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# CASSAVA PRODUCERS AND CASSAVA PRODUCTION IN THE EAST CENTRAL STATE OF NIGERIA

W. N. Ezeilo, J. C. Flinn and L. B. Williams*

## 1. Introduction

Cassava is one of the foodcrops included in the Nigerian National Accelerated Food Production Program (NAFPP). In order to assess the impact of the cassava component of the NAFPP a baseline survey was conducted of cassava producers in the East Central State of Nigeria. The survey was conducted in January and February, 1975.

This paper reports on the preliminary analysis of the information collected in the survey. A final report will be prepared to include a more rigorous analysis of the data than has been possible here and inferences will be drawn from the work related to research priorities, the nature of government policies and programs which will be necessary to stimulate an increased production of cassava in this zone.

## 2. The Survey and Sampling Procedures

The objective of the cassava benchmark survey was to seek information on:

a) the characteristics of cassava producers in E.C.S;

b) their use of technical inputs in farming

c) their existing systems of producing cassava; and

d) the constraints which limit agricultural production.

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*Cassava Coordinator, Economist and Planning Economist, International Institute of Tropical Agriculture, Ibadan, Nigeria.

Resource and time constraints limited the target number of farmers to be surveyed to 200 (we ended up with 180 usable questionnaires). The number of farms sampled in each Administrative Division was set in direct proportion to the number of Community Council Areas in the Division and that number of Community Council Areas then randomly selected from the Division. Finally, the farmer chosen in each Community Council Area was randomly selected from the Councils rate list. Five such names were drawn and the first person to meet the following criteria

a) he was a farmer who grew cassava

b) the farmer was willing to cooperate and

c) had a cassava plot ready for harvest,

was interviewed.

## 3. Characteristics of the Farmer and his Farm

### 3.1 Age distribution of farmers

As shown in Table 1, the modal age of farmers interviewed in the survey was about 40 years. The age distribution was slightly negatively skewed, with over half the farmers being over 45 years. The modal age of farmers interviewed in the survey was younger than generally reported in the literature. It may be that there are a greater proportion of younger farmers in E.C.S. than generally occurs in the remainder of Nigeria. The other possibility is that by using the Council tax lists the sample was biased. It is not uncommon for older men to be exempted from paying tax as it is felt they have already made their contribution to society.

Table 1. Age distribution of farmers surveyed in the cassava baseline survey, East Central State, 1975

| | Age class (years) | | | | | |
|---|---|---|---|---|---|---|
| | <25 | 26-35 | 36-45 | 46-55 | 56-65 | >65 |
| Number | 6 | 35 | 49 | 41 | 34 | 15 |
| Percent in class | 3 | 20 | 27 | 23 | 19 | 8 |
| Cumulative % | 3 | 23 | 50 | 73 | 92 | 100 |

3.2 The farm labor force

Figure 1 is a histogram of the number of men, women and children generally available for work on the farm. The majority of farms (47%) have one full time male available for work, and 69 per cent of farmers have three or less adult females available for farm work. Surprisingly, a third of the farmers interviewed did not regard their children as a regular source of farm labor. The frequency distribution of this farm-family labor force, when converted to a standard man basis is shown in Figure 2. On this basis, the modal supply of family labor available on the cassava farms surveyed in E.C.S. was between 2 and 4 standard labor units.

Of the 180 farmers interviewed, 148 or 82 per cent had hired labor the previous year. The mean number of days of labor claimed to be hired by these farmers was 41 days (it was not possible to stratify this hired labor figure into men, women and children). The simple correlation between family labor (expressed in standard man equivalents) and the use of hired labor, at 0.11, was not significant. Thus, there is no evidence to argue that the quantity of labor hired is related to the on-farm labor force, those farmers with smaller labor forces do not necessarily hire more labor than the farmers with larger farming labor forces.

