

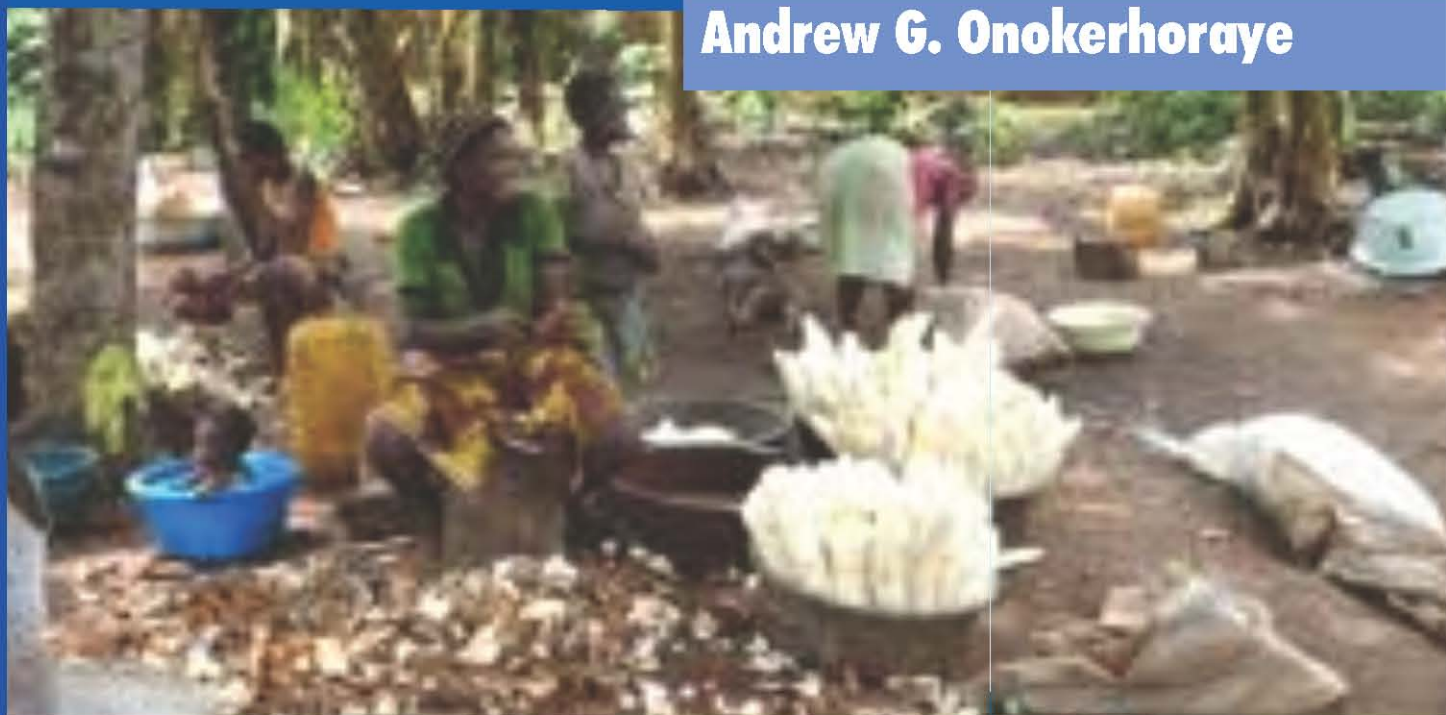


# POLICY Paper

CPED Policy Paper Series No. 1, 2013

## IMPROVEMENT IN THE PROCESSING OF CASSAVA BY SMALL SCALE FARMERS IN JESSE COMMUNITY, NIGERIA: **AN ACTION RESEARCH**

Andrew G. Onokerhoraye



This Policy Paper is supported by the *Think Tank Initiative Programme* initiated and managed by the *International Development and Research Centre (IDRC)*

**IMPROVEMENT IN THE PROCESSING OF  
CASSAVA BY SMALL SCALE FARMERS IN  
JESSE COMMUNITY, NIGERIA:  
AN ACTION RESEARCH**



**Andrew G. Onokerhoraye**

*This Policy Paper is supported by the Think Tank Initiative Programme initiated and managed by the International Development and Research Centre (IDRC)*

© Centre for Population and Environmental Development (CPED)  
BS-1 and SM-2 Ugbowo Shopping Complex,  
Ugbowo Housing Estate  
P.O. Box 10085, Ugbowo Post Office  
Benin City, Nigeria

All rights reserved. This monograph is copyright and so no part of it may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, electrostatic, magnetic tape, photocopying, recording or otherwise without the express written permission of the publisher, and author who is the copyright who is the copyright owner.

First published in 2013

**Series Editor:**

Professor Andrew G. Onokerhoraye  
Executive Director, CPED, Benin City

Printed in Nigeria by:



**AMBIK PRESS LTD.**

#4, Otike-Odibi Avenue, Isiohor,  
Via Ugbowo Old Lagos Road,  
P.O. Box 5027,  
Benin City, Edo State.  
052-880527 & 08074009192

*This Policy Paper is supported by the Think Tank Initiative Programme initiated and managed by the International Development and Research Centre (IDRC)*

## **ACKNOWLEDGEMENT**

This action research and the intervention programme were carried out with financial support from *The Shell Foundation, London*. We are grateful to *The Shell Foundation* for supporting this study. I am also grateful for CPED's Programme Officers, Mr. Johnson Dudu, Mr. Emmanuel Ideh and Mr. Solomon Oshodin for their participation in the intervention programme.

