

# Production Patterns of 180 Economic Crops in Papua New Guinea

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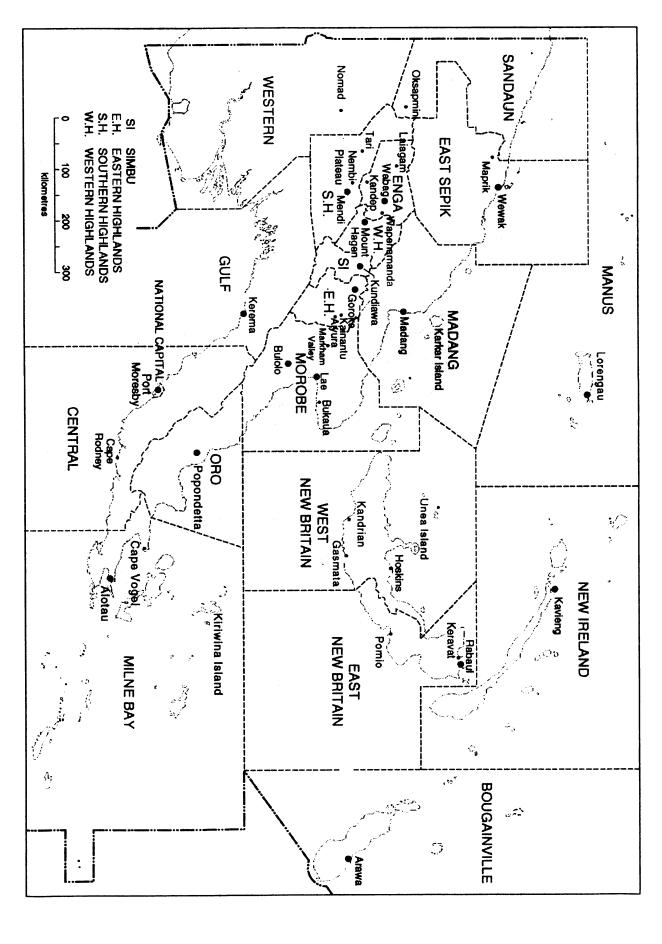
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MAP 1. LOCATIONS WHERE LONG-TERM RECORDINGS WERE MADE



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## SUMMARY

Variation in the supply over time of 180 crops in Papua New Guinea is described. Aspects of production patterns considered are continuity of supply, seasonality and reliability of the start of the producing period (if seasonal) or regularity of supply (if non-seasonal). The crops are grouped into starchy foods (11 species), traditional (pre-European) vegetables (20 species), introduced (post-European) vegetables (33 species), fruit (74 species), nuts (27 species), narcotics (8 species) and export cash crops (7 species).

Data sources are: fortnightly or weekly surveys of the quantity of food offered for sale in five highland markets over a 2-3 year period (1979-1982); purchases of fresh food by the Food Marketing Corporation in Goroka over a five-year period (1976-1981); purchases of fresh food by the Food Marketing Corporation in six lowland and highland centres over a two-year period (1979-1981); prices in five lowland and highland markets recorded weekly over a 22-year period as part of data collected to compute the Consumer Price Index (1971-1992); experimental recordings at the Lowlands Agricultural Experiment Station at Keravat on New Britain on nine fruit and nut trees over 2-3 years (1990-1993); experimental recordings on pineapple at Keravat over 3-4 years (1973-1976) and at Saiho near Popondetta in Oro Province (1969-1971); observations on experimental plantings of other fruit and nut trees at Keravat (1989-1993); an observer network for pandanus nut at six highland locations for 7-10 years (1976-1985); observations at two locations over 4-7 years on wild pandanus nuts (1972-1986); an observer network for mango at three lowland locations for seven years (1979-1985); comments by villagers on crop production patterns in many locations in PNG (1979-2002), observations (published and unpublished) on production patterns for crops in many locations in PNG by agriculturalists, anthropologists and geographers. Overall, the range for recordings is 2-22 years, with most data sets covering 3-6 years, except for recordings by fieldworkers where they are often for one year only.

Many perennial species bear seasonally in PNG, as do some annual species. For crops where there is sufficient data to generalise, the following seasonal patterns apply. For the starchy foods, two species bear seasonally, six are non-seasonal, and for one, the pattern varies with the agricultural system; for traditional vegetables, eight species bear seasonally and five are non-seasonal; for introduced vegetables, only two species bear seasonally, 20 are non-seasonal, and for four species, the pattern depends on the environment; for fruit, 44 species bear seasonally, 21 are non-seasonal, and for four, the pattern depends on the environment; for nuts, 13 species bear seasonally, three are non-seasonal, and for three, the pattern depends on the environment; for narcotics, four species bear seasonally and one is non-seasonal; for the export crops, four species bear seasonally, one is non-seasonal and for one, the pattern depends on the environment.

Three major environmental factors trigger flowering in plants, being changes in photoperiod (daylength), temperature and moisture. Seasonal changes in temperature and daylength are generally very small in PNG, except at locations further from the equator (8-12°S) where they are somewhat greater. Seasonal rainfall changes are usually larger, often over short distances, with three major seasonal rainfall patterns. There are marked differences in temperature with changes in altitude. Where there is sufficient reliable data, these differences make it possible to explore possible environmental influences on fruiting behaviour. Seasonal change in daylength is likely to be the main trigger for flowering of many perennial trees. For some species, production is seasonal at locations further from the equator (8-12°S) and non-seasonal at locations closer to the equator, suggesting that seasonal changes in daylength, and possibly temperature, initiate flowering at locations further from the equator, but not where seasonal changes are very small.

For several perennials, temperature change associated with altitude has no apparent influence on the production pattern. For three perennial species, production is non-seasonal in the lowlands, but seasonal in the highlands. For one fruit species, temperature (altitude) has a marked influence on the start and duration of the producing period. Two introduced vegetables bear in a non-seasonal manner in the lowlands, but are seasonal in the highlands. Another introduced vegetable appears to display the opposite pattern.

Rainfall has only a limited influence on seasonality for most perennial species. However, it has a marked effect on the agricultural system in some locations in that it influences the timing of clearing of fallow land and planting of food gardens after fallows. In these locations, the availability of certain annual crops is determined by the timing of clearing of land after fallow and planting of food gardens. In the highlands, this is dependent on the intensity of land use, rather than annual rainfall or temperature seasonality. There are indications that the incidence of pest and diseases, which is influenced by rainfall seasonality, determines the planting and harvesting seasonal pattern for three fruit and vegetable species.

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# **ABBREVIATIONS**

CPI	Consumer Price Index
CRI	Coffee Research Institute
DPI	Division of Primary Industry
EHP	Eastern Highlands Province
ENB	East New Britain Province
ESP	East Sepik Province
FMC	Food Marketing Corporation
HAES	Highlands Agricultural Experiment Station, Aiyura
Is	Island
LAES	Lowlands Agricultural Experiment Station, Keravat
MBP	Milne Bay Province
Mts	Mountains
PNG	Papua New Guinea
Prov	Province
R	River
Ra	Range
RMB	R. M. Bourke
SHP	Southern Highlands Province
SW	Steve Woodhouse (Observations at LAES Keravat)
V	Valley
WHP	Western Highlands Province
WNB	West New Britain Province

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# INTRODUCTION

The purpose of this publication is to define how the supply of food crops, narcotics and export crops varies over time in Papua New Guinea. Because most food is grown for subsistence consumption, direct measurement of village food production is extremely difficult, especially over several years. Hence it is necessary to use surrogate data to understand how production changes over time. Here we collate and analyse a number of diverse, long-run data sets. These include estimates of the quantity of food offered for sale in markets, market prices, crop yield records on research stations, and observations made by villagers and outsiders on village production patterns.

The origin of the project is a study of the causes of food shortages in the Highlands by Mike Bourke (RMB) assisted by Euclid D'Souza and Kiage Nema (Bourke, 1988). As part of this study, regular weekly or fortnightly surveys were conducted in four food markets in the Eastern Highlands and Southern Highlands over three years. Using the same techniques, Tevo Tarepe surveyed the quantity of certain types of food offered for sale in Goroka market. The other data sets analysed here are:

- 1. Records of the quantities of fresh food purchased by the government-run Food Marketing Corporation (FMC) for six highland and lowland buying centres.
- 2. Market prices recorded by Division of Primary Industry (DPI) staff in four lowland towns and one highland town. These are collated by the National Statistical Office (NSO) and, together with other figures, used to compute the Consumer Price Index (CPI).
- 3. Experimental recordings made by Steve Woodhouse on crop yield for a number of fruit and nut tree species at the Lowlands Agricultural Experiment Station, Keravat, East New Britain; and experimental plantings of pineapple at Keravat (RMB) and Saiho in Oro Province (John Horne).
- 4. Observations on the harvest season of karuka nut pandanus at six highland locations and on mango at three lowland locations by a network of observers over long periods.
- 5. Statements made by villagers in many parts of PNG about production patterns and recorded by one of us (RMB); and published statements by outside observers.

Claudia Camarotto was employed as a Research Assistant in 1992-1993 by the Land Management Group at the Australian National University to collate the large volume of data. The first draft of this document was written by RMB in 1994, but not revised until late 2001-early 2002, with assistance from Matthew Allen. In a related project, the production patterns for 57 fruit and five nut species in PNG were compared with those in four other nearby countries (Camarotto and Bourke, 1994). The purpose of the second study was to examine the potential for exporting fruit from PNG to other countries during their off-season.

The main locations discussed are shown in Map 1. Information on the data sources used is summarized in Table la. Information on rainfall, rainfall seasonality and the altitudinal range of the market supply areas for locations where longitudinal data are available is given in Table 2. Data on production patterns was mainly recorded over a 26-year period (April 1969 to July 1995), although they are concentrated in the four-year period 1979 to 1982 and there are several observations after 1995.

The supply of a commodity can vary over time for one or more of the following reasons:

- 1. Changes in the planting rate over time. This is especially the situation for annual crops.
- 2. Changes in yield per unit area per unit time. This is responsible for much of the variation in supply over time for perennial crops, such as fruit trees.
- 3. Changes in harvesting and marketing behaviour by villagers.

Changes in the planting rate and crop yield over time are influenced by environmental factors, in particular by rainfall, daylength and temperature changes. However they are also dependent on the

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farming system in which the crop is grown. Some of the results to be presented here illustrate this clearly. In certain highland locations, there is greater regular variation in the supply of many crops in very weakly seasonal environments than in more seasonal environments. This variation occurs because of changes in planting rates which are dependent on the proportion of a particular crop which is planted in certain garden types.

Information on production patterns over time is of value for a number of reasons:

- 1. It is needed by professional agriculturalists, planners and wholesalers who need to understand changes in crop supply over time in different environments.
- 2. It indicates regional differences, particularly those associated with differences in temperature (altitude), rainfall, latitude and farming system.
- 3. It may indicate the relative importance of climatic factors, planting rates and agricultural systems in influencing the supply pattern.
- 4. It may suggest the environment triggers for flowering and fruit production in some species.

## **Data Sources**

#### **Market Survey Techniques**

Food markets are a relatively recent institution in Papua New Guinea. In the Highlands, they commenced in the 1950s in several larger urban areas. By the late 1970s, there were numerous market places in each province. These were located in all major and minor urban locations, as well as in many villages, other rural sites such as mission stations and roadside locations.

Surveys of the volume and prices of produce offered for sale in food markets provide a relatively easy method of examining changes in village food production over time. The assumption here is that the volume of produce sold reflects the volume available in the market sellers' catchment area. Most food offered for sale is grown by non-specialist village producers, and is generally sold directly to the consumer by the producer. Hence the assumption of a reasonable link between the volume offered for sale and that available within the market catchment area is likely to be valid.

Nevertheless, there are limits to the linkage between village supply and the volume offered for sale in markets. The market sellers' catchment area is usually not known exactly. This is likely to change over a period of several years as road transport improves or deteriorates. There are also reasons why villagers might increase or decrease the quantity of a particular crop that they harvest and sell over shorter time periods. These include changes in their perception of consumer demand, transport constraints, inter group tension and changes in their cash requirements.

Market prices are a surprisingly sensitive index of supply given that only a small proportion of most commodities is marketed. The reason for this is that, as the supply decreases, some rural producers become consumers. Demand increases as the supply falls and prices increase accordingly.

#### **Five Highland Markets**

Surveys were conducted regularly in five highland markets between 1979 and 1982. Details of the surveys are given in Table lb. Kainantu and Goroka are urban markets where produce is sold by rural villagers to urban and rural people. Aiyura market is located on the Highlands Agricultural Experiment Station and caters for station workers. Ukarumpa serves staff (mostly expatriate) at the headquarters of the Summer Institute of Linguistics in the Aiyura Basin near Kainantu. Hol is a remote rural market on the Nembi Plateau west of Mendi and almost all sales are made to other villagers. Surveys have also been conducted by other researchers of Asaro, Wabag and Wau markets using the same techniques. We have not presented these results because the survey periods are short

(only one year) and there are numerous gaps in the data that make interpretation difficult. However, the Wau market survey data obtained by J. Swift in 1981 is discussed for some crops. Price surveys have been conducted in a number of PNG markets for the Fresh Produce Development Company in the 1990s. These results are not reviewed here.

The same technique was used in all surveys to record the quantity of produce. Food is offered for sale in lots or bundles of a fixed price in PNG markets. People vary the price (per kilogram) of a commodity by altering the size of the bundle rather than the price per bundle. This sort of pricing behavior is characteristic of markets in Melanesia and elsewhere in the Pacific (see Brookfield, 1969; McGee et al., 1980; Epstein, 1982; Griendl, 1997; Allen, 2001). The number of bundles and asking price for all commodities on display was recorded at the time of the survey. This was converted into a kina value. For example if there were 100 bundles of sweet potato on display at 10 toea per bundle and 40 bundles at 20 toea per bundle, this was recorded as K18 worth. This technique is adequate to indicate quantities offered for commodities that are very seasonal, such as certain fruits and nuts. However it is a less sensitive index of total produce offered for sale for commodities that exhibit less variation over time. The technique does not take into account produce kept in bags prior to display nor does it allow for variation in the size of bundles with a fixed price. Hence the data presented here are not a record of the total value for each commodity offered for sale or sold.

The value of all commodities offered for sale was recorded at Aiyura, Kainantu, Ukarumpa and Hol markets. At Goroka, starchy foods, fruits and nuts were surveyed, but not vegetables and narcotics. Results for Aiyura, Kainantu and Ukarumpa markets have been combined. This is because the three market places are within 10 km of each other and the area where produce is grown for the two smaller markets lies within the producing area for Kainantu market. The most important commodity group in Ukarumpa market is introduced vegetables because of the largely expatriate buyers. Hence these data compliment those from the other two markets which cater mainly for Papua New Guinean buyers.

Two or three surveys were made each month (4-5 for Hol market). These figures were averaged to give a mean monthly value and this is presented in Tables 3 to 11. The data are graphed as three month running means (Figures 1-19). The number of commodities (84) is not identical to the number of species because some species provide more than one commodity. For example, winged bean provides tubers, leaves, green beans and dried seed.

## **FMC Purchase Figures**

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In 1974, the PNG government set up the Fresh Food Project, later renamed the Food Marketing Corporation (FMC) (McKillop, 1981). It operated until September 1981. The FMC purchased fresh food from villagers at buying centres and resold them to retailers and other consumers. The emphasis was on introduced vegetables and fruit, although some staples such as sweet potato were also purchased.

FMC staff in Port Moresby made available purchase records for six buying centres for a 26 month period (July 1979 to August 1981). The buying centers were Port Moresby, Lae, Wau, Kainantu, Goroka and Mt Hagen. Goroka-based staff made available their buying records for a five and a halfyear period (April 1976 to August 1981). These data are presented in tabular form as weight of produce purchased per week for each month and as a three month running means in graphs (Tables 12-23, Figures 20-70).

Again it is assumed that these records are a reasonable reflection of the availability of food in the catchment area for each buying point. This assumption is more tenuous than for surveys of local markets. This is because there were undocumented changes in FMC buying policy. There are a number of other problems with these data. There are some missing figures. There are also some differences between the figures for the two data sets for the Goroka buying centre. This casts doubts on the accuracy of the records.

Despite these reservations, it is believed that they provide an indication of the availability of various foods for the catchment areas and are thus analysed here.

#### **CPI Market Surveys**

Prices of 14 fresh foods and betel nut are recorded in five urban markets every week by provincial DPI staff. The markets are Rabaul, Port Moresby, Lae, Madang and Goroka. They are compiled by the National Statistical Office and used to compute the consumer price index (CPI). The weight and price are recorded for six lots of produce for each commodity. Continuous data are available from January 1971 (or late 1970) until the present. The quality of the data collected appears reasonable, at least until the mid-1980s after which it deteriorates. There are numerous gaps in the record by the early 1990s, especially for Lae. Data has not been recorded for Rabaul after the mid-1990s. The sample size of 24 (or 30) price records per month is adequate, provided prices were recorded from separate sellers.

We compiled prices for 15 commodities for the five towns for each month for the period January 1971 to December 1992. Where prices were recorded for only one week in a month, this was treated as a missing figure and the monthly mean was not computed. Where there were two to five weeks' recordings in a month, a monthly average was computed. Recorded values were converted into constant kina using two series of consumer price index (1971 to 1977; 1977 to 1992). Results are presented as monthly means and standard deviation for each commodity and town (Tables 24-27, Figures 71-85).

The CPI figures and graphs have to be interpreted differently from the other market data or FMC purchases, where the data are for quantities offered for sale or purchased. For the CPI data, high prices indicate poor supply and lower prices suggest a better supply.

#### **Experimental Recordings**

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Generated Creative ( Yield of nine fruit and nut species were recorded by Steve Woodhouse for individual trees at the Lowlands Agricultural Experiment Station (LAES) at Keravat between January 1989 and March 1993. Each species was grown at up to four locations on the research station, with a different number of trees and crop history at each location (Tables 28 and 29). The individual tree yields were combined to derive a species mean which was weighted for the number of trees. The yield per tree was converted to yield per hectare using the tree spacings of these plots. The data are presented as weighted monthly means in graphical form and monthly means for each location in tabular form (Tables 28 and 29, Figures 86-89). As far as is known, there are no errors in the recordings apart from suspected theft of galip nuts. This may have reduced the recorded yield for galip.

Long-term, longitudinal yield data from experiment stations are also available for pineapple. John Horne recorded yield from a block at Saiho near Popondetta in Oro Province between April 1969 and October 1971; and RMB recorded yield from a block at Keravat between January 1973 and April 1976. Woodhouse also noted the fruiting pattern of a number of fruit and nut tree species at LAES Keravat during the late 1980s and early 1990s, without recording crop yield. These observations are indicated in the text as (SW).

These experimental recordings provide better quality data on how crop yield varies over time in that they are not influenced by changes in planting rate or in marketing behaviour by villagers. Because records are available from individual trees at Keravat, more detailed analysis could be done on these data than has been done here.

#### **Observer Network**

A network of observers was set up in 1980 by RMB for mango in three lowland locations (Rabaul, Markham Valley and Port Moresby); and for karuka nut pandanus in 1979 at six highland locations (Kainantu, Goroka, Wabag, Mendi, Tari and Oksapmin). The observer at each location was contacted

several times a year for a report on the start and finish of the mango or karuka nut harvesting season. Observations were also available on the karuka season at three of the highland locations for up to three years before the network was established. The observers of the karuka harvest also provided a subjective comment on the harvest size. The network was maintained until early 1986. Details on type of observations, observers and the data for each location are given in Tables 30-33 and results in Figures 90-91.

The quality of these observations is somewhat uneven because of changes in the observers at locations and the subjectivity of the assessment of production. The most consistent karuka data is for Kainantu and Tari. The Kainantu data, and those for three years for Goroka, are based on market surveys rather than on villagers' harvesting and consumption behaviour. Because stored nuts are sold in markets after the harvest has been completed, market surveys indicate a somewhat longer production season than more direct observations.

#### Villagers' Statements and Literature

Villagers in many parts of PNG were asked about the producing season for certain crops by RMB. Their responses are summarized in Tables 34a-50 and in the results section. The quality of the statements by the villagers is uneven. People in nearby locations frequently made slightly different statements about the start and finish of the harvesting season. This is not unexpected given that year-to-year variation occurs and many species produce at least some food throughout the year. Published recordings on crop seasonality made by outside observers are also assembled here. A comprehensive search of the PNG literature has been made, but it is not exhaustive. These observations were generally made by anthropologists and geographers who were residing in villages for at least a year. These records are based on their own observations or statements by villagers.

The value of this data set is that it provides information for numerous locations in diverse environments. It thus extends the observations from the catchment area of urban markets and experiment stations. These data are surprisingly consistent given the diverse sources and that, in the case of statements by villagers to RMB, they were usually based on brief conversations only.

We have not summarized general statements about crop seasonality from the literature where there is no indication of the location referred to or the source of the information, for example, data given by French (1986) on crop seasonality. Peekel (1984:598-603) provides information on the flowering behaviour of many species on New Ireland and the Gazelle Peninsula of New Britain. This is not summarized here.

#### **Data Organization**

Where information for a crop is available for more than one location, the order of presentation for locations is from east to west, and the sequence is market surveys, FMC purchase figures and observer networks. Information from villagers' statements and the literature is organized by increasing altitude of the location. For low altitude locations (0-400 m), it is also ordered by increasing latitude.

#### **Data Computer Files**

All of the raw data used in the project are available in electronic form on 3 1/2 inch disks. The Consumer Price Index data are available in IBM format and other data sets are in Macintosh format. All numeric files are in Excel 4. Copies of the disks and further information are available from: Dr. R. M. Bourke, Department of Human Geography, Research School of Pacific and Asian Studies, Australian National University, Canberra ACT 0200, Australia.

# Definitions

The following terms are used to describe the production pattern for each commodity, where commodity is defined as the main economic product of a particular species:

Continuous: The commodity is available in most or all months of a calendar year.

**Discontinuous**: The commodity is available in only some months of a calendar year. Note that for some commodities and locations, a discontinuous supply reflects the small quantity marketed rather than discontinuous village production.

Seasonal: The commodity is usually more abundant at about the same time in each calendar year.

Non-seasonal: The commodity is not more abundant at about the same time in each calendar year.

Where the availability of a commodity is **seasonal**, the following terms are used to describe the supply pattern:

**Constant**: The start of the main production period occurs at about the same time each year, that is, within plus/minus a month of the long-term mean.

**Non-constant**: The start of the main production period occurs at a somewhat different time each year, that is, within plus/minus three months of the long-term mean.

Where the availability of a commodity is **non-seasonal**, the following terms are used to describe the supply pattern:

**Regular**: The supply of the commodity is about the same in each month of the year.

Irregular: The supply of the commodity varies somewhat between months in a year.

Very irregular: The supply of the commodity varies considerably between months in a year.

The following terms are used for different altitude zones:

Lowland	0-600 m
Intermediate	601-1200 m
Highland	1201-1800 m
High altitude	1801-2400 m
Very high altitude	2401-3000 m

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# **RESULTS AND DISCUSSION**

## **Starchy Foods**

#### Banana, cooking (Musa cvs)

Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 1, Table 3); Goroka market survey (Fig 1, Table 3); Hol market survey (Fig 1, Table 3); FMC purchases, six buying centres (Fig 32, Table 17); CPI market survey (Fig 72, Table 24).

Longitudinal data are available for Rabaul, Port Moresby, Lae, Wau, Madang, Kainantu, Goroka and the Nembi Plateau. The supply is continuous at all of these locations. It is non-seasonal and irregular in the Rabaul, Port Moresby, Lae, Wau, Madang, Kainantu and Goroka areas. On the Nembi Plateau in the Southern Highlands, the Hol market survey indicates a weakly seasonal supply pattern with the best supply in March-August and the poorest in September-February. The CPI market surveys suggest a possible weakly seasonal pattern in the Port Moresby area with a somewhat poorer supply in March-May. However, given that the FMC purchasing figures did not show this pattern and that the CPI market survey prices are very variable, this is unlikely to be a real seasonal effect.

## Banana, eating (Musa cvs)

Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 1, Table 3); Goroka market survey (Fig 1, Table 3); Hol market survey (Fig 1, Table 3); FMC purchases, Goroka (Fig 20, Table 12); FMC purchases, six buying centres (Fig 33, Table 17); CPI market survey (Fig 73, Table 24).

The supply is continuous, non-seasonal and regular to irregular in all locations.

#### Breadfruit (Artocarpus altilis) and breadnut (Artocarpus camansi)

See Nuts.

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#### Cassava (Manihot esculenta)

Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 2, Table 3); Goroka market survey (Fig 2, Table 3); CPI market survey (Fig 76, Table 25).

Longitudinal data are available for Rabaul, Port Moresby, Lae, Wau, Madang, Kainantu and Goroka. Supply is continuous, non-seasonal and irregular at all of these locations. CPI market surveys show that in the Port Moresby area, there is a tendency for supply to be poorer between September and March, but there is considerable variation from year to year. Similarly, the CPI market surveys show a tendency for supply to be poorer in Goroka between October and January, but the pattern is not regular and the supply could not be defined as seasonal.

#### Corn (Zea mays)

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Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 2, Table 3); Goroka market survey (Fig 2, Table 3); Hol market survey (Fig 2, Table 3); FMC purchases, Goroka (Fig 23, Table 13); FMC purchases, six buying centres (Fig 44, Table 19); CPI market survey (Fig 78, Table 25).

Supply is usually continuous but it is sometimes discontinuous at some locations. Production is seasonal and non-constant at all locations for which good quality data are available (Rabaul, Port Moresby, Lae, Wau, Madang, Kainantu, Goroka and the Nembi Plateau). The period of best supply usually commences in December or January and continues until about March, but the pattern varies somewhat between locations and between years. Seasonality of supply is weakest in the Lae and Madang areas and most pronounced on the Nembi Plateau. The better supply earlier in the calendar year reflects increased planting rates in the October-December period. In the highlands, this occurs because mixed gardens and some sweet potato gardens planted after fallow are made at this time.

#### Potato (Solanum tuberosum)

Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 2, Table 3); Goroka market survey (Fig 2, Table 3); Hol market survey (Fig 2, Table 3); FMC purchases, Goroka (Fig 28, Table 15); FMC purchases, six buying centres (Fig 59, Table 21).

Longitudinal data are available for Port Moresby and Lae (highland production), Wau, Kainantu, Goroka, Mt Hagen and the Nembi Plateau. The main buying centre for the FMC was Mt Hagen, reflecting production at high and very high altitude locations in Enga and the Western Highlands. Supply is continuous for all locations where moderate to large quantities are available. It is non-seasonal and irregular. FMC purchases in Goroka (Figure 28), Lae and Mount Hagen (Figure 59) suggest that supply tends to be best in the January-March period but the pattern varies considerably from year to year. This reflects plantings made in gardens cleared from fallow in October-December. Since these data were recorded, potato production in the highlands has expanded greatly and monocrops are now common in high and very high altitude locations in the Enga and Western Highlands Provinces. The tendency for supply to be best early in the calendar year may no longer hold.

#### Sugar cane (Saccharum officinarum)

Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 3, Table 3); Goroka market survey (Fig 3, Table 3); Hol market survey (Fig 3, Table 3).

Longitudinal data are available for the Wau, Kainantu and Goroka areas and the Nembi Plateau. At these locations, the supply is continuous, non-seasonal and irregular. In the Dogura area of Milne Bay Province (MBP), the best supply is reported in February-May (Kahn, 1986:50).

#### Sweet potato (Ipomoea batatas)

Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 3, Table 3); Goroka market survey (Fig 3, Table 3); Hol market survey (Fig 3, Table 3); FMC purchases, Goroka (Fig 29, Table 16); FMC purchases, six buying centres (Fig 67, Table 23); CPI market survey (Fig 84, Table 27).

Longitudinal data are available for Rabaul, Port Moresby, Lae, Wau, Madang, Kainantu, Goroka and the Nembi Plateau. The supply is continuous, non-seasonal and regular to irregular at these locations.

At all locations for which longitudinal data are available, there is a tendency for sweet potato to be more available at certain periods of the year. These periods vary between locations. When long-term data runs are averaged, as with the CPI market survey prices presented here, this can give the impression of annual seasonality. In practice the supply situation varies considerably from year to year as the standard deviations presented in Tables 24-27 indicate. Thus, there is a tendency for supply to be better in certain months, but this happens in certain years only and there is considerable variation in the pattern between years.

A major study of the supply pattern in the Eastern and Southern Highlands was done by Bourke (1988). That analysis used the data presented here, other market price data and comments on sweet potato supply in patrol reports over a 20-50-year period. It concluded that the supply of sweet potato does not vary in a regular annual cycle in these two provinces. Nevertheless, episodes of particularly good or particularly poor supply tend to occur at about the same time of the calendar year. In the Eastern Highlands the best supply tends to occur in March-July and the poorest supply in October-January. The corresponding periods in the Southern Highlands are several months earlier (Bourke, 1988:81-83).

#### Taro (Colocasia esculenta)

Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 4, Table 3); Goroka market survey (Fig 4, Table 3); Hol market survey (Fig 4, Table 3); CPI market survey (Fig 85, Table 27).

Longitudinal data are available for Rabaul, Port Moresby, Lae, Wau, Madang, Kainantu, Goroka and the Nembi Plateau. At these locations, the supply is continuous, non-seasonal and irregular to very irregular, except on the Nembi Plateau where it is discontinuous.

The seasonality of taro planting in PNG is dependent on the agricultural system where it is grown. In the New Guinea Islands, where taro was previously an important staple crop, it is generally not planted seasonally. In contrast, in New Guinea north coast locations, including much of East Sepik and Madang Provinces, it is planted and harvested seasonally. For example, in the Simbai Valley, new taro-yam gardens are cleared in the drier period (June-September) and then planted (Clarke, 1971:160); on Karkar Island, taro is planted in June-August; in the Yangoru area of East Sepik Province (ESP), taro is planted in July-October (Allen *et al.*, 1993); and on the Karimui Plateau, taro is harvested mainly in May-August (Hide *et al.*, 1984:213). In both the Port Moresby/Rigo and the Madang areas, the main taro harvesting period is about May-June (G. Wiles, pers. comm., 1995). On the south-west coast of Goodenough Island, taro is available throughout the year, but it is most abundant in May-November (Mogina, 2002:159).

#### Taro, Chinese (Xanthosoma sagittifolium)

Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 4, Table 3); Goroka market survey (Fig 4, Table 3); Hol market survey (Fig 4, Table 3).

Longitudinal data are available for Wau, Kainantu, Goroka and the Nembi plateau. In the Wau, Kainantu and Goroka areas, the supply is continuous, non-seasonal and irregular. There is a weak suggestion from Goroka market that the poorest supply tends to occur between about December and April, but this is probably not a real effect.

#### Yam, greater and lesser (Dioscorea alata and Dioscorea esculenta)

Data sources: Goroka market survey (Fig 4, Table 3), literature and authors' surveys.

Survey data from Goroka market indicates that the supply of yam is discontinuous, non-seasonal and very irregular. Some of the yams sold in this market are grown in the Markham Valley, particularly lesser yam (*D. esculenta*), while some are locally grown. Hence the seasonal patterns are likely to be mixed in these data. In the Asaro Valley, Benabena Valley, Kainantu area and Lamari Valley of the Eastern Highlands, yams (*D. alata* and some *D. bulbifera* and *D. nummularia*) tend to be planted in June-July, and as late as September. Hence, the supply pattern is likely to be much more seasonal than these limited surveys indicate. In the main valleys of Enga Province below 2000 m, mixed gardens containing some yams (*D. alata* and *D. bulbifera*) are planted towards the end of the drier period, especially in October (Bourke and Lea, 1982:82; Waddell, 1972:50).

Throughout the PNG lowlands, yams are planted and harvested seasonally. In ESP, the planting period varies somewhat between locations but is generally in the September-January period for both D. esculenta and D. alata (Allen et al., 1993). In the Madang area, the planting season for yam (D. esculenta) is reported as October and for the nearby Bogia area as November-December (Allen et al., 1994). To the east in the Sialum area of Morobe Province, they are planted in September-December, while on the west coast of Umboi Island the planting season is given as September-October for D. esculenta and as August-September for D. alata (Bourke et al., 1997).

In MBP, both *D. esculenta* and *D. alata* are planted seasonally with the greatest concentration of planting in October-December. *D. esculenta* yams are typically harvested in July-August, and *D. alata* somewhat earlier, usually May-July. In the Trobriand and Marshall Bennett Islands, small early

yam gardens are also planted in June-August (Hide *et al.*, 1994). On the south-west coast of Goodenough Island, both species are planted in September-October. They are harvested in March-May. On Cape Vogel on the nearby New Guinea mainland, they are planted in October-November and harvested in April-August. In both locations, the *D. alata* are harvested earlier than the *D. esculenta* (Mogina, 2002:159, 164).

At four locations in Central Province, the planting season for yam (mainly *D. esculenta*) is reported as October-November or October-December. These are for the yam producing areas on Yule Island and the nearby areas on the mainland, on the Sogeri Plateau, the Port Moresby area and the Kwikila area (Allen *et al.*, 1996). In the Namatanai area of New Ireland, the first planting of *D. esculenta* takes place in September with another planting in January-February. They are planted in October-December on Tanga Island (Hide *et al.*, 1996).

Everywhere that yams are grown in PNG, they are planted and harvested seasonally. The most common planting period in the lowlands is at the end of the drier months and start of the wetter months, that is, in September-December. However, people in MBP plant at different periods in the early and main yam gardens and the planting periods in Enga and the Eastern Highlands are different. This suggests that people have some flexibility in the planting time and this is chosen to facilitate management as well as to maximize crop yield.

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# **Traditional Vegetables**

#### Aibika (Abelmoschus manihot)

Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 5, Table 4); Hol market survey (Table 4); CPI market survey (Fig 71, Table 24).

The supply is continuous and seasonal at all highland and lowland locations for which data are available, except on the Nembi Plateau where only very limited quantities are grown. It is constant in Port Moresby, Kainantu and Goroka, and non-constant in Rabaul, Lae and Madang. At Rabaul, Port Moresby, Lae, Wau, Madang, Kainantu and Goroka, the best supply is centred on January-March, but it may commence as early as December and finish as late as June. The period of poorest supply is usually within the period July-October, but it may occur at any time between June and December. In the Anguganak area of Sandaun Province, the best supply is reported to be March-April (Lewis, 1975:54).

#### Amaranthus (Amaranthus spp.)

Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 5, Table 4); Hol market survey (Fig 5, Table 4).

In the Wau and Kainantu areas and on the Nembi Plateau, the supply of amaranthus (mostly *A. tricolor* and *A. cruentus*) is discontinuous, markedly seasonal and constant. The best supply in the Wau and Kainantu areas occurs in October-December, and on the Nembi Plateau the corresponding period is somewhat later (January-March). The Nembi Plateau pattern occurs because amaranthus is only planted in mixed vegetable gardens, which are planted in October-January annually. In the Anguganak area of Sandaun Province, amaranthus is available in October-January (Lewis, 1975:54).

#### Cucumber (Cucumis sativus)

Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 5, Table 4); Hol market survey (Fig 5, Table 4); FMC purchases, Goroka (Fig 23, Table 13), FMC purchases, six buying centres (Fig 45, Table 19); CPI market survey (Fig 79, Table 26).

Longitudinal data are available for Rabaul, Port Moresby, Lae, Wau, Madang, Kainantu, Goroka and the Nembi Plateau. The main buying centres for the FMC were Port Moresby, Lae and Wau. Supply is usually continuous in the lowlands (except for Madang), and discontinuous in the highlands. It is seasonal and constant at all locations. Seasonality of supply is more marked in the highlands than in the lowlands and is particularly marked on the Nembi Plateau. It is only weakly seasonal in the Rabaul area. The period of best supply varies a little between locations and between data sets for the same location. It is centred on the December-February period, and the range is November-March.

There is abundant evidence of the seasonal nature of cucumber planting. In the Simbai Valley of Madang Province, cucumbers are more abundant in October-November (Clarke, 1971:160, 182-183). In the Mount Bosavi area of the Southern Highlands, cucumbers are planted in May-July (Freund, 1977:294) and thus would be maturing from August onwards. In the Aiyura Valley near Kainantu, villagers plant cucumbers seasonally in May-July (Bourke, 1988:218). In the Nankina Valley on the north side of the Finisterre Range in Madang Province, they are planted in July-September and eaten in October-January (Villagers, October 1991).

#### Cucumber seed (Cucumis sativus)

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Fig 5, Table 4).

Very small quantities of cucumber seed are sometimes sold seasonally in Kainantu market in the first few months of the year.

#### Cyanotis moluccana

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Fig 7, Table 4).

In the Kainantu area, the supply is discontinuous, non-seasonal and very irregular.

#### Fern

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Fig 5, Table 4).

In the Kainantu area, the supply is continuous, non-seasonal and very irregular. This irregularity in market supply is likely to reflect irregular harvesting of self-sown plants rather than the production of new fronds.

#### Ginger (Zingiber officinale)

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Fig 7, Table 4); Hol market survey (Fig 7, Table 4); FMC purchases, Goroka (Fig 24, Table 13); FMC purchases, six buying centres (Fig 47, Table 19).

Longitudinal data are available for the Port Moresby, Wau, Kainantu and Goroka areas. The Kainantu market surveys indicate a continuous supply; the FMC purchase figures indicate a discontinuous supply but this is probably a reflection on the data source rather than the actual situation. Supply is weakly seasonal and non-constant at these locations. The best supply tends to occur in the first half of the year (January-June), but the pattern changes considerably each year.

#### Gourd, bottle (Lagenaria siceraria)

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Table 4).

In the Kainantu area, only small quantities are offered for sale. Here the supply is discontinuous, non-seasonal and irregular.

#### Highland kapiak leaves (Ficus dammaropsis)

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Fig 5, Table 4).

In the Kainantu area, the supply is discontinuous, seasonal and non-constant. The best supply occurs sometime in the April-August period, and the worst between December and February.

#### Kumu musong leaves (Ficus copiosa)

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Fig 7, Table 4); Hol market survey (Table 4).

In the Kainantu area, the supply is discontinuous, seasonal and constant with the best supply in October-November. In the Sinasina area of Chimbu Province, leaves are eaten seasonally in September-November (Hide *et al.*, 1979:11). Villagers were asked about the seasonality of new leaves at three locations on Normanby and Fergusson Islands in MBP in February 1994. The most commonly stated period was January-March (range: December-April).

#### Mushroom

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Data sources: Hol market survey (Fig 7, Table 4).

In the Kainantu area, mushroom sales were recorded for one year only. The supply was continuous, non-seasonal and irregular. On the Nembi Plateau, very small quantities are sold in Hol market and the supply is discontinuous. It may be seasonal, with mushrooms available in October-December, but there are insufficient data for definite conclusions to be drawn. In the Haiyapugwa area west of Tari in the Southern Highlands, mushrooms are gathered seasonally between February and April (Powell with Harrison, 1982:5).

#### Nasturtium schlechteri

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Fig 6, Table 5).

In the Kainantu area, the supply is continuous, seasonal and non-constant, with the best supply in August-October.

#### Nightshade (Solanum nodiflorum)

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Fig 7, Table 4).

In the Kainantu area, the supply is discontinuous, non-seasonal and very irregular. Nightshade is selfsown in food gardens.

## **Oenanthe** (*Oenanthe javanica*)

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Fig 6, Table 5); Hol market survey (Table 5).

Oenanthe is one of the most important vegetables sold in food markets in the Kainantu area. Here, the supply is continuous, non-seasonal and fairly regular.

#### Pitpit, highland (Setaria palmifolia)

Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 7, Table 4); Hol market survey (Fig 7, Table 4).

In the Wau and Kainantu areas, the supply is discontinuous, non-seasonal and irregular. On the Nembi Plateau, where it is a more important vegetable, the pattern contrasts with the Kainantu and Wau situation. Here, supply is continuous, seasonal and constant with the best supply in April-May.

#### Pitpit, lowland (Saccharum edule)

Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 6, Table 5); Villagers' statements and literature (Table 35).

Longitudinal data are available for the Wau and Kainantu areas. Here the supply is discontinuous, seasonal and constant, and the best supply is in February-April. Information on the supply pattern is available for 16 other lowland and intermediate altitude locations (Table 35). At all locations except for the Anguganak area of Sandaun Province, lowland pitpit is reported as being available seasonally. The stated season occurs between November and May and particularly in January-March. The length of the harvesting season is reported as between two to six months. There is no apparent relationship between the harvesting season and altitude, rainfall seasonality or latitude.

For the Baining people of New Britain, the word for year is the same as the word for pitpit as the seasonal harvest most clearly delineates an annual cycle (Fajans, 1985:73). In the Eastern Baining mountains of ENB, villagers interpreted the word for pitpit as "New Year" because it bears in January-February (Villagers, June 1995). From the Nomad River area of Western Province comes another indication that the start of the season is fairly constant from year to year. Here the Samo people use the word "hiyanlin" for the wetest season, for the crop pitpit, for feasts that mark the pitpit harvest and also for an annual cycle that is the period between the pitpit feast. The crop itself is planted between September and January in this area (Shaw, 1990:39-41, 53).

## Rungia (Rungia klossii)

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Data sources: Aiyura/Kainantu/Ukarumpa market survey (Fig 6, Table 5); Hol market survey (Fig 6, Table 5).

In the Kainantu area and on the Nembi Plateau, the supply is continuous and non-seasonal. It is irregular in the former area and regular in the latter. There is an indication in the data for the Kainantu area that supply is poorest for a number of months centred on August. If this is a real seasonal effect, it is consistent with the report by Majnep and Bulmer (1983:41) that rungia does not

grow well in the drier months in the Simbai area. However, a twelve-month time-of-planting trial at Aiyura in 1980-81 did not indicate that yield variation was related to variation in rainfall (RMB, unpublished data).

#### Trichosanthes pulleana

Data sources: Goroka market survey (Table 5).

The very limited supply to the Goroka market is discontinuous and non-seasonal. In the Simbai area, trichosanthes fruit ripen during the drier season (June-September) (Clarke, 1971:160, 222).

#### Tulip (Gnetum gnemon)

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Data sources: Wau market survey; Villagers' statements and literature (Table 36).

The supply of young leaves to Wau market is discontinuous and seasonal, with the best supply in November-December. The edible young leaves and fruits (nuts) are reported as being harvested seasonally in various locations (Table 36). The main harvesting season for leaves is November-December and for fruit it is December-February. No reports are available on the seasonality of leaves near sea level, but the available data do not suggest any relationship between the harvesting period of leaves and fruit with altitude, rainfall seasonality or latitude.

#### Winged bean, tuber, green bean, leaves and seed (Psophocarpus tetragonolobus)

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Fig 8, Table 5); Hol market survey (Fig 8, Table 5).

Winged bean tubers, green beans, leaves and seed (for planting) are sold in markets in the Kainantu area; tubers and green beans are sold at Hol market on the Nembi Plateau. Production of all plant parts is discontinuous, seasonal and constant at both locations, except for tubers in the Kainantu area where the start of the season is non-constant. In the Kainantu area, tubers and leaves are in best supply in January-March, seed in February-May, and green beans in March-April. Production of both tubers and green beans is very seasonal on the Nembi Plateau, with the best supplies in March-April.

In the Kainantu area, winged bean are planted in well-drained sites between May and August each year. (The stated ideal in the Aiyura area is May-July. Plantings made between August and November are said to produce leaves and beans but no tubers). These plots are managed to maximize tuber production, but they also produce some beans. Winged bean are also interplanted with other crops in mixed gardens in moist sites in September-December each year. These plantings produce both beans and some tubers. On the Nembi Plateau, winged bean are planted in mixed gardens only in October-January each year (Bourke, 1988:213-221, 358-364).

In the Kainantu area, the period from planting to harvesting tubers and green beans is about seven and four months respectively. Tubers sold in the Kainantu area in January-March appear to be mostly coming from plots planted in drier locations in May-August. The timing of the sale of leaves indicates that green beans which are sold in March-April are mostly coming from mixed gardens planted in September-December, and not from plots planted earlier in drier sites. On the Nembi Plateau, both tubers and green beans come from plantings in mixed gardens made in October-January. Here it appears that both beans and tubers are harvested after about four months.

A twelve-month time-of-planting trial at Aiyura in 1980-81 suggests why plantings managed for tuber production are made in the May-July period. In this trial, the best tuber yields were obtained from plantings made in May and June; those made between September and December yielded no tubers at all. There was a significant negative correlation between tuber yield and rainfall during the growing period, that is, the best tuber yields were obtained from plantings which grew during the drier months of the year (RMB, unpublished data). These experimental data confirm local villagers' beliefs about the optimum time of planting. Two plantings in the Port Moresby area made at different times gave a similar result. Here, tuber yields for three cultivars were very much greater in the dry season planting than in the wet season planting (Bala and Stephenson, 1980:66).

A number of authors comment on the seasonality of planting and harvesting winged bean in PNG. Writing on the highlands in general, and the Western Highlands in particular, Khan *et al.* (1977:212) give the usual planting season as June-August. In the Western Highlands, winged bean is reported to be planted seasonally when a certain ground dwelling insect emerges from its burrow; this occurred in July in one year (Strathern, 1976:146-147). Pods are available in the Anguganak area of Sandaun Province in February-April (Lewis, 1975:54). In the Port Moresby area, beans are reported as available in February-April and September-November (Bala and Claydon, 1976). These authors give the planting time as December-January in the Trobriand Islands with the beans harvested in about April. Leaf spot caused by *Pseudocercospora psophocarpi* and powdery mildew (*Oidium* sp.) appears to be more prevalent at the end of the dry season (November) than at the end of the wet season (April) in the Eastern and Western Highlands (Price *et al.*, 1982:480).

# **Introduced Vegetables**

#### Bean, common (Phaseolus vulgaris)

Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 9, Table 6); Hol market survey (Fig 9, Table 6); FMC purchases, Goroka (Fig 20, Table 12); FMC purchases, six buying centres (Fig 34, Table 17); CPI market survey (Fig 74, Table 24).

Longitudinal data are available for Rabaul, Port Moresby, Lae, Wau, Madang, Kainantu, Goroka, Mount Hagen and the Nembi Plateau. The supply is continuous (except on the Nembi Plateau), seasonal and non-constant at all locations, although the FMC purchase figures reflect this at Goroka only. The period of best supply varies somewhat between locations and between data sets for the same location. The best supply occurs at some time between September and April, and most commonly in December-February.

#### Beetroot (Beta vulgaris subsp. vulgaris)

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Fig 9, Table 6); FMC purchases, Goroka (Fig 20, Table 12).

Beetroot is a very minor vegetable and very small quantities are offered for sale in some highland markets. There is an indication in the available data that the best supply is in September-October in Goroka and Kainantu, but this is probably not a real seasonal effect.

#### Broccoli (Brassica oleracea var. botrytis)

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Fig 9, Table 6); FMC purchases, Goroka (Fig 21, Table 12); FMC purchases, six buying centres (Fig 35, Table 17).

