



POLICY Paper

CPED Policy Paper Series No. 4, 2013

IMPROVING THE PRODUCTIVITY OF SMALL SCALE CASSAVA FARMERS IN NIGERIA'S NIGER DELTA THROUGH PARTICIPATORY 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)*

IMPROVING THE PRODUCTIVITY OF SMALL SCALE CASSAVA FARMERS IN NIGERIA'S NIGER DELTA THROUGH PARTICIPATORY 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	v
Introduction	1
Conceptual Framework	3
Methodology	4
Changing Patterns of Small Scale farming in Jesse Community	6
Framework for Participatory Intervention	14
Impact of the Action Research Intervention on the Cassava Farmers	16
Conclusion	19
References	20

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. The contribution of researchers to the improvement of small scale agricultural development in Nigeria has also been quite remarkable in terms of making direct impact on the local farmers. Often research activities tend to focus on providing basic knowledge on the characteristics and problems of the small scale farmer and at best conclude by making recommendations on policy issues which are rarely accessed and implemented by relevant government agencies. The farmers who are subjects of such research are not even given a feedback on the findings and the implications for them. There is strong empirical evidence that high levels of research and development investments lead to high productivity and eventually, to increased economic performance. However, for such research to be effective and meaningful in terms of improving the productivity of the small scale farmer, the farmers themselves should be participants in such research programmes. This will enhance the adoption of the findings and recommendations that emanate from the research activities. It is against this background that this participatory action research on promoting improvements in the productivity of small scale cassava farmers in Jesse community in the Niger Delta region of Nigeria was conceived and implemented.

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

In the Niger Delta region of Nigeria, which has over the last thirty years been characterized by violence, over 70 percent of the extremely poor people live in rural areas and depend mainly on agriculture for their livelihoods. The vast majority of these poor rural households have not been part of the oil production activities in the Niger Delta region. In Niger Delta, as in other parts of Nigeria, the pervasive poverty of farming households can be explained largely by the fact that a substantial proportion of agricultural growth comes from area expansion instead of increased productivity. If poverty is to be tackled in the Niger Delta region so as to reduce the prevailing violence, the productivity of the agricultural sector, which employs the vast majority of the people, must be increased. However, agricultural productivity will not increase if the capacity of farmers and other actors in the agricultural value chain remain low, preventing them from innovating. In agriculture, innovations can include new knowledge or technologies related to primary production, processing, and commercialization—all of which can positively affect the productivity, competitiveness, and livelihoods of farmers (Asiabaka, 2002). By putting farmers in the agriculture value chain at the centre of innovative practices and encouraging learning through the interchange of ideas, successes, and failures, they can develop the capacity

to operate efficiently in the contemporary knowledge economy.

Over the years efforts have been made by governments at the federal, state and local levels in Nigeria to bring about agricultural development without much success. Much of the failure can be attributed to the adapted transformation approach to agriculture which is characterized by the introduction of a wide variety of large scale farming and processing technologies. It is however gratifying to note that in recent years there is now a shift in emphasis from the big scale transformation approach to the small scale improvement strategy which is attuned to African age-long farm practice. Even then where efforts are made to provide extension services to small scale farmers in Nigeria, these programmes have not made any significant efforts to involve the local farmers as key participants in the programme of change. The farmers are therefore basically passive beneficiaries of such programmes. Furthermore, the failure of most agricultural extension programmes in Nigeria can also be attributed to the way information on agricultural improvement is delivered to local farmers. In most cases agricultural information is not integrated with other development programmes to address the numerous related problems that face farmers. Information is an essential ingredient in agricultural development programmes but Nigerian farmers

seldom feel the impact of agricultural innovations either because they have no access to such vital information or because it is poorly disseminated. The information provided is exclusively focused on policy makers, researchers, and those who manage policy decisions with scant attention paid to the information needs of the targeted beneficiaries of the policy decisions. Before farmers can make meaningful demands for agricultural advisory services they must themselves be empowered through the strengthening of their capacity to enquire about how their operations and performance can be improved. Increasing agricultural productivity in the economically strategic Niger Delta region of Nigeria requires building the capacity of small-scale farmers to innovate and adopt new technologies.

