

## POST HARVEST HANDLING - 2.

### GETTING YOUR PRODUCE SAFELY TO MARKET

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#### INTRODUCTION

In the first article on post-harvest handling we talked about why fresh produce is 'perishable'. Some things that farmers can do to keep their produce in good condition immediately after harvesting were discussed.

In this article, we will talk about some steps that farmers can take to protect fresh produce while it is on the way to the market either the local produce market, or a wholesaler or store in one of the urban centres of Papua New Guinea.

The main things to consider are packaging and transport.

#### PACKAGING

Good packaging makes it possible to move produce over long distances and still maintain the quality. In Papua New Guinea, very little attention has been paid to packaging by vegetable growers. The result has been that our produce reaches the market looking less fresh than produce that has come all the way from Australia or other countries. Farmers should realise that packaging is part of the cost of production just as seeds and fertilizers are.

Good packaging has the following advantages:

- It makes handling the produce a lot easier
- It makes storage easier and allows you to make better use of space

- It protects produce from mechanical damage
- It protects produce against water loss
- It keeps the produce clean
- It may help to prevent stealing
- It reduces the cost of transport and storage

#### Some rules for good packaging

Follow these rules to get the best results

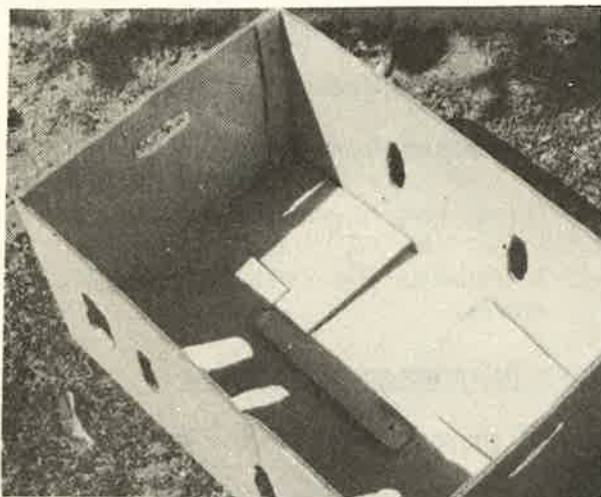
1. Grade your produce before you pack it. Only the best possible produce should be packed for transport to markets. Do not pack damaged or diseased produce with healthy produce - the whole lot could end up diseased or rotten.
2. Boxes should be water resistant - that is, they should not collapse when they get wet. Boxes made from corrugated board - e.g. beer cartons - collapse very quickly if wet produce is put into them, or if they get rained on.
3. The containers should have holes in them so that the produce can breathe and so that field heat can be removed.
4. The containers should be a convenient size to handle. For leafy greens,

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*Beer cartons collapse very quickly if wet produce is put in them or if it rains on them.*



*Containers should have holes in them so that the produce can breathe.*



*Containers should be strong enough to stack at least 3 or 4 on top of each other without collapsing.*

containers should not hold more than 16-20 kg, and for soft fruit like tomatoes, they should hold no more than 10 kg. Containers for soft fruit should be no more than 120 mm deep.

5. Containers should be strong enough to stack 3 or 4 on top of each other, when full, without the bottom one collapsing.
6. The containers should be light, especially if produce is going to be sent by air.

Below are some hints for packaging fruit and vegetables which are commonly marketed in Papua New Guinea.

#### Sweet potato

Sweet potato is usually put into hessian bags. This method is satisfactory, but if they are packed in plastic bags with plenty of airholes in them, the water loss is much less.

#### Lettuce

Pick lettuces when they are still a bit loose in the head. Very tight lettuces tend to spoil faster. Pack them in boxes of 16-20 kg, and cool them as soon as possible.



