COMPOST INCREASES SWEET POTATO YIELDS IN THE HIGHLANDS

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INTRODUCTION

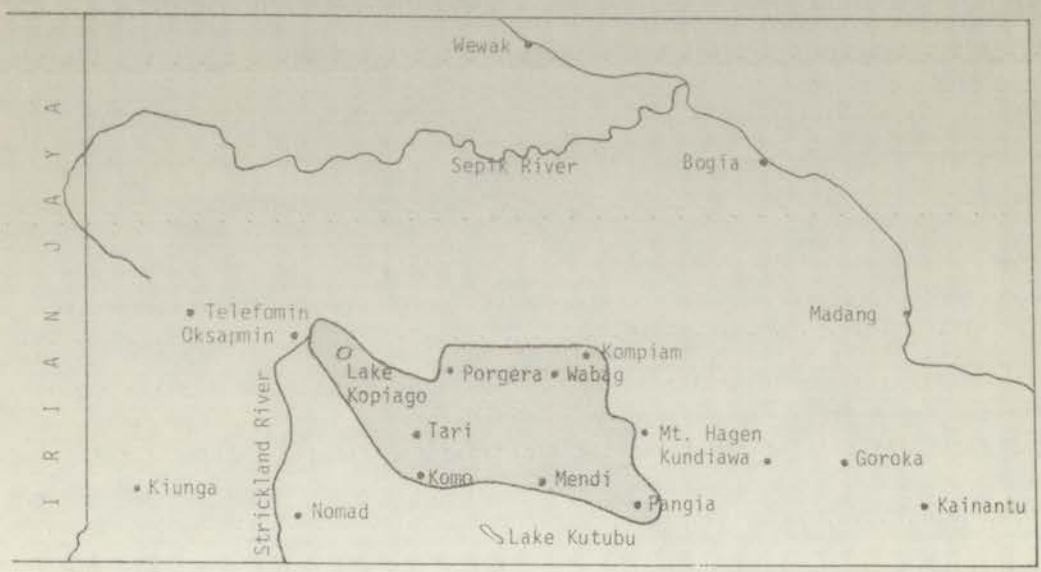
Composting of sweet potato is a traditional technique that is used by subsistence growers in parts of the highlands. When using this technique people place old sweet potato vines and leaves, weeds and grass in a mound and cover this with soil. The sweet potato vines are planted in the mound.

The area where the technique of composting sweet potato mounds is used starts just to the west of Mt. Hagen and goes as far west as the Strickland River. People use the technique as far south as Komo, Mendi and Pangia and as far north as Kompiam and Porgera. Hence it covers the main populated parts of the Enga and Southern Highlands Provinces. The area where the technique is used in Papua New Guinea is shown in the map below.

TRIALS DONE

Four trials have been done in the highlands to see whether composting really increases sweet potato yields as the village people believe.