## **TABLE OF CONTENTS**

Acknowledgement .....	iii
Preface .....	iv
Introduction.....	1
Conceptual Framework .....	2
Methodology .....	4
The Pattern of Cassava Processing by Small Scale farmers in Jesse Community .....	5
Components of the framework for participatory on the Processing of Cassava in Jesse community .....	12
Impact of the Action Research and Intervention on the Cassava farmers .....	15
Conclusion .....	17
References .....	18

## **PREFACE**

This policy research paper is part of the on-going research of the *Centre for Population and Environmental Development (CPED)* on the research theme titled *Growth with Equity* in the current strategic plan (2010-2014) of the Centre. Improvement of cassava processing techniques in the rural communities of the Niger Delta region would greatly increase labour efficiency, incomes, and living standards of cassava farmers as well as enhance the-shelf life of products, facilitate their transportation, increase marketing opportunities, and help improve human nutrition. The processing of cassava into more storable forms offers an opportunity to overcome the perishability of the fresh produce. Despite the importance of efficient cassava processing for improving the income of the small scale farmers in the rural communities and increasing food supply to Nigerians, agricultural extension services and programmes by various governments in Nigeria have not made any significant efforts to involve the local farmers as key participants in the promotion of any programme of change to improve cassava processing. The farmers are therefore basically passive beneficiaries of such programmes. Often most of the extension programmes fail to differentiate cassava from other food crops despite the fact that the challenges of cassava processing by small scale farmers are different from those of the other crops. Furthermore, the vast majority of public sector programmes to improve the agricultural productivity of the small scale farmer in Nigeria rarely embrace intervention or demonstration activities that could have enriched the changes envisaged in such programmes. Finally, researchers in Nigeria and indeed other parts of Africa have made remarkable contributions to the literature on cassava processing but most of these have focused on the generation of knowledge through baseline studies and at best articulated policy issues and implications. Often the small scale farmers that are the subject of investigation are never given a feedback on the findings of the research and recommendations or suggestions made for change. The failure of researchers to give a feedback on the subject of investigation which is still a common phenomenon in Nigeria has often led to many rural inhabitants refusing to cooperate with researchers carrying out investigations in rural communities. This paper

presents the findings of a participatory action research programme on promoting the improvement of cassava processing by small scale farmers in Jesse community of Delta State in the Niger Delta region of Nigeria.

We are particularly grateful to the *Think Tank Initiative* for the support to CPED which has enabled the Centre to carry out the study that led to this policy paper.

## INTRODUCTION

Cassava is one of the most important staple food crops grown in Nigeria as in many parts of sub-Saharan Africa. It plays a major role in efforts to alleviate the African food crisis because of its efficient production of food energy, year-round availability, tolerance to extreme stress conditions, and suitability to present farming and food systems in Africa (Hahn and Keyser 1985, Hahn et al. 1987, Westby, 2002). Traditionally, cassava roots are processed by various methods into numerous products and utilized in various ways according to local customs and preferences. In some parts of Nigeria, the leaves are consumed as vegetables, and many traditional foods are processed from cassava roots and leaves. In the Niger Delta region of Nigeria where oil exploration has done considerable damage to the traditional economy that has contributed to the wave of violence over the past three decades, cassava is important to the livelihood of the poor rural households. In Nigeria, as in most parts of sub-Saharan Africa, the majority of cassava produced (88 per cent) is used for human food. Animal feed and use for starch are only minor uses of the crop. This suggests that, if the contribution which cassava can make to the livelihood of the poor rural households in the Niger Delta is to be increased and sustained, there is need to pay adequate attention to its post-harvest handling, processing and marketing.

Rapid post-harvest deterioration of cassava means that processing is more important than for any other root crops (Westby, 2002).

Improvement of cassava processing techniques in the rural communities of the Niger Delta region would greatly increase labour efficiency, incomes, and living standards of cassava farmers as well as enhance the-shelf life of products, facilitate their transportation, increase marketing opportunities, and help improve human nutrition. The processing of cassava into more storable forms offers an opportunity to overcome the perishability of the fresh produce. Despite the importance of efficient cassava processing for improving the income of the small scale farmers in the rural communities and increasing food supply to Nigerians, agricultural extension services and programmes by various governments in Nigeria have not made any significant efforts to involve the local farmers as key participants in the promotion of any programme of change to improve cassava processing. The farmers are therefore basically passive beneficiaries of such programmes. Often most of the extension programmes fail to differentiate cassava from other food crops despite the fact that the challenges of cassava processing by small scale farmers are different from those of the other crops. Furthermore, the vast majority of public sector programmes to improve the



agricultural productivity of the small scale farmer in Nigeria rarely embrace intervention or demonstration activities that could have enriched the changes envisaged in such programmes. Finally, researchers in Nigeria and indeed other parts of Africa have made remarkable contributions to the literature on cassava processing but most of these have focused on the generation of knowledge through baseline studies and at best articulated policy issues and implications. Often the small scale farmers that are the subject of investigation are never given a feedback on the findings of the research and recommendations or suggestions made for change. The failure of researchers to give a feedback on the subject of investigation which is still a common phenomenon in Nigeria has often led to many rural inhabitants refusing to cooperate with researchers carrying out investigations in rural communities.