The contribution of researchers to the improvement of small scale agricultural development in Nigeria has also been quite remarkable in terms of making direct impact on the local farmers. Often research activities tend to focus on providing basic knowledge on the characteristics and problems of the small scale farmer and at best conclude by making recommendations on policy issues which are rarely accessed and implemented by relevant government agencies. The farmers who are subjects of such research are not even given a feedback on the findings and the implications for them. There is strong empirical evidence that high levels of

research and development investments lead to high productivity and eventually, to increased economic performance. However, for such research to be effective and meaningful in terms of improving the productivity of the small scale farmer, the farmers themselves should be participants in such research programmes. This will enhance the adoption of the findings and recommendations that emanate from the research activities.

It is against this background that this participatory action research on promoting improvements in the productivity of small scale cassava farmers in Jesse community in the Niger Delta region of Nigeria was conceived and implemented. This paper presents the findings of the action research and the impact the associated intervention programme had on the productivity of the target small scale cassava farmers. 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 productivity of small scale cassava farmers in the Niger Delta region. The second section discusses the methodology of the participatory action research while the third section examines the prevailing pattern of small scale cassava production at the time of the action research. The fourth section discusses the key components of the intervention activities. The fifth section presents the

results of the intervention while the final section draws some conclusions.

CONCEPTUAL FRAMEWORK

This conceptual framework articulates the hypothetical relationships between population growth, oil exploration, deforestation, land degradation, and small scale cassava cultivation in Nigeria's Niger Delta region. If the population size of a rural locality is small in relation to the land available the pressure on land is reduced as adequate land is available for farmers to carry out even their traditional farming activities. More clearing provides more land for the farmers, and this allows for more production to meet the limited needs of the farmer. With population growth which increases the demand for land for farming, the land available for cultivation begins to decline. At the same time if oil is being exploited in the locality a significant proportion of the land is also taken over from the farmer by oil exploitation activities and at times oil spillage that damages the land.

Thus more production from the declining land available to the farmer causes increased erosion, and this invariably leads to decreased soil fertility. This process of decreasing soil productivity is known as land degradation, which is a result of two

main factors. First, agricultural production itself depletes the soil as crops absorb the nutrients from the earth. Second is soil erosion, accelerating the rate at which the land degrades (Dean, 1995; Millington, 1993). Soil erosion is a process that occurs naturally as a result of weathering from wind and water, occurring at a faster rate where vegetative covering is sparse. This natural process is known as geological erosion; however, the two primary anthropogenic accelerators of this potentially destructive process are deforestation and agriculture. Anthropogenic soil erosion usually occurs at faster rates than geological erosion, and in areas that might otherwise be protected from wind and water erosion. The results of which are largely responsible for land degradation in many tropical areas (Millington, 1993; Watson, 2001).

Also affecting soil fertility is the production itself, because crops deplete the soil's nutrient base. Decreased fertility leads to less land, and this in turn leads to more clearing. Clearing leads to less forest, and this in the long-term will lead to less clearing since eventually the forest will reach its maximum felling potential. Continuing from the decrease in forest, a reduction in biodiversity becomes inevitable. The loss of biodiversity represents one of the key ecological problems of deforestation. The process of deforestation, cultivation, and

degradation is a cycle. The cycle begins when farmers clear an area of forest through a controlled burn, which transfers the nutrients from the forest biomass to the soil. This method, known as slashes and burn agriculture, provides the soil with a nutrient base rich enough to support crops for a temporary period of time. However, due to the unique nature of rainforest ecosystems, the soil's productivity is largely dependent upon the trees and plants that thrive in it, such that without sufficient vegetation, an area of rainforest is unable to naturally sustain its soil nutrient base (Whitmore, 1990; Watson, 2001). Vegetative cover also works to ensure that the trees and plants absorb moisture from rain, whereas on an agricultural field the soil becomes saturated with water, encouraging runoff (Millington, 1993). As soil erosion continues, the physical structure of the soil is degraded, reducing its porosity and permeability. As a result, soil absorption capabilities worsen and the amount of water lost in run off increases (Stocking, 1995; Watson, 2001).

