

Farmers' perception of cocoyam production constraints in ogbaland, Rivers State, Nigeria

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ABSTRACT

Farmers' awareness of the existence of cocoyam diseases in Ogbaland was appraised. The study was conducted on ten farmers randomly selected from 10 villages in each community to give a total of 100 respondents. Data on socio-economics, cocoyam species cultivated, awareness of cocoyam diseases, diseases of cocoyam, and management practices were assessed using questionnaire. Data were analyzed using descriptive statistics, frequencies and percentages. Results showed that 72% of farmers had knowledge and 28% were unaware of the prevalence of cocoyam diseases. Disease was rated highest as major constraint. Sanitation and rotation were practices that reduced diseases. Farmers associated diseases to oil spillage, and employed various management practices to combat it. Field inspection showed yellowing, curling and leaf defoliation, vein clearing, leaf spots, wilting, corm and root rot. Wilting and yellowing were most serious diseases, and removal of affected parts and early planting were the management techniques. Corm and root rot, folding of leaves and leaves appearing burnt were manifestations considered moderate, and managed by application of kitchen ash on leaves and base of plants. Early planting is one the traditional method of cocoyam disease management practised by many. Management practices were based on cultural beliefs, inheritance, convenience, and "economic value" and this correlated with the age of farmers. Chemical control methods were seen as 'poisonous substances', and never used. The finding of this study should be a guide to small holder farmers to have a good knowledge of farm practices and emphasis laid on appropriate management and diagnosis of disease.

Keywords: Cocoyam, disease, awareness, farmers, constraints

INTRODUCTION

Cocoyam, *Colocasia spp* and *Xanthosoma spp* is grown in the tropics and sub-tropical regions of the world particularly in Africa for human nutrition, animal feed, and income for both farmers and traders (Onwueme *et al*, 1994). As food for human consumption, the nutritional value of the various parts of cocoyam is primarily caloric (Davies *et al*, 2008). The underground corm provides easily digestible starch; and the leaves are nutritious spinach-like vegetables, which give a lot of minerals and vitamins (Tambong *et al*, 1997).

Cocoyam is a perennial crop that originates from a large corm and can grow to 4ft in length; leaves supported by 3ft long petiole are arrowhead shaped, up to 2ft long and 1.6ft wide and velvety on the upper surface (Tambong *et al*, 1997). Cocoyam is propagated by vegetative means, using corms, and it spread through rhizomes. The invasive variety also spreads through above ground stolon. The time from planting to harvest varies with genotype, in commercial plantations harvesting usually takes place

between 9-12 months (Brown, 2000). Cocoyam can be processed into chips which have a long shelf life and provide food all year round especially during the lean planting season (Asadu, 2006). There are two major types of cocoyam commonly grown in Nigeria, namely; *Colocasia spp* and *Xanthosoma spp*. It is regarded as a major crop especially in female headed households, it is an aged long tradition in Ogbaland. Most crops that followed yam (which was male dominant crop) in majority of the then South Eastern region of Nigeria, were crops cultivated or chose by women. Nigeria is one of the largest producers of cocoyam in the world contributing about 40% of total annual production (Kinspscheer, 2001).

Cocoyam is basically used as the major ingredient in the native soup of the Ogba people (Owhede). In-the 70's a farmer's wealth and riches in Ogba area were measured by the amount of agricultural produce which the farmer produced. The exploitation of crude oil in Ogba area has led to the contamination of farmlands and the reduction of commercial cocoyam production in the area.

There is a decline in the yields of cocoyam in the past few years as population pressure on land continues to increase. The decline could be attributed to a number of factors such as climate variation, drought, and poor cultural practices among cocoyam growers, poor soils, pests and diseases (Ezenwa, 2010).

Despite the usefulness of cocoyam corms and leaves in human nutrition, its production and processing in Ogbaland is faced with a lot of challenges. Some, of these challenges are the alarming rate of land degradation and lack of improved varieties for commercial cocoyam production.. The objective of the study therefore was to appraise farmers' awareness of the existence of cocoyam diseases in Ogbaland.

