DYNAMICS OF THE TECHNOLOGY ADOPTION PROCESS IN RURAL-BASED CASSAVA PROCESSING SYSTEMS IN SOUTHWEST NIGERIA

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Introduction

- Nigeria produces more than half of total world cassava.

- But most of the cassava is locally consumed by processing the fresh roots into *gari*, *fufu*, flour and several minor products.

- The crop gained national prominence as a potential foreign exchange earner for the nation following the pronouncement of a Presidential Initiative on Cassava in 2002.

- But this cannot be achieved without the uptake of key innovations that tend toward higher levels of commercialisation in cassava production and processing.

- Since, traditional cassava processing takes place predominantly in rural areas, it is important that rural people adopt appropriate cassava processing technologies along with cassava production technologies for any meaningful impact to be made on the food system.

Objectives

- This study explores the intricacies of the technology adoption process in rural based cassava processing systems with a view to contributing to a greater understanding of the process.

Furthermore the study tested two null hypotheses that:

- There are no significant differences between the socio-economic characteristics of adopters and non-adopters of selected cassava processing innovations

- There are no relationships between adoption of a cassava processing innovation and the characteristics of adopters of the innovations

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Methodology

Cassava is grown widely in all three agro-ecological zones in the area.

A random sample of 3 rural locations were selected from each agro-ecological zone.

In each of the 9 locations selected, a systematic sample of 30 rural based cassava processors were drawn

The study thus interacted with 270 rural based cassava processors.

An interview guide was used to facilitate interviews with the selected processors.

More detailed participant observation and focus group discussions were also held in 3 locations.

- The study also systematically selected a sample 50 researchers and extensioners in Southwest Nigeria.

- Of these, only 37 respondents made up of 15 extensioners and 21 researchers returned the mailed questionnaires.

- The framework used to explore the process of development of selected cassava processing technologies was based on the work of Garforth *et al.* (2003).

- The multi-framework model used in characterising food processing innovations has been used by Grassi (2003).
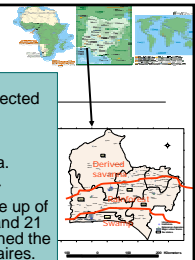
Results and Discussion

Description of cassava processors

Variable	Agro- ecological zone			Total (N = 265)
	Guinea savanna (N = 90)	Rainforest (N = 85)	Swamp (N = 90)	
Age	56.7% 21-40 years old	61.2% 21-40 years old	77.8% 41-60 years old	44.5% 21-40 years old
Sex	96.7% Female	50.6% Male	55.6% Male	63.8% Female
Marital status	60.0% Married	84.7% Married	96.7% Married	80.4% Married
Household size	71.1% 3-6persons	78.8% 3-6 persons	33.3% 3-6 persons	61.1% 3-6 persons
Position in household	54.4% 2nd	38.8% 2nd	52.2% 1st	44.5% 2nd
Education	56.7% Secondary	42.4% Secondary	35.6% Secondary	44.9% Secondary
Ancestry	97.8% Native	54.1% Native	72.2% Native	76.2% Native
Religion	52.5% Islam	65.9% Christianity	53.3% Islam	50.9% Islam
Distance regularly traveled	80% <40km/wk	50.6% <40km/wk	34.4% <40km/wk	55.1% <40km/wk
Membership of groups	56.7% >2groups	70.6% no group	68.9% no group	52.1% no group

Description of researchers and extensioners

Variable	Mean/Mode	Standard deviation
Age	40.4 years	4.0 years
Sex	89.2% Male	n.a
Marital status	94.6% Married	n.a
Level of formal education (years)	18.3 years	6.7 years
Highest educational qualification	43.2% M.Sc.	n.a
Number of cassava training attended	2.4	2.4
Number of training organized	1.7	2.6
Income (Naira/month)	N38,773.48 ($305)	N29,509.45
Experience in cassava res. and extension	64.9% <10 years	n.a
Number of professional bodies belonged to	7	5
Ancestry	64.9% Native	n.a
Religion	64.9% Christianity	n.a
Distance regularly travelled (km/wk)	47.4% <200km/wk	n.a

Range of cassava processing technologies

Cassava processing in the rural areas of Southwest Nigeria has gone through several visible changes over time

- This is more evident in the range of technologies found in the cassava processing systems

- They vary from completely manual processing systems to partially and fully mechanical cassava processing systems

Innovations adopted by cassava processors

Innovation	Agro- ecological zone			Total
	Guinea savanna N = 90	Rainforest N = 85	Swamp N = 90	N = 265
Cassava grater	86.67	41.18	44.44	57.74
Screw press	11.11	14.12	10.00	11.70
Improved method of processing *gari*	0.00	8.24	15.56	7.92
Frying machine	0.00	3.53	6.67	3.40
Steel frying pot	0.00	0.00	7.78	2.64
Processing cassava flour	0.00	2.35	3.33	1.89
Processing cassava to starch	0.00	5.88	0.00	1.89
Hygienic methods of processing	1.11	0.00	2.22	1.13
Mechanical peeler	1.11	1.18	0.00	0.75

Differences between the characteristics of adopters and non-adopters of the cassava grater

