. Finally, each village should represent a key agro-ecological zone that is representative of rural sub-Saharan Africa. These initial 12 Type 1 villages have given rise to more than 63 type 2 villages. Type 2 villages lie adjacent to Type 1 villages, and are used to scale up the findings of the Type 1 Villages and identify new challenges at the district scale. The MVP also plans to implement Type 3 villages, which will be located outside the hunger hotspots containing Type 1 and Type 2 Villages.

Food security is when all people at all times have both physical and economic access to sufficient food to meet their dietary needs for a productive and healthy life Food security has been identified to have food availability, food accessibility, utilization and stability of food access as the elements (Bonnard, 1999; Kenedy, 2003; Obanuro *et al.*, 2005; FAO, 1998; Gross *et al.*, 1999).

The study conducted in Nigeria by Oluwatayo (2008) using probit model found out that sex of household head, educational level, age and income had positive influence on food security whereas household size had negative influence on household food security. Mohammad-Lawal (2010) in a study on food security in Kwara State, identified household income, annual food stock from own production and the size of the household as the major determinants of food security. The author further showed that expenditure on food by household has no impact on food security. Agboola (2004) in a study on food security in Osun State using Tobit regression model observed that household size and diversification extent had a negative effect on food security, while gender of household head, child dependency ratio, input usage, remittance, total expenditure, food allocation and crop output had a positive effect on food security. The study further revealed that age of household head, education level, farm size, commercialization, cooperative membership, fertilizer and chemical had no significant effect on food security.

It is on the basis of the foregoing that the study compared the food security status of participating and non-participating farmers under MVP; and the constraints faced in the study area.

MATERIALS AND METHODS

The Study Area

The Pampaida cluster is located in the northern Nigerian State of Kaduna with an estimated population of about 27,000 inhabitants. Livelihoods in the villages are mainly based on pastoralism and small-scale agriculture. The region receives between 400 and 600



millimeters of rain annually. During the rainy season the rivers spill their banks, creating low-lying seasonally flooded areas which villagers use to grow rice. The community is predominantly made up of Hausa farmers and Fulani cattle raisers. Pampaida was therefore, representing the peculiarity of northern part of the country, Nigeria in both agro-ecological and socio-economic aspects and the outcome of the project could be used for generalization in the regional context.

Sampling Procedure and Sample Size

In this study, as indicated in Table 1, 109 and 104 respondents were used for MVP I and MVP II, respectively, using multi-stage sampling procedure. The first stage was purposive selection of Pampaida Millennium Village Project site in Kaduna State.

Table 1: Sample Size and Selection Plan for the Study

Project Phase	Villages/Cluster	Sample frame	Sample size
Participants of:			
MVP I:	Pampaida		
	Makaranta	321	32
	Katsinawa Fulani	290	29
	Angwan Nakundi	267	27
	Kurmin Barko	214	21
Sub-total:		1,092	109
MVP II:	Saulawa	342	34
	Fadaman Kale-A	227	23
	Mafera	170	17
	Angwan Magajiya	304	30
Sub-total:		1,043	104
Total		2,135	213
Non-participants:			
	Angwan Bazai	309	31
	Kunkumi	226	23
	Faki	210	21
	Janfalan	315	32
Sub-total:		1,060	107
Total		3,195	320

Source: Field survey, 2016

The site is one of the African Millennium Villages promoted and supported by the United Nations. The second stage involves random sampling of the villages under the MVPI and II taken 8 villages out of 20, representing 40% of the villages. In the third stage, systematic random sampling was employed in selecting the farmers involved in the project from the list of farmers obtained at the project office. With the sampling frame of 1,092 farmers for MVPI and 1,043 farmers for MVP II, 10% of the farmers were selected and used as sample size. Also, with a sample frame of 1,065 farmers from the four, non-participating communities, 10% (107) of the farmers were used as sample size in order to identify the effect attributed exclusively to the project. Therefore, a total of 320 respondents were randomly selected using the ballot method proportional to size as participants in MVP I and MVP II and non-participants. The study targeted small scale crop farmers in the study area. The selection of these respondents was assisted by the list of participating farmers given by the Millennium Villages Projects office.