MATERIALS AND METHODS

Study Area

The study was conducted in 2013 in Ogbaland in Rivers State in the humid agro ecological zone of Nigeria. The Rivers state is located between longitude 5° and 8°E and latitudes 4° and 6° N within the River Niger Delta on the West African coast (Agumagu *et al.*, 2008).The focus community was Ogba in Ogba /Ndoni/Egbema Local Government Area (ONELGA) of Rivers State. Geographically Ogbaland is located at about 4. 50' N to 5. 30'N and extends from 6. 25'E to 6. 40'E. spatially, it covers an area of 920Sq.km. (Ellah, 1997). Ten villages were selected for the study .Seven from the dryland area namely Akabuka, Ede, Erema, Obite, Obiebe, Oboburu and Obukaegi and three from the swamp/wetland area namely Obigwe, Ama and Elehia.

Survey method

Ten farmers were randomly selected in each community to give a total of 100 respondents. The selection of villages was based on the fact that farmers in the area grow cocoyam extensively for social, economic and cultural reasons. Data collection was through the use of structured questionnaires containing information on socio-economic, personal of farmers and cocoyam production in the study area. The information gathered include the socio-economics of the farmers, Cocoyam species cultivated, awareness of cocoyam diseases, diseases of cocoyam, and management practices of cocoyam diseases. A field inspection of cocoyam farms were carried out and cocoyam diseases symptoms were described.

Diseased samples were collected in black polythene bags and taken to the laboratory for identification.(Table 1)

Table 1: Disease Symptoms observed in the field and pathogens identified

S/No	Diseases	Symptoms	Pathogen	Method of identification
1.	Phytophthora blight	Leaf Small purple or dark brown, circular, water- soaked lesions on leaves; large lesions with white fuzz on both sides of leaves; leaf collapse	<i>Phytophthora colocasiase</i>	Chiejina <i>et al.</i> , 2013
2.	Phyllosticta leaf spot	Oval or irregular reddish brown spots on leaves, dark brown spots with chlorotic area around lesion, holes in leaves where lesion centers have dried	<i>Phyllosticta colocasiophila</i>	Chiejina <i>et al.</i> , 2013
3.	Pythium root and corm rot	Mushy rot on corm, stunted plants shortened leaf stalks, curled and crinkled leaves	<i>Pythium</i> spp	Trujillo <i>et al.</i> , 1975
4.	Dry Rot	Leaves appeared dry powdery	<i>Fusarium solani</i>	Anukworji <i>et al.</i> , 2012

Field Observation

The following identification processes were followed:

Comparisons were made between diseased and healthy plants: healthy plants and diseased plants were compared using differences in color, leaf shape, and leaf size; Characteristic symptoms were identified; symptoms observed were described on a piece of paper;

Distribution of symptoms were observed: distribution patterns of diseased plants over the affected area were observed; and cultural practices of the growing environment were reviewed: activities that have been conducted around affected plants were investigated.

Data Analysis

Data analyses were done using descriptive statistics, frequencies and percentages

RESULTS

Socio-economic characteristics of respondents

Gender: The result (Table 2) shows that 27% of the farmers were males and 73% were females.

Age: The result also indicated that majority of the cocoyam farmers (44%) were over 46

years, who have may have accumulated experience in cocoyam production, were 44%, while the least (24 %) were between the age brackets of 36-45 years (Table 2).

Marital status: The result shows that a greater percentage (80%), of agricultural activities in Ogbaland is dominated by married people.

Educational status: Majority of the farmers (93%) had adult to Post-secondary education, while the least (7 %) had no formal education.

Household size: A large percentage (88%) of the respondents had a household size of 5-15 persons and 10% had a household size of 16-25 and 2% of the farmers had above 26 as number of persons in the household.

Occupational status: Result in Table 1 shows that 52% of respondents combined farming with other things.

Cropping system: From the survey it was observed that 100% of the farmers voted mono-cropping as cropping system practice.

Farming experience; The result in Table 2 shows that 32% of the respondents had farming experience of 1-10 years, 34% had experienced farming for 11-20years while only 9% had an experience of 21-30years and 25% had farmed for a life time.

Farm size: Majority of the farmers (43%) had cocoyam farm holdings of 0.025ha none had up to 0.15ha (Table 2).

Cocoyam disease awareness and experience: Results from the survey revealed that most of the farmers had

knowledge of cocoyam diseases on the crops in their farms. Seventy-two per cent of farmers were aware, had knowledge and 28% were unaware of the prevalence of cocoyam diseases in their farms. The latter group only took the conditions as natural phenomena that must prevail in the course of the life of the crop.

