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EFFECT OF LINKAGES AND NETWORKING ON ROLE PERFORMANCE OF STAKEHOLDERS IN CASSAVA RESEARCH OUTPUT UPTAKE IN OYO STATE, NIGERIA

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Abstract

Agricultural research outputs are useless until they are picked up by end users, adapted and or utilised for solving social, economic and environmental problems thus bringing about sustainable development. This study assessed the effects of linkages on roles of stakeholders in cassava research output uptake in Oyo State, Nigeria. It specifically described the cassava stakeholders' characteristics, identified the roles performed by stakeholders in relation to the linkages used for networking in the cassava research output uptake process in Oyo State, Nigeria. Multistage sampling procedure was employed to select respondents. Stakeholders were purposively selected along cassava value chain. Only 40 percent of the stakeholders were proportionately selected based on numerical strength in the State. They include research scientists, agricultural extension agents, agricultural input suppliers, cassava farmers, cassava produce processors, cassava produce marketers and three policy makers/legislators.. Data were collected using questionnaire. Data were analyzed with appropriate descriptive and inferential statistics. The results show that the mean age of all the stakeholders along the cassava value chain was 50.04±5.07 years and mean years of experience was 16.76±6.91years. All the cassava stakeholders had at least 50 percent of their expected roles performed above their grand mean score. All the cassava stakeholders make use of agricultural shows/exhibitions and informal contact as major linkages to facilitate uptake of cassava research outputs. In conclusion, there exists a positive and significant effect and relationship between the role performance of stakeholders and the linkages used to transfer the cassava research output (r=0.755).

Key words**:** *role performance, stakeholders, research output uptake and linkages*

INTRODUCTION

Cassava (*Manihot esculentus Crantz*) is a tropical crop widely grown in Nigeria because of its tropical climate that favours its growth. Nigeria is the highest world producer of cassava, but hardly features in the cassava world trade market [13]. This is because cassava produce mostly takes care of the domestic consumption and high percentage is lost to post harvest handling and lack of industrial processing. It is one of the major staple foods after cereals and second to yam (Dioscorea species) in the root and tuber family. It has many varieties and cassava produce are used for different purposes such as food when processed to different recipes like flour, fufu, gari, tapioca and starch; industrial uses as raw material for production of flour, starch, biofuel, biogas, ethanol, syrups and pesticides; while it also serve as feeds for livestock [13]. Cassava research and development has come a long way to make cassava production, processing and utilisation an easy process for sustainable social, economic and environmental development of people of Nigeria. However, it seems the links between the stakeholders involved in dissemination of cassava technologies which are products of cassava research are weak and sometimes inactive. That is why cassava research output process is still laced with lack of information in relation to stakeholders' roles in enhancing the contribution of cassava to Gross domestic Product (GDP) in Nigeria [7].

Agricultural research output uptake is the process whereby agricultural research findings enter the domains of intended and unintended audience [8]. This raises question of what the focus on agricultural research and development should now be on how to create social and economic value from technologies generated by researchers. This system needed

to create better partnerships with other researchers, knowledge brokers, innovation networks, and clients in all stages of Research and Development (R&D) especially along cassava value chain process, from research prioritization and planning to implementation, monitoring and evaluation. This new perspective has implications for capacity building for research; for measuring performance, outputs, and impacts; and for looking at incentive systems to promote interactions and innovativeness among cassava stakeholders [8].

Strengthening the linkages and interaction between Agricultural Research and Development (ARD) actors has been considered as key to improved efficiency and effectiveness of ARD efforts aimed at raising the level of economic performance of rural economy through increased productivity [5]. The technology generation should take into consideration among other things opportunities and constraints associated with input and output markets and the enabling policy environment. This calls for a paradigm shift in the ARD approaches that are supply driven to more demand driven Innovation Systems Approach (ISA) [6].

MATERIALS AND METHODS

Conceptual frameworks

The concept of Systems Approach was used to examine the internal linkages, i.e. interactions between the stakeholders in cassava value chain process as components of the system as well as those between the system and the external environment. It provides an integrated view of the behaviour of the system and is useful in the formulation of policies. A first step in any Systems analysis is the identification of the major stakeholders or actors that interact with each other in value chain process. Another step involves the identification and analysis of the role players or stakeholders and their roles in the development of the Nigerian cassava sector [7]. [6], [14]

Statement of the problem

One of the most deliberating problems of research and policy in agricultural extension in Nigeria is the rate at which available research outputs are lost. There is a lag of discovery of innovations and their effective utilization in the field [14]. Although, provision is made for agricultural input suppliers to participate in Nigeria's research–extension-farmer-input supply linkages system (REFILS), the levels of participation of these stakeholders have been very weak especially in cassava value chain [12]. The identification of annual research needs is done through a joint problem diagnostic survey in each state by staff of national research institutes, universities and State ADPs. Although State ADP officers and national researchers participate in discussing the research problems at regional level, national officers assume power in finalizing decisions on research themes (without farmers' representation). Most decisions on the direction of linkage activities are taken at national level, and research and extension organizations in Nigeria are unequal in status [12].