To select appropriate comparison villages, the matching (and regression adjustments) includes pre-treatment variables that are predictive of selection to be a Millennium Village and scale-up. In other words, closely identical characteristics between the two were established. Pampaida was selected as one of the fourteen African Millennium Villages Project sites (MVPs) to represent two of the twelve major agro-ecological zones of sub-Saharan Africa countries with similar farming sub-systems and areas of high incidences of malnutrition, poverty and hunger.

Method of Data Collection

Primary and secondary data were collected for the study. Structured questionnaire and check list for Focus Group Discussions (FGD) were used to collect the primary data with the help of trained enumerators under the supervision of the researcher. The FGD was also used to generate data that supported the data gathered using questionnaires. This involved the use of the FGD guide to facilitate and ensure that the discussions are not off-track. The FGD guide was constructed based on themes and sub-themes. The socio-economic data collected were age, educational status, farming experience, and access to credit, number of extension visits to farmers, distance from the farmer's home to the farm, etc.

Data Analytical Techniques

The statistical methods used in this study were descriptive statistical model. The descriptive statistics (dispersion and central tendency such as averages, frequency, percentages and ranking) provides statistics to describe the basic features of the data used in a study. The methodology adopted in estimating food security status of millennium village projects participant was based on the core food security module of United State Development Agency (USDA, 2000) which is composed of a set of 16 questions with negative answer referring to better food security status while an affirmative answer refers to worse food security status. Thus, any negative influence on the food security level imply an increase in food security level while a positive influence will mean decrease in food security level (Omonona and Agoi, 2007). The food security level was scaled. This scale is a number continuum in a linear scale that ranges between 0 and 10. The scale measures the degree of food insecurity/hunger experienced by a household in terms of a single numerical value.

RESULTS AND DISCUSSIONS

Analysis of Food Security Line

Based on the recommended daily energy levels (L) of 2,260 Kcal, the food security line (S) as presented in Table 2 shows ₦1043.625, ₦860.397 and ₦113.697 per day per adult equivalent for MVPI, MVP II and non-participant, respectively. Also ₦ 7,305.375, ₦ 6,039.325 and ₦ 798.066 per week per adult equivalent for MVPI, MVP II and non-participant respectively, while ₦31,743.59, ₦26,170.41 and ₦3,458.287 per month per adult equivalent for MVPI, MVP II and non-participant, respectively and finally ₦380,923.00, ₦314,044.9 and ₦ 41,499.44 per year per adult equivalent for MVPI, MVP II and non-participant, respectively. The result showed that 61.5%, 57.8% and 20.6% of for MVPI, MVP II and non-participant, respectively were food secure while 38.5%, 42.2% and 79.4% for MVPI, MVP II and non-participant, respectively were food insecure.

Furthermore, the aggregate income gap (G) of -61.228, -62.012 and -185.775 for MVPI, MVP II and non-participant respectively indicates that food insecure households would need 61.228, 62.012 and 185.775 per adult equivalent to meet their daily basic food requirements for MVPI, MVP II and non-participant, respectively.

The mean food security index of food secured and food insecure households were 1.43 and 0.81, respectively. The food insecurity gap of 0.19 and 0.43 implies that on



average the food insecure households consumed 19% less than their daily calorie requirements whilst food secured households consumed 43% in excess of their daily calorie requirements. Per capital daily calorie requirement was estimated to be 2,260kcal which is lower than the national weighted average of 2,849 kcal (World Food Program, 2009). The income gap of the respondents may be due to high taste and preferences of these households. Differences in income levels predispose households to different consumption patterns due to their economic access to food. Among the respondents there was heavy reliance on agriculture. Respondents are primarily involved in own food production which include mostly cereals, legumes and tubers and also had home gardens which reduced household cost on vegetables. Engagement in livestock, poultry and fishing equally provide animal sources of protein. When own production depletes, available incomes are spent on food or assets liquidated to cater for consumption and general welfare. Households with insufficient economic access to food ultimately become food insecure (Ahmed, 2011). This finding is at variance with Kaloi et al., 2005 who reported that 62% of the households were found to be food secure while 38% were food insecure in Mwingi District.

