A close-up photograph of a hand holding a wooden-handled sickle, positioned to harvest tall, golden-brown grass. The background is a dense field of similar grass, creating a textured, natural setting. The lighting is warm, suggesting a late afternoon or early morning scene.

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Full Length Research Paper

Utilization of climate change adaptation strategies among rice farmers in three states of Nigeria

Onyegbula C. B.* and Oladeji J. O.

Department of Agricultural Extension and Rural Development, University of Ibadan, Ibadan, Oyo State, Nigeria.

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The phenomenon of climate change has negative impacts on rice production in Nigeria as it lowers its output and reduces farmers' income with a resultant depreciation in their livelihood. This accentuates the need for adaptation to climate change in order to reduce the growing dependency on rice importation, ensure food security as well as achieve a sustainable rice production system in Nigeria. The study therefore investigated the utilization of climate change adaptation strategies among rice farmers in three states of Nigeria. Data were collected from 298 rice farmers using interview schedule in Ebonyi, Ekiti and Niger States on their socio-economic and farm enterprise characteristics, knowledge and utilization of Climate Change Adaptation Strategy (CCAS). Data analysis was done using Statistical Package for Social Sciences (SPSS) and analysis of variance (ANOVA). Knowledge of CCAS was high (55.7%) among respondents while utilization of CCAS was low (65.4%). A non-significant difference existed in the use of CCAS across the states ($F = 43.15$; $p\text{-value} > 0.05$). However, continuous and frequent weeding, appropriate use of fertilizer, and early harvesting of crops were major CCAS used by respondents. The result implies that rice farmers are not totally ignorant of CCAS, but have been using one form of adaptation strategy or the other irrespective of the agro-ecology. Also, the study revealed that CCAS is ecology specific thus effective utilization should be ensured.

Key words: Climate change, adaptation strategies, utilization, rice farmers.

INTRODUCTION

Rice farming is highly dependent on environmental factors which are the most important among several factors that influence agricultural production. According to Edeh et al. (2011), rice production depends on optimum combination of production inputs in order to achieve remarkable yield. These inputs are not limited to the familiar production inputs but include the various environmental factors provided by nature. Rainfall

characteristics (intensity and duration), relative humidity and temperature constitute these weather-related and environmental factors that affect rice yield and its variability. As reported by Kuta (2011), local farmers are seriously concerned about these weather variations because of the impact on food security, availability, stability, accessibility and utilization. The change in weather affects livestock, forestry, fishery and decreases

*Corresponding author. E-mail: bilywendy@yahoo.com. Tel: 0803-951-8624.

aquatic plant species including rice.

According to Building Nigeria's Response to Climate Change (BNRCC, 2008), the prolonged change in weather resulting in a change in climate has created a significant loss of food security; increased frequency and severity of natural disasters such as desertification, drought, and flood; and human displacement and natural resources depletion. Furthermore, other consequences of climate change include lack of clean water supply, animal migration, pest management issues, diseases and health concerns, loss of cultural practices and traditional ways of life, economic downturns, and energy crises which thus affect overall development in Nigeria.

The impacts of climate change in Nigeria vary from one agro-ecological zone to the other. These include unprecedented floods in hitherto dry areas, iron toxicity caused by soil degradation, frequent intervening dry spells as well as extreme temperatures experienced across the country. This climatic fluctuation is putting Nigeria's agriculture system especially crop production under serious threat and stress (Ayinde et al., 2011).

Rice (*Oryza sativa*) is a staple food consumed globally by a large population of people. It is one of the multi-value chain crops that plays a significant role in national food security and employment sustenance, generates income as well as serves as a source of raw materials for agro industries (Okoro et al., 2015). However, as a crop, rice is affected by many abiotic factors (drought, submergence, extreme temperatures, salinity, and low soil fertility) and biotic constraints (weeds and diseases such as blast) which limit the continent's rice production. Climate change, by inducing variations in climate patterns (increasing incidence of drought, extreme temperatures and flooding, and increasing salt stress levels), aggravates these constraints, thereby affecting rice yields (Manneh et al., 2007).

Rice is one of the crops grown by farmers in most vegetative zones in Nigeria and these farmers have been witnessing heavy downpours due to intense rains as a result of variability in timing and amount of rainfall caused by climate change. The degree and intensity at which rains are experienced in recent times is far beyond what farmers are familiar and can grapple with in order to remain productive. According to Tihamiyu et al. (2015), extreme rainfall variability triggers environmental problems such as floods, gully erosion, drought and desertification which have serious effects on rice yield. While floods wash away and destroy rice farmlands as well as those of other staples thereby creating a heavy yield loss to farmers who spend much establishing the crop farms, increase in temperature on the other hand shortens the duration between sowing and harvesting in rice cycles and this adversely affects yield as it leads to early occurrence of senescence (National Research Council (NRC), 2011). Furthermore, frequent outbreaks of crop pests and diseases caused by increased duration of the wet season combined with higher temperatures

due to climate change also reduces rice yield. These pests, especially quelea birds are mostly driven by droughts and are difficult to control with pesticides as they ravage rice fields with resultant food shortages and severely malnourished children in the affected regions (Abubakar et al., 2012).

The aforementioned evidences of climate change fallout, nevertheless, can be reduced through adaptation (Kurukulasuriya and Mendelsohn, 2006). Though adaptation is not a new concept to farmers as they have survived and coped in various ways to maintain their livelihood and adaptive capacity nonetheless, it could be limited by low technological advancement, poverty and illiteracy. Therefore, understanding how they have adapted to changes become imperative for designing incentives to enhance adaptation. Hassan and Nhemachena (2008) stated that supporting adaptation strategies of local farmers through appropriate public policy, investment and collective actions can help increase adaption measures which will reduce the negative consequences of the predicted changes in future climate with great benefits accruing to vulnerable rural communities in Africa. Therefore, the objectives of the study were to investigate the socio-economic and farm enterprise characteristics of rice farmers, their knowledge and utilization of climate change adaptation strategies.

MATERIALS AND METHODS

An evaluative research design was used to determine the impact of climate change adaptation strategies on rice production in Ebonyi, Ekiti and Niger States, Nigeria. These areas were chosen because they represent the luxuriant rainforest (characterised by intense rains and longer rainy season) and Guinea savannah (characterized by lower rainfall and shorter rainy season) vegetative zones with comparative advantage in rice production. These natural vegetative zones are governed by the combined effects of temperature, humidity, and particularly variations that occur in rainfall. The variations in climate change, however, have led to devastating consequences and effects in various parts of the country such that the rainforest zone is affected by sea-level rise, deforestation-induced changes, erosion, flooding and land degradation while the savannah zone is affected by changes due to overgrazing, drought, desertification and heat stress (Ozor et al., 2012). These environmental conditions therefore make it necessary for the country to develop an array of adaptation options which will meet the different conditions of the different agro-ecological locations of the nation.

For purposes of data collection, 10% of the local government areas (LGAs) from each state including Abakiliki, Efon Alaye, Ekiti East, Bida and Lapai were randomly selected. Using a proportionate sampling technique, 20% of the farmers were selected from the Rice Farmers Association list of 1488 registered farmers in the selected LGAs (Table 1). Thus, a sample size of 298 respondents was obtained. Data was collected using interview schedule and analyzed using descriptive frequency counts, percentages and mean, while the hypothesis was analyzed using Analysis of Variance (ANOVA).

Results were presented using frequency distribution and percentages. Aggregate mean score was obtained and used to

Table 1. Sampling procedure and sample size of respondents.

Agro ecological zones	10% of states sampled	Sampled states	No of LGAs in the sampled states	10% of sampled LGAs	Sampled LGAs	No of farmers registered with RIFAN	20% of RIFAN farmers sampled
Guinea savannah (10)	1	Niger	21	2	Bida Lapai	299 275	60 55
		Ebonyi	12	1	Abakiliki	411	82
Rainforest (15)	2	Ekiti	16	2	Efon Ekiti East	248 255	50 51
		Total	-	-	-	1488	298

RIFAN: Rice Farmers Association of Nigeria.

categorize knowledge of CCAS as high or low where a “Yes” response was scored 1 and “No” scored 0. A 3 point-Likert-type scale of always=3, sometimes=2 and rarely=1. Was used to determine the extent of utilization of CCAS. The weighted mean score for each strategy was obtained by multiplying the point scale by the number of respondents in each point scale in order to identify the most frequently used strategy. Furthermore, respondents’ aggregate mean score of 58.2±15.3 was used to categorize respondents’ level of utilization of CCAS. Those with scores above or equal to the mean score were adjudged using more of the strategies and respondents with scores below the mean score as using less of the strategies.