In spite of the laudable achievement of organization of Research-Extension-Farmer-Input supply Linkages System (REFILS), the implementation activities of REFILS are characterized with various problems and challenges. The problems and challenges are as a result of non-defined expected and actual roles of stakeholders in research output uptake process in relation to cassava research and development in Nigeria. Some empirical studies though examined approaches for setting up multi-stakeholders platform for Agricultural Research and Development [2], successes and challenges of cassava enterprises in West Africa [13], cassava food commodity market and trade network in Nigeria [3], cassava value chain analysis in Nigeria [9] and Research-Extension-Farmers-Input linkages system in Agricultural extension [4], there is no known study focus on effect of linkages and network on role performance of these stakeholders on cassava research output uptake in Nigeria.

The study aim to providing answers to the following questions among many others: what are the characteristics of the stakeholders in cassava research output uptake in Oyo State?

What are the expected and actual roles performed by stakeholders in cassava research output uptake in Oyo State? What are the various linkages employed by stakeholders for networking in the cassava research output uptake process in Oyo State? What is the effect of linkages and networking on role performance of stakeholders in cassava research output uptake process in Oyo State?

Objectives of the study

i) describe the stakeholders' characteristics in the cassava research output uptake process in the study area.

ii) identify the expected and actual roles performed by stakeholders in relation to the cassava research output uptake.

iii) identify and describe the linkages and existing networking among the stakeholders in the cassava research output uptake

iv) determine the effect of linkages and networking on the performance of roles by stakeholders in the cassava research output uptake process in Oyo state.

Hypotheses of the study

Ho_1: There is no significant relationship between the characteristics of stakeholders and corresponding roles performed in the cassava research output uptake process in Oyo State.

Ho_2: There is no significant relationship between the linkages used and role performed by the stakeholders towards cassava research output uptake.

Significance of the study

This study provided relevant information on the established effect of linkages for networking that might directly enhance information dissemination among cassava stakeholders in agricultural research uptake system, so as to boost agricultural productivity in enhancing level and standard of living of cassava farmers in the study area.

Methodology

The design for the study is descriptive correlational design which enabled the researcher to describe the relationships between stakeholders' characteristics, linkages and role performed within the cassava research output uptake process in Oyo State. Respondents for the cross-sectional survey were purposively selected from categories of stakeholders along cassava value chain. This includes cassava farmers, agricultural research scientists on cassava, agricultural extension agents, cassava produce processors, cassava produce marketers and agricultural inputs suppliers and policy makers in Oyo State based on high concentration of these stakeholders in the State.

Multistage sampling technique was employed in proportionate selection of 40 percent of the various stakeholders along the cassava value chains. This amounts to 20 research scientists (RS) from International Institute of Tropical Agriculture (IITA), Ibadan; Institute of Agricultural Research and Training (IAR&T), Ibadan; and University of Ibadan, Ibadan; 44 agricultural extension agents (AEA) and 100 cassava farmers (CF) across the ADP zones in Oyo State. Others are 26 registered agricultural input suppliers (AIS), 40 cassava produce processors (CPP) across the State, 100 cassava produce marketers (CPM) at various locations across the ADP zones in the State, Two staff in the State Ministry of Agriculture and one legislator from Committee on Agriculture in the State House of Assembly totalling 325 respondents.

Research instruments and data collection

Primary data were collected using a combination of quantitative and qualitative methods. Questionnaires were used to obtain quantitative data from the research scientists, agricultural extension agents and agricultural input suppliers. Likewise interview schedule was used for the cassava produce processors, cassava produce marketers and cassava farmers in the selected institutions and farm locations in the State. The secondary data and other information were obtained from the records available at the Federal and State Ministry of Agriculture, Research Institutes centres, Agricultural Institutions of learning, Journal and Past theses related to the study.

