

Perception of Infestation Problems on Cassava Farms and Preference for Weed Management Practices in Humid Agro-Ecological Zone of Nigeria

Anthony AGUMAGU ¹

Olufemi Martins ADESOPE ¹(✉)

Edna Chioma MATTHEWS-NJOKU ²

Summary

The problem of weed infestation on cassava farms is a major factor for low crop yield. This problem has caused untold hardship on the small-scale cassava farms where production at the subsistence level and where farmers still manage to produce some quantity for sale. The study examines cassava farmers' perception of problems of infestation and preference for weed management practices in the humid agro-ecological zone of Nigeria. Data was collected with the aid of questionnaire and interviews. Random sampling technique was used to select 117 small-scale cassava farmers in the study area. Data analysis was done by simple descriptive statistics such as frequency, percentage and mean. Findings of the study revealed that majority of the respondents (73.5%) grow cassava for both household use and for sale. The major source of labour identified by respondents was family labour (51.3%). About 55% of the respondents obtained cassava planting materials from the open market. Findings showed that the commonest weed control measures used by cassava farmers were hand pulling (100%), and hoes/cutlass (100%). However, the most preferred weed control measures identified include hoes/cutlass (100%), use of machines (100%), and a combination of methods (100%). Major problems affecting cassava farms as identified by respondents include grasses (88%), broadleaf weeds (66.6%), rodents (64.1%), other animals (63.3%), cassava rot (53.9%) and insect pests (48.7%). Extension education should focus on the preferred weed control measures identified by respondents so as to work out modalities for their adequate use. This can be possible if regular extension-farmer forum is ensured.

Key words

preference, infestation, weed management practices

¹ Department of Agricultural Economics and Extension, University of Port Harcourt, Choba, PMB 5323, Port Harcourt, Nigeria

✉ e-mail: omadesope@yahoo.co.uk

² Department of Agricultural Extension, Federal University of Technology, Owerri, Nigeria

Received: August 21, 2007 | Accepted: October 17, 2007



Introduction

Cassava is a significant food crop grown in Nigeria. This is especially so in the humid Southern region of the country. Enete, *et al.* (2001) noted that cassava is important, and it provides about 70% of the daily calorie intake of over then 50 million Nigerians and about 40% of all calories consumed in Africa. Also, IITA (1989) reported that cassava provides a staple to some 200 million people in tropical Africa.

In Southeastern Nigeria, cassava is utilized for consumption in various forms to include *garri* (granulated product from dewatered cassava, dried over heated pots), *akpu* (fermented, filtered, pounded and cooked), starch (collected filtrate of cassava pulp), *tapioca* (cassava chips), *akara-akpu* (oil fried cassava pulp), and flour (dried and ground cassava chips) (Okorji *et al.*, 2003). There are few rural households in the area that do not have a cassava farm, no matter how small. The major reason for growing the crop is for food security especially to act as insurance for the family food investment. Cassava is valued for its outstanding ecological adaptation, low labour requirement, ease of cultivation and high yields (Survey Report, 2004). It is also widely cultivated because it can be successfully grown in poor soils, under conditions of marginal rainfall. It has the ability to grow with appreciable yield where many other crops would hardly survive. It gives reasonably good yields under marginal conditions and when conditions are optimal, it produces higher amounts of calories per hectare than most tropical food crops. These qualities make cassava a reliable food security crop particularly for poorer nations.

In many cassava farms, weed infestation is a major problem. A number of authors (Ahuama & Adelus, 1998; CTA, 1988) have reported that it has reached the point of being the single most important factor limiting yields. This is why the issue of weed control is significant during crop production. Likewise, weed control is one of the most important inputs in cassava crop production in general (Akobundu, 1999). Many grasses and broadleaf weeds are normally found in cassava plots limiting yield and increasing labour input. Spear grass (*Imperata cylindrica* (L) Beauv.) and running carpet grass (*Axonopus compressus*) have caused untold problems on farms in Nigeria (Okon and Amalu, 2003). Other perennial weeds such as Bahama grass (*Cynodon dactylon*), Guinea grass (*Panicum maximum*), Siam (*Chromolaena odorata*) are generally found in many cassava farms in the humid agro-ecological zone of Nigeria. Siam weed is a troublesome plant of cultivated fields and plantation crops, which is widespread in West Africa from the coastal fringes of the rainforest to the southern edge of the Guinea savanna (Akobundu & Agyakwa, 1998).