RESULTS AND DISCUSSION

Respondents socio-economic and farm enterprise characteristics

Table 2 reveals that 40.9% of rice farmers are within the age bracket of 41 to 50 years suggesting they are within economically productive age, implying availability of physical strength and by extension mental alertness in adopting and practicing modern farming techniques which are capable of reducing adverse effect of climate change on rice. This result however is in agreement with Ojehomon et al. (2009) who stated that farmers within the age group of 20 to 60 years are amenable to re-orientation for adoption of productivity-enhancing innovations and technologies. Result also shows that 67.1% of respondents earned between ₦50,000 and 89,000 per acre from rice production and 30.2% had tertiary education. Respondents’ years of experience was 17.04±10.5 which suggest higher chances of adapting to climate change because farming experience improves awareness about climate change and increases chances of adaptation. Experience according to IPCC (2007) would enable farmers observe changes in climate and should be for at least a period of one decade. About 39.0% of the respondents obtained planting materials from their previous harvests (seeds) which signify their inability to obtain seeds from extension agents and

research institutes. According to Awotide (2009), rice farmers had been having problems obtaining enough good quality seeds which had reduced yield. More than half (64.8%) of the respondents rarely had contacts with extension agents (Table 2). This can affect use of climate change adaptation strategies among farmers since their understanding of climatic change depends mostly on their previous experiences. FARO 44 was the most (36.6%) cultivated improved rice variety as stated by respondents. The result is consistent with a report from the AfricaRice (2009), which stated that many farmers prefer FARO 44 for its early maturity, good grain quality and high yield when compared with the local varieties. The analysis of socio-economic and farm enterprise characteristics suggests that respondents had the ability to understand the effects of climate change on their enterprise. This finding is in agreement with Fadullah et al.’s (2015) study.

Respondents knowledge of climate change adaptation strategies

Table 3 shows that respondents were most knowledgeable about climate change adaptation strategies such as adjustment of rice planting calendar based on onset of rainfall (96.6%), use of mulch materials to conserve soil moisture (94.0%) and appropriate use of fertilizer (84.6%). They were more knowledgeable in adaptation strategies that are indigenous to them, been practiced over long periods of time and passed from one generation to the other than technological innovation strategies such as planting drought-resistant varieties (17.1%), crop insurance against natural disasters (22.5%), and planting submergence-resistant varieties (25.2%). This result corroborates the research finding of Watson (2010) who reported that African farmers have used indigenous knowledge to understand weather and climate patterns in order to guide their decisions in crop and livestock management. It therefore becomes

Table 2. Respondents socio-economic and farm enterprise characteristics (Objective 1).

Variable description	Frequency	Percentage
Age (years)		
≤30	18	6.0
31-40	65	21.8
41-50	122	40.9
51-60	75	25.2
>60	18	6.0
Mean age = 45.3±9.1		
Estimated annual income (₦/acre)		
<10,000	6	2.0
10,000-49,000	52	17.4
50,000-89,000	200	67.11
≥ 90,000	40	13.4
Educational attainment		
Non-formal (vocational training)	37	12.4
Primary	54	18.1
Secondary	117	39.3
Tertiary	90	30.2
Years of experience		
1-10	156	52.3
11-20	67	22.5
21-30	47	15.8
>30	28	9.4
Mean = 17.04±10.5		
*Source of planting materials		
Previous harvest (seeds)	200	38.8
Research institutes	128	24.9
Extension agents	75	14.6
Growth Enhancement Scheme (GES)	112	21.7
*Contact with extension agent		
Always	9	3.0
Sometimes	96	32.2
Rarely	193	64.8
*Rice variety cultivated		
Local	104	16.1
Improved		
Faro 42	86	13.3
Faro 44	237	36.6
Faro 52	141	21.8
Faro 56	21	3.2
Nerica 7	12	1.9
Nerica 8	46	7.1

*Variables are multiple response.

imperative that farmers be sensitized on issues of climate change and its adaptation especially with regards to rice production.

Table 4 reflects the knowledge level of respondents on climate change adaptation strategies. The knowledge and understanding of an innovation is a determinant of its

Table 3. Distribution of respondents' knowledge of climate change adaptation strategies.

Items	Knowledgeable (%)
Adjustment of rice planting calendar based on onset of rainfall	96.6
Use of power tillers	63.8
Use of charms to scare birds	35.9
Timely provision of weather information	20.1
Planting drought resistant varieties	17.1
Crop insurance against natural disasters	22.5
Planting submergence resistant varieties	25.2
Cultivating different crop variety according to rainfall predictions	76.8
Diversification into other livelihood activities	39.6
Preservation and selection of seeds for next planting season	85.2
Changing planting date	19.1
Planting other crops like cowpea, sorghum	67.8
Draining excess water from the field	36.9
Use of mulch materials to conserve soil moisture	94.0
Appropriate use of fertilizer	84.6
Praying	66.1
Keeping updates on weather forecast	45.3
Regular monitoring of field for bird attack	88.3
Adopting different cropping methods	61.1
Use of improved tillage practices	85.2
Land leveling	47.3
Knowledge acquisition through trainings	22.5
Use of different cropping patterns	41.3
Planting pests and disease resistant variety	32.2
Fallow method	62.4
Planting short duration high yielding variety	73.2
Use of Integrated Pests Management (IPM)	31.9

Table 4. Categorization of respondents' on knowledge of climate change adaptation strategies in the study area.

Knowledge level of CCAS	Score	Total	
		F	%
Low	0-18	132	44.3
High	19-36	166	55.7
Mean±SD		19.5 ±4.7	

utilizations in order to achieve positive results. According to Meijer et al. (2014), the knowledge an individual possesses about an innovation forms the basis of his adopting and utilizing it. The result shows that the respondents were knowledgeable about climate change adaptation strategies as revealed by more than half of the respondents (55.7%) who had higher knowledge of the strategies compared to 44.3% of the respondents who were less knowledgeable. This implies that adapting to climate change is not dependent only on knowledge acquisition but on the utilization of the strategies in order

to enhance production. It could also be inferred from the result that despite farmers' long years of experience, there is dire need for them to be sensitized on issues of climate change and how to adapt to it especially as it regards rice production. This finding agrees with that of Moundzo (2012) that farmers especially rice growers do not have adequate knowledge for the efficient management of their farms under the impacts of a transformed climate, so they rely on individual experience and local know-how to deal with the problem of climate change.

Table 5. Climate change adaptation strategies utilized by respondents.

Adaptation strategies	Extent of utilization (weighted mean \pm SD)
Planting pests and diseases resistant varieties	2.38 \pm 0.6
Use of drought tolerant varieties	1.90 \pm 0.7
Continuous and frequent weeding	2.87 \pm 0.4
Use of integrated pest management (IPM)	2.21 \pm 0.8
Appropriate use of fertilizer	2.74 \pm 0.5
Planting crops with early rainfall	1.88 \pm 0.7
Planting submergence-tolerant varieties	2.02 \pm 0.3
Early harvesting of crops	2.48 \pm 0.9
Use of timely and adequate weather information	1.64 \pm 0.8
Using charms to scare birds	0.9 \pm 1.1
Draining excess water in field to prevent water logging	0.70 \pm 1.0
Forming a farmers group to finance adaptation	0.98 \pm 0.8
Improved extension services using modern ICT tools	1.52 \pm 0.9
Attending field schools to improve cultivation methods	1.47 \pm 0.5

Table 6. Categorization of respondents' utilization of climate change adaptation strategies (CCAS).

CCAS	Score	Total	
		F	%
Low	36 - 57	195	65.4
High	58 - 180	103	34.6
Mean \pm SD	-	58.2 \pm 15.3	

Table 7. ANOVA showing difference in utilization of adaptation strategies by respondents.

Strategy	Sum of squares	df	Mean square	F	p value
Between groups	15788.33	2	7894.16	43.15	0.17
Within groups	53966.57	295	182.94	-	-
Total	69754.90	297	-	-	-

Respondents utilization of climate change adaptation strategies

Table 5 depicts the most utilized adaptation strategies as continuous and frequent weeding (2.87 \pm 0.4), appropriate use of fertilizer (2.74 \pm 0.5) and early harvesting of crops (2.48 \pm 0.9). The result implies that rice farmers are not totally ignorant of climate change adaptation strategies but have been using one form of adaptation strategy or the other. Findings of Ukwungwu and Abo (2004) and Ozor et al. (2012) support this result. They reported increased weed infestation being a major constraint to rice production ranking second to drought stress in reducing rice yield and quality. To respond to this challenge, farmers frequently weed their farms if they are to obtain meaningful harvests. Additionally, Table 5 further shows the least utilized strategies as draining

excess water in field to prevent waterlogging (0.70 \pm 1.0), using charms to scare birds (0.9 \pm 1.1), and forming a farmers group to finance adaptation (0.98 \pm 0.8).

Table 6 shows that utilization of climate change adaptation strategies was low (65.4%) among respondents. This result implies poor utilization of adaptation strategies by respondents and could be an impediment to achieving a sustainable rice production. This is because adaptation will reduce vulnerability, increase resilience, ensure food security as well as reduce the huge foreign exchange expended on rice importation. Furthermore, the ANOVA result (Table 7) shows a non-significant difference in the adaptation strategies used in the study area (F = 43.15; p-value>0.05). This suggests that impact of climate change may vary across agro-ecologies. It therefore becomes expedient for farmers to adopt different strategies based

on the ecologies in response to climate change. Corroborating this assertion, Fakayode (2009) stated that for rice production efficiency to be established, adaptation must differ across agro-ecological zones since it is influenced by precipitation and ecology. This is because the agro ecological zones are characterized and governed by the combined effects of temperature, humidity, and the variations that occur in rainfall. These climate parameters form a major influence on the type of indigenous crops and plants that grow successfully in different parts of the country.

