

Determinants of Group Dynamics among Rice Farmers in Ogun State, Nigeria

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Abstract. Low productivity of rice occasioned by limited access to agricultural inputs is a major setback in achieving food security. Adoption of farmers' group has been the model engaged by development agencies to facilitate access to agricultural inputs among Nigerian rice farmers. This study investigated the determinants of group dynamics as well as benefits derived among rice farmers in Ogun State. A structured interview schedule was used to collect information from 161 rice farmers through a three-stage sampling procedure. Data were analysed using descriptive statistics, ranking, Chi-square, Pearson Product Moment Correlations (PPMC), and Principal Component Analysis (PCA) at $p \leq 0.05$. Finding revealed that Group Dynamic Index (GDI) was 0.64. Group members (60.9%) had access to agricultural inputs. Sale of produce ranked 1st among benefits derived by members followed by access to information and capacity building. Age ($\chi^2 = 20.32$), education ($\chi^2 = 12.59$), farming experience ($r = -0.04$), household size ($r = 0.03$) and access to agricultural inputs ($r = 0.91$) had significant relationship with group dynamics. Outcome of group dynamic was reduced by corruption among leaders (0.909), conflict among members (0.905), lack of cooperation (0.900) and poor management (0.890). Therefore, the study recommended proper monitoring by members and authorities for group activities. There is a need to build capacities of group members and officials through effective training in order to promote their understanding of group dynamics and benefits.

Keywords: Group dynamics, access to inputs, rice farmers, leadership, benefits

1. Introduction

Self-sufficiency in rice production is the goal of crop intensification and food security programmes in Nigeria. Achieving this goal to meet the ever growing rice demand remains a herculean task (Omotesho et al., 2015). Rice which is strategic to achieving economic transformation, awkwardly suffers supply-demand deficits (Falola, 2013).

Several policies and programmes have been introduced by Government of Nigeria in an effort to develop the six rice ecologies for the purpose of maximising their potentials. Unfortunately, almost all the ecologies are fraught with numerous challenges with its attendance effects on yield outcome. The upland ecology which has the greatest potential for optimal production is characterised by poor technology utilization, fertilizer and equipment, and low productivity. Upland rice farmers are finding difficulties in acquiring seeds, agrochemicals, and fertilizers to increase their yields and earn better income from production. In other words, access to agricultural inputs is inadequate which create a major setback to production increase among upland rice farmers. Bature et al (2013) and Davis (2009) have confirmed that farmers group is an efficient model to improve access to agricultural inputs to boost productivity and improve livelihood.

Farmers' group has been recognised as a form of collective action in which members constantly interact with one another on the basis of solving production challenges and collectively establishing their norms, rules, role, and sanctions as a means of enforcing compliance to facilitate their intended purpose (Abdulwahid, 2006). According to Nakazi et al, (2017), farmer's group is a forum for farmers to express their views, access technologies and information and make necessary recommendations to enhance their livelihood. Opportunities and benefits such as economy of scale, marketing participation,

increasing bargaining powers, and value addition to products are created through this forum (Gyau et al, 2012). More so, it enables resources to be pooled together thereby reducing risk burden on individuals and fosters collective marketing of products which reduces high transaction costs.

Ladele (1994) earlier pointed out that organized farmer groups are targets for the dissemination of new technologies with extension agents working with them to improve extension coverage of farming communities, providing supportive services for extension activities, and increasing farmers' access to innovations and widespread adoption. There is a growing preference among farmers to source information through social relationship from their fellow farmers who are members of social organizations to increase production. Liverpool and Winter-Nelson (2010) affirmed that social network is important in increasing productivity through knowledge sharing among rural communities. The dynamic farmers' group is increasingly significant in influencing rigorous farming activities and removing various constraints impeding rice production in Nigeria. Omotesho et al.(2015) asserted that social relationships where they exist among rice farmers can help bridge the numerous challenges confronting self-sufficiency in rice production.