Role Performance: The perceived role was measured using the 5-point likert-type scale for 15 opinion statements to generate the scores for the dependent variable. The 5-point likert-type scales are: Strongly Agree (5 points), Agree (4 points), Undecided (3 Points), Disagree (2points) and Strongly

Disagree (1point) for each category of stakeholder considered,

Linkages: Level of the linkage by the respondents was based on the frequency of their linkages with other stakeholders in the last five years. This was measured at ordinal level and scored as Never (0 point), Rarely (1point), Usually (2points), and Always (3points).

Descriptive statistical techniques such as frequency, percentages, mean, weighted mean scores and standard deviation were used to describe the data collected. The relationships between the dependent variable (roles performed by stakeholders and independent variables (major variables: effect of linkages and networking) were determined by the use of inferential statistics such as correlation and regression analyses.

RESULTS AND DISCUSSIONS

Personal and socio-economic characteristics of stakeholders

Age: Result in Table 1 shows that the mean age of the research scientists was 44.9±5.36. Agricultural extension agents' mean age was 46.19±5.55. Cassava farmers' mean age was 54.42±7.37. Agricultural input suppliers' mean age was 54.08±5.59. Cassava produce processors' mean age was 50.10±6.98. While, cassava produce marketers' mean age was 50.5±6.57. The mean age range of stakeholders was 44-54 years. This implies that majority of the respondents were at their productive age, agile and have high tendency for transforming the cassava research output effectively. Age is one of the factors that could be used to measure people's level of maturity, strength and ability to accomplish tasks [1].

Sex: Result in Table 1shows that majority (70%) of the research scientists were male and majority (91.7%) of the agricultural extension agents were male. Also, majority (96.2%) of the agricultural input suppliers were male and majority (93%) of the cassava farmers were male. But majority (57.5%) of the cassava produce processors were female and majority (81%) of the cassava produce marketers also were female. This implies that processing and marketing of cassava were been perceived as female jobs as nearly all activities involved were female dominated. Other stakeholders along the chain process were male dominated with respect to the activities involved in each category of stakeholder. This may foster effective uptake of research output in cassava.

Experience: Result in Table 1 shows that the mean year of experience by research scientists was 10.35±6.22 and the mean year of experience for agricultural extension agents was 13.67±5.29. Moreover, the mean year of experience of agricultural input suppliers was 20.77±6.30 and the mean years of farming experience was 25.54±8.82 while the mean year of processing experience was 16.40±6.76 and the mean year of marketing experience was 13.71±8.07. The mean range of stakeholders based on their years of experience in their field category was 10-26 years. This implies that all the stakeholders had more than 10 years of experience in their field of work which promotes effective performance and enhances uptake of research output on cassava. The wider experience a stakeholder has, the more opportunities of effective link with other stakeholders to address areas of concern on cassava research output and its uptake [1].

Level of Education: All of the research scientists had minimum of first degree in their field of discipline with 90% had postgraduate degree. All of the agricultural extension agents had minimum of first degree in their field of discipline. Over 50 percent of the agricultural input suppliers had minimum of first degree in the related field of discipline.

Over 90 percent of cassava farmers had minimum primary school certificate. Above 90 percent of the cassava produce processors had minimum of secondary school education.

80 percent of the cassava produce marketers had minimum of secondary school education.

The implication of these results is that research scientists, agricultural extension agents considered that their job towards effective transfer of research output highly required advanced education especially in their field of specialization for effective transmission of knowledge on subject matter. Meanwhile cassava processors, farmers and

cassava marketers feels that their job and activities along the chain process does not required more advanced education rather than skill acquisition on subject matter for them to perform effectively in the uptake process of the research output and put it into practical utilization. Education gives them opportunity of effective interaction and dissemination of those cassava research output effectively among stakeholders as in support with [1].

Income level: The mean annual income of agricultural input suppliers was ₦1.192,300±368122, the mean annual income realised by cassava processors was ₦307, 500±119,420 and the mean annual income realized by cassava produce marketers was ₦999,500±466,812. The results implies that agricultural input suppliers, cassava processors, farmers and cassava marketers all operating under small and medium scale enterprises.

There is a need for adequate link of these stakeholders with financial bodies either private or government established one to be in partnership towards boosting their productivity through regular loan or bond with moratorium at minimum interest rate.

Group participation: All the respondents in each category of stakeholders along the cassava chain process were involved in active participation in their group or organizations which are basically their professional and vocational associations. This foster linkages and encourages networking among other groups either for advice or other assistance that could promote their productivity.

