

PRODUCTION GUIDE FOR LANZONES

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The lanzones (*Lansium domesticum* Correa) is one of the most wholesome fruits in the tropics. In the Philippines, it is a very popular dessert fruit because of its sweet to sub-acid taste that consumers do not seem to tire of eating. However, the milky juice which exudes from the skin and its bitter seeds sometimes deter people outside the tropics from eating lanzones.

The crop originated from the Malay peninsula and had been introduced in the Philippines during the prehistoric times. It has spread to many parts of the country covering Luzon, Visayas and Mindanao. Recent statistics showed that the Philippines has an area of 20,504.8 hectares planted to lanzones consisting 2,131,196 bearing trees which produced 49,500 metric tons in CY 2010 (Table 1). Among the sixteen regions of the country, the Autonomous Region for Muslim Mindanao (ARMM) ranked first in terms of area planted, number of bearing trees and volume of production. Although lanzones is one of the most neglected fruit crops in the country, it is considered a promising fruit because of its great potential in the local market.

Table 1. Area planted, number of bearing trees and volume of production of lanzones in the Philippines by region, CY 2010.

Region	Area Planted (ha)	No. of Bearing Trees	Volume of Production (MT)
CAR	26	2,055	16.6
Ilocos Region	7.8	183	1.26
Cagayan Valley	27	2,490	84.75
Central Luzon	6	1,912	11.96
CALABARZON	4,321	492,226	1,006.72
MIMAROPA	325	10,932	156.57
Bicol Region	34	4,319	8.11
West Visayas	486	41,302	546.90
Central Visayas	98	20,399	162
Eastern Visayas	187	13,379	719.54
Zamboanga Peninsula	1,936	142,605	11,652.45
Northern Mindanao	3,345	303,855	4,779.15
Davao Region	2,123	299,868	3,951.7
SOCCSKSARGEN	1,318	79,750	930.93
CARAGA	832	22,520	193.85
ARMM	5,433	693,521	25,277.80
TOTAL	20,504.8	2,131,196	49,500

Source: www.contrystat.bas.gov.ph

Botanical Description

The lanzones is a slender and fairly tall tree, 15-30 cm high, with a straight trunk that measures 20-30 cm or more in diameter, slender, upright branches, and an open, irregular crown. The leaves are compound, alternate, 30-40 cm long, and bear 5 to 7 leaflets. The lanzones is a cauliflorous plant and its many-flowered inflorescence are borne either singly or in groups of two or more on the trunk and large, leafless branches. The flower buds are numerous and are widely distributed. The fruits are borne in loose or compact bunches, 10-20 cm long, with each bunch carrying 5-25 or more fruits. The round to oval fruit is a berry with 1-3 seeds, enveloped by a fleshy aril. Some cells may consist of aril tissue without developed seeds. The skin which is green when the fruit is immature and which turns brownish yellow or dull straw as the fruit ripens, is fairly thin but tough and leathery, and contains a milky juice which exudes abundantly when the fruit is not fully ripe.

Food and Medicinal Values

Generally, Lanzones is cultivated for its fruits that contain 60-70% edible portion. The fruit is always eaten fresh but seedless fruit may be bottled in syrup. The sweet to sub-acid taste and the milky juice of the lanzones fruit contains high nutritional value (Table 2). The sweet juicy flesh contains sucrose, saccharose, fructose and glucose which is predominant.

Table 2. Food composition of lanzones per 100 g edible portion

Constituent	Quantity	Constituent	Quantity
Edible portion (%)	68	Phosphorus (mg)	25
Moisture (%)	83.9	Iron (mg)	0.9
Food energy (cal)	57	Sodium (mg)	1
Protein (g)	1	Potassium (mg)	275
Fat (g)	0.3	Vitamin A	-
Total carbohydrates (mg)	14.2	Thiamine (mg)	0.08
Fiber (g)	0.8	Riboflavin (mg)	0.04
Ash (g)	0.6	Niacin (mg)	0.9
Calcium (mg)	19	Vitamin C (mg)	2

The lanzones possess some medicinal properties useful to mankind. Medicinal uses of lanzones are as follows:

1. A decoction of the astringent bark may be use for treating dysentery and malaria;
2. The powdered bark may be used as a remedy for scorpion stings.
3. The resin from the bark may be prescribed for flatulence, swellings and as an antispasmodic.
4. The dried rind of the fruit is burned to drive away mosquitoes, and inhaling the smoke has a soothing effect on tuberculous persons.
5. Tincture prepared from dried rind is useful as an antidiarrhetic.