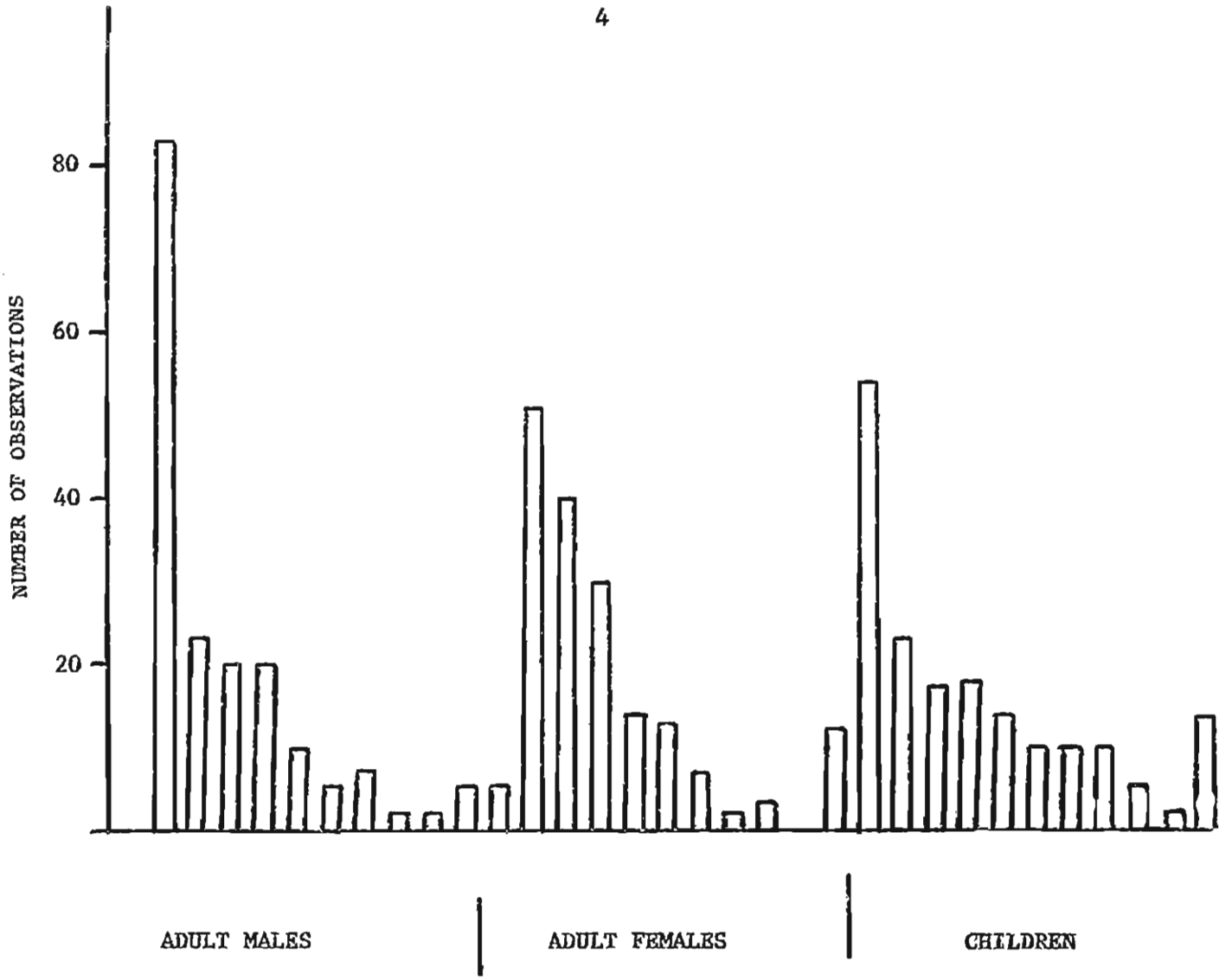


FIG. 1 Frequency distribution of adult males, females and children generally available for work on the farm

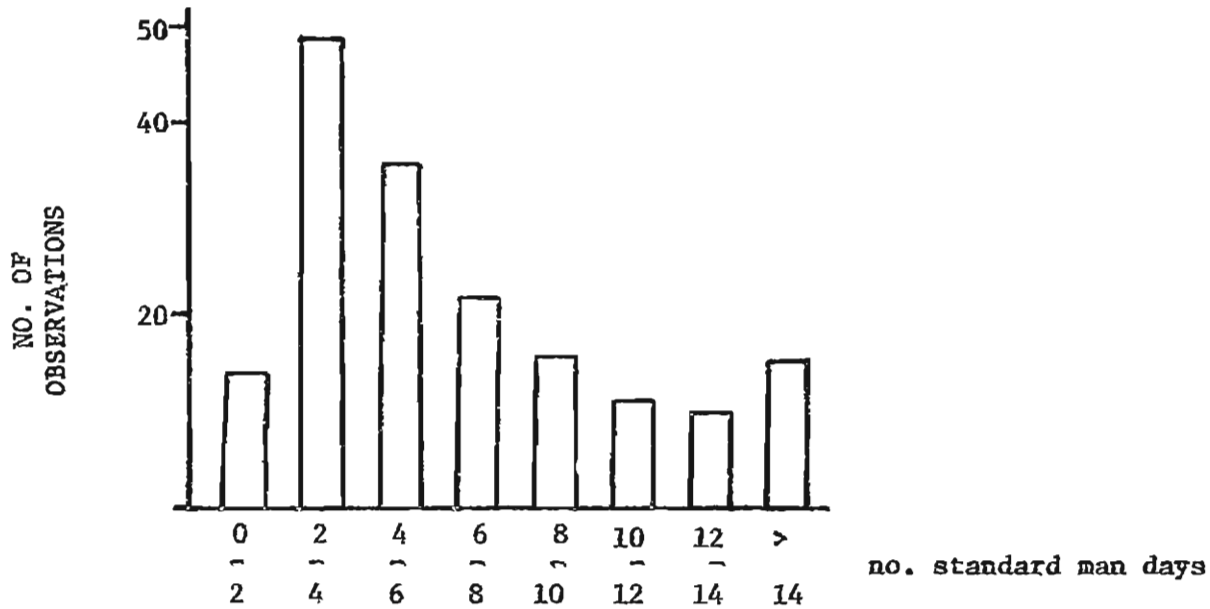


FIG. 2 Frequency distribution of farm labor supply in standard man days (men and women = 10: children = 0.5)

The modal cost of hiring adult males was ₦.80 to ₦1.00 a day, adult females ₦.50 to ₦.70, and children ₦.30 to ₦.50 a day. In addition to this cash wage 68 per cent of the farmers who hired labor also provided meals for the laborers. Five percent of farmers provided one meal, 30 percent two meals and 33 percent three meals. While the correlation coefficient between the wage rate per day for adult males and the number of meals provided by the farmer was negative, it was not significant ($r = -.14$).

3.3 The land base of the cassava farmer

The questions designed to provide data on the area of land under cultivation and under bush fallow each year did not provide, in our view, useful information. Thus, the figures contained in Table 2 related to the distribution of cultivated land between farmers in the E.C.S. was obtained from a secondary source, the Federal Office of Statistics. The F.O.S. statistics shows that over half the farmers in the state are cultivating less than 0.2 hectares each year.

Table 2. Percentage of farmers cultivating farms by hectarage, East Central State of Nigeria, 1970/1971*

| Size class (ha) | Percentage of farmers falling in class |
|---|---|
| <.10 | 36 |
| .10 to .19 | 21 |
| .20 to .39 | 21 |
| .40 to .99 | 15 |
| 1.00 to 2.00 | 2 |
| > 2.00 | 5 |

*Source: Rural Economic Survey of Nigeria. Federal Office of Statistics, Lagos, 1973.