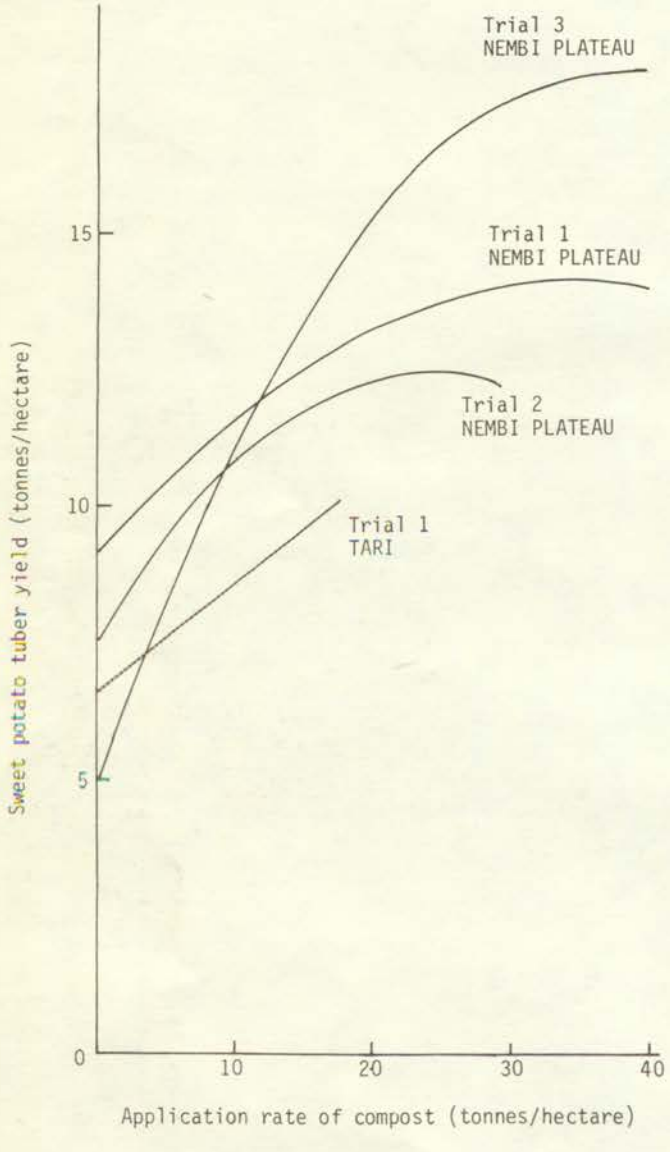
Three of the trials were done by Euclid D'Souza on the Nembi Plateau. This area is south-west of Mendi. The altitude where the trials were done is 1650 to 1700 m. On the Nembi Plateau, people use only very small amounts of compost, if any at all.



The area in the highlands where composting is traditionally practiced

The other trial was done at Piwa Agricultural Station (1620 m) near Tari by Andrew Wood. Composting is a traditional technique in the Tari Basin. Mr. Wood was a member of the Geography Department of UPNG at the time he did the trial.

In all four trials compost gave large increases in sweet potato yields. The results of the trials are shown in the diagram below. On average over the four trials, an application rate of 30 tonnes of fresh compost per hectare almost doubled yield. The average yield increased from about 7 tonnes of sweet potato per hectare without compost to 13.5 t/ha with compost. A rate of 30 t/ha is the same as 3 kg/m^2. Full results are given in the paper by D'Souza and Bourke (in press).



Effect of compost on sweet potato tuber yields, Nembi Plateau, and Tari, Southern Highlands Province

HOW COMPOST WORKS

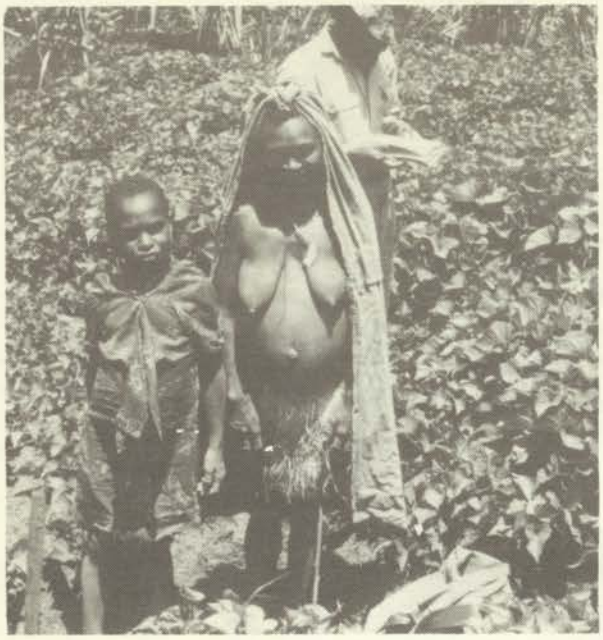
Compost increases crop yields in a number of different ways. First of all it adds organic matter to the soil. Organic matter is very important for good crop growth for many reasons. Compost also makes the soil less dense (i.e. less heavy). This is especially important for good tuber production with sweet potato. As the grass and weeds break down, they release food to the plant. On the Nembi Plateau, our research showed that it is the addition of potassium that is especially important in increasing sweet potato yields.

Compost has two other effects as well. Experiments by Dr. E. Waddell near Wapenamanda and Mr. A. Wood near Tari have shown that compost warms up the mound.