Table 2: Statistics of Food Security Measures among Households in the Study Area

Table with 4 columns: Variable, MVP I, MVP II, Non-participant. Rows include Constant, Slope coefficient, Food insecurity line S (Per day, Per week, Per month, Per year), Head count (H) (Food secure, Food insecure), and Aggregate income gap (G) (Food secure, Food insecure).

Note: ***P <0.01, **P <0.05 and *P <0.10; *Figures in parenthesis are t-values.

Source: Field survey (2016)

The mean food security index of food secured and food insecure households were 1.43 and 0.81 respectively. The food insecurity gap of 0.19 and 0.43 implies that on average the food insecure households consumed 19% less than their daily calorie requirements whilst food secured households consumed 43% in excess of their daily calorie requirements. Per capital daily calorie requirement was estimated to be 2,260kcal which is lower than the national weighted average of 2,849 kcal (World Food Program [WFP], 2009).

Food Security Status in the Study Area

Result in Figure 2 shows the distribution of the respondents on their food security status across the groups of participant and non-participant in millennium village projects. The

result shows that the participant of millennium villages projects were more food secured (62%) than the non-participant of millennium villages projects (16%). There were more participants with food insecurity without hunger (33%) than their counterparts but fewer than their counterparts in terms of insecurity with moderate hunger (20.6%) and food insecurity with severe hunger. As a whole majority (61%) of the respondents was food secured than non-participant (16%). This research derives its understanding given by the Food and Agricultural Organization (FAO, 2006) that food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. This means that people may have the physical and economic access to food but to be totally food insecure.

