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Impact and Adoption of Value Added Innovations in Root and Tuber Crops Among Farmers in Imo State, Nigeria

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Impact and Adoption of Value Added Innovations in Root and Tuber Crops Among Farmers in Imo State, Nigeria

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Abstract - The National Root Crops Research Institute (NRCRI), Umudike embarked on massive training and extension of technologies of new and improved food forms of root/tuber crops to rural farmers/women groups from 2005 to date in this country generally and in South-eastern parts in particular. However, the main purpose of this study is to determine the impact and adoption rate of the training/extension activity among farmers in Imo State of Nigeria. A structured interview schedule, administered to 90 farmers in 3 zones of Owerri, Orlu and Okigwe was the major instrument used in data collection. The respondents were 30 generated from a particular training point in each zone. The data were analysed using means, percentages and means scores. The result revealed that although the respondents were mostly women, an appreciable number of men participated in the training and these respondents were reasonably aware of the innovations. However, the adoptions of cassava innovations (value added and cultivation)by the respondents were near average but that of cocoyam and sweetpotato were very low. The adoption of the technologies had reasonable impact on the livelihood of the respondents as a reasonable of those who adopted the technologies used them as food and in receiving visitors at home. Also, tangible impact was made in the livelihood of the respondents as income earned from the adoption of the innovations helped them in paying school fees and near tangible impact were made in acquisition of more farmland and payment of medical bills. This was adjudged as being contributory to the realization of some Millennium Development Goals (MDG). However, the major challenges associated with the adoption were lack of funds, lack of equipment/facilities and lack of marketrespectively. Challenges such as inadequate knowledge of the innovations and no retraining facilities were also viewed as important. It is therefore recommended that re-training and provision of equipment and market facilities should be intensified to enhance the adoption and impact of these technologies among the farmers.

Keywords : adoption, impact, training, value added products, innovations, technologies.

I. INTRODUCTION

a) Value Added Technologies in Root and Tuber Crops gricultural produce are known to be highly perishable, hence most rural farmers do not get the desired reward for their work as most of their produce are lost a day or two after harvest. Consequent

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upon this, the National Root Crops Research Institute (NRCRI), Umudike which had the national mandate to research into root and tuber crops, developed some processing technologies of root and tuber crops in order to curtail their perishability and add value to these crops. Food items such as cassava fufu flour, high quality cassava flour for confectionery production and other products were developed. The essence is to ensure that these crops can be put to wider uses in the home. for income generation and possibly for export purposes. Armed with value added products of the root/tuber crops the NRCRI, Umudike participated in World Food Days in Abuja and other parts of Nigeria and also took part in many other food shows in which NRCRI was adjudged the best food exhibitor. To this effect, groups and individuals all over Nigeria appreciated this development and requested to be trained in those technologies. In Imo State of Nigeria this training by NRCRI, Umudike was conducted for various farmers' and women groups in all the agricultural zones of the state based on request by such groups. However, ever since this massive dissemination of these technologies to farmers/women groups in ImoState of Nigeria started in 2006, no data have been collected in order to specify the impact and adoption of these technologies among farmers trained.

The work of Atala (1990) inferred that the appropriateness of any technology depends on its acceptability by the people. Hence, if an innovation was not acceptable by the people the time, money and efforts spent in developing the innovation and that spent in its disseminations must have been wasted. Also Adams (1985) opined that the appraisal of the impact and adoption rate of an innovation will help to establish strength and weakness of the extension activities in order to modify methodology for more effective extension activities in future, as well as determine the attributes of technologies recommended for adoption.

The adoption of innovation is the last step in a decision process to make full use of an innovation having considered that such will impact positively on the livelihood of the adopter (Adams, 1985, Chambers, 1993). The level of adoption Roger and Shoemaker, (1971) contended is usually influenced by personal, socio-economic and communication factors. This implies that the individual meant to adopt an innovation must 2012

first consider what benefits he/she stands to earn out of the innovation to be substantial above the cost of adoption in order to adopt. In other words, such innovation should possess attributes or characteristics enticing to the farmer that will warrant high adoption rate. Also, Aniedu (2006) indicated that such personal issues such as gender, availability of resources required for the use of innovations, priority and benefits expected to be gained motivate people to adopt innovations. This study is therefore aimed at the determination of the impact and adoption of value added technologies in root and tuber crops disseminated to farmers in Imo State through various training programmes of NRCRI, Umudike which commenced in the state in 2006.