Group dynamics is a term used to provide insight into the interactions that exist among individuals' members of a group and the forces influencing such interactions. The root of dynamics is drawn from the formation of farmer group. Thus, group dynamics in agriculture involves formation of farmers' groups for both production and marketing. The concept is complex including the way and manner members of a group engage with and influence each other's behaviour towards achieving group tasks. Thus, internal and external forces are activated during group processes and these forces tend to influence the extent of dynamics that can be achieved in the group (Swaminathan and Balan, 2013). However, inadequate knowledge of group dynamics may lead to low productivity and dissatisfaction among members (Toseland and Rivas, 2012). A better understanding of group dynamics can influence access to agricultural inputs and make farming activities more productive leading to higher returns to farmers. These among many other benefits derived from adopting a farmer group approach facilitate agricultural development (Naveenan and Kumar, 2018; Ramdwar et al, 2014).

Therefore, the specific objectives of the study are to:

- Describe the socio-economic characteristics of rice farmers the study area,
- Determine influence of group dynamics on access to rice production inputs;
- Examine benefits derived from group dynamics by the respondents,
- Analyse the determinants of effective farmer group dynamics in the area.

2. Literature review

A group is a social unit for the continued human existence. It is self-regulating through shared perception, interaction, sensing, feedback, and through interchange with its environment. Group dynamics is, therefore, a concept that explains the relationships of members in a group. Dynamics implies complex and interdependent internal and external forces that are operational during group processes. The diverse processes existing in a group influence whether the established group structure in terms of norm, role, rule, and decision making would lead to goal achievement which is the primary purpose of group formation. Understanding group dynamics gives credence to the purpose of group existence while inadequate understanding of group dynamics has led to unproductive group activities and members' dissatisfaction. (Naveenan and Kumar, 2018; Smokowski et al., 2001).

A conceptual framework of group dynamics is an important empirical device for understanding the group operations and how the group emerges during interaction. Several scholars have established five domains of group dynamics in their studies which include communication processes and interaction patterns, interpersonal attraction and cohesion, social integration and influence, power and control, and finally, culture (Bales et al, 2000; Forsyth and Elliott, 1999 and Hare et al, 1994).

Group members are communicating and sending messages to one another during group processes that have meanings. Effective leaders listen hard for the meaning of messages. In face-to-face groups, members are always communicating, because even if they are not communicating verbally, their nonverbal behaviour is observable which send some messages (Toseland and Rivas, 2001). Interpersonal attraction is just one of the building blocks of group cohesion. Other factors contributing to cohesion include (i) satisfaction of members' needs for affiliation, recognition, and security; (ii) resources and prestige that members believe will be garnered through group participation; (iii) expectations about the beneficial

consequences of the work of the group; and (iv) positive comparison of the group with previous group experiences. Those with minority opinions are more likely to be heard if they offer compelling and consistent arguments, if they are assertive about the importance of listening to their opinion, appear confident rather than rigid or close-minded, flexible and able to grant small concessions to the majority, and confront majorities that are not certain about their positions (Forsyth and Elliott, 1999). Therefore, members with minority opinions can have an important voice when their arguments are well reasoned and persuasive, especially in groups that value open-mindedness as a norm.

Levi (2001) viewed norm and culture as styles and approaches that group members use when interacting with each other. For example, the way conflict or competition is resolved in a group is a clear expression of its culture. The deepest level of culture consists of core ideologies, values, and beliefs held in common by members of the group. The measurement of group dynamics is essential in understanding the behaviour of individuals and of the group as a whole. A dynamic group is branded by a number of factors including strong interactions between various actors of the group, a strong dependency on time, and an internal complex causal structure subjected to feedbacks (Swaminathan and Balan, 2013). Therefore, a better comprehension of the complexities and diversity of group dynamics and factors that influence its outcome are paramount in engendering effectiveness of all activities of farmer group and predicting overall achievement.