The most important source of land (form of tenure) farmed by the farmers interviewed was family land (44%), followed by land on lease (18%); purchased, pledged communal land and land acquired through gifts were approximately of equal importance (Table 3).

The farmers were asked how they would acquire more land if they wished to increase their scale of operation. Thirty-six percent of the farmers indicated that the main way they would attempt to acquire more land would be through leasing the land; purchasing the land or acquiring rights to farm the land through pledging were regarded as equally important at 20 percent each. Only 15 percent of farmers felt they could acquire more communal land, and less than 10 percent of the farmers regarded family land as an important source of land for them to expand their operation.

Table 3 Form of tenure of land currently cultivated by farmers and methods farmers would use to procure more land, cassava benchmark survey, E.C.S., 1975.

| | Major form of current control (%) | Acquisition of more land (%) |
|---|---|---|
| Farming land | 44 | 9 |
| Leased land | 18 | 36 |
| Pledged land | 14 | 20 |
| Communal land | 12 | 15 |
| Purchased/Gift | 12 | 20 |

The above results suggest that farmers in the East Central State perceive that additional land is not widely available though the traditional sources

which historically, were rent free. Most farmers feel there is a real financial cost involved in their increasing their scale of operation.

## 4. The Farmer's Use of Technical Inputs

### 4.1 Credit

Of the farmers interviewed, 131 or 73 percent indicated they had used credit during the 1974 cropping season. The most important sources of credit mentioned by the farmers are listed in Table 4. The dominant source of credit was other members of the farmers extended family, followed by "Isusu" and age group associations. Apparently money lenders, farmer cooperatives and commercial banks are not important sources of credit for the smallholder in East Central State.

Table 4 Reported sources of credit used by small farmers in 1974, cassava benchmark survey, E.C.S., 1975.

| Source of credit | % of farmers ranking source as the most important |
|---|---|
| Extended family | 38 |
| Isusu | 27 |
| Age Group | 17 |
| Other | 13 |
| Cooperatives | 3 |
| Money lenders | 2 |
| Banks | 0 |

The primary reason for the farmer wanting credit was to pay for hired labor. The use of credit for family needs and for the purchase of planting material were

next in importance. Significantly, using credit to purchase productive inputs for farming (other than labor) was rare, only 9 farmers of the 180 farmers surveyed used credit to purchase fertilizers or pesticides. The major use the small farmer seems to make of credit -- labor and family needs -- suggests that programs aimed solely at providing credit in kind are unlikely to meet the higher order uses for funds in the view of the smallfarmer.

### 4.2 Fertilizer

Eighty six percent of the farmers interviewed had heard of fertilizer. The main source of information about fertilizer had been the Extension Officer and family friends (Table 5). Opinion leaders in the village, the radio and newspapers do not seem to be an important source of information on fertilizer.

Table 5 Sources from which farmers heard about fertilizer, cassava benchmark survey, E.C.S., 1975

| Source of information | Number | % |
|---|---|---|
| Extension Officer | 65 | 36 |
| Family friends | 40 | 23 |
| Other | 40 | 23 |
| Radio | 8 | 4 |
| Opinion leaders | 1 | - |
| Newspapers | 0 | 0 |
| Had not heard of fertilizer | 26 | 14 |

While 154 farmers had heard of fertilizer, 70 or 45 percent claimed to have

had used it on some occasion. Of those who have used fertilizer, 93 percent felt it had increased their yields, 3 percent felt it had no impact on yields and 4 percent thought the fertilizer had actually reduced their crop yields. In consequence, the majority of farmers consider that using fertilizer will definitely increase their yields. The major reasons advanced by the farmers for not using fertilizer was a lack of funds to buy the input, followed by fertilizer not being available or the farmer not knowing where to buy it (Table 6)

Table 6 Reasons advanced by farmers who have heard of fertilizer not using it, cassava benchmark survey, E.C.S., 1975.

| Reason for not using fertilizer | Percent of farmers advancing reason |
|---|---|
| Lack of funds | 51 |
| Fertilizer not available | 17 |
| Don't know where to buy fertilizer | 15 |
| Will not increase crop yields | 8 |
| Other | 9 |

4.3 Pesticides

Fifteen farmers in the sample have used seed dressing and insecticides. It seems that while it was the Extension Officer who made the farmer aware of pesticides (11 cases), most of these materials are obtained from private dealers (9 farmers) or Extension Officers (4 farmers).

## 5. Farmer's Identification of his Farming Problems

Each respondent was asked to identify the four most important problems which, in his view, were holding back increases in foodcrop production in his area. The responses are summarised in Table 7. some farmers identified less than four problems, hence the total number of responses is less than 720 (i.e. 4 x 180). By far the most important problem in the farmer s view was his financial solvency as reflected in his cash reserves or access to credit to enable him to increase his output. A scarcity of land to expand production and the problems caused by diseases and insects seem to be roughly of equal importance. The fourth most important problem was the high cost and difficulty of hiring labor.

Table 7 Problems identified by farmers which importantly limit their potential production of food crops, cassava benchmark survey, E.C.S., 1975.

| Problem | No. of times problem mentioned |
|---|---|
| Lack of liquidity (cash and credit) | 159 |
| Lack of land | 79 |
| Insects and diseases | 77 |
| High cost (lack) of labor | 55 |
| Crops damaged by animals | 16 |
| Lack of transport | 14 |
| Poor health of farmer | 14 |
| Too much or too little rainfall | 11 |
| Soil fertility declining | 9 |
| Fertilizer not available | 8 |
| Weed problems | 6 |
| Lack of high yielding planting material | 4 |
| No extension services available | 2 |
| Others | 9 |

The three classical constraints -- land, labor, and capital -- together with crop losses due to diseases and insects seems to dominate the farmers concept of his most pressing problems in farming. Until these dominant problems

are alleviated, particularly the financial one, it is unlikely that the lower order problems will be successfuly circumvented. The farmer's recognition that access to cash, land and labor constitute important limitations on his production suggests that when designing agricultural technology, researchers must ensure that the technology is both land and labor augmenting and not capital intensive.