*Pick lettuces when they are still a bit loose in the head.*



### English cabbage

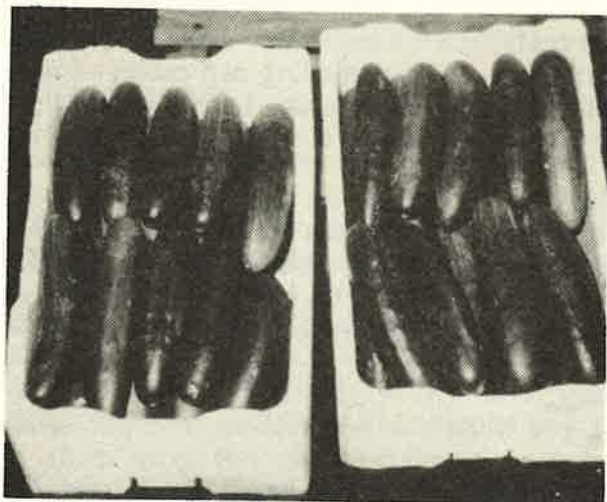
You should pick cabbages when they weigh 1-1.5 kg, although they can grow up to 8 kg. Cabbages can be packed in mesh bags. Some farmers use coffee bags. However a coffee bag full of cabbages is too heavy for one man to manage on his own. This can lead to rough handling and damage.

### Cucumbers

You often see cucumbers packed into mesh or flour bags weighing up to 70 kg. Although cucumbers are easy to grow, they are also easily bruised. If you want to sell your cucumbers, they should be well presented in boxes weighing no more than 20 kg.



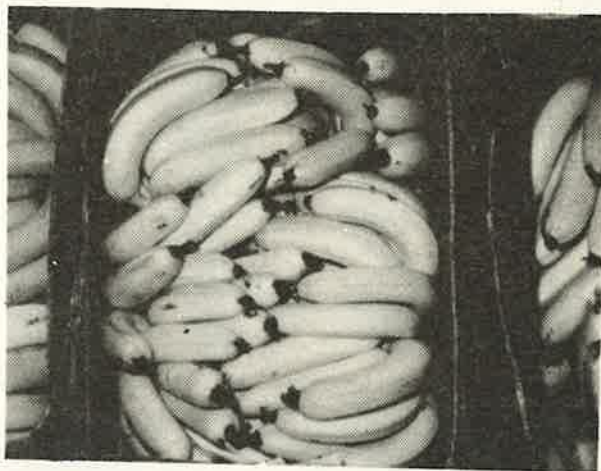
*Cucumbers are often packed in sacks weighing up to 70 kg.*



*To prevent losses, cucumbers should be well presented in boxes weighing no more than 20 kg.*

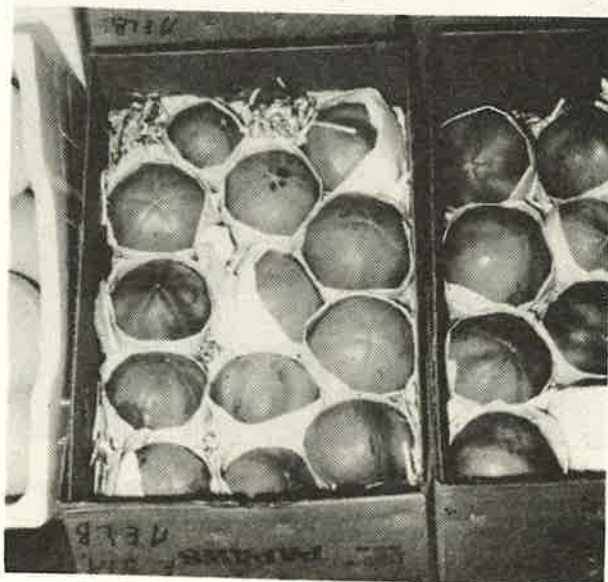
### Bananas

Of all the fruits and vegetables grown in Papua New Guinea, bananas are the most easily bruised and the most often damaged. Ideally they should not be touched by hand at all. This is not possible in Papua New Guinea. However, farmers should observe simple techniques such as using shoulder pads when carrying bunches; and laying the bunches on plastic foam when transporting by truck. For transporting long distances, bunches should be separated into hands and packed in boxes, as shown in the photograph below.



