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Cassava Production Systems Across Some Agro-ecological Zones in South West-North West Axis of Nigeria

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Abstract: An extensive survey was conducted in 59 villages under Ecologically Sustainable Cassava Plant Protection Project (ESCaPP) across mangrove forest, rainforest, transition forest, wet savannah and dry savannah agro-ecological zones in 1994 dry season and 1995 early planting season. The objective was to study the demographic factors such as number of adult cassava farmers, gender, literacy level, access road, nearness to market, reason for growing cassava and general production practices of the farmers in south west-northwest axis of Nigeria. It was discovered that 41.6 and 42.5% of men and women were involved in cassava production. In all the villages, cassava production is on the increase replacing fallow land. The land preparation method adopted in most of the villages was determined primarily by vegetation and the nature of the soil. In wet savannah, 89, 79 and 32% of the farmers adopted slashing/hoe, bush burning and use of tractor methods of land preparation, respectively. In all the zones, 50% of the farmers embraced the use of improved varieties of cassava; although a significant 41.6% still make use of the local varieties. The result suggested that Federal and State governments of Nigeria should improve their extension activities for more awareness of improved cassava varieties and other improved production practices.

Key words: Cassava, ecozones, land preparation methods, road access, gender, varieties

INTRODUCTION

Cassava (*Manihot esculenta*) is one of the most important staple food crops in Africa It is a major source of energy for over 200 million people in the continent. Nigeria and nine other countries in the world whose food energy comes mostly from cassava are all in Africa (Dahniya, 1994). Besides its use as food, it is an industrial raw material for production of starch, alcohol, pharmaceutics, gums, confectionaries and livestock feed. Cassava is cultivated in virtually all agro-ecological zones because of its ability to thrive in areas with rainfall between 508 and 1524 mm and in mean annual temperatures between 17 and 30° C. The cassava plant is a shrub of about 2.5 m in height with edible tubers of about 1m in length. Nigeria is now the world's largest producer of cassava (Osemeobo, 1993). The Food and Agriculture Organization of the United Nation (FAO) in Rome (FAO, 2004) estimated 2002 cassava production in Nigeria to be approximately 34 million tonnes. This is as a result of development and distribution of high-yielding, pest and disease resistant varieties accompanied by improved production technologies. Nigeria's production is targeted at 40 million tonnes by 2005 and 60 million tonnes by 2020 (IITA, 2002). Cassava was rapidly adopted by farmers and integrated into the traditional farming and food systems of Africa because of its low input resource requirements and relative ease of cultivation and processing (Hahn *et al*., 1979). A Collaborative Study of Cassava in Africa (COSCA) reveals that proportionately more cassava was grown for sale by women than by men; households headed by women planted proportionately more cassava for sale than household headed by men (Nweke, 1995). Cassava can grow on a wide range of soils and can yield satisfactorily, even on poor acid soils where most other crops fail (Han, 1984). It can grow in high rainfall areas and also in semi-arid regions because of its drought tolerance. The crop, therefore, plays a vital role in alleviating famine by providing sustained food supplies when other crops failed. Cassava is well adapted to the diverse African traditional farming systems. It is an efficient producer of calories providing twice as many calories per hectare as maize and at a considerable lower cost. The efficiency of protein production is also higher than commonly realized. Cassava leaves contain 5.1 to 6.9% protein (Owueme, 1978; Oomen and Grubben, 1978; Gomez and Valdivieso, 1985). The key challenges that need to be addressed as a matter of urgency range from

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low crop performance, agronomic, edaphic and socioeconomic constraints to training, technology development and transfer (Dahniya, 1994). In an Ecologically Sustainable Cassava Plant Protection Project (ESCaPP) survey reported by Okeleye *et al.* (2001), some production parameters such as land preparation methods, use of cleared weeds, size of cuttings planted, types of varieties planted and dynamics of cassava production were measured but not reported. The objective of this research is to highlight these issues as it affects Nigeria. Discussions were also made on demography and other general production practices associated with cassava production in some agro-ecological zones in South West-North West axis of Nigeria.

MATERIALS AND METHODS

A survey was carried out with International Institute For Tropical Agriculture (IITA) under Ecologically Sustainable Cassava Plant Protection Project (ESCaPP) across some ecological zones in South West- North West axis of Nigeria in 1994 dry season and 1995 early planting season. A specially designed questionnaire was administered across 59 sites from Lagos State in South West to Jigawa State in North West Nigeria. The number of sites chosen per state was based on a sampling site every 75 km. Hence the number of 75×75 km surfaces in a state determined the number of sites required. The actual sites were randomly selected based on the 18×18 km grid resolution available in the International Institute For Tropical Agriculture (IITA) Resource Information System (RIS) Database. A list of randomly selected grid covers major agro-ecological zones in Nigeria. Selected grids were located on a good road map, then checked for road accessibility starting from the centre of the grids by ecological zones. The site within 10 km of motor able road were deemed to be valid. If the site was too far from the road, another grid was selected. Each selected site was visited for suitability and familiarization with the villagers before sampling and actual survey. A sampling site in each 75×75 km area was eliminated where no cassava or no road access was found.