## 6 Cassava Production

### 6.1 Cassava yields

Ten square metre plots of cassava were harvested by the enumerators and weighted to allow an estimate of cassava production on a per hectare basis to be made. Of the 198 fields harvested, 59 were compound fields and 139 were outer fields. As no significant difference was found between the yield distributions for the compound and outer fields, the yield histogram shown in Figure 3 is for the totality of the harvested plots. The yield distribution of cassava over the State was positively skewed, with a modal yield of 6 tons per hectare and a mean yield of 9.29 tons per hectare.

In an attempt to determine spatial trends in cassava yields over the State, the yields at each location were mapped onto an overlay map of E.C.S. A visual inspection of the yield overlay does not make us optomistic that significant yield trends will be identified over the State. One possibility emerging from a study of the overlay is that cassava yields are inversely related to population density -- yields seem to be lower where the population pressure of land is the highest (e.g. Owerri, Orlu, Okigwi regions). A computerised mapping routine will be used to determine whether the survey data

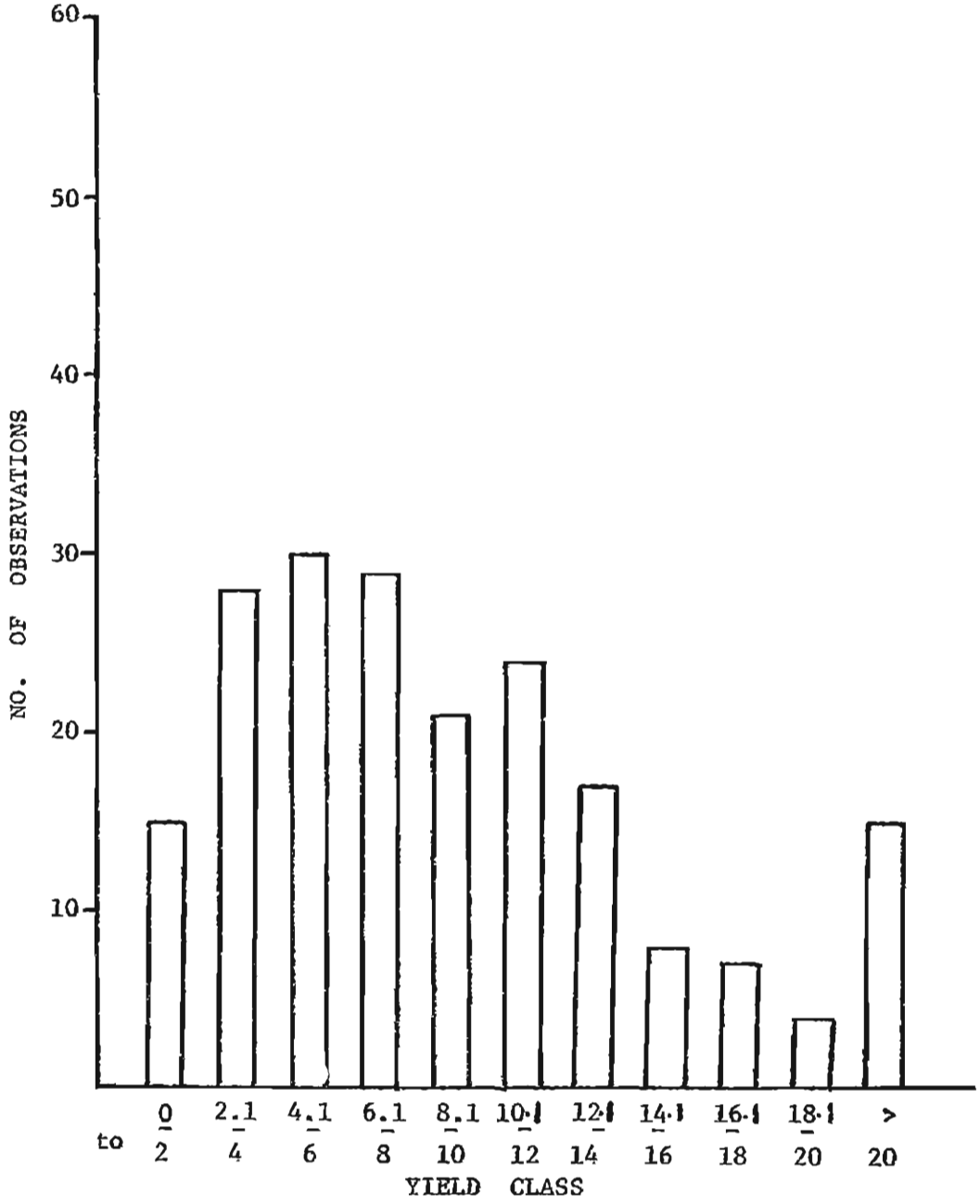


FIG. 3 Frequency Distribution of Cassava Yields, Baseline Cassava Survey, E.C.S. Jan. - Feb., 1975

will enable yield isoquants to legitimately be mapped over the state.

6.2 Crop sequences

The bulk of the cassava harvested during the survey in January and February of 1975 had been either planted in February - March or April of 1974 and in March or April of 1973 (Figure 4). That is much of the cassava was either 11 to 12 months old or up to 24 months old at harvest.

The cassava planted in 1973 was essentially all sole crop "old" cassava in 1974, and that planted in 1974 had other crops interplanted with it during its year of growth. The dominant two crop mixtures for the "new" cassava were cassava and maize or cassava and yams. The dominant 3 or more crop mixtures contained either yam or maize (if not both) as principal components of the cassava intercrop. The frequency of occurrence of the "3 or more" crop mixtures was higher in the compound farms than in the outer fields.