Also a direct result of forest loss is a decrease in soil fertility, since the soil is dependent upon the trees for the regeneration of nutrients and moisture. Another ecological problem area is the flooding and scooting of waterways, which increases with greater erosion. When soil fertility is low, one solution used by many farmers is the increased

usage of fertilizer to remedy degenerating soils. More fertilizer can be a solution, as it results in increased fertility, but the side effect is the eventual increase in pollution. The increase in crop production leads to an increased output. While increased output may initially appear as a positive result of greater production of the land more output could lead to a reduction in prices of crops. Lower prices mean less money for the farmers, thus a resultant increase in poverty. The results of land degradation through agricultural production and soil erosion are lower yields, often accompanied by higher costs to produce a given yield. Eventually soils may become so degraded that their value as productive agricultural land is lost. Currently, fertilizers are relied upon by the agricultural extension agencies to alleviate erosion and slightly prolong the life of farmlands. Controlling rapid soil infertility resulting from over exploitation of land and thereby reducing poverty is the challenge facing stakeholders concerned with development in the Niger Delta region of Nigeria.

METHODOLOGY

The action research focused on Jesse community area located in the Ethiope 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 the 37 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 carried.

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 of households to be interviewed 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 the 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 later selected for participation in the implementation of the action research and the associated 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, and civil society groups 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 household and farmers' 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. A significant proportion of the quantitative data collected as well as some documentary statistical data were analysed using descriptive statistical methods. First frequency tables reflecting trends and patterns were produced for the different communities. Secondly the relationships among the variables/indicators of child migration

were analysed as they relate to differences among the communities.

CHANGING PATTERNS OF SMALL SCALE FARMING IN JESSE COMMUNITY

Focus group discussions and key informant interviews revealed clearly the challenges facing small scale farmers in Jesse community. The key elements of the findings are as outlined below.

Land scarcity and degradation

There was a consensus among the respondents and participants in the discussions that farmlands in Jesse community have generally become unproductive, a phenomenon which most community members now battle with as they seek avenues to improve yields, as falling yields have direct bearing on household income and quality of life. It is this great search for means and sources for attaining improved yields that is now adversely affecting the state of forest resources and the environment of Jesse Community. The community members particularly the farmers pointed out that land has suddenly become unproductive these days when compared to the past because, in the years past, after a farmland has been cultivated it was left to fallow for a period of 10-15 years and during which soil fertility was replenished through decaying and dried leaves which were also burnt to enrich the soil. These days, however, fallow are

less than 3-4 years and therefore there are no sufficient decaying matter accumulated before the next planting or soil use. The main reason for shortened fallow according to the Jesse community members was increased population and pressure on land resources. Because of the phenomenal rise in population in the community one finds that the land where about 3 people farmed in the past has been taken over by 10 -15 people. The result is reduced farmland, shortened fallow, farmland fragmentation and conflict over land. In some cases people farm the land all-year round. The pattern of demand for land is such that community farmland is no longer sufficient and many have had to look for land in other community areas (Chokor, 2004).

According to the people of Jesse, when population was less and land was abundant, a family may have 5-10 children and each could have access to a strip of farmland, but now a polygamous father may have many children and wives to feed from the proceeds of the land which has in fact reduced due to fragmentation. In the process, land scarcity results, continuous cropping is adopted and land is no longer productive. In several cases the children can no longer have access to farm in their father's land and so many migrate to other communities. As members of some focus groups concluded during the discussions, with these pressures and with no new land

in the community, if innovative and modern farming techniques and land conservation measures are not introduced, sooner or later, the community will find it increasingly difficult to survive.