6. The bitter seeds when ground and mixed with water may be given to children as vermifuge and antipyretic.

The sturdy wood can be utilized for charcoal, house post, tool handles and furnitures.

VARIETIES OF LANZONES

1. **'Paete'**- This variety is characterized having slender stem with upright branches, shiny, dark green leaves. The fruit bunch is long, carrying 15-25 ovoid thin-skinned fruits which contain latex even if it is already ripe. The fruit size is about 3.0 cm long, 2.5 cm in diameter and weighs about 14 grams. It has a total soluble solids of 16° Brix after 3 days from harvest. This cultivar is famous in Camiguin, Gingoog, and Laguna Province. This variety is also common in Davao region grown by indigenous people which they called it Buahhan (Fig. 1).
2. **'Duku'** – This variety has spreading branches, often with dense dome-shaped canopy, with roundish light green leaves. The tree bears shorter spikes, usually with few fruits. The fruits are normally bigger and more roundish with a thicker skin and free of latex when ripe. The fruit is about 3.5 cm long and 3.4 cm in diameter, weighs about 21 grams having 18° Brix total soluble solids. Its thicker skin makes the fruit last for one week after harvest (Fig. 2).
3. **'Longkong'**– This variety is a natural cross between Duku and Paete (Langsat). The leaves are shiny and dark green in color. The fruits which are arranged in long compact clusters are aromatic, unique in taste and almost seedless. The flesh is very sweet (18-20°Brix) when ripe. The fruit is roundish to oblong with a fruit diameter of 3.2 cm and 3.8 cm long and weighs about 25 grams (Fig. 3).
4. **Jolo** – This variety is common in Mindanao most especially in Davao, Jolo, and Zamboanga Peninsula. The fruit is bigger than Duku which is about 3.6 cm long, 3.3 cm in diameter and weighs about 22 grams having 13°Brix total soluble solids. It is sour compared to other commercial varieties but it is widely used as rootstocks because of its bigger and viable seeds. This variety is also common in the forest wherein the seeds are carried by fruit bats.

CULTURE AND MANAGEMENT

Soil and Climatic Requirements

Lanzones can be grown in many soil types but it perform better in sandy loam to clay loam soil, well drained, slightly acidic (5.3 to 6.5) and rich in organic matter. It

is a tropical fruit and cannot tolerate low temperatures. It thrives in humid areas below an elevation of 1,000 meters above sea level. Areas at sea level are best. The tree needs ample amount of water after a couple of dry months to stimulate flowering. Sometimes the flower buds are held dormant for 1-2 years depending on the environmental condition.

Preparation of Planting Materials

Seed Preparation and Germination

Jolo and Duko variety of lanzones can be utilized as rootstock because of its bigger and viable seeds. Seeds from ripe fruits are harvested and extracted after soaking in water for 1-2 days to soften the aril. The aril and mucilages are easily removed by scrubbing with the use of a fish net. Discard the small seeds that are less than one gram. Soak the viable seeds in fungicide solution, air dry and sow in a shaded seedbed or pots containing coir dust as growing medium. Seeds will germinate within 2-3 weeks.

Transplanting and Care of Seedlings

Lanzones seeds are polyembryonic and produce 2-3 seedlings per seed. Choose the bigger seedling with 2 pairs of leaves and transplant in 7 X 11 polybags containing 50% garden soil, 25% decomposed rice hulls, and 25% decomposed chicken dung. Arrange the bagged or potted seedlings in rows and in blocks with 50%-70 % shading using fish nets to avoid wilting and scorching of leaves. Regular watering is necessary especially during dry period to avoid stunted growth of the seedlings. After a period of time the plastic bags are loosened due to the decomposing rice hulls, therefore it is advisable to add garden soil mixed with decomposed chicken dung. The seedlings can be asexually propagated within 7-12 months from transplanting.