The old cassava plots of 1974 had similar crop mixtures in 1973 as did the new cassava plots in 1974; 96 of the new cassava plots were in fallow in 1973 and 155 of the 198 fields surveyed were in fallow in 1972. Thus, the typical cassava sequence is one to two years of cultivation with maize or yams (or both) being the most frequently found crops grown with the cassava. The crop mixtures will be analysed to assess whether spatial differences in the cropping patterns of cassava occurs over the State.

6.3 Division of labor responsibility

Information was sought to identify the person primarily responsible for carrying out the various tasks involved in producing a cassava crop. As shown

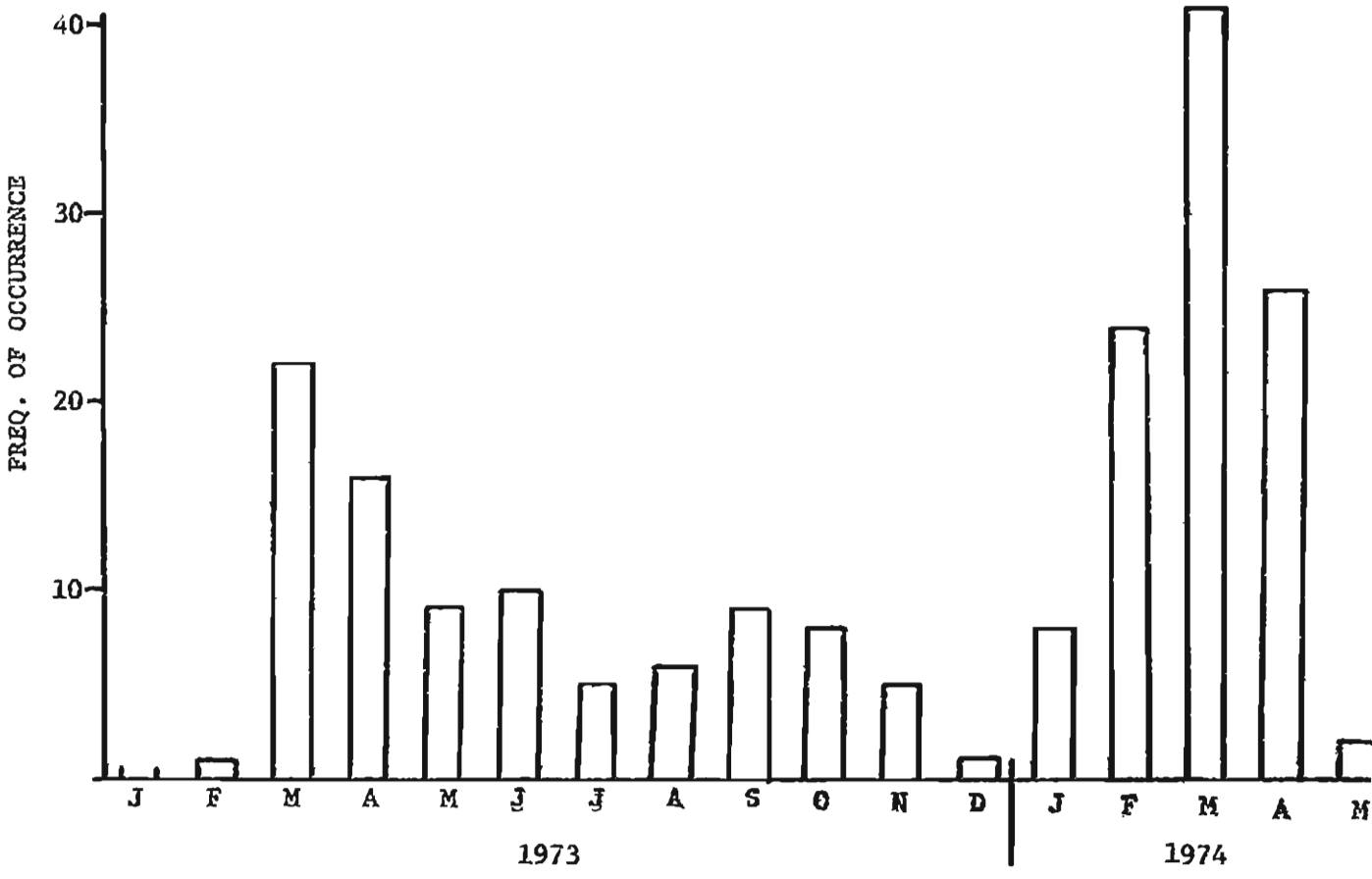


FIG. 4 Date of planting of cassava harvested in Jan - Feb 1975, Cassava benchmark survey, E.C.S., 1975

in Table 8, the only job the man is primarily responsible for is land preparation (it was all done by hand) the women in the household are identified as having the major responsibility for managing, harvesting and processing the cassava crop.

Table 8 Primary responsibility, in percentage terms, for performing various operations in cassava production, E.C.S., 1975

| Operation/ Activity | Labor Class | | |
|---|---|---|---|
| | Men | Women | Both |
| Land preparation | 59 | 1 | 40 |
| Planting | 4 | 63 | 33 |
| Weeding | 4 | 69 | 27 |
| Harvesting | 4 | 54 | 42 |
| Carrying | 1 | 56 | 43 |
| Processing | 1 | 60 | 39 |

6.4 Planting material

The most important source of planting material was, as expected, cuttings from the farmers own farm. Obtaining cassava cuttings from friends or purchasing them in the market were roughly of equal importance. The farmer who purchased cassava cuttings in the market paid on average, ₦2.00 for this planting material in 1974. Finally, as shown in Table 9, obtaining cuttings through the Ministry of Agriculture was rare. While 50 (28%) of the farmers knew of improved varieties of cassava, only 31 (17%) claim to grow the new varieties.