### Pawpaws

Pawpaws are also very easily damaged. Pick pawpaws with a small amount of yellow colour showing. The safest way to transport them is to pack them standing on their stem end in boxes, as shown here:



## TRANSPORT

One of the special problems that Papua New Guinea faces in the fresh produce industry is transport. Transporting fruit and vegetables from the areas of production to the markets can be quite complicated.

There are four methods of transporting produce - by road, by air, by boat and by foot. Let us consider these one by one.

### Transport by road

In Papua New Guinea there are no specially designed refrigerated trucks to carry fresh foods. The vehicles used normally are PMV's (Public Motor Vehicles) - which can be buses, utilities or trucks. PMV's are designed to carry people, not cargo. Damage can occur in the following ways:

1. People sit on the produce. Bananas and sweet potatoes often get bruised because of this. People think they make good firm seats. However they are easily damaged.
2. Produce is stacked up in containers which are not strong enough, so they collapse.
3. Vibration damage occurs when travelling over rough roads. The damage is greatest in loosely packed boxes.



*Damage to produce results from poor packaging and temperature increases.*

4. Produce can become hot, from the heat of the engine and the sun.

The following steps could reduce the damage:

1. Where possible, all produce to be transported by road should be packed in boxes.
2. In the case of bananas, if packing is not possible, then the bunches should be hung up.
3. Stack up produce as close to the cab as possible. There is less vibration there than at the end of the tray.
4. Boxes should not be stacked more than 2 high.
5. If the road surface is uneven, the vehicle should be driven slowly to reduce jolting.
6. If the farmer owns his own truck, he could consider using softer springs and reducing the air pressure in the tyres.
7. Keep produce under cover all the time.

### Transport by air

Air transport is often the only way of getting produce to market quickly. However, it is expensive. Often it far more than doubles the cost of the article to the consumer.

Aircraft offer a smoother ride for produce but loading and unloading can cause a lot of damage. All produce travelling by air should be well packed in strong containers.

Produce is usually on the aircraft for less than two hours. But it can spend a long time sitting on the airstrip waiting for the aircraft or waiting to be picked up. In this case damage can result from increases in temperature.

If you must use aircraft to transport your produce to market, do not grow fruit or vegetables which can be grown where the market is. Your produce will be too expensive.



### Transport by boat

Transport by boat gives a smooth ride, and it is very cheap. The biggest problems are high temperatures, and damage from water.

Quite a lot of produce is carried by canoe, but very little has been successfully carried by large coastal ships. It is suggested that farmers do not attempt to ship anything except potatoes, sweet potatoes and pumpkins. Pack them in coffee sacks. Potatoes and sweet potatoes should be cured for at least 3-5 days before hand. 'Cured' means being held at a temperature over 30°C in high humidity so that the skins become tougher (see p. 97 of this issue).

Where possible stack the bags in open-sided containers, or in ordinary containers with the door left slightly open. Do not stack produce on the deck where it may get wet, or in holds above the water line where it gets very hot.

### Transport by foot

All produce is transported by foot at some stage. Farmers who grow fruit or vegetables on a small scale may have to walk several kilometres over rough terrain with their produce in a bilum. Soft containers like bilums are constantly moving under the weight of the produce, and soft items are easily crushed. If you are carrying a mixed load, put the heavier items at the bottom.