Broccoli is a minor vegetable in parts of the highlands, but it is a cash crop in high and very high altitude locations in Enga. This is reflected in the FMC purchase figures for Mount Hagen. The supply is discontinuous at all centres except Mount Hagen. It is non-seasonal and very irregular, although the best supplies in the Kainantu, Goroka and Mount Hagen (Enga) buying centres tend to be in the July-November period.

## Cabbage, Chinese (Brassica pekinensis)

Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 9, Table 6); FMC purchases, Goroka (Fig 21, Table 12); FMC purchases, six buying centres (Fig 36, Table 17).

Longitudinal data are available for Port Moresby, Lae, Wau, Kainantu, Goroka and Mount Hagen. The main buying centres for the FMC were Wau and Port Moresby. The supply is continuous at all locations (except Lae where the supply is small), non-seasonal and irregular.

#### Cabbage, head (Brassica oleracea var. capitata)

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Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 9, Table 6); Hol market survey (Fig 9, Table 6); FMC purchases, Goroka (Fig 21, Table 12); FMC purchases, six buying centres (Fig 37, Table 18).

Longitudinal data are available for Port Moresby (mostly from production in mountainous parts of Central Province), Lae, Wau, Kainantu, Goroka, Mount Hagen and the Nembi Plateau. Mount Hagen was the main FMC buying centre, reflecting production at high and very high altitude locations in Enga and the Western Highlands.

The supply is continuous at all locations. Market survey data for the Kainantu area and the Nembi Plateau indicate a seasonal pattern, but FMC purchase figures do not suggest this for other locations. It is not clear to what degree this reflects the poorer quality of the FMC purchase figures as an index

Original from UNIVERSITY OF MICHIGAN of village production or real differences between locations. In the Kainantu area, the supply appears to be weakly seasonal and non-constant with cabbage more abundant in September-December. On the Nembi Plateau, the pattern is very seasonal and constant with the best supply in December-April.

#### Capsicum (Capsicum annuum var. grossum)

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Fig 9, Table 6); FMC purchases, Goroka (Fig 21, Table 12); FMC purchases, six buying centres (Fig 38, Table 18).

Longitudinal data are available for Port Moresby, Lae, Wau, Kainantu, Goroka and Mount Hagen. Port Moresby and Wau were the main buying centres for the FMC, reflecting the fact that capsicum grow best in dry lowland and intermediate altitude locations. At the highland centres of Kainantu, Goroka and Mount Hagen the supply is discontinuous, non-seasonal and irregular to very irregular. In contrast, the supply in the Port Moresby and Wau areas is continuous and appears to be seasonal. In the Port Moresby area, the best supply tends to be in July-September, and in the Wau area, it is in January-March. The data run is short (26 months) but if the apparent pattern for Port Moresby and Wau is valid over longer periods, it suggests that the seasonal production patterns in the Port Moresby and Wau areas are complementary. Both of these locations are seasonally dry in contrast with most highland locations where rainfall seasonality is weaker or non-existent.

#### Carrots (Daucus carota)

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Fig 10, Table 6); FMC purchases, Goroka (Fig 22, Table 12); FMC purchases, six buying centres (Fig 39, Table 18).

Longitudinal data are available for Lae, Wau, Kainantu, Goroka and Mount Hagen. Mount Hagen was the main buying centre for the FMC, reflecting production at high altitude locations in Enga and the Western Highlands. At all centres, the supply is continuous, non-seasonal and irregular. The apparent seasonality of supply in Lae is not a real effect. It possibly reflects sales there by highlanders who travel to Lae during the coffee harvesting season.

#### Cauliflower (Brassica oleracea var. botrytis)

Data sources: FMC purchases, Goroka (Fig 22, Table 13); FMC purchases, six buying centres (Fig 40, Table 18).

Longitudinal data are available for Port Moresby, Lae, Wau, Kainantu, Goroka and Mount Hagen. Mount Hagen was the main buying centre for the FMC, reflecting production at high altitude locations in Enga and the Western Highlands. Supply at all centres is discontinuous, non-seasonal and very irregular, although there is a weak suggestion that the best supply occurs between August and November.

#### Celery (Apium graveolens var. dulce)

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Fig 10, Table 6); FMC purchases, Goroka (Fig 22, Table 13); FMC purchases, six buying centres (Fig 41, Table 18).

Longitudinal data are available for Wau, Kainantu and Goroka. The main buying centre for the FMC was Wau. Here the supply is continuous, non-seasonal and regular. In the Kainantu and Goroka areas, the supply is discontinuous, non-seasonal and very irregular.

#### Chillies (Capsicum frutescens)

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Data sources: FMC purchases, Goroka (Fig 22, Table 13).

The only available data are FMC purchase figures for Goroka for a two-year period. Here the supply was discontinuous, non-seasonal and very irregular, although most sales occurred between December and May.

#### Choko fruit (Sechium edule)

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Fig 10, Table 6); FMC purchases, Goroka (Fig 23, Table 13); FMC purchases, six buying centres (Fig 42, Table 18).

Longitudinal data are available for Port Moresby, Lae, Wau, Kainantu and Goroka. The main buying centre for the FMC was Wau, reflecting the significance of choko in the intermediate altitude zone in PNG. The supply is continuous at Wau, but discontinuous at other centres. It is seasonal and constant at Wau, Kainantu and Goroka, with the best supplies in January-March. Supply of fruit to the FMC depot at Port Moresby was non-seasonal and very irregular.

#### Choko tips (Sechium edule)

Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 10, Table 6).

In the Wau and Kainantu areas, the supply is continuous, non-seasonal and irregular.

#### Corn (Zea mays)

See Starchy Foods.

#### Eggplant (Solanum melongena)

Data sources: FMC purchases, Goroka (Fig 23, Table 13); FMC purchases, six buying centres (Fig 46, Table 19).

Longitudinal data are available for the Port Moresby, Lae, Wau, Kainantu, Goroka and Mount Hagen areas. The main supply centres for the FMC were Port Moresby and Wau, reflecting the fact that eggplant grows best in lowland and intermediate altitude locations with a seasonal rainfall distribution. In the Wau and Port Moresby areas, the supply is continuous, non-seasonal and irregular. In the Kainantu and Goroka areas, the supply is discontinuous, seasonal and constant, with the best supply in December-February.

#### Garlic (Allium sativum)

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Fig 10, Table 6).

The only available data are from market surveys in the Kainantu area where small quantities are sold, particularly in Ukarumpa market. Here the supply is discontinuous, non-seasonal and very irregular. At Aiyura, the best crops were obtained from plantings that grew during extended dry periods in 1979 and 1982.

#### Kohlrabi (Brassica oleracea var. gongylodes)

Data sources: FMC purchases, Goroka (Table 14).

The only available data are FMC purchase figures at Goroka. Here the supply is discontinuous, non-seasonal and very irregular.

#### Leek (Allium ampeloprasum var. porrum)

Data sources: FMC purchases, Goroka (Fig 24, Table 14); FMC purchases, six buying centres (Fig 49, Table 20).

Longitudinal data are available for Port Moresby, Lae, Wau, Kainantu, Goroka and Mount Hagen. Wau was the most important buying centre for the FMC. The supply is continuous at Wau and discontinuous at other locations. At all centres, the supply is non-seasonal and irregular.

#### Lettuce (Lactuca sativa)

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Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 10, Table 6); FMC purchases, Goroka (Fig 25, Table 14); FMC purchases, six buying centres (Fig 51, Table 20).

Longitudinal data are available for Port Moresby, Lae, Wau, Kainantu, Goroka and Mount Hagen. The most important buying centre for the FMC was Wau. At all locations, the supply is continuous, non-seasonal and irregular.

#### Marrow (Curcurbita sp.)

Data sources: FMC purchases, Goroka (Fig 25, Table 14).

Data are available for Goroka only. Here the supply is discontinuous and apparently seasonal, with the best supply in December-January.

#### Pak choi (Brassica chinensis)

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Fig 10, Table 6); FMC purchases, Goroka (Fig 26, Table 14); FMC purchases, six buying centres (Fig 54, Table 20).

Longitudinal data are available for Port Moresby, Lae, Wau, Kainantu, Goroka and Mount Hagen. FMC purchases came mainly from Wau, Port Moresby and Kainantu. The supply is continuous at all locations where market sales or FMC purchases are reasonably large. Market surveys in the Kainantu area show supply to be very seasonal and non-constant, with the best supply in August-October. In contrast, the FMC purchase figures indicate a non-seasonal and irregular supply at all centres.

#### Parsley (Petroselinum crispum)

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Fig 10, Table 6); FMC purchases, Goroka (Fig 26, Table 14); FMC purchases, six buying centres (Fig 55, Table 21).

Longitudinal data are available for Port Moresby, Wau, Kainantu and Goroka. FMC purchases came mainly from Wau, Kainantu and Goroka. Supply is continuous where the quantities sold are greater, and discontinuous where they are smaller. It is non-seasonal and irregular to very irregular at all centres, except at Goroka. Here the FMC purchase figures suggest that it is seasonal and nonconstant, with the best supply in November-February. It is not clear if this is a real effect.

#### Parsnip (Pastinaca sativa)

Data sources: FMC purchases, Goroka (Fig 27, Table 15).

Data are available for Goroka only where very limited quantities were purchased by the FMC. The supply is discontinuous, non-seasonal and very irregular.

#### Peas (Pisum sativum)

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Fig 12, Table 7); FMC purchases, Goroka (Fig 27, Table 15).

Peas are sold in very small quantities at Ukarumpa market and to the FMC at Goroka. Supplies are continuous at Ukarumpa and discontinuous in Goroka. They are non-seasonal and irregular to very irregular.

#### Pumpkin fruit (Curcurbita moschata)

Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 12, Table 7); Hol market survey (Fig 12, Table 7); FMC purchases, Goroka (Fig 28, Table 15); FMC purchases, six buying centres (Fig 61, Table 21); CPI market survey (Fig 82, Table 26).

Longitudinal data are available for Rabaul, Port Moresby, Lae, Wau, Madang, Kainantu, Goroka, Mount Hagen and the Nembi Plateau. The most important buying centre for the FMC was Port Moresby. The supply is continuous at all locations. It is seasonal and non-constant in the intermediate altitude and highland centres, with the best supply occurring some time between September and April, particularly in January-March. The most marked seasonality in supply occurs in the least seasonal environment, that is, the Nembi Plateau. FMC purchase figures indicate a non-seasonal and very irregular supply in the Port Moresby and Lae areas. However, the CPI market surveys show a very weak to weak seasonality in supply in the lowland centres of Rabaul, Port Moresby, Lae and Madang with the best supplies tending to be in January-March and the poorest in July-September. In the Dogura area of MBP, pumpkin are available between August and March (Kahn, 1986:49-50).

#### Pumpkin fruit, Queensland blue (Curcurbita moschata)

Data sources: FMC purchases, six buying centres (Fig 60, Table 22).

Separate purchase records were kept by the FMC for Queensland Blue pumpkin fruit for the Port Moresby, Lae, Wau, Kainantu, Goroka and Mount Hagen buying centres. Purchases in Port Moresby and Lae probably came from production at higher altitude locations. At all centres the supply is discontinuous and seasonal with the best supply in December-January.

#### Pumpkin tips (Curcurbita moschata)

Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 12, Table 7); Hol market survey (Fig 12, Table 7); CPI market survey (Fig 83, Table 27).

Longitudinal data are available for Rabaul, Port Moresby, Lae, Wau, Madang, Kainantu, Goroka and the Nembi Plateau. In markets in the Kainantu area and on the Nembi Plateau, the supply is continuous, non-seasonal and irregular. The CPI market surveys for Rabaul, Port Moresby, Lae, Madang and Goroka indicate that the supply is non-seasonal, but with a tendency for the best supply to be in January-March and the poorest supply some time in the second half of the year. This pattern is somewhat more pronounced at Goroka than at the lowland centres.

#### Radish (Raphanus sativus)

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Fig 12, Table 7); FMC purchases, Goroka (Fig 28, Table 15); FMC purchases, six buying centres (Fig 62, Table 22).

Longitudinal data are available for Port Moresby, Lae, Wau, Kainantu, Goroka and Mount Hagen. The most important buying centres for the FMC were Port Moresby and Wau. At all locations, the supply is discontinuous, non-seasonal and very irregular.

#### Rhubarb (Rheum rhaponticum)

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Fig 12, Table 7); FMC purchases, Goroka (Fig 29, Table 15); FMC purchases, six buying centres (Fig 63, Table 22).

Longitudinal data are available for Port Moresby, Lae, Wau, Kainantu, Goroka and Mount Hagen. The main buying centres for the FMC were Wau and Kainantu. Here the supply is continuous, elsewhere it is discontinuous. At all centres the supply is non-seasonal and irregular to very irregular.

#### Shallot (Allium cepa var. aggregatum)

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Fig 12, Table 7).

Shallot was distinguished from spring onion in market surveys in the Kainantu area. It is only a minor vegetable and the FMC did not distinguish between shallot and the more important spring onion. In the Kainantu area, the supply is discontinuous, non-seasonal and irregular.

#### Silverbeet (Beta vulgaris var. cicla)

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Fig 11, Table 7); FMC purchases, Goroka (Fig 29, Table 16); FMC purchases, six buying centres (Fig 65, Table 22).

Longitudinal data are available for Port Moresby, Lae, Wau, Kainantu, Goroka and Mount Hagen. The main buying centres for the FMC were Wau and Kainantu. At all centres, the supply is continuous, non-seasonal and irregular to very irregular.

#### Spring onion (Allium cepa var. cepa)

Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 11, Table 7); Hol market survey (Table 7); FMC purchases, Goroka (Fig 26, Table 16); FMC purchases, six buying centres (Fig 66, Table 22).

Longitudinal data are available for Port Moresby, Lae, Wau, Kainantu, Goroka and Mount Hagen. The main buying centres for the FMC were Goroka, Wau, Kainantu and Port Moresby. At all locations, the supply is continuous, non-seasonal and irregular.

#### Tomato (Lycopersicon esculentum)

Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 11, Table 7); Hol market survey (Fig 11, Table 7); FMC purchases, Goroka (Fig 30, Table 16); FMC purchases, six buying centres (Fig 68, Table 23).

Longitudinal data are available for Port Moresby, Lae, Wau, Kainantu, Goroka, Mount Hagen and the Nembi Plateau. The main buying centre for the FMC was Wau. Supplies are continuous at all centres, except on the Nembi Plateau where it is a very minor vegetable. In the Kainantu area, market surveys indicate a weakly seasonal and non-constant pattern, with the best supplies tending to be between October and January. FMC purchase figures do not indicate a seasonal pattern except for Port Moresby where supply appears to be somewhat seasonal and non-constant with more produce tending to be available in the August-October period.

#### Turnip (Brassica rapa)

Data sources: FMC purchases, Goroka (Fig 30, Table 16).

Minor quantities of turnip were purchased by the FMC at Goroka. Here, the supply is noncontinuous, non-seasonal and very irregular.

#### Watercress (Nasturtium officinale)

Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 11, Table 7); Hol market survey (Table 7).

Small amounts are sold in markets in the Wau and Kainantu areas and on the Nembi Plateau. The supply is continuous in the Kainantu area and discontinuous at Wau and on the Nembi Plateau. It is non-seasonal and irregular at these three locations.

#### Zucchini (Curcurbita pepo var. medullosa)

Data sources: FMC purchases, Goroka (Fig 30, Table 16); FMC purchases, six buying centres (Fig 70, Table 23).

Longitudinal data are available for Port Moresby, Lae, Wau, Kainantu, Goroka and Mount Hagen. The main supply area for the FMC was Wau. The supply is discontinuous at all centres, except for Wau where it is continuous. Supplies are weakly seasonal and non-constant at all locations. The best supply tends to occur between August and January and the poorest between March and June.

# Fruit

## Abiu (*Pouteria caimito*)

At the Lowlands Agricultural Experiment Station (LAES) at Keravat, abiu produces fruit in a discontinuous and non-seasonal pattern (observations by Steve Woodhouse, hereafter SW).

## Apple (Malus sp.)

At the Highlands Agricultural Experiment Station (HAES) at Aiyura, experimental plantings fruited in March 1979 and again in March 1980 (Tarepe and Bourke, 1982:95), although they failed to fruit in the following two years. Experimental plantings at Kuk Agricultural Station in the Western Highlands fruited in March-April and again in August-September in one year (E. Groedl, pers. comm., 1981). These very limited observations suggest that the fruiting season, when it does occur, is most likely in March-April.

## Avocado (Persea americana)

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Fig 13, Table 9); Goroka market survey (Fig 13, Table 9); FMC purchases, Goroka (Fig 20, Table 12); FMC purchases, six buying centres (Fig 31, Table 17).

Longitudinal data are available for Port Moresby, Lae, Wau, Kainantu, Goroka and Mount Hagen. As well, a number of generalized statements on the production pattern are available. The main fruiting period for the highlands is given as February-May by Tarepe and Bourke (1982:89). The same period is also given for Enga Province by Naki (1991:39). At Keravat, Aburu (1982:119) gives a fruiting season as November-May or August-November. In contrast, Woodhouse reports the main fruiting period at Keravat to be January-March, with lesser production in May-August and November-December, and no fruit maturing in September-October. Aburu's report is not consistent with other data and may be based on short-term observations only.

The available information may be summarized as follows. The fruiting pattern is similar at all lowland, intermediate altitude and highland locations over a wide range of environments. The supply is continuous (or nearly so), seasonal and non-constant. The main fruiting period usually occurs between January and April but major harvests may occur as late as July. The size and timing of the harvest varies from year to year for any location. The pattern in the Kainantu and Goroka areas, which are 60 km apart, is similar but not identical in any given year. The similar production pattern in locations in seasonally dry lowland, seasonally dry intermediate altitude, weakly seasonal highland and non-seasonal highland environmental zones suggests that rainfall does not have a major influence on bearing, but that daylength and small seasonal temperature differences are the triggers for flowering.

## Banana, eating (Musa cvs)

See Starchy Foods.

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## Brazil cherry (Eugenia uniflora)

At Keravat, fruiting is discontinuous and non-seasonal (SW).

## Bukabuk (Burckella obovata)

Fruit are available seasonally in a number of lowland areas, particularly on the Gazelle Peninsula of New Britain, elsewhere in the Islands Region, and on the islands and mainland of MBP. The fruiting season for the Gazelle Peninsula is reported as January-March by SW, and December-January for 1980-81 by RMB. On Unea (Bali) Island north of New Britain, the season is reported as December to January (Villagers, July 1995). In February 1994, people in MBP were asked about the harvesting

season in 11 locations on the following islands: Normanby, Fergusson, Kiriwina, Kitava, Iwa, Gawa and Ianaba. Responses were quite consistent with the period December-February most commonly given as the harvesting season. The range of responses was October-February.

The statements by villagers in the islands of MBP are consistent with observations from New Britain and suggest that the harvesting season occurs between December and March. The consistency of statements in MBP suggests that it may not vary greatly from year to year. The rainfall distribution pattern varies between the Milne Bay locations. The consistent production pattern suggests that seasonal changes in daylength, rather than rainfall, trigger flowering.

# Bullock's heart (Annona reticulata)

At Keravat, the fruiting season is given as December-March by Aburu (1982:117). However, SW records that fruiting is non-seasonal and production varies throughout the year.

#### Canistel (Pouteria campechiana syn. Lacuma nervosa)

At Keravat, Aburu (1982:119) reported that experimental plantings fruited twice a year with the harvesting season in April-May and July-September. However, SW observed that fruiting is continuous and non-seasonal, with more fruit maturing in December-March than in other months.

#### Cape gooseberry (Physalis peruviana)

Casual observations at Aiyura and the Ukarumpa market survey, where cape gooseberry is sold in very small quantities, suggest that production is continuous and non-seasonal.

#### Carambola (Five corner) (Averrhoa carambola)

Data sources: Experimental recordings (Fig 87, Table 29).

At Keravat, the fruiting season for experimental plantings was given as November-May by Aburu (1982:117). However, yield records from three trees at LAES over a three-year period show production to be continuous, non-seasonal and very irregular (Fig 87, Table 29). At the Wau Ecology Institute (1200 m), fruiting is reported as seasonal, with the harvest in March (A. Allison, pers. comm., 1991). A small number of fruit appear in Goroka market in March-April in some years from trees growing at ca 1400 metres.

It appears that carambola production is continuous, non-seasonal and very irregular at Keravat. It is probably seasonal when grown at 1200-1400 m near the crop's upper altitudinal limit.

#### Cherimoya (Annona cherimolia)

A producing tree on Korona Plantation near Kainantu bears between June and September each year. Aburu (1982:117) reports a similar fruiting season at Keravat (July-October). At Wapenamanda and Laiagam in Enga Province, trees produce in May-June (V. Older, pers. comm., 1994).

#### Custard apple (Annona squamosa)

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At Keravat, trees are reported to bear seasonally between December and February (SW); or between December and May (Aburu, 1982:117).

#### Durian (Durio zibethinus)

Data sources: Experimental recordings (Fig 86, Table 28).

Experimental recordings in three blocks at LAES Keravat show fruiting to be discontinuous, seasonal and non-constant. The main producing period occurs some time between November and April and most commonly in February-March. In some years, some trees produce a second crop in the middle of the year (Woodhouse, 1991:162). Aburu's observations on the same trees at Keravat a decade

earlier are similar. He gives the harvesting season as December-February (Aburu, 1982:118). In the Philippines, the production period commences later at higher altitudes, being May-June at sea level, but November-December at the crop's upper altitudinal limit at 600 metres (R. Coronel, pers. comm., 1994). This pattern has not been noted in PNG because most bearing trees are growing near sea level.

### Eggtree (Garcinia xanthochymus)

Data sources: Experimental recordings (Fig 87, Table 29).

Experimental records from five trees at LAES Keravat indicate that fruiting is discontinuous, non-seasonal and very irregular.

## Elder (Sambucus nigra)

In the highlands, fruit production is continuous and non-seasonal (Tarepe and Bourke, 1982:88).

#### Golden apple (Spondias cytherea)

Malinowski gives the harvesting season for "menoni" (golden apple) on Kiriwina Island in the Trobriand Group as December-January (Malinowski, 1935:50-51, 311). In February 1994, villagers were asked about the fruiting season at 11 locations on the following islands in MBP: Dobu, Fergusson, Goodenough, Kiriwina, Kitava, Iwa and Gawa. The most commonly stated harvesting period was January-February and the range was October-April. The consistency of responses suggests that the fruiting season is fairly constant in MBP from year to year. In the inland Pomio area of New Britain, the harvesting season is reported as February-March (Villagers, June 1995). The season in the Musau Islands is reported as August-December by Lepofsky (1992:203).

The available information suggests that golden apple fruit production is discontinuous and seasonal, with the harvesting season in about December-February.

## Cherry (Prunus sp.)

At Laiagam in Enga, a capuli cherry tree fruits in May-July (V. Older, pers. comm., 1994).

#### Governor's plum (Flacourtia indica)

At Keravat, fruiting is continuous and non-seasonal with peaks in November-February and June-July (SW).

#### Granadilla (Passiflora quadrangularis)

At Keravat, fruiting is continuous and non-seasonal (SW).

# Grapefruit (Citrus paradisi)

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Fig 13, Table 9); Goroka market survey (Fig 13, Table 9); FMC purchases, Goroka (Fig 24, Table 13); FMC purchases, six buying centres (Fig 48, Table 19).

Data are available for Port Moresby, Lae, Wau, Kainantu, Goroka and Mount Hagen. The main buying centres for the FMC were Wau and Mount Hagen. The supply is discontinuous at all locations, except Wau where it is continuous. In the highlands and the Wau area, the supply is weakly seasonal and non-constant. Some fruit may be available in all months, but the best supply is usually March to August.

# Guava (Psidium guajava)

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Data sources: Aiyura/Kainantu/Ukarumpa market survey (Fig 13, Table 9); Goroka market survey (Fig 13, Table 9); FMC purchases, Goroka (Fig 24, Table 13).

Original from UNIVERSITY OF MICHIGAN Survey data are available for the Kainantu and Goroka areas only and long-term casual observations have been made at Keravat and on the Gazelle Peninsula. At Keravat, the supply is continuous and non-seasonal with somewhat more fruit available in about August-September (SW). Aburu (1982:119) reported the harvesting season as October-May for experimental plantings at Keravat, but this pattern has not been observed for other trees.

In contrast to the humid lowlands, guava are only available seasonally in the Eastern Highlands. In the Kainantu and Goroka areas, the supply is discontinuous, very seasonal and constant. They are in best supply in February-April in the Goroka area and somewhat later (April-May) in the Kainantu area. This difference is consistent between years and probably reflects the fact that guava are grown at a somewhat higher altitude in the Kainantu area (ca 1600 m) than in the Goroka area (1400-1600 m).

# Guava, cherry (Psidium cattleianum)

Very limited information is available on the production pattern. At Keravat, fruit are reported to be available seasonally, with the best supply in October-January (Aburu, 1982:119). At Bulolo, the main production period is reported to be in April (J. Simpson, pers. comm., 1981). At Aiyura, fruiting is discontinuous. In one year (1980), fruit ripened in April, but it is not known if this occurs in most years.

# Guava, sour (Psidium friedrichsthalianum)

At Keravat, production is continuous and non-seasonal (SW).

# Jackfruit (Artocarpus heterophyllus)

At Keravat, the fruiting season is reported to be October-May by Aburu (1982:117); but more recent observations by SW at Keravat indicate that production is continuous and non-seasonal.

# Kumquat (Fortunella japonica)

At Keravat, the season is reported to be December-May (Aburu, 1982:118) or December-February (SW).

# Kumu musong fruit (Ficus copiosa)

Villagers were asked about the seasonality of fruit production at three locations on Normanby and Fergusson Islands in MBP in February 1994. The range of months given was December-April, with January-February the most commonly claimed period. In Chimbu, fruit are reported as ripening about November by Whiteman (1965:310).

# Langsat (Lansium domesticum)

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At Keravat, the harvesting season is reported as January-February by Aburu (1982:118) and slightly later (March-April) by Woodhouse (1991:165). Both authors report that langsat tends to biennial bearing, that is, to produce a crop only every second year.

# Lemon (Citrus limon)

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Fig 13, Table 9); Goroka market survey (Fig 13, Table 9); FMC purchases, Goroka (Fig 25, Table 14); FMC purchases, six buying centres (Fig 50, Table 20).

Lemons were distinguished from limes in market surveys in the Kainantu area but not in the Goroka market survey or the FMC purchase figures. Lemon and lime grow in both the lowlands and the highlands but lemons are less common below 400 m altitude. Hence, it is likely that data from lowland centres refers mainly to limes, but where no distinction is made, it is not clear whether highland data are for lemon or lime.

The only unambiguous longitudinal data for lemon are from the Kainantu market surveys. Here, the supply is continuous, apparently weakly seasonal and non-constant, with the best supply in two of the three survey years in the May-August period. At Wapenamanda in Enga, Mayer lemons bear in July-October (V. Older, pers. comm., 1994).

# Lime (Citrus aurantifolia)

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Table 9); Goroka market survey (Fig 13, Table 9); FMC purchases, Goroka (Fig 25, Table 14); FMC purchases, six buying centres (Fig 50, Table 20).

FMC purchase figures for Port Moresby, Lae and Wau are interpreted as referring mainly to lime, not lemon (see under lemon above). In the Port Moresby and Wau areas, the supply is continuous, seasonal and non-constant, with the best supplies in the February-May period. FMC purchase figures at Goroka indicate a continuous, seasonal, non-constant pattern with the best supply in January-March. This is similar to the Port Moresby and Wau areas and the pattern for the very limited supply of lime in Kainantu markets. It differs from the Kainantu lemon pattern, suggesting that the main supply to Goroka FMC was lime, not lemon. In the Dogura area of MBP, the season for lemon is given as February-May by Kahn (1986:168), although this is very likely a misidentification for lime.

At Keravat, production of experimental lime plantings is continuous and non-seasonal (Aburu, 1982:117). Yields from a fertiliser trial at Keravat over a seven-year period (1969-1975) clearly show variations in yield over time, but no seasonal patterns (Unpubl. data, LAES, Keravat). Published experimental figures for twelve-month periods at Keravat and Popondetta confirm that production is continuous and somewhat variable. At Keravat, the supply was somewhat better in November-December in 1971 and at Popondetta it was better in March-April in 1971-72 (Byrne, 1984:236-240). At Laloki, citrus leaf miner is reported to be more severe in June and July than in August or November (Brough, 1983), although longer term data than presently available are required to confirm this conclusion.

The available information for lime is somewhat ambiguous. Overall, it seems that lime supply in the seasonally dry lowlands and intermediate altitude zone is continuous and somewhat seasonal with a better supply in February-May. The Eastern Highlands data are less clear, but a similar seasonal pattern to the seasonally dry lowlands is likely. At Keravat, in a non-seasonal humid lowland environment, production is continuous, non-seasonal and irregular.

# Loquat (Eriobotrya japonica)

In the Kainantu area, the supply of fruit is discontinuous, seasonal and non-constant. The producing season occurs at some time between March and July, particularly in April-May. Over the six-year period 1978 to 1983, the best production was in 1980 and 1983 following droughts in the previous years. At Wapenamanda in Enga, fruiting is reported to occur in February-March (V. Older, pers. comm., 1994).

# Mabewa (Baccaurea papuana)

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At Keravat, production is discontinuous and seasonal, with fruit produced in March-July (SW).

# Malay apple (Syzygium malaccense)

Data sources: Villagers' statements and literature (Table 37).

Most reports in the literature and statements by villagers indicate that fruit ripen seasonally at some time between September and February, particularly in December-January (Table 37). However, at Keravat the season was observed by SW to be June-August and villagers at six locations in the Kandrian and Gloucester Districts of West New Britain (WNB) gave a similar period when asked in May 1993. In the Talasea area of WNB, people stated in mid-1995 that two seasons occur each year, one in about July and the other in about January. In June 1995, villagers on the Gazelle Peninsula gave the harvesting season as

Original from UNIVERSITY OF MICHIGAN December-February, even though there was a minor crop at the time of the survey (June). In the Eastern Baining Mountains of the Gazelle Peninsula, people said that Malay apple bears in both May-June and December-January. It seems that the main harvesting season occurs in about December-January and that some production occurs in the May-August period. The available data do not indicate a relationship between the harvesting season and rainfall seasonality or latitude (Table 37).

## Malay apple, giant (Syzygium megacarpa)

The conflicting information noted for Malay apple also occurs for giant Malay apple. At Keravat, Aburu (1982:118) gives the season as January-February, but SW has observed it to be June-August. Kahn (1986:49-50) identified Malay apple as *Syzygium megacarpa*, not *S. malaccense* and gives the season in the Dogura area as December-February.

## Mandarin (Citrus reticulata)

Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 14, Table 9); Goroka market survey (Fig 14, Table 9); FMC purchases, Goroka (Fig 25, Table 14); FMC purchases, six buying centres (Fig 52, Table 20).

Longitudinal data are available for Port Moresby, Lae, Wau, Kainantu, Goroka and Mount Hagen. The main buying centres for the FMC were Port Moresby (production from mountainous areas of Central Province), Lae and Wau.

At all locations, the supply is discontinuous, markedly seasonal and constant. The period of best supply is May-August, and the production usually lasts for about three months. There is only limited fruiting in other months of the year. Information from other locations also indicates that production is very seasonal. Reported producing periods are June-August on the Kokoda Trail in Central Province (Brough and Rogers, 1982:172); April-August at Karimui in Chimbu (A. Poka, pers. comm., 1989); and March-June at Pindiu on the Huon Peninsula (Villagers, October 1991).

These data do not indicate a relationship between mandarin seasonality and altitude. However, it was observed in the Kainantu area in 1983 that the producing period commenced progressively later at increasing altitudes over the range 1400 to 1800 metres.

#### Mango (Mangifera indica)

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Data sources: Aiyura/Kainantu/Ukarumpa market survey (Fig 14, Table 9); Goroka market survey (Table 9); Observer network (Fig 90, Table 30); Villagers' statements and literature (Table 38).

The market survey data for Kainantu and Goroka reflects production in the Markham and Ramu Valleys. It is not discussed here as direct observations are available over a longer period for the Markham Valley. Reasonably good longitudinal observations are available for the Rabaul area, Markham Valley and Port Moresby area for a six-year period and generalized statements on mango seasonality are available for 13 other lowland locations.

At all locations production is discontinuous, markedly seasonal and constant. The fruiting season usually occurs at some time between October and January, but it may start as early as July and finish as late as February. For the Kandrian area on the south coast of New Britain, there are inconclusive reports by villagers of a second smaller season in April-June.

The detailed observations from the Rabaul, Markham Valley and Port Moresby areas are now considered (Fig 90, Table 30). In the Rabaul area, the harvesting season generally starts in November or December and continues into January. This is a little later than the other two locations. The fruiting season is about two months long, excluding the exceptional 1984-85 season. The season in the Markham Valley usually commences in October or November. The average length of the season (1.5 months) is shorter than for the Rabaul or Port Moresby areas. However, it is not clear whether this is a real effect or whether it reflects differences in interpretation of the length of season by different observers.

The start of the fruiting season varies more from year to year in the Port Moresby area than at the other two locations. Over the six-year period of observations, it commenced as early as August and as late as November. As at Rabaul and the Markham Valley, the length of the fruiting season is quite variable. It averaged two months, excluding the 1984 season. In that year, the harvesting season commenced in July-August and was exceptionally long in the Rabaul and Port Moresby areas, but not in the Markham Valley. It is not known why this occurred.

Some preliminary conclusions are now made about the relationship between climatic factors and the timing and size of the fruiting season. Mango fruit regularly in lowland and intermediate altitude environments where there is some rainfall seasonality. This occurs even where the total annual rainfall is very high (3000-4000 mm) and no months are really dry (less than 100 mm per month on average). Examples of such locations are Kandrian, Finschhafen, Madang and Kiriwina Island. Mango trees rarely fruit where the rainfall is very evenly distributed throughout the year, for example at Keravat. In the highlands, some fruit are produced at up to about 1600 m altitude in locations where rainfall distribution is seasonal, for example, the Wahgi Valley, Kundiawa area, Asaro and Arona Valleys. The best mango production in PNG occurs in lowland locations that have a marked dry season, for example, coastal Central Province, the southern part of Western Province, the Rabaraba area of MBP, the upper Markham Valley, the Sialum area on the Huon Peninsula, the western end of Umboi Island and the eastern part of the north-east lowlands of the Gazelle Peninsula of New Britain.

In general, the producing season is similar at all locations, that is, the October-January period, irrespective of when the dry season occurs (Table 38). Thus, the season is similar at Finschhafen (driest months are January-March) and nearby Sialum (marked seasonal rainfall distribution; driest months May-October); it is similar at Kandrian (drier months January-February) and Gloucester (May-September) on New Britain; and in MBP it is similar at Dogura (markedly seasonal rainfall; driest months June-November), in the area of Milne Bay (reversed seasons; driest months November-January) and in the D'Entrecasteaux, Trobriand and Marshall Bennett Islands where rainfall is only weakly seasonal (drier months November-December). There is no apparent relationship between the producing season and altitude or latitude.

At locations where the driest months occur during the South-East wind season (May-September), there is a relationship between the period of lower rainfall and the start of the harvesting season. This relationship holds both for different locations and for different years in the same location. For example, the driest months in the Markham Valley and the Port Moresby area usually start in April or May and the mango season starts in October or November. The drier period starts a little later in the Rabaul area (May-July) and the mango season also tends to start a little later (November-December). For the Port Moresby area over the period 1980-85, there was a five-six month lag between the start of the drier period (recorded rainfall <100 mm/month) and the commencement of the producing season. This is consistent with the period between flowering and fruit harvesting for the annual phenological cycle in mango (Cull, 1991:60).

However, the relationship between the start of the drier months and the harvesting season does not hold for locations where the South-East wind season (May-September) is the wettest part of the year and the drier period occurs in December-February. These locations include Kandrian, Finschhafen, Bukaua and Milne Bay area. This suggests that some other factor such as lower temperatures also initiate flowering. In the Kandrian area, informants at a number of locations indicated that a second smaller harvesting season occurs. This statement was not consistently given by informants at different locations and it is not clear how significant or regular the second season is.

There were indications that the harvest was poor in years when the dry season was brief, for example, in the Markham Valley in 1981. Following a drought in 1982, good production was reported in the Rabaul area and the Markham Valley. The 1979 and 1982 droughts also induced flowering and fruit set at highland locations where fruiting does not usually occur, such as at Aiyura. The very severe drought in the mid- and upper-Markham Valley in 1987 was followed by an

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exceptionally good mango harvest. The usual back-up staple crops, such as yam and cassava, failed because of the drought and villagers relied on cash from mango sales to purchase food and survive the food shortage (H. Holzknecht, pers. comm., 1993).

Productivity in mango is determined by both the stored carbohydrate and current carbohydrate production (Cull, 1991). Thus, production in any given year will be determined by the previous history of bearing and environmental conditions during the current year's growing period. The available data on production are too subjective for further analysis.

# Mango, traditional (Mangifera foetida and Mangifera minor)

Reports from various parts of PNG indicate that the traditional mangoes bear seasonally and at about the same time as the introduced species (Fig 90, Tables 30, 38). On Kiriwina Island, it ripens in September-December (Malinowski, 1935:50, 314). On Goodenough, Fergusson and Normanby Islands, villagers gave the harvesting season as November-December when asked in February 1994. In the Kandrian and Gloucester Districts of WNB, villagers say that the traditional mango bears in about December-January. In the Eastern Highlands, the traditional mango bears a little later than the introduced mango in the Markham Valley where fruit ripen in October-December (Tarepe and Bourke, 1982:87).

# Mangosteen (Garcinia mangostana)

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Data sources: Experimental recordings (Fig 86, Table 28).

Experimental recordings are available for four plots over five seasons at LAES, Keravat. Here, fruiting is discontinuous, seasonal and non-constant. Fruit usually mature at some time between November and March, but the start of the harvesting season can be as early as September and as late as February. The size of the harvest varies considerably from year to year. Trees in the four plantings have a similar fruiting pattern each year (Table 28). This suggests that the trees come from uniform genetic material. Aburu (1982:118) observed the same trees a decade earlier and recorded the harvesting season as December-April.

# Marita pandanus (Pandanus conoideus)

Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 14, Table 9); Goroka market survey (Fig 14, Table 9); Hol market survey (Fig 14, Table 9); Villagers' statements and literature (Table 39).

Longitudinal data are available for the Wau, Kainantu and Goroka areas and the Nembi Plateau. Statements by villagers and outside observers are also available for 22 locations in the lowland, intermediate altitude and highland zones (Table 39). In the highlands at 1500-1700 m altitude, the supply is discontinuous, very seasonal and constant. Fruit ripen over about a four-month period. This usually occurs between January and April, but the season may commence in November or December.

There is a clear relationship between the length of the fruiting season and altitude in PNG. This is illustrated in Fig 92 where the length of the main harvesting season is plotted against altitude. Near sea level, production is usually reported as continuous and non-seasonal, although shorter producing seasons are reported for two locations at low altitudes. At intermediate altitude locations, some fruit are commonly reported as being available for all or most months of the year. However, the main producing period commences later and is shorter with increasing altitude.

The fact that the marita-producing season commences earlier and lasts longer at lower altitudes has been reported at a local level by a number of observers. This has been noted, for example, in the Ivori Valley in Gulf Province over an altitudinal range of 600-1500 m (Bonnemère, 1992:41); in the Simbai Valley in Madang Province at up to 1200 m (Buchbinder, 1973:107); and in the Mount Sisa area in the Southern Highlands Province (SHP) (800-1100 m) (Dwyer, 1990:148, 160). The seasonal differences at different altitudes are exploited by villagers living on the highland fringe and in lower altitude valleys. In the last two or three months of the calendar year, it is common to encounter

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villagers from lower altitude locations carrying marita fruit into the main highland valleys to sell or trade. The main producing period does not appear to be influenced by rainfall seasonality or latitude.

The word for marita also defines a certain season of the year in all language groups in the mountainous southern side of the central highlands from the Angan speaking area in Gulf Province to the Great Papuan Plateau (R. Hide, pers. comm., 1993). For example, in the Lake Kutubu area, the marita season ("abari") contrasts with the "anumu" (lowland pitpit), the "waria" tree, the "pango" fruit and the "mist" seasons (Williams, 1976:166-167; Weiner, 1983:26-27). In the Mount Sisa area, people divide the year into two seasons, the "cloud exists" season and the "fruit pandanus exists" season (Dwyer, 1990:23). A similar phenomenon has also been recorded on the northern side of the central highlands. In the Simbai Valley, the ripening of different marita cultivars is used to mark various periods of the year (Rappaport, 1968:174-176). The widespread use of marita as a temporal marker in traditional society highlights both the importance of the fruit, particularly in intermediate altitude locations, and the regular commencement of the main harvesting season.

#### Microcitrus sp.

At Keravat, a planting of Microcitrus sp. (known as "kamokuku" on Manus Island) bear in December-March (SW).

#### Mon (Dracontomelon dao)

In the Madang area, fruiting is discontinuous. Fruit were sold in Madang market in October-November 1981, but it is not known whether this is the usual producing period. On the Duke of York Islands off New Britain, the fruit are reported to ripen in October-December (Villagers, June 1995).

#### Mulberry (Morus nigra)

In the Kainantu area, fruiting is discontinuous, seasonal and constant. Observations made over a fiveyear period indicate that fruit ripen between September and December each year.

#### Naranjilla (Solanum quitoense)

At Aiyura, fruit production is continuous and non-seasonal (Tarepe, 1982:184).

#### Nectarine (Prunus persica var. nectarina)

At Taluma on the Sirunki Plateau west of Wabag in Enga, the main bearing period is May-July (V. Older, pers. comm., 1994).

#### **Orange** (Citrus sinensis)

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Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 14, Table 9); Goroka market survey (Fig 14, Table 9); FMC purchases, Goroka (Fig 26, Table 14); FMC purchases, six buying centres (Fig 53, Table 20).

Longitudinal data are available for Port Moresby, Lae, Wau, Kainantu, Goroka and Mount Hagen. The best supply for the FMC was at Lae (reflecting production in the Snake River-Mumeng area), Port Moresby and Wau. At all locations the supply is discontinuous, seasonal and non-constant. The best supply usually occurs at some period between April and August. Production is quite variable from year to year and significant fruiting may also occur in January-March. The pattern is the same at intermediate altitude and highland locations.

Observations from other locations confirm the conclusions from the longitudinal data. At Karimui (1200 m), oranges ripen in April-August (A. Poka, pers. comm., 1989). At Pindiu (700-900 m), villagers say that oranges are only weakly seasonal and that the best supply occurs in March-June. In the Western Highlands, the main producing period is April-July but navel oranges often produce a smaller crop in November-December (Rogers and Movis, 1991:153). At Wapenamanda in Enga, most

fruit are available in May-June, with some in December (V. Older, pers. comm., 1994). On the Mamusi Plateau in WNB, at an altitude of about 800 m, the harvesting period is April-June (Villagers, July 1995).

### Parartocarpus venenosa

This obscure fruit is common on New Britain, except on the north-east lowlands of the Gazelle Peninsula. Information is restricted to statements by villagers in various locations on New Britain.

In the Kandrian area of WNB, villagers say that there is no particular harvesting season (May 1993). On the coast north of the Baining Mountains, at Lassul Bay, villagers stated that production is discontinuous and non-seasonal, and the same pattern was described for the inland Kandrian area, the Cape Hoskins area and the Talasea area on the north coast. A slightly different interpretation was given by villagers in the Eastern Baining Mountains who described the pattern as continuous and non-seasonal (Villagers, June 1995). At two locations a seasonal production pattern was claimed. These were east of Pomio (August-September) and Uvol on the south coast (March-April).

The available information suggests that fruiting on New Britain is discontinuous, non-seasonal and irregular.

## Passionfruit, banana (Passiflora mollissima)

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Table 9); Goroka market survey (Table 9).

In the Kainantu and Goroka areas, small quantities of fruit appear in the markets occasionally. Casual observations were made on fruiting in the Kainantu area, at Tambul in the Western Highlands and at various locations in Enga Province. Fruiting is discontinuous and appears to be non-seasonal.

## Passionfruit, highland yellow (Passiflora ligularis)

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Fig 15, Table 8); Goroka market survey (Fig 15, Table 8).

In the Kainantu and Goroka areas, the supply is discontinuous, non-seasonal and very irregular.

#### Passionfruit, lowland yellow (Passiflora edulis f. flavicarpa)

At Keravat, production is continuous and non-seasonal (RMB, SW). In the Dogura area of MBP, Kahn (1986:46, 164) gives the fruiting season as October-February.

#### Passionfruit, purple (Passiflora edulis f. edulis)

Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 15, Table 8); Goroka market survey (Fig 15, Table 8); FMC purchases, Goroka (Fig 27, Table 15); FMC purchases, six buying centres (Fig 56, Table 21); Literature (Table 40).

Longitudinal data are available for Wau, Kainantu and Goroka. Some data are also available for Port Moresby and Lae, reflecting production in mountainous areas in these cities' hinterlands. Generalized statements on passionfruit seasonality are collated in Table 40. The main buying centres for the FMC were Goroka and Wau.

At all locations, production is discontinuous, very seasonal and constant. The main harvesting period is usually between January and April, commencing in either January or February. The pattern is similar at all centres and there is no influence of altitude or rainfall seasonality on the main production period. The regular commencement of the fruiting season in January or February suggests that daylength is the main influence on flowering.

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### Pawpaw (Carica papaya)

Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 15, Table 8); Goroka market survey (Fig 15, Table 8); Hol market survey (Table 8); FMC purchases, Goroka (Fig 27, Table 15); FMC purchases, six buying centres (Fig 57, Table 21).

Longitudinal data are available for Port Moresby, Lae, Wau, Kainantu, Goroka and Mount Hagen. Most of the FMC supply came from Port Moresby and Lae. In the PNG lowlands, the supply is continuous, non-seasonal and irregular. This also appears to be the case in the Wau area. In contrast, production is continuous but seasonal and non-constant in the Kainantu and Goroka areas. Here fruit are more available between August and October.

## Peach (Prunus persica)

At Taluma in Enga, the main bearing period for peach is May-July (V. Older, pers. comm., 1994).

#### Persimmon (Diospyros kaki)

A tree at Laiagam in Enga bears in June-July (V. Older, pers. comm., 1994).

#### **Pineapple** (Ananas comosus)

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Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 17, Table 8); Goroka market survey (Fig 17, Table 8); Hol market survey (Fig 17, Table 8); FMC purchases, Goroka (Fig 28, Table 15); FMC purchases, six buying centres (Fig 58, Table 21); CPI market survey (Fig 81, Table 26); Experimental recordings, Keravat (ENB) and Saiho (Oro Province) (Fig 89); Villagers' statements and literature (Table 41).