CONCLUSION AND RECOMMENDATION

Rice farmers are not totally ignorant of climate change adaptation strategies. They have adapted to different challenges over time, having means of ensuring that their production is improved and livelihoods sustained. This they do by using one form of adaptation strategy or the other such as early harvesting of crops and draining excess water in field to prevent waterlogging. The focus of climate change adaptation by farmers therefore, should be on the new extremes and magnitude of climate change which they should adapt to so as to enhance production. Effective and productive adaptation strategies depend on factors such as wealth, information, education and management capabilities. However, the study revealed that climate change adaptation strategies are ecology specific. Thus, it is recommended that while designing intervention programmes on climate change adaptation strategies by policymakers/stakeholders for farmers, the agro-ecologies where such strategies are to be used should be put into consideration for effective use bearing in mind that ecologies differ across zones.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Full Length Research Paper

Gender division of labor and rural women's control over productive resources: The case of Dita and Mirab Abaya districts, Gamo Gofa zone, Southern Nations, Nationalities, and Peoples' Region (SNNPR), Ethiopia

Yohannes Mare

Department of Rural Development and Agricultural Extension, Arba Minch University, Postal Address 21,
Arba Minch University, Ethiopia.

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This study aimed to identify the existing gender division of labor, rural women's control over productive resources and its effect on the stated poverty reduction strategy. Group discussion with key informants, field observation and interview with rural women was done to obtain primary data. The analysis was done by using SPSS software. Man biased division of labor, particularly on productive activities and limited control over, of rural women on productive resources are identified in the study area. This was the main challenge they face in the society. These make their contribution to development and poverty reduction very minimal.

Key words: Rural women, productive activities, control over, division of labor, poverty reduction.

INTRODUCTION

Since 1993, the government of Ethiopia has committed itself to promote gender empowerment through the implementation of the Beijing platform of action. Institutional mechanisms for advancing the course of women involves capacity-building financed by a proper institutional development fund; increasing the access of women/girls to education; improving participation in decision-making and in local and national elections; and other measures taken by the government of Ethiopia to improve the employment situation of women are indicative

of the country's commitment to improving gender roles in national development (Skied, 2007; United Nations, 2002).

The labor division of farm tasks between rural women and men in Ethiopia varies according to the enterprise, cultural settings, the farming system, the technology used, location and the wealth of the household. Control over the benefits of production also varies between women and men, partly reflecting their labor input, but also reflecting the use of produce in the home or for sale,

E-mail: wontagab@yahoo.com

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cultural norms regarding 'women's' and 'men's' enterprises, and the dominance of men as the household head and, consequently, are entitled to the most important resources like land (Abera et al., 2006; Lemlem et al., 2010).

Rural women constitute a substantial proportion of the nation's farmers and provide about 60 to 80% of the rural labor input (MOFED, 2006). Poverty is hitting increasing number of rural women and it is hitting harder. They are the most disempowered, experiencing inadequate right to control over different productive resources like land and decision-making about its productive use, to decision about water sources and other resources they require. Decision-making is related to different level of control over, of different agricultural products and their outcomes including incomes earned from sales of productive resources and decisions on transfer through bequeath inheritance, sale or rent (Sida, 2003).

Generally, men are the key role players in labor division of crop and livestock production, and are also the principal beneficiaries in terms of control over the income generated from these products. Men also control the income from several enterprises in which the workload is shared (Lemlem et al., 2010).

Gender is a way in which, culture in a society prescribes rights, roles, responsibilities and identities of women and men in relation to one another.

Control over productive resources

Control over resources implies the ability to use and even dispose a resource or benefit. Women's control over productive resource means that women can own productive resource (can be legal title-holders) and can make decisions on selling or leasing out the productive resource (Akuna, 2004).

It is mostly difficult to realize women's equal control over productive resources even in cases where different policy demonstrates gender equality (Lemlem et al., 2010).

The case of Gamo Gofa in relation to this present work is not yet studied. Identifying the gap and planning to fulfill it is very important to countries plan in this regard. Development initiatives should be designed with a gender perspective to ensure they are relevant to their context. So, this study aimed to examine and identify the productive activities of rural women and men and find out the existing rural women's control over productive resources and its implication on poverty reduction.

RESEARCH METHODOLOGY

Gamo Gofa Zone has 15 districts mainly in two agro-ecological zones. This study was carried out in two Districts, namely Dita and Mirab Abaya representing two different agro-ecologies of highland and low land District of Gamo Gofa Zone. Both sample districts were selected using stratified simple random selection technique.

The three Kebeles (lower government administrative unit below district) from each district totally six kebeles was selected using lottery method of random sampling technique.

Finally, 30 respondents per kebele, with a total of 180 rural women were selected in the same method to respond to the structured interview questionnaire of the study.

Types and sources of data

Both primary and secondary data sources were used for this study. Qualitative data were obtained by discussion and field observation and quantitative data were obtained from interview questionnaire. To get background information on the study area, secondary data sources like reports, records of rural women and unpublished documents of districts concerned offices were reviewed. The other related information and primary data were obtained using appropriate data collection instruments including focus group discussions with key informants of six men, six women and six development agents; one from each sample kebele of both districts.

Methods of data collection and analysis

Productive activities of the area were listed and qualitative data were gathered from group discussion that were held for one day in each district with key informants in the presence of four experts selected from district women's affairs office and agricultural development office. In addition, the group discussion was used to identify different productive resources found in the rural area. Home and farm observation were also used to observe different productive resources owned by female farmers in the research area.

The case history of the woman who has owned the productive resource was listed carefully. The main interview questionnaire for quantitative data was prepared based on the sources. The main data of the study was collected from the selected 180 respondent using the pre tested survey questionnaire. Control over, of a rural woman to productive resources was measured using the 'yes' or 'no'. Data was analyzed using the Statistical Package for the Social Science (SPSS) and some descriptive statistics, such as percentage and mean.

RESULTS AND DISCUSSION

Basic activities for production in rural areas

There are many activities in the society which leads to production and productivity. The data on main activities in the society which leads to production and productivities are listed and responsibilities are examined.

Credit

As indicated in gender-desegregated data, rural women's control on credit appears limited (only 6.1%) (Table 1). A variety of legal, socio-cultural and institutional constraints continue to restrict rural women's control over money taken by credit. These are low educational levels, lack of knowledge regarding financial management, bias in lending institutions and fiscal regulations which do not take into account the special characteristics of rural

Table 1. Gender based division of labor on agriculture support productive activities.

S/N	Productive and related activities	Men		Women	
		f	%	f	%
1	Buy different farm machines	158	87.7	22	12.3
2	Take credit from different sources	169	93.9	11	6.1
3	Participate in different meetings	153	85	27	15
4	Participate in different trainings	156	86.6	24	13.4
5	Continuously contact with DAs	180	100.0	0	0
6	Member of different association	174	96.7	6	3.3
7	Receiving technical assistance	160	88.9	20	11.1
	Total	1150	638.8	110	61.3
	Average	164.3	91.2	15.7	8.8

businesses and their small-scale nature and lack of transportation to credit institutions which are often located in urban areas or more populated rural towns and villages.

In addition to the above problems, the men do not give the chance and right for his partners. One reason for this is hesitation of wives from taking money from credit providing organization and the fear to payback if she loses that money (Abera et al., 2006).

Contact with development agents (DA)

The data indicates that the contact of rural women with the DAs is almost zero. This gap of contact is caused by the problem raised from both sides which are DAs and rural women's sides.

The first one is deep-rooted, erroneous beliefs on the part of extension workers making them to overlook women. They may claim that it is difficult to establish dialogue with women (who are, in any case, of only minor importance in agricultural production), that women have little say in farm decisions or a poor grasp of what extensionists are teaching, or that they are too shy or reluctant to accept new technology.

Women get information from neighbors while participating in indigenous self-help and social network associations, as well as through their husbands, school children and friends. The sources are mostly informal, indirect and sometimes provide incomplete information. This limits their role for the future in the community and development.

Other factors hindering women's participation in agricultural extension training are their lack of formal schooling, mobility and time for extension activities. However, women are good at finding ways of balancing domestic responsibilities with farm duties.

Their inclusion in extension programs would make their work more productive, helping to boost agricultural production. Extension programs would be more likely to succeed if they were tailored to women's special circumstances (Samuel et al., 2009).

Member of different associations

Women rarely belong to cooperatives and other similar association. The data shows that their membership in different organization is only 3.3%, but cooperative membership is often a necessary qualification for government-subsidized inputs for small farmers. The lack of extension service provision and not being a member of different association of women restricts their control over inputs such as improved seed, fertilizer and pesticides.

Participation in different meetings

Rural women's participation in different meetings, trainings, experience sharing visits, etc. is crucial to enable them to increase the level of consciousness, acquire the knowledge and improve skills required to expand the range of their income-generating activities in a changing rural economy. Men are expected to participate in such events and pass on the information and knowledge gained to their wives.

However, in practice, there is often little 'trickle across'. Women participate directly in women's associations but the activities are dominated by social or political discourse, whereas topics relating to farming skills, technologies, land use rights, water and natural resource use and management are peripheral (Berhanu et al., 2006). The level of rural women's participation in different trainings, meetings, discussions and in any other forum of exchanging idea is about 15%. In general, however, women in rural areas tend to be less educated than both urban women and rural men.