Method of Propagation

A. Sexual Propagation

Lanzones may be propagated by seeds; in fact most farms with matured-bearing trees in Laguna, Oriental Mindoro, Jolo, Basilan, Zamboanga, Osamiz, Misamis Oriental and Davao Region are seedlings derived materials. In using seeds as planting materials for production purposes, the seeds should be selected from desirable mother trees that bear sweet fruits and a regular bearer. A good example for seedling tree is using seeds of Duku and Longkong. The disadvantage of planting a seedling is the longer period of juvenility that most seedling derived plants bear flowers within 10-15 years from planting.

B. Asexual Propagation

Lanzones are commercially propagated by cleft grafting utilizing an 8-12 months old rootstock and a scion from registered mother trees. Cleft grafting is best done

towards the end of the rainy season to avoid higher mortality in the nursery. Cleft grafted seedlings with plastic cover during rainy days have higher survival rate which is the same as during dry period. Cleft grafted plants bear flower within 7-8 years from planting.

Other methods of asexual propagation in lanzones are: marcotting, stem cutting, inarching and top working. Some commercial nursery operators are also doing modified atmospheric propagation (coffee tube grafting/conventional cleft grafting) wherein the leaves of the scion are still intact and inserted into the rootstock by wedge or cleft grafting. The joint or union of the rootstock and the scion are tied with a plastic to enhance union and callus formation. The propagules are stored in bulk inside a plastic tunnel or plastic bags for 2-3 weeks.

Field Establishment and Management

Land Preparation

Land preparation is done during the dry season or before the onset of the rainy season to expose the soil from sunlight by deep plowing and harrowing especially when the farm is open and or under coconut trees. As soon as the land is ready, lay-out stakes based on the distance of planting to be used. Under coconut trees, lay-out stakes at the center of the squares to form a quincunx planting system.

In open field, the distance of planting varies depending on the variety to be planted. For Longkong, the distance can be 6 m by 6 m having a population of 300 plants per hectare. For Duku, Paete, Jolo and the sexually derived plants will be wider at 8 m by 8 m apart with a population of 156 plants per hectare. After staking, dig out holes 2-3 days before planting. The sizes of the holes are at least 2-3 times larger than the size of the seedling bag. During holing, take soil samples for analysis that will be used as basis for fertilization.

Planting

Planting is best done during the rainy season. Before planting, check the holes if there is stagnant water. Drain water or construct canals to exit water to the main stream. Mix organic fertilizer such as chicken dung or vermicast with the top soil from the dug holes at 50:50 ratio. Prior to planting, put 50% of the mixture at the bottom of the hole and use the remaining 50% to cover the hole with the planting material. In planting, remove the plastic bag that holds the plant without breaking the ball of earth. This is done by cutting the bottom and the side of the plastic bag using a blade or knife and set the plant in the hole with care.

Shading

Newly planted seedling requires shade to protect them from direct sunlight which causes sun scalding, scorching, and leaf abscission that result to death of the seedling. Shades can be coconut fronds, fish nets and banana leaves with tree guards to protect the plants from stray animals like goats, cows and carabaos. During drier months, it is advisable to cover or wrap the stem of the lanzones with banana leaf sheath to minimize transpiration.

Watering/Irrigation/ Drainage

Newly planted lanzones should be watered regularly during dry period. For bearing trees, irrigation is also necessary to enhance flowering. The root system of matured lanzones is very shallow and when the tree is water stressed for a couple of months and followed by rainfall or irrigation, flowering occurs. Irrigation should be continued until the flowers develop into fruit, otherwise the flowers will be aborted.

Good drainage is needed in promoting growth and maintaining the vigor of the tree. It insures deep and extensive root development, aeration and prevents stagnation of water especially in low-lying areas during rainy period. Construct drainage canals in between rows of the tree with a diameter of 1.0 m (top), 0.5 m (bottom) with a depth of 0.5 m. Maintain the drainage system from time to time for efficient exit of water during heavy rains.