3. Methodology

3.1 Study Area and Data Collection

The study was conducted in Ogun State, Nigeria. The State is located within the latitude $6^{\circ}21'$ and $7^{\circ} 8'$ North Equator and Longitude 3° and 5° East of the Greenwich Meridian. It has a population of 4.5 million people and dominated by the Yoruba ethnic group. Its favourable geographical location and weather condition makes the state suitable for the cultivation of diverse crops such as cassava, rice, maize, cocoa, kola nut, and oil palm. The population of the study comprises all members of Rice Farmers Association of Nigeria, RIFAN in Ogun State. A three-stage sampling procedure was used to sample respondents for the study. In the first stage of the sampling procedure, two major rice-producing Local Government Areas, Obafemi/Owode and Yewa North LGAs, were purposively selected for their high

level of rice production in Ogun State. The second stage involved the random selection of a total of 10 rice-growing communities based on probability not proportional to size. The sampled frame comprised 211 rice farmers and included communities such as Sowunmi, Ajana, Onidundun, Idiiroko and Lajila from Obafemi/ Owode LGA and Eegua, Igbogila, Anigbado, Ilogun and Ikeredu from Yewa North LGA. The final stage of the procedure involved the random selection of 75 percent of the total number of rice farmers in each selected community to give a sample size of one hundred and sixty-one rice farmers. Data were gathered with the use of a structured interview schedule administered using personal interview method. The content validity of the instrument was ensured through expert consultation and literature search. Reliability which ensures the consistency of the instrument in measuring the variable was ascertained using correlation coefficient (r). The coefficient (r) of 0.80 was estimated reflecting the high consistency of the research instrument.

3.2 Method of data analysis

Data analysis was performed using descriptive and inferential statistics and multivariate technique. Access to agricultural inputs was measured on a 3-point scale of regularly (3), irregularly (2), Not at all (1). The mean value was calculated based on the cut-off point using a minimum score (1) and the maximum score (3). The variables with mean values of less than 1.5 were regarded as lowly accessed while those with mean values of 1.5 and above were regarded as highly accessed by the rice farmers. Group Dynamic Index (GDI) was based on intra-group activities which enhanced group interaction and operationalized on a 3-point scale such as very much influence (3), somewhat influence (2), No influence (1). GDI was calculated on the aggregate score divided by the total number of variables. GDI was estimated at 0.64 which indicated high group dynamics level. Constraints to group dynamic were determined on a 3-point scale including very serious (3) serious (2) and not serious (1). Benefit derived from group dynamics was measured by ranking in order of accrued benefits derived from group dynamics by rice farmers.

Descriptive statistics such as frequency, mean, percentages, ranking were used to describe the socioeconomic characteristics, access to agricultural inputs, and benefits of group dynamics. Chi-square and Pearson Product Moment Correlation (PPMC) were employed to determine the relationship between

socioeconomic characteristics and group dynamics while Principal Component Analysis (PCA) estimated the determinants of group dynamics using the constraint variables at $p < 0.05$ level of significance.

4. Results and Discussion

4.1 Socioeconomic Characteristics of Respondents

Table 1 presents results on the socio-economic characteristics of the rice farmers. The result reveals that 60.8% of the respondents fall within the age bracket of above 50 years. This implies that rice production in the area was dominated by young and middle aged people in the study area. The implication is that rice production appears to be attractive to the younger generation. The result corroborates the finding of Ogundele and Okoruwa (2006), which affirmed that the rice sub-sector needs the injection of young generations.

Majority (82.6%) of the rice farmers were males. This may be due to the nature of rice production

which is usually strenuous, laborious, and time-consuming which could discourage female from getting more involved. Many of them (84.5%) were married. This suggests that farming may be a means of catering for their households. Quite a large number (75.7%) had one form of formal education or the other with the highest level of education being secondary school. Educational attainment of the rice farmers could assist them in understanding the process and dynamics of groups.

More so, 74.5% of the respondents cultivated 1-3 hectares of land with average farm size of 2.76 hectares. This described them as small farm-holders who operate at subsistence level. Majority (83.2%) of respondents had over 5 years of rice farming experience. Experience is expected to assist the respondents in risk management while actualizing the goal of increased rice production. Majority (83.9%) had, at least, 4 members in their family with a mean of 6 persons. This implies that they have a fairly large family size which has implications for family labour supply. Sule et al., (2002) earlier observed that family labour constituted majority of labour supply to the agriculture sector.

