

RESEARCH NOTE: 4

**COST-EFFECTIVENESS OF WEED CONTROL ALTERNATIVES IN CASSAVA (TMS 30572) INTERCROPPED WITH MAIZE AND EGUSI.**

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**ABSTRACT.**

Branching and canopy developing habits of cassava (TMS 30572) were matched with ground covering characteristics of egusi (melon) compared with pre-emergence application of herbicides in controlling weeds in cassava/maize intercrop systems. Three-hectare plots were subjected to this field trail at Uyo during the 1997 and 1998 cropping seasons. The first one hectare plot carried cassava/maize and was subjected to two-hoe weeding (control) as the weed control option. The second one hectare plot with the same cassava/maize mixture had its weed controlled with pre-emergence application of primextra. The third one hectare plot was planted up with cassava/maize/egusi and was not weeded. The crop yields were: Cassava tubers (tones/ha): 22,30,22,47 and 22,15; Cassava sticks (bundles/ha): 315.00,301.50 and 294.00; Maize grains (tones/ha): 1.74, 1.77, and 1.57 for the first second and third plots respectively. The third

one hectare plot gave 9.32 tonnes of egusi seeds. The result of partial budgeting analysis gave a Gross Margin over control of N5,390 per hectare for weed control with Primextra (Chemical Control) and N25,890 per hectare for weed control using egusi (bio-control).

## INTRODUCTION:

It has now been accepted that increased food production in the tropics will involve replacing shifting cultivation with a system that will involve more intensive land use (Ruthenberg, 1976). It is also recognized that such a change will create problems of excessive pests and disease (Akobundu, 1978). Appropriate weed control practices for such intensive/intercrop systems in the humid and sub-humid tropics will have to take into consideration the need to conserve the fragile tropical soils; must represent a demonstrable net gain in the use of resources available to the farmers and requires to be sufficiently attractive to encourage the farmers to abandon other available production options (Chinaka, 1998).

Currently, Nigeria is topping the world's cassava production chart with an annual tuber output of about 333 million t/ha (NRCRI, 1999). In the Southern States of Nigeria where

cassava production is about the most common crop enterprise. Cassava is not grown sole. It is always grown in mixture with other crops like maize, yam and vegetables (NAERLS, 1999). The cassava/maize mixture is the most popular intercrop. Cassava is also often intercropped with low growing crops (planophiles) such as cowpea, groundnut, egusi (melon) and fluted pumpkin (Ekpe, 1998). Some of the advantages of growing these planophiles with erectophiles (erect growing crops) like cassava include: increased total land productivity, improved total caloric yields/unit area/unit time and better weed control (Ikeorgu, 1984).

The critical period of weed interference in cassava production is between 8-12 weeks after planting (WAP) (Unamma, 1983). Uncontrolled weed growth has been shown to depress yield of cassava tubers by as much as 50% (NRCRI, 1983). In cassava production, weed control has been re-

ported to represent as high as about 45% of the total production outlay (NRCRI, 1985). Earlier recommendations have shown that intercropping cassava with maize and egusi did not require any other type of weed control measure (NRCRI, 1983). This crop combination gave as good yield of cassava as cassava intercropped with maize with two hand weedings at 3 and 8 WAP. If no low growing crop is included for weed control, the pre-emergence application of herbicides e.g. Primextra (4kg ai/ha) could be as effective as 2 hand weedings at 3 and 8 WAP (Unamma, 1983).

These recommendations based on experimental field plot trials require to be verified under large scale field conditions. This necessitated the trial: "Cost Effectiveness of Weed Control in Cassava (TMS 30572) intercropped with Maize and Egusi", hereby reported.

## METHODOLOGY

The data used for the study were obtained from field trials conducted at the University of Uyo farm in Akwa Ibom State of Nigeria during the 1997 and 1998 cropping seasons respectively. Three hectares of

ploughed, harrowed and rigged land was divided into three one hectare units. The first one hectare was planted up with cassava (TMS 30572) intercropped with maize. Weed control in this unit was 2 hoe-weedings (T1) at 3 and 8 weeks after planting (WAP). This served as the control plot. The second one hectare unit was equally planted up with cassava (TMS 30572) intercropped with maize. Pre-emergence application of Primextra-a herbicide applied after planting at the rate of 4kg active ingredient/hectare (4kg. ai/ha) served as the second weed control option (T2). There was no hoe weeding. The third one hectare unit carried cassava (TMS 30572) intercropped with maize and egusi (melon). The egusi (melon) planted at 20,000 stands/ha served as the third weed control option (T3). There was no hoe weeding and no herbicide application.