Table 1. Distribution of stakeholders according to their characteristics

Stakeholders	**R.S**		**AEA**		**AIS**		**CSF**		**CPP**		**CPM**	
Variables	**fre**	**%**	**fre**	**%**	**freq**	**%**	**fre**	**%**	**freq**	**%**	**freq**	**%**
Age												
31-40	5	25	8	22.2	7	26.3	2	2	5	12.5	8	8
41-50	13	85	20	55.6	15	57.7	34	34	17	42.5	44	44
51-60	2	10	8	22.2	4	15.4	47	47	15	37.5	45	45
Above 60							17	17	3	7.5	3	3
Mean	44.9			44.2		54.08	54.4		50.1		50.57	
Sex												
Male	14	70	33	91.7	25	96.2	93	93	17	42.5	19	19
Female	6	30	3	8.3	1	3.6	7	7	23	57.5	81	81
Educational level												
Primary education							28	28	3	7.5	13	13
Ordinary level					3	11.5	41	41	24	60	52	52
NCE/OND					6	23.1	22	22	5	12.5	22	22
HND/Bachelor	2	10	30	83.3	13	50	9	9	8	20.0	13	13
Postgraduate	18	90	6	16.7	4	15.4						
Years of service												
1-10	12	60	11	30.6			3	3	7	17.5	31	31
11-20	7	35	22	61.1	15	57.7	36	36	26	65	61	61
21-30	1	5	3	8.3	9	34.6	45	45	6	15	7	7
31-40					2	7.7	12	12	1	2.5	1	1
Above 40							4	4				
Mean	10.4			13.7		20.77	25.5		16.5		13.71	
Professional membership												
Ordinary	11	55	24	66.7	5	19.2	17	17	24	60	68	68
Committee	2	10	10	27.8	14	53.8	47	47	5	12.5	13	13
Executive	7	35	2	5.5	7	26.9	38	38	11	27.5	9	9
Income generated (₦)												
1,000-500,000					10	38.5	35	35	15	37.5	25	25
500,001-1,000,000					3	11.5	32	32	8	20.0	37	37
1,000,001-1,500,000					8	30.8	23	23	7	17.5	26	26
1,500,001-2,000,000					3	11.5	8	8	6	15.0	10	10
Above 2,000,000					2	7.7	2	2	4	10.0	2	2
Mean					492300		392100			307500		999500

Source: Field survey, 2016

Performed roles of stakeholders towards cassava research output uptake

Research scientists: Result in Table 2 shows that capacity building on monitoring and evaluation, experimentation and empirical study on cassava value chain were mostly

rated roles always performed by research scientists towards uptake of cassava research output. The result further shows that about 50 percent of the stated roles that were performed above role grand mean score. Though facilitating cassava innovation platform and interaction survey on cassava value chain were rarely performed by research scientists in relation to uptake of cassava research output uptake.

Agricultural extension agents: Result in Table 2 shows that advisory role on cassava technology, dissemination of practical information and training of new technology on cassava and its products were among the roles rated very high as always performed by agricultural extension agents towards uptake of cassava research output. While facilitating memorandum of understanding within stakeholders and platform facilitating were among the roles rarely performed by agricultural extension agents in relation to uptake of cassava research output. These indicated that above 60 percent of the stated roles were performed above the roles grand mean score.

Agricultural input suppliers: Result in Table 2 shows that delivering and distribution of farm inputs for new technology on cassava and its products were among the roles rated very high as always performed by Agricultural input suppliers towards uptake of cassava research output. Facilitating cassava innovation platform and facilitating memorandum of understanding (MoU) among the stakeholders on cassava value chain were roles rated as poorly and rarely performed by agricultural input suppliers in relation to uptake of cassava research output. There were 60 percent of the stated roles that were performed above the roles grand mean score.

Cassava farmers: Result in Table 2 shows that training of other farmers and providing information on new technology on cassava were among the roles rated very high and always performed by cassava farmers towards uptake of cassava research output. There were about 70 percent of stated roles that were performed above the role grand mean score. Facilitating cassava innovation platform and facilitating memorandum of understanding among stakeholders on cassava value chain were among the roles rated as poorly and rarely performed by cassava farmers in relation to uptake of cassava research output.

Cassava produce processors: Result in Table 2 shows that brainstorming on knowledge of cassava and exploring market linkages were among the roles rated higher and always performed by cassava produce processors towards uptake of cassava research output. Facilitating cassava innovation platform and its operation on cassava value chain were the roles rated as poorly performed by cassava produce processors in relation to uptake of cassava research output. This indicated that above 60 percent of these roles were performed favourably above role grand mean score.