Intercropping, Cover cropping and Mulching

Lanzones is compatible if grown under coconut, banana and cacao. When lanzones are still young, and space are still available for intercropping; sweet potato can be used as cover crop. Leguminous crops like Kudzu can also be used to provide source of organic nitrogen, improve soil structure, conserve moisture, and control the growth of weeds.

Mulching is also important during dry period. The used of chopped banana pseudo stem, coir dust, coconut husk, and rice hull can mitigate the effect of long dry period. These materials are laid down on the soil surface and around the tree trunk (Fig. 4). After a period of time this materials will decomposed and will serve as food nutrients to the lanzones trees.

Fertilization

As a standard procedure, soil sampling must be done before using any inorganic fertilizer. This is to determine the requirement of the soil and plant for its growth and development. Lanzones is a slow growing tree that it requires ample amount of organic fertilizer to sustain the soil condition. During planting, apply basally decomposed chicken dung, cow dung or vermicast at the rate of 5 kgs per tree mix with the top soil removed during holing and put it back to the holes. After 3 months from planting, apply Ammonium phosphate (16-20-0) at the rate of 50 g per tree and repeat in quarterly basis during the first year of growth. In the second year,

broadcast dolomitic limestone around the trunk at 200 g per tree. One month after, apply 200 g per tree of complete fertilizer, i.e. 14-14-14 or 16-16-16 and repeat every quarter. Organic fertilizer in the form of chicken or cow dung or vermicast must be applied every 6 months at the rate of 5 kgs per tree. Cover the fertilizer by mulching using coir dust or rice hull at least 2 inchesthick to protect from erosion especially during rainy season. On the 3rd, 4th and 5th year after planting, apply 4 times yearly 250 to 500 g per tree of complete fertilizer and 5-10 kilograms of organic fertilizer twice a year. On the 6th year, the soil should be sampled for analysis. If the soil becomes acidic due to organic application, it is advisable to apply calcium or limestone before the next schedule of fertilization. The plant in this period is about to initiate flower buds but it will be dormant in 1-2 years depending on the climatic and soil condition. Spray foliar fertilizer with grade analysis of 13-0-46 or potassium nitrate at the rate of 2 kilograms per 200 liters of water. Spraying should be done in the late morning (8:00-10:00 am) when the intensity of sunshine is low to prevent the leaf from scorching.

On the 7th to the 10th year onwards, the trees are already productive, the dosage of inorganic fertilizer should be increased to 1-3 kgs per tree per quarter. The application of organic fertilizer should be also increased to 10-20 kgs per tree every six months. After application of fertilizers, mulching should be done.

Training and Pruning

Sexually propagated plants tend to grow erect when they are not top pruned during vegetative stage. A seedling tree should be cut back when it reaches one meter high to enhance development of jorquettes. This jorquettes will be the primary branch that will allow secondary branch to produce flowers and fruits. Tertiary branches and water sprouts should be removed otherwise if left unattended this will grow into big branches and competes with the main branches for fruit production. Pruning of excess branches also allows air circulation and sunlight penetration inside the tree that prevent growth and development of pests and diseases.

For grafted plants, water sprouts that grow below the graft union should likewise be removed. If not, this will grow faster than the scion and emerge as a seedling rootstock. Asexually propagated plants tend to produce its own jorquettes even if they not top pruned at vegetative stage. Eventually, secondary branches should be removed to provide space of the primary branches and trained to grow downward to open space for air entrance. All wounds incurred during pruning should be painted with water base paint (latex) to prevent from fungal infection. Dead branches, twigs damaged by twig borers should be removed and burned. If not, this will cause death of the tree by boring; tunneling the soft core of the twigs and branches and eventually the tree dies.

Flower and Fruit Management

Flower Induction

For seedling grown trees, flowering usually starts at the age of 10-15 years while grafted trees at 7 years from planting. The flowering season differ from each region. In Luzon, especially in Southern Tagalog, the flowering season is from April to June, and in Mindanao is in January to April. Flower buds are sometimes dormant for 1-2 years and make it alternate bearer depending on the environmental and nutritional condition of the tree.