Objectives of the Study

The specific objectives of this study were to:

- Establish the socio-economic characteristics of the respondents
- Ascertain that NRCRI, Umudike conducted training on value addition in the area.
- Establish the adoption rate of the innovations of value added products of root/tuber crops extended to farmers through training of farmer groups
- Determine the impact of the adoption of the innovations on the farmers
- Identify factors inhibiting or enhancing the adoption of the innovations

II. METHODOLOGY

The population for the study consisted of farmer groups made up of mostly women farmers who participated in NRCRI, Umudike organized training in value addition to root/tuber crops in Imo State of Nigeria. The state consists of three agricultural zones of Owerri, Orlu, and Okigwe. The random sampling method was used to select one group of farmers in each of the zones among which 30 farmers were in turn, randomly selected giving a total of 90 respondents for the study.

To determine the adoption rate of the selected innovations, the respondents were requested to indicate their levels of adoption on a three-point adoption scale (not aware, awareness and adoption). Percentages were used to determine the rate of "not aware, awareness and adoption. The technologies were value added products of cassava, sweetpotato, cocoyam and some cultivation technologies. In order to ascertain that the training was actually conducted by NRCRI, Umudike in the areas, the respondents were requested to rate their source of training/extension activities on a three point scale of 1 not a source. 2 rarely a source and 3 important source. The options given were NRCRI, Umudike, ADP, radio, TV, newspaper, friends/relatives and the result was processed by adding the values (1+2+3=6) and the product later divided by 3 to get a

mean score of 2, which was regarded as the cut-off point. Hence, any source with a mean score of 2 and above was regarded as a major source of training/extension activities in value addition to root/tuber crops. The tangible impact of the technologies was determined by requesting the respondents to rate the impact 1 extremely not important, 2 not important, 3 undecided and 4 important. The options given were acquired a house, a bicycle, a motor cycle, took new title, married new wife, bought/hired more farmland, bought new TV/radio and paid medical bills. The result was processed by adding the values (1+2+3+4=10)the product was later divided by 4 to get a mean score of 2.5 consequently any mean score of 2.5 and above was regarded as a tangible impact on the respondents. In the same way the problem associated with the impact/adoption of the technologies were determined on a five-point scale of 1 extremely not important, 2 not important, 3 undecided, 4 important and 5 very important. The values were summed up (1+2+3+4+5)= 15) and the product was in turn divided by 5 to get a mean of 3. The mean scores of 3 and above were adjudged to have tangible impact. However, the rest of the results were presented in means, frequencies and percentages.

III. Results and Discussion

a) Personal and socio-economic characteristics of the respondents

The result in Table 1 showed that 76% and 80% respondents were women of the and marriedrespectively, also 52% and 48% were part time and full time farmers respectively. This may be a disadvantage for adoption of innovation since Young (1994) opined that women were the poorest of the poor, hence their ability to take risks involved in adoption of innovation is minimal. The report also stated that women have limited time available to them due to their multiple roles and also have subsistence as their priority as against adoption of innovation for income yielding and marketing opportunities. This result also showed that over 93% acquired education from primary to tertiary education levels, while and 98.8% of the respondents belonged to farmers' association. The age of the respondents showed that majority (62%) were 40 years and above, indicating that the respondents comprised of old people, who did not have the energy to embark on farming. The work of Rogers (1983) stated that education facilitates adoption of innovation and the theory of group dynamics by Child (1986) contended that social interaction and imitation of parents, famous people in a group, etc. encouraged adoption of innovation. In the same way, Voh (1982) supported the view by stating that education, young age, peer group and availability of resources were some of the factors that influenced adoption and diffusion of innovations positively. However, it is important to deduce that

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although education and memberships of farmer's association were variables favourable to adoption the

rest of the variables in personal characteristics were not favourable to adoption of the innovation.