Cassava produce marketers: Result in Table 2 shows that provision of information on strategic market linkages on new products from new cassava technology and proactive networking stakeholders on cassava and its products were among the roles rated very high and always performed by cassava produce marketers towards uptake of cassava research output. Facilitating cassava innovation platform and facilitating memorandum of understanding (MoU) on cassava value chain were the roles rated as poorly and rarely performed by cassava produce marketers in relation to uptake of cassava research output. There were almost 70 percent of the stated roles that were performed above role grand mean score.

The findings reveal that the two most important interactive activities of stakeholders were poorly or rarely done. The implication is that more attention is needed to facilitate innovation platform on cassava and memorandum of understanding among stakeholders on cassava. This can be a private sector led cassava marketing association to improve the marketing and data dissemination. This sectors is essential for developing the domestic market, improve market access, market channels and information on available products [10].

Table 2. Distribution of stakeholders by their performed roles toward cassava research output uptake

Performed roles	**RS mean**	**AEA Mean**	**AIS Mean**	**CF mean**	**CPP Mean**	**CPM mean**
Information dissemination	1.70	2.54	2.27	2.24.	1.98	2.25
Training of stakeholders	1.70	2.42	2.38	2.22	1.98	1.58
Experimentation on cassava	2.10	1.72	1.42	2.05	1.73	1.64
Identify felt need of stakeholder	1.65	2.47	1.97	2.33	2.08	2.14
Marketing system linkage	1.55	1.94	2.04	2.17	1.77	2.21
Brainstorming on knowledge of cassava and its value chain	1.80	2.47	1.88	2.56	2.23	1.43
Proactive networking of stakeholders	1.55	2.86	1.50	2.21	1.95	2.22
Capacity building on M&E	2.70	2.33	1.65	2.55	2.00	2.11
Facilitating MoU	1.35	1.39	1.31	1.68	1.55	1.43
Building awareness from the local level	1.45	2.39	2.08	2.33	2.13	2.06
Sourcing for input on cassava	1.35	2.36	2.42	2.37	2.10	2.06
Commercializing supply of inputs/outputs	1.50	2.25	2.42	2.13	2.18	2.10
Innovation platform facilitation & operationalization	1.30	1.97	1.19	1.82	1.68	2.17
Advocacy for linkage	1.75	2.61	1.98	1.77	2.25	1.57
Liaison for foreign expert on cassava	1.70	1.44	1.42	2.19	2.00	2.14
Grand mean score	**1.60**	**2.12**	**1.86**	**2.13**	**1.98**	**1.92**

Source: Field survey, 2016

Linkages used by stakeholders to facilitate cassava research output uptake

Result in Table 3 shows that agricultural shows/exhibition and linkage to input/output markets were among highly rated linkages used by farmers, cassava produce processors, agricultural input suppliers and cassava produce marketers. Meanwhile, collaboration with other organization/ project coupled with technical report, meeting with stakeholders and agricultural shows/exhibition were among highly rated as always used linkages by research scientists and agricultural extension agents to facilitate the uptake of cassava research output. This implies that proper and adequate organizing of agricultural shows/ exhibition would facilitate effective uptake of research output among the stakeholders. Result in Table 3 was further revealed that use of internet and joint journal publications were rarely used by all the stakeholders as a means of linkage to facilitate the uptake of cassava research outputs in the study area. This might be as a result of poor facility of the internet and low literacy level of majority of stakeholders in accessing joint journal publication as a regular means of linkage to facilitate cassava research output uptake in the area.

Effect of linkages and networking among the cassava stakeholders

Figure 1 below shows the chart representation of the summary of linkage and networking among the various categories of cassava stakeholders considered in the study. It was revealed from the findings that all the stakeholders interrelated with one another through various linkages available to them. This was corroborated with [1] that stakeholders in cassava value chain process prefers using those linkages that they were conversant with such as organized workshops/agricultural shows, cooperative meeting among themselves, informal meeting, technical report meeting, internet link and journal publications. All the stakeholders considered made use of above 50 percent of the listed linkages above the grand mean score in the study. This implies that stakeholders were ready to use any linkages available to them either to transfer or receive cassava research output in the area which would invariably promotes the uptake of cassava research output in the area.