This paper presents the findings of a participatory action research programme on promoting the improvement of cassava processing by small scale farmers in Jesse community of Delta State in the Niger Delta region of Nigeria. The remaining part of the paper is divided into six sections. The first section provides a conceptual framework which can be used to examine the challenges of improving the processing of cassava by small scale farmers in rural communities of the Niger Delta region. The second section

discusses the methodology of the participatory action research while the third part the baseline situation of cassava processing by small scale farmers in Jesse community. The fourth section examines the key components of the intervention activities. The fifth section presents the outcome of the intervention while the final section concludes the paper.

## **CONCEPTUAL FRAMEWORK**

One of the best overviews of the complex nature of cassava processing in Africa has come from the Collaborative Study of Cassava in Africa (COSCA) as described by Nweke (1988) and Westby, 2002). Details of the three most important products in 233 villages in six countries (Cote d'Ivoire, Nigeria, Ghana, Democratic Republic of Congo, Uganda and Tanzania) were collected (NRI, 1992). Across the six countries 147 different product names were used to describe the 623 products for which details were collected. Through a process of examining key processing steps, this complex array of products was rationalised in eight main groups comprising cooked roots (12 per cent), roasted granules (11 per cent), steamed granules (5 per cent), flours/dry pieces (45 per cent), fermented pastes (12 per cent), leaves (1 per cent), drinks (1 per cent), sedimented starch (4 per cent) and unclassified (3 per cent). The classification of the products emerging

from cassava processing, as outlined above, shows that the processing of cassava into flours/dry pieces constitutes the bulk of the processing activities associated with cassava. This component also dominates the processing activities of small scale farmers in the rural communities of Nigeria, especially in the Niger Delta region where flours/dry pieces from cassava constitute the main output.

Fresh cassava roots cannot be stored for long because they rot within 3-4 days of harvest. They are bulky with about 70 per cent moisture content, and therefore transportation of the tubers to urban markets is difficult and expensive. The roots and leaves contain varying amounts of cyanide which is toxic to humans and animals, while the raw cassava roots and uncooked leaves are not palatable. Therefore, cassava must be processed into various forms in order to increase the shelf life of the products, facilitate transportation and marketing, reduce cyanide content and improve palatability. The nutritional status of cassava can also be improved through fortification with other protein-rich crops. Processing reduces food losses and stabilizes seasonal fluctuations in the supply of the crop. Traditional cassava processing does not require sophisticated equipment. Processing cassava into *garri* requires equipment such as grater, presser and fryer. The traditional cassava grater is made of flattened kerosene tin or iron sheet

perforated with nails and fastened onto a wooden board with handles. Grating is done by rubbing the peeled roots against the rough perforated surface of the iron sheet which tears off the peeled cassava root flesh into mash. In recent years, various attempts have been made to improve graters. Graters which are belt-driven from a static 5 HP Lister type engine have been developed and are being extensively used in Nigeria. Its capacity to grate cassava is about one ton of fresh peeled roots per hour. For draining excess liquid from the grated pulp the sacks containing the grated pulpy mass are slowly pressed down using a 30-ton hydraulic jack press with wooden platforms, before sieving and roasting into *garri*. Stones are used in traditional processing to press out the excess moisture from the grated pulp. Tied wooden frames are used for this purpose in places where stones are not available. Pans made from iron or earthen pots are used for roasting the fermented pulp. Fuel wood is the source of energy for boiling, roasting, steaming and frying. Fuel wood may not be easily and cheaply obtained in the future because of rapid deforestation.

Slight changes in the equipment used in processing can help to save fuel and lessen the discomfort, health hazard, and drudgery for the operating women. The economic success of any commercial development of cassava processing would depend upon the

adaptability of each processing stage to mechanization. However, a major step to take for improvement of cassava technologies should be to improve or modify the simple processing equipment or systems presently used, rather than to change entirely to new, sophisticated, and expensive equipment. At the same time priority should be given to making small scale cassava farmers, who do not have access to mechanical processing of cassava, especially for flour (gari) and therefore depend on manual processing methods, to adopt the use of simple mechanical means to improve their productivity.

## **METHODOLOGY**

The action research focused on Jesse community area located in the Ethiopia West Local Government Area of Delta State. Jesse community has a population of about 65,000 according to the 2006 census of Nigeria. The geographic extent and location of Jesse Community was determined and mapped, using the hand-held Global Positioning System (GPS) receiver. The GPS was also used in identifying the co-ordinates (geographic locations) of the entire social infrastructure and other population nucleation existing in the Jesse community area. The territorial extent of villages within the community area was similarly determined. Four sets of structured/unstructured questionnaires were designed to elicit the relevant information on the socio-economic

patterns in Jesse community area. They are *household questionnaire* meant to elicit information on: respondents' socio-economic characteristics; *questionnaire for small cassava farmers*, *questionnaire on the social structure of the Jesse community*, and *questionnaire on environmental challenges in Jesse community*. Finally focus group discussions and key informant interviews were conducted.

For the purpose of administering the household questionnaire, field assistants were recruited from Jesse community area. They were subsequently trained on the interpretation of the questionnaire items and on the administration techniques and thereafter deployed to the different villages for the administration of the questionnaires. A total of 2,000 male and female household members were interviewed in 37 villages in Jesse Community. For purposes of the selection each village settlement was broken into 10 blocks with each block containing at least 200 people. This design enabled the selection of housing units to be easy for field staff. The survey method gave every block the chance of being selected. With the above design, a minimum of 50 housing units were targeted in each settlement. A systematic sampling selection was adopted to select the housing units where household interviews were conducted. In each household one male and one female adult were

interviewed. A more specific questionnaire for cassava farmers was administered to 1000 farmers from which 600 of them were identified for participation in the implementation of the intervention programme.