The questionnaire consisted of 34 questions and the data generated were analysed using Microsoft Excel platform. The parameters measured were explained with the aid of pie chart and percentage distribution of observations.

RESULTS AND DISCUSSION

Demography: The number of sites surveyed in each ecological zone is shown in Table 1. The mangrove forest despite its special nature still provided a large expanse of arable land for the poor resource farmers to grow cassava and other food crops for subsistence and sale for cash. In the two villages covered in this zone cassava are planted on soils pulled up into large heaps in order to keep the root zone of the crop off the water level.

The study, Fig. 1 shows that 25.4% of the villages have 1-10 adult farmers, 33.9% of the villages have 11-20 adult farmers, 23.7% of the villages have 21-30 adult farmers, while 16.9% of the villages have more than 30 adult farmers. Most of the farmers, about 59.6%, have been involved in cassava production for over 10 years. The ability of cassava to grow on marginal soils, the assurance of relative optimum yield and the relative ease involved in its cultivation are some of the factors that encouraged most of the farmers to grow the crop. Expansion of cassava production has been relatively steady since 1980 with an additional push between the years 1988 to 1992 owing to the release of improved IITA varieties.

Figure 2 shows that 41.6 and 42.5% of men and women grows cassava, respectively. Also 13.3% of children in the villages grow cassava and 3.3% of men and women had a joint cassava farm. The interest of children in cassava production is quite encouraging and worth of note because they would likely replace the elderly and

Table 1: EsCaPP survey sites by ecozones in south west-north west axis of Nigeria

Ecozones	No. of sites**	Brief description*
Magrove forest	2	Annual rainfall 1580-2610 mm. Wet season of more than 290 days. Muddy, smelly, wet with tangled roots. Some of the trees are *Avicennia* sp., *Sonneratia* sp. and *Rhizophora* sp. Different species of fauna and sauna abounds.
Rain forest	18	Annual rainfall of 1550-2550 mm. Wet season of more than 250 days. Trees abound and form canopies with little undergrowth. Economic tree crops abound.
Transitional forest	12	Annual rainfall of 1000-1650 mm. Wet season of more than 190-250 days. More trees abound than in any of the savannas. Trees not fire-tolerant. Oil palm restricted to river banks. Tree crop can thrive well.
Wet savannah	19	Annual rainfall of 900-1400 mm. Wet season of more than 130-190 days with more trees than dry savannas.
Dry savannah	5	Annual rainfall of 500-1000 mm. Wet season of more than 90-130 days. Vegetation consist of grasses with trees which are mostly fire-tolerant.

* Yayock *et al.* (1988) ,** The sites correspond to number of fields studied in each zone

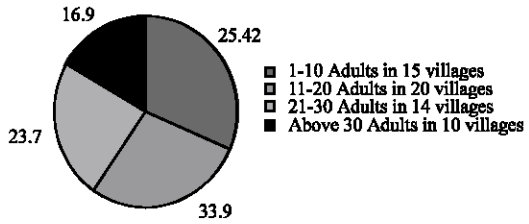

Fig . 1: Percentage of adult cassava farmers in villages across ecozones in South West-North West axis of Nigeria

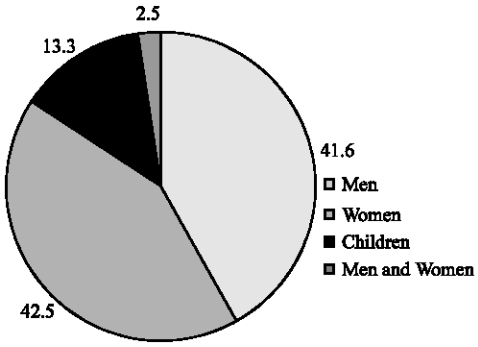

Fig. 2: Percentage of gender involvement in cassava production across ecozones in South West-North West axis of Nigeria

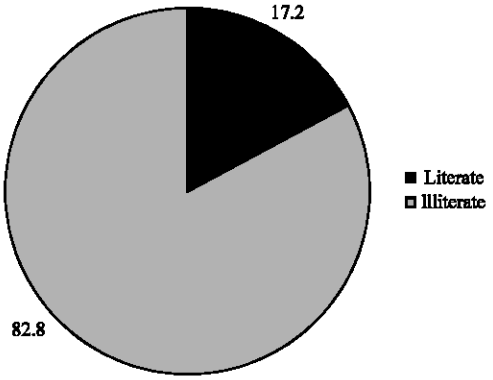

Fig. 3: Percentage of literacy level among cassava farmers across ecozones in South West-North West axis of Nigeria

aged farmers over time. Cassava production have also changed the women from the traditional housewives to steady income earners who have the capacity to support themselves and other members of their families financially.