Table 9 Sources of cassava planting material, cassava benchmark survey, E.C.S., 1975

| Source of cuttings | Number of times source mentioned* |
|---|---|
| Own farm | 165 |
| Market | 66 |
| Friends | 61 |
| Extension agent | 3 |

*Several farmers mentioned more than one source of supply.

6.5 Cultural practices

The majority of the cassava was grown on light soils. Over 77 percent of the cassava was grown on large (30%) or small (47%) mounds, 11 percent was grown on ridges and 11 percent on the flat. Table 10 is the contigency table relating soil type to planting method. The majority of cassava grown on the light to medium textured soils was grown on small mounds, however, a significantly larger proportion of cassava grown on heavy soils is grown on large, as opposed to small mounds.

Fifteen of the farmers interviewed had applied fertilizer to the cassava plot harvested for the yield measurements, one had applied insecticide to the cassava (Alderin dust to control white ants). No significant difference was found between the yields of the fertilized and the unfertilized plots. Forty seven percent of the farmers weeded their cassava patch three times, 43 percent weeded it twice -- again there was no significant difference between yield and the number of times the plot was weeded.

Table 10 Contingency table relating form of land preparation to soil type, cassava baseline survey, E.C.S., 1975

| Cultivation Method | Soil type (% in bracket) light | medium | heavy |
|---|---|---|---|
| large mounds | 34 (27) | 10 (22) | 15 (60) |
| small mounds | 61 (48) | 24 (52) | 8 (32) |
| ridges | 14 (11) | 8 (17) | 2 (8) |
| flat | 18 (14) | 4 (9) | 0 (0) |

$X^2 = 13.93\ 7^{***}$, df = 4 (for the purpose of the chi-square analysis, data for the small mounds and flat was pooled)

6.6 Processing and disposal of cassava

After the crop is harvested and headloaded to the compound (usually by the women) that portion of the crop which is not sold as roots is processed. (Unfortunately, we did not record the relative importance of fermented cassava ("abà") and gari in the various areas, or in which form the processed cassava tended to be consumed at home or sold in the market). 123 (.73%) of the farmers and their families processed the cassava by hand, 44 (24%) had their cassava roots grated using gari graters in the village, four of the farmers interviewed owned their own gari graters. The cost for grating cassava was in the range of 8 to 10 kobo a headload (which weighs close to 30kg.).

In an attempt to establish the relative importance of cassava produced on the farm for family consumption versus that sold, the respondents were asked "what proportion of the cassava you produce is consumed at home, what proportion is sold?". Many farmers found this a difficult question to answer, 27

respondents did not provide usable information. The frequency distribution of the farmers responses are shown in Figure 5. Of those farmers who provided an answer, 37 percent thought their family consumed 90 percent or more of the cassava they produced 87 percent thought 50 percent or more of the cassava produced was consumed by the farm family. There was no significant difference between the method of processing (hand versus gari grater) and the proportion of the cassava crop sold ($\chi^2 = 4.34$, df = 2).

6.7 Cassava and gari prices

The price at which the farmer could sell three loads of cassava roots and the number of cigarette cups of gari which could be bought for ₦.10 was obtained from the market closet to each farmer interviewed. In some cases when no market was in session the farmer or his wives estimated the price, in other cases no information was recorded.

The average price of cassava roots in late January to early February, 1975 was approximately ₦.03 (.0327) per kg., the most common number of cigarette cups of gari bought for 10 kobo was four or five. A cigarette cup of gari weighs approximately 0.17 kg., so the price of gari fell in the range of ₦.12 to ₦.15 per kg. Assuming it takes 3.5 kg. of roots to produce 1 kg. of gari using traditional methods, results in the value added due to the processing of the roots falling in the range of .55 to 3.55 kobo per kilogram.

The correlation coefficient between the price per kg. of cassava roots (.85) and the price per kg. of gari (.89) over the State are both remarkably high suggesting a high degree of integration between markets for these commodities. However, while the correlation between the price of cassava and the price of gari was highly significant, it was low ($r = .40$), raising some