For achieving the goal of effective uptake of cassava research output among stakeholders, there must be information on how to link farming communities and industrial end users for effective performance of stakeholders' role. From the empirical study, it was observed that there are three main ways to establish this links between farmers, the industrial sector and other stakeholders namely: developing large scale farms, establishing out-growers scheme and private intermediaries [11].

There is implication that if industries, like flour mills should require larger quantities of cassava and do not wish to engage in Out-Grower schemes, private entrepreneurs should then provide the missing link.

Table 3. Distribution of stakeholders by linkages used towards cassava research output uptake

Linkages	RS		AEA		AIS		CSF		CPP		CPM	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Collaboration with other organization/projects	1.90	1st	2.58	1st	1.58	6th	2.18	7th	1.88	5th	1.91	8th
Joint Journal publication	1.65	2nd	1.06	20th	0.38	20th	0.63	20th	0.25	20th	0.13	20th
Partnering project with other organization	1.60	3rd	1.50	15th	1.35	8th	2.18	7th	1.50	8th	0.55	18th
Alliance collaboration with other stakeholders in programmes	1.45	4th	1.98	10th	1.35	8th	1.46	11th	1.08	11th	1.32	10th
Agricultural shows/exhibition	1.45	4th	2.50	3rd	2.08	1st	2.69	1st	2.28	1st	2.12	6th
Partnership with other stakeholders	1.40	6th	2.08	8th	0.42	19th	1.50	8th	0.70	17th	1.18	11th
Technical report meeting/MTRM/SMS	1.40	6th	2.58	1st	0.96	13th	1.37	13th	0.50	18th	0.15	19th
Internet link/network on cassava	1.40	6th	1.11	19th	0.92	15th	0.75	18th	0.48	19th	1.08	13th
Conferences/seminars for cassava stakeholders	1.40	6th	1.72	14th	0.77	18th	1.36	15th	0.90	14th	0.81	16th
Informal contact/meeting	1.30	10th	2.50	3rd	2.08	1st	2.66	2nd	2.28	1st	2.22	4th
Joint problem solving on cassava	1.15	11th	2.36	5th	1.00	11th	1.84	9th	1.50	8th	1.54	9th
Formal arrangement/meeting with institution	1.15	11th	1.86	12th	0.96	13th	1.41	12th	0.90	14th	0.98	15th
Linkage to farm inputs on cassava	1.15	11th	2.19	7th	1.88	3rd	2.44	3rd	1.95	3rd	2.39	2nd
Partnering knowledge of cassava	1.10	14th	2.08	8th	1.54	7th	0.74	19th	1.70	6th	2.21	5th
Contract knowledge on cassava	1.05	15th	1.25	18th	0.88	16th	0.90	17th	0.88	16th	0.71	17th
Advocacy linkage with relevant stakeholders	1.05	15th	1.92	11th	1.00	11th	1.12	16th	1.03	12th	1.02	14th
Sector association with other organization	0.95	17th	1.36	17th	0.88	16th	1.37	13th	0.93	13th	1.10	12th
Sharing consumers' taste/preferences on cassava	0.90	18th	1.86	12th	1.77	4th	2.38	4th	1.55	7th	2.51	1st
Market linkages for cassava output	0.75	19th	1.58	15th	1.04	10th	1.90	8th	1.25	10th	2.24	3rd
Cooperative meeting among other stakeholders	0.55	20th	2.31	6th	1.73	5th	2.34	5th	1.90	4th	1.97	7th
Grand mean	**1.29**			**1.91**		**1.23**		**1.68**		**1.20**		**1.41**

Source: Field survey, 2016

The implementation of Out-Grower or private intermediaries' schemes will require facilitation by research institutions, NGOs, and extension services.

For example, research and extension services have to play a proactive role by introducing appropriate cassava chipping and drying technologies, with industrial end-users committing to strengthening market linkages by related investments. Lastly, Government should provide an enabling economic environment, which may include an appropriate regulatory and legal framework [10].

It was observed that majority of the means of linkage used such as agricultural show, collaboration with one another, informal meeting with others are the major linkages used by majority of these stakeholders to facilitate networking among each other towards effective uptake of cassava research output uptake.