TABLE 2. Socio Economic Characteristics of Cocoyam farmers in Ogba, Rivers State

VARIEBLE	Frequency
Gender	
Male	27
Female	73
Age	
10-35	32
36-45	24
46 and above	44
Marital Status	
Single	13
Married	80
Widow	7
Level Of Education	
No formal education	7
Adult education	22
Primary education	17
Secondary education	40
Post-secondary education	14
Household Size {Hhsize}	
0	9
4-6	16
7-9	66
10-11	7
12-13	2
Occupation (Ocupt)	
Farming	39
Trading	5
Civil service	4
Combination of farming and others	52
Farming Experience (FarmExp)	
1-10	37
11-20	34

21 and above	29
Cropping System	
Mixed cropping	100
Mono cropping	
Cocoyam Farming Experience	
{CoyamExp}	
0	25
1-10	40
11-20	23
21 and above	12
Area under Cocoyam Cultivation (ha)	
0	25
0.025	43
0.05	30
0.1	2
Disease Experience	
Yes	72
No	28

Cocoyam production constraint: Disease was rated be the highest constraint in the production of cocoyam in Ogbaland. This was followed by oil spillage and finance respectively. Poor soil type, flood (which

was not a regular occurrence) limited land, in order of magnitude, were other constraints recognized. These together, were rated 18% (Figure 1).

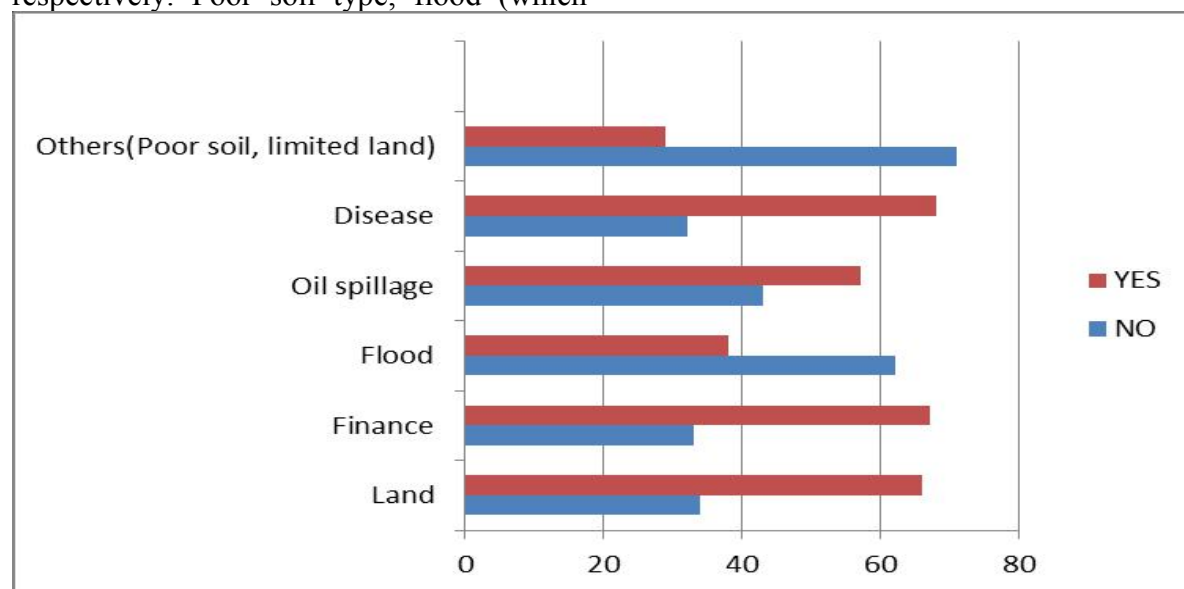


Figure 1: Cocoyam Production Constraints (%)

Number of farmers prioritizing cocoyam constraint

Findings of the study are that diseases are major constraints of the production of cocoyam in Ogbaland (Figure 1). This singular constraint is aggravated by other

minor constraints such as land tenure system, environmental pollution etc. that work together to encourage disease prevalence.

Cocoyam Diseases as described by farmers: Thirty-seven (37%) of farmers recognized yellowing of cocoyam leaves as

a very serious disease and adopted removal of affected plant parts and early planting as a management technique (Figure 2).