Longitudinal data are available for Rabaul, Keravat, Port Moresby, Saiho, Lae, Wau, Madang, Kainantu, Goroka, Mount Hagen and the Nembi Plateau. Market surveys of Gordons market in Port Moresby by the FMC have been published by Rogers and Levett (1994). Generalized statements are available for other lowland and intermediate altitude locations. Port Moresby was the most important buying centre for the FMC.

In our surveys of Wau, Kainantu, Goroka and Hol markets, a distinction was made between rough and smooth leaf pineapples. The experimental data (Keravat and Saiho) is for the rough leaf type. No distinction was made between the two types for FMC purchases, the CPI market surveys and villagers' statements. In the highlands, the smooth leaf type is much more important than the rough leaf type. The opposite applies in the lowland and intermediate altitude zone where the rough leaf type dominates. Where no distinction is made, the highland data refer mainly to the smooth leaf type; and the lowland and intermediate altitude data to the rough leaf type.

In the highlands, the supply of smooth leaf pineapple is continuous, seasonal and non-constant. Market surveys and FMC purchases indicate that the best supply occurs at some period between September and March, and particularly in January-February, and the poorest supply is between April and August. The CPI market survey in Goroka indicates that the best supply is in January-March and the worst in May-September. There is considerable variation in the pattern between years. In the Eastern Highlands, the supply of rough leaf pineapples is discontinuous, seasonal and non-constant. The best supply occurs between October and February and the pattern appears to be more regular than for the smooth leaf type.

In the lowlands and intermediate altitude zone, the supply of rough leaf pineapples is continuous, seasonal and non-constant. The best supply usually occurs at some period between October and March and particularly between November and January. The poorest supply is usually between April and September. The different data sets indicate slightly different periods of best and worst supply. This reflects the considerable variation in the pattern from year to year. This year-to-year variation is well illustrated by the experimental records from Keravat and Saiho (Fig 89).

A study at Keravat by Bourke (1976b) concluded that flowering in rough leaf pineapples is initiated by low night temperatures and not by variation in sunshine hours, rainfall or maximum temperature. Data presented here supports this conclusion. In the lowlands, the fruiting pattern is similar in locations where the driest months occur between May and September (most locations) and those where the driest months occur between November and March, for example, the Kandrian area and Normanby Island. This indicates that flowering is not initiated by dry conditions. The large variation in the year-to-year pattern suggests that changes in daylength, which is constant between years, is not responsible for flower initiation.

# Plum, Japanese (Prunus sp.)

At Aiyura, fruiting is discontinuous (L. Schultz, pers. comm., 1980). It is not known if it is seasonal. At Sopas in Enga, five trees of unknown varieties bear in a discontinuous and apparently nonseasonal pattern; and at Taluma, several varieties fruit in May-June (V. Older, pers. comm., 1994).

# Pomegranate (Punica granatum)

Fruit are produced between December and March in the Rabaul area and between December and May at Keravat (Aburu, 1982:111, 119).

# Pomelo (Citrus maxima)

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Generated Creative Fruit production is continuous and non-seasonal at Keravat (RMB, SW).

# Pouteria (Pouteria maclayana)

On Karkar Island, villagers claimed in October 1991 that production was discontinuous and seasonal with fruit maturing in August-October. Mature fruit were available at the time of fieldwork but no other data on seasonality are available.

# Pulasan (Nephelium mutabile)

Data sources: Experimental recordings (Fig 88, Table 29).

At Keravat, fruit production from 10 trees in an experimental planting is discontinuous, seasonal and non-constant. Fruit ripen between November and March; production varies considerably from year to year; and very few fruit were produced in one of the four years for which data are available.

# Rambutan (Nephelium lappaceum)

Data sources: Experimental recordings (Fig 87, Table 28).

At Keravat, fruit production is discontinuous, seasonal and constant. The fruiting season lasts for about three months and occurs between February and May, but it may start as early as November. Production levels are reasonably stable from year to year. Aburu (1982:113, 119) gives the season at Keravat and in the Rabaul market as November-March.

# Raspberry, black (Rubus lasiocarpus)

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Table 8).

In the Kainantu area, fruit production is continuous and appears to be non-seasonal. This fruit was sold in Ukarumpa market for only the final year of the survey period, and here the supply was nonseasonal and irregular.

# Rockmelon (cantaloupe) (Cucumis melo)

Data sources: FMC purchases, six buying centres (Fig 64, Table 22).

Only limited data are available as rockmelon is a minor crop in PNG and plantings are commonly affected by fungal disease. The FMC purchased some five tonnes in September-November 1980 in Lae and limited quantities in Port Moresby and Wau. The supply is discontinuous, non-seasonal and very irregular. At Keravat, it is necessary for plantings to be made in May to produce fruit in August-November, otherwise fungal diseases destroy crops (SW). The recommended planting period for the Markham Valley is towards the end of the wet season (April-May) (Antonio, 1986:6). The available information suggests that successful crops are most likely to be harvested at the end of the drier months, that is, August to November in most locations.

# Rollinia (Rollinia deliciosa)

At Keravat, fruit production is continuous and non-seasonal (SW).

### Rukam (Flacourtia rukam)

In January-February 1994, villagers at seven locations on Normanby, Dobu, Fergusson and Goodenough Islands in MBP were asked about the seasonality of rukam. Fruit were available at this time. No consistent responses were obtained to RMB's questions, suggesting that fruiting may be discontinuous and non-seasonal.

#### Santol (Sandoricum koetjape)

Data sources: Experimental recordings (Fig 88, Table 29).

There are three trees in an experimental plot at Keravat. Production is discontinuous, seasonal and constant. Fruit are produced over a two-month period each year at some time between December and March.

#### Sapote, white (Casimiroa edulis)

At Laiagam in Enga, the main fruiting season is reported to be May-September. At Wapenamanda, it is reported as May-September or February-March (V. Older, pers. comm., 1994).

#### Soursop (Annona muricata)

Production is continuous and non-seasonal in the PNG lowlands, including at Keravat (Aburu, 1982:117).

#### Star apple (cainito) (Chrysophyllum cainito)

At Keravat, experimental plantings are reported as producing fruit in December-January in a biennial pattern (Aburu, 1982:117).

#### Strawberry (Fragaria sp.)

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Fig 15, Table 9); Goroka market survey (Fig 15, Table 9); FMC purchases, Goroka (Fig 29, Table 16).

Data are available for the Eastern Highlands only. As well as market surveys and FMC purchase figures, observations are available from the Awande Vocational School near Okapa and records from experimental plots at HAES, Aiyura for 1980-1981. In the Eastern Highlands, production is discontinuous, seasonal and probably non-constant. Most fruit ripen between May and November, particularly in June-September. The supply varies greatly from year to year, probably because of large variations in the area planted due to changing perceptions of marketing opportunities by villagers.

#### Tamarind (Tamarindus indica)

At Keravat, the production season is reported to be April-June (Aburu, 1982:119).



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### Taun (Pometia pinnata)

Data sources: Villagers' statements and literature (Table 42).

Thirteen generalized statements are available on the main harvesting period in PNG as well as Santa Cruz Island in the Solomon Islands and Vanuatu. The PNG observations are from the New Guinea Islands and from inland areas of East Sepik and Sandaun Provinces, reflecting locations where taun is important. These reports indicate that fruiting is discontinuous and seasonal. The reported harvesting season occurs at some time between August and April and most commonly in November-February. The season is most commonly given as 2-3 months in duration. There is no apparent relationship between the reported harvesting period and altitude, rainfall seasonality or latitude.

## Tree cucumber (Averrhoa bilimbi)

At Keravat, fruit production is discontinuous and non-seasonal (SW).

## Tree tomato (tamarillo) (Cyphomandra betacea)

Data sources: Aiyura/Kainantu/Ukarumpa market survey (Fig 16, Table 8); Goroka market survey (Fig 16, Table 8); FMC purchases, Goroka (Fig 30, Table 16).

Limited information is available for the Kainantu and Goroka areas where the supply is discontinuous. There is an indication that the best supply occurs in March-April, particularly from the FMC purchases, but there is insufficient data for definite conclusions to be drawn. At Wapenamanda and Taluma in Enga, fruiting is reported to be continuous (V. Older, pers. comm., 1994).

## Velvet apple (Diospyros discolor)

At Keravat, fruit production is discontinuous and non-seasonal (Aburu, 1982:118; SW).

#### Watermelon (Citrullus lanatus)

Data sources: Wau market survey; FMC purchases, six buying centres (Fig 69, Table 23); Villagers' statements and literature (Table 43).

Longitudinal observations are available for Port Moresby, Lae, Wau, Kainantu, Goroka and Mount Hagen and generalized statements for four other locations. Most of the FMC supplies came from the Lae (Markham Valley) and Port Moresby buying centres. The supply is continuous in the Port Moresby area and the Markham Valley and discontinuous at other locations for which data are available. At all locations the supply is seasonal and constant, with the best supply occurring between November and March.

At two locations (Obo, Fly/Strickland Rivers Junction and Kandrian, WNB), villagers stated that they plant watermelon in the drier months because insect damage to leaves is excessive in the wetter months. The claimed planting seasons were September-October and November-December at the two locations respectively.

#### Watery rose apple (Syzygium aqueum)

The supply to Goroka market is discontinuous and non-seasonal (data not presented). On Dobu Island in MBP, villagers claimed in February 1994 that production was discontinuous and non-seasonal. Earlier observations recorded the supply at Keravat as seasonal (December-May) (Aburu, 1982:118); but more recent observations at Keravat are that production is discontinuous and non-seasonal (SW). Overall, the limited information available indicates that the supply is discontinuous and non-seasonal in the lowlands and highlands.

# Nuts

# Breadfruit (Artocarpus altilis)

Data sources: Villagers' statements and literature (Table 34a).

The main economic product of breadfruit is the flesh, but the seeds are also eaten. Some cultivars recently introduced from the Eastern Pacific are seedless. Breadfruit is grown on all island groups just north of the New Guinea mainland, in the Admiralty Group, New Britain, New Ireland, Solomon Island chain and the islands of MBP. It is also widely grown elsewhere in the Pacific. Breadfruit is grown on the New Guinea mainland in the coastal part of MBP, that is from about Cape Vogel to about East Cape, in the Rigo area of Central Province and possibly in other coastal locations. However, it is not common on the New Guinea mainland. A related species, or possibly a different form of this species, is grown on the island of New Guinea, as well as in the Moluccas west of New Guinea and in the Philippines. This is breadnut *(Artocarpus camansi)* and only the nuts are eaten for this species (Coronel, 1994; Ragone, 1997). The production pattern for breadnut is considered separately.

Statements about breadfruit harvesting seasons are available for some 25 locations on Vokeo Island, Karkar Island, New Britain, Bougainville, and mainland and island MBP (Table 34a). The production period for Milne Bay is usually given as commencing in October or November and extending for 4-6 months. The statement by Malinowski (1935) that breadfruit is mature in April-May in the Trobriand Islands is an exception to this generalisation. These locations are at 9-11°S, where seasonal changes in daylength are more marked. It is possible that differences in daylength in MBP are sufficiently large to impose a more-or-less regular seasonal flowering pattern.

In response to questions by RMB about breadfruit seasons, different villagers in the same area often gave conflicting information. For example, in a village on the western side of Umboi Island, people claimed that breadfruit produces seasonally but could not clearly identify the season. In a village on the eastern side of the same island, one group of informants claimed February as the harvesting period, but another group were uncertain. There is also some confusion in the literature about breadfruit seasonality for other Pacific island countries where statements are made by Coenan and Barrau (1961) and by Massal and Barrau (1956:19-20). However in Vanuatu, the pattern seems to be similar to that in Milne Bay. There the producing period is given as from November onwards for Malo Island (Allen, 2001:87) or more generally as November-January with a minor crop in June-August (Weightman, 1989:112).

In contrast to the Milne Bay area, there is no consistent seasonal pattern for the other locations for which data are available (Table 34a). It is likely that flowering and fruiting vary from year to year in an irregular manner. There is no relationship between the seasonality of rainfall distribution and the production pattern for these locations, including Milne Bay. In Milne Bay, the pattern is probably discontinuous, seasonal and constant. At other locations closer to the equator in PNG, the pattern appears to be discontinuous, non-seasonal and probably very irregular.

Hogbin's (1938-39:128) statement that breadfruit bear at irregular intervals on Wogeo Island and that periods for the harvest cannot be accurately forecast is a good summary of the production pattern, at least for locations nearer the equator in PNG.

# Breadnut (Artocarpus camansi)

Data sources: Villagers' statements and literature (Table 34b).

The main economic product of breadnut is the large seed which is cooked before eating. In PNG, it is widely grown on the New Guinea mainland up to an altitude of 1250 m, and occasionally as high as 1450 metres. Over 20 statements on the breadnut production pattern are available from villagers or the published literature (where the name "breadfruit" is generally used). It is reported to bear in all

months of the year at different locations. There is no relationship between the claimed production period and altitude or latitude. There is insufficient data from locations with contrasting rainfall seasonality patterns, but there does not appear to be a relationship between rainfall seasonality and production. At a number of locations, different sources give different "production seasons", including the Mogulu area of Western Province, the inland Gulf Province area (Swanson and Ivori Valleys) and the Simbai area of Madang Province. In contrast, two authors give the same period for the Karimui Plateau of Simbu Province (Table 34b).

A number of authors comment further on the pattern. Dornstreich (1973:222) could not determine whether breadnut bore seasonally in the area of the southern tributaries of the Sepik River. He recorded production in March, July and October during his year's fieldwork. In the Dreikikir area, Obrist van Eeuwijk (1992:108) noted that breadnut was available all year but more matured in the May-July period.

It is clear that breadnut production is discontinuous in PNG, but the available information does not indicate any general pattern. The lack of consistency suggests that the producing period varies from year to year at any one location. It is not clear whether there is a tendency for the producing period to occur during certain months for any given location or whether production may occur during any month.

## Buchanania sp.

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Generated Creative C In the Mogulu area near Nomad in Western Province, "hotuna" (Buchanania sp.) nuts ripen in about December (van Beek, 1987:20, 23).

#### Canarium (Canarium acutifolium and Canarium vitiense)

#### (see "Galip" for Canarium indicum)

Nuts of these two species are reported as being eaten in parts of Western Province. The taxonomy of the species is close and unreliable in the field (Evans, 1994:12) so the possibility of misidentification exists. In the Mogulu area near Nomad, nuts of *C. acutifolium* are reported to ripen in about December by van Beek (1987:20, 23). On the Oriomo Plateau, nuts of *C. vitiense* are harvested and eaten in September-November (Ohtsuka, 1983:89-90). In the Strickland Valley north of Nomad, there are two canarium species with edible nuts, one with nuts much larger than the other (P. Dwyer and M. Minnegal, pers. comm., 1993). Nuts of the large-seeded type were available in August (?)-December 1986 and also in October-November 1991.

#### Candle nut (Aleurites moluccana)

Data sources: Goroka market survey (Fig 18, Table 10).

Small quantities are offered for sale in Goroka market. The supply is discontinuous, seasonal and constant. They appear in the market in August-November. In Sinasina District in Simbu Province, they were sold in markets in September-December 1972, peaking in November (Hide, 1981:400). Peekel (1984:602) records fruiting in August on the Gazelle Peninsula and New Ireland. These scattered and limited records indicate that nuts are available seasonally between August and December.

#### Cashew (Anacardium occidentale)

At Keravat, nuts are reported to produce in October-January each year (Aburu, 1982:120) or in December-January (G. Ling, pers. comm., 1995). The period of October-January was also reported for the 1988-89 fruiting season at Numanuma on Bougainville (Allen, 1991:171).

#### Castanopsis (Castanopsis acuminatissima)

Data sources: Villagers' statements and literature (Table 44).

Seven generalized statements on castanopsis production are available. These indicate that nuts are available seasonally, that the season lasts for about two months, and that it commences at some time between July and December (Table 44). There is an indication from the available data that the producing season commences earlier (July-September) at 800-1200 m than at higher altitudes (1600-2000 m) where it commences in November-December.

#### Coconut, dry (Cocos nucifera)

Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 16, Table 10); Goroka market survey (Fig 16, Table 10); FMC purchases, six buying centres (Fig 43, Table 19); CPI market survey (Fig 77, Table 25).

Longitudinal data are available for Rabaul, Port Moresby, Lae, Wau, Madang, Kainantu and Goroka. Market sales in highland centres reflect production in the Markham and Ramu Valleys. The main buying centre for the FMC was Port Moresby.

In the lowlands, the supply of dry coconuts is continuous, non-seasonal and irregular to very irregular. It is not known whether irregular supplies reflect changes in production or changes in the quantity offered for sale. The very even CPI market prices for most centres suggest that supply is fairly constant throughout the year. For Port Moresby only, market prices tend to be higher in August-October than in other months, suggesting a weakly seasonal supply pattern. However, there is considerable variation from year to year in market prices and this apparent seasonal pattern in Port Moresby only occurs in some years. National level data for copra production for a nine-year period (1977 to 1985) are given by Jolly *et al.* (1990:100-101, 109). These figures do not indicate any consistent seasonal pattern, although average production was slightly higher for March and December for this particular period.

Supply in highland markets is discontinuous, non-seasonal and very irregular, but the lack of continuity of supply reflects marketing constraints rather than production changes in the lowlands. Very minor quantities of sprouted dry coconuts are sold in markets in the Kainantu area (Table 10). The supply is discontinuous, non-seasonal and irregular. In the Imonda area in Sandaun Province, coconut palms are not very common. Here villagers restrict harvesting until the festive season in May-June (Gell, 1975:161-166).

#### Coconut, green (Cocos nucifera)

Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 16, Table 10).

In markets in the Wau and Kainantu areas, the supply of green coconuts ("kulau") is discontinuous, seasonal and constant. The best supply is in September-November in both locations. Green coconuts sold in the Kainantu area originate in the Markham and Ramu Valleys and most of those sold in Wau probably come from the Markham Valley. These data suggest that, in the Markham Valley, the best supply of green coconuts occurs in September-November. Further data are required to confirm this.

#### Daucia (Terminalia megalocarpa)

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On Kiriwina Island, the harvesting season is given as December-January by Malinowski (1935:50, 311) who uses the Kiriwina name "gwadila". (The common name adopted here, "daucia", is from Misima Island where the species is very common). Villagers on four islands in MBP (Kitava, Iwa, Gawa and Ianaba) were asked in February 1994 about the producing period. Responses were quite consistent. The nut was said to be available seasonally with the harvesting period between December and February (or March). In a number of locations, fruit had been harvested in January-February 1994 and these were being processed to remove toxin from the seed before consumption.

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#### Elaeocarpus (Elaeocarpus womersleyi)

In the upper Karawari River area of ESP, nuts are available in June-September (our interpretation of information in Dornstreich [1973:364]).

### Finschia (Finschia chloroxantha)

In the Hindenberg Range of Western Province, nuts are gathered in November-December (Hyndman, 1979:211). Nuts are sold very occasionally in markets in the Eastern Highlands, but our limited observations do not clearly indicate the production pattern.

## Galip (Canarium indicum)

Data sources: Experimental recordings (Fig 88, Table 29); Villagers' statements and literature (Table 46).

Longitudinal recordings are available for two plantings at Keravat. (The data are presented as nut-inshell [NIS]. The kernel content of NIS is 17-21 per cent [Evans, 1994]). In one planting, there are eight trees some 30 years old. Production from these trees is discontinuous, seasonal and constant with the harvesting period in June-October. In the other planting, there are three trees some 40 years old. Here production is discontinuous, weakly seasonal and constant, with nuts produced some time between July and January (Table 29). The production pattern varies somewhat between years. For example, there was a shorter more intensive production period in 1991 and a more extended one in 1990 and 1992. The report by Aburu (1982:120) that there are two production seasons at Keravat presumably reflects a very extended season with a short break during his period of observation.

Generalized statements on galip seasonality are available for over 21 locations in PNG, the Solomon Islands, Queensland, Vanuatu and Fiji (Table 46). The reported producing period is typically three months long (range 2-5 months). The available data indicate that latitude has a strong influence on the start of the harvesting season. The harvest starts progressively later at locations further from the Equator, so that at Vanuatu (ca 17° 30'S) it starts as late as October (with a second smaller producing period in June-July). The relationship is illustrated in Figure 93 where the data from Table 46 for PNG and Solomon Islands locations is plotted against latitude. The pattern at three locations at 3-4°S (Tanga [3°25'S], Anguganak [3°40'S] and Dreikirkir [3°25'S]) does not fit this relationship and these points have been excluded from Figure 92. There is no apparent relationship between harvesting season and rainfall seasonality. The season is similar in locations with contrasting rainfall seasonality, for example, Kandrian and Gloucester on New Britain.

In some locations, galip are reported to be the only crop that bears seasonally. This is the case in south Bougainville where the annual cycle is known by the local name for galip ("moi") (Oliver, 1949:57-58); and most feasts were held in the month following galip ripening (Oliver, 1955:29). On Wogeo Island in ESP, galip is also reported to be the only crop to provide an annual rhythm (Hogbin, 1938-39:131). In the Morovo Lagoon area of New Georgia Island in the Solomon Islands, the word for year ("buruburu") is also the term for canarium nut tress and this signifies the role of canarium harvests in time reckoning (Hviding and Bayliss-Smith, 2000:45). In the Kandrian area of WNB, the galip season is said by villagers to commence in the Gasmata area and to move progressively west along the coast towards Kandrian (Villagers, February 1990).

# Karuka (Pandanus julianettii)

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Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 18, Table 10); Goroka market survey (Fig 18, Table 10); Hol market survey (Fig 18, Table 10); Observer network (Fig 91, Table 31); Patrol reports, Southern Highlands (Table 32) and Simbu Provinces.

Longitudinal data are available for Kainantu, Goroka, Wabag, Mendi, Tari and Oksapmin for 6-10 years (Figure 91, Table 31). Comments made in patrol reports on karuka bearing are an unexpected, although low quality data source. (The patrol officers were interested in karuka harvests because of disputes over trees). These comments have been assembled for the Southern Highlands (Table 32)

and for Simbu (Hide, 1981:284). There are numerous generalized statements on karuka harvesting seasons in the literature, but these are not collated here because they add little to other data. The reported harvesting seasons in the literature cover all months of the year with more claims for the December-March period than for other months and reports of June-July season also common.

The available data are now summarized. At all locations, production is discontinuous. The nuts may mature during any month of the year, but this is most likely between January and March and least likely between September and November. The size of the crop varies considerably from harvest to harvest and large crops are more likely during the January-March period than at other times. Karuka nuts mature in a more regular manner in the Kainantu and Goroka areas, and production there could be described as seasonal and constant.

In the western part of the highlands (Wabag, Mendi, Tari, Oksapmin areas and Nembi Plateau), production is less regular and would be described as non-seasonal and very irregular. Following the exceptionally large harvest in early 1983, there was no significant production for two or more years at all six locations for which longitudinal data are available. Shorter observations, for example for the period 1983-1985, suggest an apparent biennial bearing pattern, and claims in the literature for biennial production are common. However, the long-term observations reported here do not support these claims.

There are many statements in the literature and in patrol reports that villagers survived on karuka nuts after frost had damaged sweet potato gardens. There were exceptionally good karuka harvests following drought and severe frosts in 1941, 1972 and 1982 (Waddell, 1989; D. Eastburn, pers. comm., 1987; Table 31; Figure 91). It could be inferred from this association of frosts and good harvests that frosts initiate very heavy flowering and bearing. The issue is complicated because the most severe frosts are associated with drought, but drought and frost do not necessarily coincide in the PNG highlands (Allen, 1989a:275-278).

It is much more likely that water stress rather than low temperature is a more important trigger for flowering. It is also likely that exceptionally good harvests follow drought, which may or may not coincide with frosts, provided that plants have accumulated sufficient carbohydrate reserves since the previous producing period. Evidence for this reasoning is now presented. Detailed data on the occurrence of frosts and soil moisture levels over long periods are presented in Bourke (1988:170-180, 348-356) and Allen (1989a).

In the Eastern Highlands where rainfall distribution is seasonal, production is more regular and approaches a regular seasonal pattern. In the western part of the highlands where production is much less regular, rainfall seasonality is very weak or non-existent. A second line of evidence is that fruiting was only synchronized twice at all six locations between 1978 and 1985. The first time that this happened (early 1980) followed mild water stress in the western part of the highlands and a drought in the Eastern Highlands in late 1979. The second occasion (early 1983) followed a widespread drought in 1982. In the Southern Highlands, a drought in 1965 was followed by widespread reports of karuka harvests in late 1965 and early 1966 (Table 32); mild water stress in August-September 1976 was followed by a particularly good harvest in early 1977 (Rose, 1982:165); and water stress in 1979 and a drought in 1982 preceded good harvests early in the following years. In contrast, frost in September-October in 1958, 1961 and 1981 that occurred without associated soil moisture stress were not followed by average or above average harvests.

There is some evidence for differences in the bearing pattern of different cultivars. In the Tari Basin, the relative performance of two cultivars varied somewhat between years over the period 1976-1980 (Rose, 1982:165). In the Oksapmin area, the cultivar "lindel" consistently bears a little earlier than other recognized cultivars, such as "kwal". In the very good harvest of late 1982-early 1983, "lindel" bore two to three weeks earlier at 1700 m than at 2100 m altitude (J. Darby, pers. comm., 1983).



### Karuka, wild (Pandanus antaresensis)

In the Hindenberg Range area of Western Province, *Pandanus antaresensis* is reported to bear continuously throughout the year (Hyndman, 1984:296).

## Karuka, wild (Pandanus brosimos)

Data sources: Observer network (Table 33).

Longitudinal data are restricted to observations from very high altitude locations near Kandep in Enga and the fringe of the Tari Basin in SHP (Table 33). As with the cultivated karuka in this region, production is discontinuous and non-seasonal.

Fruiting has been recorded in most months of the year, although it is more likely in January-February than in other months. Good harvests have also been recorded in May-July in Kandep and other areas. Claims in the literature for annual or biennial bearing are not supported by the available data.

The producing season may coincide with that for cultivated karuka at lower altitudes in the same region (Tables 31, 32). This occurred in early 1983 and mid-1985 in the Kandep and Tari areas. However, as the 1984 records for Enga show, this does not always occur. Producing periods for wild karuka in the upper Simbu Valley in May-July 1989 and in the Hindenberg Wall area of Western Province in May-June 1992 did not coincide with the harvest of cultivated karuka at these locations (RMB).

# Macadamia (Macadamia integrifolia and M. tetraphylla)

In the Aiyura area, nuts drop in December-April (L. Schultz, pers. comm., 1980). At Karimui, the large-seeded type drops its nuts in December-March but production is reported to be non-seasonal for the small-seeded type (K. Aburu, pers. comm., 1982).

## Okari (Terminalia kaernbachii)

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Data sources: Experimental recordings (Fig 86, Table 28); Villagers' statements and literature (Table 47).

Experimental records are available for two plantings at Keravat over a four-year period (Figure 86, Table 28); and for one of the plantings for an earlier two-year period (Aburu, 1982:121). (The data in Figure 86 and Table 28 is for nut-in-shell [NIS]. The kernel content of NIS is about 14 per cent). There are 22 trees in one planting, some of which are 40 years old. Production in this series is discontinuous, seasonal and constant with the main producing period commencing in March or April and lasting for about three months. There are ten trees in the other planting about 30 years old. The pattern is similar to the first planting, but the main producing season is less well defined and most nuts mature between April and July. Total nut yield varies considerably from year to year in both plantings. Aburu (1982:121) gives the fruiting season for ten individual trees of the second planting for 1978 and 1979. Nuts matured in March-May for all trees in both years. He recorded significant variation in yield per tree between years.

Overall, the experimental data from Keravat indicate that production is discontinuous, seasonal and constant. The main harvesting period extends over about three months and starts in March or April. There is significant year-to-year variation in yield for individual trees and groups of trees.

Generalized statements on the main harvesting season for okari are available for 14 locations in PNG and the Solomon Islands (Table 47). Responses from different informants asked about the okari producing season in the same area are usually fairly consistent. The harvesting period is reported as being two to four months in duration. There is no apparent relationship between the start of the harvesting season and rainfall seasonality. For example, the season is similar in the Swanson Valley and the Bereina area, which are in the same general region but which have different rainfall patterns.

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There is a very clear relationship between latitude and the stated start of the harvesting period. Nearer the Equator, harvesting commences in about March. At the latitude of Bereina (8° 40' S), or Guadacanal Island in the Solomon Islands (9° 30' S), it commences several months later in June or July (Table 47). This relationship is illustrated in Figure 93 where the data for lowland locations (0-400 m) is plotted against latitude.

The influence of altitude on the harvesting season is not known. Data are available for four higher altitude locations (Mount Dayman, Swanson Valley, Mount Sisa and the Karimui Plateau). For two of these locations (Mount Dayman and Karimui), the harvesting season is said to commence at about the same time as at other locations at a similar latitude. At the other two locations (Swanson Valley and Mount Sisa), it reportedly commences later, suggesting that the start of the harvesting period is further delayed at higher altitudes as well as at higher latitudes. Better quality data are needed to test this relationship.

Another indication of yield variation between individual trees comes from Gwaimasi Village in the Strickland Valley north of Nomad in Western Province. Here P. Dwyer and M. Minnegal kept detailed records on 14 trees in 1987 (pers. comm., 1993). Of the 14 trees, five failed to bear in that year, five produced a poor crop (<50 nuts), and four produced between 80 and 490 nuts per tree. Most of the yield of three of the four most productive trees was obtained when villagers climbed these trees and shook most of the nuts off. The nuts from the forth tree were obtained over a longer period because they were harvested as they fell.

## Okari, wild (Terminalia impediens)

Howcroft (1992:33) states that fruit mature in July-August at Bulolo. In the Angoram area of ESP, nuts matured in March-April in 1989 (RMB).

#### Omphalea gageana

The fruiting season is given as August-September for the Gazelle Peninsula and New Ireland by Peekel (1984:602). On Anir and Tanga Islands in New Ireland Province, the harvesting season is reported as December to about May (R. Croyden, pers. comm., 1981).

#### Pao (Barringtonia procera, Barringtonia edulis and Barringtonia novae-hiberniae)

*B. procera* is the most important edible species in the New Guinea Islands region, but it is uncommon on the New Guinea mainland. In the Kandrian area of WNB, informants at four locations stated in February 1990 and May 1993 that production of *B. procera* is discontinuous and nonseasonal. Villagers on the Gazelle Peninsula and the Pomio area of ENB made similar statements in mid-1995, that is, flowering and fruiting is intermittent and non-seasonal. In the Mussau Islands, Lepofsky (1992:203) indicates that production of *B. procera* (previously known as *B. magnifica*) is continuous throughout the year. Nut maturity of the traditional type of pao nut (*B. edulis*) was reported as being seasonal in the Pomio area of New Britain in June 1995.

At Keravat, Aburu (1982:120) gives the fruiting season for *Barringtonia* sp. as November-January; but Rogers and Movis (1994:8) give the season as March-July. Peekel (1984:600) recorded fruit of *B. novae-hiberniae* in May for the Gazelle Peninsula and New Ireland. In the Solomon Islands, edible *Barringtonia* species (*B. edulis, B. procera* and *B. novae-hiberniae*) fruit two to three times a year with no apparent inter-species pattern (Evans, 1991:56). In the Santa Cruz Islands in the Solomon Islands, Yen (1974:270) reported that flowering occurred up to four times a year and supplies of nuts were available throughout the year. In Vanuatu, the producing period of *B. edulis* commences later at locations further from the Equator, but the production period of *B. procera* and *B. novae-hiberniae* is not latitude dependent (A. Walter, pers. comm., 1994).

To summarize, production of *B. procera* is discontinuous and non-seasonal, but further observations are needed on the patterns of both individual trees and populations of trees.

## Peanut (Arachis hypogaea)

Data sources: Wau market survey; Aiyura/Kainantu/Ukarumpa market survey (Fig 18, Table 10); Goroka market survey (Fig 18, Table 10); Hol market survey (Fig 18, Table 10); CPI market survey (Fig 80, Table 26).

Longitudinal data are available for Rabaul, Port Moresby, Lae, Wau, Madang, Kainantu, Goroka and the Nembi Plateau. The supply is continuous and seasonal at all locations except the Nembi Plateau. It is weakly seasonal at some locations such as Madang and quite seasonal at others such as Kainantu.

In the Eastern Highlands, the supply is continuous, seasonal and constant in the Kainantu area and continuous, seasonal and non-constant in the Goroka area. The best supply is usually in January-March and the poorest is between May and about September. The marked seasonality of supply in the Eastern Highlands perhaps reflects variation in planting rate rather than regular changes in crop yield over time. If this was the case, the highest planting rate would occur in August-October. However, a longitudinal study of planting rates in one community in the Kainantu area between 1979 and 1982 did not show any regular variation in the planting rates of peanut, although this did occur for mixed gardens, winged bean and cucumber (Bourke, 1988:215, 218, 358). The limited data for Wau indicate a similar seasonal pattern to the Eastern Highlands locations with the best supply in October-February in 1980-81.

CPI market surveys show that the supply of peanuts varies seasonally in the lowland centres of Rabaul, Port Moresby, Lae and Madang. The pattern varies somewhat between centres and changes considerably between years, that is, supply is continuous, seasonal and non-constant. In general, the best supply occurs at some time between November and May, particularly in January-February. The poorest supply occurs at some time between July and November. Seasonal differences are less marked in Madang than in the other centres.

## Polynesian chestnut (Inocarpus fagifer)

Data sources: Villagers' statements and literature (Table 48).

Generalized statements about the main harvesting period are available for 15 locations (Table 48). The reported harvesting periods fall into two groups, one centred on May-July and the other on October-February. There is no consistent pattern for all locations nor is there any obvious relationship between the harvesting season and rainfall seasonality or latitude. In the Kandrian and Gloucester areas of WNB, villagers were asked about the harvesting season at four locations in May 1993. Responses were not consistent.

Four people have recorded similar harvesting periods in various parts of MBP, that is, the main production period commencing in September-November and continuing for 3-4 months (Table 48). One of us (RMB) asked villagers about the production pattern at 15 locations on eight islands in MBP in 1993. Responses were fairly consistent, with the range of months as October-March and with November-February as the most commonly claimed months. The starting period was usually given as November or December and the season said to last for two or three months. The consistency of the data for MBP suggests that here, at least, nuts are produced seasonally. Within MBP, there is no relationship between the reported harvesting season and rainfall seasonality.

It is possible that Polynesian chestnut fruits seasonally at locations further from the Equator, such as MBP, but production is discontinuous and non-seasonal at locations nearer the Equator where daylength variation is less. The season is given as December-April in Vanuatu by A. Walter (pers. comm., 1994), which is consistent with this hypothesis. Further data are needed to test this.

#### Sea almond (Terminalia catappa)

Data sources: Villagers' statements and literature (Table 45).

Generalized statements about the harvesting season are available from four regions in PNG and one in Papua (Irian Jaya), with the MBP observations covering 16 locations (Table 45). The available information is similar with the reported supply being discontinuous and seasonal, with the producing period occurring at some time between November and May. In the 16 locations in MBP, the season was given as two or three months long, with December-February as the most commonly reported period. In the Solomon Islands, Evans (1991:56) reports that *T. catappa* fruit sporadically throughout the year.

#### Sis (Pangium edule)

Data sources: Villagers' statements and literature (Table 49).

Generalized statements on the main harvesting season are available for 12 locations. Peekel (1984:384) gives two harvesting periods per year for New Ireland, but all other observers report one main harvesting period only. Apart from New Ireland and the MBP islands, the main harvesting period is reported to be similar for all other locations. The most common reported start of the harvesting season is May or June, but July and August are also given, and the season extends for two to four months. It is not clear why the apparently consistent MBP information differs from other locations. There is no apparent relationship between the reported main harvesting period and altitude, rainfall seasonality or latitude.

On the Karimui Plateau, two main seasons of the year are distinguished by villagers on the basis of trees with distinctive seasonal fruiting patterns. One of these seasons, "siburu" is named after *P. edule*, the other for the marita pandanus (Hide *et al.*, 1984:213; Wagner, 1967:11). The association between periods of the year and certain crops suggests that the start of the sis harvesting season is fairly constant from year to year.

#### Tulip (Gnetum gnemon)

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See Traditional Vegetables.



# **Narcotics**

# Betel nut (Areca catechu)

Data sources: Aiyura/Kainantu market survey (Fig 19, Table 11); CPI market survey (Fig 75, Table 25); Villagers' statements and literature (Table 50).

Longitudinal data are available for Rabaul, Port Moresby, Lae, Madang, Kainantu and Goroka. Betel nut sold in markets in Kainantu and Goroka is grown in the Markham Valley and elsewhere in Morobe and Madang Provinces. There are very large differences in market prices between centres. Of the five towns included in the CPI market surveys, betel nut is cheapest in Rabaul, and most expensive in Port Moresby and Goroka. (The price difference between remote supply centres in the lowlands and remote urban areas in the highlands may be as great as 100 times.)

At all centres, the supply is continuous, seasonal and constant. The supply is less seasonal in Madang and most seasonal in Lae. In general, the best supply occurs between April and August, and the worst supply between September and December. There are some regional differences. The best supply in the Madang area occurs in the January-March period and this is the time of poorest supply in the Port Moresby area. This difference occurred consistently between 1971 and 1985, after which the CPI market survey data are of limited value. Generalized statements on the period of best supply at five locations support conclusions from the long-term market survey data (Table 50).

# Betel nut, highland (Areca macrocalyx)

Data sources: Aiyura/Kainantu market survey (Fig 19, Table 11); Hol market survey (Fig 19, Table 11).

Of the locations surveyed, the highland betel nut is important only in the Kainantu area where the monetary value of the highland and lowland species sold in markets was similar in the early 1980s. However, by 2000, the Kainantu market was dominated by lowland betel nut, with very little highland betel nut being sold (M. Allen, pers. comm., 2002). Elsewhere in the highlands, it is a minor commodity, for example, on the Nembi Plateau. In the Kainantu area, the supply is continuous, seasonal and constant, with the best supply in the October-December period. This complements the supply pattern of the lowland species which is brought up from the Markham Valley. As a result, the combined supply of the two species in the Kainantu area was reasonably regular throughout the year in the early 1980s.

# Highland betel pepper fruit (Piper gibbilimbum)

Data sources: Aiyura/Kainantu market survey (Table 11).

Very minor quantities of the fruit of highland betel pepper are sold in Kainantu market. The supply is discontinuous and apparently non-seasonal.

# Highland betel pepper leaves (Piper gibbilimbum)

Data sources: Aiyura/Kainantu market survey (Fig 19, Table 11); Hol market survey (Table 11).

In the Kainantu area, the supply is continuous, weakly seasonal and constant, with the best supply in September-November.

# Lowland betel pepper fruit (Piper betle)

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Data sources: Aiyura/Kainantu market survey (Fig 19, Table 11).

In Kainantu market, produce is sold which originates in the Markham Valley. The supply is continuous, seasonal and constant. The best supply is in January-March and the poorest in September-October.

# Lowland betel pepper vine (Piper betle)

Data sources: Aiyura/Kainantu market survey (Fig 19, Table 11).

Minor quantities are sold at irregular intervals in Kainantu market. The supply is discontinuous and apparently non-seasonal.

## Marijuana (Cannabis sativa)

Plantings grown for observation by police in a green-house at Keravat in 1970-72 produced leaves throughout the year (RMB).

#### Tobacco (Nicotiana tabacum)

Data sources: Aiyura/Kainantu market survey (Fig 19, Table 11); Hol market survey (Fig 19, Table 11).

The supply in Kainantu and Hol markets is continuous, non-seasonal and irregular.



# **GENERAL DISCUSSION**

# **Data Reliability**

A large number of data sources have been used here. The strengths and limitations of each data source were discussed in the Introduction under the heading Data Sources. Here some comments are offered on the reliability of information on different crops. For many species, information is available from a number of different sources, over different time periods and from different locations. For these crops, we can be more confident about general conclusions about the plant's behaviour. Commonly, the recordings and observations come from locations with different daylength (latitude), temperature (altitude) and rainfall regimes. These differences, often over short distances, allow us to explore possible environmental influences on flowering.

For other crops, there is less available information and it comes from a more limited number of environments. Here the conclusions are firm, but there is less scope to generalise. For some crops, there is only information from one or two locations. This is particularly the case with many of the fruit species grown experimentally at Keravat but not elsewhere in PNG, and for some other fruits. For these crops, only tentative conclusions are possible.

In many of the data sets, it is apparent that some of the early recordings are not consistent with most other information. This applies to some of the observations reported by Peekel (1984) and by Aburu (1982), but also for some observations by anthropologists and geographers. It is likely that these reports were based on shorter observations or in atypical years. For a number of crops, there is little agreement on the production pattern between observers at different locations, or even the same location, where observers made their recordings for one year or less. These crops include karuka nut (*Pandanus julianettii*) (Tables 31 and 32), breadfruit (*Artocarpus altilis*) (Table 34a), and breadnut (*Artocarpus camansi*) (Table 34b). This suggests that production is irregular, and a 6-10 year data run for six locations for karuka nut show this to be the case in the western part of the highlands (Figure 91).

For most of PNG, seasonal differences in daylength and temperature are small to negligible, although rainfall seasonality is often more marked. Hence the start and finish of the production season for most crops is not well defined. Even for crops that are markedly seasonal in their production pattern, such as purple passionfruit (*Passiflora edulis f. edulis*) in the highlands, the start of the producing period varies somewhat from year to year and this is reflected in the published literature and comments by villagers assembled here. Many crops produce some of the economic product in many or most months of the year, even some crops for which production is markedly seasonal.

The information reported here is at the species level. There is very little known about variation between individual plants or cultivars at the same location. Occasionally there are indications of differences between cultivars in their behaviour. For example, on the north coast of New Britain, in the Hoskins and Ulamona areas, villagers stated that the traditional type of lowland pitpit (*Saccharum edule*) bears seasonally, as is generally reported in PNG, but that recently introduced types bear in an irregular and non-seasonal manner. Likewise, there are reported consistent differences in the bearing pattern for different cultivars of karuka nut (*Pandanus julianettii*) at Oksapmin and in the Tari Basin. While not considered here, the experimental recordings on individual trees of galip nut (*Canarium indicum*) and eight other fruit and nut tree species at the Lowlands Agricultural Experiment Station at Keravat would allow variation between individual trees to be examined for these species.

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# **Environmental Influences**

Only three major physical environmental factors have been identified as cues that initiate onset of flowering. These are photoperiod, temperature and moisture (Rathcke and Lacey, 1985:190). Where longitudinal data on crop production patterns are available from locations with a range of environments, it is possible to make some suggestions as to the influence of these three environmental factors on the production pattern. The three factors are now considered.

A crop is said to be producing in a seasonal manner if its economic product is usually more abundant at about the same time each year. The term is often used loosely to describe variation in supply. (See definitions of terms used at the beginning of the Results Section).

# Daylength

Photoperiod is the duration of an organism's daily exposure to light. It is dependent on daylength. There are only small differences in daylength during the year in most of PNG. The difference is very small at locations nearer the equator, such as on Manus or Mussau Islands, and somewhat greater at locations further south, such as the southern part of Western Province and much of Central, Oro and Milne Bay Provinces, which lie between 8° and 12° South. At Lorengau (2° 1'S) on Manus Island, the difference between the longest day (in December) and the shortest day (in June) is only 14 minutes. In contrast, at Port Moresby (9° 27'S), the difference is 1 hour 6 minutes (McAlpine *et al.*, 1983: 119). Differences are greater still in the southern part of Milne Bay Province.

A number of species flower and fruit in a predictable manner from year to year. These include sis (*Pangium edule*) where the harvesting season for nuts is most commonly reported as commencing in May or June (Table 49); marita pandanus fruit (*Pandanus conoideus*) where the start of the harvesting period is dependent on altitude (temperature), but appears to be constant from year to year for each location (Table 39, Figures 14 and 92); and purple passionfruit (*Passiflora edulis f. edulis*) where the fruit are available in the highlands from January or February for several months (Figures 15, 27 and 56; Table 40). Daylength varies in a predictable manner from year to year, whereas seasonal temperature and rainfall changes are generally more variable and somewhat less predictable, except for temperature changes at locations further from the equator. Hence, it is likely that daylength is the main determinant of flowering for species that have a predictable and marked seasonal production pattern. A number of environmental factors may interact to determine flowering onset (Rathcke and Lacey, 1985:190). This may be the situation in the case of marita pandanus. For that crop, it is likely that both changes in daylength and temperature differences associated with altitude determine the start and duration of the fruiting season.

For a number of species, there is no predictable season in much of PNG, except in the far south-east in MBP, where these species appear to fruit seasonally. This seems to be the situation for breadfruit (*Artocarpus altilis*) (Table 34a) and Polynesian chestnut (*Inocarpus fagifer*) (Table 48). It is likely that changes in daylength are sufficiently great at these latitudes to create a seasonal fruiting pattern. However, changes in daylength at locations nearer the equator are likely to be too small to induce a regular flowering season.

For okari nut (*Terminalia kaernbachii*), there is a very clear relationship between latitude and the start of the harvesting period, with the season commencing earlier nearer the equator and progressively later at higher latitudes (Figure 93). A similar pattern occurs with galip nut (*Canarium indicum*) where this relationship holds as far south as Vanuatu at about 17° 30'S. (Figure 93). Some observations for galip nut do not fit this pattern at 3-4°S and the relationship between the start of the production period and latitude may only hold south of 4°S.

#### Temperature

Altitude has the greatest influence on temperature regime in PNG (McAlpine *et al.*, 1983:91-92). There is a regular rate of decline of temperature with altitude above 500 m, with a 0.5° C decline in temperature for every 100 m increase in altitude. Other factors which have a relatively small influence on temperature are physiography (physical geography) and latitude. Seasonal temperature ranges are somewhat greater at locations further from the equator and these differences are reinforced where most rainfall occurs in the south-east wind season (May-September) which coincides in time with the Southern Hemisphere winter (McAlpine *et al.*, 1983: 96-97).

The marked differences in temperature associated with altitude change allow the influence of temperature (altitude) to be examined. For a number of fruit trees, altitude has no apparent influence on the start and duration of the production period. This is the case for avocado (*Persea americana*) where the fruiting pattern is similar in all lowland, intermediate altitude and highland locations over a wide range of rainfall regimes (Figures 13, 20 and 31). Data on mandarin (*Citrus reticulata*) are available from a number of locations in the lowlands, intermediate altitude zone and the highlands (Figures 14, 25 and 52). For all locations, the main producing period is May-August, with no indication of significantly different patterns in these three altitude zones. Recordings are available for orange (*Citrus sinensis*) for a number of intermediate altitude and highland locations (Figures 14, 26 and 53). As with mandarin, the producing pattern appears to be similar in both altitudinal zones. Purple passionfruit (*Passiflora edulis f. edulis*) bears over an altitudinal range of 800 to 2300 m in PNG. Data from locations in the highland and intermediate altitude zones do not suggest that the fruiting season varies with altitude (Figures 15, 27 and 56; Table 40).