Lanzones can be enhanced to produce flowers by irrigation, flooding or watering after a period of dry spell. When the tree are stress after exposure to dry period for 30 days and followed by irrigation, dormant buds emerge to produce profuse flowers.

Flower Thinning

Lanzones produces 3-5 flower clusters which result to overcrowding and production of small and deformed fruits. Thin out flowers by removing the outer-shorter cluster buds retaining at least 1-2 clusters. In this case, flower thinning promotes the development of remaining flower into a well formed and large bunch of lanzones fruits.

Fruit setting and development

Lanzones fruits are considered parthenocarpic. The fruits develop even without undergoing pollination. This is the reason why fruits of some varieties of lanzones are seedless. Fruit setting and seediness in lanzones is enhanced due to the presence of ants during flowering. After fruit setting, corn sized fruits abscised due to hormonal deficiencies. Foliar spraying of hormones like Gibberellic Acid (GA), Indolebutyric Acid (IBA) or Naphthalineacetic acid (ANAA) at 5 parts per million (ppm) during flower bud and fruit formation improved fruit setting and retention.

CONTROL OF PESTS, DISEASES AND OTHER PHYSIOLOGICAL DISORDERS

Insect Pest

Ants, mealy bugs, aphids, mites, bark borers, twig borer, fruit flies scale insects and fruit bats seriously infest lanzones trees during its growth cycle. Ants and mealy bugs have a symbiotic relationship for their co-existence. The most serious pest in lanzones that greatly affect production are the bark borer and scale insects.

The bark borers are larvae of green and caterpillar moth that stay in the bark and feed on the spongy tissue and cause scabbing formation. In this aspect, the larvae make a tunnel or excavation on the lower part of the bark and feed. This destroys and damages the bark surface where flower buds emerge (Fig. 5). Damaged surface, if not controlled cannot produce fruits within 2-3 years. The pest can be controlled by sanitation or removal of the infested barks and exposing the tunnel to sunlight. Spraying with contact insecticide is an option. Introduction of *Trichogramma* could suppress the population of the larvae. Birds also act as predator against the larvae of bark borers. The infested bark can be painted or sprayed with Kocide to control scab for the next cycle of flower buds emergence.

Twig borer is also a problem in Lanzones (Fig. 6). This is very common on trees that are left unattended in the field without any pruning. The overcrowding of branches makes it conducive to the emergence of borers. This can be prevented by sanitation, and if infestation is severe, use of systemic insecticide is necessary. Insecticide can be sprayed on foliage, or drench on the soil for efficient utilization and effect of the chemical.

Scale insects (mussel scale) are also important and new emerging pest in lanzones (Fig. 7). They feed on the lower surface of the leaf, suck the leaf tissues which cause death and the foliage abscised which lead to the death of the tree (Fig. 8). Before defoliation, fertilize the trees with organic and inorganic fertilizer at 50:50 ratios and cover the fertilizer with mulching materials like coir dust and rice hulls.

Scale insects can be prevented by sanitation through gathering of fallen dried leaves, use of trans-laminar systemic insecticide and biological control agents like the coccinellid beetles, *Chilocorus nigrita* (Fig. 9) and *Chilocorus circumdata* (Fig. 10). Burn falling leaves to suppress the cycle of the scale insects, and spray or drench systemic insecticide to the ground roots to prevent the development of scale in the leaves. So far, drenching is better so as not to kill the predator that also controls the scale insects. The predator, *Chilocorus nigrita* can be released in the lanzones trees when there is an incidence of scale insect infestation. Another control measure is by spraying cold water solutions using Potassium Nitrate (Kristal K, Multi K) or Urea (46-0-0) at the rate of 2 kilos per drum.

Fruit bats are also considered as pest in Lanzones. They are considered as nocturnal pest that attack the ripe fruit of lanzones at night time that causes bruising of the lanzones skin and the fruit to abscise. Bagging the fruit bunch with fish nets, and hanging of barriers like dried coconut fronds, bamboo twigs, banana plastic bags for bagging, and empty cans and other scare crows is economical and effective in preventing bat damage of lanzones fruits.