Another consensus view of the focus group participants relates to what they perceive as the adverse effects of oil exploration activities. Oil drilling drains soil nutrients some argued, making them less productive more so, as no soil regeneration and land reclamation is carried out by oil companies. There was therefore a high consensus opinion amongst group discussants that population increase, land fragmentation, shortened fallow and continuous cropping are critical issues facing their communities. Furthermore, since increased land demand no longer allowed for natural replenishment because of the on-set of continuous cropping, the old traditional way of cropping through fallow was no longer sufficient and appropriate. So, as most of them concluded, with population increase and farmland scarcity what they now require is access to fertilizers and other modern inputs.

Declining farmland productivity

Land scarcity is not the only problem facing farmers in Jesse community. Declining farmland and productivity, which are the major issues affecting rural survival and quality of life, are heightened by a number of related issues that are largely economic.

Many small scale farmers had sought for loans from various sources to improve on their farms to no avail. The problem of capital has also been heightened by modern day inflation and cost of living. According to some discussants, in the old days money had real value and with little money the family could be maintained. But today inflation is a major problem and a source of pressure on the family. The impact of limited capital, inflation and cost of living is such that the farmer has little room to manoeuvre to increase his income through the farming process. The cost of labour has within a short period gone up three-fold, and yet the farmer has to contend with the increasing cost of hiring farmland in government forest reserves. Many agreed that the cost of hiring farm labour is a major constraint to meaningful improvement in small scale farming in the community.

The second major constraint pertains to receding forests and farmlands and the increasing distance to access farmland. For people in Jesse Community whose major source of land is now in territories outside their community area, geographical distance is now a major issue in terms of physical exertion and transportation costs, since many have to cover as much as 20-25 kilometres or more. Bicycle, which is the major means of transportation and also for conveying farm products and labourers, has suddenly gone out of

the reach of farmers. For farmers to use public transportation there is considerable constraint as most farmlands cannot be reached by motor vehicle while the cost has also become very prohibitive. Transport cost is thus a major source of worry for poor rural farmers. Under these prevailing circumstances, farming has become a difficult option as a traditional means of survival by the poor as they can no longer readily fall back on it as a means of generating income for the upkeep of their household (Chokor, 2004).

Internal migration to the community

In spite of the challenge facing farmers in terms of access to land, capital and inflation, additional pressures have come by way of changing migration pattern. In the past, rural-urban migration was the common pattern of movement because of the depressed economies of rural areas and perceived prospects of better life in the urban areas. However, with the onset of the structural adjustment programme (SAP) in Nigeria in the mid 1980s, urban economies have equally been depressed, and high unemployment has resulted, to the extent that as many focus group members and key informants pointed out, there is now some considerable invasion of rural lands and forest resources by urban dwellers. At the same time, rural-urban migration has reduced, thus compounding the pattern of demand

for cropping land, the use of natural resources and overall prospects of household economic survival. Thus an area previously, noted for out-migration because of the poor status of soil resources and land scarcity is now witnessing some significant in-migration as the indigenes of the area in towns return home to seek survival in the land.

Socio-economic changes in the community

Focus group discussions revealed a number changes that have taken place in Jesse Community arising from population growth and increased pressure on natural resources; as well as changes in internal migration pattern. These changes have been felt particularly in the nature of cropping, land and resource conservation ethics, as well as general attitude to resource and its exploitation and use. In the attempt to survive people, particularly newcomers from the towns, no longer discriminate between sustainable and non-sustainable farming practices. The people noted that their society has changed from the traditional ways of farming. In the process, non-sustainable methods, for example, bushfire, are employed in the hope of

eking a living from the land. Overall, resources quality is now increasingly affected. Not only has natural resources witnessed a more intense exploitation activities from the range of ‘free’ seekers, but conservation principles having been abandoned, environmental degradation has become more rapid with the confused and diffused pattern of exploitation. In effect, the conservation ethics that ought to be passed on professionally are gradually being lost while the efficiency in resource use that should go with specialization is also lost.

