Caring for the harvest: back to basics

Ramon A. Diño

Mango (Mangifera indica). Source: Plant Resources of South-East-Asia, Vol. no.2. Pudoc, Wageningen. 1991.

For years, extension in the Philippines has focused on improving production. The farmers appreciated the increased yield, but did not realize that these increases often were lost again as a result of huge post-harvest losses. Typical post-harvest losses in the Philippines were estimated to be somewhere between 28 - 42 percent. When this estimate was released in the early 1980s, the Department of Agriculture initiated a research and extension programme to help farmers reduce the losses and change the equation of farmers' livelihoods.

In recent years, decentralization of agricultural services has meant the transfer of research and extension services to local governments, which often have a low priority for agricultural development. Agriculture and Fishery Councils (AFCs) at national, regional, provincial, municipal and village levels are now actively working with the Department of Agriculture, for the dissemination of post-harvest technology. Their tasks are twofold: to serve as an advisory council for the agriculture and fishery sectors and to monitor and evaluate the implementation of national programmes in agriculture in their areas of responsibility. Membership of the AFCs is mostly voluntary and includes farmers, NGOs and local agencies, as well as government agency representatives, providing an open line of communication between these different actors, at different levels. Ever since the Department of Agriculture actively promoted post-harvest management, the AFCs have enthusiastically performed their role in advising the farmers of the nature and scope of post-harvest systems.

Through persistent work of extension agents, farmers are now familiarized with the practical means of avoiding post-harvest losses. They are encouraged to come up with their own practical applications of the concepts that are taught, improving on the basics as they go along.

Fruit and vegetables – focusing on the basics

The improvements that have been gradually introduced into fruit and vegetable production illustrate the types of efforts being made to reduce crop losses and increase their post-harvest storage and shelf life. Improvements were realized by combining the basics: determining the right stage of maturity for harvest and taking greater care during harvest and transport to avoid damaging the crops.

A number of simple measures can be taken as early as planting time to help avoid damage during harvesting. Farmers already knew that the post-harvest condition of a crop should be taken into consideration as early as planting time. By distancing rows and hills properly, a farmer ensures that harvesting can be carried out efficiently and with minimal damage to the crop.

Care should also be taken during harvesting when fruit and vegetables are pulled or twisted from stalks or branches (for example tomatoes or mangoes) and when they are being dug up (cassava, sweet potato). The way in which tools are used is also important because if they are used roughly, they will damage edible roots.

When fruit and vegetables are being harvested, they should be kept as clean as possible. The condition of leafy vegetables and stems, for example, will be improved if they are cut instead of pulled. Not only will this save farmers the time and expense of washing off soil and dirt, but the damage caused by such handling will also be avoided. In the same way, fruits like mango should be harvested cleanly. Mangoes drip latex and if they are stored or transported with latex on their skins, they will not only look unattractive to consumers but they will also rot quickly. Special care is needed when handling, storing or transporting fruits that have a delicate skin, such as star apple (*Chrysophyllum cainito*). A torn skin will expose the fruit to microorganism attack and result in rapid decay. For perishable fruit and vegetables, less injury simply translates into better quality and longer life.

Farmers are often surprised at the difference that the time of harvesting can make. Harvesting fruit and vegetables during the early, cool period of the day helps improve storage life and quality. Some fruits, however, like citrus and mangoes, are best harvested in the late morning, because the oil glands of these fruit are full in the early morning, causing immediate discolouration of the peel if they are accidentally pressed or bumped. After harvesting, fruit and vegetables should never be left in direct sunlight. Harvesting under wet conditions is also to be particularly avoided. Wet fruits and vegetables are more susceptible to microbial growth, and soil particles may cling to wet crops, exposing them to soil-borne rot organisms.

Encouraging innovation

In the province of Sorsogon, located on the tropical southern-most tip of the island of Luzon, farmers were introduced to new methods of sorting, packaging and storage to preserve the longevity and freshness of their agricultural products. The farmers were challenged to apply the newly learned techniques and encouraged to use their initiative in modifying them and developing their own techniques.

The more advanced process of post-harvest treatments like irradiation, de-greening (changing citrus colour from green to orange), use of sprout inhibitors and pre-cooling are still beyond the knowledge and means of local farmers, but familiarization with these technologies was provided (theoretically) to farmers in classes, to stimulate their minds to think of locally applicable systems that may approximate, or be adopted as alternatives for these highly sophisticated techniques.

Increasing farmers' post-harvest know-how and enabling them to handle their crops in a cost effective way has had a positive effect on their livelihoods. Not only have they become aware that good results can be achieved by applying precautionary measures, they have also become more alert to other possible problems and dangers. Uneven and roughly paved roads, for example, should be improved so that fruit and vegetables are not bounced around excessively during transportation, causing damage. And if the bins used to hold fruit and vegetables from field to market are filled too full there will certainly be some spillage and loss.