Table 1: Socio-economic characteristics of respondents (n = 161)

Socio-economic characteristics	Percentage (%)	Frequency	Mean (\bar{x})
Age (years)			
< 30	23	14.3	
31-40	40	24.8	
41-50	50	36.0	43.9
51-60	33	20.5	
>60	7	4.3	
Sex			
Male	133	82.6	
Female	28	17.4	
Marital status			
Single	14	8.7	
Married	136	84.5	
Divorced	8	5.0	
Widowed	3	1.9	
Educational level			
No formal education	39	24.2	
Primary	44	27.3	
Secondary	53	32.9	
Tertiary	25	15.5	
Household size (persons)			
1-3	26	16.1	
4-6	78	48.4	

7-9	47	29.2	6.0
10-12	8	5.0	
>12	2	1.2	
Farming experience(yrs.)			
< 5	30	18.6	
5-10	58	36.0	
11-15	39	24.2	12.0
16-20	21	13.0	
>20	13	8.1	
Farm size (ha)			
1-3	120	74.5	2.76
4-6	41	25.5	

Source: Results of Field Survey, 2015

4.2 Access to Agricultural Inputs

The results in Table 2 indicate that majority of the rice farmers had regular access to agricultural inputs such as fertilizers (90.1%), credit facilities (81.4%), herbicides (75.2%), and improved seed varieties (62.7%). This may suggest that access to agricultural inputs was probably influenced existence of group dynamics among the farmers in the study area. This finding agrees with Liverpool and Winter-Nelson, (2010); Swaminathan and Balan, (2013) that mobilisations of resources like credit, extension services, fertiliser and seed are facilitated through group dynamics.

Table 2: Distribution of respondents based on access to agricultural inputs (n= 161)

Agricultural inputs	Extent of Access		
	Regularly Freq. (%)	Irregularly Freq. (%)	Not at all Freq. (%)
Fertilizer	145 (90.1)	11 (6.8)	5 (3.1)
Herbicide	141 (75.2)	31 (19.3)	9 (5.6)
Improved rice varieties	101 (62.7)	48 (29.8)	12 (7.5)
Credit facilities	131(81.4)	13(8.1)	17(10.6)
Labour acquisition	70 (43.5)	4 (2.5)	87 (54.0)

Source: Results of Field Survey, 2015

4.3 Rice farmers' level of access to agricultural inputs

The results in Table 3 further revealed that majority of the rice farmers (60.9%) had high levels of access to agricultural inputs. This finding underscores the importance of group dynamics in improving access to agricultural inputs. This is in consonant with the report of Ramdwar et al. (2014) who asserted that group dynamics enable farmers to gain access to production and market resources and that access to agricultural inputs is the cardinal reason for joining groups. Nakazi et al (2017) agreed that achievement of farmers group is sustained by right dynamics.

Table 3: Distribution of respondents by access to agricultural inputs

Category	Freq.	%
High	98	60.9
Low	68	39.1

Source: Results of Field Survey, 2015

4.4 Benefits derived from group dynamics

Table 4 shows the ranking of benefits derived by members of group dynamics in the study area. The ranking revealed that access to farm inputs was the first among the three major benefits followed by adoption of technology and access to agricultural information. This implies that farmers benefited from their participation in the groups. This finding confirmed the reports of Gyau et al (2012) which affirmed that farmer's benefits are promoted by farmers group in the value chain and it enables them gain market access and bargaining power. The benefit derived

is a function of the type of dynamics, equity and collective relationship among group members (Omotesho et al, 2015).