Farming characteristics of small scale cassava farmers in Jesse community

The survey of the 1,000 identified cassava farmers who participated in the action research confirmed in quantitative terms the challenges facing small scale farmers in Jesse community. Table 1 shows that the vast majority of the cassava farmers depend on family land which suggests that as the family size increases due to population growth considerable pressure is placed on the family land as more family members aspire to farm part of it.

Table 1: Main sources of land for cassava farmers in Jesse community

Source of cassava farm land	No of farmers	Percentage
Family	700	70.0
Community	250	25.0
Rentage and other sources	50	5.0
Total	1,000	100.0

Source: Author’s Field Surveys, 2005-2008

Table 2 also shows that the size of farmland available to each cassava farmer is small as 70 per cent of them had less than one hectare which could be reduced in the following year if additional members of the family

become farmers. The inadequacy of the size of farmland available to cassava farmers become obvious if it is realised that virtually all of them do not use inputs such as fertilisers to improve the productivity of the land.

Table 2: Land hectare per farmer for cassava farmers in Jesse community

Land hectare per farmer	No of farmers	Percentage
Less than 1 hectare	700	70.0
1-2 hectares	250	25.0
Over 2 hectares	50	5.0
Total	1,000	100.0

Source: Author's Field Surveys, 2005-2008

Table 3: Main sources of labour used by cassava farmers in Jesse community

Source of labour	No of farmers	Percentage
Family labour only	450	45.0
Hired labour only	365	36.5
Combined family and hired Labour	185	18.5
Total	1,000	100.0

Source: Author's Field Surveys, 2005-2008

Table 3 indicates that the family provides the main source of labour (45 per cent) for the cassava farmers which suggest that the farming activities are largely family enterprises. Generally, family members are not paid professional labour charges. Table 3 further shows that over 36.5 per cent of the cassava farmers also depend on hired labour while 18.5 per cent use a combination of family and hired labour. With respect to

the sources of capital used by the farmers, Table 4 indicates that traditional sources such as local credit facilities with exorbitant interest rates are used by the vast majority of the farmers while family sources account for about 30 per cent. This reflects the fact that the farmers do not generally have access to the other modern financial sources such the banks and other finance houses.

Table 4: Main sources of capital used by cassava farmers in Jesse community

Sources of capital	No of farmers	Percentage
Formal credit sources	8	0.8
Traditional sources	700	70.0
Family sources	202	29.2
Total	1,000	100.0

Source: Author's Field Surveys, 2005-2008

Despite the limited size of the cassava farmlands, Table 5 shows that most of the farmers depend solely on the income generated from the cassava farms while about 25 per cent also derive their income from the sale of other

agricultural products while just as about 20 per cent generates income from various non-agricultural activities to supplement their income from cassava farming.

Table 5: Main sources of income by cassava farmers in Jesse community

Sources of income	No of farmers	Percentage
Cassava sales	555	55.5
Cassava sales with other agricultural sales	255	25.5
Cassava sales with other non-farming sources	195	19.5
Total	1,000	100.0

Source: Author's Field Surveys, 2005-2008

The small scale cassava farmers generally face the problem of pest and diseases affecting cassava production which, as expected, negatively affects the productivity of their farmland. Table 6 indicates that over 61 per cent of the cassava farmers reported that their cassava farms have been heavily affected by pests and diseases while 35

per cent indicated that their cassava farms have been slightly affected. Table 6 further shows that only about 4 per cent claimed that their cassava farms have never been affected by pests and diseases. The effect of pests and diseases is to further reduce the income accruing to the cassava farmers in Jesse community.

Table 6 Proportion of 1,000 cassava farmers affected by pests and diseases

Degree of pests and diseases impact on cassava farms	No of farmers	Percentage
Heavily affected	615	61.5
Slightly affected	350	35.0
Not affected	35	3.5
Total	1,000	100.0

Source: Author's Field Surveys, 2005-2008

The use of improved varieties is an important way of coping with the declining size of cassava farms as well as the reduction in the fertility of the soil. Table 7 shows that the vast proportion of the farmers do not use improved varieties to increase the productivity from their limited farmland. As indicated in Table 7 only 5 per cent of the cassava farmers

reported that they used improved varieties occasionally. Table 8 also shows that virtually all the small scale cassava farmers do not use fertilisers to improve the productivity of the soil considering the over exploitation of the farmlands over the years. Some of the farmers farm the same piece of land every year without the use of fertilisers.