The literacy level of cassava growers was considered very important since good knowledge of both oral and written English language would afford them the opportunity to learn and make use of recent research findings and techniques that could enhance increase in the yield of cassava. Figure 3 shows that 82.8% of the farmers are illiterate while only 17.2% of the farmers were found to be literate. The illiterate farmers responded to questions in Yoruba, Edo, Kemberi and Hausa languages. The literate farmers exhibited some knowledge of modern cassava production practices especially the use of tractors, fertilizers and herbicides.

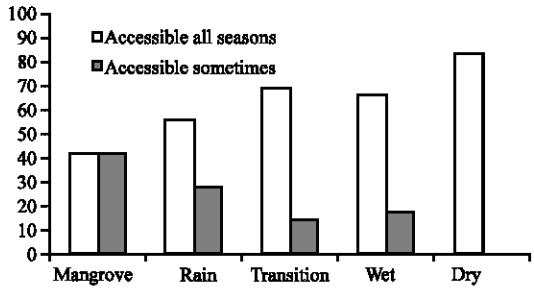

Fig. 4: Road access to villages across ecozones in South West-North West axis of Nigeria

General production practices: There was a good percentage of access to the villages, as shown in Fig. 4 most of the seasons; ranging from 50%in mangrove, 67% in rain forest, 83% in transition zone, 79% in wet savannah and 100% in dry savannah. Some of the villages were not really accessible all seasons: 50% in mangrove, 33% in rain forest, 17% in transition zone and 21% in wet savannah. The lack of access was usually caused by deep pot holes, flooding and gullies created by the rains. There were instances where the bridges and culvert leading to some of the villages were swept away by flood water.

It was also found, as shown in Fig. 5 that 50.8% of the villages were within the 20 km radius to the nearest market while 25.4, 15.3 and 8.5% of the villages were found to be within 40, 100 and 200 km radius, respectively to the nearest market. The nearness of the villages to the markets and commercial centres would facilitate easy movement and sales of the farm produce. Consumer demand, industrial demand and establishment of market centres within 10-15 km radius of most villages that are very far away from the existing markets would serve as a push factor to farmers to open up more land for cassava cultivation.

The land preparation methods (Fig. 6) found in the villages across the ecological zones varies. In the mangrove zone, 100% of the villages adopted slashing/hoe method. In rain forest zone, 88 and 44% of the villages adopted slashing/hoe and herbicide application methods, while 55 and 83% of the villages adopted use of tractor and bush burning methods. The choice of a land preparation method was determined

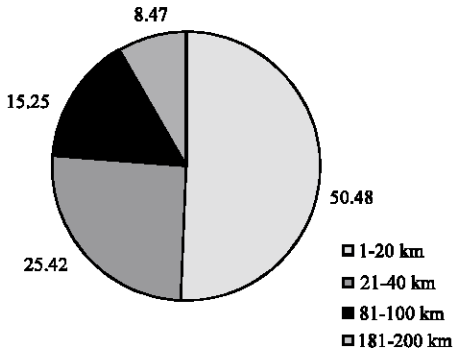

Fig. 5: Percentage of distance of villages to the nearest market across ecozones in South West-North West axis of Nigeria

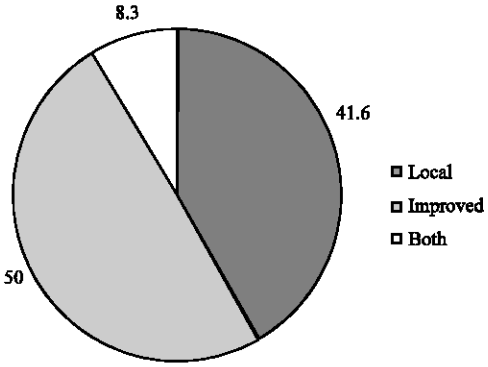

Fig. 7: Percentage of types of cassava varieties planted across ecozones in South West-North West axis of Nigeria

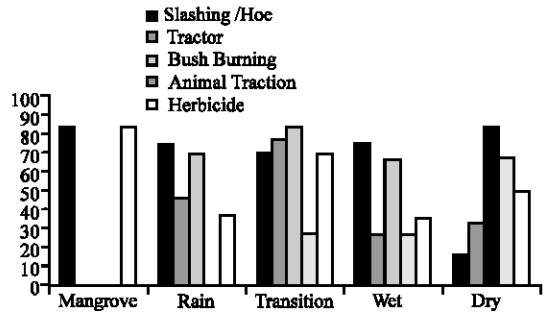

Fig. 6: Land preparation methods in villages across ecozones in South West-North West axis of Nigeria