Focus group discussions were aimed at involving the local people who are the focus of the action research and the intervention activities on their participation as well as soliciting for their views and opinions. Community leaders, farmers, other community members, interest/occupational interests, were identified and mobilised for interactive discussions, aimed at identifying their perceived problems and needs and ways of ameliorating and mitigating the barrier, thereby enhancing overall community well-being. The information from focus group discussions is used to confirm and crosscheck the data from the questionnaire surveys.

The fieldwork commenced after the research team and community leaders held a series of reconnaissance surveys, as well as pre-mobilisation meetings. Finally, a general meeting of the representatives of all the communities was held at Jesse town, during which, the aim and objectives of the action research, survey instruments and modalities, were thoroughly discussed. Qualitative and quantitative data were analysed as soon as they were collected. The field assistants wrote reports on their observations on the

social and economic situation in the villages particularly with reference to farming activities. Focus group moderators also reported on conclusions arrived at in the focus group discussions. They did this through the transcription and documentation of all the recorded discussions held in the villages. This was followed by a more systematic presentation of the findings in which the views, opinions and consensus reached especially with the cassava farmers were codified and analysed.

## **THE PATTERN OF CASSAVA PROCESSING BY SMALL SCALE FARMERS IN JESSE COMMUNITY**

Cassava processing by small scale farmers in Jesse community has some common characteristics which basically aim at reducing cyanide and improving storability, convenience and palatability. Cassava processing procedures in Jesse community vary, depending on products, from simple processing (peel, boil and eat) to complicated procedures for processing into *garri*, for example, which involve many more steps, namely peeling, grating, pressing, fermenting, sifting, and roasting. The dominant form of cassava processing in Jesse community results in the production of *garri* which is widely sold in the market apart from consumption by family members of

those producing cassava. The focus of the action research in Jesse community presented here is therefore on the processing of cassava for *garri*.

***Harvesting and transportation of cassava roots***

The transportation of cassava roots from the farmland to the roadside or household is one of the major challenges facing cassava farmers in Jesse community area in terms of postharvest processing. Roots are typically transported in a bowl carried on the head. At times bicycles are used by farmers to convey cassava roots from the farmland. Table 1 indicates that among the 1000 famers surveyed, family labour constitutes 58.3 per cent of the source of labour for the transportation of cassava roots while hired labour accounts for 36.5 per cent. This indicates that hired labour plays a major role in the transportation of cassava roots for processing. With respect to the mode of transportation of

cassava roots, Table 2 shows that the vast majority (70 per cent) of the farmers use head portage to carry cassava roots to the processing point. The proportion that use bicycle to convey cassava roots is 25 per cent while about 5 per cent use a combination of bicycle and head portage. These findings indicate that the distance and cost of conveying cassava roots from the farmland to the processing point is a key factor influencing the choice of farmland and indeed cassava production. Key informant interviews with the farmers indicate that most of them reported that the problem of transporting cassava roots during harvesting to their households is a major consideration in the choice or hiring of cassava farmlands. There is no doubt that improvements in rural transportation in Jesse community will stimulate increased cultivation of more cassava farmlands located far from the small scale farmers' homes.

**Table 1:** Main sources of labour for the transportation of cassava roots by cassava farmers in Jesses community

<b>Source of labour</b>	<b>No of farmers</b>	<b>Percentage</b>
Family labour only	583	58.3
Hired labour only	365	36.5
Combined family and hired labour	52	5.2
<b>Total</b>	<b>1,000</b>	<b>100.0</b>

Source: Author's survey 2005-2008

**Table 2:** Mode of transportation of cassava roots by cassava farmers in Jesse community

<b>Mode of transportation</b>	<b>No of farmers</b>	<b>Percentage</b>
Head portage	700	70.0
Bicycle	250	25.0
Bicycle and head portage	50	5.0
<b>Total</b>	<b>1,000</b>	<b>100.0</b>

Source: Author’s survey 2005-2008

*Cassava root preparation for further processing*

Cassava roots are normally peeled prior to further processing as flour (garri). In Jesse community, mechanical peelers are not yet available, although the technology exists for the debarking of cassava roots for processing as *garri* and extraction of starch (Westby and Cereda, 1994, Westby, 2002). Cassava peeling for processing as *garri* and starch which is carried out manually is considered as one of the most labour intensive processes. Table 3 indicates

that most of the small scale cassava farmers in Jesse community depend on family labour for the peeling of cassava roots while hired labour accounts for 29.5 per cent. Generally, small scale cassava enterprises owned by men use largely hired labour for the peeling of cassava roots while those owned by women use mainly family labour. The small scale cassava enterprises using combined family and hired labour for peeling of cassava roots are mainly owned by women and these accounts for about 5 per cent.