This is important at very high altitudes. It also holds moisture in the soil and helps plants do better in drought.

RECOMMENDATION

These four trials have shown that the traditional technique of using compost in this part of the highlands is a very good one. Based on these trials we recommend that compost can be applied to sweet potato at a rate of 20-30 tonnes of fresh material per hectare (t/ha). This should be applied every time a crop of sweet potato is



Horticulturist Euclid D'Souza makes recordings in a village composting trial on the Nembi Plateau. The woman in the photo is the owner of the garden. In four trials on the Nembi Plateau and in the Tari Basin of the Southern Highlands, composting almost doubled sweet potato yields.

replanted. This is the same as 2-3 kg of fresh material per square metre. People use different size beds and mounds in different parts of the highlands. Hence this recommendation is made per square metre, not per mound. For a typical mound that occupies about 10 m^2, 20-30 kg of fresh material would be needed.

An application rate of 20-30 t of fresh material per hectare sounds a lot. But this is the amount that people in Enga and Southern Highlands use at the moment. Dr. Waddell recorded that people apply 17 t/ha near Wapenamanda. At a very high altitude in Kandep District, Dr. Paul Wohlt found that people were using 29 t/ha of compost.

MAKING COMPOST

In the trials reported here, the traditional technique used in the highlands was tried. This is different from the techniques used in other parts of the world where the compost is made in a separate heap, away from the garden. For more information on this technique see the article 'Making compost' by A. Leng in this issue of HARVEST, or the article by D. Franklin.

This is how Enga people make compost in the Lai Valley near Wabag and Wapenamanda: People plant their crop of sweet potato in large mounds which can be 3-5 m in diameter. After the women have finished harvesting all of the sweet potato from a mound, it is opened up. Then old sweet potato vines and leaves, weeds and grass brought in from outside the garden are thrown into the centre of the

Men in the Tsak Valley of Enga Province heap grass to make a sweet potato mound. Later, soil will be placed on top of the compost to finish the mound. This technique is used widely in the Enga and Southern Highlands Provinces.

mounds. This is allowed to sit for up to 10 weeks. Then the compost is covered with soil to make the new mound. This is preferably done on a dry day. The women then plant new sweet potato vines in the mound straight away.

The technique changes a little from place to place. The mounds are smaller on heavier soils and when gardens are made in woody regrowth, such as in the Porgera area. In the Kandep Basin, Tari Basin and areas to the west, the new mound is made between the old mounds, not the same place. In these places the grass and old vines are placed in a heap on the soil surface. Later, soil is piled on top of the compost.

In some of the trials done in the Southern Highlands, mounds were closed up straight after the grass was added. In other trials, it was allowed to rot down for 6-8 weeks before the mound was closed. The technique used did not appear to change the results much. In the trials done on the Nembi Plateau, traditional square mounds were used, not the circular mounds which are usually used in the traditional composting areas.

OTHER PARTS OF PAPUA NEW GUINEA

Does this sort of composting work elsewhere in Papua New Guinea? It has been shown to be a good technique on the Nembi Plateau and Tari Basin in the Southern Highlands and on the Gazelle Peninsula of New Britain (Leng, 1982). All of the sites where it has been tested have been heavily cropped and have been on volcanic ash soils.

Composting has been shown to work in both the lowlands and highlands. It is a traditional practice over a wide range of altitudes (1300-2850 m a.s.l.). We expect the technique to work elsewhere in Papua New Guinea but more experiments are needed to test this.

There are some places where composting is not likely to work. On soils that are already very high in organic matter, composting may increase the top growth of sweet potato and reduce the tuber yield. On very steep slopes, it might lead to soil erosion because the soil has to be tilled to form mounds. Where land is used for one or two crops only before it goes back to fallow we would not expect it to be such a useful technique. This is because the soil fertility would still be high after a fallow or one crop only.

CONCLUSION

This way of making compost was made up by the village people themselves in parts of the highlands. The experiments done so far show that it is a very good technique. We think that it should be tried out much more widely in Papua New Guinea.

FURTHER READING

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