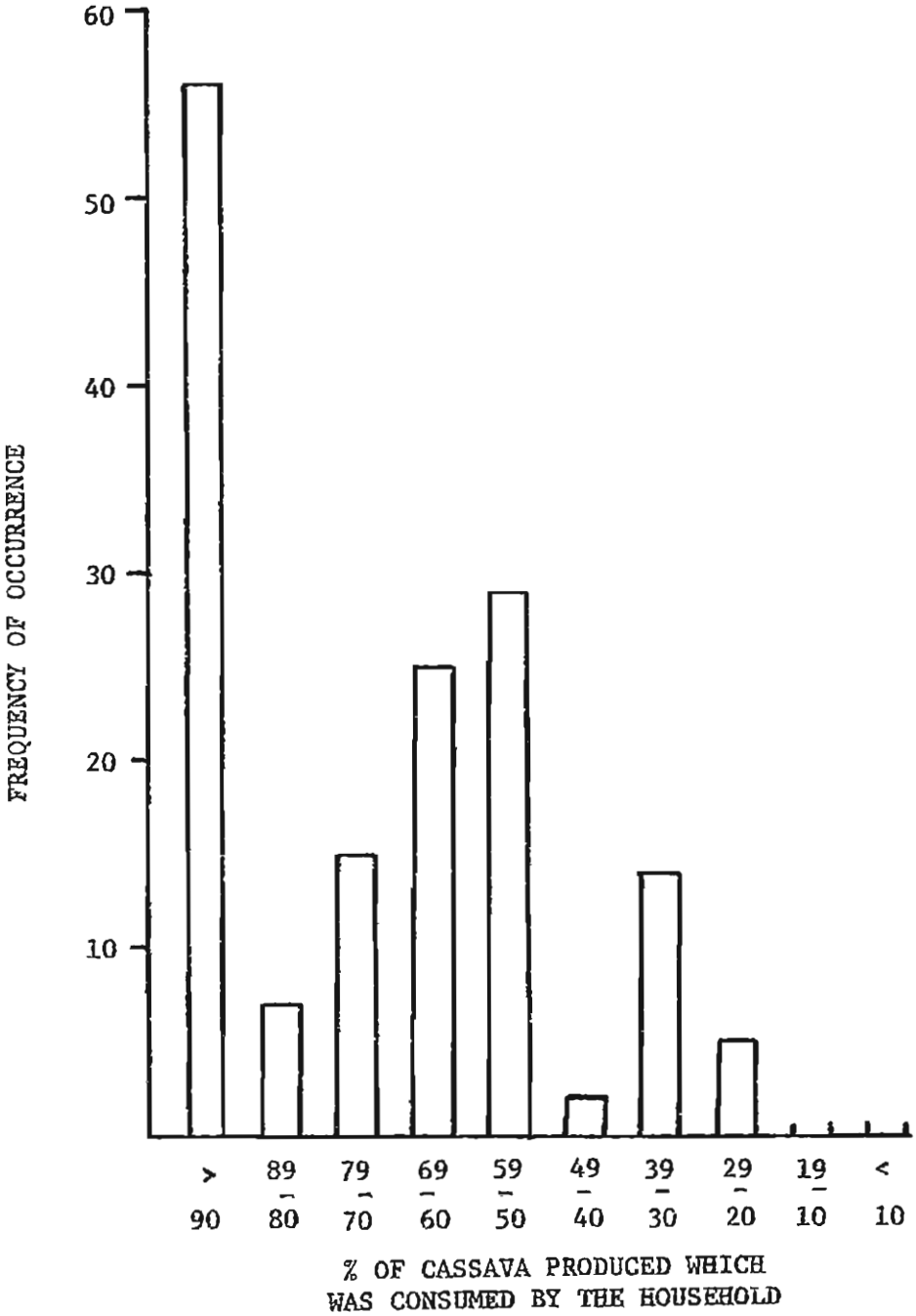


FIG. 5 Farmers estimates of the proportion of the cassava they produced which was consumed by the farm-family

doubts in the authors minds in the validity, particularly of the information recorded for gari prices.

## 7. Relationships Between Variables

### 7.1 Cassava yield and planting date

The relationship between the yield of cassava and its date of planting (see Figure 5) are shown in Table 11. While it appears that a greater proportion of the later planted crop falls into the lower yield class when compared to the earlier planted crop, the chi-squared test showed there is close to a 40 percent chance of yield distributions differing by this amount and still being a subset of the same population. Thus, no significant difference was recorded between the date of planting and yield of cassava.

Table 11 Yield of cassava by class, related to the date of planting, cassava baseline survey, E.C.S., 1975

| Date of planting | Yield class (kg/ha) 0 - 7 | 7.1 - 14 | >14 |
|---|---|---|---|
| Jan. - June 1973 | 22 (38) | 22 (38) | 14 (28) |
| July - Dec. 1973 | 15 (42) | 15 (42) | 6 (17) |
| Jan. - Apr. 1974 | 53 (52) | 34 (33) | 15 (15) |

$X^2 = 4.212^{n.s}$ df = 4 (the bracketed figures are % by yield class)

### 7.2 Cassava yield versus soil type

The contingency table relating cassava yield, by class, to soil type is shown in Table 12. There was no significant difference between the yield distributions over the various soil classes.

Table 12 Cassava yields by class related to soil type, cassava baseline survey, E.C.S., 1975

| Soil type | Yield class (kg/ha) 0 - 7 | 7.1 - 14 | >14 |
|---|---|---|---|
| sand to sandy loam | 60 (47) | 45 (35) | 22 (17) |
| loam to clay loam | 20 (43) | 19 (41) | 7 (15) |
| clays / lateritic | 10 (40) | 9 (36) | 6 (24) |

$X^2 = 1.346^{n.s.}$, df = 4 (bracketed figures are percentages)

7.3 Diseases and cassava yields

The enumerators, with the farmers co-operation assessed the presence of cassava bacterial blight, cassava mosaic disease, root rots and "other" diseases of cassava on the harvested plots. There was no significant correlation between the yield of cassava and the presence or absence (or combinations) of these diseases. Likewise, no differences were found due to the effect of the different diseases on the resulting yield distributions of the cassava.

Based on the available evidence, it appears that

a) the higher yielding cassava plots were not necessarily those with a lower incidence of diseases;

b) there was no differential effect on yield due to the four classes of cassava disease.

However, had the plots been scored for severity of infection (which would be extremely difficult at that time of the year) as opposed to the yes/no information provided by the survey disease-yield relationships may have been

identified.

A test was also run to determine whether there was any significant differences between the incidence of disease on the various soil types. No significant differences were found, it appears that the four diseases were equally prevalent across soil types.

### 7.4 Further analysis

It is apparent from the preceeding Sections that the variables investigated did not explain differences in the observed yields between the cassava plots. In an attempt to identify which of the remaining variables recorded may have explained the variability in cassava yields over space we used rather a sledge hammer approach and factor analysed the data. This exercise did not identify groups of factors which were importantly related to cassava yields.

While the data will be stratified into sub-sets based on the mapping exercise of yields over the State and other criteria, the authors are pessimistic that the information collected will result in those causes which importantly influence cassava yields being identified from this study. Obviously, there are some important variables we did not measure (weather effects, soil fertility, vigour of planting material, severity of disease etc.) also, for some variables recorded there probably was not a sufficient range in their magnitude for statistical relationships to be identified.

## 8 Summary and Inferencies

### 8.1 Summary

A survey of 198 cassava producers was undertaken in the East Central State of Nigeria to provide baseline information on cassava production for planners

involved with the Nigerian National Accellerated Food Production Program.