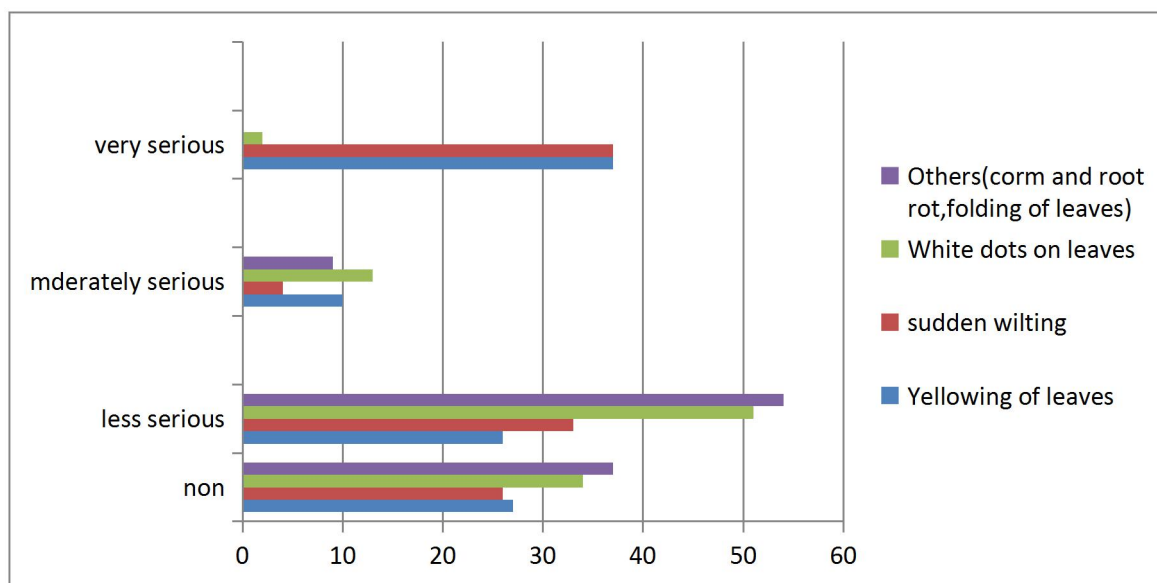


Fig. 2. Number of farmers prioritizing cocoyam diseases observed

Also 37% of farmers also recognized sudden wilting of plant as very serious and adopted uprooting of affected plant and early planting as a control measure. Two per cent (2%) of farmers observed white dots on leaves as a serious disease and used late planting as a means of managing the disease. Finally 9% of farmers observed other cocoyam diseases such as corm and root rot, folding of leaves and leaves appearing burnt at the edge and took it to be moderately serious. Management practices such as

application of kitchen ash on leaves and base of plants were adopted for corm and root rot.

Management practices of cocoyam diseases as described by farmers in Ogbaland: Early planting accounted for the highest cocoyam disease management practice used by cocoyam farmers in Ogbaland (Table 2). The farmers used different management practices and believed they had effect on the crops, but the efficacy of the management practices was unknown to them.

Table 2: Management Practices Adopted by Farmers

Variables	Percentages			
	Non	Less important	Moderately important	Very important
Early Planting	25	31	4	40
Late Planting	25	54	8	13
Removal of affected plant part	25	66	6	3
Uprooting of affected plant	26	65	5	4
Use of chemical	24	68	5	3
Combination of control measures	24	70	2	4

DISCUSSION

The study showed that women constituted a large proportion of those who cultivated cocoyam in Ogbaland. This is expected as cocoyam farming is regarded as a small business and requires less energy and input. Issues related to gender involvement in agricultural production and technology adoption have been investigated for more than a decade. There have been divergent views, and most reports show mixed evidence regarding the different roles men and women play in agricultural production and technology adoption. However, gender biases with particular crop commodity may have played a role here as majority of the farmers were women. Studies in Ghana on improved maize technology and another for coffee in Papua New Guinea showed little or insignificant effects of gender disparity (Overfield and Fleming, 2001). Similarly issues related to gender determinants of cocoyam productivity, have also been studied in southeastern Nigeria (Okoye *et al*, 2008)