When natural forest is cleared for farming, the originally stable forest environment is disturbed and trees that formed the climax vegetation are cut down. As more light reaches the soil surface, fast-growing annual weeds, whose seeds had remained dormant in the shade, now germinate, grow and complete their life cycles, provided conditions of light, moisture and temperature remain favourable (Akobundu, 1999).

IITA (1989) attributed low yields in cassava production to failure of farmers to abide by the recommended practices such as regular weeding. If weeding is not carried out at the appropriate time, there is a multiplier effect which could lead to low yield. However, for various reasons farmers use different weed management practices. Studies on preference and perception of weed management practices are scanty and this has affected the type of information that get to farmers. This study therefore investigates cassava farmers' perception of, and preference for weed management practices in the humid agro-ecological zone of Nigeria. Specifically the study sought to describe personal characteristics of respondents, describe weed control measures and preferred methods among respondents, and identify problems affecting cassava farms as perceived by respondents.

Methodology

The study covered the humid agroecological zone of Nigeria where cassava is a major agricultural crop grown, and the focus of the study was mainly cassava farmers. Cassava farmers included in this study were farmers who mainly grow cassava on their farms. Rivers state was purposively selected because of its relevance to the agroecological zone since it records a high amount of rainfall annually and produces reasonable quantities of cassava, producing about 2.06 million tonnes from 193 hectares in 2000 and 2.29 million tonnes from 195.3 hectares in 2002 (Projects Coordinating Unit (PCU), 2004, Federal Ministry of Agriculture (FMA), 2004). The 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. It is bounded by Abia, Imo, Abia, Bayelsa, Delta and Akwa Ibom States. There is a long period of rain which lasts from April to October and a shorter dry season which lasts from November to March and is interrupted by occasional rainfall. The occupations of the people include fishing and farming.

Multi-stage and cluster sampling techniques were used in this study. In the first stage, three local government areas were randomly selected to include *Ikwerre*, *Emohua* and *Ogba/Egbema/Ndoni*. In the second stage, two communities were selected from each of the selected local government areas to give six communities. These are

Igwuruta, Umudioga, Elele-Alimini, Emohua, Obrikom and Ogbogu. In the third stage, a list of farmers was obtained with the help of the Extension agents in the area and from this list, thirty farmers, who were household heads were randomly selected from each of the chosen community to give 180 farmers. Information was obtained from the identified farmers with the aid of questionnaire and interview schedule.

In order to determine preference for identified weed control methods, respondents were presented with five methods and required to rate their preference based on a three-point scale of less preference (0 point), moderately preferred (1 points) and the most preferred (2 points). A mid point of 1.00 was established from the 3 points. The mean scores were then ranked in order to prioritize preference. Perception of infestation problems on cassava farms was determined using 11 items based on a three point rating scale of not serious (0), serious (1), and very serious (2), with a mid point of 1.00. After proper editing of retrieved instruments only 117 were properly completed. This formed the actual sample used for analysis in the study. Data analysis was through descriptive statistics such as frequency, percentage and means.

Results and discussion

Table 1 shows that majority (51.3 percent) of the respondents in the study area were female. Odurukwe (2003) in a study on gender differences in adoption of recommended improved cassava production technologies found that more females were involved in cassava production than males. Cassava has always been noted to be a woman's crop in southeastern Nigeria, and this finding has further confirmed this. Odii (2003) reported that female cassava farmers were more efficient in the use of improved cassava varieties. This obviously could be because of their desire to provide food for members of the household. The role of women in agricultural development has been widely reported Kabeer (1994), CTA (2000). Women have accounted for over 50% of agricultural production. Mgbada (2000) reported that women were involved in about 60% of the tasks on cassava farm. Also, Enete *et al.* (2001) reported high cassava crop yields on female-owned farms. This further underscores the contributions of women to the cassava production enterprise.

Respondents' age ranged between 40 and 59, with average age of 45.1 years, which implies that they are still active to exert adequate energy and time on the farm. This has implications for increased cassava production. Ekong (2003) reiterated that the mean age of Nigerian farmers is between 45 and 50 years, with the age graph skewing towards the right.