In contrast, a number of fruit bear in a non-seasonal manner in the lowlands, but bear seasonally in the highlands. Pawpaw (Carica papaya), guava (Psidium guajava) and carambola (five corner) (Averrhoa carambola) do not appear to bear in a seasonal pattern in the lowlands, but are seasonal near the crops' upper altitudinal limits in the highlands. More pawpaw fruit are available in August-October in the Goroka and Kainantu areas at 1400-1600 m than during other periods (Figures 15, 27 and 57); while guava supply is very seasonal in the Goroka and Kainantu areas (Figures 13 and 24). Carambola production is non-seasonal at Keravat in the wet lowlands (Figure 87), but seasonal in the Wau and Goroka areas at 1200-1400 metres. However for guava and carambola, lowland longitudinal data are restricted to Keravat where rainfall seasonality is very weak. It is possible that these two crops may display a greater seasonal pattern in lowland locations with a more marked seasonal rainfall distribution.

The data for lime (*Citrus aurantifolia*) is somewhat ambiguous because of possible mis-identification in some of the surveys. It seems that the supply of limes is somewhat seasonal in the seasonally dry lowlands and the intermediate altitude zone, and probably in the seasonally dry highlands (Figures 25, 50). In one weakly seasonal lowland environment at least (Keravat), long-term experimental data indicates that the supply varies over time, but not in a seasonal manner.

There is also an interaction between temperature and the start/duration of the fruiting period for marita pandanus (*Pandanus conoideus*). For that crop, observations are available over a wide altitudinal range, which increases one's confidence in the relationship (Figure 14; Table 39). Near sea level, production is continuous and non-seasonal. The producing period becomes shorter with increasing altitude, and it is only four months long at 1600-1700 m near the crop's upper altitudinal limit (Figure 92).

For three introduced vegetables, the supply pattern appears to depend on the environment in which they are grown. For eggplant (*Solanum melongena*), the supply appears to be non-seasonal in the seasonally dry and lower altitude Wau and Port Moresby areas, but clearly seasonal in the highland

locations of Kainantu and Goroka (Figures 23 and 46). Pumpkin fruit (*Curcurbita moschata*) exhibit a similar pattern. Production is seasonal in the intermediate altitude or highland centres of Wau, Kainantu, Goroka, Mt Hagen and the Nembi Plateau, but only weakly seasonal in the lowland centres of Rabaul, Madang, Lae and Port Moresby (Figures 12, 28, 61 and 82). The supply of capsicum (*Capsicum annuum var. grossum*) appears to exhibit the opposite pattern. It seems to be non-seasonal in the highland areas of Kainantu, Goroka and Mt Hagen but seasonal in the seasonally drier, and lower altitude, locations of Wau and Port Moresby (Figures 9, 21 and 38). However, the data for capsicum may be less reliable than for eggplant and pumpkin as there are fewer observations.

An experimental study at Keravat on environmental triggers to flowering of rough leaf pineapple concluded that flowering is initiated by low night temperatures, and not other environmental changes (Bourke, 1976b). The data presented here is consistent with that conclusion, particularly the very inconsistent start to the fruiting period between years and the similar fruiting pattern at locations with very different rainfall patterns (Figures 17, 28, 58, 81 and 89; Table 41). Changes in minimum temperature at the latitude of Keravat (4° 21'S) are small throughout the year, but are sufficient to initiate flowering. For that study, the mean minimum temperatures ranged from 20.4° to 23.3° C (Bourke, 1976b).

# Rainfall

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Papua New Guinea is one of the wettest regions on earth. Average annual rainfall varies from about 1000 mm (at Port Moresby) to nearly 10,000 mm, with most of PNG receiving 2000-4000 mm per year. There is no association between rainfall and altitude on a country-wide level, but there is commonly a relationship at a local level. Three broad patterns of rainfall seasonality distribution can be distinguished. In most of PNG, rainfall distribution is seasonal with the maximum in January-April and the minimum in May-August. Parts of the country have the reverse pattern, with the highest rainfall in May-August. In the third pattern, there is little rainfall seasonality, that is, all months are wet (after McAlpine *et al.*, 1983:61-70).

Changes in the rainfall patterns frequently occur over short distances, often with all three patterns occurring in nearby locations, for example, between the north and south coast of New Britain; on the Gazelle Peninsula of New Britain; in Milne Bay Province; in the eastern part of Gulf Province and the western part of Central Province; in the Lae-Nadzab area or the Finschhafen-Sialum area of Morobe Province; on Bougainville and Buka Islands; and between the Eastern Highlands and locations further to the west. Over short distances of some tens of kilometres only, changes in daylength and seasonal temperature differences (latitude related) are negligible. Thus the major changes in the rainfall seasonality pattern allow the influence of rainfall on crop seasonality to be examined for certain crops.

In general, rainfall seasonality has only a limited effect on the flowering and fruiting behaviour of perennials, such as fruit and nut trees. For example, in Milne Bay Province, the production period is the same for many fruit and nut species in locations which receive more rain in January-April, such as the Cape Vogel-Rabaraba area; those which receive most in May-August, such as the Alotau-Suau coast area; and locations where rainfall distribution is only very weakly seasonal, such as most of the islands of the province. Similarly there is no change in seasonal production patterns in many other locations in PNG where the rainfall seasonality varies markedly over a short distance.

However, rainfall seasonality does influence the timing of clearing fallow land for food gardens and the planting of these "new" gardens. (This is distinct from replanting of existing gardens which are rarely planted seasonally, except for certain crops such as yam, cucumber, winged bean and watermelon). In much of PNG, fallow land is cleared at the end of the drier months and then planted in about October-December. This results in the seasonal availability of many traditional vegetables, for example aibika (*Abelmoschus manihot*) and amaranthus (*Amaranthus* spp.). However, for a significant part of PNG, gardens are not planted seasonally and the supply of arable foods is generally not seasonal.

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For a limited number of crops, rainfall seasonality influences disease and insect pests and thus determines the optimum time for planting. This appears to be the situation for a number of cucurbits, including cucumber (*Cucumis sativus*), watermelon (*Citrullus lanatus*) and rockmelon (*Cucumis melo*). The limited information indicates that successful rockmelon crops can be had from plantings made at the end of the wetter months in about April-May and harvested towards the end of the drier months in August-November. The situation for watermelon is similar, where it is necessary to plant in the drier months and harvest during the wetter months in December-March to obtain a successful crop.

In the case of winged bean (*Psophocarpus tetragonolobus*), the seasonal planting pattern is influenced by the main economic product which in turn is dependent on soil moisture. In the highlands, winged bean are grown primarily for the green beans. They are cultivated seasonally in the mixed vegetable gardens which are planted at the start of the wetter months in September-December. Beans are harvested some four months later. In parts of the Eastern and Western Highlands, other plantings are made in different sites and are managed primarily to produce tubers, although they do produce some green beans also. These plantings are made in better drained sites; they are grown on short (ca 1 m) stakes rather than the taller (1.5-1.8 m) stakes used when green beans are the main product; flowers are often pruned to promote tuber production; and they are planted in the drier months in May-July in the Eastern Highlands rather than at the start of the wetter months in September-December.

Development and maturation of mango (*Mangifera indica*) fruit is dependent on both seasonal temperature and rainfall changes (Cull, 1991:60). In PNG, mango bear during the same period (October-January) in all locations, irrespective of the timing of the rainfall seasonality pattern, although the pattern varies from year to year for any location (Figure 90; Table 38). Rainfall does have an influence in that the highest yields occur in locations with a marked dry season, such as coastal Central Province, the southern part of Western Province, the Rabaraba-Cape Vogel area of Milne Bay Province, the upper Markham Valley, the Sialum area on the Huon Peninsula, the western end of Umboi Island and the eastern part of the north-east lowlands of the Gazelle Peninsula of New Britain. This may be related to the incidence of disease. The fact that the seasonal production pattern is broadly similar in locations with very different rainfall seasonality patterns suggest that seasonal temperature changes are an important flowering trigger for mango in PNG.

For the three locations where observations are available over a six-year period (Rabaul, Markham Valley and the Port Moresby area) (Figure 90, Table 30), there exists a relationship between the period of lower rainfall and the start of the harvesting period. This relationship holds between locations and between years for any given location. For example, for the Port Moresby area for the period 1980-1985, there was a 5-6 month lag between the start of the drier months each year and the start of the harvest period.

Periods of lower soil moisture influence the bearing of karuka nut (*Pandanus julianettii*). In the Eastern Highlands, where rainfall distribution is seasonal, production is more regular and approaches a regular seasonal pattern. In the western part of the highlands, where rainfall seasonality is very weak or non-existent, production is much less regular. Where observations are available for six widely scattered highland locations for the period 1978-1985, fruiting was only synchronised twice at all six locations. Both occasions followed a drought.

# Influence of the Agricultural System

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For some annual crops, the seasonality is very dependent on the agricultural system. Taro (*Colocasia esculenta*) is a case in point. In much of PNG, the supply of taro does not vary seasonally. However, for many locations, especially on the north side of the central highlands and along the north coast, taro tends to be planted at the start of the wetter months in about October-November and is thus most abundant for a number of months from May onwards. The supply of sweet potato varies throughout the year in highland locations, sometimes very markedly. This is determined by environmental changes,

especially in soil moisture, and the planting rate which can vary significantly within a year. Despite there being a tendency for the best supply to occur at about the same time of the year, there is no predictable seasonal variation in sweet potato supply.

The pattern for common bean (*Phaseolus vulgaris*) also illustrates the influence of the agricultural system on crop seasonality. Common bean tend to be planted on more fertile sites and particularly in seasonally-planted mixed vegetable gardens in the highlands. Where soil fertility is low in the sweet potato gardens in the highlands, as on the Nembi Plateau, beans are only planted in the mixed gardens. Hence the supply at this location is markedly seasonal (Figure 9). Where soil fertility in the sweet potato gardens is greater, as in much of the Eastern Highlands, they are planted in both the non-seasonal sweet potato gardens and in the seasonal mixed gardens. In the case of traditional vegetable production in the highlands, there also appears to be a relationship between the intensity of land use and the seasonality of supply. Where land use is more intensive, there is a tendency for most vegetables to be planted seasonally in mixed gardens and thus the supply of these foods is more seasonal. Where land use is less intensive, there is less or no use made of this garden type and the supply of vegetables is less seasonal.

Hence in the Goroka and Kainantu areas, production of common bean is seasonal, but less so than on the Nembi Plateau (Figures 9, 20 and 34). This is despite the fact that rainfall is seasonally distributed in the Goroka and Kainantu areas, but it is non-seasonal on the Nembi Plateau. Thus production of common bean, as with many other annuals, is more seasonal in this non-seasonal environment than in other highland locations where rainfall is distributed seasonally. The difference reflects variation in how crops are managed within the agricultural system rather than seasonal environmental changes.

The supply of corn (maize) varies seasonally in all environments for which data are available in PNG (Figures 2, 23, 44 and 78). Again this reflects planting of gardens after fallows in October-December, especially mixed gardens in the highlands, rather than any inherent seasonality in the crop itself. Under experimental conditions, good yields of corn can be achieved with plantings made throughout the year, provided that soil moisture is adequate.

# Seasonality within Commodity Groups

Comment is now offered on the seasonal production patterns for the different commodity groups. In general the perennial crops, that is trees and vines, tend to produce flowers, fruit and sometimes new leaves in a seasonal manner. There is less real seasonality in production of annual crops in PNG, although some do produce seasonally. In general, the agricultural system, rather than environmental factors, has a greater influence on the production pattern for annual crops. Note, however, that the agricultural system devised by villagers is partly a response to seasonal environmental changes, mainly in rainfall.

# **Starchy Foods**

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The supply of most of the starch foods does not vary seasonally. This is the case for banana, cassava, potato, sugarcane, sweet potato and Chinese taro. As noted above, taro is planted and harvested seasonally in some locations but not in others, depending on the agricultural system. Yams are planted and harvested seasonally everywhere in PNG. The most common planting period is September-December with some variation between locations. For some places, people make certain plantings earlier (early yam gardens) than the main gardens, suggesting some flexibility in management of the crop. In contrast, the supply of corn is seasonal for all locations for which data are available, and it is suggested that this is a result of the agricultural system rather than the cycle of the crop itself.

# **Traditional Vegetables**

Most of the data are for highland locations although, for lowland pitpit (Saccharum edule) and aibika (Abelmoschus manihot), there is data from both lowland and highland locations. Of the most important species, five are available in a non-seasonal manner and eight are available seasonally.

#### **Introduced Vegetables**

Production of most (20 species) of the important introduced vegetables is non-seasonal. Common bean is the only introduced vegetable where production is markedly seasonal in both the lowlands and the highlands. The supply of tomato appears to be weakly seasonal in two locations only (Port Moresby and Kainantu), but this may not be a real effect. The supply of zucchini is weakly seasonal in both the lowlands and highlands. For a number of vegetables, the pattern differs between the lowlands and highlands. This is the case for eggplant, pumpkin fruit and capsicum, as discussed above.

#### Fruit

About two thirds (44 species) of fruit trees produce fruit seasonally in PNG and one third in a nonseasonal manner. For two fruits, the pattern is only weakly seasonal. These are lemon (*Citrus limon*) and grapefruit (*Citrus paradisi*). Of the 21 species where the available information does not indicate a seasonal pattern, 12 are restricted to experimental plantings in a weakly seasonal environment at Keravat, and it is possible that they may bear seasonally in other environments. Five highland species do not bear seasonally, being cape gooseberry (*Physalis peruviana*), elder (*Sambucus nigra*), naranjilla (*Solanum quitoense*), highland yellow passionfruit (*Passiflora ligularis*) and black raspberry (*Rubus lasiocarpus*). The other non-seasonal fruit species are *Parartocarpus venenosa* on New Britain, rukam (*Flacourtia rukam*) in Milne Bay, soursop (*Annona muricata*) and pomelo (*Citrus maxima*). As discussed above, a number of species have a different pattern in different environments. These are pawpaw, guava, carambola and lime.

## Nuts

Most nut bearing plants produce nuts seasonally. Fourteen species, 13 trees and peanuts, bear seasonally in PNG. Another three species bear in a non-seasonal pattern. Coconuts bear continuously, while breadnut (*Artocarpus camansi*) and pao nut (*Barringtonia procera*) bear in an intermittent, but non-seasonal manner. As discussed above, another three species seem to bear seasonally in some environments, but non-seasonally in others. These are breadfruit, Polynesian chestnut and karuka nut.

# Narcotics

Four crops used as narcotics bear seasonally in PNG. These are betel nut (Areca catechu), highland betel nut (Areca macrocalyx), highland betel pepper leaves (Piper gibbilimbum) and lowland betel pepper fruit (Piper betle), although betel nut supply is not markedly seasonal. The supply of tobacco (Nicotiana tabacum) in two highland locations at least is non-seasonal.

# **Export Cash Crops**

All of the main export crops produce throughout most of the year in PNG, with production being markedly seasonal for Arabica coffee, somewhat seasonal for cocoa and weakly seasonal for pyrethrum (Appendix 1). Robusta coffee is not seasonal at Keravat in a weakly seasonal environment, but it is reported to be seasonal in a more seasonal environment in Milne Bay at about 10° S. Flowering and seeding of *Casuarina oligodon* is also seasonal in the Eastern Highlands at least. In contrast, coconut does not produce in a seasonal manner and there is insufficient data available for cardamom to make a judgement.

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# APPENDIX 1. SOURCES OF INFORMATION ON PRODUCTION PATTERNS OF EXPORT CASH CROPS IN PAPUA NEW GUINEA

There is some published information available on the production patterns for a number of export cash crops. It is not presented here as it is not derived from the data sources used for the food crops. The published information sources are noted and information on the seasonal patterns are summarised. There is a reasonable amount of literature for Arabica coffee, but only a limited amount available for other export cash crops.

#### Arabica coffee (Coffea arabica)

Production of Arabica coffee is highly seasonal in the Papua New Guinea Highlands, although some production occurs throughout the year. This is well documented in six publications (Table 51) and referred to in many others. The main production season varies a little between years and between locations, but is generally in the period May to September and particularly in June, July and August.

The marked seasonality of coffee production and the heavy reliance on coffee for cash income by Highland villagers means that cash income and expenditure is also very seasonal in the Highlands. The influence of income derived from coffee production on gambling, beer sales, alcohol related disputes, sales of petrol, various foods (including rice, tinned fish, soft drinks, bread) and food consumption is examined by: Christie (1980:29, 34-38, 86-107), Hide (1981:251-263, 622-628), Warry (1982:98), Grossman (1984:196-214), Sexton (1986), Bourke (1988:107-117, 328-330), Allen and Bourke (1988) and Grossman (1991).

It is a widely held view in Papua New Guinea that villagers' devotion of time to coffee production, particularly seasonal harvesting, results in neglect of food production and consequent food shortages. This hypothesis has been examined in detail by Bourke (1988:107-117) and rejected.

Epidemics of coffee rust are seasonal in the Papua New Guinea Highlands. Rust incidence is greatest between May and July (Whan *et al.*, 1994).

## Cardamom (Elettaria cardamomum)

Twelve months of production data from the Mysore and Malabar varieties are presented from Malasaet Village (550 m), Baining Mountains, East New Britain by DPI (1983:54). For Mysore most production was between March and July in 1982 and Malabar had a similar pattern (February to July).

## Casuarina (Casuarina oligodon)

Casuarina is an important tree in the New Guinea highlands. It provides timber for construction and firewood; enhances soil fertility as it fixes atmospheric nitrogen; reduces soil erosion; and is the most important shade crop for coffee. In the Baliem Valley of Irian Jaya, casuarina flowers and sets seed in the drier months of July-August, with seed drop in about October-November (Askin *et al.*, 1990:217). A similar pattern has been reported in the Eastern Highlands of PNG with flowering in early August and seed maturity in November-December (Ataia, 1983).

#### Cocoa (Theobroma cacao)

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National monthly cocoa production is presented for a 24-year period (1962-1985) by Jolly, Beck and Bodman (1990:103-104, 111). This shows that production is seasonal with the greatest production in the period May to July and the lowest in February to March. The pattern sometimes varies considerably between locations although it is generally consistent between years for any particular location (J. O'Donohue, pers. comm., 1993). Thus at Keravat and Vunapau Plantation in the Gazelle Peninsula, the main production flush occurs between October and December, but on the eastern side of the Peninsula it occurs earlier in the year (April to June) (J. O'Donohue, pers. comm., 1993). In

the area inland from Kandrian on the south coast of New Britain, the main production season is said by villagers to be May to September; in the Bukaua area east of Lae, the main production period is said to be October and November (Villagers, 1991); in the Angoram area on the Sepik River it is July to September (J. Risimeri, pers. comm., 1989).

The available data indicates that, in general, more cocoa is produced between May and July than in other months. However, for two locations where data are available, the main producing period is reported as October to November or December. This difference from the general pattern may be related to rainfall seasonality. In the Keravat-Vunapau area of the Gazelle Peninsula, rainfall distribution is only very weakly seasonal and the Bukaua area east of Lae receives most rainfall in May-September. The information from Kandrian, where the rainfall between May and September is extremely high, is not consistent with this hypothesis. However cocoa production is very limited in the Kandrian area because of black pod disease and the reported pattern there may be influenced by the very high rainfall, especially during the May-September period.

In a study using 17 months of production data at Keravat, Bridgland (1953) found that cocoa yield had a highly significant negative correlation with rainfall four or five months prior to harvest. However, the patterns described above, which are based on long-term recordings, are not consistent with this conclusion from Bridgland's short-term study.

### Copra (Cocos nucifera)

Dwyer (1940:19) examined three years of copra production figures for a plantation near Madang. He considered that the peak production months were November to January with the period March to June having somewhat lower production. National level data for a nine-year period (1977 to 1985) are given by Jolly, Beck and Bodman (1990:100-101, 109). These figures do not indicate any consistent seasonal pattern, although average production was slightly higher for March and December for this particular period.

#### Pyrethrum (Chrysanthemum cinerariaefolium)

Mean monthly purchase figures of pyrethrum by DPI at Laiagam in Enga Province for a ten-year period (1970-1979) are given by Carrad (1982:152). These indicate that average production is somewhat higher between September and March and somewhat lower between April and August.

#### Robusta coffee (Coffea canephora)

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According to Sumbak, there is no definite harvesting season for Robusta coffee at Keravat. However, in the Milne Bay area, the main harvest occurs between May and August with the peak in June-July (Sumbak, 1967:122).

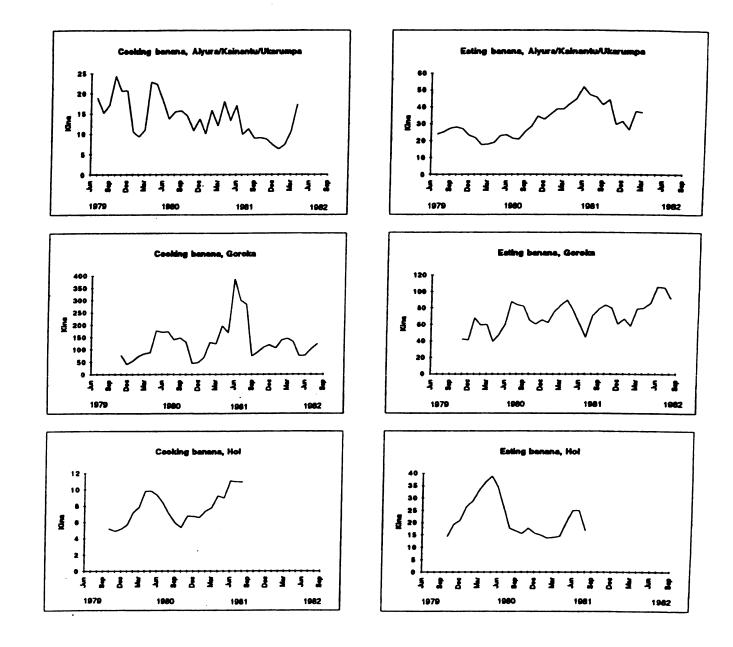
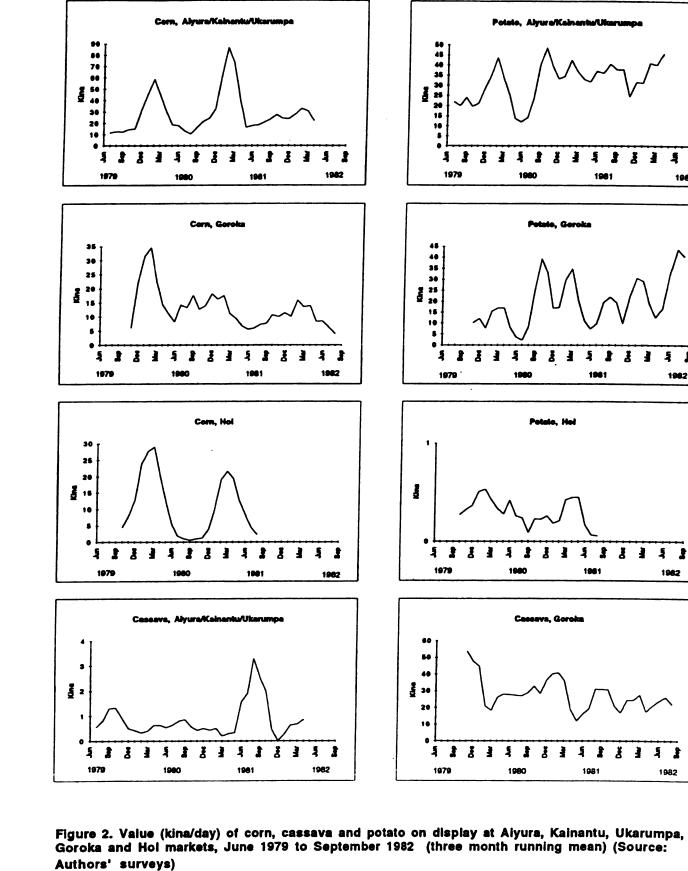


Figure 1. Value (kina/day) of cooking banana and eating banana on display at Alyura, Kainantu, Ukarumpa, Goroka and Hol markets, June 1979 to September 1982 (three month running mean) (Source: Authors' surveys)



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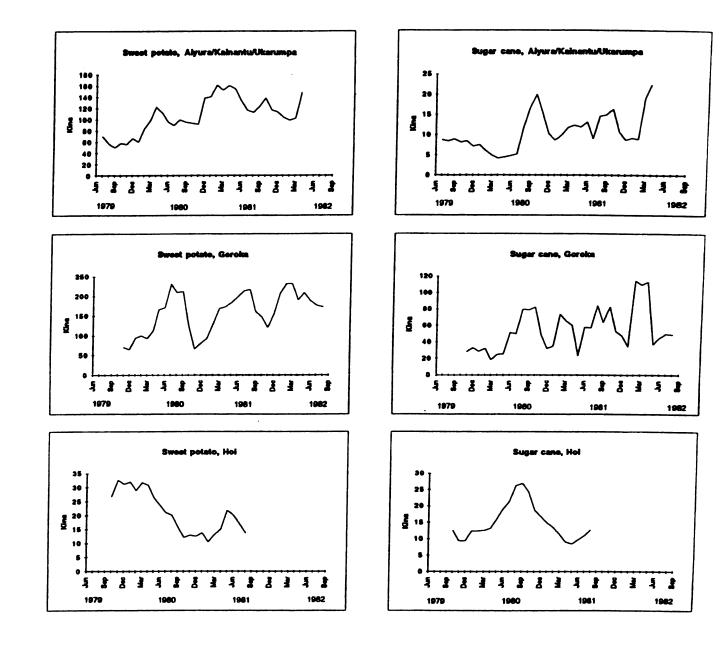


Figure 3. Value (kina/day) of sweet potato and sugar cane on display at Aiyura, Kainantu, Ukarumpa, Goroka and Hol markets, June 1979 to September 1982 (three month running mean) (Source: Authors' surveys)

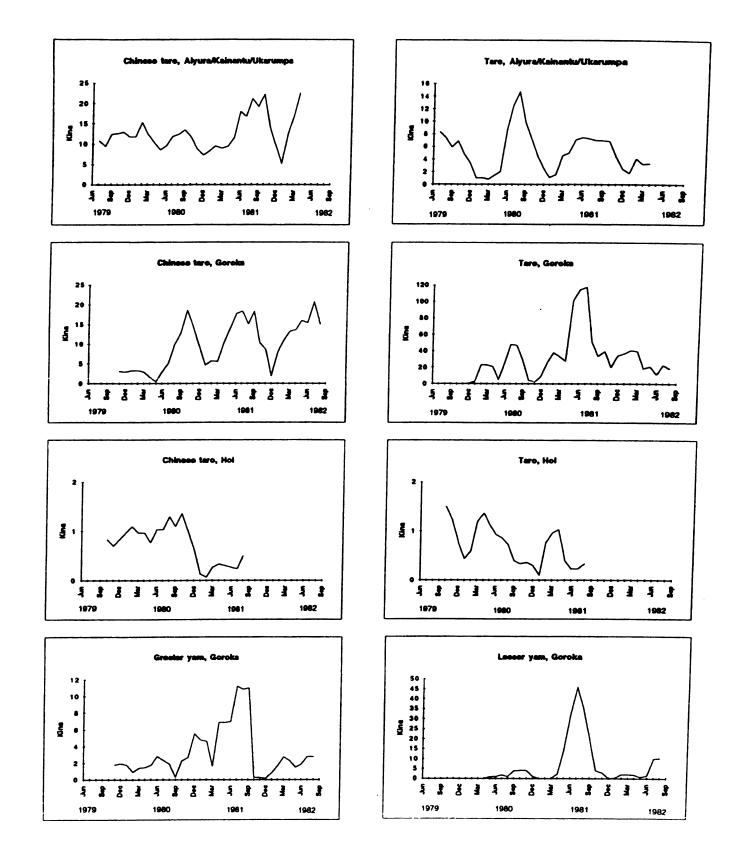


Figure 4. Value (kina/day) of Chinese taro, taro, greater yam and lesser yam on display at Aiyura, Kainantu, Ukarumpa, Goroka and Hol markets, June 1979 to September 1982 (three month running mean) (Source: Authors' surveys)

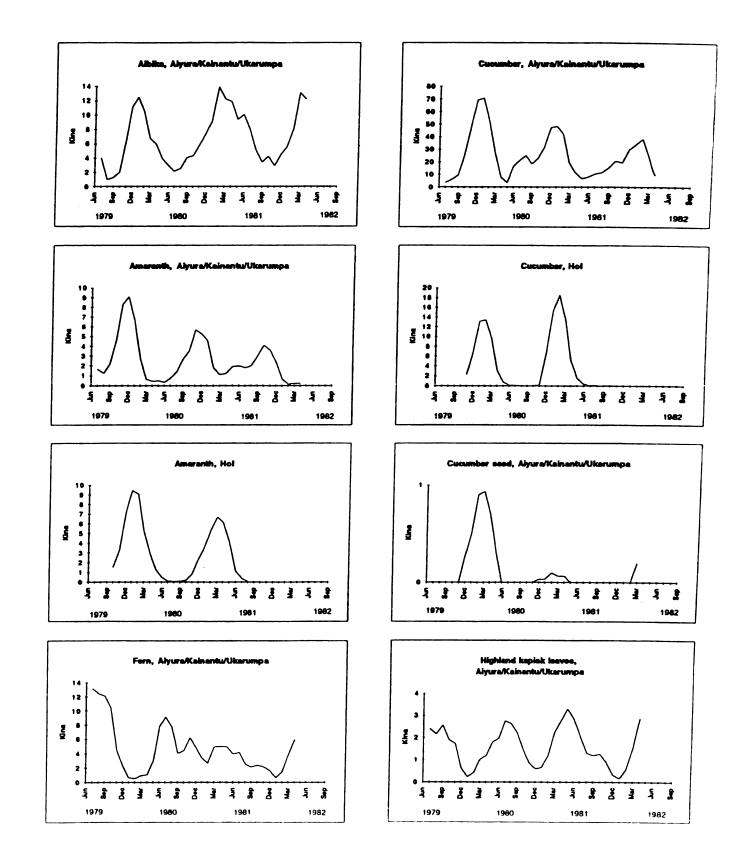
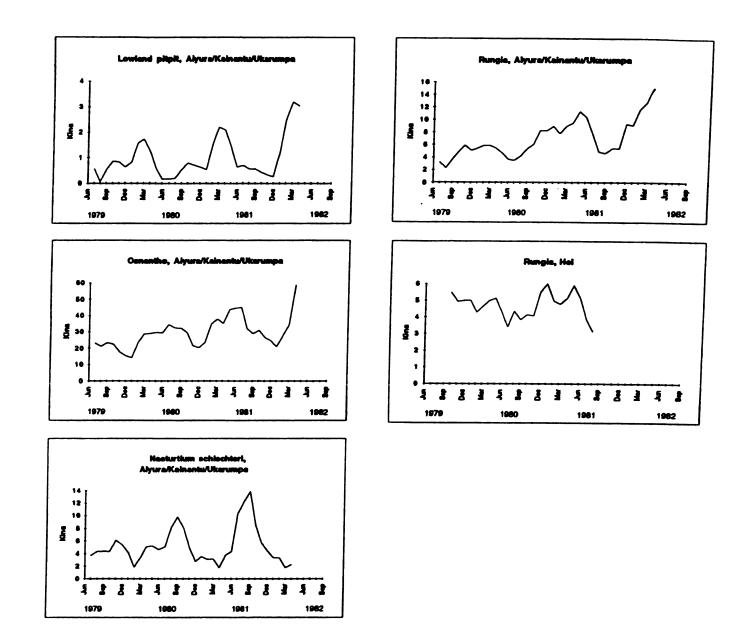
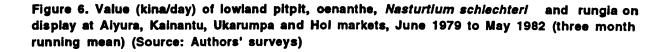


Figure 5. Value (kina/day) of aibika, amaranth, fern, cucumber, cucumber seed and highland kapiak leaves on display at Aiyura, Kainantu, Ukarumpa and Hol markets, June 1979 to May 1982 (three month running mean) (Source: Authors' surveys)





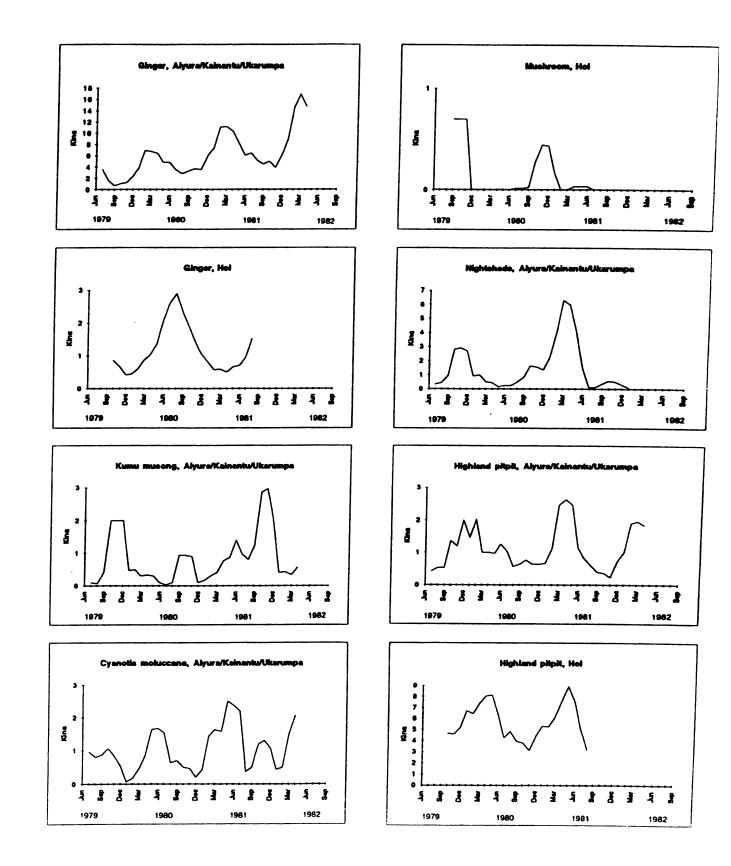


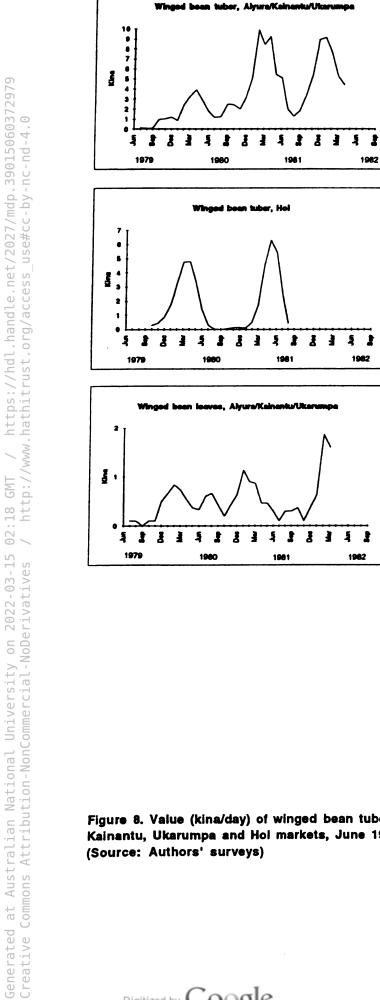
Figure 7. Value (kina/day) of ginger, kumu musong, *Cyanotis moluccana*, mushroom, nightshade and highland pitpit on display at Aiyura, Kainantu, Ukarumpa and Hol markets, June 1979 to May 1982 (three month running mean) (Source: Authors' surveys)

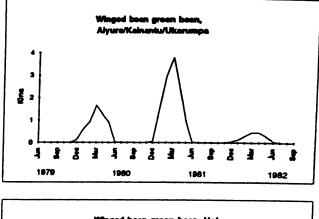
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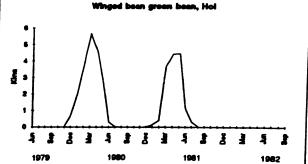
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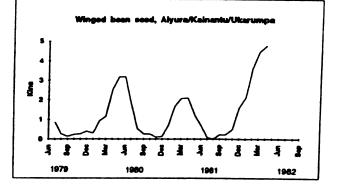
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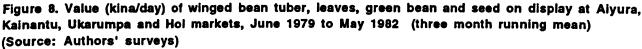
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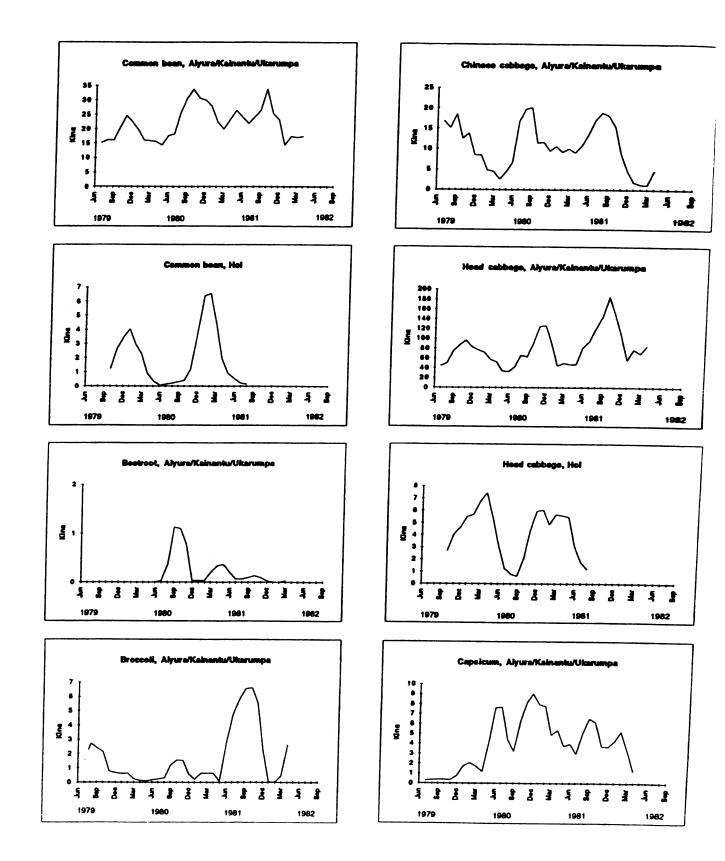


Figure 9. Value (kina/day) of common bean, beetroot, broccoli, Chinese cabbage, head cabbage and capsicum on display at Aiyura, Kainantu, Ukarumpa and Hol markets, June 1979 to May 1982 (three month running mean) (Source: Authors' surveys)

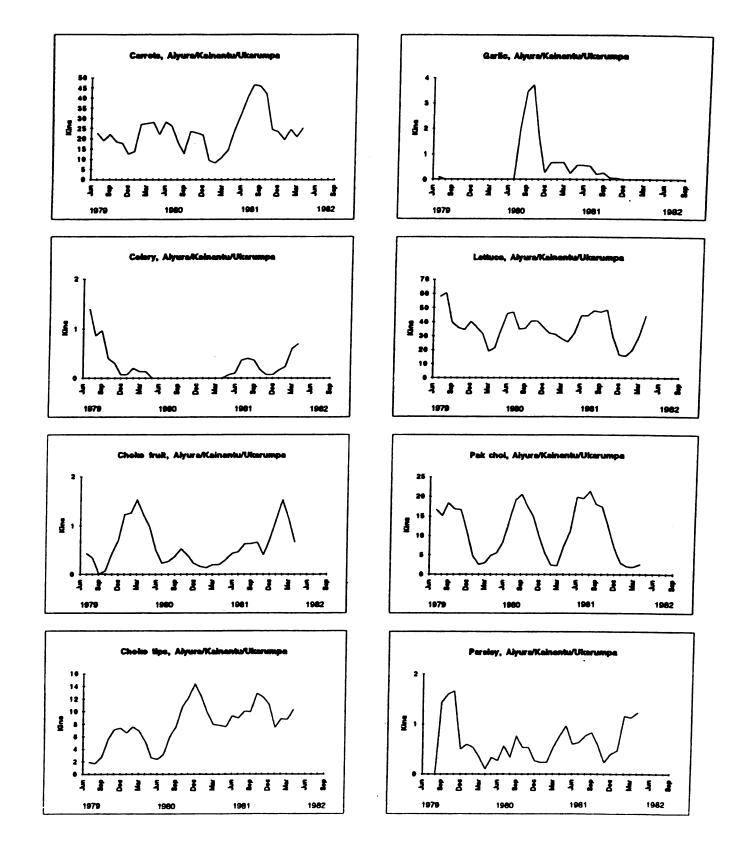


Figure 10. Value (kina/day) of carrots, celery, choko fruit, choko tips, garlic, lettuce, pak choi and parsley on display at Aiyura, Kainantu and Ukarumpa markets, June 1979 to May 1982 (three month running mean) (Source: Authors' surveys)

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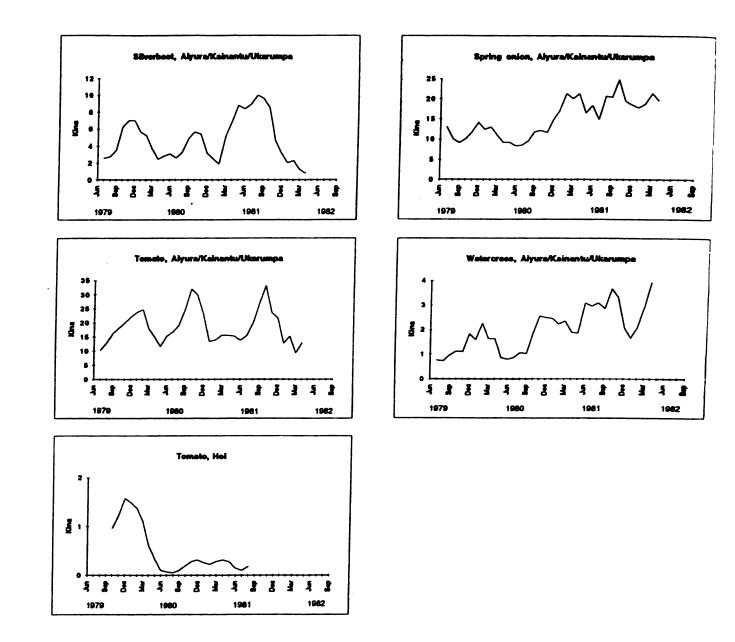


Figure 11. Value (kina/day) of silverbeet, spring onion, tomato and watercress on display at Aiyura, Kainantu, Ukarumpa and Hol markets, June 1979 to May 1982 (three month running mean) (Source: Authors' surveys)

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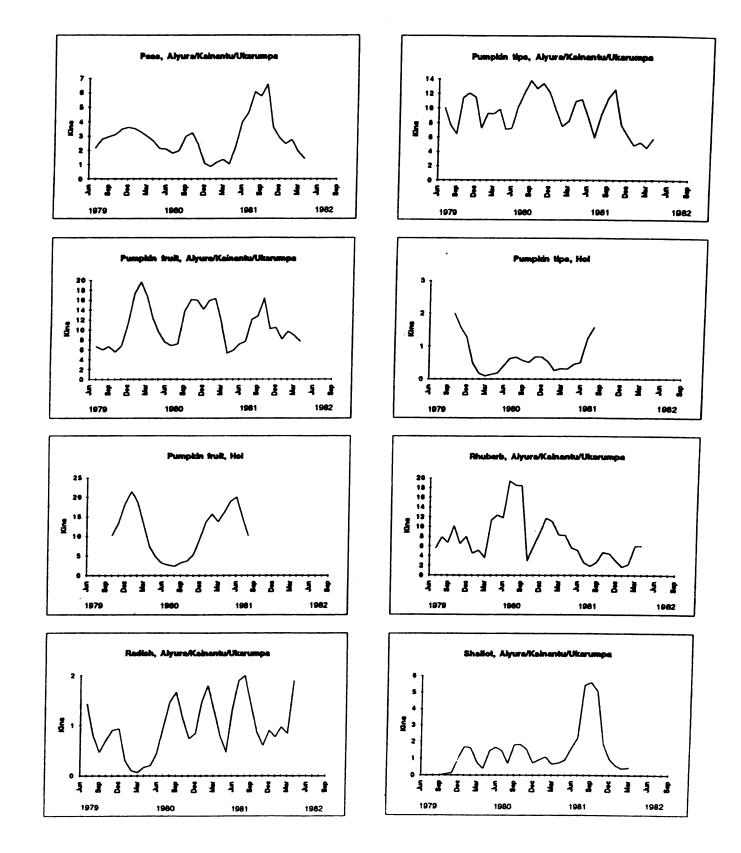


Figure 12. Value (kina/day) of peas, pumpkin fruit, pumpkin tips, radish, rhubarb and shallot on display at Aiyura, Kainantu, Ukarumpa and Hol markets, June 1979 to May 1982 (three month running mean) (Source: Authors' surveys)

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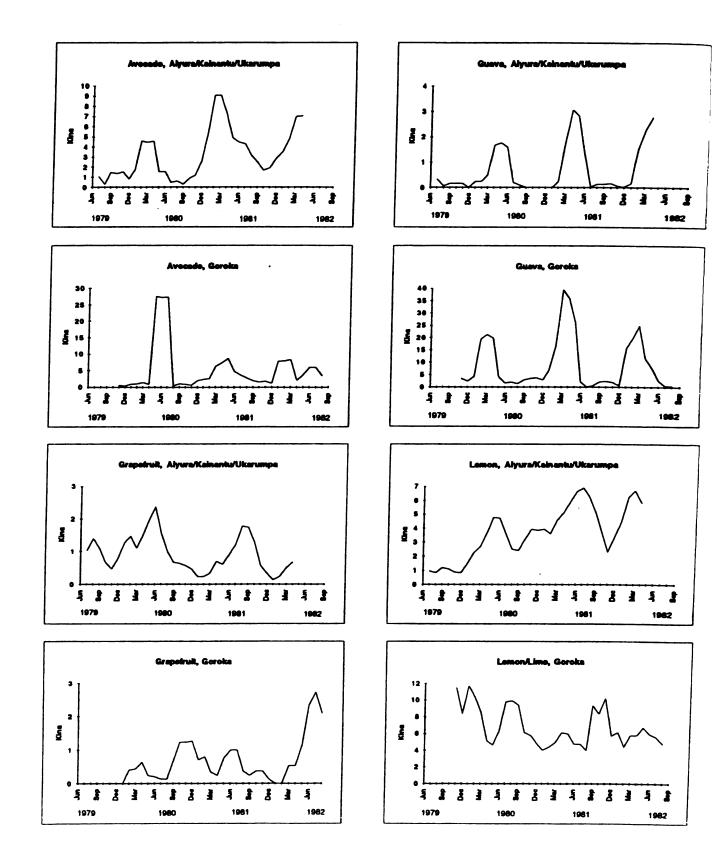