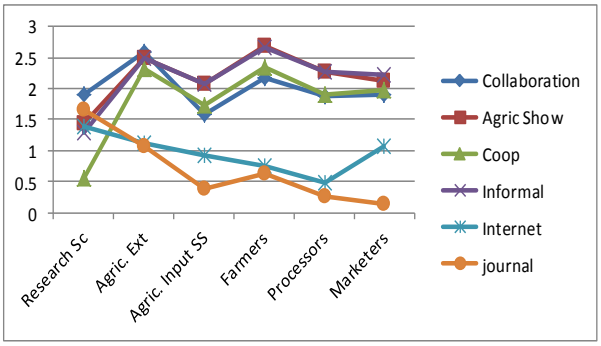

Fig 1. Distribution of stakeholders by linkages
Source: Own design.

Relationship between stakeholders' role performance and their characteristics towards cassava research output uptake

The result in Table 4 shows the second order correlation and regression analysis of stakeholders' characteristics reflects that there exists a positive and significant relationship between the role performance of stakeholders with level of education (r=0.476), group participation (r= 0.332) and years of experience (r=0.210) possess by stakeholders. Meanwhile, age (r= -0.185) has a negative and significant relationship with the role performance of these stakeholders. The lower the age of stakeholders the more effective was their role performance. The coefficients of determination (r^2) indicate that these variables were contributing up to 41.5 percent to the relationship. The regression coefficient further substantiate the strength of the relationship with the significance of age, level of education and years of experience of stakeholders with role performance of the cassava stakeholders with value of R^2=0.67. This indicates 67 percent contribution of the significant variables to role performance of the stakeholders. The finding implies that, high level of education of stakeholders and years of experience amounted to effective role performance of the stakeholders towards uptake of cassava research output.

Relationship between stakeholders' role performance and linkages used towards cassava research output uptake

The result in Table 5 shows the second order correlation and regression analysis of stakeholders' role performance with linkages. This reveals that a positive and significant relationship exists between the role performance of cassava stakeholders with linkages used for transferring cassava research output (r=0.755). The coefficient of determination (r^2) indicates that linkage used contributed up to 57 percent to the relationship. The regression coefficient further substantiate the strength of the relationship with the significance of linkage with role performance of the stakeholders with value of R^2=0.63. This indicates 63 percent of the significant variables to role performance of the stakeholders. This revealed that there was a strong relationship between the stakeholders' role performance and their linkages between other stakeholders. The implication is that the use of common and effective linkage as a means of networking has positive and significant effect on the role performance of stakeholders on cassava. This promotes effective networking among various categories of stakeholders and it facilitates effective uptake of cassava research output among the intended users as reported by [1]. This finding further implies that the use of adequate linkages amounted to strong bond among the stakeholders such that they tend to work together for effective uptake of research outputs in cassava production, processing and marketing. This finding suggests a need for Cluster Development Approach in cassava value chain. This involves the identification, coming together, and operation of different

stakeholders at different levels to achieve a common goal. Therefore, it should be led by the private sector [12]. The advantages that would accrue from a Cassava Cluster Development include improvement in efficient uptake of production and processing research output. It will also enhances rural development through provision of infrastructures. The cluster of stakeholders has the potentials to provide a forum for dispute settlements in order to avoid a major commercial or trade conflict; has a defined leadership structure to maintain regular meetings and ensures compliance with codes of conduct as specified in the codified laws [12]. There must be a need for it to cut across all the stakeholders in the cassava value chain process for effective transformation of cassava production in Oyo state and Nigeria as a whole.

Table 4. Results of correlation and regression coefficient showing second order analysis of stakeholders' role performance and socioeconomic characteristics investigated towards cassava research output uptake

Variable	Correlation coefficient (r)	Coefficient of determination (r^2)	P-value	Regression coefficient(b)	t-value	p-value
Age	-0.185*	0.034	0.002	0.007*	2.171	0.032
Level of education	0.476*	0.227	0.036	0.301*	2.225	0,035
Years of experience	0.210*	0.044	0.012	0.110	0.573	0.571
Professional membership	0.332*	0.110	0.019	0.223	0.443	0.797

Source: Computed from field survey, 2016 ** Significant at p≤ 0.01 *Significant at p≤ 0.05 **R=0.812; R^2=0.670; F=5.681**

Table 5. Results of correlation and regression coefficient showing second order analysis of stakeholders' role performance and linkages investigated towards cassava research output uptake

Variable	Correlation coefficient (r)	Coefficient of determination (r^2)	p-value	Regression coefficient (b)	t-value	p-value
Linkages	0.755**	0.570	0.000	0.639**	3.381	0.004

Source: Computed from field survey, 2016
** Significant at p≤ 0.01, *Significant at p≤ 0.05 **R=0.794; R^2=0.630; F=4.768**

CONCLUSIONS

Out of the stated expected roles towards uptake of cassava research output, all the stakeholders were able to perform above 50 percent of their roles above the respective grand mean. The most commonly used linkages by all the stakeholders for transferring or receiving research output on cassava and its uptake were organizing workshop, cooperative meeting among stakeholders and informal meeting with other stakeholders.