Table 1. Personal characteristics of respondents (n=117)

Characteristics	Frequency	Percentage
Gender		
Male	57	48.70
Female	60	51.30
Age		
30 – 39	34	29.10
40 – 49	54	46.20
50 – 59	17	14.50
60 –69	12	10.20
Occupation		
Farming	62	53.00
Trading	33	28.20
Contract/supplies	9	7.70
Hired labour	4	3.40
Crafts	14	12.00
Food vending	5	4.30
Purpose of growing cassava		
Household consumption	18	15.40
Sale for money	14	12.00
Both household + sale	85	73.50
Source of labour*		
Family	60	51.30
Hired	10	8.50
Community residents	16	13.70
Work exchange	27	23.10
Source of cassava planting materials		
Open market	64	54.70
Friends and neighbours	4	3.40
Relatives ADP agents	18	15.40

The average Nigerian farmer operates on subsistence level producing enough to feed her family and then some for sale in order to meet other domestic needs. Findings of the present study showed that most respondents engaged in farming as an occupation. Farming is a major occupation to a significant proportion of Nigerian rural dwellers. This study also found that respondents were involved in other activities such as trading, and to a less extent crafts making. Respondents grow cassava for both household consumption and sale for money. Cassava is a major staple crop that feeds majority of Nigerians. It is interesting to note that about 99% of the cassava produced in Nigeria is consumed in one form or the other and none exported until recently. Cassava is widely consumed by totality of Nigerian especially in the southeastern region. The high poverty level is a reason why most of cassava produced is also consumed.

Nigeria is the highest producer of cassava in the world. Monetary Policy Group (2000) reported that whereas Thailand is the largest world exporter of cassava, Nigeria and Brazil mainly grow cassava for domestic consumption. Cassava is also a source of income to many resource-poor individuals in the area.

Family labour was identified as the major source of labour utilized by respondents. This is obviously cheaper for farmers since there is no financial cost involved. Mudukuti (2003) noted that rural households are large because they involve extended families that often contribute “free” labour for agricultural production. Respondents also identified work exchange as a source of labour. This practice is carried out among groups and can be referred to as reciprocity practices (Mariscal, 2005). The three forms of reciprocity practices identified by Mariscal (2005) include labour in exchange for products, labour in exchange for labour and labour in exchange for food. These practices are not very common in the study area, except in cases of labour in exchange for food

Respondents mostly obtained cassava planting materials from friends and neighbours. In most cases these materials were obtained free of charge because farmers may have more than enough to cultivate so give out the excess to friends and neighbours. Respondents also indicated that another source of planting materials is the open market.

Table 2 shows the frequency distribution of responses according to common weed control measures and most preferred methods by respondents in the study. Hand pulling was identified as the most common (100%) weed control measure utilized by cassava farmers. This was followed by the use of hoes and cutlasses (75.2%). However, results of the study showed that respondents preferred (100%) the use of hoes and cutlasses for control of weeds on their cassava farms. This is expected because hoes and cutlasses are more easily available and affordable for use. Farmers identified effectiveness in total removal of entire weed plant, easy to carry about, and cheapness as reason for preference of this method. Farmers also prefer the use of machines (tractor mounted equipment) for weeding (100%) their farms but this is not easily available because of the high cost outlay, and the land tenure system that results in land fragmentation thereby posing problems of access when machines are utilized. The use of machines is, however, more efficient in farm operations. Respondents also prefer a combination of weed control measures (100%). This implies the use of an integrated approach.

Respondents identified hand pulling as the next most preferred weed control measure (98.3%). This method is a tedious, less effective and less efficient method that is only applicable when weeds are still very tender and not properly established. Hand pulling is a less expensive method; hand weeding is a common method of weed control throughout the tropics (Akobundu, 1999). The use of herbicides was identified as a preferred measure. This is not expected because most farmers indicated that they did not know how to use chemicals to control weeds because extension agents did not teach them. However indigenous weed control measures were adopted when necessary.