**Table 3:** Main sources of labour for the peeling of cassava roots by cassava farmers in Jesses community

<b>Source of labour</b>	<b>No of farmers</b>	<b>Percentage</b>
Family labour only	659	65.9
Hired labour only	295	29.5
Combined family and hired labour	52	4.6
<b>Total</b>	<b>1,000</b>	<b>100.0</b>

Source: Author’s survey 2005-2008

*Size reduction (grating) of cassava roots*

The size reduction of fresh cassava roots in Jesse as in other places is usually by

grating. This aspect of the processing of cassava can be carried out mechanically

in a facility located within a community. There are many designs of grater ranging from punched metal discs to ones that use nails punched through wood. Grating is a necessary part of starch extraction and similar machines are used for garri extraction. Where machines are not available as is the case in many villages in Jesse community, grating is done by hand but this is a very labour-intensive process. Table 4 indicates that most of the small scale farmers (61.5 per cent) in Jesse community use manual means for the grating of cassava roots while about 20 per cent use mechanical means. The peeled roots are grated by women, using a simple traditional grater, but it is done by men if a power driven grater is used. Table 4 further shows that 18 per cent of the farmers use a combination of manual and mechanical means of grating cassava roots. This pattern reflects the fact that mechanical machines are not available in most of the localities where the small scale farmers are located. Table 4 shows that only 5.5 per cent of the farmers use mechanical means of grating their cassava roots within their villages. This implies that most farmers who may want to use mechanical means for the grating of their cassava roots may have to transport them to other locations the cost of which most of them cannot afford. If mechanical means of grating cassava were to be available and easily accessible to small scale farmers, they would have been encouraged to use the

facilities. The absence of such mechanical processing means which small scale farmers in Jesse community can use has some implications for cassava production as many farmers tend to limit their production to their ability to carry out manually key processes such as grating of the cassava roots. This obviously has negative effects in the income of the farmers who could have produced more cassava had there been grating machines in their locality.

Furthermore, the dependence of most small scale cassava farmers on manual means of grating has negative effects on the quantity and quality of output such as garri and even starch. The use of hand results in wastages which would not have taken place if machines are used. Such wastages reduce the quantity of output and by implication the income of the small scale farmers. With respect to the quality of output, the hygienic conditions under which the grating of cassava roots by manual means is carried out is usually poor compared with those in which machines are used. Key informant and focus group discussions with cassava farmers indicate that most of them want cassava grating machines to be located in their locality so as to boost the production of cassava and thereby increase their income.

**Table 4:** Mode of grating of cassava roots by small scale cassava farmers in Jesse community

Mode of grating	No of farmers	Percentage
Manually by hand only	610	61.5
By mechanical process within the village	55	5.5
By mechanical process in another village area	150	15.0
By a combination of manual by hand and mechanical process within or outside the locality	180	18.0
Total	1,000	100.0

Source: Author's survey 2005-2008

*Drying of cassava after grating*

Further processing of cassava for consumption such as production of *garri* entails drying and frying. In Jesse community, as in most other parts of Nigeria, the grated pulp is put in sacks and the sacks are placed under heavy stones or pressed with a hydraulic lack between wooden platforms for 3-4 days to express excess liquid from the pulp while it is fermenting. Fermentation imparts an acidic taste to the final product. The dewatered and fermented lumps of pulp are crumbled by hand and most of the fibrous matter is removed. The remaining mass is sieved with traditional sieves (made of woven splinters of cane) or iron or polyethylene mesh. After being sieved, the fine pulp is then roasted in an iron pan or earthen pot over a fire. If the

sieved pulp is too wet, it takes longer to roast resulting in a finished lumpy product with dull colour. Palm oil may be added to prevent the pulp from burning during roasting and to give a light yellow colour to the *garri*. When palm oil is not added, a white *garri* is produced. Palm oil contains substantial quantities of vitamin A; therefore, yellow *garri* is 10-30 percent more nutritious and expensive than white *garri*. The gratification or conversion rate of fresh roots into *garri* is 15-20 per cent. This value varies with cassava varieties, time of harvesting, age of plant and other environmental factors (Hahn, 1990).

Table 5 which presents the mode of pressing of grafted cassava roots by small scale cassava farmers in Jesse



community shows that pressing is carried out manually by the vast majority (70 per cent) of the cassava farmers while only 3.2 per cent used mechanical means of pressing located within their locality. The proportion of the farmers who used mechanical means located outside their village locality is 10 per cent. Finally, about 18 per cent of the farmers used a combination of manual and mechanical methods in pressing grafted cassava roots. This pattern again shows that small scale cassava farming in Jesse community is constrained by lack of access to mechanical means of processing cassava. The absence of machines for pressing grafted cassava forces the farmers to resort to the use of

hand mainly by women and takes a longer time compared with the situation in which machines are used. If the farmers have to use mechanical means it implies that they have to transport the bulky grafted cassava to another locality with cost implications which many farmers may not be able to afford. This situation as usual limits the capacity of the farmers to produce more cassava because they have to consider the cost of transporting peeled and grafted cassava to other distant localities where such machines are located. The implications for the income of the small scale farmer are therefore obvious.

**Table 5:** Mode of pressing of grafted cassava roots by small scale cassava farmers in Jesse community

<b>Mode of pressing</b>	<b>No of farmers</b>	<b>Percentage</b>
Manually by hand only	700	70.0
By mechanical process using a hydraulic presser within the village	32	3.2
By mechanical process using a hydraulic presser in another village area	100	10.0
By a combination of manual by hand and mechanical process using a hydraulic presser within or outside the locality	168	16.8
<b>Total</b>	<b>1,000</b>	<b>100.0</b>