Figure 13. Value (kina/day) of avocado, grapefruit, guava and lemon on display at Aiyura, Kainantu, Ukarumpa and Goroka markets, June 1979 to September 1982 (three month running mean) (Source: Authors' surveys)

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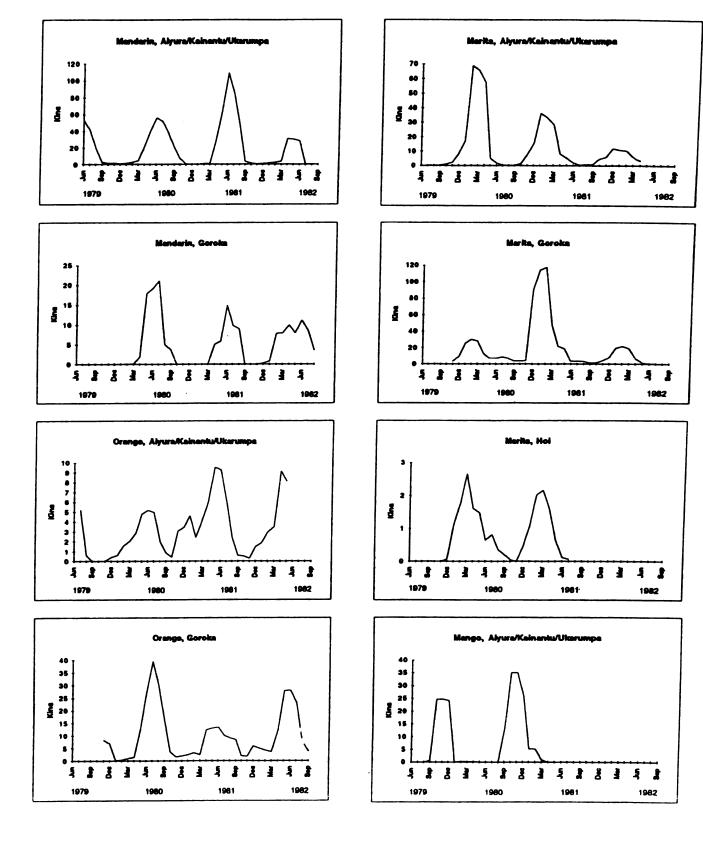


Figure 14. Value (kina/day) of mandarin, orange, marita and mango on display at Aiyura, Kainantu, Ukarumpa, Goroka and Hol markets, June 1979 to September 1982 (three month running mean) (Source: Authors' surveys)

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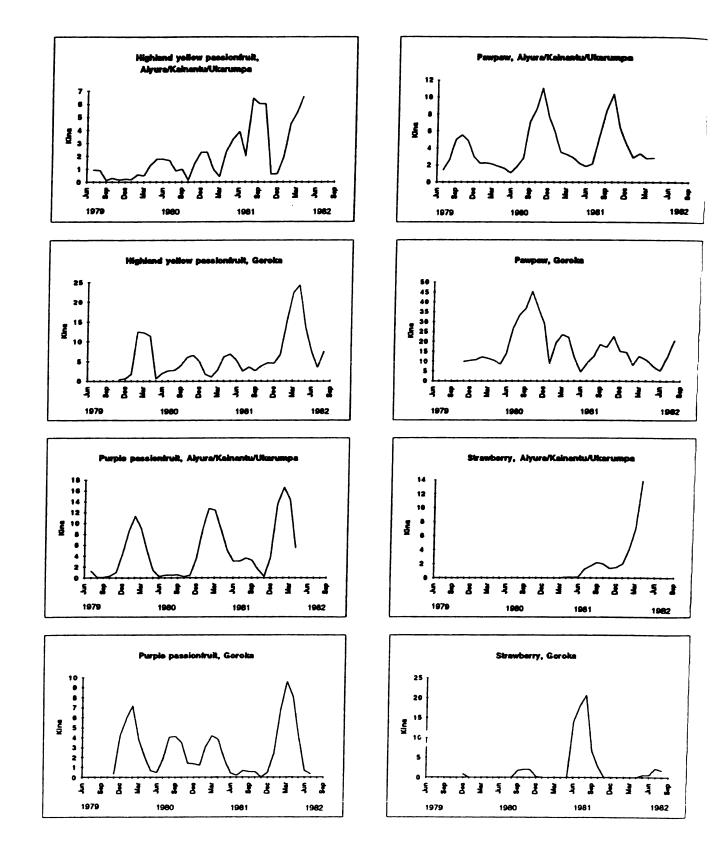
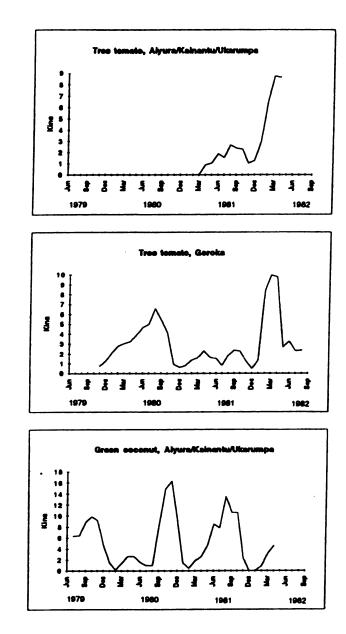
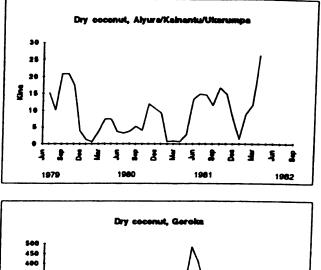
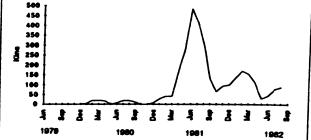
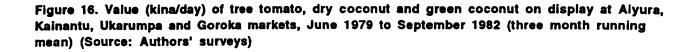


Figure 15. Value (kina/day) of highland yellow passionfruit, purple passionfruit, pawpaw and strawberry on display at Aiyura, Kainantu, Ukarumpa and Goroka markets, June 1979 to September 1982 (three month running mean) (Source: Authors' surveys)









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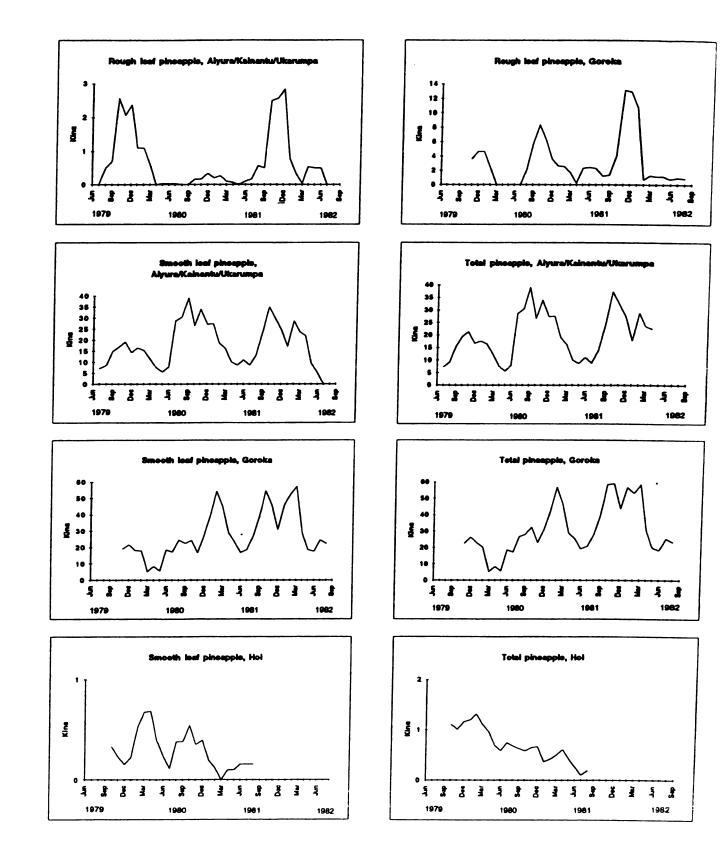


Figure 17. Value (kina/day) of smooth leaf pineapple, rough leaf pineapple and total pineapple on display at Aiyura, Kainantu, Ukarumpa, Goroka and Hol markets, June 1979 to September 1982 (three month running mean) (Source: Authors' surveys)



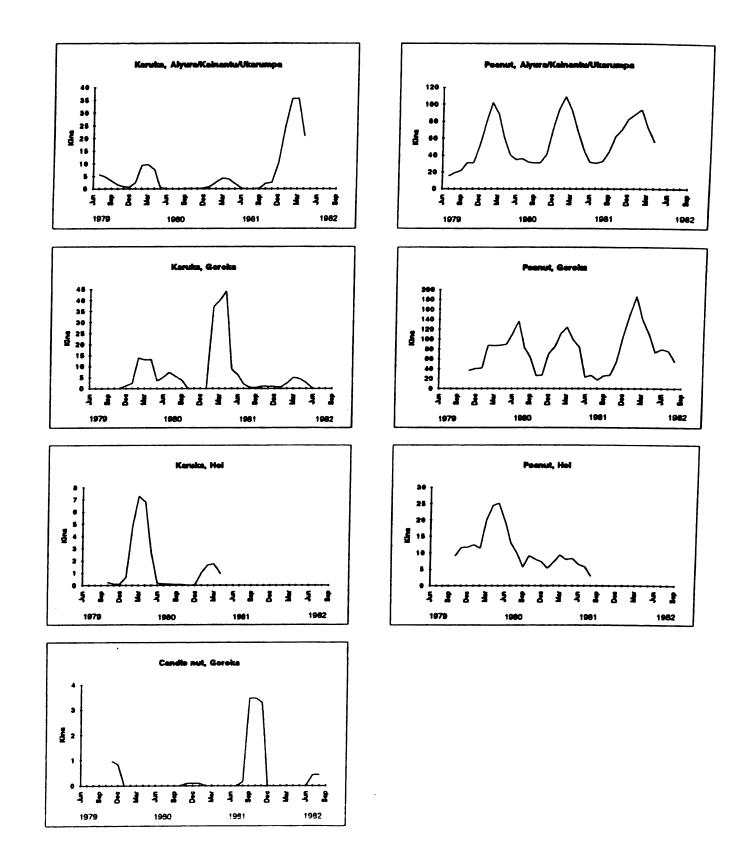


Figure 18. Value (kina/day) of karuka, candle nut and peanut on display at Aiyura, Kainantu, Ukarumpa, Goroka and Hol markets, June 1979 to September 1982 (three month running mean) (Source: Authors' surveys)

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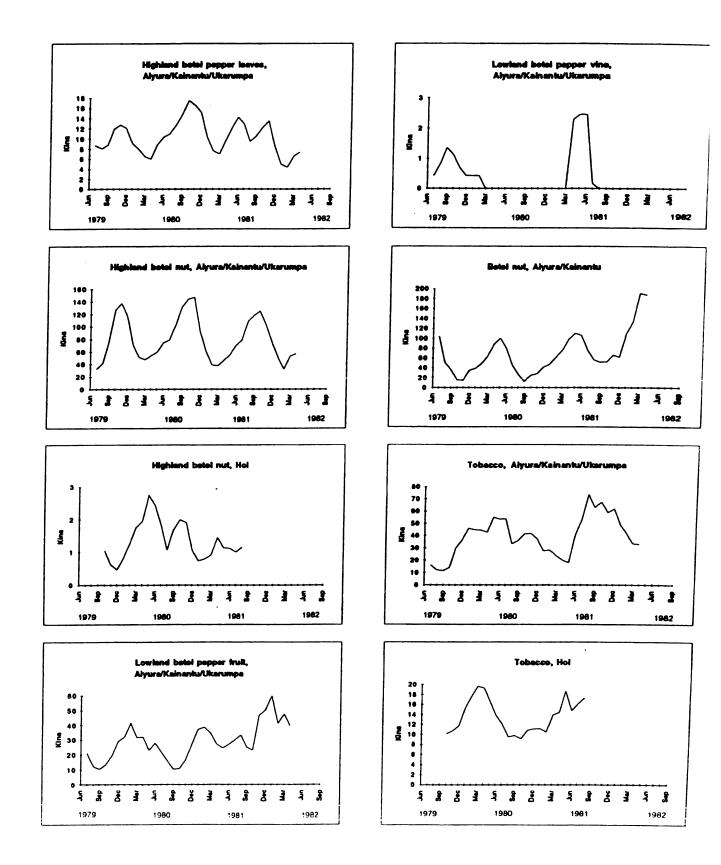


Figure 19. Value (kina/day) of highland betel pepper leaves, highland betel nut, lowland betel pepper fruit, lowland betel pepper vine, betel nut and tobacco on display at Aiyura, Kainantu, Ukarumpa and Hol markets, June 1979 to May 1982 (three month running mean) (Source: Authors' surveys)

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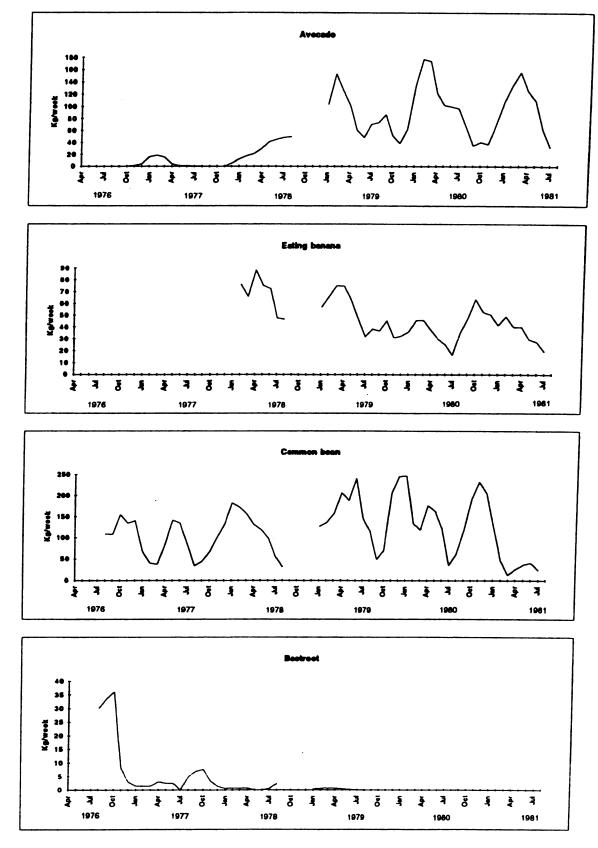
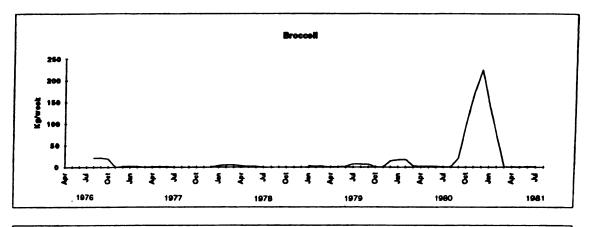
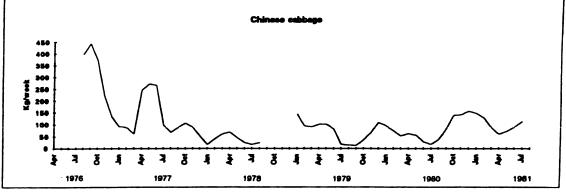


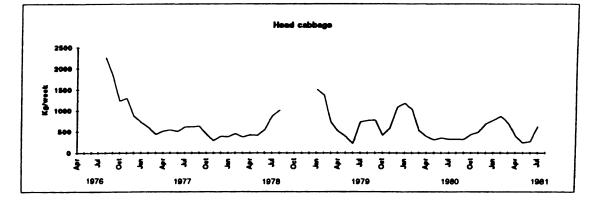
Figure 20. Monthly purchases (kg/week) of avocado, eating banana, common bean and beetroot by the Food Marketing Corporation at Goroka, April 1976 to August 1981 (three month running mean) (Source: FMC purchase records)

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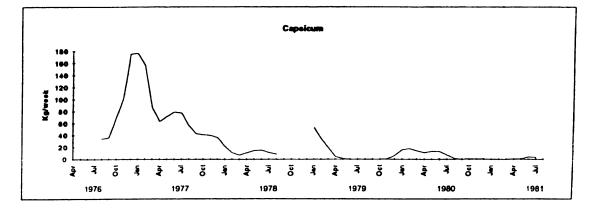


Figure 21. Monthly purchases (kg/week) of broccoli, Chinese cabbage, head cabbage and capsicum by the Food Marketing Corporation at Goroka, April 1976 to August 1981 (three month running mean) (Source: FMC purchase records)

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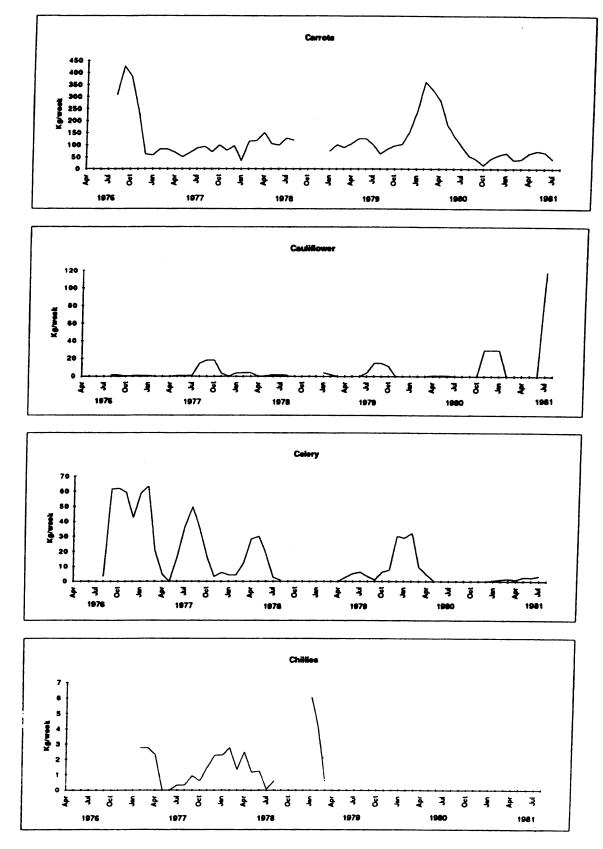


Figure 22. Monthly purchases (kg/week) of carrots, cauliflower, celery and chillies by the Food Marketing Corporation at Goroka, April 1976 to August 1981 (three month running mean) (Source: FMC purchase records)

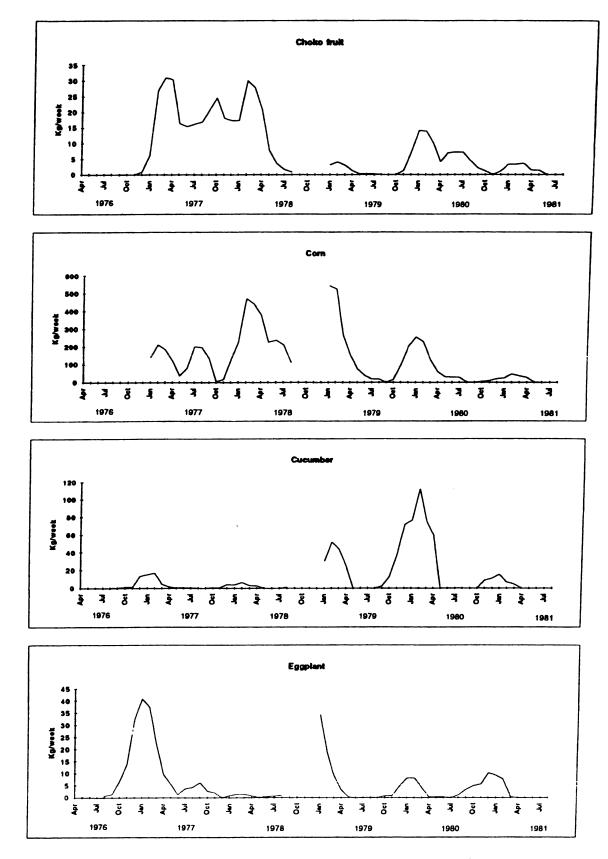


Figure 23. Monthly purchases (kg/week) of choko fruit, corn, cucumber and eggplant by the Food Marketing Corporation at Goroka, April 1976 to August 1981 (three month running mean) (Source: FMC purchase records)

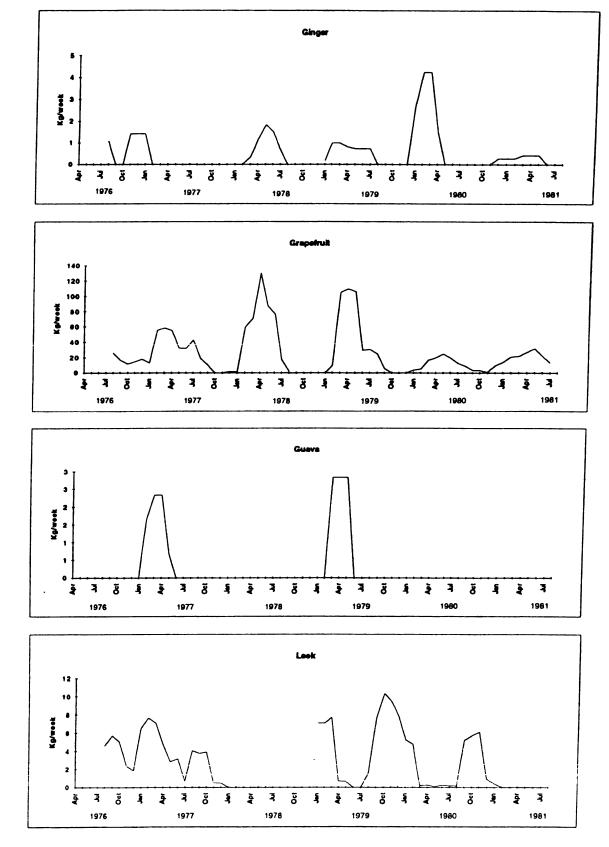


Figure 24. Monthly purchases (kg/week) of ginger, grapefruit, guava and leek by the Food Marketing Corporation at Goroka, April 1976 to August 1981 (three month running mean) (Source: FMC purchase records)

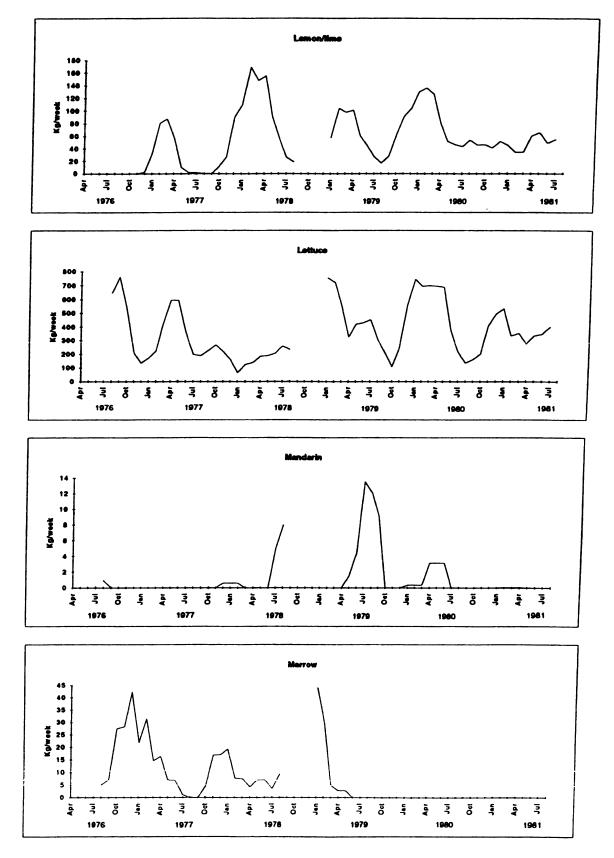


Figure 25. Monthly purchases (kg/week) of lemon/lime, lettuce, mandarin and marrow by the Food Marketing Corporation at Goroka, April 1976 to August 1981 (three month running mean) (Source: FMC purchase records)

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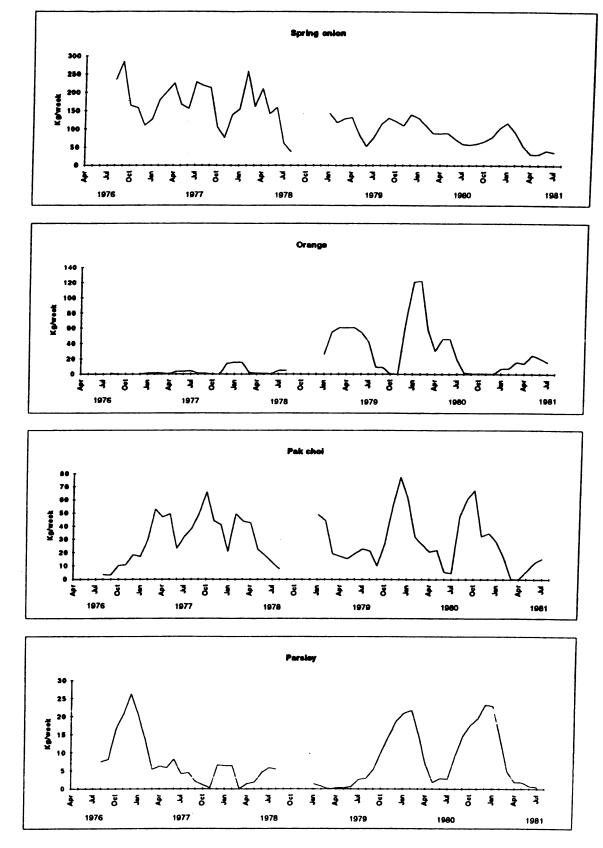
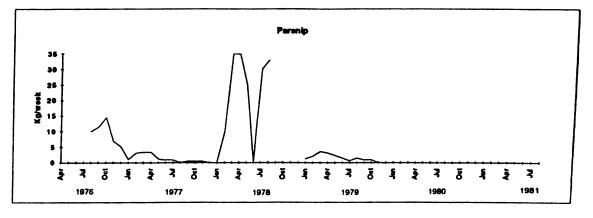
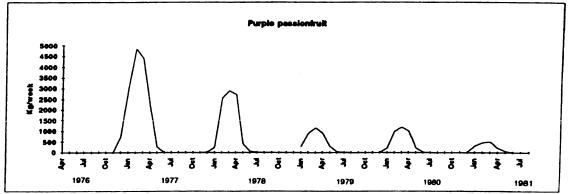


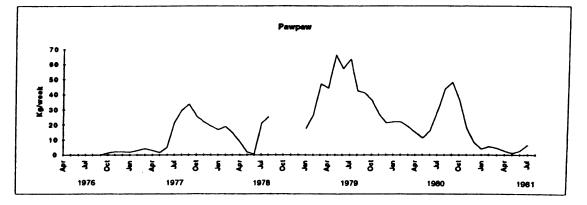
Figure 26. Monthly purchases (kg/week) of spring onion, orange, pak choi and parsley by the Food Marketing Corporation at Goroka, April 1976 to August 1981 (three month running mean) (Source: FMC purchase records)

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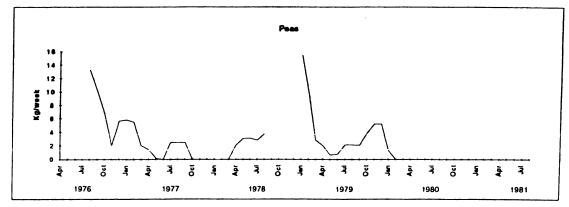
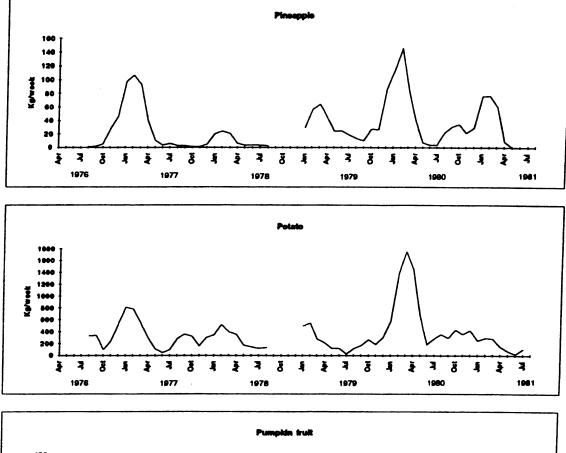
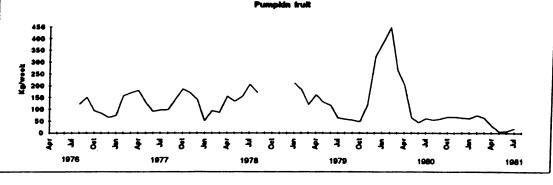


Figure 27. Monthly purchases (kg/week) of parsnip, purple passionfruit, pawpaw and peas by the Food Marketing Corporation at Goroka, April 1976 to August 1981 (three month running mean) (Source: FMC purchase records)





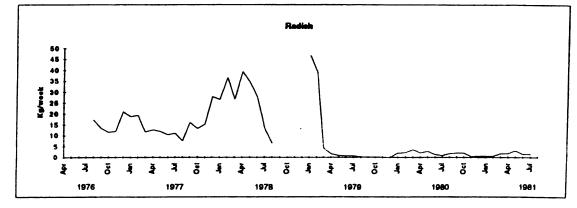
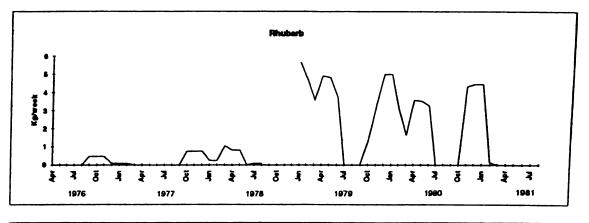
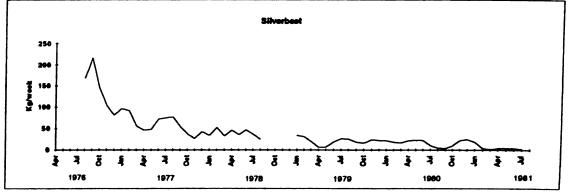
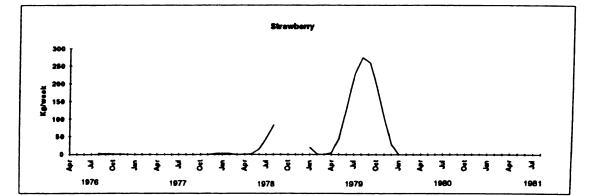


Figure 28. Monthly purchases (kg/week) of pineapple, potato, pumpkin fruit and radish by the Food Marketing Corporation at Goroka, April 1976 to August 1981 (three month running mean) (Source: FMC purchase records)







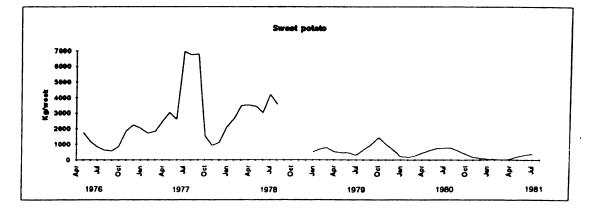


Figure 29. Monthly purchases (kg/week) of rhubarb, silverbeet, strawberry and sweet potato by the Food Marketing Corporation at Goroka, April 1976 to August 1981 (three month running mean) (Source: FMC purchase records)

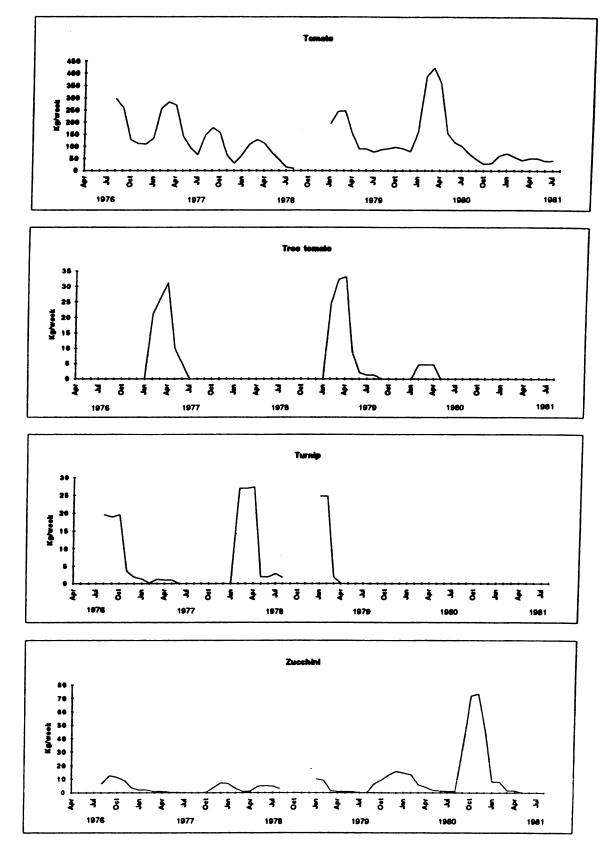


Figure 30. Monthly purchases (kg/week) of tomato, tree tomato, turnip and zucchini by the Food Marketing Corporation at Goroka, April 1976 to August 1981 (three month running mean) (Source: FMC purchase records)

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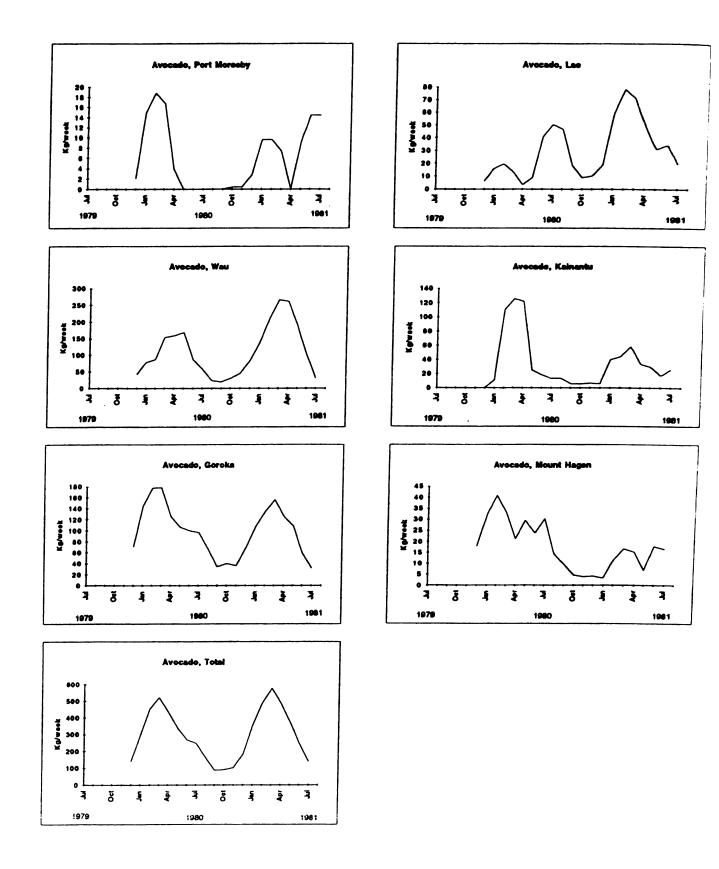
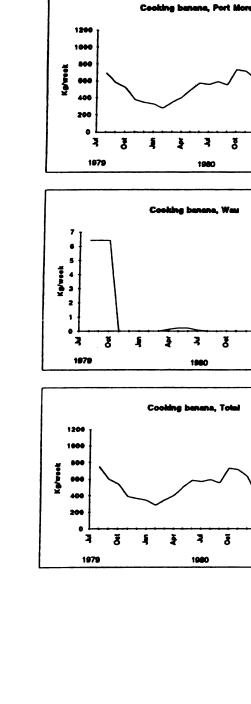
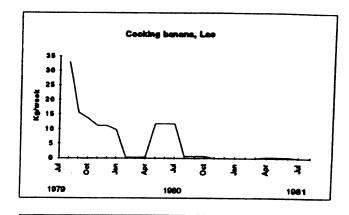
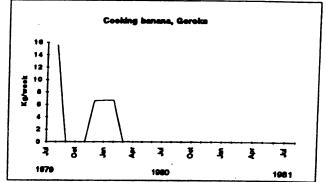
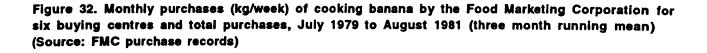


Figure 31. Monthly purchases (kg/week) of avocado by the Food Marketing Corporation for six buying centres and total purchases, July 1979 to August 1981 (three month running mean) (Source: FMC purchase records)









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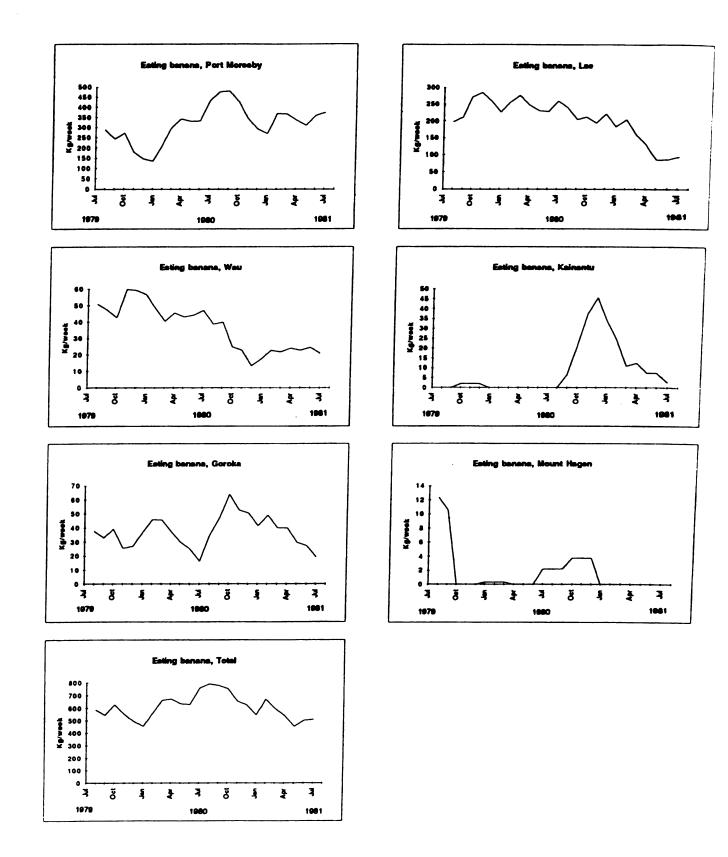


Figure 33. Monthly purchases (kg/week) of eating banana by the Food Marketing Corporation for six buying centres and total purchases, July 1979 to August 1981 (three month running mean) (Source: FMC purchase records)

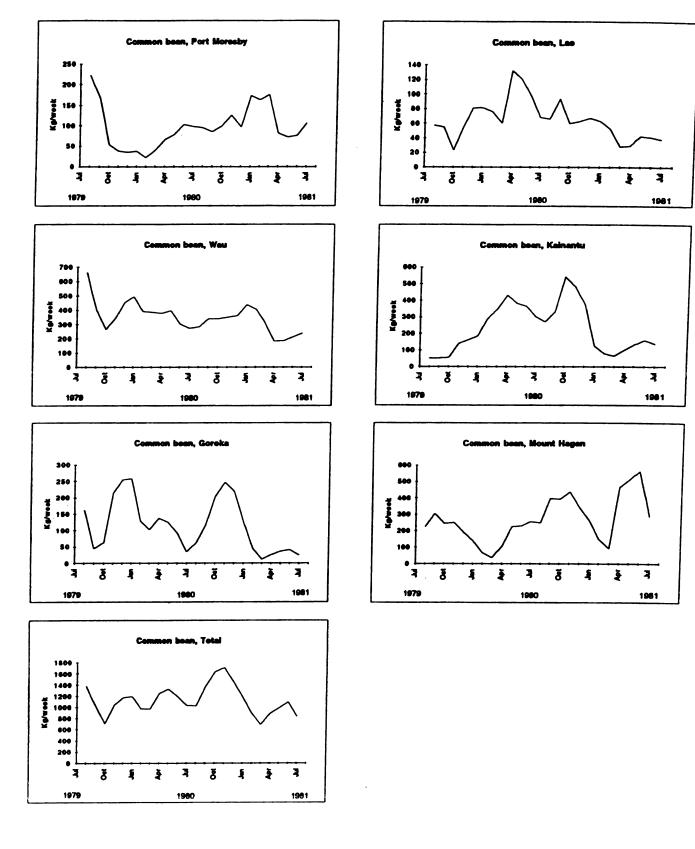


Figure 34. Monthly purchases (kg/week) of common bean by the Food Marketing Corporation for six buying centres and total purchases, July 1979 to August 1981 (three month running mean) (Source: FMC purchase records)

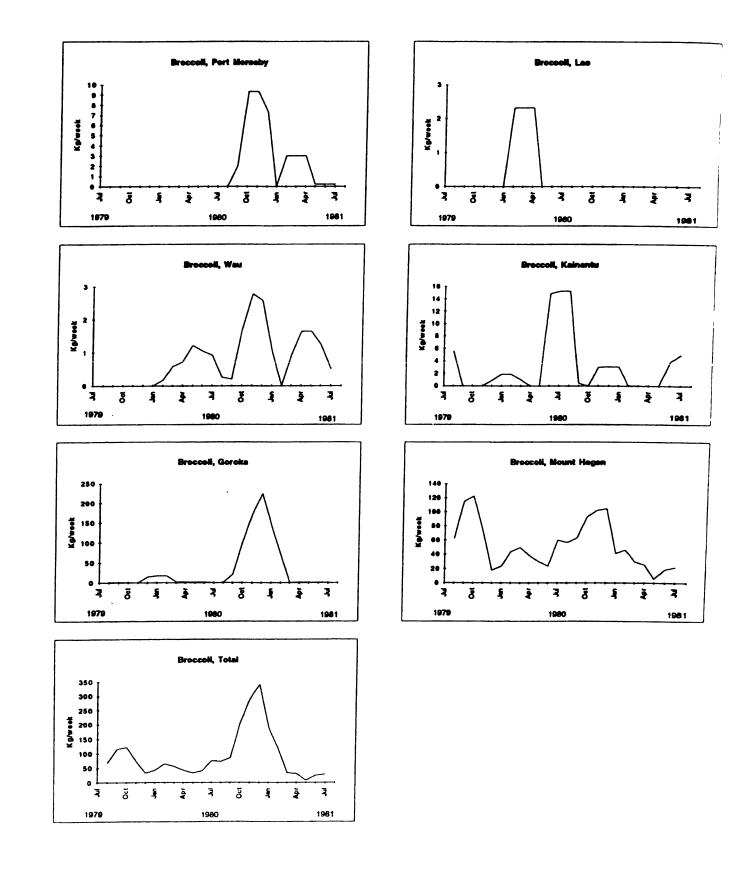


Figure 35. Monthly purchases (kg/week) of broccoli by the Food Marketing Corporation for six buying centres and total purchases, July 1979 to August 1981 (three month running mean) (Source: FMC purchase records)

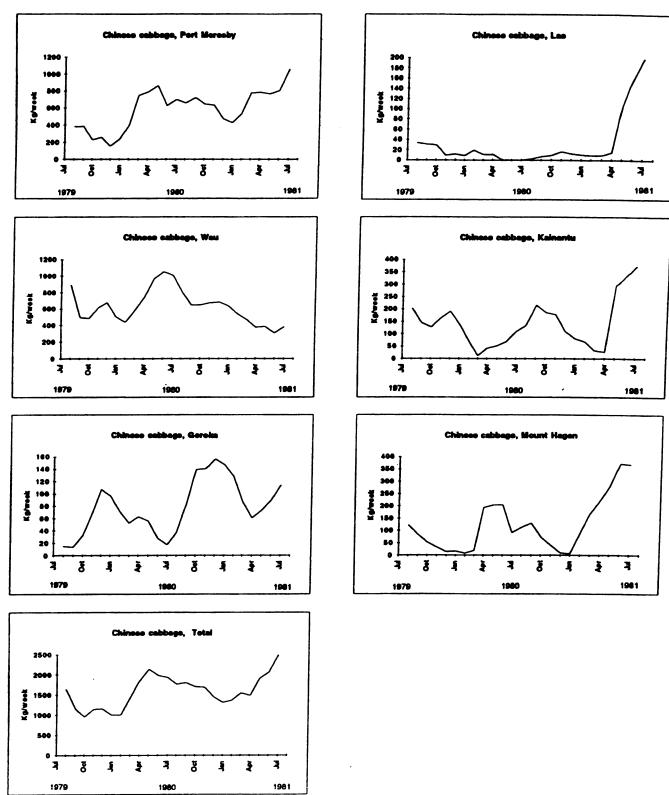


Figure 36. Monthly purchases (kg/week) of Chinese cabbage by the Food Marketing Corporation for six buying centres and total purchases, July 1979 to August 1981 (three month running mean) (Source: FMC purchase records)

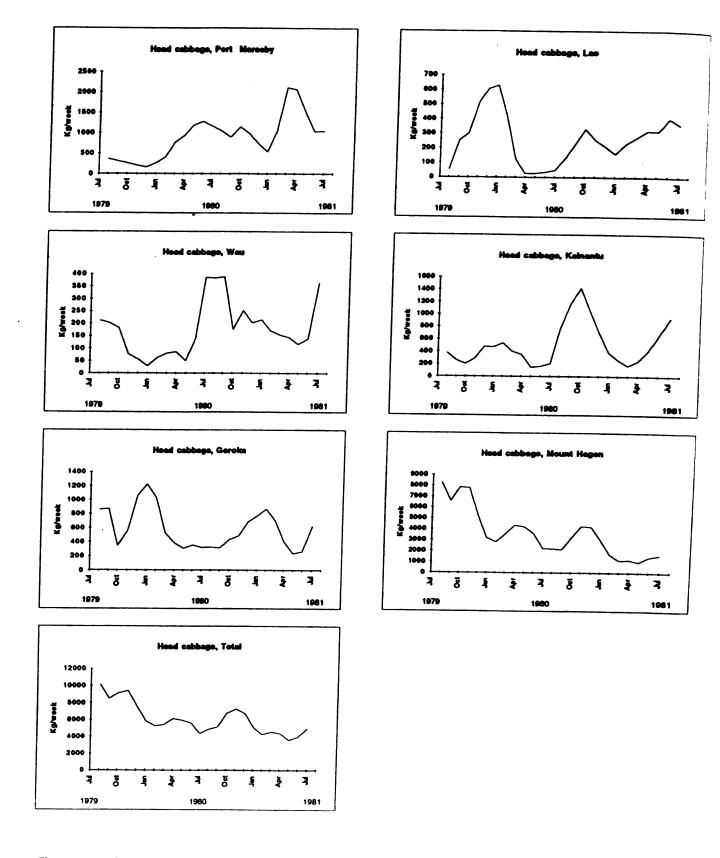


Figure 37. Monthly purchases (kg/week) of head cabbage by the Food Marketing Corporation for six buying centres and total purchases, July 1979 to August 1981 (three month running mean) (Source: FMC purchase records)