The modal farmer interviewed was surprisingly young, in the order of 40 years old. The farm labor force typically consisted of the farmer, one to three adult females and possibly some of his children. A third of the farmers interviewed did not regard their children as being generally available as part of the farming labor force. Eighty-two percent of the farmers interviewed hired labor, but there was no evidence that the quantity of labor a farmer hired was related to the size of his on-farm labor force.

Nearly two thirds of the farmers interviewed reported that they had used credit in 1974. The major sources of credit were traditional (the extended family and Isusu) as opposed to the formal sources such as banks and farmer cooperatives. Important reasons for the farmer borrowing money was to hire labor and to meet family living expenses. Eighty six percent of the farmers interviewed had heard of chemical fertilizer -- mainly from the Extension Officer -- though, only eight percent claimed to have applied it to fields containing cassava in 1974. The main reasons advanced for not using fertilizer were a lack of funds to buy it, the fertilizer not being available, and the farmer not knowing where to buy it.

The major problems or constraints which the farmers felt prevented them from increasing their agricultural output were a lack of working capital and access to credit a lack of land to enable them to increase their scale of operation, and the high cost of hired labor (presumably related to labor productivity). These three economic constraints were joined by the farming hazards of crop diseases and insects as the major biological constraint on farm productivity.

The modal cassava yield recorded in the survey was in the order of 6 tons per hectare. The crop is grown using traditional methods, at the end, not the head of the cropping phase. The farmer provides the majority of his own planting material, uses little if any fertilizer or pesticides on the crop. Other than for the physically demanding task of land preparation, the women are largely responsible for the production and processing of cassava. Nearly three quarters of the farm families processed their gari by hand and half the farmers claimed the family consumed in excess of 70 percent of the cassava they produced.

An attempt was made to relate cassava yields to the management strategies adopted by the farmer (time of planting, previous crop history, mulching, number of weedings etc.), biological factors (e.g. presence or absence of diseases), and soil type on which the crop was grown. This exercise proved to be singularly unsuccessful.

8.2 Implications for the NAFPP

The broad purpose of the NAFPP is to create an environment conclusive to an increase in the supply of six foodcrops in Nigeria. One of these crops is cassava. The Program will involve varietal improvement, the multiplication and distribution of planting material, a cadre of trained personnel in cassava production and the establishment of both input and marketing infrastructures necessarily to allow the increased production of cassava to become a reality.

The farmers perception that diseases of cassava are a major constraint to his production indicates that the present emphasis of the cassava breeding programs to develop varieties that have high stable yields and are resistant to cassava mosaic disease and cassava bacterial blight are well directed. To be successful the management technology associated with these new varieties

should be both land and labor augmented but not capital intensive.

In addition to diseases, land and labor, farmers also identify the lack of credit and the non-availability of inputs as factors which limit their adoption of improved production packages. Questions arise as to the most workable structure for the credit and technical input supply sectors. These inputs must be available in the required quantity and formulation, as when and where required. A timely supply available to the farmer so he does not have to "seek" it out with a loss of energy is a key to adapting improved practices.

In addition to the question of physical availability, input and product prices must be such that it is financially attractive for the farmer to use them. Take fertilizer as an example; its subsidised price to the farmer in E.C.S. is in the order of ₦.20 per kg. of nutrient. With cassava roots valued at ₦.03 per kg. requires that one kg. of nutrient must result in an added yield of at least 7 kg. of roots for the application of the fertilizer to be profitable. In Western State the price per kg. of nutrients is closer to ₦.50, requiring an incremental yield of over 16 kg. of cassava per kg. of nutrient to pay for the fertilizer. Is this incremental yield possible? The point is that even if inputs are available, the relative input/product prices may still render the improved technology unattractive to the smallfarmer. What are the "relevant" input and product pricing policies?

There are other price and market related questions which must also be of concern to the planner. If improved cassava technology becomes available, what would be the likely impact on the price of cassava, and so by implication the economic attractiveness of the technology to the farmer? Three points

among others should be considered:

a) a large proportion of the cassava produced is also consumed on the farm, so an increase in production, over and above expanding family requirements could lead to a large increase in marketed surplus;

b) the price elasticity of demand[1] for cassava for human consumption is low (Olayide et al[2] place it at about 0.2) so an increase in production in excess of increasing demand will lead to a decline in total income from cassava sales, as the increase in the amount sold is insufficient to affect the effect of the reduction in price;

c) the income elasticity of demand for cassava is low (if not zero) in Nigeria, any increase in demand for consumption will be largely as a result of population growth.

Thus if the NAFPP is successful in increasing the supply of cassava at a rate greater than in the order of 3 percent a year, they must consider the question of establishing alternative markets for cassava or being faced with a fall in the price of cassava relative to other food products. Potential industrial uses of cassava are for starch manufacture and for livestock feed. These markets must be developed in Nigeria at a rate adequate to consume any increase in production over and above that required to satisfy the increase in population.

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[1] Price elasticity of demand = $\frac{\%\text{ change in quantity sold}}{\%\text{ change in price}}$

[2] Olayide, S. O. et al. A Quantitative Analysis of Food Requirements, Supplies and Demands in Nigeria, 1968 - 1985. Federal Department of Agriculture, Lagos, 1972.

When making policy and planning inputs and marketing infra-structure, it is almost impossible to feel that all the facts required are at hand for making decisions. As with all surveys the cassava benchmark survey in East Central State pointed up new area's for fruitful study. For example, it has been well established that cassava responds to fertility levels and insects and disease control. Insect and diseases were listed third by farmers as principal constraints holding back yields. In analysing the data, a significant correlation between these factors and yields was not found. In the future should there be an evulation of NAFPP program benefits and equate back against the base lime data, these new area's should be studied.