On further discussion, respondents gave the following as reasons for preference for weed control measures: easy to get/common, efficient and effective, less expensive, being used to it, easy to use, multiple functions, not bulky, affordability, safe to use, reduction in labour cost. Oral interview also revealed the following as the commonest weeds on respondents farms: Bahama grass (*Cynodon dactylon*), water leaf (*Talinum triangulare*), Siam weed (*Chromolaena odorata*), Tridax (*Tridax procumbense*), *Pueraria*, Centro (*Centrosema pubescence*), Goat weed (*Ageratum conyzoides*), Sensitive plant (*Mimosa* spp), Guinea grass (*Panicum maximum*), Broom weed (*Sida acuta*), Yellow tassel flower (*Emilia coccinea*), Calopo, Spurge weed (*Euphorbia heterophylla*), Spiny amaranths (*Amaranthus spinosus*), Elephant grass (*Pennisetum purpureum*), Sedges, Blue fleabean, Morning glory weed. Respondents also indicated that Elephant grass (*Pennisetum purpureum*), Carpet grass (*Axonopus compressus*), Tridax, Siam weed, Bahama grass (*Cynodon dactylon*), Sensitive plant (*Mimosa* spp), African Kudzu (*Pueraria* spp), and Broom weed (*Sida acuta*) were the most troublesome weeds in their cassava farms.

Table 3 shows that cassava farmers identified grasses as the most serious problem on their cassava farms (88.0%). The commonest grasses identified in most farms included Guinea grass (*Panicum maximum*), spear grass (*Imperata cylindrica*) and Elephant grass (*Pennisetum purpureum*). Broad leaf weeds were identified as the next serious problem with 66.6%. The commonest included Siam weed (*Chromolaena odorata*), Goat weed (*Ageratum conyzoides*), *Aspilia* (*Aspilia* spp), *Alchornia* spp. Akobundu (1999) reported that *C. odorata* is the most widely distributed and highly competitive perennial, broad leaved weed, while *I. cylindrica* is one of the most serious weeds of the forest Guinea savannah zones. Okon and Amalu (2003) reported that spear grass (*Imperata cylindrica*) and running carpet grass (*Axonopus compressus*) are two types of grasses that have wreaked havoc on farms in Nigeria and affected thousands of hectares too by reducing yield. Akobundu and Agyakwa (1998) noted *Emilia* (*Emilia coccinea*), Tridax (*Tridax procumbens*), morning glory weed (*Ipomea involucreta*), and spurge weed (*Euphorbia heterophylla*) as common weeds of arable crops.

Rodents was also perceived a serious problem affecting their cassava field (64.1%). Rodents such as cane rats (*Thryonomys swinderianus*) are especially prevalent in the area. About 63.3% of the respondents identified other animals as serious problem on their cassava farms, which includes goats, sheep and pigs. In the rural areas and some peri-urban and urban areas in southeastern Nigeria domestic animals like goats, pigs and sheep, and sometimes cows roam about unguided and they destroy cassava farms. Apart from this, respondents identified cassava rot as a serious problem (53.9%). This finding is not unexpected

Table 2: Distribution of responses according to common weed control measures and most preferred methods

Methods	Commonest method	Most preferred	Moderately preferred	Less preferred
Hand pulling	117 (100.0)	15 (12.8)	100 (85.5)	2 (1.7)
Hoes/cutlass	88 (75.2)	88 (75.2)	29 (24.8)	0 (0.0)
Machines	5 (4.3)	69 (59.0)	48 (41.0)	0 (0.0)
Herbicides	5 (4.3)	10 (8.5)	107 (91.5)	0 (0.0)
Various methods	5 (4.3)	41 (35.0)	76 (65.0)	0 (0.0)

*Multiple responses recorded

Table 3: Problems affecting cassava farms

Problems	Very serious	Serious	Pooled percentage seriousness	Not serious	Rankings
Insect pests	35 (29.9)	22 (18.8)	48.7	60 (51.3)	6
Rodents	27 (23.1)	48 (41.0)	64.1	42 (35.9)	3
Birds	2 (1.7)	40 (34.2)	35.9	75 (64.1)	7
Other animals	54 (46.2)	20 (17.1)	63.3	43 (36.8)	4
Cassava rot	25 (21.4)	38 (32.5)	53.9	54 (46.2)	5
Pilfering	4 (3.4)	24 (20.5)	23.9	89 (76.1)	11
Fungi	14 (12.0)	19 (16.2)	28.2	84 (71.8)	10
Leaf damage	6 (5.1)	28 (23.9)	29.0	83 (70.9)	9
Nematodes	0 (0.0)	41 (35.0)	35.0	76 (65.0)	8
Grasses	70 (59.8)	33 (28.2)	88.0	14 (12.0)	1
Broad leaf weeds	6 (5.1)	72 (61.5)	66.6	39 (33.3)	2

especially because of the humid nature of the agro-ecological zone. Apart from moisture/humidity, cassava rot could result from exposure due to chewing and gnawing effects from rodents, snails, and beetles. Insect pests were identified also as serious problem (48.7%) on cassava farms, especially when the area is moist. Examples of such include beetles and millipedes.