Table 7 Proportion of cassava farmers in Jesse community using improved cassava varieties

Frequency of cassava variety use	No of farmers	Percentage
Permanent use of improved Varieties	0	0.0
Used of improved varieties Occasionally	50	5.0
Use only traditional varieties	950	95.0
Total	1,000	100.0

Source: Author's Field Surveys, 2005-2008

Table 8 Proportion of cassava farmers in Jesse community using soil improvement fertilizers

Frequency in the use of fertilisers	No of farmers	Percentage
Permanent use of fertilizers	0	0.0
Use of fertilizers occasionally	20	2.0
Do not use fertilizers	980	98.0
Total	1,000	100.0

Source: Author's Field Surveys, 2005-2008

Table 9 confirms the fact that land degradation is a major challenge facing cassava farmers in Jesse community. The farmers reported that they have been affected by soil erosion, oil spillage and water logging of farmland. The water logging of farmland is identified by over 40 per cent of the cassava farmers as a problem while oil

spillage accounts for 15 per cent. Another challenge identified by the cassava farmers is the shortage of planting materials as most of them indicated that even the traditional materials which they require for the planting of cassava are not adequate.

Table 9: Proportion of cassava farmers in Jesse community affected by land degradation problems

Nature of land degradation problems experienced	No of farmers	Percentage
Soil erosion	105	10.5
Deforestation	50	5.0
Oil spillage	150	15.0
Water logging of farmland	405	40.5
Not affected by any of the Above	290	29.0
Total	1,000	100.0

Source: Author's Field Surveys, 2005-2008

Table 10. Proportion of cassava farmers in Jesse community affected by shortage of planting materials

Degree of shortage	No of farmers	Percentage
Heavily affected	955	95.5
Slightly affected	45	4.5
Not affected	0	0.0
Total	1,000	100.0

Source: Author's Field Surveys, 2005-2008

FRAMEWORK FOR PARTICIPATORY INTERVENTION

The findings of the action research provided the background for the intervention activities designed to improve the productivity of 600 target cassava farmers. This entailed carrying out the following activities in which the key stakeholders and the 600 cassava farmers participated in their implementation.

Constitution and training of Village Project Implementation Committees

The 600 cassava farmers who participated in the project were selected from fourteen villages within Jesse community. In order to ensure the effective participation of the cassava farmers, a project implementation committee of about five members comprising democratically elected women, men and youth 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 organisations and associations, officials of the Delta State and Ethiope West Local Government

Area. In all about 1,000 people participated in the workshop.

The main research findings and issues involved in the implementation of the intervention programme were discussed at the workshop 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 the improvement in the production of cassava by small scale farmers in Jesse community including: that improved cassava stems should be made available to the farmers during the project implementation period; that farmers should be assisted to control dangerous weeds during the implementation period; that solution should be found to the rotting of the cassava tubers shortly before harvest; that farmers should be assisted to purchase farm implements that are expensive in the market; and that farmers should be

assisted to get access to fertiliser and other inputs for their deteriorating farmland soils.

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 were 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. The number of cassava farmers that were willing to participate in the intervention project overwhelmed the project team. This is in marked contrast to the general attitude of local farmers to extension and intervention 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. On the basis of the visits to the cassava farmers' farmlands the final list of 600 participants in the intervention programme 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. The farmers were assisted to register their cooperative societies with the Local Government Authority.

Provision of agro-business training to the participating cassava farmers

In order to make the intervention programme 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 components: 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; and farm accounting. 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 other members of the participating farmers in each village were trained by the action research team members. Those trained were later sent to train their members in the different villages.

Support for the farmers in the provision of cassava inputs and the management of their farms

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 sourcing for their inputs in the following ways: support for and supervision of farm clearing; support for the purchase of cutlasses; support for the provision of cassava stem cuttings; support for the provision of fertilizers; and support for the control of herbicides and pesticides.