In 1997, the crops were between 3<sup>rd</sup> and 5<sup>th</sup> of May. In 1998, the planting was done between the 12<sup>th</sup> and 14<sup>th</sup> June. The cassava was planted at the crest of the ridge at a plant population of 10,000/ha (1m x 1m). The maize was planted at a spacing of 1m x 1m at 3

seeds per hole and later (2 weeks after planting) thinned to 2 seeds per hole to give a population of 20,000/ha. Maize was planted 2/3 down the ridge at a spacing of 1m x 1m and 2 seeds per hole to give a plant population of 20,000/ha. Egusi was planted

at 2 seeds/hole at the base of the ridge on the side opposite the maize, spaced 100cm apart to give a plant density of 20,000/ha. Fertilizer, NPK 15:15:15 was applied at the rate of 400kg/ha (i.e 8 bags of 50kg per hectare) at 3 WAP. The cost of the inputs used in

**Table 1: Partial Budget Analysis For Different Weed Control Technologies at Uyo 1997/98**

Benefits/ Variable	Weed Control technologies					
	T2		T1		T3	
	Yield	Value N'000	Yield	Value N'000	Yield	Value N'000
A) Revenue						
Cassava tubers (t/ha)	22.30	26.80	22.47	26.97	22.15	26.59
Cassava sticks (bd/ha)	315.00	23.62	301.50	22.62	294.00	22.05
Maize Grain (t/ha)	1.74	65.50	1.77	66.82	1.57	59.09
Egusi seeds (t)					0.32	31.46
Total Revenue		115.93		116.41		139.19
(B) Variable						
Herbicide (4kg)				120		
Egusi seeds						0.94

(Table 1: Continued)

## Weed Control technologies

Benefits/Variable	T2		T1		T3	
	Yield	Value N°000	Yield	Value N°000	Yield	Value N°000
Maize seeds (25kg/ha)		0.94		0.94		0.94
Cassava Sticks (62bd/h)		4.20		4.20		4.20
Labour						
Planting + Har- vesting						
Maize (12 man- days)		2.40		2.40		2.40
Egusi (16 man- days)		-		-		3.20
Cassava (21 mandays)		4.20		4.20		4.20
Herbicide appli- cation (2 man- days)		-		0.70		-
Fertilizer applica- tion (mandays)		0.08		0.08		0.08
Hoe weeding (34 mandays)		6.80		-		-
Land preparation (1ha)		3.50		3.50		3.50
Transportation fertilizer + Cas- sava stick)		3.55		3.55		3.68
TOTAL VARI- ABLE COST (TVC)		26.39		21.49		28.77
*Gross Margin (A) - (B)		89.53		94.92		115.42
Gross Margin Over Control				5.39		25.89

each one hectare plot was calculated. Yields of cassava tubers, maize grains and egusi seeds (cleaned and sun dried) were measured in tones per hectare (t/ha). Yields of cassava stems were measured in bundles per hectare (bd/ha). Partial budgeting was used to evaluate the profitability of the weed control technologies and enabled a choice of cost effective method(s) of weed control. The method involved computation of gross Margin (GM) which is the difference between the total value of production or Total Revenue (TR) and the Total variable Cost (TVC).

Thus:  $GM = TR - TVC$

The total variable cost included all input costs which predictably varie with the use of each technology in checking the growth of weed onl the Cassava/Maize mixture plots (CIMMYT, 1988).

## RESULTS AND DISSCUS- SION:

The mean values of products (revenues) and variable costs incurred in the trials are presented in Table 1. The result shows that gross Margin from production varied with alternative weed control techniques.

The highest gross Margin per hectare (N115,420) was recorded with technology 3 which is use of egusi weed control; while the traditional 2 hoe-weeding gave the least (N89,850) per hectare (Technology 1). The use of Premextra (technology 2) equally gave a high gross Margin of N94,920 per hectare. It appears from this result that as more crops enter the cropping system in form of planophiles or cover crops and as less costs were incurred in the conventional mechanical or chemical control of weed, mixed cropping becomes potentially more profitable.

The planophiles when planted to suppress weeds performed another role of increasing net farm income. It added to the revenue by diversifying the saleable farm product(s) and cogserving soil nutrients which otherwise could be eroded from the reach of crops. Technologies 1 and 2 averaged about the same gross benefit for the two years, (N115,930 for T1 and N116,410 for T2). The highest revenue of N139,190 was realized from technology 3 due to the additional revenue from egusi. Total variable cost was highest(26,390) with technol-

ogy 1 and least (N21,490) with technology 2. This shows that hiring of farm labour in technology 1 involved much additional cost than the purchase and application costs of chemical herbicide. The choice of chemical control of weeds in the cassava/maize intercrop system will depend on availability and correct use of the herbicides. A correctly used herbicide should be effective for the time required for the control of weed but should disappear as soon as possible thereafter, (Ikemefuna, 1999).

Table 1 further shows that adoption of either technology 3 (use of egusi in weed control) or technology 2 (use of primextra – a herbicide in weed control) in place of technology 1 (the traditional 2 hoe-weeding) is justifiable since the value of the Gross Margin of the two technologies (T3) and (T2) over the control (T1) were positive, (N5, 390 for T2 and N25890 for T3).

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