Source: Author's survey 2005-2008

Table 6, which presents the mode of roasting of grafted and fermented cassava roots by small scale cassava farmers in Jesse community, reflects essentially the

same pattern as the situation with respect to the mode of pressing grafted cassava discusses above. It shows that a high proportion (75 per cent) of the small scale farmers carry out the roasting of garri by hand while only 1.5 per cent indicated they use a mechanical process by using a drier located within the village locality. In the case of manual roasting, the sieved fermented pulp is roasted almost exclusively by women in a pan or pot on the fire with fuel wood as the energy source (Hahn, 1990). Table 6 further shows that only 5 per cent of the small scale farmers roast their *garri* through mechanical means while 18.5 per cent use a combination of manual and mechanical process. The explanation for this pattern also reflects the absence of mechanical facilities within the localities of the farmers which forces them to resort to manual mode of drying *garri*. It should

however be noted that some small scale cassava farmers particularly women believe that hand fried or roasted *garri* is better than that roasted by machines. This could be a factor preventing them from using a mechanical means of roasting their *garri*. As pointed out earlier, the dependence of the small scale farmers mainly on manual means of processing cassava at its various stages has implications for the scale of production which the farmers can embark upon. The need for the farmers in Jesse community to have access to such mechanical facilities and education on the need to use such facilities is essential to improving the livelihood of the farmers.

**Table 6:** Mode of roasting of grafted and fermented cassava roots by small scale cassava farmers in Jesse community

<b>Mode of roasting</b>	<b>No of farmers</b>	<b>Percentage</b>
Manually by hand only	750	75.0
By mechanical process using a garri drier within the village	15	1.5
By mechanical process using a garri drier in another village area	50	5.0
By a combination of manual by hand and mechanical process using a gari drier within or outside the locality	185	18.5
<b>Total</b>	<b>1,000</b>	<b>100.0</b>

Source: Author's survey 2005-2008

## **COMPONENTS OF THE FRAMEWORK FOR PARTICIPATORY INTERVENTION ON THE PROCESSING OF CASSAVA IN JESSE COMMUNITY**

The findings of the action research, as discussed in the preceding section, provided the background for the intervention activities designed to improve the processing of cassava produce by the 600 cassava farmers who were identified and agreed to participate in the intervention programme. This entailed carrying out a number of activities in which the key stakeholders and the target 600 cassava farmers participated in their implementation.

### *Constitution and training of Village Project Implementation Committees*

The 600 cassava farmers who agreed to participate in the project were selected from fourteen villages within Jesse community. In order to ensure the participation of the cassava farmers, a project implementation committee of about five members comprising democratically elected by the participating farmers was constituted in each village. The members of the committees were trained to mobilize the participating cassava farmers in their respective villages for effective participation in the implementation of the intervention.

### *Stakeholders' Workshop on the findings of the action research and the associated intervention*

It was necessary to provide a feedback of the action research findings to the key stakeholders in Jesse community so that they can collectively share the findings of the research and make their comments and observations. At the same time the details of the intervention programme arising from the findings of the action research needed to be presented to the stakeholders and in particular the participating cassava farmers so that they can make their input into the programme. It is in this context that a stakeholders' workshop was organised. The workshop brought together the cassava farmers, local non-governmental organisation and associations, officials of the Delta State and Ethiope West Local Government Area. In all about 1,000 people participated in the workshop.

The key research findings and issues involved in the implementation of the intervention programme were discussed including: lack of improved cassava stems for the farmers in most villages; high cost of labour in clearing farmlands; problem of spear grasses that cover cassava farms as soon as they are planted; rotting of cassava tubers before harvesting; high cost of farm implements such as cutlasses, hoes and files; lack of fertiliser for the improvement of the soil after long

years of cultivation; lack of extension officers to guide them on modern cassava farming techniques; inadequate land for cassava farming which makes some farmers to rent, at high costs, farmland from neighbouring communities and finally farmers borrowing money at high interest rates from traditional sources of loans.

The workshop made a number of recommendations for improvements in the processing of cassava root crops by small scale farmers in Jesse community including: the improvement of rural roads that will facilitate the transportation of cassava root crops from farmlands; provision of machines for the peeling of cassava root crops; provision of machines for the grating, pressing and drying of cassava root crops for the production of garri and starch; and formation of farmers cooperatives so that the small scale farmers can take collective action on key issues affecting cassava production in their villages.

*The identification and selection of the cassava farmers that participated in the intervention programme*

The participatory approach used in mobilizing the small scale cassava farmers to participate in the action research was also used to identify and select the 600 farmers that will be involved in the intervention programme. Following the presentation of the findings of the action research and the decision to

carry out an intervention programme on the improvement of cassava processing in Jesse community, the interest of the farmers was stimulated and they became enthusiastic about participating in the intervention. The number of cassava farmers willing to participate in the intervention project overwhelmed the project team. This is in marked contrast to the general attitude of local farmers to projects of this nature. Considering the enthusiasm of the people and the need to make the project felt in all the fourteen villages, a tentative list of 800 farmers was initially compiled for screening, which entailed visits to their farmlands and an examination of their production capacity. On the basis of the interaction with the farmers the final list of 600 participants was compiled.

*Formation and training of cassava farmers' cooperative organizations*

The cassava farmers participating in the project were encouraged to form a cooperative union or association. The members were trained in a series of workshops. In order to make the training effective and successful, an attempt was made to build the spirit of oneness and collective responsibility among the farmers by organizing them into cooperative organizations based primarily on the list of cassava farmers participating in every village. Indeed the *Village-based Implementation Committees* formed the focus points for the establishment of the Cooperative

Societies from where the various executive and leadership positions were elected. The cassava farmers' cooperative societies, and their members, especially the leaders, were trained in the modern methods of managing an outfit of that nature. An importance aspect of these cooperative societies is the establishment of rules and regulations by the members to guide or regulate their conducts in a form of constitutions which have been so helpful in running the associations.