According the discussant information, young, educated (and often single) women are more likely to migrate to urban areas, which reduces the overall education levels of women remaining in rural communities and, over time, could eventually lead to the total abandonment of rural areas. In many instances, for young people to increase their consciousness about relatively civilized life, they are often required to leave their rural community and their chance of return is very low. Moreover, lack of available

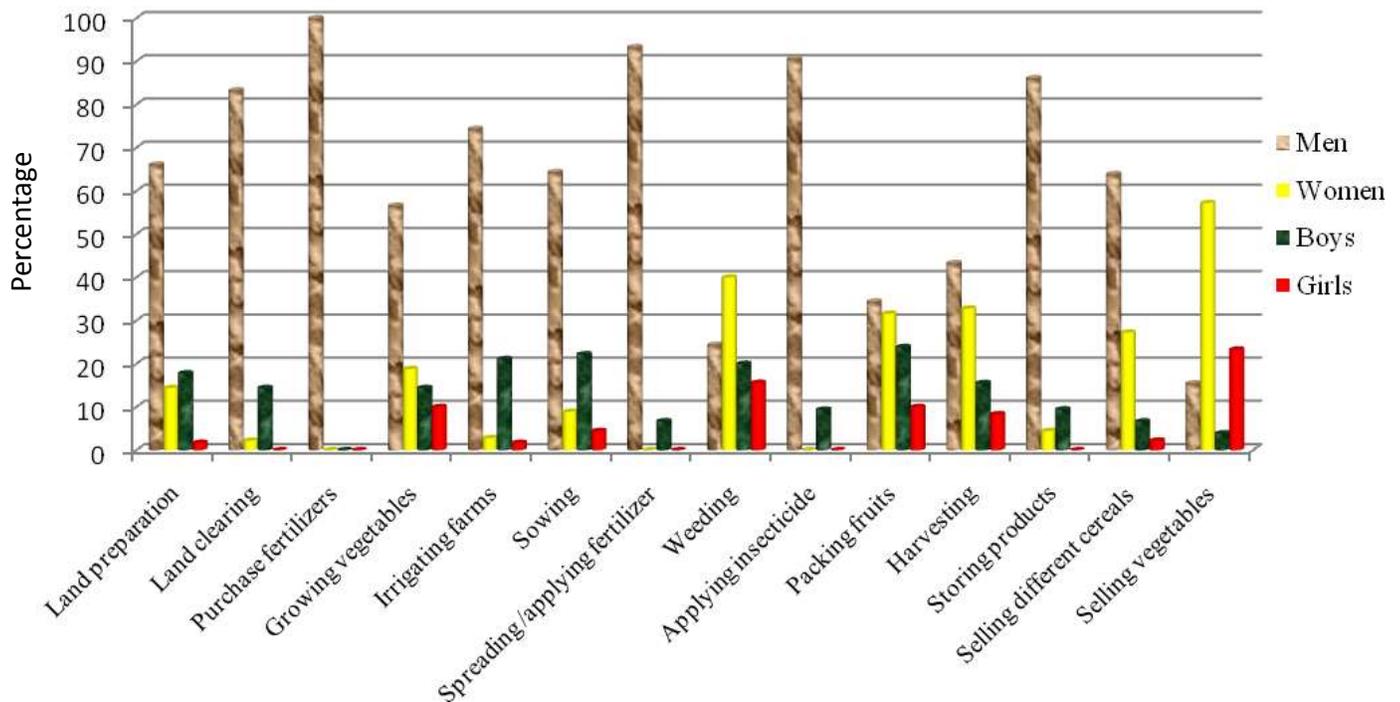


Figure 1. Gender based division of labor with regards to productive activities.

time acts as a further constraint, due to rural women's double and often triple workloads, as discussed above (MOFED, 2006).

When women do participate even in little trainings, the subject matter trained usually deals with activities of such limited nature, scope and profitability and the result is often further marginalization rather than mainstreaming of rural women into the changing economic base of rural communities (Abera et al., 2006).

Gender based division of labor on productive activities

In the study area, the traditional division of labor most often situates women in roles based on providing emotional support and maintenance, while men are primarily responsible for economic support and contact with the world outside the home. Women's participation is in activities such as cooking, fetching water and food processing, all of which are outside the cash economy and concentrated around the household. Women are not given the opportunity to compete with men for certain jobs, even if women may do the jobs better than some men. Because of socio-cultural socialization and their biology, women in the study area have tended to dominate non-market activities (UNICEF, 2007).

Unfortunately, most women do not consider their chores as 'work' and thereby do not rate these activities

as entitled to any form of recognition. This is a perception most often reflected in the inequalities that women suffer, and reveals why it is unlikely that they will be active in decision-making. The above data (Figure 1) reflects how much the rural women are neglected from productive activities and how much these activities are controlled by rural men.

The gender division of labor in the agricultural sector in the rural area is one of the problems in fighting poverty with full social power. In this sector, rural women could contribute a lot but because of labor division, they are forced to remain in reproductive activities whereas men are engaged in productive activities (Ngome, 2003). Despite women being the main farmers or producers, their roles are largely unrecognized because of the fact that they are given mainly domestic activities which almost do not generate income. The research result in Figure 1 reflects this fact. The gender division of labor found in Table 1 can be shown in the graphic form to recognize the difference easily. It shows how gender division of labor is biased to men and the productive works are controlled by men.

The particular tasks done on farms by men and women have certain common patterns. In general, men undertake the heavy physical labor like land clearing or preparation and jobs which are specific to distant locations, such as livestock herding, while women carry out the repetitious, time-consuming tasks like weeding and those which are located close to home, such as care

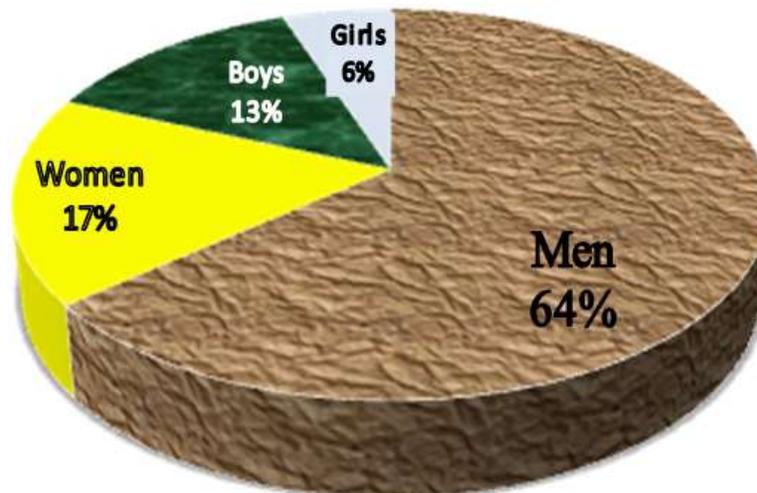


Figure 2. Average gender based division of labor with regards to productive activities.

of the kitchen garden. In most cases, the application of pesticides is considered a male task, even though women are not aware of the danger of exposure to chemicals to their unborn children. Women do a major part of the weeding of crops. Purchasing fertilizer fully and applying modern fertilizer mostly are among the duties left of men only. Packing fruits is one of the agricultural activities relatively neutral to gender division of labor. Care of livestock is shared, with men looking after the larger animals and children especially boys, and the smaller ones. Vegetable marketing is often seen as a female task, whereas marketing cereals are among the tasks men are responsible for. Women have often been excluded from agrarian reform and training programs in new agricultural methods.

The pie chart (Figure 2) indicates that about 64% of productive activities are carried out by men. Only 17% of productive activities are carried out by women. Similarly, girls have less proportion than boys (14 and 6%). This indicates that productive activities are mainly men's work than women's (Adereti, 2005).

Rural women's control over productive resources

As it is indicated on Table 2 another focus of this research was rural women's control over different productive resources. The previous roles on productive resources are used to examine the control over, of rural women on these resources. The data of these types of resources and their control over is analyzed and the disaggregated data are presented in Figure 3.

Land

As shown in Figure 3, rural women exercises only 7%

control over the land. They have no significant control over land and there is no historical background to bequeath land to daughters by their fathers.

In the area where this research was done, women do not own the land they cultivate. Discriminatory culture and practices for inheritance of ownership to land are still widespread. Land that women do own tends to be considered as transfer to another clan, probably as a result of the woman's marriage.

Even if she had married and her partner died at any age the right of land passes to their eldest son or in the case where there is no boy, the nearest related person will own or control the land. High and intolerable pressure will be exerted from the society on females as they is going to neutralize their culture in the cases where she claims to inherit the land. If a women partner does not have a boy and only girls, she feels as she has no one who will inherit the fixed property that they have owned.

There was a case in Mirab Abaya District where a woman tried to register the land that they had before her partner passed away. The kebele administrators was afraid to reject her registration because of her legal right, but the whole community mobilized to exclude her from different social activities (social sanction). She was threatened by the mobs of the community towards her and finally gave her registration license to the concerned body of kebele which decided on her land was to be administered according to the interest of the society. This kind of social or cultural barrier to inherit land is relatively loose in urban area than rural area where it is very strong and deep rooted (World Survey, 2009).