Table 4: Distribution of respondents by derived benefits (n = 161)

Benefits derived	Rank
Access to credit facilities	7
Sales of produce	4
Access to agricultural information	3
Capacity building	8
Adoption of technology	5
Procurement of farm equipment	2
Facilitate procurement of agricultural insurance	6

Source: Field Survey, 2015

4.4 Test of Hypothesis

Table 7 shows the results of test of hypothesis. The estimate revealed that age ($\chi^2= 20.32, \alpha=0.05$) and level of education ($\chi^2= 12.59, \alpha=0.05$) have significant relationship with group dynamics. Meanwhile, the results of the Correlation Analysis in Table 8 shows that household size ($r=0.03$) and farming experience (-0.042) have a weak but positive correlation with group dynamics while access to agricultural credit has a strong and significant relationship with group dynamics.

Table 7: Chi-square estimates of socio-economic relationship with group dynamics

Socio-economic variable	df	χ^2 Value	Decision
Age	4	20.33	Significant
Sex	1	1.23	Not Significant
Marital status	3	6.61	Not significant
Level of Education	3	16.01	Significant
Farm size	1	11.94	Not significant

Source: Results of Field Survey, 2015

Table 8: Estimates of Correlation analysis with group dynamics

Variables	r-value	p-value	Decision
Household size	0.025	0.000	Significant
Farming Experience	-0.042	0.000	Significant
Access to inputs	0.905	0.000	Significant

Source: Results of Field Survey, 2015

4.5 Determinants of the group dynamic

The Principal Component Analysis (PCA) was used to measure the determinants of the group dynamic among the rice farmers. Kaise- Meye Olkin (KMO) test and Bartlett’s test of sphericity were applied to confirm the sampling adequacy. Eigen value of 1 was considered for the number of components to be generated. The result revealed that KMO and Bartlett’s test value was 0.856 at $p < 0.01$ level of significance. The estimates in Table 9 show that the Eigen values for the first three components were 6.820, 2.156, and 1.293 respectively. The first component explained 61.99% of the variance while the second and third component explains 19.60% and 11.75 % respectively. The other component was considered not significant because it was less than Eigen value of 1. The extracted factor loading by Varimax rotation and the items with loading greater than or equal to 0.4 were considered.

The results revealed that the range of the factor loadings was 0.909 - 0.745 in component 1, from 0.963 - 0.820 in component 2 and from 0.955- 0.953 in component 3. The interaction of items with others in the same subscale tends to validate the result implying that the highest factor loading is central to the domains assessed by these components (Francis et al.,2000). These three factors were named based on the variables included in respective components. The three estimated factors influencing the group dynamics were important to draw attention to how group extension

programme is being implemented. Therefore, extension programme needs to develop leadership through training in order to achieve effective group dynamics. This finding confirmed the reports of Agarwal (2001) that members' cooperation, shared norms, social capital and effective leadership influenced group dynamic. However, membership would lose confidence in any leader that is corrupt, partial and foster conflict among members.

Table 9: Extracted factors along their factor loading

Rotated Component Matrix			
Constraint indicators to Effective Group Dynamics			
Loading item	Component 1	Component 2	Component 3
Corruption among group leaders	0.909	0.254	0.235
Conflict among group members	0.905	0.239	0.269
Lack of cooperation	0.900	0.230	0.278
Leadership problem	0.890	0.285	0.247
Unequal treatment by leaders	-0.745	-0.303	0.036
Non-availability of farm inputs	0.228	0.963	0.073
Lack of infrastructure	0.231	0.960	0.073
Inadequate credit facility	0.243	0.956	0.074
Instability of government policy	0.445	0.820	0.090
Poor educational background	0.224	0.078	0.955
Gender bias	0.232	0.079	0.953

Source: Results of Field Survey, 2015.

5. Conclusion

The study revealed that farmer dynamic group promotes the benefits derived by members which include high access to agricultural inputs particularly fertilizer, credit facilities, herbicides, and improved seed through group interaction. Poor leadership, poor access to farm inputs, government policy, and characters of members were the factors limiting group dynamics outcome. The study concluded that a strong and effective leadership should be established to nurture the dynamics that would lead to good management of group resources towards improved productivity and better income of members. Therefore, it is recommended that group activities should be properly monitored by members and relevant authorities to curb perceived leadership problems and corruption tendencies of the group leaders. There is a need to build capacities of members and officials of the groups through effective training so that they can understand the benefits of group dynamics.

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