IMPACT OF THE ACTION RESEARCH INTERVENTION ON THE CASSAVA FARMERS

After three years of the implementation of the intervention activities to improve the productivity of the cassava farmers, an independent evaluation of the impact of the intervention shows considerable improvement in their situation. Some of the impacts of the intervention programme include the following:

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 production and the implementation of the intervention programme. This is a major innovation in Jesse community where participation in action research and poverty reduction intervention programme are rare phenomena.

Main sources of land for the cassava farmers: The proportion of the 600 cassava farmers who were able to rent farm land increased from 5 per cent during the baseline survey to 50 per cent during the implementation of the intervention programme while the

proportion that took additional farm land from their community increased to 65 per cent. These changes reflect the enthusiasm of the farmers to produce more cassava following the stimulation provided by the intervention activities.

Increase in land cultivated by the cassava farmers: The proportion of 600 cassava farmers who were able to cultivate less than one hectare declined from 70 per cent during the baseline survey to 25 per cent while the proportion that is able to cultivate 1-2 hectares increased from 25 per cent to 65 per cent during the intervention period.

Changes in the sources of labour used by cassava farmers: The proportion of 600 cassava farmers who were able to hire additional labour increased from 36.5 per cent during the baseline survey to 75 per cent while the proportion that depended solely on family labour declined to 25 per cent from the baseline figure of 45 per cent. These reflect the expansion of cassava farmlands, as the participating farmers were eager to produce more cassava following the intervention activities.

Changes in the sources of capital used by cassava farmers: The proportion of 600 cassava farmers who were able to have access to formal credit increased from 0.8 per cent during the baseline survey to 25 per cent while the proportion that depended solely on traditional sources

where the interest rate is higher declined to 45 per cent from the baseline percentage of 70. These changes reflect the increased access of the farmers to formal credit facilities as a result of the agro- business training provided during the intervention activities.

Changes in the proportion of cassava farmers affected by pests and diseases: The proportion of 600 cassava farmers who were not affected by pests and diseases increased from 3.5 per cent recorded during the baseline survey to 35.5 per cent during the implementation of the intervention activities while the proportion that was heavily affected by pests and diseases declined to 42.5 per cent from the baseline figure of 61.5 per cent. These changes reflect the results of the agro- business training provided to the farmers during the intervention period.

Changes in the proportion of 600 cassava farmers using improved varieties: The proportion of 600 cassava farmers who were able to use improved varieties of cassava occasionally increased from 5 per cent recorded during the baseline survey to 95 per cent during the implementation of the intervention programme.

Changes in the proportion of 600 cassava farmers using soil improvement fertilizers: The proportion of 600 cassava farmers who were able to use fertilizers increased from 2 per cent recorded

during the baseline survey to 95 per cent while the proportion that do not use fertilizers declined to 5 per cent from the baseline figure of 98 per cent. These changes reflect the impact of the activities of the intervention programme in promoting the use of farm inputs.

Changes in the proportion of 600 cassava farmers affected by the shortage of planting materials: The proportion of 600 cassava farmers who were heavily affected by the shortage of cassava planting materials decreased from 95.5 per cent recorded during the baseline survey to 35 per cent achieved during the intervention period while the proportion that is not affected increased to 60 per cent from the baseline figure of zero per cent.

Changes in the proportion of cassava farmers that adopted improved cassava farming methods: The proportion of 600 cassava farmers that adopted improved cassava farming methods following the intervention activities increased to over 75 per cent mid-way in the implementation of the intervention activities and 90 per cent at the end of the intervention activities.

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 output by the participating cassava farmers: The targets set by the intervention programme were exceeded as over 95 per cent of the participating farmers increased their output by the end of the programme.

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 over the baseline figure at the end of the programme.

Increased fallow period by cassava farmers: The targets set at the beginning of the intervention programme were also exceeded as over 70 per cent of the participating farmers increased the fallow period in their farmlands by the continuous tilling of their existing farmland sustained by the use of fertilisers and improved inputs.