Labor

The data shown in Figure 3 indicates that 74.1% of the

Table 2. Distribution of respondents with regards to control of productive resources.

No.	Productive activities	Men		Women		
		f	%	f	%	
1	Land	Farm	175	97.2	5	2.8
		Communal land	175	97.2	5	2.8
		Home garden	112	62.2	68	37.8
		Grass land	180	100.0	0	0
		Forest lands	175	97.2	5	2.8
		Contracted land	180	100.0	0	0
		Wet lands	175	97.2	5	2.8
		Average land	167.4	93	12.6	7
2	Labor	House hold's labor	179	99.4	1	0.6
		Wife's labor	71	39.4	109	60.6
		Boy's labor	179	99.4	1	0.6
		Social labor	180	100.0	0	0
		Girl's labor	12	6.7	168	93.3
		Dependents' labor	180	100.0	0	0
		Average labor	133.5	74.1	46.5	25.9
3	Water	Water for irrigation	175	97.2	5	2.8
		Potable water	34	18.9	146	81.1
		Livestock's water	179	99.4	1	0.6
		Spring water	144	80.0	36	20.0
		Sanitation water	49	27.2	131	72.8
		Average water	116.2	64.5	63.6	35.5
		4	Livestock	Oxen	162	90.0
Cows	78			43.3	102	56.7
donkey	180			100.0	0	0
Mules	180			100.0	0	0
Poultry	67			37.2	113	62.8
Sheep's	180			100.0	0	0
Goats	180			100.0	0	0
Average livestock	146.7			81.5	33.3	18.5
5	Inputs	Fertilizer	180	100	0	0
		Improved seeds	170	94.4	10	5.6
		Improved poultry	110	61.1	70	38.9
		Pesticide	180	100.0	0	0
		Average Inputs	160	88.9	20	11.1
6	Finance	Equb	180	100.0	0	0
		Micro-finance	180	100.0	0	0
		Edir	180	100.0	0	0
		Bank	180	100.0	0	0
		Safety net	179	99.4	1	0.6
		credit from persons	179	99.4	1	0.6
		Average finance	179.7	99.8	0.3	0.2

right to control labor is reserved for men and women's right to control labor is only 25.9%. This one fourth right to control labor is only her labor and girls' labor. Mostly, the girls' labor is controlled by women, whereas the boys' labor is controlled by fathers. If mothers want to order

young boys, she had to have permission from the father who controls their labor. The reason why men have no control over girls' labor and full control over boys' labor is based on the labor division where girls exercise reproductive role and boys' productive role.

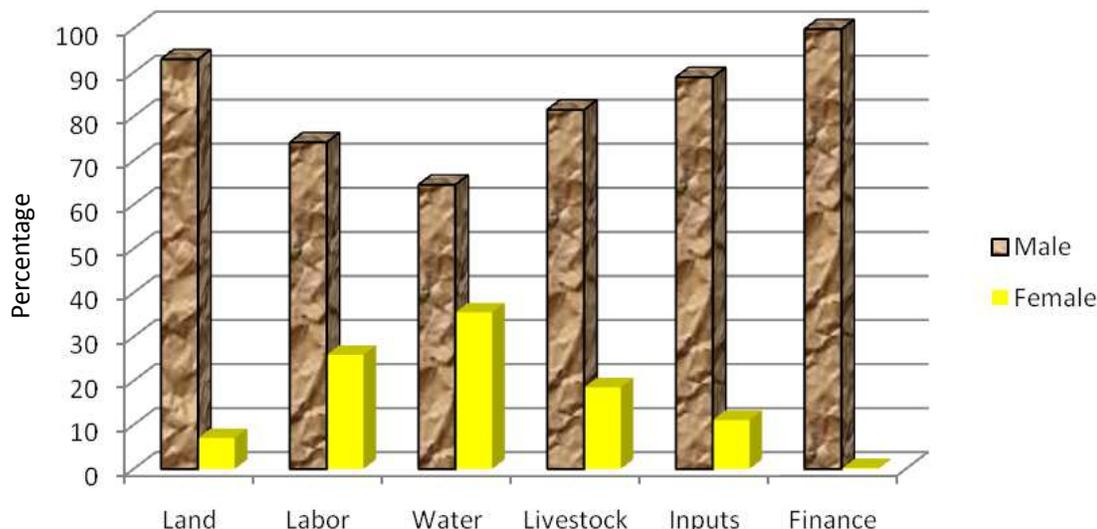


Figure 3. Rural women's control over main productive resources.

In the case where there is no husband because of different reasons, the chance of leading the whole family lies on the eldest male child of the family. If the eldest child is very young or there is no male child, the house may be headed by the female, but it is under the patronage of the nearest male relative. In this case, she cannot sell or exchange any permanent assets without the approval of that person.

Water

The power of rural women to control water resources varies based on purpose of water. In a case where water is for irrigation and livestock, it is controlled by men. In another way, if it is for home consumption or for sanitation, it is under the control of women. This indicates the way resources are divided. If it is for productive purpose, it goes to men's control and the opposite will be applied if it is for reproductive purpose. When it is generalized, 64.5% of water resource is controlled by men and 35.5% by women.

Livestock

The above data also revealed that 81.5% of the right to control livestock is for the men. Only 18.5% is reserved for rural women. From this data, one can conclude that rural women have almost no control over livestock and their production. The right to control livestock is almost reserved for men. The decision related to livestock is solely controlled by men except few men who want to discuss some issues simply for the sake of discussion. Even some men claim to control milk and milk products in which rural women considered as where they have

control right in comparison with other products (Berhanu et al., 2006).

In some houses, poultry can be owned by different members of the family. Except that in some cases, the production of poultry is controlled by men just like other livestock and their product.

Inputs

Rural women have 11.1% of control over different inputs related to productive activities. In contrary, men have 88.9% of control over different resource related to productive activities. They have better control only in poultry inputs when compared with male counterparts.

Financial resources

The control over financial resources of rural women is only 0.2%, whereas the control of men on financial resources is 99.8%. This is the data in researches which is highly surprising. With this, almost zero control over financial resource, their contribution to economic growth is almost insignificant. This means their role is bounded on reproductive role only (Lemlem et al., 2010). Though much efforts has been made, rural women farmers have no control over finances to purchase even impertinent inputs such as fertilizers, pesticides and veterinary medicines which are critical to increase production and productivity.

Difficulties in gaining control over credit restrict womens' use of inputs, and this has consequences on productivity. The obstacles that women face in gaining both control over credit has not correctly been addressed by some recent innovations developed by lending

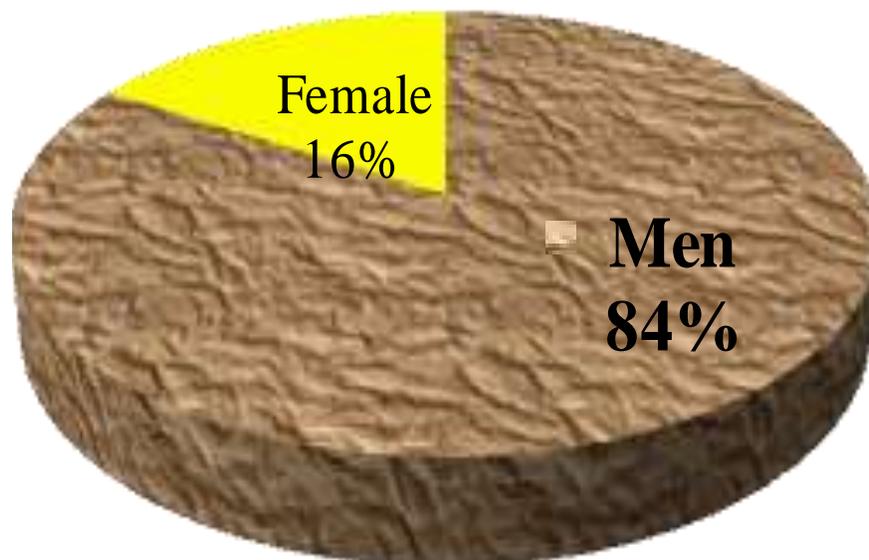


Figure 4. Rural women average control over productive resources.

institutions to overcome these problems (Pitt et al., 2006). Men have 84% of control over total productive resource when all control of productive resources is summed up (Figure 4). Whereas, only 16% of control over the productive resources are left for rural the women. This indicates that the lion's share of control over productive resources is taken by men.

Implication of the result to poverty reduction

Poverty can be defined as the combination of uncertain or non-existent income and a lack of control over economic resources needed to ensure sustainable living conditions. It often goes hand-in-hand with hunger, malnourishment, poor health, high mortality and morbidity rates, insufficient education and precarious and unhealthy housing (MOFED, 2006).

The Convention on the Elimination of all Forms of Discrimination against Women (CEDAW) provides a comprehensive framework for the guarantee of women's full rights to economic and social benefits. Article 14 specifically addresses the situation of rural women, stipulating that "States Parties shall take all appropriate measures to eliminate discrimination against women in rural areas in order to ensure, on a basis of equality of men and women, that they participate in and benefit from rural development and, in particular, shall ensure that such rural women have the right to control productive resources like agricultural credit and loans, marketing facilities, appropriate technology, equal treatment in land and agrarian reform as well as extension services and participation in different social affairs to empower rural women (Adereti, 2005; Ngome, 2003; Skied, 2007).

