CASSAVA: A FOOD CROP IN THE WAU VALLEY

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INTRODUCTION

Cassava, *Manihot esculenta,* has long been cultivated in Central America and Brazil. More recently it was introduced to Africa, Asia and the Pacific Islands. It has become an important subsistence crop in Africa. Because it is so easy to cultivate and gives such a good output on low-fertile soils, cassava is now growing in importance as a staple in the Pacific Islands, including Papua New Guinea.

Cassava was introduced to the Wau Valley very recently. After only a short time for selection, several suitable varieties are now grown as a useful food crop in subsistence gardens around Wau. However, compared with the traditional staples of taro, yam and sweet potato, cassava is still a minor crop.

THE HISTORY OF CASSAVA IN THE WAU VALLEY

The traditional landowners of the Wau Valley, the Bianghi, can clearly remember the first cassava brought to Wau. White goldminers introduced it near Kilolo Creek, for the purpose of feeding their animals. The Bianghi saw that the tubers could be eaten. They saw also how to prepare and cook them. After sampling some cooked cassava, a few villagers took cuttings from the plants during the night, and planted them in bush gardens far away from Kilolo Creek.

This original variety became well known in the area and was widely grown. Traditionally, the best places to plant cassava were on ant mounds, clear land free of old stumps, or at the edges of gardens.

A second variety was brought to Wau from the coast. This type was tall, non-branching, and had bright red stems. The tuber was 'hard' when boiled or roasted.

After World War Two, a cassava known as the 'pig variety' was planted on a coffee plantation, and brought to the villages. When people tried to eat this variety, they became very sick and it became known as the poison variety. It is no longer grown in the area.

Three other varieties were also introduced. One was an ornamental type which produced no tubers. It was used as a shade crop and is still seen near villagers' homes in Kaisenik. The types preferred by the villagers are the high yielding 'yellow' and 'green' varieties. The yellow type with its sweet, soft, yellow flesh, yields the best of all.

Goaru Nalu inspecting a local variety of cassava

THE CASSAVA PLANT

Tubers of cassava contain a very toxic substance called hydrocyanic glucoside (HCN). Proper cooking removes most of the HCN though a second boiling in fresh water is sometimes needed.

The 'poison variety' from the Wau Valley probably contained a lot of HCN and may have been a 'bitter' variety. It made people sick when it had not been cooked long enough.

All varieties in Papua New Guinea are thought to be the 'sweet' type. These plants are ready to harvest at 9-12 months. Their potential yield is high. Only two or three tubers are harvested at a time. The whole plant is never dug up. Some varieties grown on relatively infertile soil at Wau, yield 30-40 tonnes of tubers/ha/crop.

The young leaves of cassava are rich in protein. They also have useful amounts of other nutrients. Table 1 compares cassava with other common leaf vegetables. The leaves are not normally eaten at Wau, but when the village women tried them, they were found to be quite acceptable. Wider use of this highly nutritious green vegetable could improve the health of both children and adults.

GROWING CASSAVA

Some general recommendations for cassava production are made in the article by Barry Holmes in HARVEST Volume 6(3):128-133.

Cassava does not require very fertile land, but the soil should be well drained, and there should be enough potassium. Potassium is usually supplied with wood ashes.

TABLE 1. CASSAVA LEAVES COMPARED TO OTHER GREEN VEGETABLES (PER 100 g EDIBLE PORTION)

Vegetable	Protein (g)	Calories	Calcium (mg)	Iron (mg)	Vitamin A (mg)	Vitamin C (mg)
Cassava	6.9	60	145	2.8	8.3	80
Abika	5.5	95	580	3.0	9.0	118
Amaranthus	5.2	43	340	4.1	7.7	120
Karakap	4.6	44	215	4.2	1.7	30
Choko tips	4.0	25	60	1.4	1.5	25
Watercress	1.7	18	115	1.9	1.0	45
Cabbage	1.6	22	39	1.2	0.5	43
Lettuce	1.7	14	25	0.8	0.3	17

Cassava has little resistance to cold, but can stand long periods without water.

The most important factor for good cassava production is planting fresh setts (stakes) from healthy, mature plants. At Wau, setts of 30 cm cut straight at both ends gave best results. Planting setts vertically gives even root development and faster growth, and protects the plant from falling over in the wind. In ridged or mounded soil, horizontal planting (laying stakes flat), 5-10 cm deep, will give good yields, especially if short setts have to be planted. The village women traditionally plant the setts at a 45° angle and claim this method to be superior.

Setts can be stored safely for several months, if they are put in a dry hut and covered with soil.

If weeds are controlled during the first three months, yields are greatly improved. Interplanting with peanuts or a similar crop results in excellent ground cover. This will help to keep out weeds and keep in moisture.

Cassava interplanted with peanuts gives a good ground cover.

A DISEASE PROBLEM AT WAU

The high-yielding 'yellow' variety which was growing in the agro-forestry garden at the Wau Ecology Institute, became heavily infected with the fungus *Colletotrichum gloeosporiodes*. How was this fungus introduced?

The experimental garden has many fruit and nut trees interplanted with other food crops. One of these trees is avocado. The avocado is known to act as a host plant for this fungus. The fungus can live in various parts of the tree, and fungus spores are spread by rainsplash.

Cassava leaves showing symptoms of the fungus disease.

The first cassava plants to show symptoms (signs) of infection were next to an avocado tree. This probably started the spread of the sickness throughout the garden.