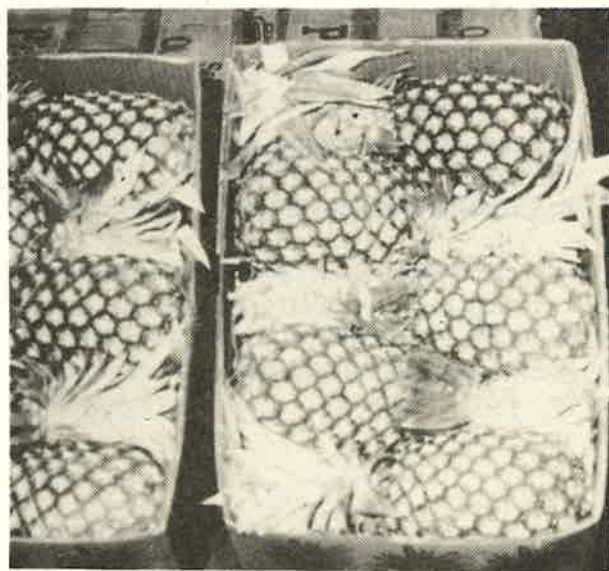
Do not overload your bilum.

### **CONCLUSIONS**

In order for fruit and vegetable growers in Papua New Guinea to gain maximum benefit from the introduction of the quota system for fresh produce imports, it is very important that local produce reaches the stores and markets looking as fresh and attractive as possible. People will readily buy, and even pay high prices for, well packaged, good quality fruit and vegetables.

Because of the difficulties of transport in this country it is essential that the farmer:

- (a) makes sure that only the very best produce is sent to markets in the main urban centres.
- (b) makes sure that this produce is handled and stored in the proper way after harvest.
- (c) makes sure that the produce is properly packed in appropriate containers.



*Make sure that produce is properly packed in appropriate containers, like these avocados (top) and pineapples (bottom).*

## AN EXAMPLE: KIN'S VEGETABLES

Finally let us consider the case of a typical highlands farmer; we'll call him Kin.

Kin lives in the Western Highlands province. He has some good land, which is one hour's walk from the road to Mount Hagen. Once at the road it is about a one hour drive into town. Kin has found that with a little care, and help from D.P.I., he can grow very good vegetables on his land. He decides to grow vegetables like cauliflowers which he hopes will eventually be sold in Lae or Port Moresby.

This is the story of what happens to Kin's vegetables before they get to the markets.

- Kin gets up very early one morning and harvests a lot of cauliflowers.
- He packs everything in bilums and he and his family carry it to the road.
- Here, Kin waits almost an hour for a PMV. Unfortunately Kin cannot afford his own vehicle yet. The sun is up now and it is getting quite warm.
- On the PMV, Kin tries to keep his bilums out of everyone's way. But it is a long bumpy drive. Somebody sits on one of them.
- In Mount Hagen, Kin carries his heavy load to the buying centre. Here the vegetables are emptied out, graded and weighed. Kin is paid, but the vegetables still have a long way to go.
- The produce is repacked, then held overnight in a coolstore, with a lot of produce from other farmers. Some will go to Lae by truck, and some by plane to Port Moresby. Kin's vegetables

happen to be going to Port Moresby this time.

- They are taken to the airport by truck, and then sit on the tarmac for 2 hours before being loaded onto a morning flight to Port Moresby.
- Once in Moresby, the produce waits on the tarmac for 3 hours before being loaded onto trucks and delivered to the wholesaler's coolstore.
- Late that afternoon someone buys the produce and transports it in a utility to his store a few kilometres away.
- The produce is finally sold to consumers the next day.

You can see that at every step in the story some damage and wastage of Kin's vegetables can occur. If Kin is careful: for example, he packs only the best produce, keeping back damaged and diseased vegetables for home consumption, he does not overload his bilums, and he takes care that people do not handle them roughly or sit on them - then the vegetables will still be in reasonable condition when they get to the buying centre.

If the buying centre, transport operators and wholesalers are also careful about packaging and transport, then the vegetables will still be reasonable when they finally reach the consumer.

Farmers like Kin, as well as vegetable wholesalers, retailers and transport operators should realise that with a little bit more care they can all make more money from fresh produce - and the consumer will get a better product.