Control over productive resources strongly influences

efforts to achieve entire development and reduce poverty; thereby to realize the Millennium Development Goals (MDGs). For instance, control over the land is closely tied to efforts to achieve Goal 1 on eradicating extreme poverty and hunger due to the link between food security and utilization of land. In terms of achieving Goal 3 to promote gender equality and women's empowerment, use of land, own and control economic resources, property and inheritance rights are important indicators of women's empowerment and human development (MOFED, 2006; Skied, 2007).

Whereas, this study shows that the rural women's control over productive resources is very little. Without fair control over the productive resources, the equitability of gender is unlikely and by the same token, their contributions towards poverty alleviation endeavor are negligible. They do not have frequently contact with extension agents and do not participate in development oriented trainings. They have no first hand or new information about economic development. Instead, they have to rely on information being passed on to them from men or her husband, or ideas gleaned through their informal networks. In turn, this will affect their ability to control resources, to increase productivity and their ability to innovate and fulfill their productive potential.

In general, these can decrease women's contribution to poverty reduction and thereby attributed to the absence of economic opportunities and autonomy, lack of control over economic resources, including credit, land ownership and inheritance and support services and their minimal participation in the decision making process (MOFED, 2006). In the area where this research is carried out, rural women contribute minor effort to the Reduction of poverty. This is a very alarming result for different stockholders who engage in women empowerment.

Conclusion

Female farmers in the two surveyed districts have limited control over major productive resources such as irrigation water, credit, extension services and rural institutions. These are further aggravated by the cultural barriers, low infrastructure and educational level. Moreover, they face various constraints which hamper their efforts to uplift their lives and those around them.

However, facilitating control over productive resources by poor rural female farmers is not a one-time event, but an institutional process requiring permanent adaptation to changing circumstances of power, economics and culture. Therefore, empowering women is essential not only for the well-being of individuals, families and rural communities, but also for overall economic productivity and thereby to reduce poverty.

Recommendations

Ensuring women's economic empowerment and control over resources requires an integrated approach to growth and development, focused on gender-responsive employment promotion and informed by the interdependency between economic and social development. Social objectives need to be incorporated into economic policies. A participatory, continuous, gender-differentiated database is imperative in identifying target groups for extension services, reorienting extension programs, maximizing experience, ensuring feedback and monitoring and evaluating extension activities.

Empowerment helps rural women gain control over their own lives, communities and in their society, by acting on issues that they define as important. Hence, empowerment of rural women should be viewed as a means of creating fertile ground for them to exercise their right and protest men to have equal control over productive resources either individually or collectively for social transformation. Empowerment should include multi-dimensional social process, sociological, psychological economic spheres and at various levels, such as individual, group and community and challenges assumptions about status quo, asymmetrical power relationship and social dynamics.

Empowering women puts the spotlight on education and employment which are an essential element to sustainable development. Working with partners to facilitate women's access to extension advice, credit and inputs, especially for crop and livestock enterprises that are mainly in the women's domain can increase their role in controlling economic resources. Targeting women and female-headed households to participate in technology development, transfer and adoption is taken with great attention by different development actors.

Conflict of interests

Authors have not declared any conflict of interest

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Full Length Research Paper

Management performance of farmers' groups and its impact on membership: A prerequisite for group sustainability in Trinidad

David Ram¹, Wayne Ganpat² and Lendel Kade Narine^{3*}

¹Ministry of Agriculture, Land and Fisheries, Trinidad and Tobago.

²Department of Agricultural Economics and Extension, University of the West Indies, Trinidad and Tobago.

³Department of Agricultural Education and Communication, University of Florida, United States of America.

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The Government of Trinidad has implemented plans to promote the establishment of new farmers' groups and also strengthen existing groups. It is expected that extension officers will work more with farmers in groups to increase extension-to-farmer interactions. Groups however, have not been sustainable in Trinidad. The study examined group members' perceptions of how management functions are performed, and how such performance is related to their satisfaction with being a member of the group. A convenient sample of 150 farmers from 87 farmers' groups across the country was surveyed using a structured instrument. Calculated means show farmers perceived the planning, organizing and leading management functions were moderately performed, with the controlling function being even lower. A one-way within-subjects ANOVA model showed there was a statistically significant difference in mean perceived performance in functions of management. OLS results showed statistically significant and positive correlations between members' perception of groups' organizing, leading and control activities, and their satisfaction with membership in the group ($R^2 = .55$). The major implication is that if basic management functions of groups are not strengthened then the sustainability of groups and thus government's food security objectives would be at risk.

Key words: Management functions, farmers' groups, performance, membership satisfaction, Trinidad.

INTRODUCTION

With an extension officer to farmer ratio hovering around 1:600 over the past few decades in Trinidad (Ganpat, 2013), farmers are not visited by an extension officer on a regular basis. However, some efforts have been made to

promote farmers' groups in an attempt to increase farmers' access to extension services. The Ministry of Food Production, Land and Marine Affairs, in its National Food Production Action Plan, stated that it intends to

*Corresponding author. E-mail: lendelkn@yahoo.com.

engage in capacity building of farmers' groups not only to enhance cohesiveness and promote better organizational structure, but also to enhance technology dissemination efforts (MFPLMA, 2011). Other national agricultural agencies have also attempted to work together to build and sustain farmers' groups (Francis, 2010). Ramdwar et al. (2014) noted that even regional agencies such as the Technical Centre of Agriculture and Rural Cooperation (CTA), and the Caribbean Agricultural Research and Development Institute (CARDI) have also placed emphasis on supporting farmers' groups.

One prerequisite for success with farmers' collective action is trust; not only among farmers but also in their leaders. Danida (2004) noted that accountability of leaders is one major factor affecting farmers' organization. Ostrom (1990) reported that internal factors such as inadequate mechanisms to develop trust and lack of capacity to communicate with each other negatively impact the sustainability of farmers' groups and this limits their impact on improving the livelihood of small farmers. The International Fund for Agricultural Development (IFAD) highlighted the importance of leadership in farmer organizations, stating that leaders' roles are important in reducing poverty in developing countries (IFAD, 2010). However, the intergroup dynamics of farmers' groups in Trinidad have been marginally explored, and there has been little research on the effectiveness and sustainability of such groups (Ramdwar et al., 2014).

The official registers in Trinidad are replete with names of farmers' groups that have been formed; yet short lived. Why do farmers' groups fail to survive in an environment where the benefits from group involvement are known? Ramdwar et al. (2013) found that in the Caribbean region, the main issues that limit involvement in groups include poor leadership, weak task cohesion, low levels of farmer satisfaction with group membership, and lack of trust. The results of this work also suggested that good governance can positively impact the formation and functioning of farmers' groups.

Success with farmers' groups has also been linked to leadership abilities and failure has been associated with attempts to undertake activities that require experience and skills in effective collective action (Stringfellow et al., 1997; FAO, 1994, 2001). On the other hand, Ramdwar et al. (2014) found that leadership was a major issue in farmers' group sustainability and training was recommended for leaders and potential leaders in governance. Public extension officers in Trinidad are charged with the responsibility of promoting and building farmer group capacity. Extension officers identified technical capacity and proper functioning of groups as the main predictors of satisfaction with membership in such groups (Ramdwar et al., 2015). Satisfaction, as noted before, impacts involvement in groups.

While there is the need to better understand the

conditions under which collective action is useful and viable (Markelova et al., 2009; Poulton et al., 2010), intra-group dynamics have been singled out (Liverpool-Tasie, 2012) as one factor not properly investigated in developing countries. Management of groups, we contend, is a core area of intra-group dynamics, and is the focus of this study. Ali (2012) pointed to management skills as a key factor in farmer group development. Similarly, Zumda (2010) indicated that leaders needed several management skills, and Vilas et al. (2005) suggested that the ability of managers is one of the most important factors determining the success or failure of farmers' groups.

In spite of the stated benefits of involvement in farmer groups, there has been a decline in participation in farmer groups (Rouse and Juhaz, 2006). In Trinidad, anecdotal evidence shows a reduction in attendance at meetings and reported discontinuance of payment of membership fees. Why this situation exists has not been fully explored. While many reasons may account for such a situation, this investigation will focus on management factors. It is posited that management factors affect group membership satisfaction, and consequently impact the sustainability of groups; a prerequisite for sustaining the livelihoods of farmers and food security.

The aim of the study is to investigate the role of management functions on membership satisfaction in farmer groups. Specifically, the study seeks to;

1. Describe members' perceptions of selected management functions;
2. Describe farmers' satisfaction with group membership;
3. Assess differences in membership satisfaction based on selected management functions;
4. Estimate the relationship between management functions and farmers' satisfaction with group membership.