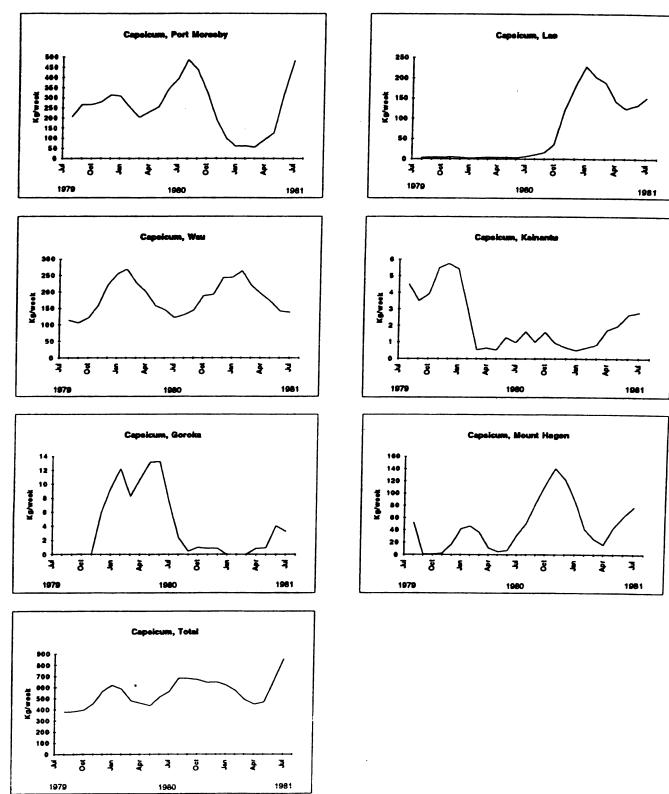


Figure 38. Monthly purchases (kg/week) of capsicum by the Food Marketing Corporation for six buying centres and total purchases, July 1979 to August 1981 (three month running mean) (Source: FMC purchase records)

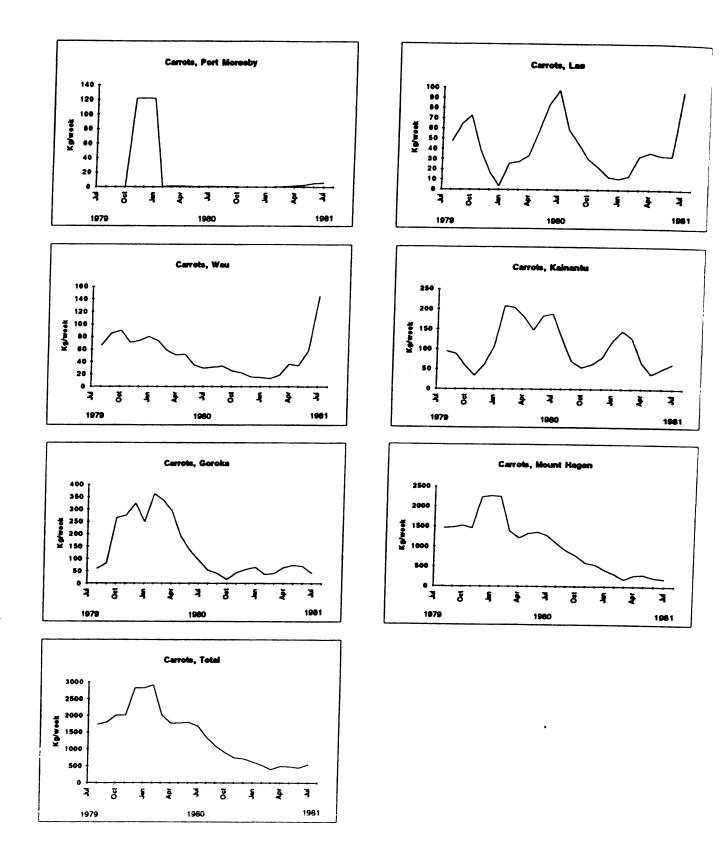


Figure 39. Monthly purchases (kg/week) of carrots by the Food Marketing Corporation for six buying centres and total purchases, July 1979 to August 1981 (three month running mean) (Source: FMC purchase records)

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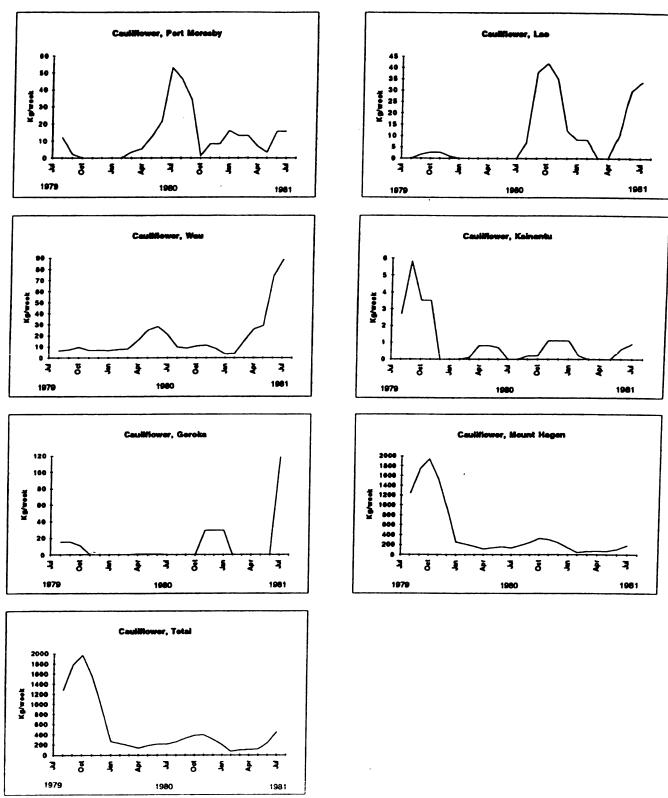


Figure 40. Monthly purchases (kg/week) of cauliflower by the Food Marketing Corporation for six buying centres and total purchases, July 1979 to August 1981 (three month running mean) (Source: FMC purchase records)

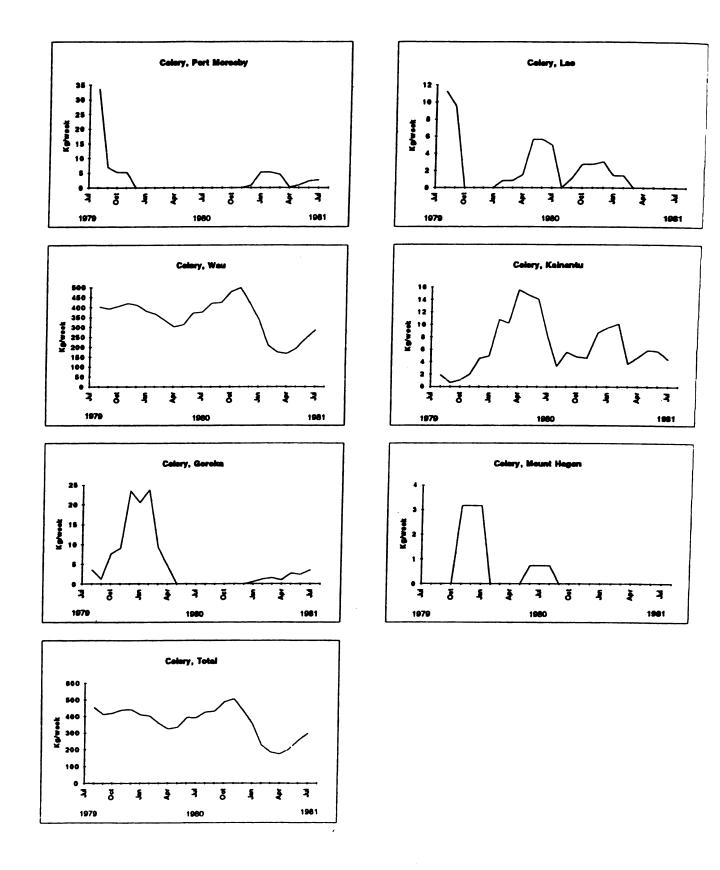


Figure 41. Monthly purchases (kg/week) of celery by the Food Marketing Corporation for six buying centres and total purchases, July 1979 to August 1981 (three month running mean) (Source: FMC purchase records)

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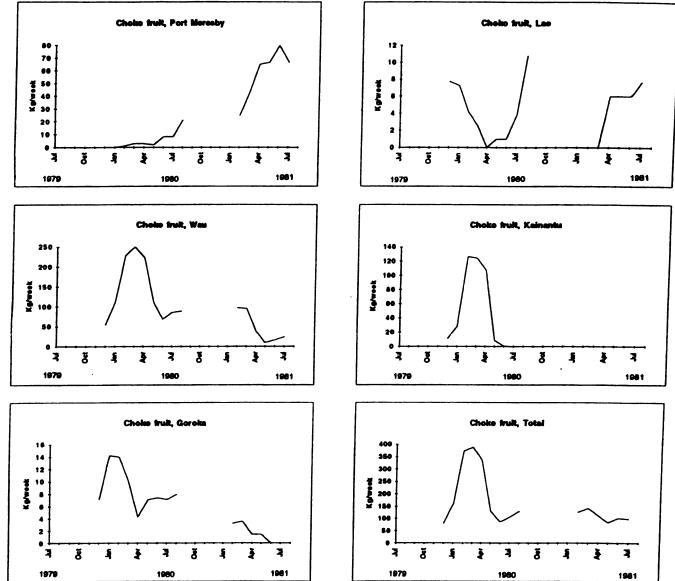
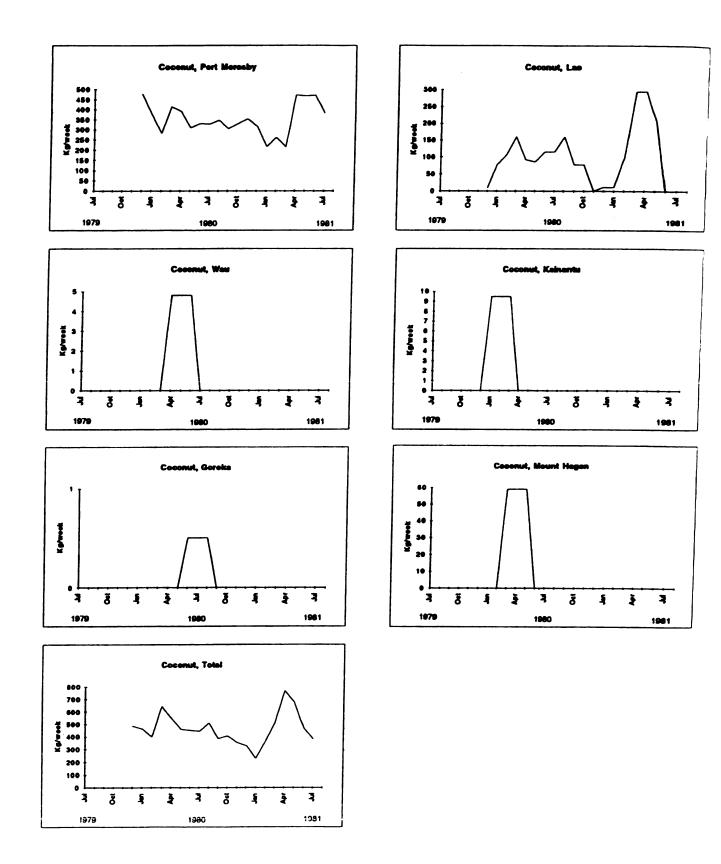
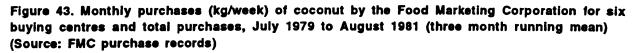
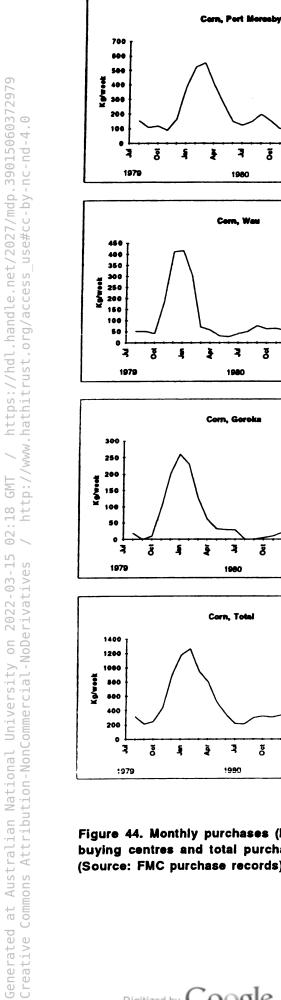
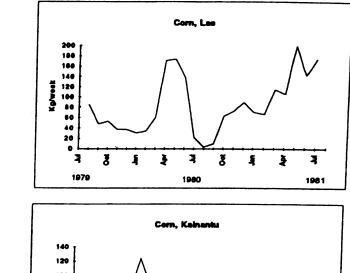


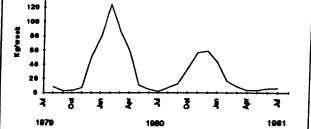
Figure 42. Monthly purchases (kg/week) of choko fruit by the Food Marketing Corporation for six buying centres and total purchases, July 1979 to August 1981 (three month running mean) (Source: FMC purchase records)

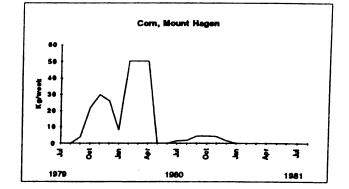


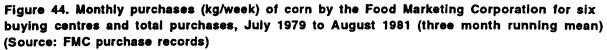












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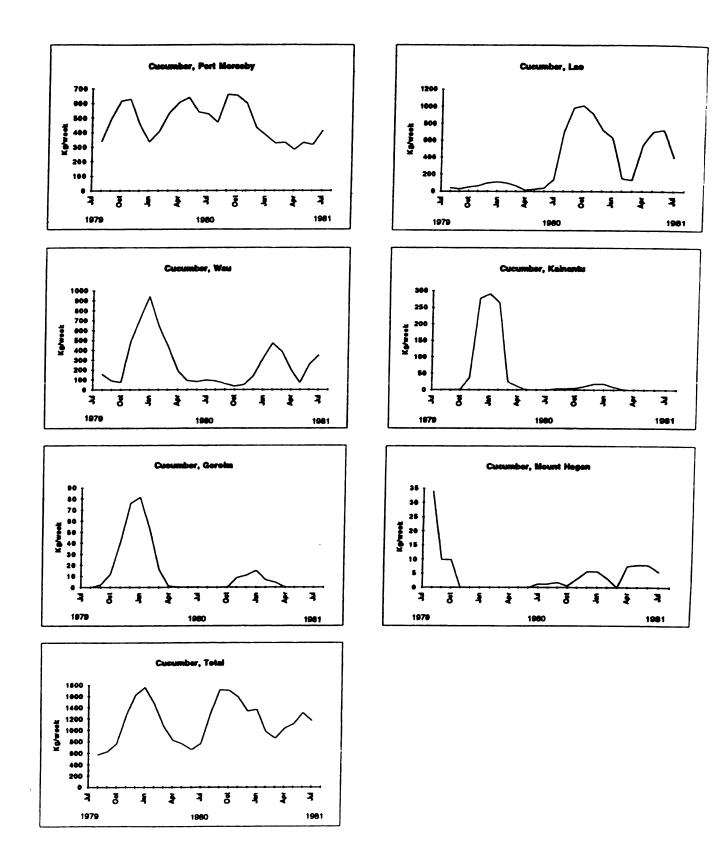


Figure 45. Monthly purchases (kg/week) of cucumber by the Food Marketing Corporation for six buying centres and total purchases, July 1979 to August 1981 (three month running mean) (Source: FMC purchase records)

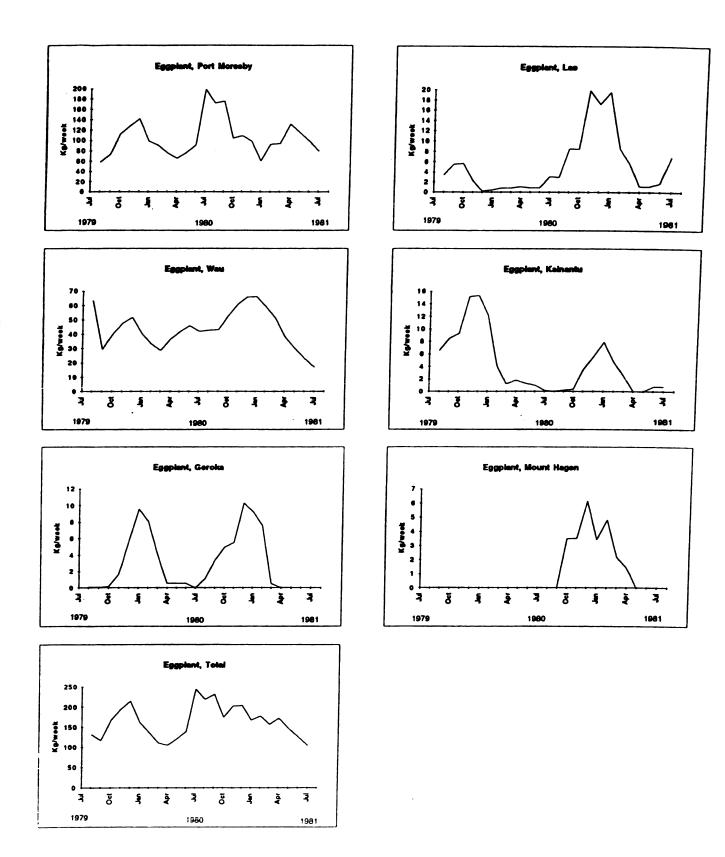


Figure 46. Monthly purchases (kg/week) of eggplant by the Food Marketing Corporation for six buying centres and total purchases, July 1979 to August 1981 (three month running mean) (Source: FMC purchase records)

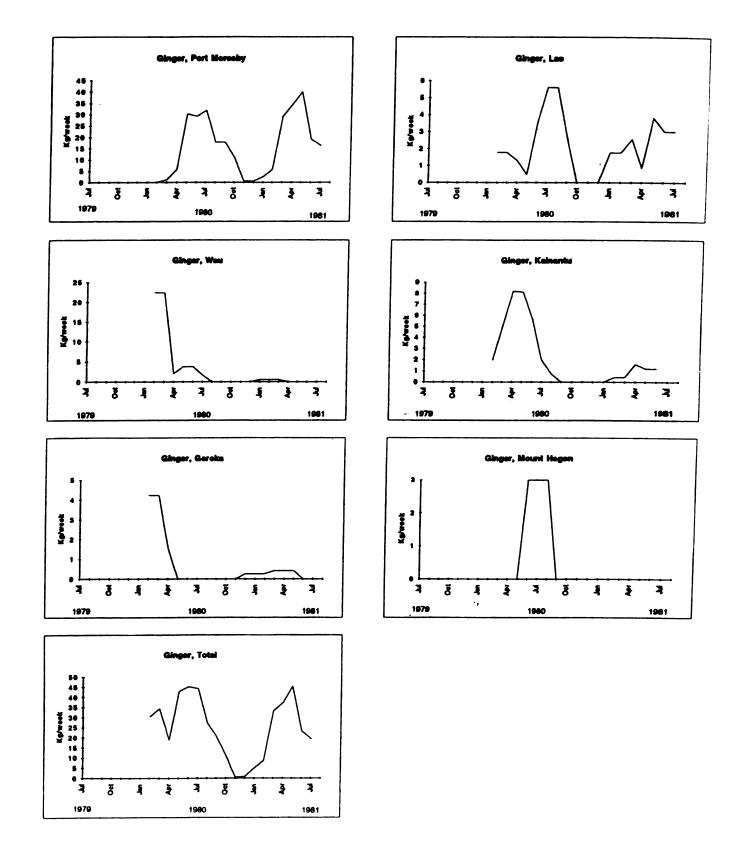


Figure 47. Monthly purchases (kg/week) of ginger by the Food Marketing Corporation for six buying centres and total purchases, July 1979 to August 1981 (three month running mean) (Source: FMC purchase records)

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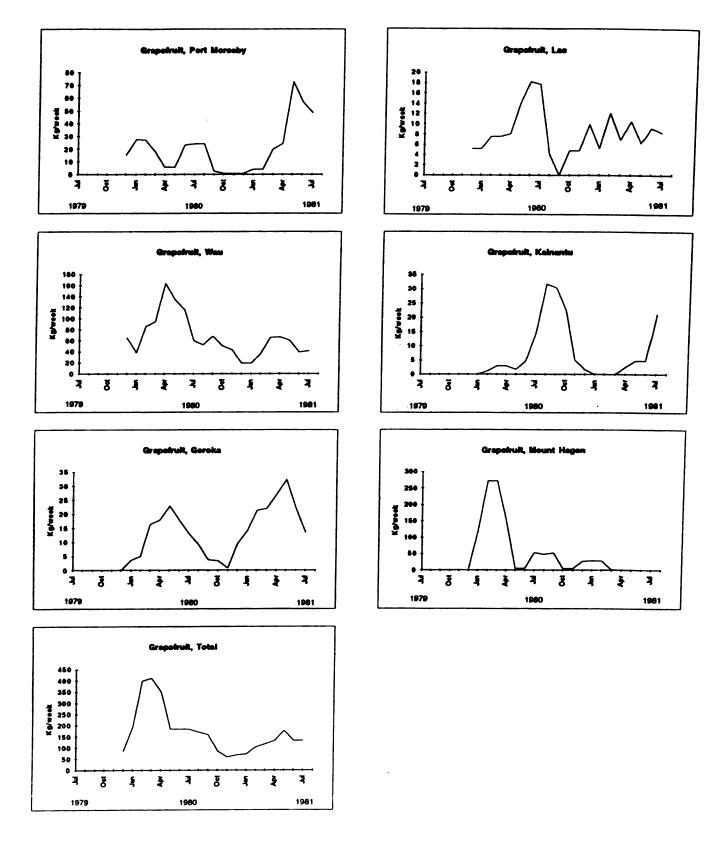


Figure 48. Monthly purchases (kg/week) of grapefruit by the Food Marketing Corporation for six buying centres and total purchases, July 1979 to August 1981 (three month running mean) (Source: FMC purchase records)

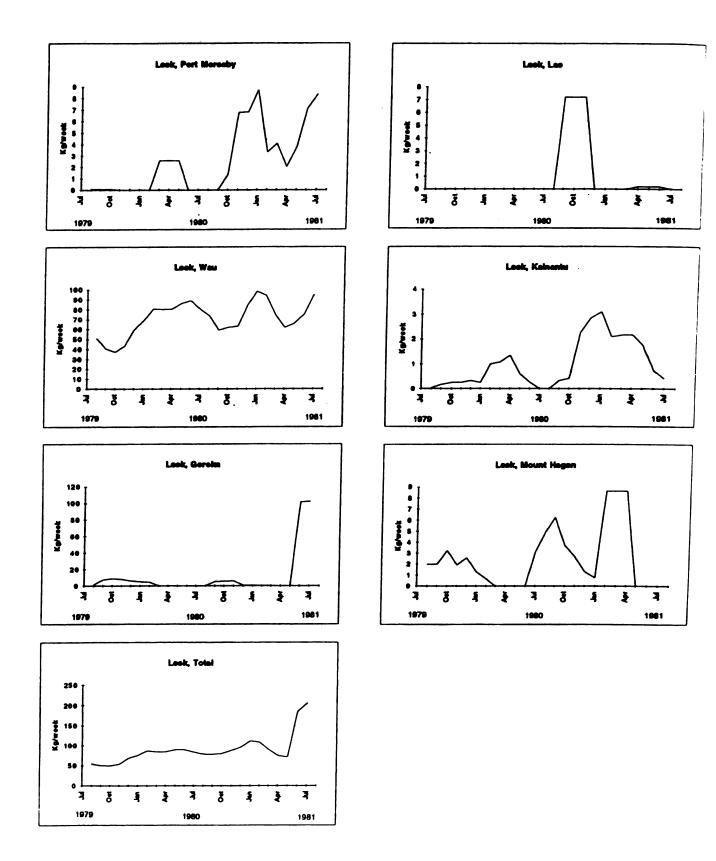


Figure 49. Monthly purchases (kg/week) of leek by the Food Marketing Corporation for six buying centres and total purchases, July 1979 to August 1981 (three month running mean) (Source: FMC purchase records)

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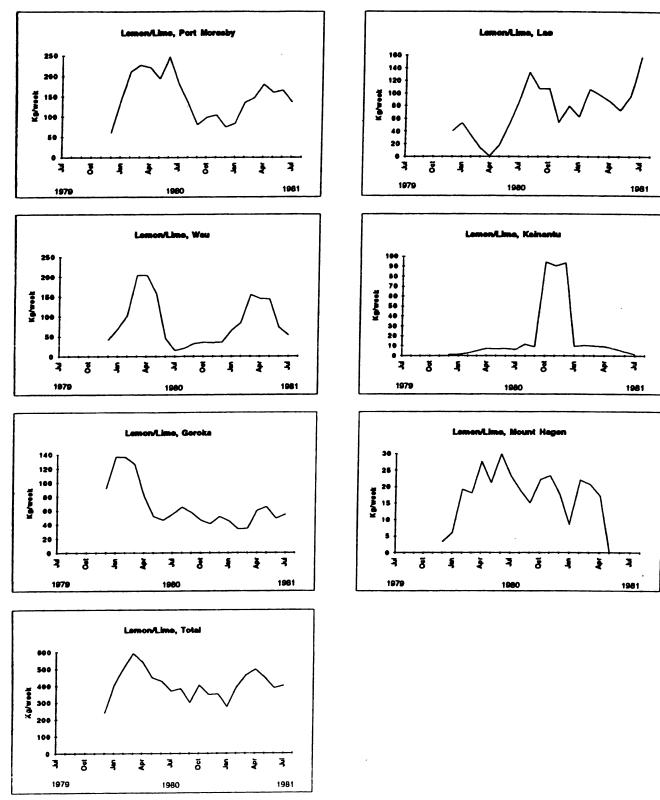
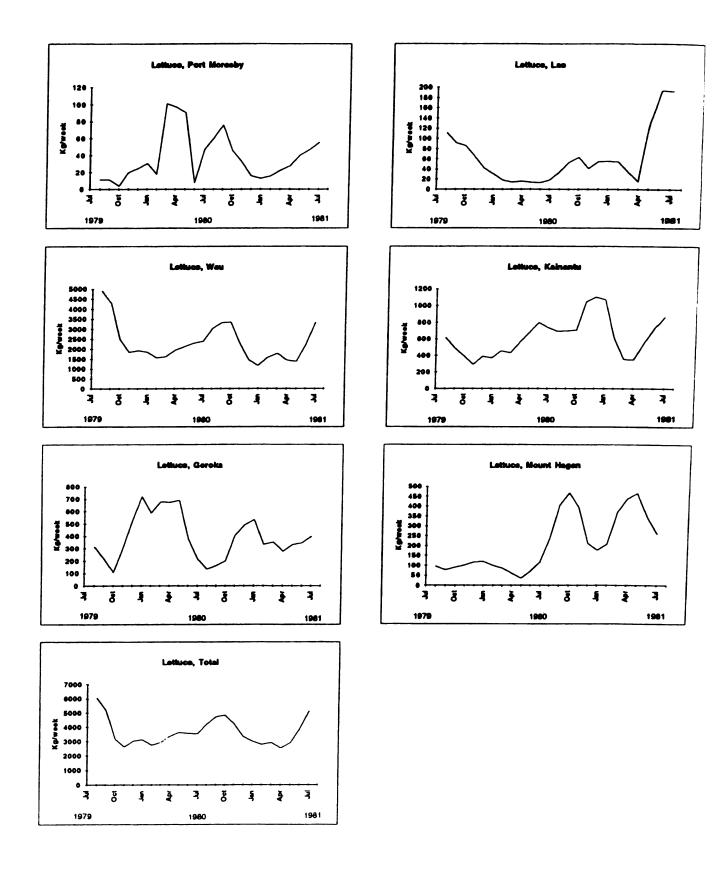
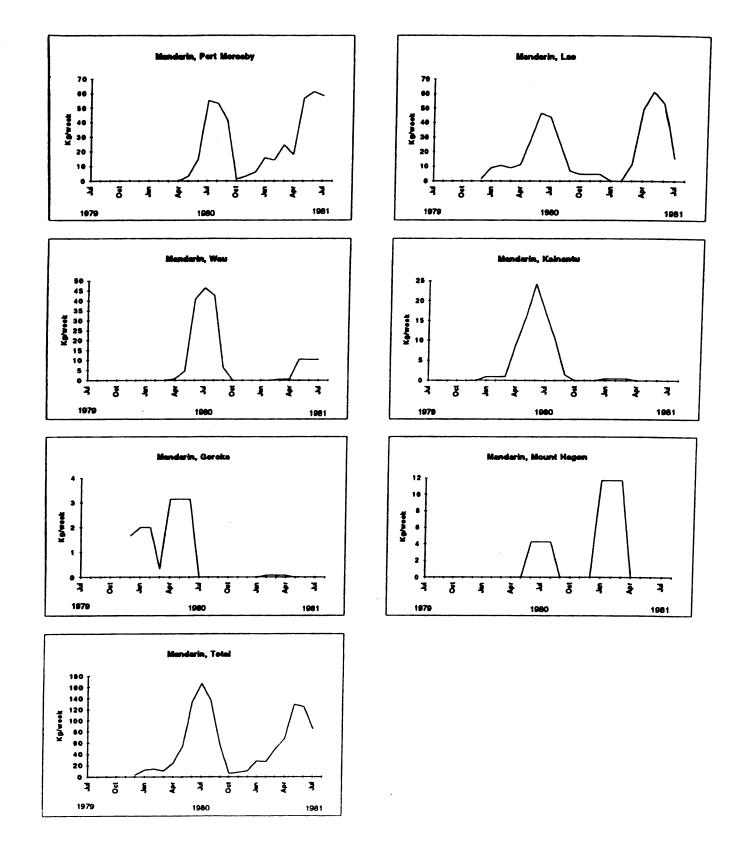
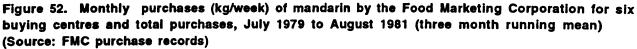


Figure 50. Monthly purchases (kg/week) of lemon/lime by the Food Marketing Corporation for six buying centres and total purchases, July 1979 to August 1981 (three month running mean) (Source: FMC purchase records)









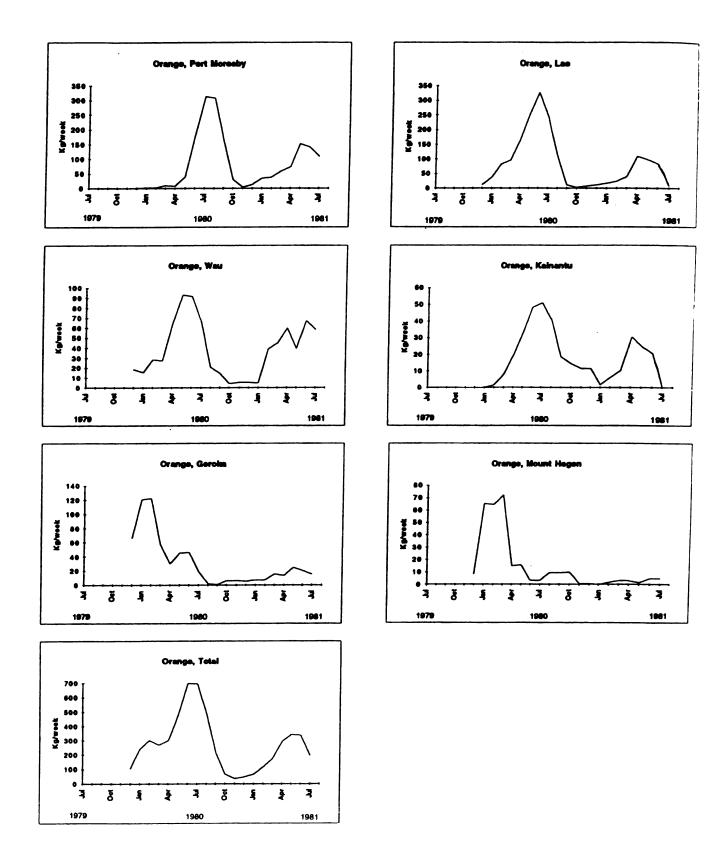


Figure 53. Monthly purchases (kg/week) of orange by the Food Marketing Corporation for six buying centres and total purchases, July 1979 to August 1981 (three month running mean) (Source: FMC purchase records)

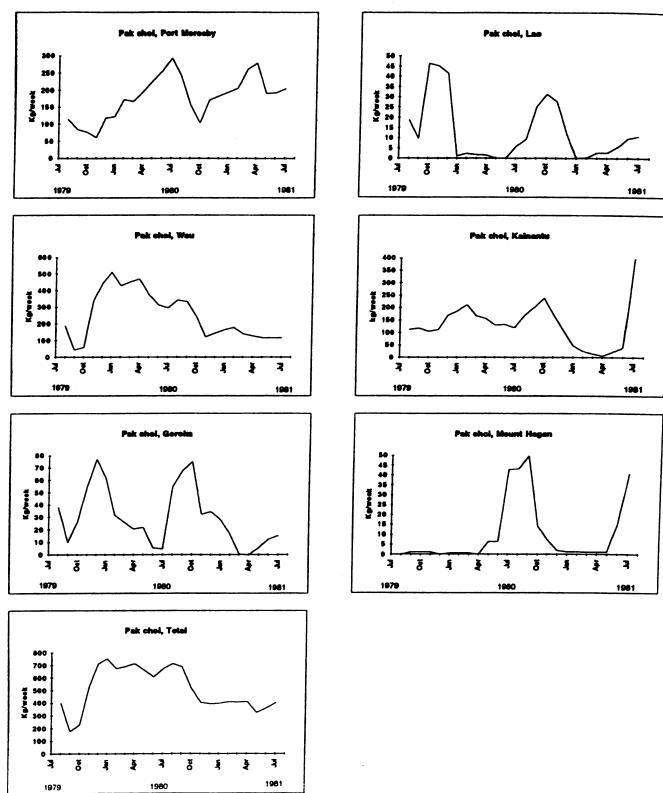


Figure 54. Monthly purchases (kg/week) of pak choi by the Food Marketing Corporation for six buying centres and total purchases, July 1979 to August 1981 (three month running mean) (Source: FMC purchase records)

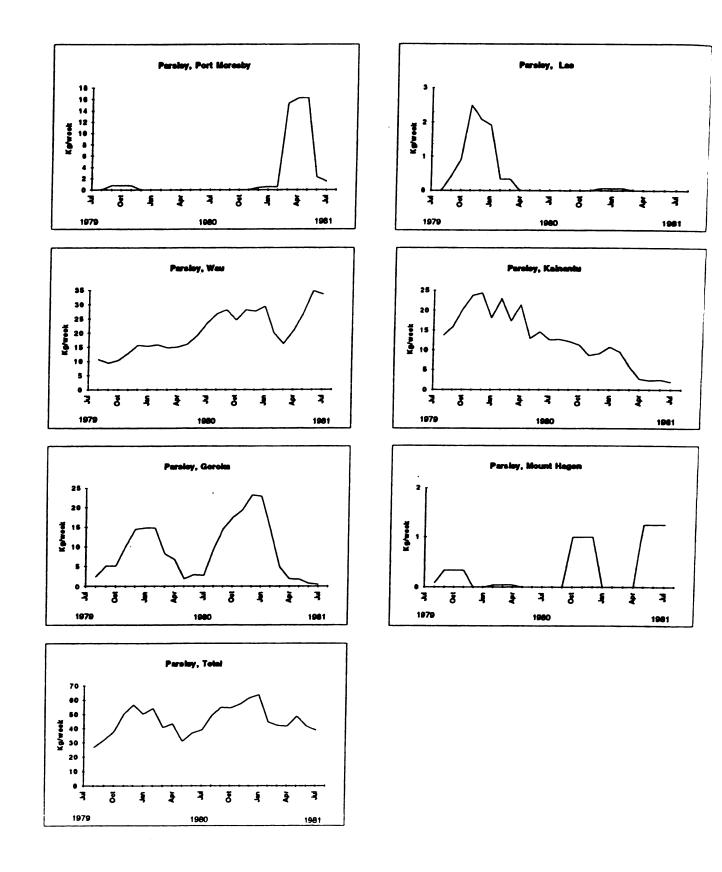


Figure 55. Monthly purchases (kg/week) of parsley by the Food Marketing Corporation for six buying centres and total purchases, July 1979 to August 1981 (three month running mean) (Source: FMC purchase records)

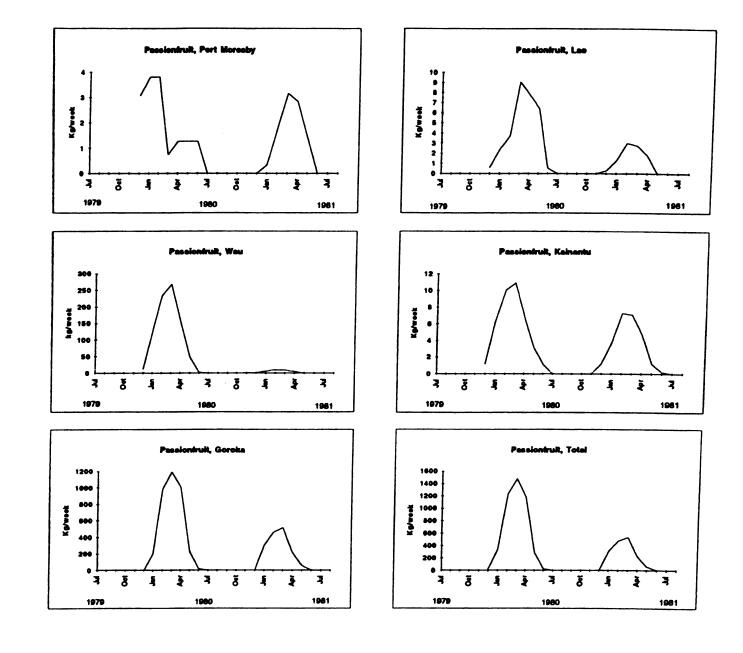


Figure 56. Monthly purchases (kg/week) of purple passionfruit by the Food Marketing Corporation for six buying centres and total purchases, July 1979 to August 1981 (three month running mean) (Source: FMC purchase records)

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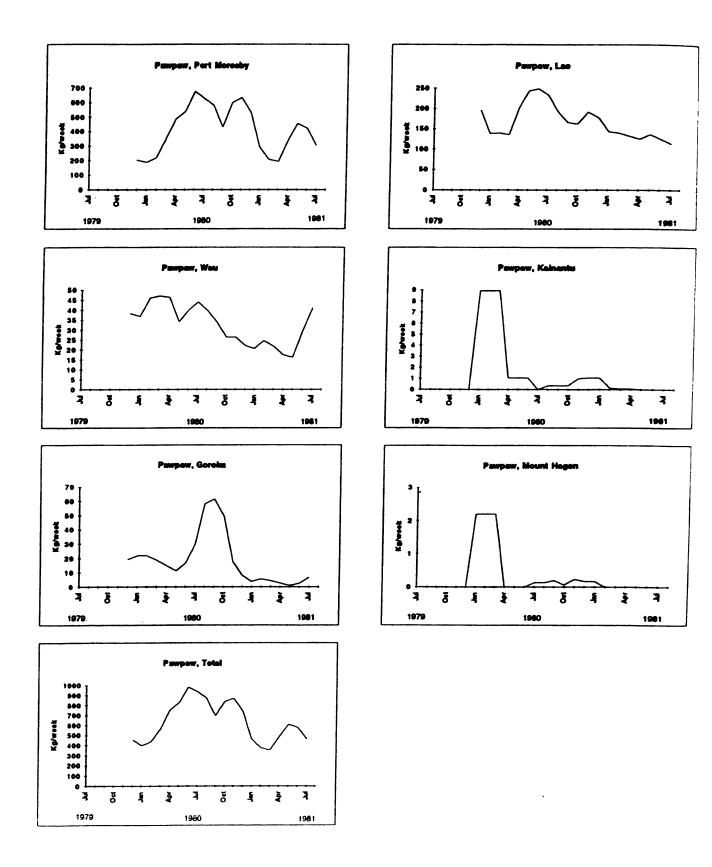


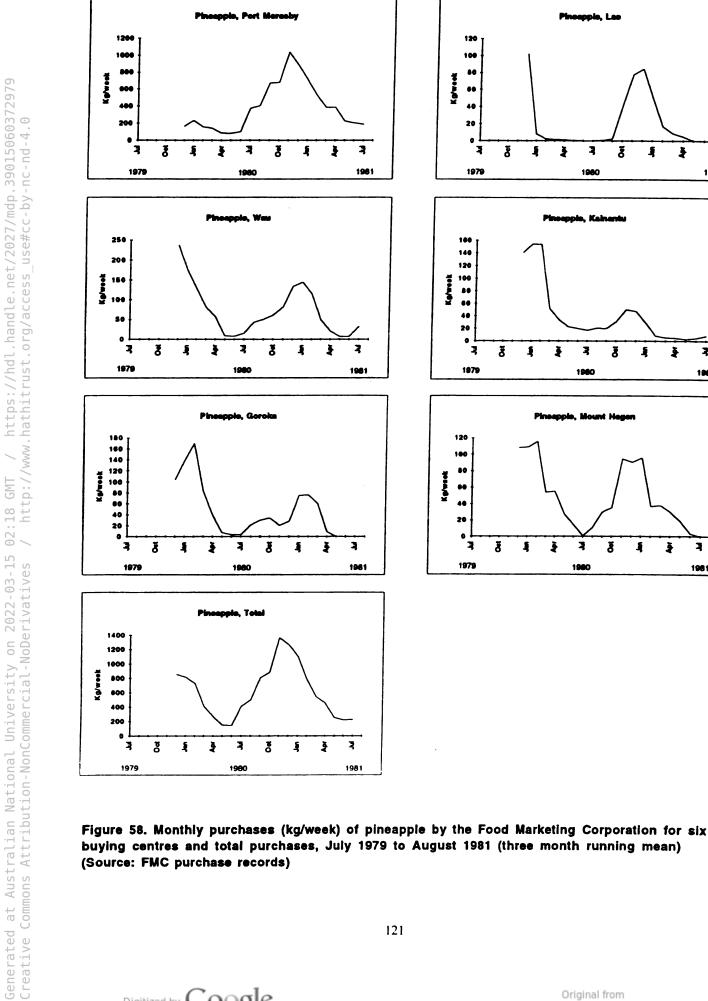
Figure 57. Monthly purchases (kg/week) of pawpaw by the Food Marketing Corporation for six buying centres and total purchases, July 1979 to August 1981 (three month running mean) (Source: FMC purchase records)

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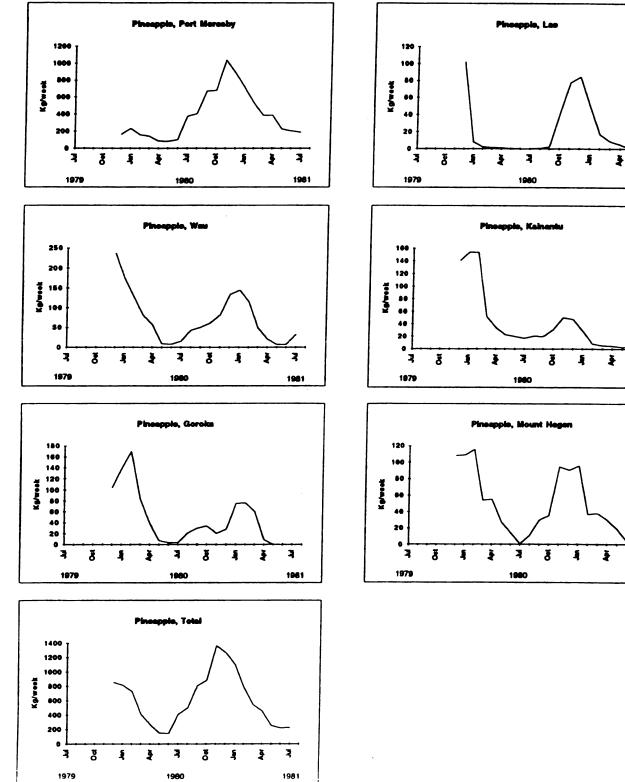
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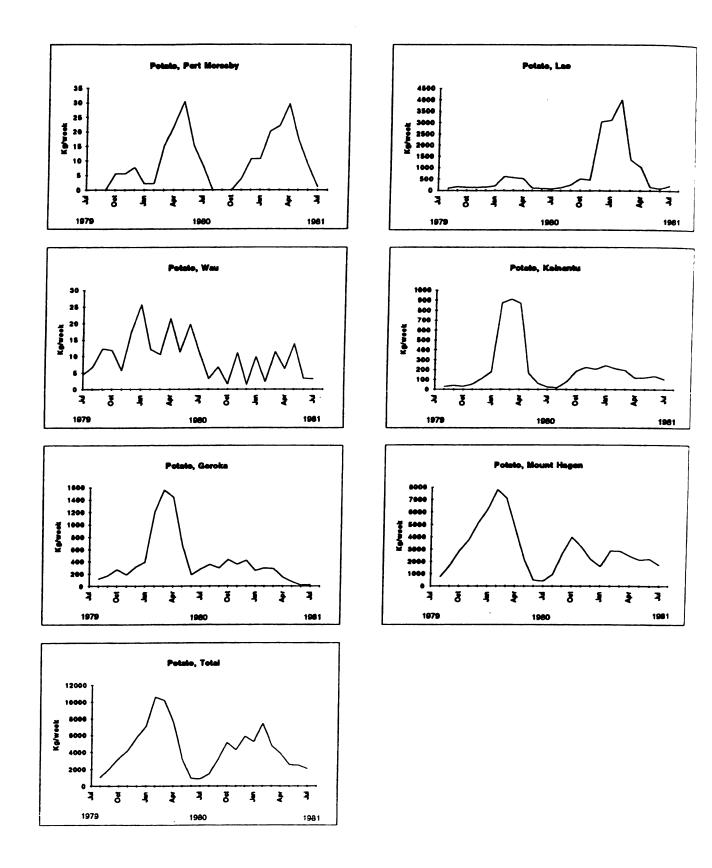
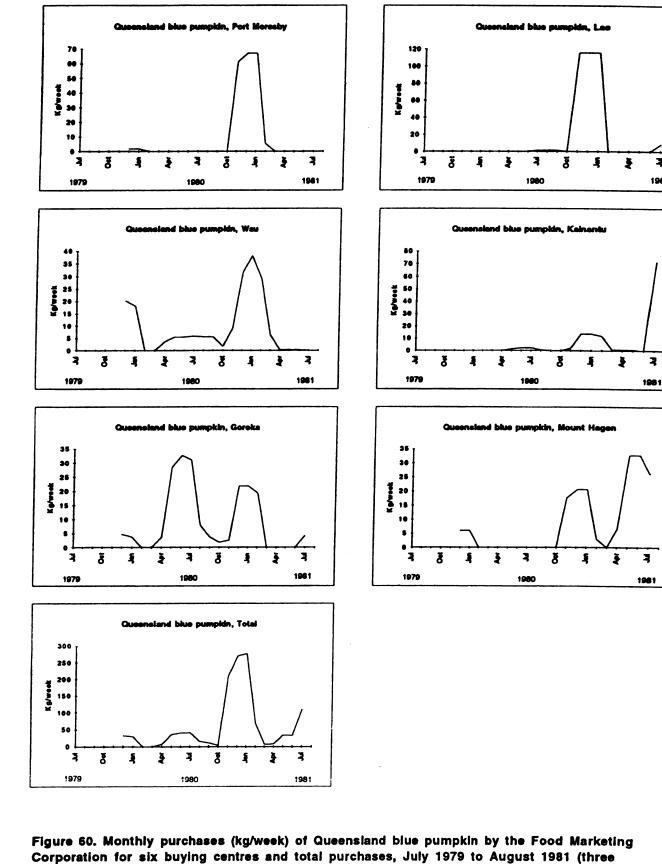