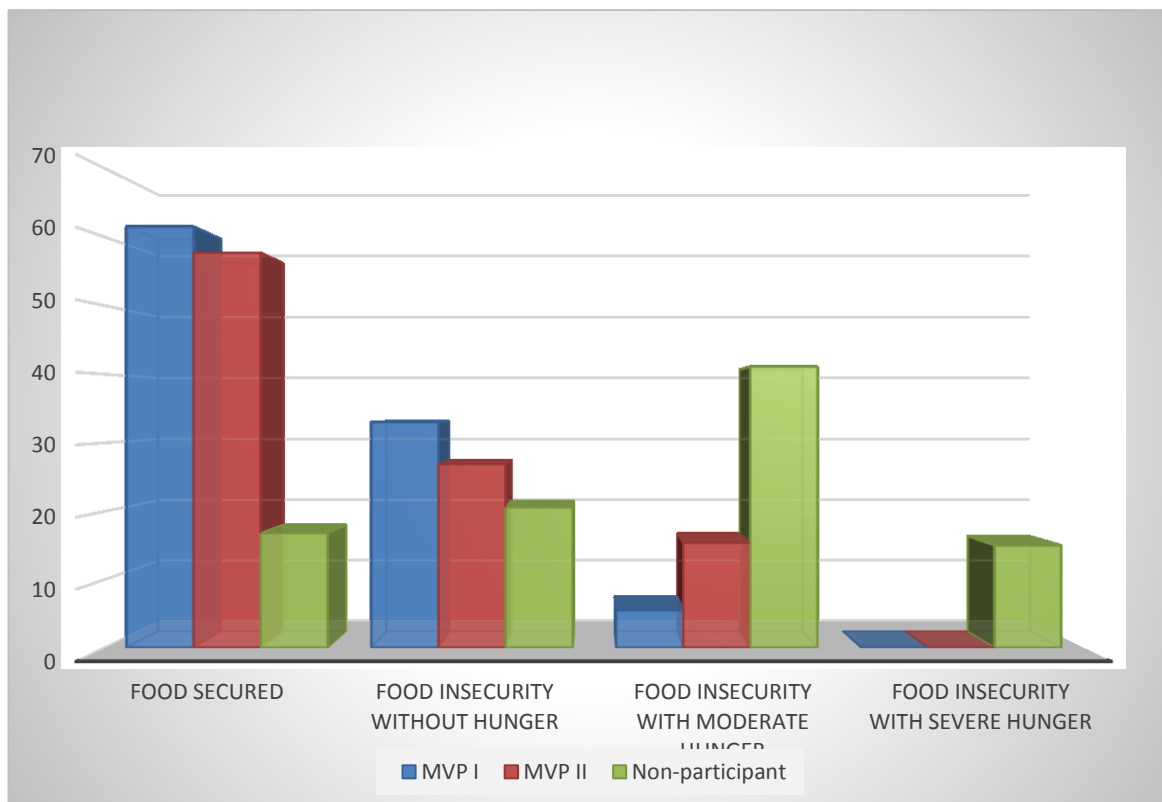


Figure 2: *Distribution of the respondents based on their food security status*
 Sources: Field survey (2016)

Constraints Faced by the Participants and Non-participants in the Study Area

According to Table 3, the respondents (81.6%) reported inadequate capital as a major constraint in their participation in millennium village projects. The importance of credit to agricultural development cannot be overemphasized. Credit enables farmers to advantageously use inputs and factors of production by granting farmers more access to resources through the removal of financial constraints. The provision of credit will reduce the costs of capital intensive technology and assets relative to family labour. Thus, instead of growing low yielding local crops, for example, access to credit may allow an increased use of improved seeds and fertilizers leading to higher crop output per unit of labour and land (Ammani *et al.*, 2010). Looking generally at this constraint, it is assumed that shortage of capital was a major constraint. This was as a result of project implementers not given much capital to the participant directly to avoid diversion and misuse of project fund rather the inputs



such as fertilizers; seeds; storage bins etc., were subsidized and given to the beneficiaries. However, due to the fact that inputs were subsidized, the participant had bumper harvest.

The problem of pest and disease was reported by the majority (69.7%) of the respondents attesting to this fact that pest and disease were responsible for pre-harvest and post-harvest losses by producers. However, it is one of the major constraints and it is also important to note because endemic diseases have devastating impacts on agriculture, leading to losses of hundreds of millions of dollars every year in developing economies like Nigeria (Bamaiyi, 2012).

Table 3 also reveals that low prices were listed by 58.70% of the farmers. Low prices offered for the commodity relates to the imperfect nature of the rural markets in the study area. These rural markets are separated by long distances connected by bad roads and few vehicles. The proportion of produce price captured by smallholders, and the wages paid to labourers on the farms, have a critical bearing on poverty including the ability of rural households to meet health and education costs. The result of Table 3 also shows that 46.8% of the respondents reported high cost of agrochemicals as a constraint. Agrochemicals are considered as a powerful weapon or magic bullets in the developing countries in order to enhance the agricultural productivity and considerably improve the major public health indices as well. Due to the awareness of the benefits of agrochemicals, the respondents adopted the technology. However, the subsidized input was not enough coupled with high cost of buying personal protective devices. The implication is that there was increase in cost of production and the farmers were affected economically.

On poor road infrastructure, about 37.6% of the respondents reported poor road infrastructure as a constraint. The existence of poor road infrastructure will inevitably impact negatively on the competitiveness of African agriculture through increasing internal transport costs. Due to poor road network in our rural communities, the farmers found it very difficult to bring their agricultural products to the market especially during rainy season. The implication is that the farmers dispose of their products at ridiculously low price and are at the mercy of middlemen.