Farmers over 46 years, who have accumulated experience in cocoyam production, were 44% which is an indication that aged people were the farmers mostly involved in farming, and knowledge of such commodity and its constraints is likely to come with age. Age is said to be a primary latent characteristic in adoption decisions, and there is contention on the effect of age. However, the ability of a farmer to bear risk, and be innovative have been found to decrease with age (Banabana-Wabbi, 2002). Other studies have indicated that young people are more adventurous in adopting innovations than old people (Doss and Martin, 2001). The representation of farmers in all age groups, and in the younger farmers, is an indication that farming is becoming more income oriented especially with cocoyam farming in Ogbaland. Majority of the farmers (54%) having secondary education and above implies that they are

capable of understanding or being aware of the problems associated with their crops. Cocoyam production is expected to be influenced positively by large family size as large family sizes constitute a major source of labor. This is why it seems rational to increase the number of hands working in the farm as mechanization is absent. Occupational status of farmers also affected production, as farmers that combined farming with other things were not very conversant with constraints facing their farming business. Cropping system adopted by the farmers was continuous mono-cropping which depletes soil nutrient and results in disease build up. The result which showed that only 9% of farmers had an experience of 21-30 years and 25% had farmed for a life time, explains why farmers are unaware of constraints. A farmers experience can increase or decrease confidence and with more experience a farmer can become acquainted with the possible diseases that attack his plants and the possible control measures suitable. Majority of the farmers (43%) had cocoyam farm holdings of 0.025ha and below, which is an indication that, cocoyam cultivation in the area is dominated by small scale farmers. In sub Saharan African, most food produced at the subsistence level, and are made for household consumption are produced by women, and $\geq 80\%$ of these women are small scale farmers (Mamman, 1994; FAO, 2004; Durno and Stuart, 2005). Farm size affects management strategies to be adopted for crop diseases, tenure arrangement, labor requirement and more. Most farmers had knowledge of cocoyam diseases on the crops in their farms and few were unaware of the disease. This means that, farmers were aware of cocoyam diseases but could not identify them. This agrees with the report of Hossain *et al.*, (2009), that, farmers knew diseases of eggplant but could not identify any disease. Disease was rated the highest constraint in the production of cocoyam in Ogbaland. This singular

constraint is aggravated by other minor constraints such as land tenure system, environmental pollution etc. that work together to encourage disease prevalence (Jesse 2001). Cocoyam farmers in Ogbaland did not know or understand the animate cause of the diseases rather, associated them to oil spillage. Therefore they carried out different management practices for the disease symptoms whether they suited the diseases or not. The farmers believed they had effect on the crops, but the efficacy of the management practices was unknown to them. This was similar to the observation by Hossain *et al* (2009), who stated that when the farmers were asked about the use of pesticides and integrated pest management, 100% voted for using integrated pest management technique for controlling the diseases. Major components of integrated management used were removal of affected plant parts, removal or uprooting of affected plant Njenga *et al* (2005).

CONCLUSION

Findings of the study showed that in addition to other constraints, diseases appeared to be major in cocoyam production in Ogbaland. This singular constraint is aggravated by other minor constraints such as land tenure system, environmental pollution occasioned by oil spillage. These other factors poses limit to farming space, thereby encouraging continuous cropping, which then enables disease pathogen to accumulate in the field, which then predisposes the crops to infection and damage. Farmers observed and described disease symptoms or manifestation on their crop but could not identify the specific pathogen. This means that farmers were aware of cocoyam diseases but could not identify them. Cocoyam farmers in Ogbaland did not know or understand the cause of the diseases, but associated them to oil spillage, and other factors. The different management practices adopted to combat the disease symptoms whether viable or not, were based on cultural beliefs, inheritance, convenience, and economic value attached

to it. The farmers employed management practices such as early planting, late planting, and removal of affected plant parts, use of chemical and combination of various practices without knowing their implications or the appropriateness. This practically resulted in poor yield, and less economically valuable crop or produce. There are several other diseases of cocoyam prevalent in Ogbaland such as viral, bacterial, nematode in addition to the diseases in this study, which may also constitute constraints. This study which focused on cocoyam production constraints has given insight into the fact that diseases in general were major constraints in the production of cocoyam in Ogbaland. The current result calls for more work on the sensitization of farmers on the causes of cocoyam diseases in Ogbaland, how to identify the pathogens and the appropriate management practices applicable. Small holder farmers should be encouraged to improve on their farm knowledge and practices and emphasis should be laid on appropriate practice for cocoyam disease diagnosis. Government and other stake holders should see to the reduction and management of oil spillage, subsequent environmental effect that limits area of land under cultivation. There should policies directed towards adequate compensation of land owners where oil spillage has limited cultivable arable land. Conscious efforts should be made on the management of these cocoyam diseases and other cocoyam production constraints observed as this will encourage its production in large quantities, thus improving food sustainability and income for the small scale farmers, and this will enhance the general security of the community on the long run.

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