Figure 59. Monthly purchases (kg/week) of potato by the Food Marketing Corporation for six buying centres and total purchases, July 1979 to August 1981 (three month running mean) (Source: FMC purchase records)





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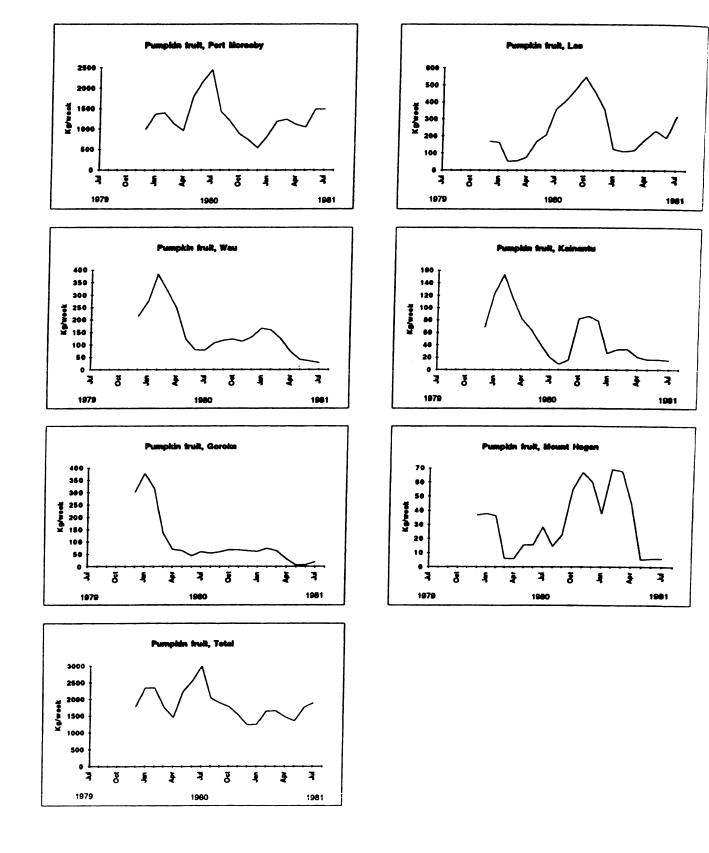


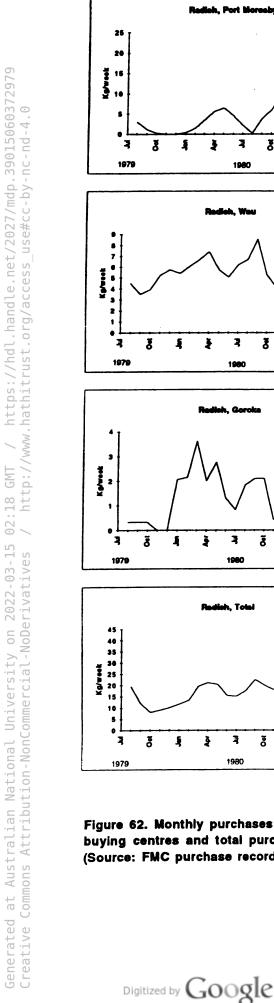
Figure 61. Monthly purchases (kg/week) of pumpkin fruit by the Food Marketing Corporation for six buying centres and total purchases, July 1979 to August 1981 (three month running mean) (Source: FMC purchase figures)

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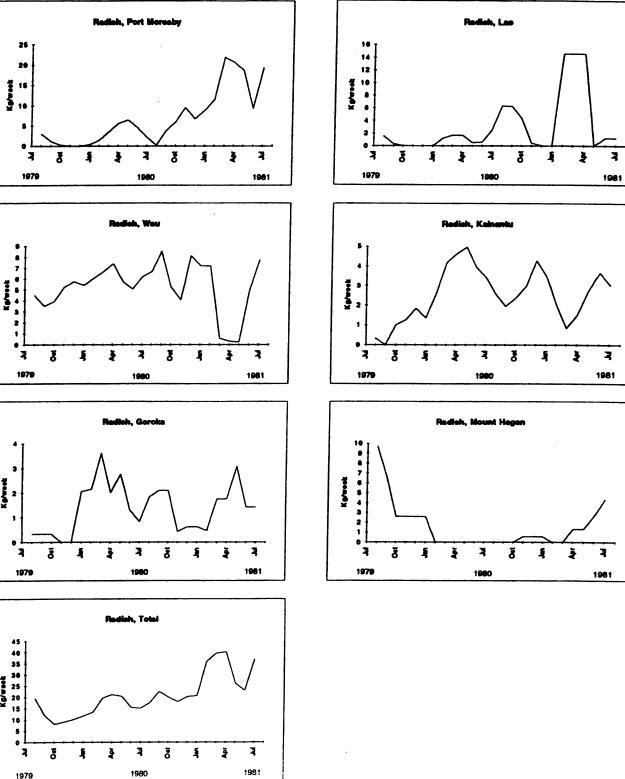
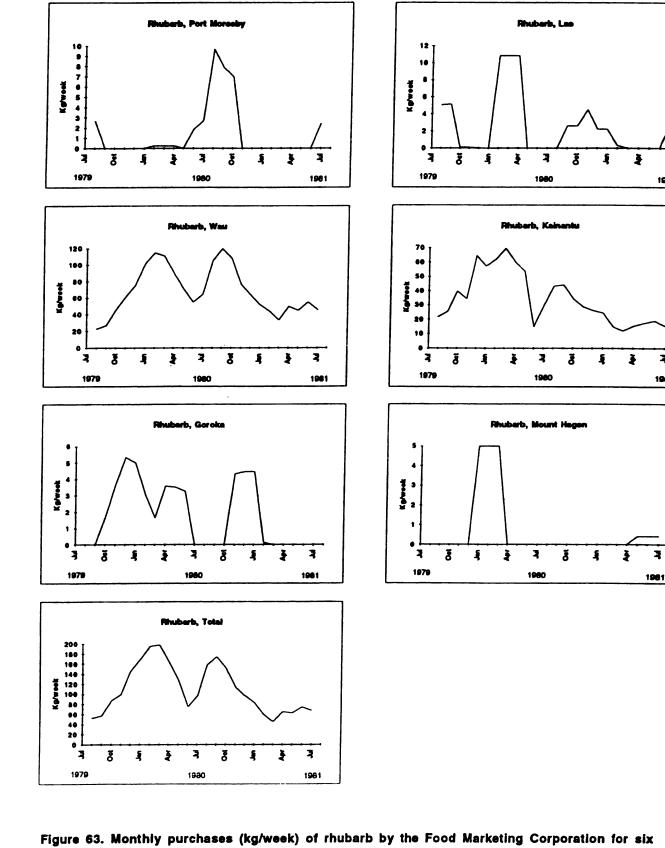


Figure 62. Monthly purchases (kg/week) of radish by the Food Marketing Corporation for six buying centres and total purchases, July 1979 to August 1981 (three month running mean) (Source: FMC purchase records)



buying centres and total purchases, July 1979 to August 1981 (three month running mean) (Source: FMC purchase records)

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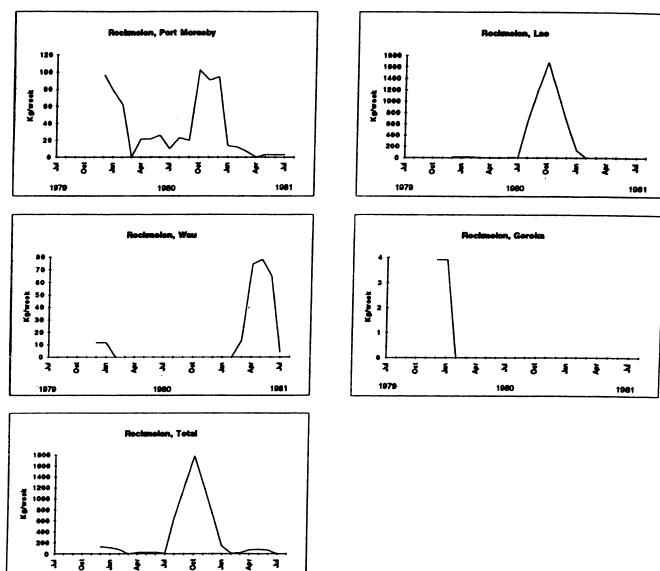


Figure 64. Monthly purchases (kg/week) of rockmelon by the Food Marketing Corporation for six buying centres and total purchases, July 1979 to August 1981 (three month running mean) (Source: FMC purchase records)

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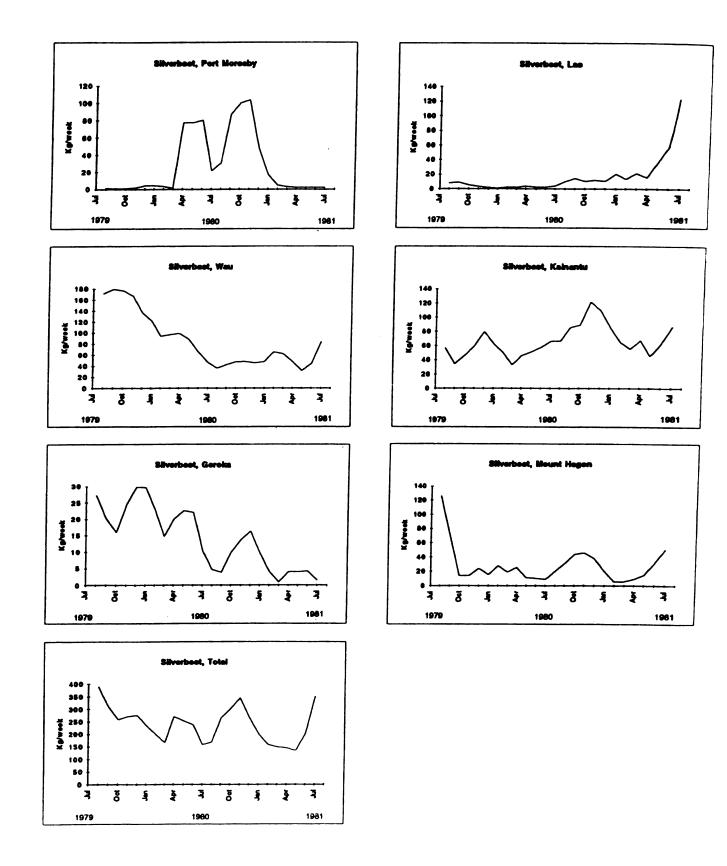


Figure 65. Monthly purchases (kg/week) of silverbeet by the Food Marketing Corporation for six buying centres and total purchases, July 1979 to August 1981 (three month running mean) (Source: FMC purchase records)

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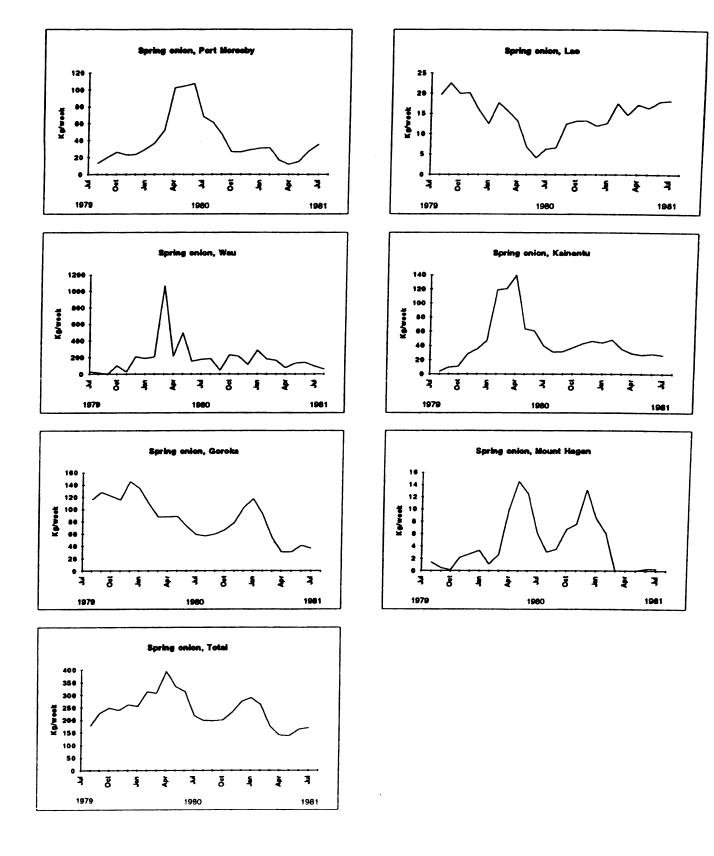
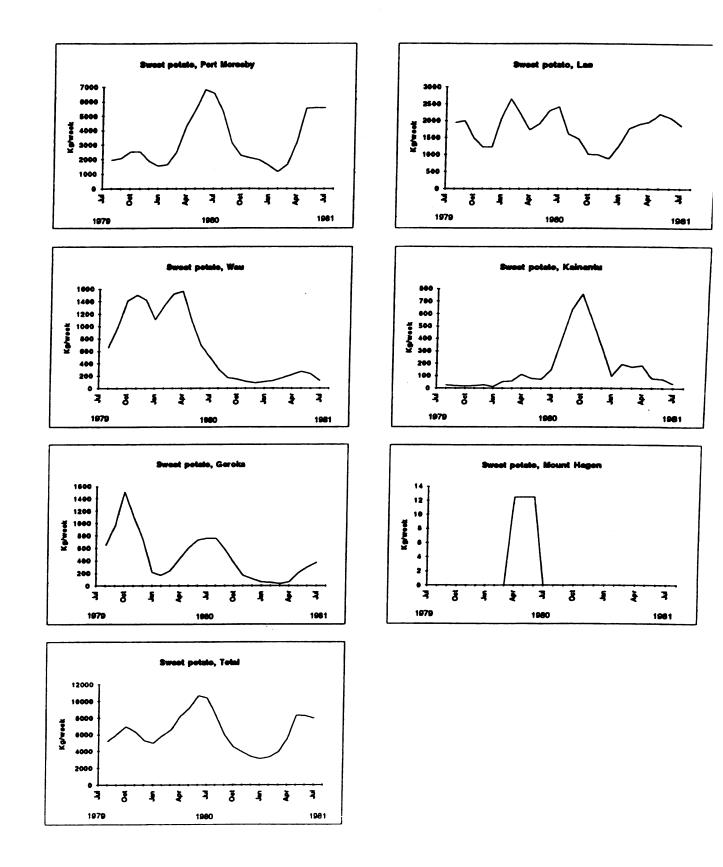
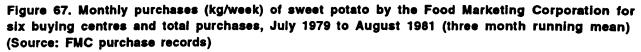


Figure 66. Monthly purchases (kg/week) of spring onion by the Food Marketing Corporation for six buying centres and total purchases, July 1979 to August 1981 (three month running mean) (Source: FMC purchase records)





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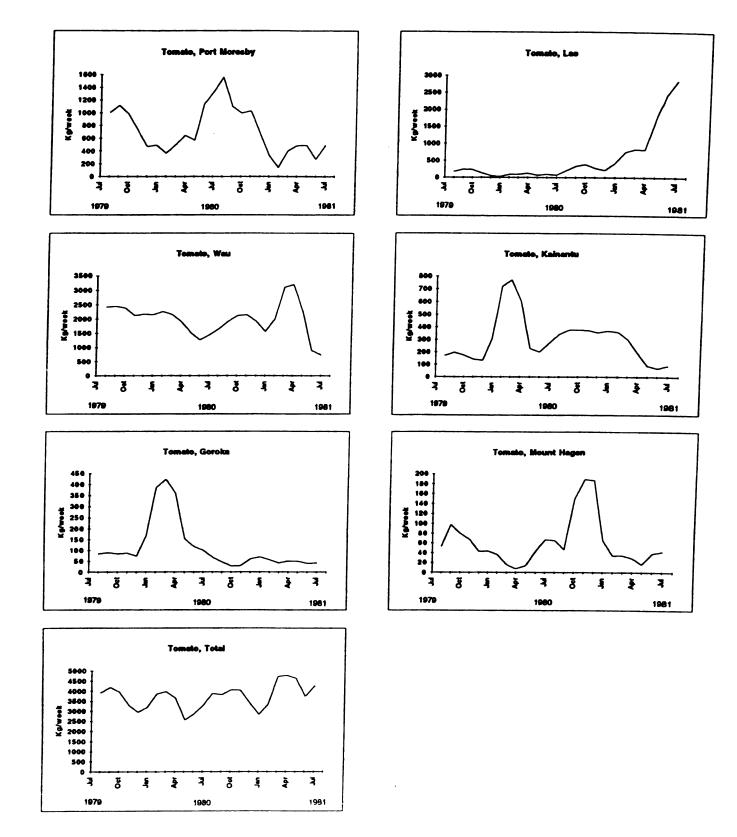


Figure 68. Monthly purchases (kg/week) of tomato by the Food Marketing Corporation for six buying centres and total purchases, July 1979 to August 1981 (three month running mean) (Source: FMC purchase records)

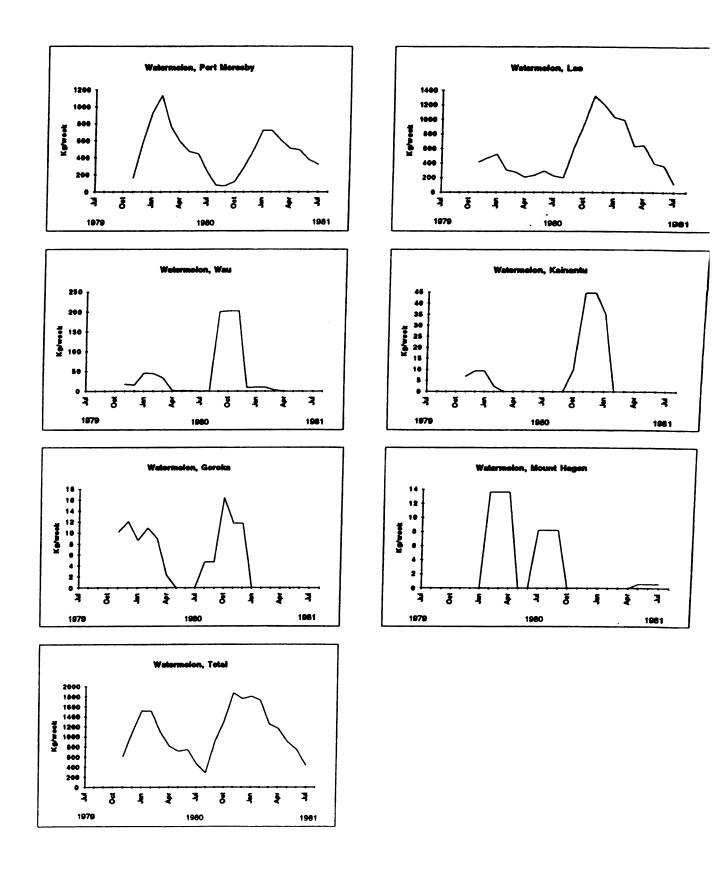
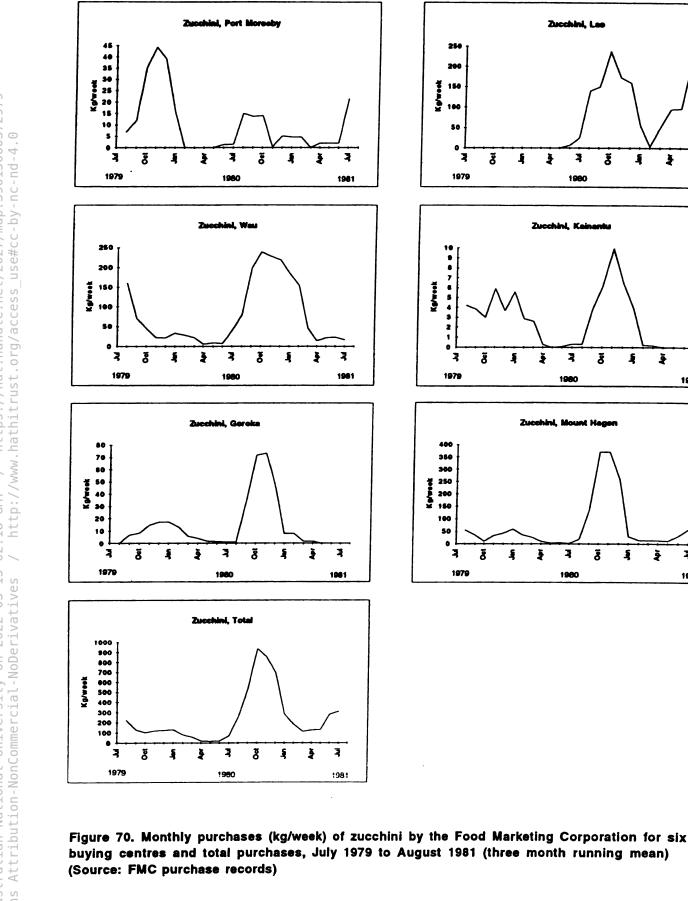


Figure 69. Monthly purchases (kg/week) of watermelon by the Food Marketing Corporation for six buying centres and total purchases, July 1979 to August 1981 (three month running mean) (Source: FMC purchase records)





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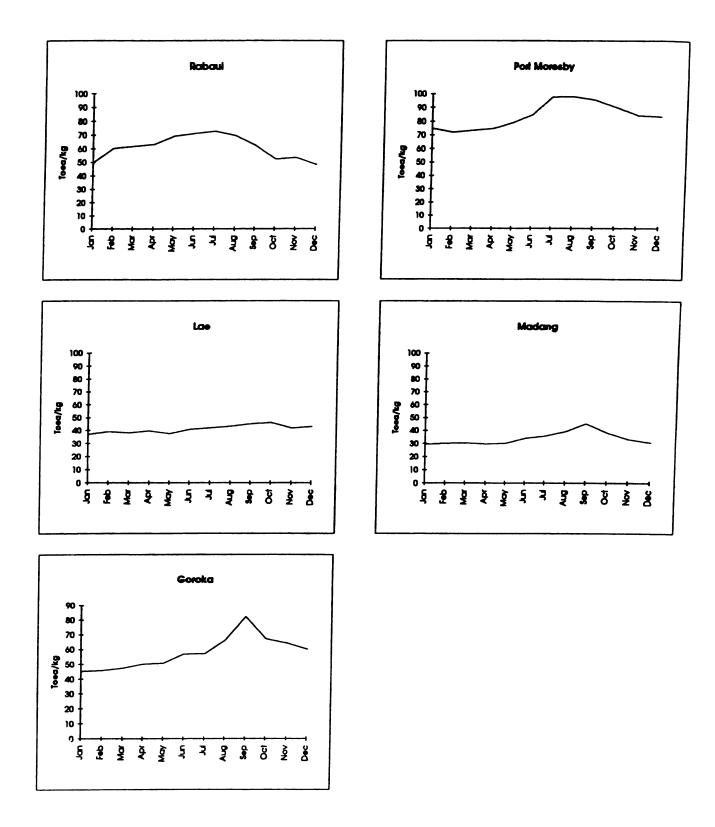


Figure 71. Mean monthly price (toea/kg) for aibika at Rabaul, Port Moresby, Lae, Madang and Goroka markets, January 1971 to December 1992, in constant 1991 prices (Source: National Statistics Office)

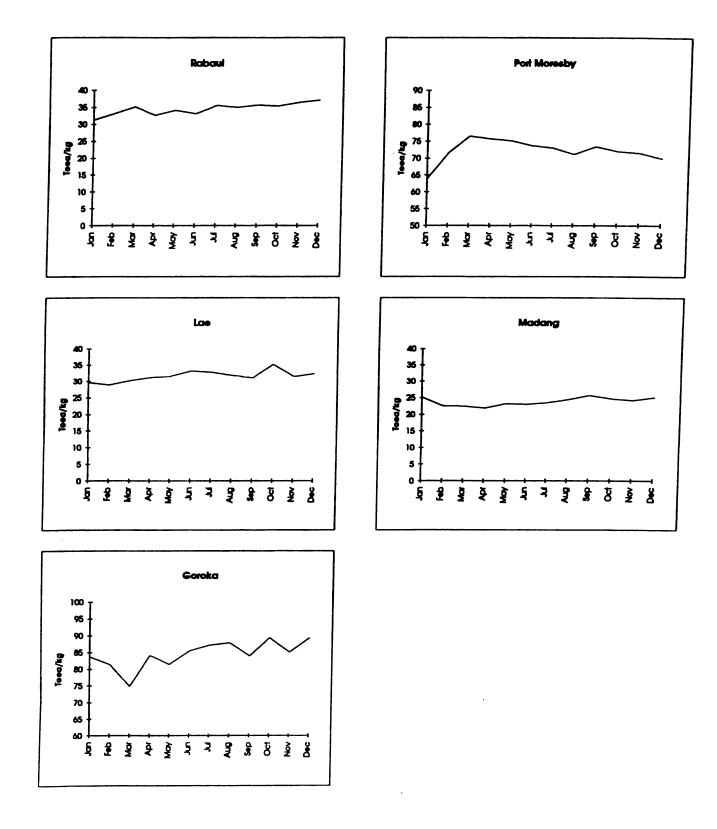


Figure 72. Mean monthly price (toea/kg) for cooking banana at Rabaul, Port Moresby, Lae, Madang and Goroka markets, January 1971 to December 1992, in constant 1991 prices (Source: National Statistics Office)

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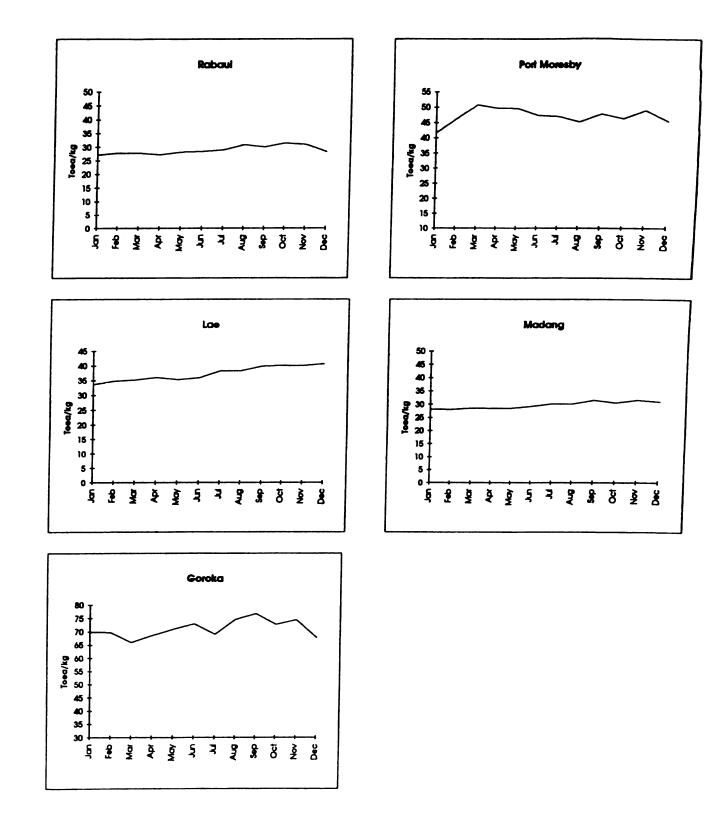


Figure 73. Mean monthly price (toea/kg) for eating banana at Rabaul, Port Moresby, Lae, Madang and Goroka markets, January 1971 to December 1992, in constant 1991 prices (Source: National Statistics Office)

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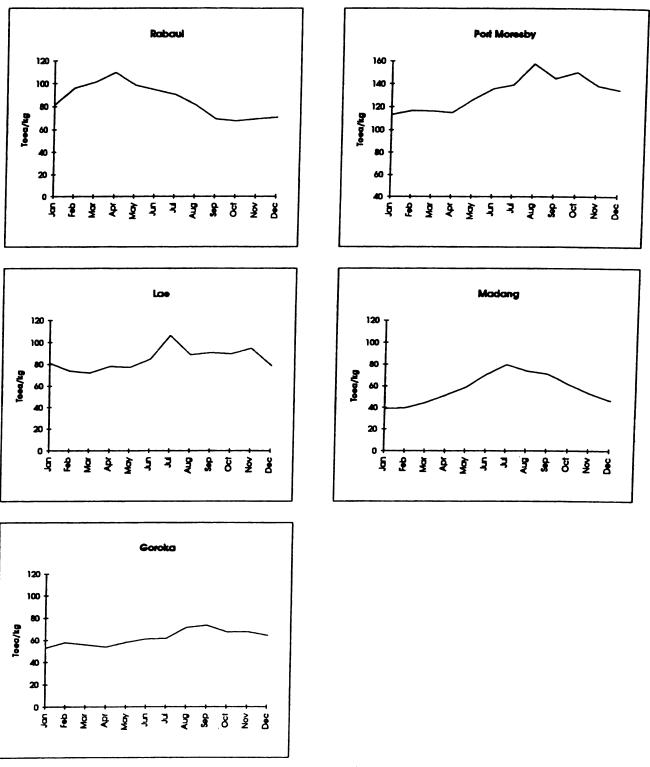
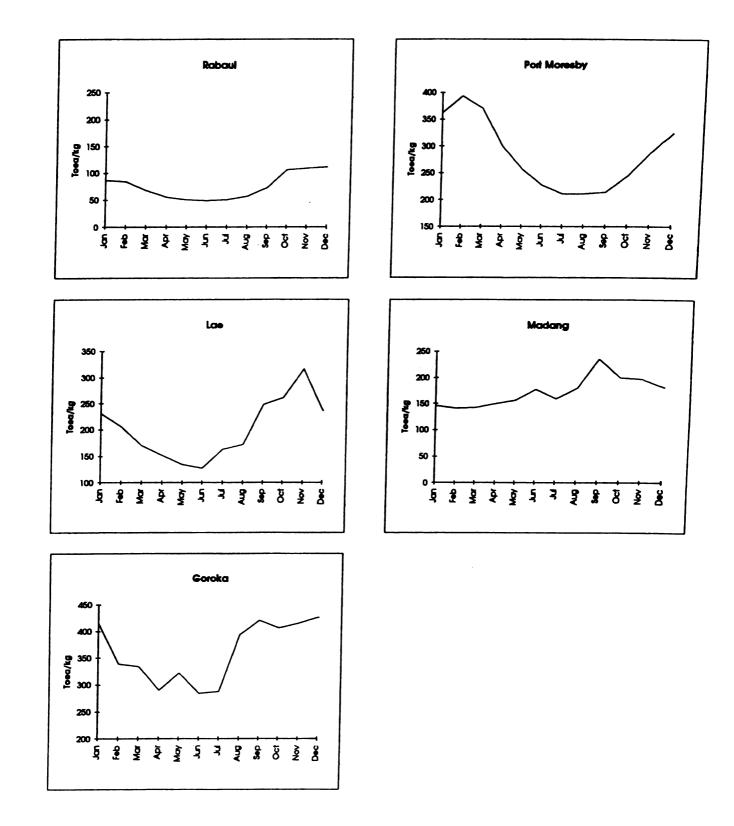
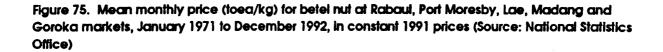


Figure 74. Mean monthly price (toea/kg) for common bean at Rabaul, Port Moresby, Lae, Madang and Goroka markets, January 1971 to December 1992, in constant 1991 prices (Source: National Statistics Office)



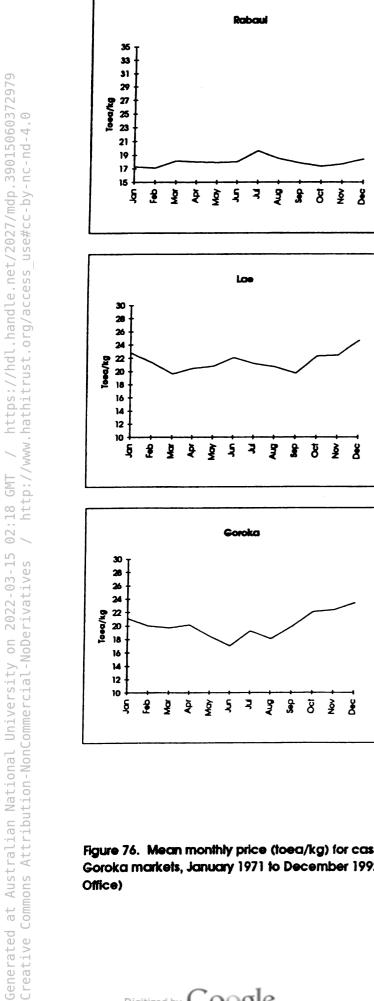


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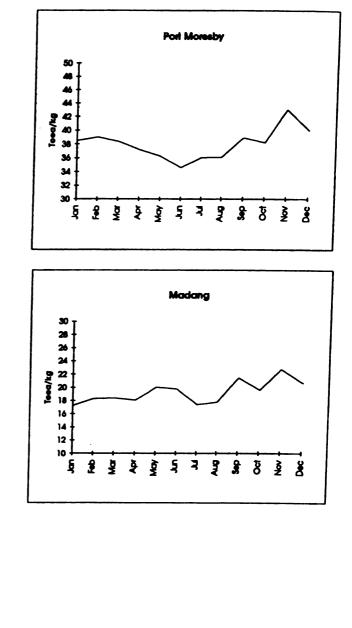


Figure 76. Mean monthly price (toea/kg) for cassava at Rabaul, Port Moresby, Lae, Madang and Goroka markets, January 1971 to December 1992, in constant 1991 prices (Source: National Statistics

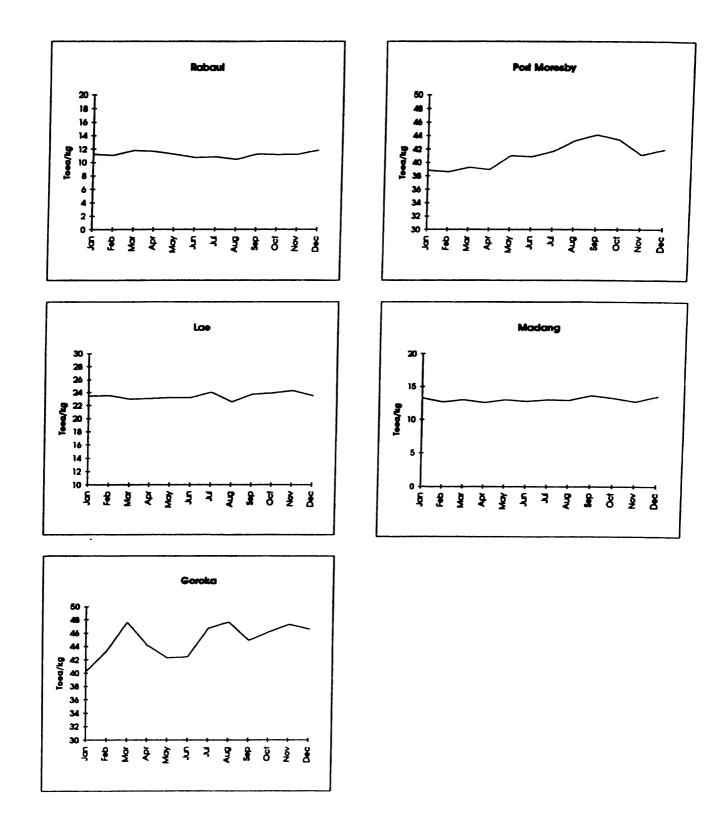


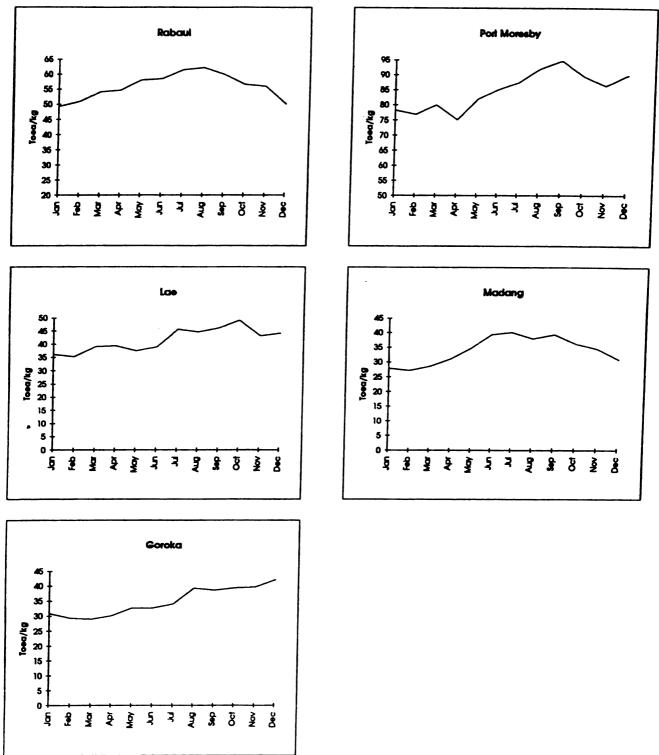
Figure 77. Mean monthly price (toea/kg) for coconut at Rabaul, Port Moresby, Lae, Madang and Goroka markets, January 1971 to December 1992, in constant 1991 prices (Source: National Statistics Office)

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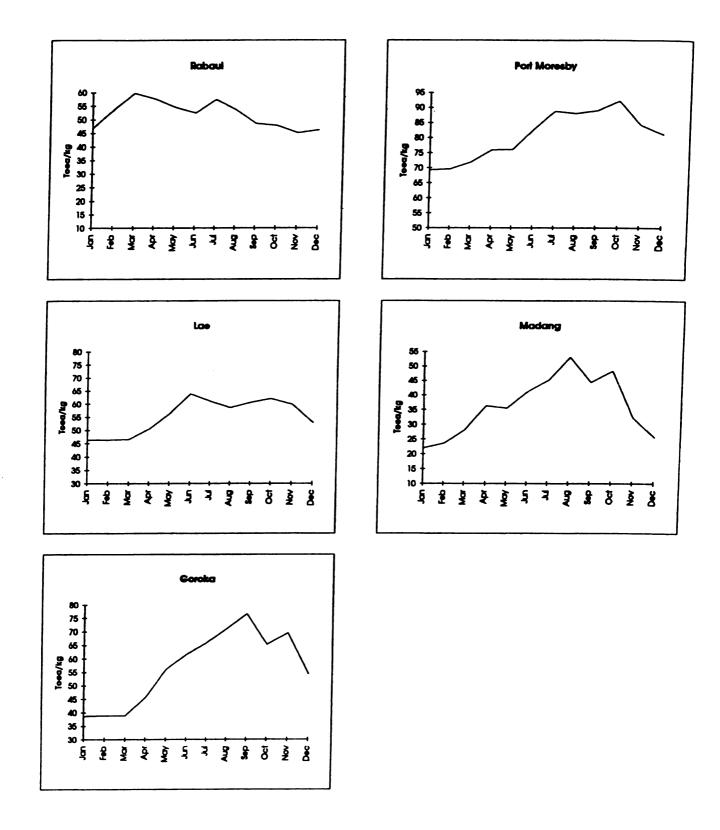


Figure 79. Mean monthly price (toea/kg) for cucumber at Rabaul, Port Moresby, Lae, Madang and Goroka markets, January 1971 to December 1992, in constant 1991 prices (Source: National Statistics Office)

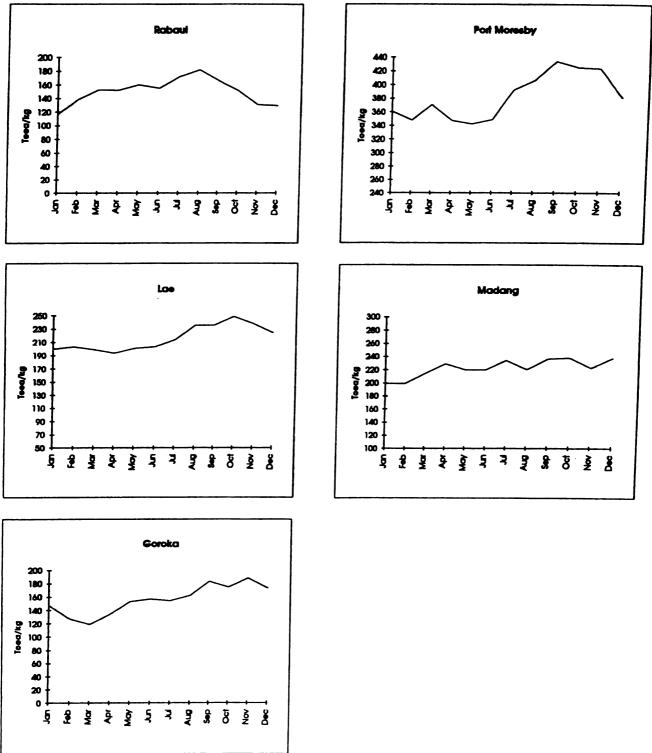


Figure 80. Mean monthly price (toea/kg) for peanuts at Rabaul, Port Moresby, Lae, Madang and Goroka markets, January 1971 to December 1992, in constant 1991 prices (Source: National Statistics Office)

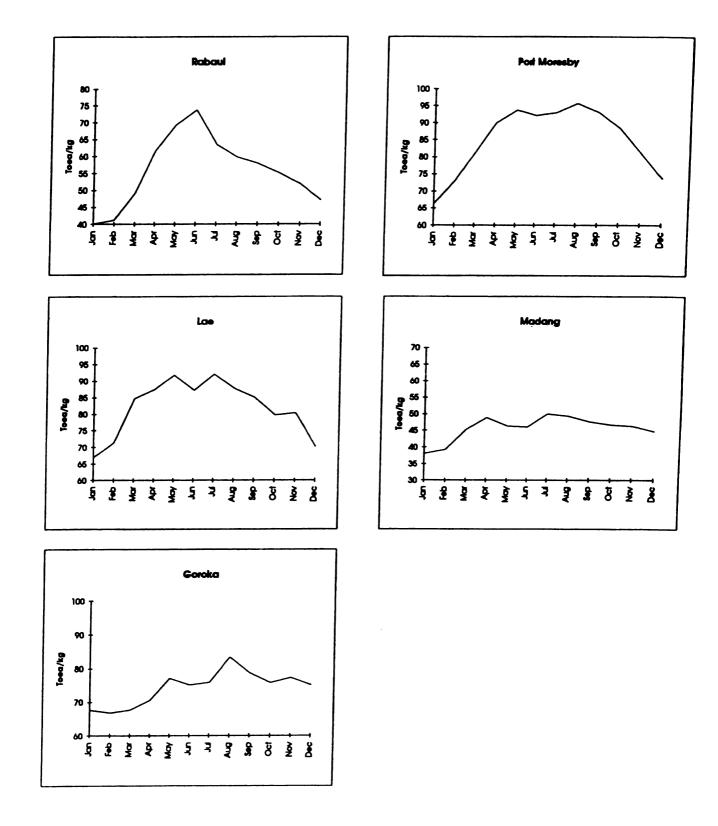


Figure 81. Mean monthly price (toea/kg) for pineapple at Rabaul, Port Moresby, Lae, Madang and Goroka markets, January 1971 to December 1992, in constant 1991 prices (Source: National Statistics Office)

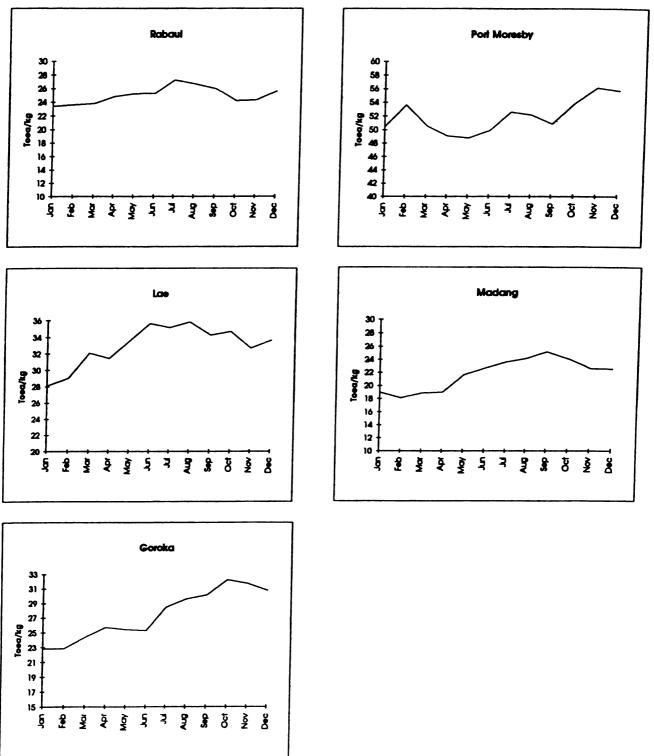


Figure 82. Mean monthly price (toea/kg) for pumpkin fruit at Rabaul, Port Moresby, Lae, Madang and Goroka markets, January 1971 to December 1992, in constant 1991 prices (Source: National Statistics Office)