*Provision of agro-business training to the participating cassava farmers*

In order to make the intervention project sustainable, farmers were trained in all aspects of cassava production. During the training, the farmers were made to realize that cassava has a potential of over 100 tones per hectare, and yields of over 50 tones per hectare are common in experimental farms. It is against this background that the 600 participating cassava farmers were trained in efficient methods of cassava production entailing the following: methods of planting cassava (farm operations in cassava cultivation); sourcing for farm inputs (Stem cuttings, fertilizers, herbicides, Pesticides etc); financing agricultural projects; Farm Machineries (Cassava Processing Machines); keeping records of farm activities; farm accounting and cassava processing technologies and benefits of each methodology. In an

attempt to train the participants in the various communities, a Train the Trainer (TOT) method was adopted. Some members of the Village Implementation Committees were selected in addition to some members of the participating farmers in each village and were trained by the action research project team members. Those trained were later sent to train their members in the different villages.

*Support for the farmers in the provision of mechanical facilities for the processing of cassava into garri in their village communities*

Having provided relevant agro-business training to the cassava farmers, the action research embarked upon the provision of the much-needed assistance to cassava farmers in the processing of cassava roots. This entailed further detailed training on how to improve the processing of cassava at the various stages of the process including; harvesting and transportation, peeling, grating, pressing and roasting. The intervention activities culminated in the purchase and installation of fifteen mechanical facilities with components for the grating, pressing and roasting of garri. The beneficiaries were trained to operate the facilities. The sustainable management of the mechanical facilities in each village is being carried out by the respective Village Implementation Committees. The beneficiaries and other cassava farmers

in the target villages pay token fees for the use of the different components of the mechanical processing facilities. The plants have been working successfully for the past five years.

### **IMPACT OF THE ACTION RESEARCH AND INTERVENTION ON THE CASSAVA FARMERS**

After three years of the implementation of the intervention activities to improve the processing of the cassava by small scale farmers in fourteen villages within Jesse community area, evaluation of the impact of the intervention shows considerable improvement in the pattern of processing of cassava as well as on the livelihood of the participating farmers. Some of these impacts are outlined below:

*Promotion of Participation:* The key stakeholders, target groups and beneficiaries specifically, the farmers were mobilized to take part in the action research which identified the key challenges facing cassava farmers in Jesse community. They also participated in reviewing the findings of the action research, the identification of strategies to improve cassava processing and the implementation of the intervention programme. This was a major innovation in Jesse community where participation in action research and associated intervention programme are rare phenomena.

*Harvesting and transportation of cassava roots:* There were some changes in the relative proportions of the participating farmers who were able to use hired labour to convey cassava roots from their farmlands to cassava processing facilities. There was an increase in the proportion of farmers that were able to use hired labour from 36 per cent recorded during the baseline survey to 65 per cent while the proportion that used family labour declined to 25 per cent. These changes reflect the capability of the farmers to produce more cassava following the processing facilities provided through the intervention activities. Before the intervention the farmers were constrained by the lack of processing facilities to bother about transporting cassava root crops to their homes. As observed during the baseline survey most of the farmers that had any surplus sold them in their farmland to buyers who carried out the processing so as to increase the value of the product.

*Mode of transportation of cassava roots:* There were also some changes in the mode of transportation of cassava roots from the farmlands as about 25 per cent of the farmers were able to convey their cassava roots to processing facilities. This was partly a reflection of the fact that farmers were encouraged to produce more cassava roots since there were processing facilities. At the same time there were some

improvements in rural road facilities in Jesse community following rural road rehabilitation by the Delta State Government as well as the Niger Delta Development Commission. These factors enabled the farmers to convey cassava roots to the processing facilities.

*Cassava root preparation for further processing:* The peeling of cassava root crops which is normally done by hand by the farmers also experienced some changes because of the availability of processing facilities. During the baseline survey it was observed that family labour constituted over 65 per cent of the overall labour for the peeling of cassava while hired labour was about 30 per cent but with increased production of cassava during the intervention period a higher proportion of the farmers (52 per cent) started using hired labour for the peeling of cassava root crops. This indicates that the farmers were able to mobilise more resources for hiring labour due largely to improved cassava processing facilities which has encouraged the farmers to increase their production.

*Size reduction (grating) of cassava roots:* One of the major cassava processing facilities introduced in many of the villages during the intervention programme was the grating of cassava by mechanical means. During the baseline survey it was observed that over 61 per cent of the farmers carry out the grating of cassava manually by hand

because the machines for grating of cassava were not available in most of the villages. The introduction of the machines during the intervention period provided the opportunity for many small scale farmers to use these facilities in processing their cassava. There was an increase in the proportion of the farmers using mechanical means of grating of cassava to 75 per cent from the less than 10 per cent which prevailed before the intervention activities. The use of mechanical facilities not only improved the quality of garri and starch produced by the farmers but also increased the quantity of garri and starch which were reflected in the increase in the income of the farmers.

*Drying of cassava after grating:* The benefits of the presence of the mechanical means for the grating of cassava for the small scale farmers was also extended to the pressing and drying of grafted cassava roots. Before the introduction of the mechanical processing facilities as shown during the baseline survey, over 75 per cent of the farmers depended on manual labour for the pressing and drying of grafted cassava roots. The proportion of farmers depending on manual labour declined to less than 10 per cent while the proportion of the farmers using mechanical means to press and dry grafted cassava roots increased to over 60 per cent from the baseline proportion of less than 5 per cent. Again these changes led to increased production of garri and to some extent starch by the

farmers which were also reflected in their income level compared with what they made before the introduction of the processing facilities.