Characteristics	Frequency	Percentages
AGE		
20 – 29 years	12	13.30
30 - 39 years	22	24.40
40 – 49 years	21	23.30
50 – 59 years	17	19.00
60 – 69 years	18	20.00
Above 69	0	0.00
TOTAL	90	100.00
MARITAL STATUS		
Married	72	80.00
Single	5	6.00
Divorced	0	0.00
Widowed	13	14.00
TOTAL	90	100.00
EDUCATION		
No education	7	7.80
Primary educ	22	24.40
Secondary educ	45	50.00
Tertiary Educ	16	17.80
TOTAL	90	100.00
OCCUPATION		
Full-time	43	47.80
Part-time	47	52.20
TOTAL	90	100.00
GENDER		
Male	22	24.00
Female	68	76.00
TOTAL	90	100.00
MEMBERSHIP OF FARMERS' ASSO.		
Yes		
No	89	98.80
TOTAL	1	1.20
	90	100.00

Table 1 : Percentage Distribution of Respondents by Socio-economic Characteristics (n = 90).

b) Adoption of the value added products of root and tuber crops

The result in Table 2 indicated that cassava value-added products had mean adoption rate of 41%. However, the cassava value added products of high guality cassava flour (HQCF) and cassava chin-chin, recorded the highest adoption rates of 74% and 51% respectively. However, cassava croquette, cassava fufu flour and doughnutsrecorded moderate adoption rates of 49%, 46% and 42% respectively. Although cassava value added products such as cakes, strips and bread had high awareness rates, they recorded very low adoption rates. The cocoyam value-added products recorded mean adoption rate of 19% with its component parts such as crisps, flour and fufu flour having adoption rates of 24%, 19% and 14% respectively. It is important to note that the cocoyamvalue added products recorded high levels of awareness which could mean that respondents probably did not understand the procedure during the training of the innovations. The

result also showed that the sweet potato value added products recorded a mean adoption of 9.6% with its component parts offufu, flour and cakesrecording adoption rate of 11%, 11% and 7% respectively. The result of the production technologies had 43% mean adoption rate(which was the highest among the groups) with the component parts recording 52%, 56% and 23% for 1m planting distance, 4node cutting and sweetpotato planting respectively. The moderate rates of adoption of cassava value added innovations and cultivation technologies can be attributed to the fact that the Agricultural Development Project (ADP) and the media have been promoting or reinforcing the training initially conducted by NRCRI in the state. It is important to note that cocoyam and sweetpotato technologies which recorded the lowest mean adoption rates of 19% and 9.6% respectively were newly introduced by NRCRI hence, they need reinforcement or further promotion for the adoption rate to improve.

Innovations	Unaware (%)	Aware (%)	Adopted (%)	Total (%)
(Cassava)				
i. High Quality Cassava Flour	0	16.00	74.00	100
ii. Cassava chin-chin	0	39.00	51.00	100
iii. ,, cakes	0	67.00	23.00	100
iv. ,, strips	0	66.00	24.00	100
v. ,, bread	0	71.00	19.00	100
vi. ,, croquette	0	51.00	49.00	100
vii. ,, doughnuts	0	58.00	42.00	100
viii. ,, fufu flour	0	44.00	46.00	100
MEAN			41.00	100
(Cocoyam)				
i. Cocoyam crisps	0	66.00	24.00	
ii. ,, flour	0	71.00	19.00	100
lii cocoyam fufu	0	76.00	14.00	100
MEAN			19.00	100
(Sweetpotato)				
i. Sweetpotatofufu flour	0	79.00	11.00	
ii. ,, flour	0	79.00	11.00	100
iii. ,, cakes	0	83.00	7.00	100
MEAN			9.60	100
Production Technologies				
i. 1m apart cassava planting distance				
ii. 4-node cassava cuttings	0	38.00	52.00	
iii. Planting of sweetpotato	0	34.00	56.00	100
	0	63.00	23.00	100
MEAN			43.70	100
	1	1	1	I

Table 2: Percentage Distribution of Respondents based on Adoption Status	(NI -	— ar	۱)
TADIE 2. FEICEITIAGE DISTINUTION DESPONDENTS DASED ON AUOPTION STATUS	(1) ·	- 90	".

c) Sources of Training/Extension Activities

Although the researchers were aware that training in value added innovations of root and tuber crops took place in the study area, the respondents were made to indicate their sources of training and extension activities to ensure that the respondents participated in the training. The result in Table 3 revealed that the respondents accepted that the main source of their training and extension activities was NRCRI. However, the result also indicated that in addition to the training obtained from NRCRI, Umudike the state ADP played an important role in the dissemination of the information as well.

Table 3 : Mean Distribution of Source of Training and Extension Activities.