Conclusion and recommendations

Cassava is a major staple that sustains the inhabitants of the study area, but weed is a major hindrance to effective production. This study found that farmers in the area prefer some weeding practices to some others for reasons which range from easy to get/common, efficient and effective, less expensive, being used to it, easy to use, multiple functions, not bulky, affordability, safe to use, reduction in labour cost. The following problems were identified to be serious on cassava farms: grasses, broad leaf weeds, rodents, other animals and cassava rot. The study found that cassava farmers obtained planting materials from informal sources mainly. This is an indication that adequate extension services were not provided to farmers. Based on the findings of the study it is recommended that Extension contact with farmers should be intensified and also, regular in the study area, to educate farmers on their preferred weed control methods so that increased cassava production can be guaranteed. There is therefore a need for regular

extension-farmer forum to enhance extension education related to weed management on cassava farms.

References

- Ahuama G.U. & Adelusi A.A., (1998), The interactive effects of weed competition and light stress on the growth and reproductive yield of soybean (*Glycine max*). Nigerian Journal of Botany, 11: 1-13
- Akobundu I.O. & Agyakwa C.W., (1998), A handbook of West African weeds. International Institute of Tropical Agriculture, Ibadan.
- Akobundu I.O., (1999) Weeds and their control. In Youdeouwei A. et.al (eds) Introduction to tropical Agriculture. Longman Group Ltd., England
- CTA, (1988), Tropical weeds a growing menace. Spore, 12: 4-6
- CTA, (2000) The economic role of women in agric & rural development promoting income-generating activities. Summary report of a seminar, Athens, Greece. CTA, The Netherlands
- Ekong E.E., (2003) An introduction to rural sociology. Dove publishers, Uyo, Nigeria
- Enete A.A., Nweke F.I., Achike, I., & Tollens, E., (2001), Differentiated gender ownership of cassava fields and implications for root yield variations in small holder Agriculture of Southeast Nigeria. Tropicultura
- Federal Ministry of Agriculture (FMA) (2004) Actual production of cassava in Nigeria. Abuja: Federal Ministry of Agriculture
- IITA, (1989) IITA Annual reports 1988/89. IITA, Ibadan
- Kabeer N., (1994), Reversed Realities, Gender hierarchies in development thought. Verso, London, UK

- Mariscal J.C., Delgado F. & Perez R., (2005), Indicators for measuring poverty. *Compas Magazine for endogenous development*, No 8 (February)
- Mgbada J.U., (2000), Production of staple crop by rural women in Enugu and Ebonyi States: Lessons for enhancing poverty alleviation programmes. *Proceedings of the sixth annual conference of Agricultural Extension Society of Nigeria* (10 – 12 April)
- Monetary Policy group, (2000), Summary of the production and sales of cassava in 2000. Monetary Policy group Agricultural and services team real sector department
- Mudukuti A.E., (2003), Rural women's perceived barriers to extension participation: The Zimbabwe case. *Journal of Extension systems*, 19, 2: 23-31.
- Obasi P.C., (2004), Household food security in Imo State: A reflection of Nigerian situation. *Journal of Agric and social Research*, 4, 1: 42-59.
- Odi M.A.C.A., (2003), Effects of improved technologies on gender productivity in cassava production. *Journal of Agriculture and social research*, 3, 1: 78-89.
- Odurukwe S.N., (2003), Gender differences in adoption of recommended improved cassava production technologies in Imo State Nigeria. *Journal of Agriculture and social research*, 3, 2: 126-134
- Okon P.B & Amalu U.C., (2003), Using weed to fight weed. *LEISA, Magazine on Low External Input and Sustainable Agriculture*. Vol 19, No 4, p.1
- Okorji E.C., Eze C.C & Eze V.C., (2003), Efficiency of cassava processing techniques among rural women in Owerri, Imo State, Nigeria. *Journal of Agriculture and social research*, 3, 2: 84-96.
- Projects Coordinating Unit (PCU) (2004). *Cassava production estimates in Nigeria*. Abuja: Projects Coordinating Unit (PCU)
- Survey Report (2004) *Cassava. A survey on cassava production, processing and marketing*. 147pp

acs73_18