Diseases of Lanzones

A. Pathogenic disease

The most serious disease of lanzones is root rot, a fungus that attacks the bearing and non-bearing trees. This is common in low-lying areas where water are not well-drained during heavy rains. The fungus enters the roots through injuries and infection starts in the lateral roots and move towards the main root going up to the main trunk. The disease can be prevented by providing good drainage, sanitation and drenching of fungicide such as Ridomil.

Another disease affecting the lanzones is the scabbing of the bark that makes the bark crack and bulged wherein caterpillar moth can laid its eggs on the bark and where larvae feed on the surface of the bark that affects the flowering of lanzones. The scabbing can be control by spraying Copper Fungicide together with insecticide.

B. Non-pathogenic disease

Fruit cracking is one of the most important problem in lanzones during maturity and ripening. This problem is usually observed on trees that are stressed due to water shortage during dry period and suddenly followed by rain. The splitting or cracking is due to osmotic pressure in which there is absorption of water in roots and translocated to the fruits. When the tree is starved with water, the fruit skin is turgid and when rains fall, the fruit cracks. To prevent this malady, the tree and fruits should be sprayed with water to moistened the skin of the fruits and irrigate or water the base of the trunk when fruits are about to mature and ripen during dry spell. Importantly, the base of the trunk should be mulched before dry spell to conserve moisture to prevent the tree from water stress. Trees with maturing fruits should be sprayed weekly with fresh water in the foliage and fruits during dry periods.

HARVESTING AND POSTHARVEST HANDLING

Harvesting is usually done when all the fruits in the cluster or fruits in the tree are fully ripe. The best index to check for the proper maturity and ripeness of lanzones is the color of the fruit stalk. When the color of the fruit stalk changes from green to brown, the fruits are already ripe or when the skin of the fruits turns brownish yellow. Some buyers harvest their lanzones by priming or by selecting the ripe fruits and retaining the fruit with sting of green. At this stage, the fruit taste sour. It is advisable

to harvest the fruit when there is enough sunlight and free of moisture during packing. In harvesting, a sharp knife or pruning shear should be used by cutting off the base of the fruit stalk or bunch (Fig. 11).

Treatment of Fruit Bunch, Sorting, Packaging and Storing

At harvest, the bunches are dip in water with powder soap for 5 minutes to remove the ants staying in the fruit. The ants will float and should be removed and the fruits will be air dried before packing in cartoons or crates. Non-marketable or damaged fruits must be sorted out. Fruit of lanzones are highly perishable. Its shelf life is so short and it needs packaging materials to extend its freshness and palatability for one week. The fruit bunch can be wrapped in newspaper and enclosed in plastic bags and stored in the refrigerator's vegetable section.

MARKETING

Marketing Channels

Market flow for lanzones is relatively simple (Fig.). Lanzones is mainly marketed as fresh fruits in by weight basis from farmers to wholesalers/traders, retailers and consumers. Since lanzones fruits are highly perishable, these are commonly sold in the local markets.

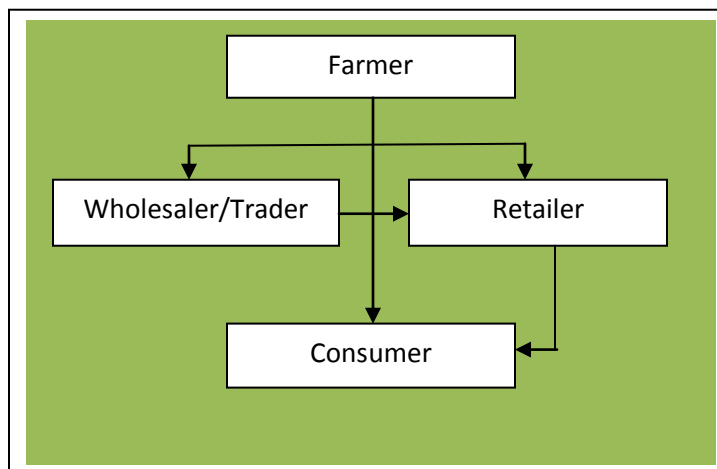


Fig.12. Marketing channels for lanzones.