Literature review

According to Bartol and Martin (1998), management is defined as the process of achieving organizational goals by engaging in four basic functions; planning, organizing, leading and controlling. Planning is the process of setting goals and designing strategies to achieve these goals (Bartol and Martin, 1998). In the context of farmer groups, planning activities include the identification and analysis of problems facing farmers, developing feasible solutions, prioritizing problems and solutions based on availability of funds, and developing an action plan (CRS and MEAS, 2015). As a function of management, planning is an ongoing activity and can be extended to designing measures of evaluation for monitoring progress towards meeting organizational goals (Rockwell and Bennett, 2004). Organizing is the process of allocating and

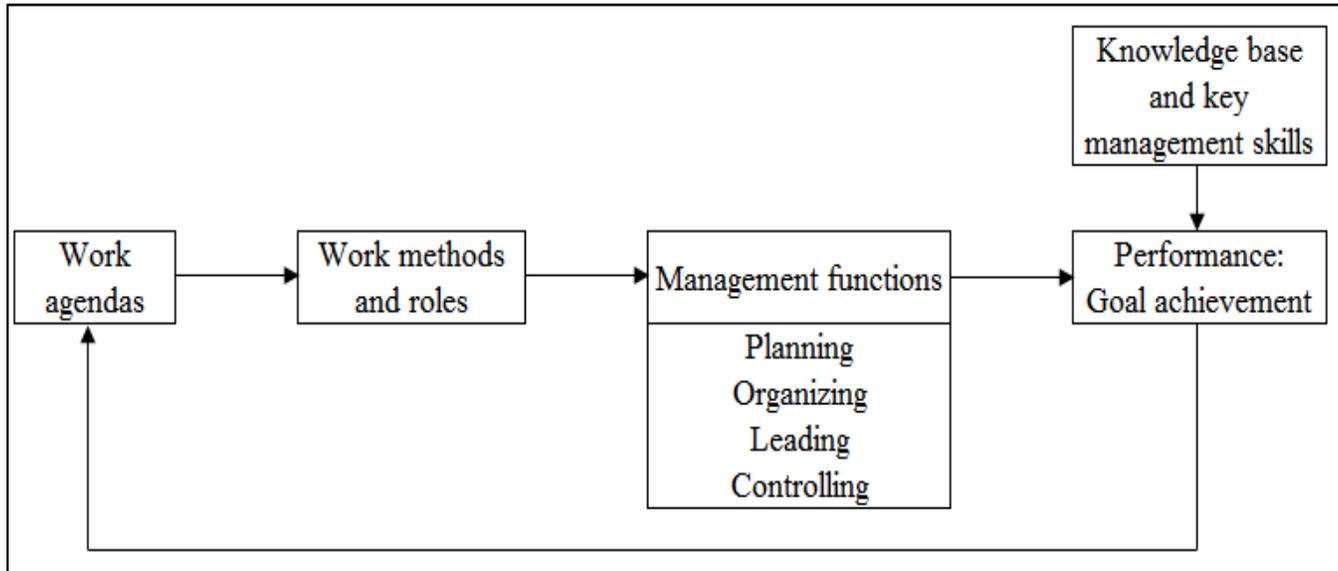


Figure 1. Management process.

arranging human and non-human resources to ensure the successful implementation of plans. It involves prioritizing tasks in alignment with the structure of the organization (Bartol and Martin, 1998). Organizing can include budgetary considerations, membership payment schemes, and allocation of incentives to farmers. Controlling is the process of regulating organizational activities to ensure that the actual performance conforms to the expected organizational standards and goals. Controlling is focused on formative or process evaluation, and involves the continuous monitoring of a group's performance in comparison with the performance benchmarks (Bartol and Martin, 1998). The results of formative evaluation are utilized to adjust program activities to ensure continued or improved program effectiveness (Rossi et al., 2004). Leading is the process of influencing others to engage in work behaviors necessary to accomplish organizational goals. Leading includes communicating a vision, providing direction, motivating members, and encouraging change and innovation (Bartol and Martin, 1998). Evidently, these functions of the managerial process outlined are broad in nature. However, such functions are central to the achievement of organizational goals, and should be strongly factored into the management of any type of organization, including farmer groups.

Bartol and Martin (1998) proposed a simple management process to show the effect of management functions on performance (Figure 1). The model illustrates antecedents to organizational performance, starting with work agendas. A work agenda is considered as a set of tentative goals and tasks of management

(Bartol and Martin, 1998). Stewart (1982) noted that work agendas are affected by three main factors: Job demands, job constraints and job choices. Job demands are "must do" activities, job constraints are internal and external factors limiting management's ability to complete tasks, and job choices are optional activities of management. Management tends to align agendas to work roles and methods (Kotter, 1982). Work roles are a set of behaviors associated with a position (Mintzberg, 1980). Three main types of roles are: interpersonal, informational, and decisional (Mintzberg, 1980). Interpersonal roles are directly linked to the authority of management and involve developing and maintaining positive relationships. Informational roles allow management to serve as a knowledge center for their organizations by receiving and transmitting information. Decisional roles entail making important decisions that affect the organization. Work agendas, methods and roles affect the functions of management (that is, planning, organizing, controlling, and leading). In turn, organizational performance and goal achievement are dependent on the execution of these activities (Bartol and Martin, 1998). However, management skills and knowledge base also affect performance. Management skill is the ability to engage in a set of behaviors that lead to a desired performance level. Katz (1955) identified three types of managerial skills as: technical, human and conceptual. Knowledge base refers to the information about the industry and relevant technologies, company policies and practices, goals and plans, culture, personalities of organization members, and important suppliers and customers (Bartol and Martin, 1998).

This study operationalized organizational performance as farmers' perceptions of performance on four functions of management, and sought to examine the effects of these managerial functions on membership satisfaction. As such, organizational performance was assessed and interpreted based on farmers' perception of the effectiveness of the group's management functions [Planning (MF_P), Organizing (MF_O), Controlling (MF_C), and Leading (MF_L)]. These functions were specified as independent factors affecting farmers' satisfaction with their membership in the group (SM). A positive relationship between farmers' perceptions of management functions and satisfaction with membership was hypothesized. Therefore, if farmers perceived high performance in the groups' management, then they are more likely to be satisfied with group membership. The study assumes that satisfaction with group membership positively affects the sustainability of farmers' groups and achievement of food security.

METHODS

Due to the unreliable statistics in the official register, the exact number of active groups in Trinidad is unknown. However, checks and cross-checks were done with the lists of groups from The Agricultural Society of Trinidad and Tobago (the umbrella organization for farmers' groups), the National Agricultural Marketing and Development Corporation (the national marketing agency) and the Regional Agricultural Administrations (North and South) of The Ministry of Agriculture. Such checks gave an indication of the number of active groups at the time of the study. Some 87 farmers' groups were identified as existing across the country; this is the study population. A convenient sample of 150 farmers was chosen from these groups.

This study used a cross-sectional design and a survey methodology. A self-reporting survey instrument was used to gather data and the response rate was 90%. The survey instrument consisted of personal and farm related questions; 19 item statements were used to assess four management functions which includes: Planning (2 statements); organizing (4 statements); leading (9 statements) and controlling (4 statements). Respondents were asked to state their extent of agreement with each statement and these were scored as: Strongly agree (score = 4); Agree (score = 3); Undecided (score = 3); Disagree (score = 2) and Strongly disagree (score = 1). A ten-item scale of similar construction and measurement was used to assess the satisfaction with membership in the group. Internal reliability for the satisfaction scale was assessed and found to be acceptable (Cronbach $\alpha = 0.84$). The instrument used in this study is part of a more elaborate instrument used in a larger study being pursued for graduate research work. The instrument was validated by three experts in the subject area (two from the University of the West Indies and one from the Trinidad government extension services). A pilot test was done with 10 farmers in one farmers' group and some modifications were made. Results were presented as descriptive analysis of variance (ANOVA) and ordinary least squares (OLS).

RESULTS

Table 1 provides an overview of the sample characteristics.

Most respondents were males (86.6%), between 46 and 60 years old, and possessed secondary level education (42.9%). The majority had over 15 years of experience in farming (70.3%), and engaged mostly in crop production (78.5%). Most were full-time farmers (67.1%) and many operated on rented or leased land (45.8%). Respondents reported moderate level of profitability from agriculture (61.2%). With respect to farmer group status, many respondents were involved with their respective group for 1 to 5 years (45.9%), and the majority stated that the size of group membership exceeded 40 farmers (51.4%). Most farmers reported that they paid a group membership fee (86.4%) and had 75 to 100% meetings attendance (55.9%).

Table 2 provides an overview of farmers' perceptions of four management functions. With respect to planning, most farmers (77%) agreed that group members were involved in setting goals for the group. Similarly, most members (88%) agreed that all office holders in the farmer group were democratically elected. More so, most farmer group members agreed that the group leader always informed the group about important matters concerning the group and the leader is a good spokesperson for the group. Majority of farmers also agreed that the group leader played a key role in controlling the group by documenting and dating all information for reference, as well as review in cases of updates and/or changes. However, there were varied responses among farmers, including indecision and disagreement, on the function of organizing regarding regular scheduling of group meetings. A similar trend in response was recorded regarding the leading function of the group leader in relation to being a good problem solver and providing an atmosphere of trust within the group. The function of controlling received the highest level of indecision and disagreement regarding: sanctions for breaking the rules of the groups, existence of standards, policies and procedures (in written form) stipulating how to deal with the challenges that the groups are likely to face and honest and transparent accountability of groups' finances.