Independent variables	t	d	p (2-tailed)	Decision*
Age (years)	-8.31	264	0.00	Reject Ho
Household size (persons)	-28.56	264	0.00	Reject Ho
Education (years)	-27.24	255	0.00	Reject Ho
Number of cassava training attended	-32.82	264	0.00	Reject Ho
Income (N/month)	10.59	262	0.00	Reject Ho
Cassava processing experience (years)	-23.46	264	0.00	Reject Ho
No. of employees in cas. processing ent. (pers.)	-25.61	264	0.00	Reject Ho
Est. value of cassava processing ent. (Naira)	**1.80**	**244**	**0.07**	**Do not reject Ho**
Number of groups affiliated to	-33.01	264	0.00	Reject Ho
Average distance regularly travelled (km/week)	**1.74**	**261**	**0.08**	**Do not reject Ho**
Relative advantage index	-33.10	264	0.00	Reject Ho
Compatibility index	-33.05	264	0.00	Reject Ho
Risk level	-33.16	264	0.00	Reject Ho
Complexity index	-33.19	264	0.00	Reject Ho
First contact with innovation (years)	-25.87	264	0.00	Reject Ho
Attitude score	16.12	264	0.00	Reject Ho

* = Decision criterion is reject null hypotheses when p > 0.05   df = Degrees of freedom

Relationships between the characteristics of cassava processors and their adoption of the cassava grater

Independent variables	r	p	Decision*
Age (years)	0.01	0.90	Do not reject Ho
Household size (persons)	**-0.15**	**0.01**	**Reject Ho**
Education (years)	0.00	0.98	Do not reject Ho
Number of cassava training attended	**0.20**	**0.00**	**Reject Ho**
Income (N/month)	0.09	0.16	Do not reject Ho
Cassava processing experience (years)	0.01	0.85	Do not reject Ho
No. of employees in cas. processing ent. (pers.)	-0.07	0.23	Do not reject Ho
Est. value of cassava processing ent. (Naira)	0.09	0.18	Do not reject Ho
Number of groups affiliated to	**0.13**	**0.04**	**Reject Ho**
Average distance regularly travelled (km/week)	**0.12**	**0.05**	**Reject Ho**
Relative advantage index	**0.29**	**0.00**	**Reject Ho**
Compatibility index	**0.15**	**0.01**	**Reject Ho**
Risk level	-0.11	0.08	Do not reject Ho
Complexity index	0.04	0.51	Do not reject Ho
First contact with innovation (years)	0.11	0.07	Do not reject Ho
Attitude score	**0.36**	**0.00**	**Reject Ho**

* = Decision criterion is reject null hypotheses when p > 0.05

Relationships between the characteristics of cassava processors and their adoption of the cassava grater

Variable	Chi square Value	df	Asymp. Sig. (2-sided)	Decision*
Zone	49.05	2	0.00	Reject Ho
Marital status	16.55	3	0.00	Reject Ho
Sex	10.50	1	0.00	Reject Ho
Position in household	**9.68**	**5**	**0.09**	**Do not reject Ho**

* = Decision criterion is reject null hypotheses when p > 0.05
df = Degrees of freedom

The process of development of selected cassava processing technologies

Criterion	Very high	High	Moderate	Low	Very low
Demand driven	10	13	10	2	2
Target specific	10	16	5	4	2
Locally funded	9	17	3	3	5
Easily adaptable	16	12	6	0	3
Compatible with local practices	19	10	7	1	0
Cheap to adopt	13	12	7	2	3

Adapted from: Grassi (2003)

The dominant research process is demand driven, target specific, locally funded, easily adaptable, compatible with local practices and cheap to adopt.

Dominant extension and advisory approach

Dimension	One extreme	Somewhere in-between				The other extreme
Focus	Business	X				Social policy goals
Specificity of clientele	Narrow target category		X			Broad or unspecified target
Means of influence	Promote specific view		X			Help client achieve own objectives
Programme objectives	Technology transfer	X				Process
Scale of decision	Individual management unit	X				Group, community or area (collective decision)
Scope of advice	Information and advice	X				Financial incentives within the scheme
Payment for service	Clients pay		X			Free to clients
Direction of information flow	Top-down	X				Bottom-up
Information delivered by	Public sector	X				Private sector
Duration	Short term campaign		X			On-going
Intensity	No one-to-one advice		X			All one-to-one advice

Adapted from: Garforth et. al. (2003)

Approaches for promoting cassava processing interventions

The innovation mapping approach

o Based on the observed level of cosmopoliteness among researchers and extensioners interviewed in is study and the spatial distribution of innovative centres (universities, research institutes and extension organisations) in relation to locations where cassava processors are residents.

o Information flow within the cassava processing system in southwest Nigeria can benefit from a system which allows innovative centres within relevant geographical bounds to freely share information on what each entity in the technology subsystem is working on, with whom are the innovations been tried, what are its prospects and it failures?

Approaches for promoting cassava processing interventions

The communication approach

o Based on the assumption that communication is intertwined with all aspects of human life.

o Much of people's experiences are shaped by the sources of their information and the sources of information they regularly use.

o In this study, cassava processors' main sources of information about cassava processing innovation are the radio, extension agents, colleagues and friends, research institutes and television.

o Sources perceived as "good" offers ample fora for the conscious use of information dissemination to influence the opinion of cassava processors.

Approaches for promoting cassava processing interventions

The "meeting the expectations" approach

- Based on the assumption that interest is essential for learning, memory and use of what is learnt.
- One of the key motivators for keeping the interest of adult learners is meeting their expectations.
- Cassava processors have unambiguous expectations from processing innovations, researchers and extensioners, government and consumers of cassava products.
- Once these expectations are met, favourable responses to innovations can be expected.

Acknowledgement

Thank you for your patience!