*Sustainable management of the cassava processing facilities:* A major impact of the intervention programme relates to the fact that the processing facilities in each village was under the management of the representatives of the farmers. They maintained the processing facilities while the farmers who used the facilities for the processing of their cassava paid appropriate charges and this enabled those managing the facilities to carry out repairs pay for the cost of power supply for the machines.

*Membership of co-operative groups:* The 600 cassava farmers were not members of any cooperative group during the period of the baseline survey. By the end of the intervention activities all the cassava farmers became members of different cooperative societies. This showed a 100 per cent achievement during the intervention period.

*Increased income of participating cassava farmers:* The target of 50 per cent increase in income set at the beginning of the intervention programme were also exceeded as the increase in the income of the participating farmers was about 75 per cent at the end of the programme.

*Multiplier effect of the programme on other farmers in the locality:* The intervention programme generated multiplier effects among other small scale farmers in

Jesse community as some of them adopted the strategies of the intervention programme in their cassava processing activities.

## **CONCLUSION**

This study has demonstrated the importance of action research in contributing to knowledge generation and translation in strategies to improve the livelihood of the low income population in the Niger Delta region of Nigeria. The study has shown that if action research is to be effective in contributing to poverty reduction in a volatile region such as the Niger Delta, the participation of key stakeholders particularly the beneficiaries is important. One of the major challenges of small scale farming in the Niger Delta region, as in other parts of Nigeria, relates to the need to improve the processing of farm products so as to increase their output for the benefit of the farmers. However, improving the processing of farm crops must involve the participation of the small scale farmers so that they can willingly accept and adopt whatever innovations that are introduced as was done in this study. At the same time research is essential to generate knowledge about the practices and constraints of small scale farmers. This study combines these two necessities, research and intervention which should be emulated in other development initiatives in the Niger Delta region. Such approach will contribute remarkably to peace building in the region.



## REFERENCES

- Asiabaka, C. (2002), *Promoting Sustainable Extension Approaches: Farmer Field School (FFS) and its role in sustainable agricultural development in Africa*, <http://www.Codestria.org/links/conferences/IFS/Ashabaka>
- Chokor, B.A. (2004) "Perception and Response to the challenge of poverty and environmental resource degradation in rural Nigeria: Case study from the Niger Delta" *Journal of Environmental Psychology*, Vol. 24, pp 305 - 318.
- Hahn S.K. (1990) "An overview of traditional processing and utilisation of cassava in Africa" in S.K. Hahn (ed.) *Cassava as livestock feed in Africa - Proceedings of the IITA/ILCA*, Ibadan.
- Hahn, S.K, and J. Keyser. 1985. Cassava: a basic food of Africa. *Outlook on Agriculture* 4: 95-100.
- Mohammed, A. B, A. Apata, T. Peter and D. Fidelis (2010) "Factors Declining Cassava Production in Ogori-magongo Local Government Area of Kogi State, Nigeria" *ARPN Journal of Agricultural and Biological Science* Vol. 5, pp.16-18.
- Oke, O. L. 1968. Cassava as food In Nigeria. *World Review of Nutrition and Dietetics*, 9: 227-250
- Onabowale, S. O. (1990), "Constraints and projections for processing and utilization of Cassava" in S.K. Hahn (ed.) *Cassava as livestock feed in Africa - Proceedings of the IITA/ILCA*, Ibadan
- Nweke F.I. and H.C. Ezumah (1990) "Cassava in African farming and food systems: Implications for use in livestock feeds" in S.K. Hahn (ed.) *Cassava as livestock feed in Africa - Proceedings of the IITA/ILCA*, Ibadan
- Shams-Ud-Din, Md. 2002. Training manual on cassava processing, Dept. of Food Technology & Rural Industries, Bangladesh Agricultural University, Mymensingh. Published by: REFPI Project of the DFID – Bangladesh
- Ukeje, E. (2004) Modernizing Small Holder Agriculture to Ensure Food Security and Gender Empowerment: Issues and Policy [www.g24.org/ukeje.pdf](http://www.g24.org/ukeje.pdf)
- Westby, A. (2002), "Cassava Utilisation, Storage and Small Scale Processing" in R.J. Hillocks, J.M. Thresh and A.C. Bellotti (eds.) *Cassava: Biology, Production and Utilisation*, CAB International.

*This Policy Paper is supported by the Think Tank Initiative Programme initiated and managed by the International Development and Research Centre (IDRC)*

## ABOUT THE AUTHOR

**Andrew G. Onokerhoraye** was educated at the University of Ibadan, Nigeria and at the London School of Economics and Political Science, University of London. He transferred his services from the *Nigerian Institute of Social and Economic Research, Ibadan* to the Department of Geography and Regional Planning, University of Benin as, Senior Lecturer in 1980. He was subsequently appointed Associate Professor in 1981 and Professor in 1982. He was at various times Head of the Department of Geography and Regional Planning, Dean of the Faculty of Social Sciences, Deputy Vice-Chancellor and Vice-Chancellor in the University of Benin. Professor Onokerhoraye is at present the Executive Director of the *Centre for Population and Environmental Development (CPED), Benin City, Nigeria*.