The best way to prevent the disease from spreading is to plant only disease free material from healthy plants. The drop in yield with the first attack is usually minor.

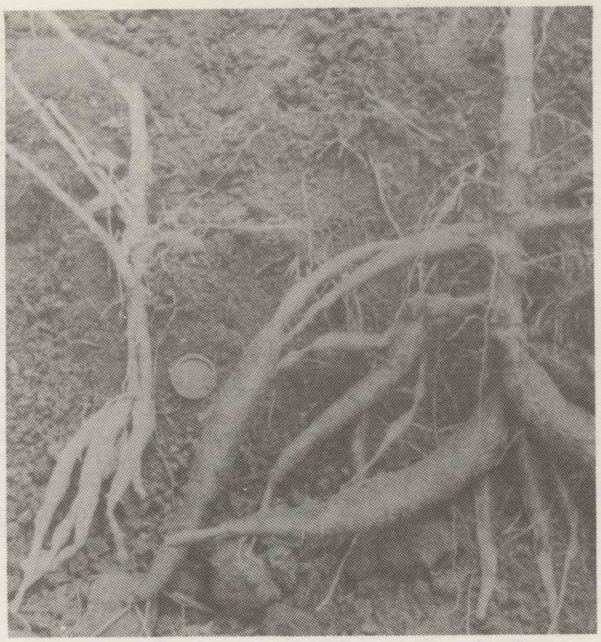
However, replanting the same material again will cause a significant yield reduction.

TESTS ON CASSAVA VARIETIES

In June 1980, Barry Holmes, at Kuk Agricultural Research Station, supplied the Wau Ecology Institute with a selection of varieties of cassava. We planted each variety in a separate mound in the ground. We wanted to compare the varieties for yield, and for resistance to the fungus.

A tall, thin variety of cassava tested at the Wau Ecology Institute.

None of the varieties was completely resistant to the sickness. However, some were only slightly affected. In the worst cases, the plants showed dieback of leaves, and the yield of tubers was greatly reduced. Yet, in other cases, scars formed on the stem but the plant remained quite healthy. The resistances of the different varieties are given in Table 2.



The cassava tubers on the right are healthy. Those on the left are the same variety, infected by the fungus.

We also compared the varieties for yield. Not all varieties were grown under identical conditions, but we think that the results are still useful for comparison. The results are shown in Table 2.

Of all the varieties tested, the local 'yellow' variety from Wau gave the best yield. The villagers tend to prefer varieties with yellow flesh as a food crop. Some of the highest yielders were also the best eating ones.

The only two of the Kuk varieties which we would recommend for introduction to Wau are 9 and 31. No variety was completely resistant to fungal attack. Therefore, the most important way to prevent the spread of the cassava fungus will be through careful growing practices. For example, Farmers should plant cassava well away from trees such as avocados, which are carriers.

The yields we obtained at Wau were very different from those

TABLE 2. A COMPARISON OF VARIETIES OF CASSAVA

Variety number (given from Kuk)	Description of variety	Disease resistance **	Yield of 2 average healthy plants(kg)	Other comments
1	Large leaf; Red petiole	3-4	4.5	
2*	Tall; Dense leaves; Minor branching; Red petiole	4	7.1	Yellow flesh
3	Short; Green petiole; Top branching	4	4.5	
4*	Tall; High branching; Long leaf; Green petiole; Dark brown stem	4-5	5.4	
5	Tall; Thick stem; Top branching; Dense leaves	3-4	6.7	
7*	Tall; High branches; Purple petiole; Wide leaf; Light brown stem	3	6.7	
9*	Golden stem; Tall; High branching; Green petiole	2	13.0	Yellow flesh
12	Green petiole; Tall slender stem; Top branching	2	4.4	
30/32	Green petiole; Top	1-2	1-1.5	Very poor production
31*	Crooked stem; Red petioles; Low branching	3	10.7	Soft, white, flesh; Cooks quickly
Siasi	Long thin leaf; Narrow stem; Quick maturing; Red petiole	3	3.4	A preferred variety
Institute* yellow (from Wau)	Moderate height; Red petiole; Low branching	3-5	16.4	Yellow flesh

* The yields of these varieties were tested under identical conditions.

** Disease resistance: 1 = no damage; 2 = light damage; 3 = moderate damage; 4 = heavy damage; 5 = some dieback of plants.

at Kuk Agricultural Research Station. Apparently, a change of environments has a significant effect on the variation of yields. The varieties which performed best in Wau, did poorly at Kuk, and the reverse was also true.

Growing cassava varieties under your own environmental conditions will determine which are most suitable for local distribution.

ANOTHER USE FOR CASSAVA

On a very steep hillside in the Bulolo gorge, Morobe Province, sweet potatoes are planted on the treeless slopes. Each small garden is separated off by a closely planted row of cassava along the contour. From a distance the hillside almost looks terraced. This helps to protect the well dug soil from washing away.

CONCLUSION

Cassava has an expanding role to play in food gardens around Papua New Guinea. Not only can it protect the soil, but it also supplements the other staple crops and could add a nutrititous kumu to the diet.

FURTHER READING

Atlee, C. (1980). *Agronomic Practices for Cassava Production: A Literature Review.* C.I.A.T.

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Thaman, R.R. and Thomas, P.M. (1981). The cassava invasion: The cultural, nutritional and ecological impact of cassava on Pacific island food systems. *Proceedings of the Second Papua New Guinea Food Crops Conference, 1980.* (In press.)