Table 3 presents findings of farmers' responses to ten item statements representing their satisfaction with membership in the group (Cronbach $\alpha = 0.84$). Based on the findings, farmers mostly agreed with statements such as "the group is not politically affiliated nor has a political agenda", "there is no corruption or misuse of funds in the group", and "the farmer group provides several benefits to members". In contrast, farmers did not agree with the statement "my standard of living has improved as a result of being a member of the group".

Table 4 presents the results of the one-way within-subjects ANOVA with contrasts. There was a statistically significant difference in the mean perceived performance based on functions of management (Greenhouse-Geisser adjusted, $F_{(2.80, 355.89)} = 9.465$, $p < 0.001$). Based on

Table 1. Descriptive summary of sample demographics.

Variable	Level	n(150)*	%
Sex	Male	129	86.6
	Female	20	13.4
Age (year)	18-30	8	5.4
	31-45	43	29.3
	46-60	75	51.0
	>60	21	14.3
Years in farming	<5	4	2.7
	5-10	24	16.2
	10-15	16	10.8
	>15	104	70.3
Type of farming	Crop	127	86.4
	Livestock	20	13.6
Land tenure	Family owned	42	29.5
	Rented or leased	65	45.8
	Occupied with permission	19	13.4
	Squatted	16	11.3
Farming status	Full-time	98	67.1
	Part-time	48	32.9
Perceived profitability of enterprise	Highly profitable	15	10.2
	Moderately profitable	90	61.2
	Breakeven	32	21.8
	Loss	10	6.8
Education	Primary school	48	32.7
	Secondary school	63	42.9
	Technical Diploma	26	17.7
	University degree	6	4.0
	Postgraduate degree	4	2.7
Size of farmers group (acres)	1-10	6	4.1
	11-20	14	9.6
	21-30	18	12.3
	30-40	33	22.6
	>40	75	51.4
Length of membership (year)	< 1	9	6.1
	1-5	68	45.9
	6-10	41	27.7
	> 10	30	20.3
Pay membership fees	Yes	127	86.4
	No	20	13.6
Attendance to meetings (%)	0 - 24	18	12.6
	25 - 49	11	7.7
	50 - 74	34	23.8
	75 - 100	80	55.9

*Totals vary in column due to non-responses.

Table 2. Descriptive summary of statement responses for management functions.

Statement	SD(%)	D(%)	U(%)	A(%)	SA(%)
Planning (MF_P)					
Members are involved in setting goals for the group	0	14	9	66	11
The group has clear objectives and goals that are written and shared with members	0	12	17	61	10
Organizing (MF_O)					
All office holders in the farmer group have been democratically elected	0	8	4	71	17
Farmer group meetings are held on regular scheduled dates	1	14	20	57	8
Members are consulted to decide which tasks are to be done first	1	14	8	65	12
More time, energy, money and resources are spent on the more important activities	0	17	8	66	9
Leading (MF_L)					
The group leader always informs the group about important matters concerning the group	0	8	5	71	16
The group leader actively tries to attract more members to join the group	0	8	12	67	13
The group leader provides clear direction on what the group has to do	0	7	15	60	18
The group leader has a strong influence to ensure that goals are achieved	0	8	14	66	11
The leader does not seek his/her own interests	3	12	17	52	16
The leader is a good spokesperson for the group	1	4	8	70	17
The group leader is a good problem solver	1	10	22	54	13
There is an atmosphere of trust in the group	0	10	25	52	13
The group leader conducts himself professionally and is a good role model	1	7	14	63	15
Control (MF_C)					
There are standard policies and procedures in written form which will cover most of the common problems the group has to deal with	2	14	28	51	5
There are sanctions for breaking the rules of the farmer group	2	26	32	34	6
Group finances/money are accounted for in an honest and transparent manner	1	7	24	49	19
All information is documented and dated for reference and reviewed to enable updates and changes	1	8	21	58	12

SD, Strongly disagree; D, Disagree; U, Undecided agree; A, Agree; SA, Strongly agree.

Table 3. Descriptive summary of membership satisfaction (SM) statements.

Satisfaction with membership	SD	D	U	A	SA
The group is not politically affiliated nor has a political agenda	2	10	13	47	28
There is no corruption or misuse of funds in the group	0	6	24	51	19
The farmer group provides several benefits to members	0	14	9	60	17
The benefits or rewards are worth the time, and effort of being a member of the group	0	13	12	66	9
I can be sure that I will obtain benefits, products and services as a member of the farmer group	0	12	14	66	8
The benefits or rewards are worth the costs of being a member of the group	0	14	16	60	10
I am generally satisfied with how the farmer group is managed and operated	1	24	15	52	8
Without the farmer group, I would not be able to access the benefits on my own	2	28	15	43	12
All members are committed and work to making the farmer group successful	3	23	22	47	5
My standard of living has improved as a result of being a member of the group	2	40	10	42	6
Mean satisfaction (range = 1 - 5)	3.61 (SD = 0.59)				

follow-up contrasts with a Bonferroni adjustment, there was a statistically significant difference in mean

perceived performance between controlling and the other three functions. Farmers perceived that management

Table 4. Differences in performance based on functions (One-way within-subjects ANOVA).

Independent factor	Level	Outcome: Mean perceived performance (Std. error)	F	P
Management functions	Planning (MF _P)	3.71 (0.07) ^a	9.465	0.000
	Organizing (MF _O)	3.73 (0.06) ^a		
	Leading (MF _C)	3.82 (0.60) ^a		
	Controlling (MF _L)	3.52 (0.05) ^b		

Follow-up contrast, $a \neq b$ with Bonferroni adjustment ($p < 0.008$).

Table 5. The effect of management functions) on satisfaction.

Variable	B	Std. error	T	P	VIF
[Constant]	0.43	0.27	1.62	0.109	
Planning	0.03	0.07	0.50	0.620	1.72
Organizing	0.25	0.08	2.30	0.003**	2.01
Leading	0.29	0.08	3.76	0.000***	1.69
Control	0.28	0.06	4.55	0.000***	1.39

$R^2 = 0.546^{***}$.

performance with respect to controlling was significantly lower than the other functions of management.

Table 5 shows the estimates of a linear regression, indicating the effect of management performance with respect to four functions on farmers' satisfaction with group membership. Overall, the model was statistically significant ($F_{(4, 117)} = 37.37, p < 0.001$), and independent factors explained 55% of the variation in farmers' satisfaction with group membership. There were statistically significant and positive correlations between members' perception of the effectiveness of groups' organizing, leading and controlling activities, and their satisfaction with membership in the group. As perceptions of groups' organizing, leading and controlling functions increased, member satisfaction significantly increased.

DISCUSSION

The management functions that were proposed by Bartol and Martin (1998) as being predictors of management performance in structured organizations were found to be consistent in this study. This study also determined that management performance impacted farmers' satisfaction with being in a group. Farmers responses to the statements under each of the functions assessed showed that there was some degree of disquiet among membership with the functioning of the groups in key management areas. The results indicated that farmers perceived moderate levels of performance in all four

functions of management. Moreover, capacity for the controlling function may be lacking in comparison to other functions.

While the model used in this study is taken from a context of a developed organization with highly educated managers, it contrasts sharply with farmers' groups; such groups being managed by farmer-leaders, who in developing countries are not likely to be highly educated, more so have any specialized training in management. The farmers in this study had mostly primary and secondary level education as their highest level of education attained. It is unreasonable to expect that these farmers have the requisite skills and abilities needed for the groups' effective management. As such, some attention has to be given to improving the capacities of farmers and farmer-leaders, and government, as the main facilitator of agriculture development should play a key role.

The areas for intervention have been identified; these are the areas in which farmers are not very satisfied. While all the functions assessed had generally moderate level of performance and needs to be developed, the controlling function needs priority attention. The findings of this study suggest the need to build the capacity of leaders and future leaders through educational programs aimed at improving management competencies. The central thesis of this study was that management functions were determinants of membership satisfaction and consequently on the sustainability of groups; sustainability of groups being a stated strategy for agricultural development in Trinidad. Membership

satisfaction is moderate, and it is impacted by management performance. Actions after such as training of leaders and the extension officers who work with them, can improve management performance and consequently impact farmers' satisfaction with being in the group. Extension officers will have to be trained to become the agents of change through group development; intra group dynamics that will bring about positive perceptions of groups' leading, organizing and controlling functions will have to be the focus. Ganpat et al. (2014) noted that for farmers to produce and earn a decent livelihood for themselves and their families, they require an extension service that satisfies their needs in a timely and effective manner. Extension has a role in educating groups on how to choose good leaders. Leaders should at least be early adopters as recognized by extension. If membership to a group is viewed as an innovation, then leaders should be at the forefront as change agents by encouraging participation through good discharge of management functions. Leaders and potential leaders in a group will have to be trained in management as part of a development agenda.

While membership satisfaction was indeed impacted by management issues, the sustainability issue is the one that will bring about larger, more meaningful change. As farmers stay in groups, the stated benefits to farmers of group involvement could be realized. Satisfaction was posited as an antecedent of long-term success such that increased satisfaction leads to sustainability of groups and farmers livelihoods. Finally, it is recommended that factors other than management factors, which may impact the sustainability of groups, should be examined.

CONFLICTS OF INTERESTS

The authors have not declared any conflict of interests.

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