Multiplier effect of the programme on other farmers in the locality: The intervention programme generated multiplier effects among other small scale farmers who were not directly involved in the intervention within the Jesse community adopted the strategies of the intervention programme in their cassava production activities.

CONCLUSION

Improving the productivity of small scale cassava farmers and indeed other small scale farmers in the Niger Delta region cannot successfully take place without the introduction of new and modern farming techniques that can increase both the land and labour productivity of these small-scale farmers in largely poor rural communities. The introduction of modern and improved farming methods cannot occur effectively without the creation, accumulation, sharing, and use of knowledge generated through action research. Researchers contributing to the generation of new ideas on improved farming for small scale farmers must go beyond basic research to action research entailing the implementation of intervention programmes. However, the involvement of farmers—and other agricultural actors and their networks—in this process is key, and requires building their capacity so that they can seek knowledge either in the form of information or new findings and process it into innovations for use. This is what this action research project has tried to do. Further action research in the areas of improving the productivity of small scale farmers in the Niger Delta region is needed as part of the process of peace building in the region.

REFERENCES

- Akoroda, M.O. and A.E. Ikpi (1988), 'The adoption of improved cassava varieties and their potential as livestock feeds in southwestern Nigeria', *Cassava as livestock feed in Africa - Proceedings of the IITA/ILCA/University of Ibadan*
- Asiabaka, C.C. and B.B. James (1999), Farmer Field Schools for Participatory Cassava IPM Technology Development in West Africa. In Renard, G. et al (eds). *Farmers and Scientists in a changing environment: Assessing research in West Africa*. Weikersheim, Germany: Margrat Verlag.
- Asiabaka, C.C. and J.G Mwangi (2001), Strategies for effective Extension Services in Africa: Lessons from Kenya Paper presented at the Association of Third World Scientists, Njoro, Kenya: Egerton University
- 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>
- Asinobi, C. O. & Ndimantang B. Nwajiuba, C. U. (2000) Cassava Production, Processing Trends and Constraints in Ohaji-Egbema Local Government Area of Imo State, Nigeria, www.csus.edu/org/capcr/documents/.../Asinobi-Ndimantang-Nwajibua.pdf
- 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.
- Dean, W. (1995), *With Broadax and Firebrand: The Destruction of the Brazilian Atlantic Forest*. University of California Press: Berkeley.
- Millington, A.C. (1993), "Soil Erosion and Conservation" in *Environmental Issues in the 1990's*. John Wiley and Sons: Chichester, England.
- 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" *ARPJN Journal of Agricultural and Biological Science* Vol. 5, pp.16-18.
- Painter, Michael and William H. Durham, ed. (1998), *The Social Causes of Environmental*

- Destruction in Latin America.*
University of Michigan Press:
Ann Arbor, Michigan.
- Stocking, Michael (1995), 'Soil Erosion and Land Degradation' in *Environmental Science for Environmental Management*. Longman Scientific and Technical: Essex, England.
- Whitmore, T.C. (1990), *An Introduction to Tropical Rainforests*. Clarendon Press: Oxford, England.
- Ukeje, E. (2004) Modernizing Small Holder Agriculture to Ensure Food Security and Gender Empowerment: Issues and Policy www.g24.org/ukeje.pdf
- Watson, K. (2001) *Deforestation, Coffee Cultivation, and Land Degradation: The Challenge of*
- Developing a Sustainable Land Management Strategy in Brazil's Mata Atlântica Rainforest*, Lund University Master's Programme in Environmental Science Thesis.
- Werner, J. (1993), *Participatory Development of agricultural innovations, procedures and methods*. GTZ, Germany
- Yaker, L. (1993), 'Constraints and opportunities for Sustainable food production in Sub-Saharan Africa'. *Keynote paper presented at a symposium on sustainable food production in sub-Saharan Africa*, IITA, Ibadan, Nigeria, December 7-9, 1992

ABOUT THE AUTHORS

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*.