SOURC	E OF TRAINING/EXTENSION ACTIVITIES	MEAN SCORE
1.	NRCRI, Umudike	2.84*
2.	State ADP	2.10*
З.	Radio	1.30
4.	TV.	1.20
5.	Newspapers/books/etc	1.10
6.	Friends/relatives	1.60

*Major sources of training and extension influencing adoption

d) Impact of adoption of value added products on Respondents

The result of the usefulness of the training in value added innovations of root and tuber crops on the respondents in Table 4a showed that only 22% of the respondents earned income from their value-added products, 35% claimed they used theirs to feed their families and in receiving visitors and while 41% claimed they simply acquired information from the training and 2% claimed that it afforded them a good opportunity of

preservation and storage of their perishable food crops. This goes to support the earlier assertion by Young (1994) that women's priority in adoption of innovation was most importantly for subsistence with market and income generation being secondary. The adoption of the value-added products has made appreciable tangible impact on the livelihood of the respondents as revealed in Table 4b. Although no tangible wealth had been acquired from the proceeds from the adoption of the innovations by the respondents, but the result showed that the school fees (mean score of 2.5) was accomplished by the respondents. Also, the result indicated that the respondents were able to buy/hire more farmland (mean score 2.1) and paid medical bills (mean score of 2.0). However, it is important to note that education, healthcare andfood are critical areas people in developing world need to access if millennium goals will have to be achieved and the training in value added innovations of root and tuber crops has made an appreciable contributions in these areas.

Table 4a : Usefulness of the	Training on the Res	pondents ($N = 90$).
	0	

Factors	Percentage	
Usefulness		
Feeding my family/Receiving visitors	35.00	
Acquired more information	41.00	
Earned more income	22.00	
In preservation/storage of foods	2.00	
TOTAL	100.00	

Table 4b : Mean Distribution of Tangible Impact of the Technologies on the Livelihood of Respondents.

Tangible Impact		Mean Score	
1.	Built a house	1.1	
2.	Bought a bicycle	1.0	
З.	Bought motor cycle	1.3	
4.	Paid school fees	2.5*	
5.	Took a new title	1.0	
6.	Married a new wife	1.0	
7.	Bought/hired more farmland	2.1	
8.	Bought new TV/radio	1.3	
9.	Paid medical bills	2.0	

*Perceived major impact of the innovations on farmers

e) Challenges associated with the adoption of value added products

The result in Table 5 revealed that challenges such as inadequate knowledge of the innovation (mean score 2.9) and no-retraining facilities (mean score 2.6) and no extension agent to answer questions (mean score 1.9) were challenges experienced by the respondents, butlack of funds with a mean score of 3.7, lack of equipment/facilities with a mean score of 3.5 and lack of market with a mean score of 3.0 were the major challenges associated with adoption of value added innovations of root and tuber crops. This is in line with the earlier report of Young (1994) which claimed that women were mostly poor resource farmers and in addition have the multiple roles. Hence, to enable the women adopt any innovation funds should be provided and the provision of energy and time saving equipment and facilities to reduce drudgery should be made. Otherwise, any innovation that will add more work to the women will not be readily acceptable by the women. Also there is need have organized market readily available as an incentive for those who adopt these innovation so that there will not be discontinued adoption.

Table 5: Mean Distribution of challenges Associated with the Adoption of the Technologies.

Factors	Mean Scores	
Lack of market	3.0*	
Inadequate knowledge of innovation	2.9	
Lack of funds	3.7*	
No-retraining facilities	2.6	
Lack of equipment/facilities	3.5*	
No extension agents to answer questions	1.9	

*Perceived major challenges associated with adoption

IV. Conclusion

The studies revealed that the cassava valueadded products and production technologies recorded moderate adoption rates in Imo State, while cocoyam and sweetpotato value added innovationrecorded very low adoption rates. The reason may be attributed to the fact that training in the technologies given by NRCRI was being reinforced by extension activities of the State ADP, which is very commendable. This is in line with the argument of Rogers and Shoemaker (1971) which stated that time and reinforcement of an extension

activity were necessary for diffusion of innovation in a given culture. It is important to note that the respondents were mostly women, who were seen to have multiple roles in the society - production roles, reproduction roles, community and family care roles, among others (Young, 1994). The report further stated that adoption and diffusion of innovation among women will be greatly improved if resources such as funds, market, equipment and facilities were provided in order to reduce drudgery and make the burden of their multiple roles lighter on them and also create much needed income. Efforts therefore should be made to ensure that the farmers were retrained in the innovations particularly in cocoyam and sweetpotato innovations. Also, provision ofmarket, equipment and facilities put in place to ensure enhanced adoption and tangible impact of the training on the livelihood of the people in future dates.

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