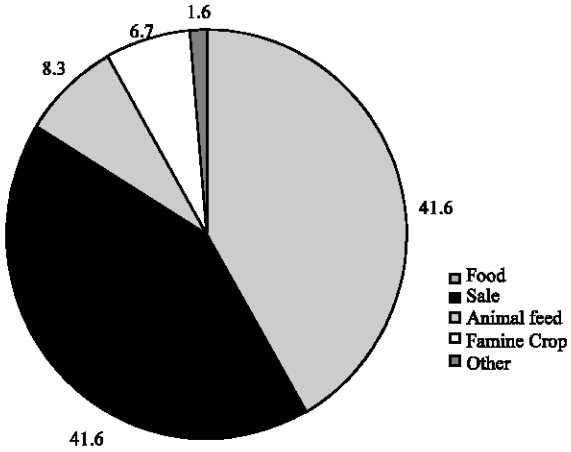

Fig. 8: Percentage of reasons for growing cassava in villages across ecozones in South West-North West axis of Nigeria

primarily by the vegetation and the nature of the soil. In some of the zones, plant wastes generated from slashing and hoe ploughing were used in filling land depressions and in blockage of erosion paths.

The type of cassava varieties grown varies across the zones. Majority of the farmers (50%) preferred to plant the improved varieties of cassava possibly because of its ability to give higher yield and withstand pest and diseases. As shown in Fig. 7, 41.6% of the farmers still prefer to plant the local varieties because of their belief that the fresh tubers contain more starch and less water. Some of the farmers were of the opinion that the by-products obtained from the tubers of the local varieties are more stable in colour, taste and shell-live.

Most farmers (41.6%) grow cassava to provide food for the household and also to make money to provide for other needs of the family. About 8.3% of the farmers grow cassava to provide feed for the animals while 6.7 and 1.6% of the farmers grow cassava as famine crops and for other purposes (Fig. 8). Cassava by-products such as gari and 'fufu' enjoys wide patronage across the zones. Fufu was most relished by labourers and farmers because of the belief that it supplies a lot of energy to the body.

The plant population and yield of cassava per hectare across the zones are shown in Table 2. The plant population on farmers field ranged from 9, 135 ha^{-1} in dry savannah to 13, 910 ha^{-1} in the rain forest. The yield per hectare also follow the same trend with 15, 120 kg ha^{-1} in rain forest and 10, 190 kg ha^{-1} hectare in the dry savannah.

The Federal and State Governments in Nigeria in recent times have promoted and improved the status of cassava from been a subsistence crop of the poor resource farmers to a cash crop that can now fetch the farmers and the country foreign currencies. A lot of farmers are now opening more land that had hitherto been left to fallow for a long period of time. Most farmers have also adopted the technique of burying a whole stem

Table 2: Cassava plant population and average yield per hectare across ecozones in south west-north west axis of Nigeria

Ecozones	Population	Average yield (kg)
Magrove Forest	11.850	12.350
Rain Forest	13.910	15.120
Transition	10.940	11.105
Wet Savannah	11.210	12.140
Dry Savannah	9.135	10.190
Average	11.409	12.181

cutting of 9-12 cm in size with 6-10 nodes at a depth of 6-8 cm. The cassava plant will bring forth 3-4 shoots thereby closing the canopy early enough to suppress weeds with the attendant reduction in the cost of weeding. In all the villages across the zones, cassava production has been confirmed to be on the increase replacing fallow land and thus raising hope of meeting a IITA production target of 60 million tonnes by 2020.

CONCLUSION

The survey reveals that cassava production is dominated mostly by women and men. Though the involvement of children and young adults in cassava production have raised a lot of hope that the number of hectares of land under cultivation would continue to increase and consequently the total annual production would increase. It was found that push factors such as government support in form of infrastructure and loan to farmers, new and higher yielding varieties, better farming practices and farmers motivation could enhance production and increase yield drastically. To perform economic transformation and bring about economic development, government policy should be directed towards the development of agriculture in the countryside instead of the exploitation of agriculture by imposing burdening measures and taxes to protect industry (Krueger *et al*., 1988; Johnson, 1993). Agriculture is still the most important economic sector in most African countries. By its product contribution and its foreign exchange contribution, agriculture can be the engine of development (Ghatak and Ingersent, 1984). It is concluded that availability of ready market and competitive price regime of cassava at both local and international market would serve as key factors in expansion of frontiers in cassava production and development in Nigeria.

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