The study suggested that for effective cassava research output uptake, every stakeholder in cassava agriculture should identify the expected role of active participation in the cassava innovation platform and perform it accordingly, so as to improve effective uptake of cassava research output.

Cassava agriculture should be both production-demand driven approach rather than being focusing on production approach alone. Production, processing, storage and marketing processes of cassava should be harnessed together with effective linkages to improve its agribusiness potential.

REFERENCES

[1]Adekunle, I.A., 2017, Assessment of the roles of Stakeholders in Cassava research Output Uptake in Oyo State, Nigeria. Unpublished Ph.D thesis, Obafemi Awolowo
University, Ile-Ife, Nigeria.Pp.48-51.
[2]Adekunle, A. A., Fatunbi, A. O., 2012, Approaches for Setting-up Multi-Stakeholder
Platforms for Agricultural Research and Development. World Applied Sciences Journal 16 (7): 981-988.
[3]Ezedinma, C., 2005, Agribusiness Investments in the cassava sub sector in Nigeria:some critical considerations, Paper presented at a workshop on Guiding Investmentsin the Cassava sub Sector in

Nigeria held at IITA Conference Center, IITA Ibadan, August 2005.
[4]Faborode, H.F.B, Laogun, E.A., 2008, Reseach – Extension – Farmer –Input Linkage System in Agricultural Extension, A comprehensive Treatise. Akinyemiju and Torimiro (eds). ABC, Agricultural System Ltd. Ikeja, Lagos, Nigeria.
[5]Hall, A. J., Bockett, S., Taylor, M. V., Sivamohan, K., Clark. N., 2005, Why research partnerships really matter: Innovation theory, institutional arrangements and implications for developing new technology for the poor. World Development 29(5): 783–797.
[6]Hounkonnou, D., Kossou, D., Kuyper, T.W., Leeuwis, C., Nederlof, E. S., Röling, N., Sakyi-Dawson, O., Traoré, M., van Huis, A., 2012, An innovation systems approach to institutional change: Smallholder development in West Africa. Agricultural Systems 108: 74-83.
[7]Federal Ministry of Agriculture and Rural Development (FMARD) (2011). Agricultural transformation agenda: we will grow Nigeria's agricultural sector. Federal Ministry of Agriculture and Rural Development Abuja, Nigeria. Draft for Discussion, Executive summary, pp.1-89.Value for Africa (C:AVA), Natural Resources Institute, UK.
[8]Kirsten, J. F., Doward, A. R., Poulton, C., Vink, N. (Eds)., 2009, Institutional Economics Perspectives on African Agricultural Development. Copyright ©IFPRI pp. 477.
[9]Kleih, U., Sanni, L., Dipeolu, A., Abass, A., Abdulsalam-Saghir, P., Butterworth, R., Siwoku, B., 2008, Value Chain Analysis for Nigeria. Submitted to Cassava: Adding.
[10]Obiora, C. J., Emodi, A. I., 2013, Restructuring the Agricultural Extension Service for effective Agricultural Transformation Agenda in Nigeria, Greener Journal of Agricultural Science, 3(6):511-517.
[11]Oyewole, L.O., 2002, Contract farming for root production and supply. Paper presented at the International Workshop on Cassava Competitiveness in Nigeria, IITA Conference Centre, Ibadan, November 18-20, 2002.
[12] Research Into Use (RIU), 2009, Putting Research into use: stimulating demand in Sub-Saharan Africa, Rwanda country programme annual report 2008-2009. https://assets.publishing.service.gov.uk/media/57a08bb940f0b652dd000e4a/Brochure_Sub-Saharan_Africa.pdf, Retrieved December 10, 2017.
[13]Sanni, L. O., Onadipe, O. O., Ilona, P., Mussagy, M. D., Abass, A., Dixon, A. G. O., 2009, Successes and Challenges of Cassava Enterprise in West Africa: Case study of Nigeria, Benin and Sierra Leone. IITA, Ibadan, Nigeria. p.35
[14]World Bank, 2006, Enhancing agricultural innovation: How to go beyond the strengthening of research systems. Washington, D.C.: World Bank.