Utilizing waste

In conventional understanding, post-harvest management means the handling of an agricultural product after harvest to prolong storage life, freshness and an attractive appearance. Considering this definition in one farmer group, there ensued a discussion on whether the use of plant parts normally discarded after harvest, such as rice straw and abaca (*Musa textiles*) pulp should be included in the concept of post-harvest systems. There was a general consensus among the farmers that the utilization of harvested products either on the farm (for example organic fertilizers) or to generate income, should be considered as part of post-harvest management, rather than separately as waste utilization.

Farmers in Sorsogon have begun to discover ways and means of expanding post-harvest concepts and in doing so have been able to augment their income. In the town of Gubat, for example, farmers traditionally burned rice straw after the harvest. Now many farmers have started to compost the rice straw into organic fertilizer. Using this fertilizer on their farms reduces input costs and improves the soil, while at the same time avoiding the pollution caused by burning. They also sell the fertilizer to other farmers at a reasonable price.

In Bulusan, the local AFC has refined this process still further. Farmers use the rice straw first as bedding material for mushroom growing and after an eight-week growing period, farmers are able to harvest between six and ten kilos of mushrooms. Apart from the additional income they get from selling mushrooms, important nutrients are added to their household diet. The old bedding material can be recycled as compost and provides an important source of fertilizer for next season's crops.

Results

Improved management has now reduced post-harvest losses in the province of Sorsogon from a previously estimated 28% to around 15%.

The post-harvest programme has also been taken up at the political level and some senators and congressmen have devoted part of their congressional aid fund to help construct warehouses, improve farm to market roads, and build large concrete multi-purpose pavements where farmers can sun dry their rice and maize. Before these pavements were introduced farmers dried their grain on mats or on the road where it can be damaged by passing vehicles, eaten by birds or chickens or stolen by petty thieves.

The adaptations of technology combined with the innovative application of indigenous knowledge and local creativity have enabled farmers to enhance the natural cycle. Efforts to increase farmers' understanding of the post-harvest system have helped to increase their confidence in their own abilities and ideas. As a result, many are now actively contributing to the development of new knowledge, fusing traditional know-how and modern insights to create greater self-sufficiency and food security. ■

Ramon A. Diño. Provincial Agricultural & Fishery Council, Office of the Provincial Agriculturalist, Capitol Compound, Sorsogon City, Philippines 4700. Fax +63 56 211 2155. Email: dknew@hotmail.com

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Handling and storage of leafy vegetables

Paul B. Okon, A. E. Uko and Uche C. Amalu

Leafy vegetables tend to deteriorate quickly after harvest, especially in dry and warm tropical conditions. A number of measures can be taken to maintain their freshness for a few days. In Nigeria, native leafy vegetables such as fluted pumpkin (*Telfairia occidentalis*), waterleaf (*Talinum triangulare*), bush okra (*Corchorus olitorius*) and amaranth (*Amaranthus* spp.) are specially conditioned to avoid rapid deterioration. In the dry and warm Calabar area, farmers harvest during the cooler part of the day, and exposure to the sun is avoided at all times. Stems are cut to equal and controllable length and washed with potable water.

Storage at ambient temperatures

Storage in buckets: Pumpkin and amaranth leaves are bunched up and dipped in a bucket with water, then the tips of the stems are left in the water. Waterleaf and bush okra are not dipped but rather sprinkled. The leaves are covered with a thin polythene sheet and tied to the bucket, which is kept in a cool place. Every day the polythene sheet is removed temporarily and water sprinkled on the leaves. This way the leafy vegetables will remain fresh for about 6 days.

Storage in clay pots: Clay pots of convenient size are washed clean and placed on a firm support. A layer of sterilized (boiled) wet jute bag is put at the bottom of the pot and a wire gauze is placed on top of it. The washed vegetable leaves are laid on top of the gauze and covered with another layer of wire gauze and a second jute bag. This bag is kept moist at all times.

Transport to markets

If the leaves have to be transported to market over a long distance, bunches of vegetable leaves are wrapped in a clean or sterilized wet jute bag that is kept moist. Alternatively, vegetable baskets are made from raffia or other flexible plant material with a smooth surface. The inside of the basket is completely lined with wet jute bags. ■

Paul B. Okon, **A. E. Uko** and **Uche C. Amalu.** Department of Soil and Crop Sciences, Faculty of Agriculture, University of Calabar, P.M.B. 1115, Calabar, Cross River State 540001, Nigeria. Email: pbokon@yahoo.com