There is no doubt on the fact that participating in millennium village projects had a significant impact on participating farmers in the study area based on improvement in income and food security status of the participants compared with non-participants. Further reference to Table 3 shows that 97.7% of the respondents reported that stringent rules and regulations. This result also supports Mwangwela and Duvel (2010) who stated that inadequate resources by service providers and high intensive management are the barriers to participation in agricultural projects.

For the participated farmers, low prices were listed by 61.5% of the farmers as constraints faced. Low prices offered for the commodity relates to the imperfect nature of the rural markets in the study area. These rural markets are separated by long distances connected by bad roads and few vehicles. The proportion of produce price captured by smallholders, and the wages paid to labourers on the farms, have a critical bearing on poverty including the ability of rural households to meet health and education costs.

Table 3 further discloses that about 33% of the respondents who participated in the MVP indicated inadequate land as constraints. This indicates that access to land is a limiting factor against in the study area. Land is a basic source of livelihood; providing employment, the key factor in agricultural activities, and a major determinant of a farmer's access to other productive resources and services. Farmer's right to land is a critical factor in social status, economic well-being and empowerment. Limited access to land by women could be attributed to land tenure system which is strictly by inheritance. According to Kajoba (2002), in



countries where ownership and inheritance laws have been reformed in favour of women, in practice women do not necessarily have more rights to land, as local customs act as barriers.

Poor recreation facilities were a constraint revealed by the respondent showing that about 29% indicated poor recreation facilities as a constraint. Recreational facilities like television viewing centers, rural telephony and recreational parks are lacking in most rural areas. This often leads to rural-urban drifts, reduction in the working population in the village and low agricultural production. The implication is that as well as these amenities are in short supply, healthy youths will continue to migrate to the urban centers in search of jobs which are not there. But, the availability of these amenities will automatically reduce the rural-urban drift and more hands will be engaged in agricultural production which will translate into food security.

Table 3: Constraints of the Respondents

Constraints	Frequency	Percentage	Ranking
Participants:			
Stringent rules and regulations	208	97.65	1 st
Intensive management	1654	77.00	2 nd
Low output pricing	131	61.50	3 rd
Inadequacy of land	71	33.33	4 th
Poor recreational facilities	32	29.36	5 th
Total	*606		
Non-participants:			
Inadequate capital	89	81.65	1 st
Pest and diseases	76	69.72	2 nd
Low produce price	64	58.72	3 rd
High cost of agro chemical	51	46.79	4 th
Poor road infrastructure	41	37.61	5 th
Total	*321		

Note: *Multiple responses exist.

Source: Field survey (2016)

CONCLUSION AND RECOMMENDATIONS

From the findings of the study, 61.5%, 57.8% and 20.6% of for MVPI, MVP II and non-participant, respectively were food secure while 38.5%, 42.2% and 79.4% for MVPI, MVP II and non-participant, respectively were food insecure. This implies that the millennium village projects had significantly improved the food security status of the participants from the non-participants. Based on the findings of this study, the following recommendations were made to enhance farmers' participation, improve agricultural developments, create enabling environment for more wage earning activities and moreover, increase improvement in income and standards of living of rural dwellers.

- i. Farmers were constrained by inadequate capital. Since there is the growing need for credit on the farm either to pay for additional farm inputs, pay for farm labour, procure agro-processing equipment and storage facilities the promotion of savings among farmers and farmer groups should be encouraged as well as encouraging the social organizations to secure loans for their members from agricultural banks.
- ii. The inclusion of women in agricultural empowerment programs should be increased by government and donor agencies. Despite the contribution of women to agricultural



production, there is still inequalities in terms of access to productive resources some barriers to improved productivity and income include: low level of education, poor access to productive resources, finance, improved technologies and access to extension delivery system. The quota of women should be increased in order tap from the technical trainings and linkages to inputs and markets.

- iii. Also for sustainability sake, the public-private partnership linkage should be strengthened by involving relevant stakeholders (research institutes, inputs dealers, seed and fertilizer companies, agro-machinery companies and credit and financial institutions) in training programs to increase their commitment to the achievement made so far.

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