Marketing Practices

The most common practice of marketing lanzones is by contract before the fruits ripen. The number of fruiting trees is counted and the fruits are estimated by

kilograms and the price is agreed upon by the buyer and the farmer. Sometimes middlemen act as negotiator with the farmer before going to the trader or buyer. The buyer assumes the responsibility of taking care of the tree until harvesting. The agreed amount will be paid in full before the trader will harvest the fruit.

Other marketing options are as follows:

1. Farm owner will harvest, sort and pack the fruits and sell at farm level or let buyers pick the fruits at farmgate price. With this system of marketing, the farmer spent the least marketing cost.
2. Farm owner will harvest, sort and pack the fruits and sell in wholesale basis or deliver the fruits to wholesaler-retailers. Increase in marketing costs is expected to be incurred with this system of marketing since the fruits will be transported to other places.
3. Farm owner will harvest, sort and pack the fruits and sell or retail the fruits directly to consumers. With this marketing system higher costs is expected to be incurred since aside from the fruits will be transported to other places, space for selling the fruits will be rented and the time to be spent is quite longer than the other marketing options. However, a better income of the farmer is expected.

COSTS AND RETURN ANALYSIS

Given the proper care and management, asexually propagated lanzones trees starts bearing in 7th year. Based on the Davao National Crop Research and Development Center's (DNCRDC) observations on the yield performance of lanzones, the estimated volume production and the costs and return of a one-hectare lanzones orchard was computed for comparison of farmer's economic benefits derived from planting the three commercial varieties and marketing systems being practiced (Table 3, 4a-4c and Appendix 1a-1b).

Nowadays, the Longkong variety offers higher market price compared to Duku and Paete (Tables 4a-4c). Thus, better income is to be expected from this variety provided the trees are properly managed and free from severe pests and disease infestations.

Variation in farmer's income is also visible on the different marketing systems. Retailing the fruits directly to consumers offers the best income for the farmers (Tables 4a-4c)

Table 3. Estimated volume of production of a one-hectare lanzones orchard.

	Yield per Tree	Ave. Yield per Hectare	Marketable Yield per Hectare
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Year	(kgs)	(kgs)	(kgs)
7	5-10	1530	1454
8	10-25	3570	3392
9	25-50	7650	7268
10	50-80	13260	12597
11	80-100	18360	17442
12	100-150	25500	24225

Assumptions:

1. Population density = 204 trees
2. 10% Non-marketable yield (rejects)

REFERENCES:

BPI-DNCRDC. Unpublished Annual Report for 2011. Bago Oshiro, Davao City. 76p.

Coronel, R.E. Promising Fruits of the Philippines. Laguna: Coll. Agric. UP Los banos, 1983. 508p.

<http://blog.agriculture.ph/lanzones-production-in-the-philippines.html>

<http://www.cropsreview.com/lanzones.html>. Crop Farming Review. How-To Guide in Growing Lanzones

<http://www.docstoc.com/docs/44719701/Microsoft-PowerPoint---Lanzones-Production#>

<http://www.mixph.com/2007/12/production-of-lanzones.html>

<http://negosyopinoy.info/476/lanzones-production/>

<http://www.pinoy-entrepreneur.com/2010/02/24/lanzones-production/>

Pamplona, P.P. and M. E. Garcia (2001). Handbook on the Lansium: Production techniques with Emphasis on Duku and Longkong in the ASEAN. University of Southern Mindanao. Kabacan, North Cotabato, Philippines. 75pp.

Plant Resources of Southeast Asia 2 (PROSEA). Edible Fruits and Nuts. Bogor, Indonesia. 1992.

The Philippines Recommends for Durian. Los Banos, Laguna: PCARRD, 2000. 111p. – (Philippines Recommends Series No. 87).

www.bas.gov.ph.