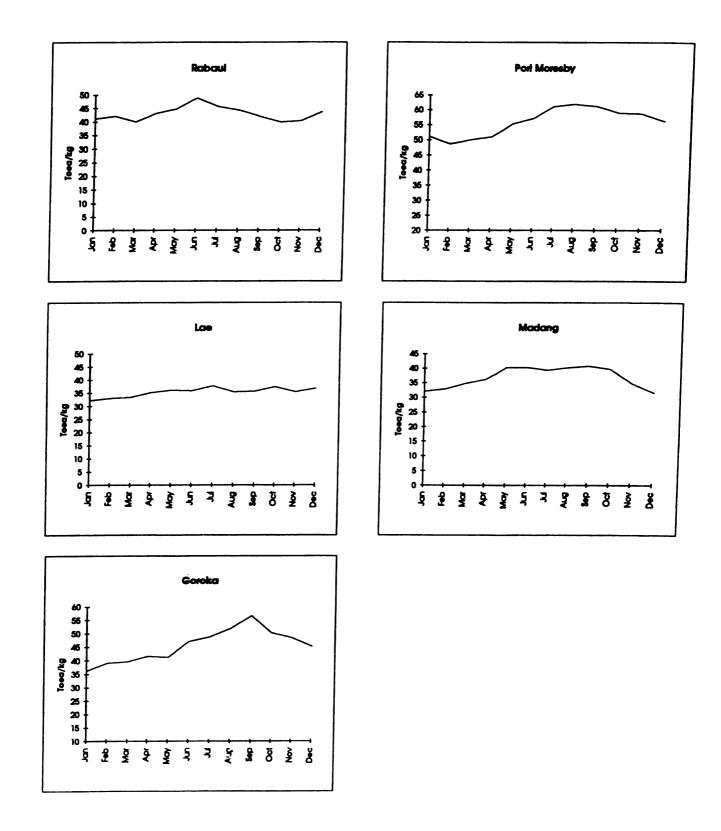


Figure 83. Mean monthly price (toea/kg) for pumpkin tips at Rabaul, Port Moresby, Lae, Madang and Goroka markets, January 1971 to December 1992, in constant 1991 prices (Source: National Statistics Office)

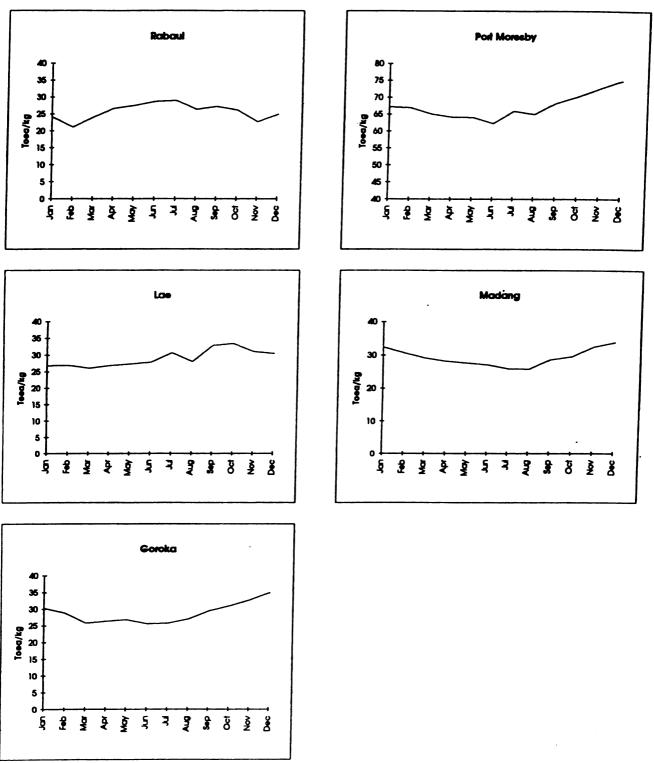


Figure 84. Mean monthly price (toea/kg) for sweet potato at Rabaul, Port Moresby, Lae, Madang and Goroka markets, January 1971 to December 1992, in constant 1991 prices (Source: National Statistics Office)

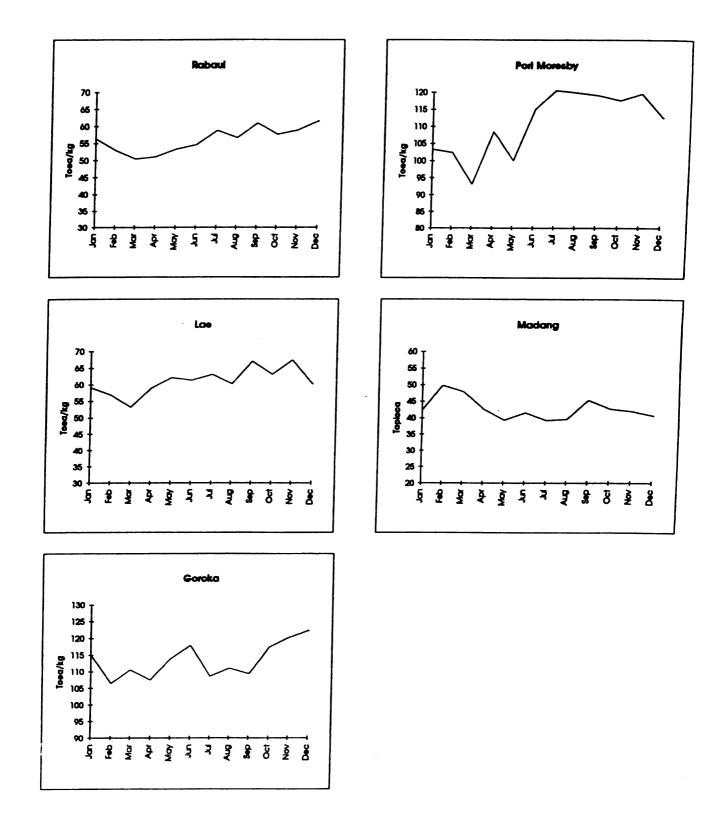
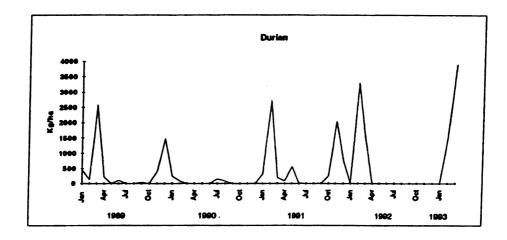
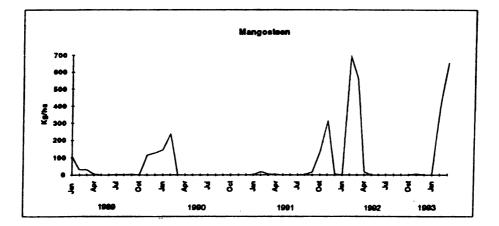


Figure 85. Mean monthly price (toea/kg) for taro at Rabaul, Port Moresby, Lae, Madang and Goroka markets, January 1971 to December 1992, in constant 1991 prices (Source: National Statistics Office)

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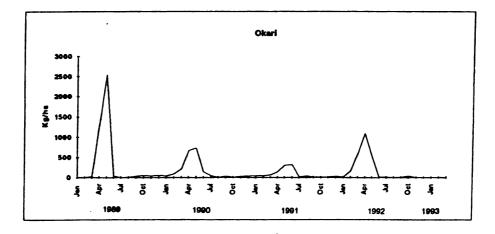
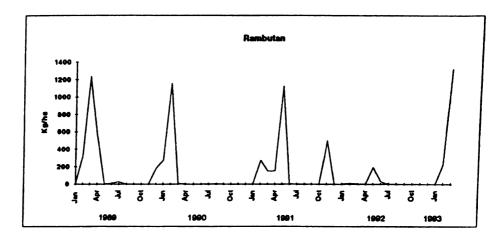
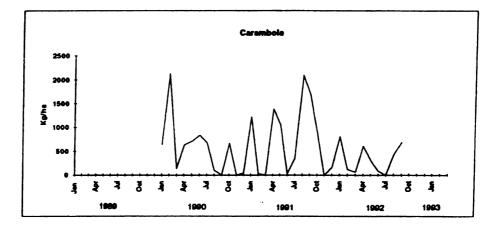


Figure 86. Production (kg/ha) of durian, mangosteen and okari at LAES Keravat, January 1989 to March 1993 (Source: S. Woodhouse)





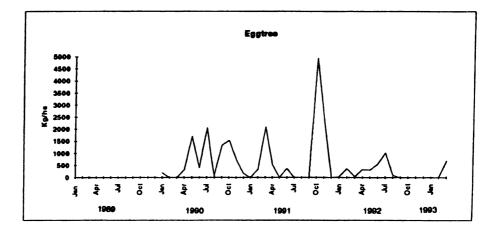
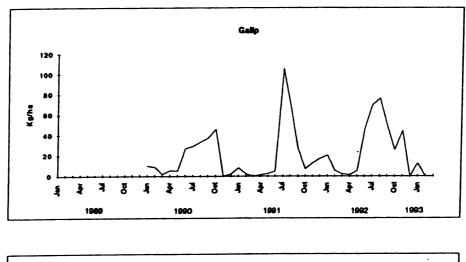
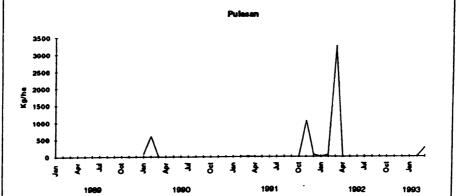


Figure 87. Production (kg/ha) of rambutan, carambola and eggtree at LAES Keravat, January 1989/1990 to March 1993 (Source: S. Woodhouse)





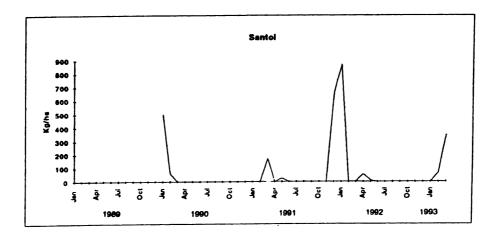


Figure 88. Production (kg/ha) of galip, pulasan and santol at LAES Keravat, January 1990 to March 1993 (Source: S. Woodhouse)

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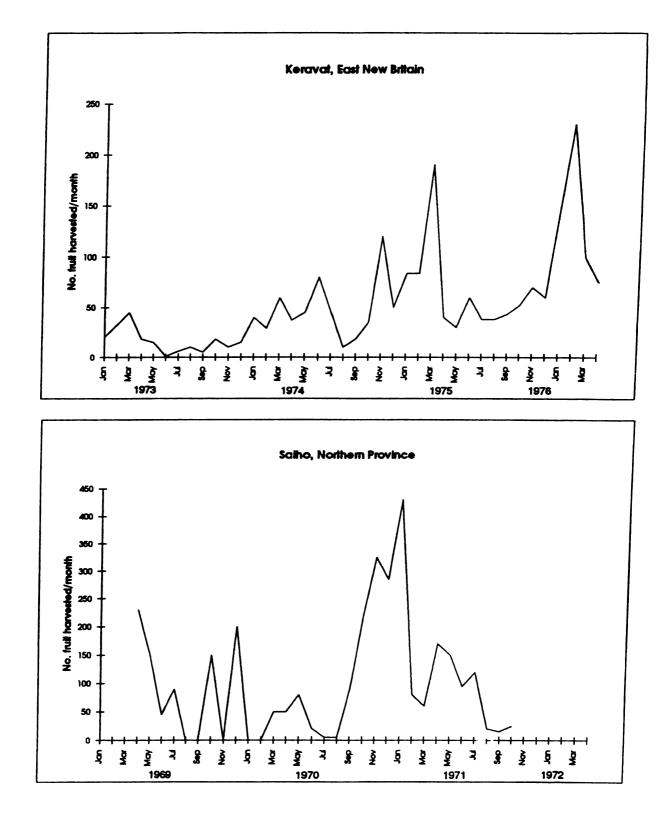
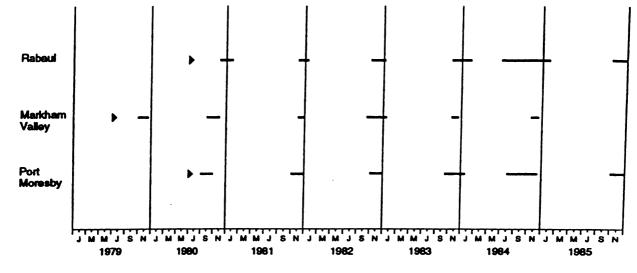


Figure 89. Pineapple production (truit/month) at Saiho, Northern Province (April 1969 to October 1971) and Keravat, East New Britain (January 1973 to April 1976) (Source: Bourke, 1976a)

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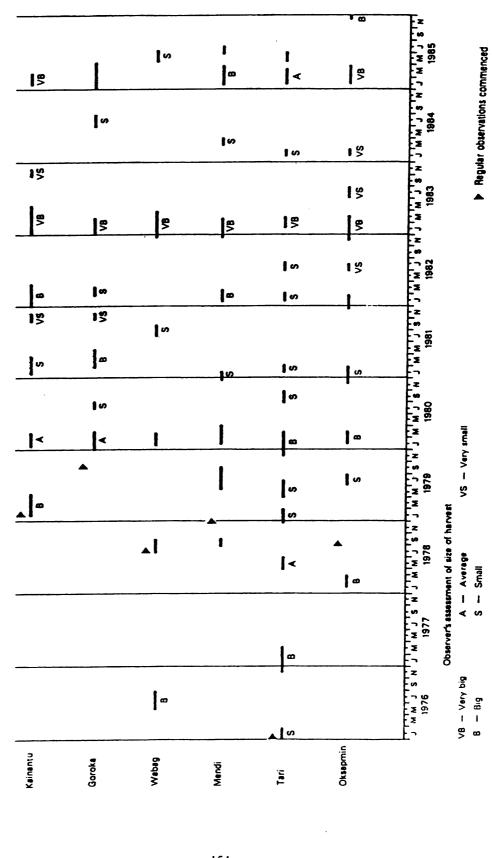


Regular observations commenced

Figure 90. Harvesting periods of introduced mango at Rabaul, Markham Valley and Port Moresby, 1979 to 1985 (Source: Network of observers)

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# Figure 91. Harvesting periods of karuku nut pandanus at six highland locations, 1976 to 1985 (Source: Bourke 1988: 125)



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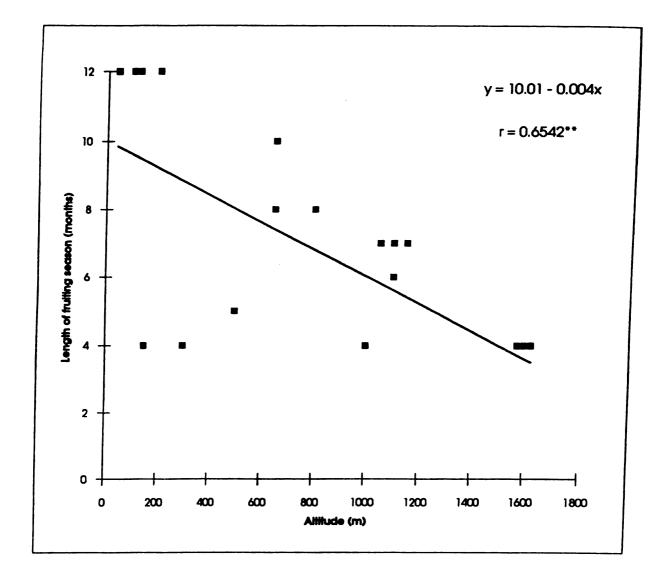
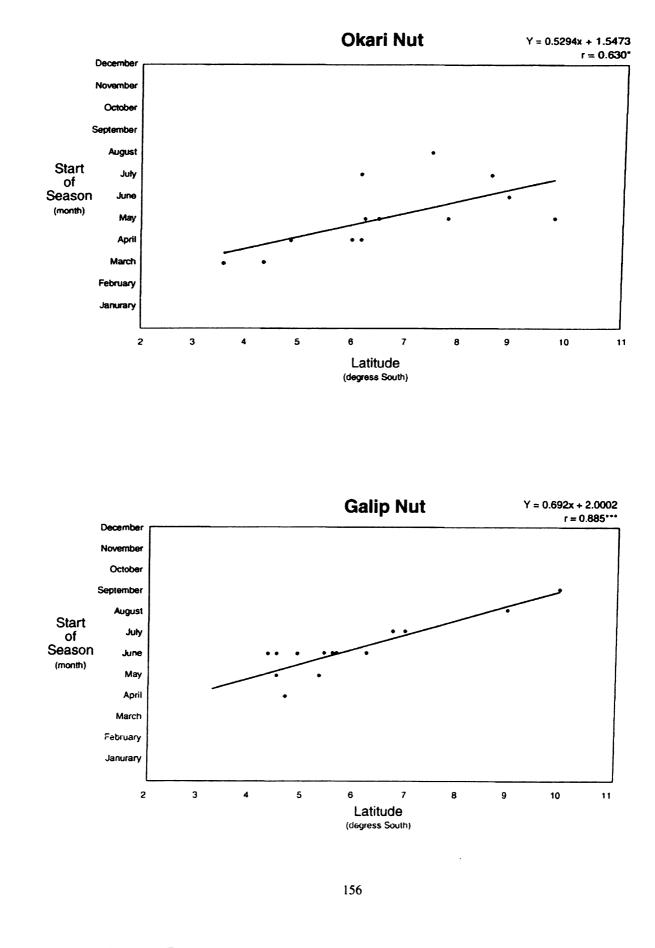


Figure 92. Length of fruiting season of marita pandanus at various locations versus attitude

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# Figure 93. Start of the harvesting season (month) of galip and okari nuts at various locations versus latitude



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## Table 1a. Details of data sources

Data source	Location	Period (years)	Number of commodities	Type of data
Market survey	Aiyura, Kainantu, Ukarumpa EHP	3	84	Fortnightly counts of value of produce on display
Market survey	Goroka	3	33	Fortnightly counts of value of produce on display
Market survey	Hol, Nembi Plateau SHP	2	36	Weekly counts of value of produce on display
FMC purchase figures	Goroka	5	45	Quantity purchased per week
FMC purchase figures	Port Moresby, Lae Wau, Kainantu, Goroka, Mt Hagen	2	40	Quantity purchased per week
CPI market survey	Rabaul, Port Moresby, Lae Madang, Goroka	22	15	Weekly records of price per kg
Experimental recordings	Keravat, ENB (and Saiho, Oro Province)	3/4	10	Weekly weight of fruit or nuts produced
Observer network	Rabaul, Markham Valley, Port Moresby	6	1	Start/finish of mango harvest season
Observer network	Kainantu, Goroka Wabag, Mendi, Tari Oksapmin	10	1	Start/finish of karuka nut harvest season
Villagers' statements and literature	Numerous locations	-	74	Statements by villagers and observations by long-term residents

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### Table lb. Survey details for five highland markets

Market	Main survey period <sup>1</sup>	Frequency of survey <sup>2</sup>	Survey time <sup>3</sup>	Supervisor
Kainantu <sup>4</sup>	Jun 79-May 82	FN	10 am-noon Fri	R. M. Bourke
Aiyura	Feb 79-May 82	FN	3-4 pm Fri	R. M. Bourke
Ukarumpa	Jun 79-May 82	FN	6-7 am Fri	R. M. Bourke
Goroka	Oct 79-Sep 82	FN	10 am-noon Sat	T. N. Tarepe
Hol, Nembi	Sep 79-Sep 81	W	9-10 am Sat	E. D'Souza

#### Notes:

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<sup>1.</sup> Some surveys were conducted for up to three months before the main survey period whilst techniques were being tested. Certain data were collected regularly for several years after the main survey period.

<sup>2</sup> The fortnightly surveys (FN) were done on the Friday or the Saturday of the Government pay week as turnover is much higher on these days than any other during the fortnightly business cycle. There is not a fortnightly cycle in Hol market and hence the survey was done weekly (W).

<sup>3.</sup> Surveys were timed for the period when most sellers were in position but buying had not started or had not peaked. The actual time of the survey depended on weather conditions. Following wet mornings, market activities and the surveys were delayed.

<sup>4.</sup> Separate surveys were also conducted in 1981-1982 of Kainantu, Aiyura and Ukarumpa markets to calculate total annual sales, the influence of the fortnightly business cycle on market sales and mean earnings per seller (Bourke and Nema, 1985).

### Table 2. Physical environment of market supply areas and other locations

Location <sup>1</sup>	Mean annual rainfall (mm)	Number of dry months <sup>2</sup>	Drier months <sup>3</sup>	Altitude range (m)
Rabaul, ENB	2000	2	May-Oct	0-400
Keravat, ENB	2800	0	Jun-Aug	20-50
Popondetta/Saiho, Oro Prov	2500	2	Jun-Oct	100
Port Moresby <sup>4</sup>	1000	7	May-Nov	0-500
Lae, Morobe Prov <sup>4</sup>	4600	0	Jan-Feb	0-1000
Bulolo, Morobe Prov	1500	3	May-Oct	600-800
Wau, Morobe Prov	1800	2	May-Oct	800-1200
Markham Valley, Morobe Prov	1400	5	Apr-Sep	100-400
Kainantu, EHP	2000	3	May-Oct	1200-2000
Aiyura/Ukarumpa, EHP	2200	1	May-Oct	1600-1800
Madang	3500	0	Jul-Sep	0-200
Goroka, EHP	1900	3	May-Oct	1400-2200
Mt Hagen, WHP <sup>4</sup>	2600	0	Jun-Aug	1500-2400
Mendi, SHP	2800	0	Jun	1600-2200
Wapenamanda, Enga Prov	2500	0	Jun-Jul	1800
Wabag, Enga Prov	3000	0	Jun-Jul	2000-2700
Taluma, Enga Prov	2400	2	Jun-Aug	2600
Laiagam, Enga Prov	2200	2	Jun-Aug	2200
Nembi Plateau, SHP	3000	0	Jun-Jul	1600-2000
Kandep, Enga Prov	2200	0	Jun-Aug 🕐	2500-3000
Tari, SHP	2700	0	Jun-Jul	1600-2500
Oksapmin, Sandaun Prov	2900	0	Jun	1500-2200

#### Notes:

1. Locations included are those for which longitudinal data are available.

<sup>2</sup>. The number of months where the mean monthly rainfall is less than 100 mm.

<sup>3</sup> Months in which rainfall is significantly less than in other months. Note that monthly rainfall may still be high (>100 mm/month) in the "drier months".

<sup>4</sup> Produce sold in Port Moresby, Lae and Mt Hagen markets is drawn from a wide range of environments and the total range of environments is greater than indicated here. Produce in Lae comes from all major environments in PNG, including the seasonally dry lowlands, humid lowlands, intermediate altitude zone, highland, high altitude and very high altitude zones.

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	1991	•	78	10	33	39	15	2	15	15	•	2	36	12	0
	1981		78	11	55	112		5	40	26		1	47	40	0
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. 1	982		128			53					1				

#### Table 3. Value (kina/day) of starchy foods on display at Alyura, Kainantu, Ukarumpa, Goroka and Hol markets, June 1979 to September 1982 (Source: Authors' surveys)

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		le en	noos be	teles	Sanahanun			Xantha	iama sagi	ille ikum	Cala	nasia ascu	lanta	Disecerse alata	Dissearce excutants
MONTH	YEAR	Aly/Che/Uka	Gerein	Hel	Aly/Kha/Uka	Gereine	Hel	Aiy/Ktu/Uka	Garaka	Hat	Aiy/Khu/Uka	Gereka	Hul	Goroka	Aly/Ktu/Uka
	1979	80			7			10			10				•
	1070				•			10			11				
Aug	1979	54			11			13			5				
Sup	1979	40		25	•		20	•		1	7		2	1	
Oct	1979	48	183	28	10	43	10	10	2	1	7	0	2	0	0
Nev	1979		30	28	•	20		13	3	0		٥	2	2	0
Dee	1979	43	72	43	7	18	10	7	4	1	٠	0	1	3	0
Jan	1960	78	84	23	7	\$7	10	15	1	1	2	1	0	1	0
Feb	1000		124	30	10	13	17	14	4	1	0	•	1	1	0
Mar	1999	114	92	•34	2	25	10	18	5	1	•	58	1	1	0
Apr	1999	121	82	32	3	16	10	•	•	1	2	1	2	2	0
May	1990	134	181	27	7	33	19		•	1	2	4	1	2	0
Jun	1999	83	256	20	3	27	19	12	1	1	2	11	1	2	3
J.	1990	71	77	24	4	95	19	•	•	2	21	62	1	5	0
Aug	1980	114	359	10	•	29	26	15	7	1	14	72	1	0	3
Sop	1988	114	193	17	23	116	33	13	15	1	•	7	0	1	0
Oct	1000	50	82	11	10	92	22	13	17	1	7	7	0	0	•
Nev	1999	108	90	٠	18	40	18	•	24	2	•	0	1	•	3
Dec	1999	108	15	20	•	14	16	5	2	0	1	0	0	2	0
Jun	1991	200	120	10	4	42	18	•	2	0	1	29	0	•	0
Feb	1981	114	135	12	14	48	13	12	10	0	2	47	0	4	0
Mar	1981	171	128	10	12	132	12	•	5	0	2	38	2	1	0
Арг	1981	172	244	10	10	17		•	1	1	•	14	1	0	0
May	1981	140	147	17	15	33	•	14	25	0	4	30	0	18	8
an.	1981	153	101	30	10	20	10	15	16	0	•	259	0	1	38
<b></b>	1941	110	288	13	14	120	13	26	12	1	11	55	0	0	54
Aug	1981		192	•	3	31	•	10	27	0	3	30	0	32	48
Sop	1981	141	171	20	27	102	18	28	6	1	•	50	1	0	3
Oct	1981	142	118		15	50		20	22		11	2		1	•
Nev	1981	133	150		•			19	3		3	58		0	0
Dec	1981	77	92		10	12		3	1		0	0		0	0
Jan	1942	131	218		•	43		7	2		5	45		1	0
Feb	1942	104	309		•	49			21		1			2	1
Mar	1982	61	167		9	252		25	10		7	11		3	5
Apr	1982	142	220		39	29		19	9		2	42		4	0
May	1982	243	184		19	80		24	22		1	3		1	0
جدل	1942		222			23			18			10		0	2
<b></b>	1942		157			51			7			13		5	2
	1982		151			76			38			37		4	26
Sep	1982		211			20			1			5		0	2

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#### Table 4. Value (kina/day) of traditional vegetables on display at Alyura, Kainantu, Ukarumpa and Hol markets, June 1979 to May 1982 (Source: Authors' surveys)

			Albiku			naranth	Cucu		Cucumber asex		Bottle gou	
MO	NTH		Abahneahus # Aiy/Kha/Uka		Amara Aiy/Khs/Uka	undhase app. Had	Cuain Aiy/Khu/Uka	is aatrus Hal	Cummis safnus Aiy/Kim/Uka	Aiy/Kha/Like	Lagenaria sieu Aiy/Kitu/Uku	
J		1979	10		2		1		•	22	•	-
-	ul - 19	1878	1		2		7		:	<b>8</b> 10	•	
8	•	1879	•	•	•	1	•		•	20	•	
	et W	1070 1970	2	0	5	2	17 53	•	0	7	1	
D		1979	14	ō	12	,	75		0	2	1	
Ja A		1990	10	0	7	14	80 58	13 20	1	•	1	
Fi M		1000	● 7	1	1	5	38 18	20	1	0	0	
4	r	1000	5	0	1	2	4	2	t	1	•	
يلا بد	-	1999	5 2	0	1	1	•	0	•	1 7	•	
5		1960	2	ī	ő	ò	43	ò	•	18	ő	
Au	•	1960	3	1	2	0	15 17	0	0	5 3	2	
Se Ot		1980	3	0	4	•	23	•	•	5	0	
Ne		1888	3	•	•	•	28	٠	٠	•	•	
De Je		1989	7 12	0	•	2	43 71	1	•	•	0	
Fe	•	1981	•	1	2	4	31	26	•	1	•	
Ma Ap	-	1981 1981	21 7	•	•	7	25 3	11	•		0	
Ĩ		1961	í	ō	3	2	7	i		2	0	
يد ا		1981	14	0 2	3	1	10 7	0	•	•	0	
Ju Au		1961 1961	2	2	2		15			2		
84	• 1	1981	5	0	3	•	13	•	•	1	1	
Oe Net		1981 1981	4		4		18 32		•	3	•	
Der	<b>i</b> 1	1981	1		2		•		•	0	0	
Jun Fai		1962 1962	• 7		•		49 44		0	2	•	
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	т н 1 7	EAR   1979 1979	ingiber ellisinal	le 🛛	Fine dennerente	Fiers a	upieses .	moluccana	1	Aiy/Khu/Uka	Sotaria p	initale
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10M Jac Jac 24 25 05		64A 979 979 979 979 979	Engiber attainei Aiy/Klu/Uko 7 4 1 1 1	io Hul 1	Finus demonstratio Aly/Rite/Uko 1 2 4 1 4	Fians an Aiy/Khu/Uka O	yricea Hal 1	mokuccana Aiy/KuuUka 1 1 1 1	8 Hul 0 2	kelenum neddlenum Aly/Khe/Uka 0 1 0	Solaria p Aiy/Khu/Uka	atruttada Hal S
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#### Table 5. Value (kina/day) of traditional vegetables on display at Alyura, Kainantu, Ukarumpa, Goroka and Hol markets, June 1979 to September 1982 (Source: Authors' surveys)

		Cena		Lowiand pitpit Seedorum odulo	Nasturtium schlechteri		ngle	Trichoenthes
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Nev	1979		õ	1	•	5	4	
Dec	1079		0	•	•	5	•	0
Jun	1900		0	1	2	•	5	•
Feb Mar	1000		0	2	2			1
Aer	1990			1	-	•		0
May	1995	21	0	0	7	4	5	1
Jun	1960		•	0	2	4	4	1
bit. Awa	1989	31 30	0	0 0		3	4	0
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#### Table 6. Value (kina/day) of introduced vegetables on display at Alyura, Kainantu, Ukarumpa and Hol markets, June 1979 to May 1982 (Source: Authors' surveys)

	-	Common bean Phasealus vulgaris		Beetroot Bets vulganie	Broccoll Braceica elemene	Chinese cabbage Brassice polinorais	Brancia	cabbage • elemens	Capsicum Capsicum annum		
					var. botytis			napilata	Ver. greesum		
MONTH	YEAR	Aly/Kha/Uka	Hel	Aiy/Khu/Uka	Aiy/Kta/Uka	Aiy/Khu/Uka	Aiy/Kiu/Lika	Hal	Aiy/Kiu/Lite		
Jun	1979	12		0	1	13	44		•		
<b></b>	1878	21		•	3	12	51		1		
Aug	1079	12		0	1	25	38		0		
3ap	1079	15	1	0	4		82	3	0		
Oet	1070	21	1	0	2	22	124	3	1		
Nev	1079	25	2	0	1	7	74	2	0		
Dee	1978	28	5	•	0	12	92	7	0		
Jan	1999	14	3	0	1	6	83	5	2		
Feb	1980	17	4	0	0	7	55	4	3		
Mar	1888	17	2	0	0	1	78	•	1		
Apr	1999	13	1	•	0	5	38	•	1		
May	1999	10	0	0	0	2	40		2		
	1000	13	0	0	0	7	23	2	10		
<b></b>	1986	23	0	0	0	11	34	1	11		
Aug	1980	18	0	0	0	32	70	1	2		
Sop	1968	36	0	1	1	10	94	0	1		
Out	1988	38	0	2	3	12	25	1	7		
Nev	1868	27	1	0	1	•	150	5	11		
Dec	1000	27	3	0	0	10	190	7	•		
Jan	1981	36	•	0	0	•	31		10		
Fab	1991	22		0	0	10	43	5	•		
Mer	100 1	10	3	0	2	12	80	4	•		
Apr	1981	28	1	1	0	<u>.</u>	40	•	1		
May	1981	31	1	0	0	7	30	5	•		
- Aun	1001	20	0	•	0	17	50	3	1		
	1981	21	•	•		17	140	1	2		
Aug	1981	25 27	0	0	•	17 23	74 139	1 2	•		
Sep	1881		0	-	-			2	7		
Oet	1961	28		•	10	15	218		•		
Nev	1981	47		•	•	• 2	190 27				
Dee	1981 1982	2			0	4	•3		0		
Jan Feb	1962	20		0	0	•	48				
Mar	1942	11		ŏ	0	ŏ	#2		7 3		
Apr	1002	20		0	1	3			J		
	1982	21		•	ż	i.	95				
	1004	~ 1			•		• •		v		
		Carrols Deveus careta	Celery Apium prevealens	Choko Iruit Sechium edule	Choko tips Sectium edule	Garlic Allum satirum	Lottuce Loctuce setive	Pak choi Praeice chinensis	Parsley Petrocolinum crispum		
MONTH	YEAR	Deveus careta	Aprium prevealans var. dulco	Section edule	Section edute	Alium satirum	Loctuce setive	Pressica chinensis	Petrosofnum criepum		
MONTH	YEAR 1979	Deveus careta /	Anium gravesland var. daloo Aiy/Khu/Uka	Sochism ockelo Aig/Kla/Uka	Section edule				Petroselinum criepum Aiy/Kbu/Uka		
Jun	YEAR 1070 1970	Deveus careta	Aprium prevealans var. dulco	Section edule	Section edute	Allum satirum Aiy/Kha/Uka	Lockup solive Aiy/Kha/Uka	Pressics chinenesis Aly/Kha/Uka	Petrosofnum criepum		
مىل. لەل	1979	Davaus carela Aiy/Klu/Uka 27	Apium graveslans var. dules Aiy/Khu/Uka 2	Sachium achda Aig/Kha/Uka Q	Sochium adula Aiy/Khu/Uka 2	Alfum sativum Aiy/Que/Lika O	Lockup setire ( Aiy/Khu/Lika 41 90 44	Brassics chineneis Aiy/Kha/Uka 13	Petrosefnum crispum Aly/Ktu/Ulta 0		
Jun	1878 1979	Davaus carola Aiy/Klus/Uka 27 17	Apium provoalens var. duloo Aiy/Khu/Uka 2 1	Sochism ockdo Aig/Kha/Uka O 1	Section edule Aiy/Klu/Uke 2 3	Alium setirum Aiy/Ruu/Uka 0 0	Loctuce setime Aiy/Kbs/Uke 41 90	Brassics chinanais Aiy/Klu/Uka 13 12	Petrosefnum crispum Aly/Ktu/Ulta 0		
میر لیر وییم	1878 1878 1879	Dawws carets / Aly/Kw/Uha 27 17 24	Apium praveelens var. duloo Aiy/Khu/Uka 2 1 2	Sochism ockdo Aig/Kba/Uka 0 1 0	Sechium edule Aiy/Ktu/Utra 2 3 1	Alfum sectrum Aig/Rhe/Lites 0 0 0	Lockup setire ( Aiy/Khu/Lika 41 90 44	Brassics chinansis Aiy/Klu/Uka 13 12 25	Petrosefnum crispum Aly/Ktu/Ulta 0		
ید بد 40 مو	1878 1879 1879 1879	Deverse carets / Aiy/Kus/Uka 27 17 24 10	Asium gravesions var. duice Aiy/Klu/Ulta 2 1 2 0	Section echie Aig/Klu/Uka 0 1 0 0	Sectium edule Aiy/Ktu/Uke 3 1 2 5 10	Albun satirum Aiy/Ris/Uka 0 0 0 0	Loctuce sative ( Aiy/Kta/Uka 41 90 44 48	Brassics chinensis Aiy/Klu/Uka 13 12 25 8	Petrosefnum crispum Aly/Ktu/Ulta 0		
Jan Jai Aug Sep Out Nov Dec	1878 1879 1879 1878 1878 1878 1878	Davana carata A Aly/Kta/Uka 27 17 24 10 20 13 13 14	Apium preventene vez: dutos AbyNChu/Uka 2 1 2 0 1 1 0 0	Section edde Aiy/Kw/Uka 0 1 0 0 0 0 1	Sochism adula Aiy/Khu/Uka 2 3 1 2 5 10 7	Alium satirum AiyAliuu/Uka 0 0 0 0 0 0 0	Lactuce settine 4 Aly/Ktm/Uka 41 80 44 46 28 32 44	Brassics drihansis Aiy/Klu/Uka 13 12 25 8 22 21 8	Petrosefnum crispum Aly/Ktu/Ulta 0		
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	1878 1979 1879 1879 1879 1879 1879 1860 1860	Devenus careta / Aly/Klus/Uka 27 17 24 16 20 13 14 11 16	Aprium preventanos vez: dados Aigvitāvu/Uka 2 1 2 0 1 0 0 0 0 0 0 0 0	Sochism adula Aigr/Ktur/Uka 0 1 0 0 0 0 1 1 1 2	Sochium adula AiguKhurUktea 2 3 1 2 5 10 7 6 7	Alium satinum Aig/Rin/Uka 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Locium setima d AigritherUite 41 90 44 40 20 32 44 45 19	Brazica dihanais Aiy/Klu/Uka 13 12 25 8 22 21 8 5 1	Petrosefnum crispum Aly/Ktu/Ulta 0		
Jan Jal Aug Sep Out Nov Doc Jan Feb Mar	1878 1879 1879 1879 1879 1879 1879 1870 1860 1860 1860	Devens caves / Aly/Ktw/Uka 27 17 24 10 20 13 13 14 11 16 53	Aprium preventano vez: dadeo Aiy/Khu/Uka 2 1 2 0 1 0 0 0 0 0 0 0 0 0 0 0 0	Section adds Aiy/Kiu/Uka 0 1 0 0 0 1 1 1 2 1	Sachium adula Aiy/Klu/Uka 2 3 1 2 5 10 7 6 7 10	Alium satirum Aiy/Rue/Uka 0 0 0 0 0 0 0 0 0	Lockus setina 4 Aig/Kku/Uka 41 90 44 48 20 32 44 45 19 29	Bruesica chinensis Aiy/Khu/Uku 13 12 25 8 22 21 8 5 5 1 1	Petrosefnum crispum Aly/Ktu/Ulta 0		
Ja Ja Aug Bep Ot Not Ja Se Ja Ap	1878 1879 1879 1879 1879 1879 1879 1860 1880 1880 1880	Deurus cervis / Aiy/WavUka 27 17 24 10 20 13 14 11 10 53 12	Aprium preventance ver. chileo Aiy/filu/Uka 2 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Section adds Airy/Kite/Uka 0 1 0 0 0 1 1 1 2 1 2 1 2	Sachium adula Aiy/Kbu/Uka 2 3 1 2 5 10 7 6 7 10 4	Alium satinum Aig/Rin/Uka 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Loctuce setime 4 Aignitum/Uko 41 40 40 20 32 44 45 10 20 9	Bruesica chinensis Aly/Klu/Uku 13 12 25 0 22 21 21 0 5 1 5 1 1 7	Petrosefnum crispum Aly/Ktu/Ulta 0		
53 99 83 89 53 9 89 8 9 8 9 8 9 9 8 9 8 9 9 9 9 9 9 9	1878 1979 1879 1879 1879 1879 1879 1880 1880 1880 1880	Devens careto / Aiy/Km/Uka 27 17 24 10 20 13 14 13 14 11 16 53 12 19	Apium prevealana vez: deleo Aiy/Riu/La 2 1 2 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Sochism adula Aigr/Khu/Uku 0 1 0 0 0 0 0 1 1 1 2 1 1 2 1	Sochium edulo Aiy/Klu/Uke 2 3 1 2 5 10 7 6 7 10 7 10 4 2	Alium satinum Aig/Rin/Uka 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Lockus estive / Aig//Khe/Uke 41 90 44 46 32 44 45 19 20 9 27	Bruesics of Unerasis Airy/Kha/Uha 13 12 25 8 22 21 8 5 1 1 1 7 7	Petrosefnum crispum Aly/Ktu/Ulta 0		
Ja Japa Alapa Distant Japa Japa Japa	1979 1979 1979 1979 1979 1979 1960 1980 1980 1980 1980	Devens careta / Aiy/Kau/Uka 27 17 24 10 20 13 14 11 14 53 12 12 16 35	Aprium preventano vez. dadeo Aiy/Kbu/Uka 2 1 2 0 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Section adds Aiy/Kiu/Uka 0 1 0 0 0 0 1 1 1 2 1 2 1 2 1 0	Sachium adula Aiy/Klu/Uka 2 3 1 2 5 10 7 6 7 10 4 2 2	Alium satinum Aig/Rin/Uka 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Loctures series 4 Aign/Ktm/Uka 41 90 44 40 20 32 44 45 10 29 9 9 27 68	Bruesics of Anonesis Alty/Khu/Uku 13 12 25 8 22 21 8 5 5 1 1 7 7 3	Petrosefnum crispum Aly/Ktu/Ulta 0		
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		Pees Piese seinen		Pumpkin Iruit Cuantria maschata		Pumpitin tips Constitute meechate		Rhubarb Ahrum Anpanticum	Shallot Alfum cape	
MONTH	YEAR	Aiy/Khu/Like	Aiy/Kas/Uka	Hel	Aiy/Khu/Uka	Hal	Aiy/Khu/Uka	Aiy/Khu/Uka	vac. aggregatum Aiy/Kta/Uka	
Ja	1979	1	•		14		2	5	0	
Jal	1879	2	2		13		1	•	0	
Aug	1070	4	11		3	_	1	8	0	
Sep	1070	3	•	•	7	2	0	12	0	
Oet	1979	2	•		10	1		•	0	
Nev	1979	4	•	13	18	2	2	13	0	
Dee	1070	•	•	10	•	1	1	1	0	
Jun	1980	3	10	24			0	10	3	
Fub	1990	4	20	21	5	0	0	2	2	
Mar	1999	4	15	11	15	•	•	3	0	
Арт	1960	2	10	7			•	•	0	
May	1000	3	12	4	7	0	0	25	1	
Ja	1980	2	7	3	•	0	•	•	3	
J.M	1980	2	4	2	•		1	4	1	
Aug	1980	2	10	3	10	1	2	44	1	
Sup	1999	3	•	2	12	0	2	4	1	
Oct	1960	5	24	5	14	1	1	4	4	
Nev	1980	3	17	4	13	1	0	2	1	
Dec	1960	•	7	7	14	1	1	13	0	
Jan	1981	1	18	17	10	1	2	12	2	
Feb	1981	2	22	17	•	0	2	11	1	
Mar	1961	1	•	13	7	•	2	11	1	
Apr	1981	1	4	10	12	1	0	4	0	
May	1981	1	3	25	14	0	1	10	2	
Jan	1881	5	10	22	•			3	1	
Jul	1981	6	4	14	5	1	3	2	2	
Aug	1981	3	5	•	5	2	2	3	3	
Sep	1881	•	24	•	18	2	1	1	11	
Oet	1961	5	10		11		!		3	
Nev	1001	5	16				1		2	
Dee	1981		5		3				1	
Jun Fab	1992		•				2		0	
Person Marer	1962	;	10		2			3		
	1982				2			2	1	
Apr		1	5		3		4	5	•	
May	1982	3	3		•		•	3		

# Table 7. Value (kina/day) of introduced vegetables on display at Alyura, Kainantu, Ukarumpa and Hol markets, June 1979 to May 1982 (Source: Authors' surveys)

		Silverbeet	Spring on	ion	Tomat	0	Watercrees		
		Bota vulganis	Allum any var. cap		Lycopersion a	eculentum	Nectorium a	licinale	
MONTH	YEAR	Aiy/Khu/Uka	Aly/Kas/Uka	Hal	Aiy/Kiu/Uha	Hal	Aiy/Khu/Like	Hat	
Jan	1979	1	12				1		
Jul .	1979	4	•		11		1		
Aug	1979	2	18		12		1		
340	1070	2	3	•	16	•	1	•	
Oet	1070	•	•	0	20	1	1	٠	
Nev	1979	11	21	•	10	2	1	0	
Dee	1979	4	•	•	21	1	1	0	
Jan	1980	•	13	۲	27	2	3	•	
Fab	1960	7	16	1	23	2	1	•	
Mar	1988	3	10	1	24	1	3	•	
Арг	1880	2	7	0	7	1	2	0	
May	1999	3	10	1	14	•	1	0	
	1980	4	10	0	14	0	0	•	
Jul .	1980	2	5	0	18	0	1	•	
Aug	1980	1	11	0	18	0	1	•	
Sep	1980	•	13	0	21	0	1	0	
Oet	1980	7	11	1	35	0	1	•	
Nev	1980	4	12	0	40	0	3	1	
Dee	1989	5	12	0	15	0	3	ŧ	
Jan	1981	1	21	0	13	0	1	1	
Feb	1981	2	18	0	12	0	3	1	
Mar	1961	3	24	0	16	0	2	1	
Apr	1981	10	17	0	19	0	1	0	
May	1961	7	22	0	12	0	2	•	
Jan	1981	•	10	0	16	0	2	•	
Jul	1981	•	23	0	14	0	5	0	
Aug	1961	•	12	0	17	0	2	•	
Sep	1981	12	27	0	30	0	3	0	
Oct	1981	•	22		34		4		
Nev	1081	5	25		35		4		
Dec	1981	1	11		2		2		
Jan	1982	4	10		29		1		
Feb	1982	2	23		•		3		
Mar	1982	1	14		•		3		
Apr	1982	1	27		10		3		
May	1982	1	17		19		6		

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ноі	mark	sts, June 19/1		eptemp	<b>e</b> i 130	2 (30)		Autio	s surv	eysj	
		Highland yellow passi		Purple pi			Pawpa			tometo	Black raspberry
MONTH	YEAR	Peesitore Squis Aig/Ktu/Uka		Passillers of Aly/Kts/Uks	kulis /. edulis Goraka		Garice ; Ika Gorola			dra bolaces a Gercka	Aubus Insiscagus AigKhaUlus
Jan	1878	1		4		1			0		0
ايل وبيد	1079 1079	2		0		1			0		0 0
- Sep	1979	0		ō		4			ō		0
Oct Nev	1070 1979	0	0	0	0		13	1	•	0	0
Dec	1979	•	ò	2	Ó	2		ő	ő	1	0
Jun	1960	0	1	10	12	3	15	•	0	2	0
Feb Mar	1980 1980	0	4	13	6 4	2 2	13	1	0	3	0
Арг	1980	0	0	3	2	2	13	•	0	3	0
Hay Jan	1868 1960	3	2	1	0	1 2	5 7	0	0	3 5	0
	1980	0 <sub>.</sub>	4	0	1	ō	30	ō	ŏ	5	0
Aug Sep	1960	3	4	1	4	4	43	1 2	0	4	0
Oct	1960	0			í	13	39	1	0	2	0 0
Nev	1000	0	10	0	2	•	70	2	0	1	0
Dec Jan	1960 1961	4	2	1	1	12	2 16	1	0	1	0
Feb	1861	•	0	10	2	3	•	1	0	1	0
Her Apr	1981 1981	0 1	0	13	4 5	5 3	34 28	1	•	2	0
May	1081	•	11	5	1	1	4	•	3	3	•
Jun	1981	3 3	2	2 2	0	32	4	1	0 3	0	4
Jul Aug	1981 1981	3 0	2	2 5	0	2	17	0	3	1	• 2
Sep	1981	10	5	4	2	12	14	1	4	3	3
Oet Nev	1861 1861	2	0	1	0	11	25 13		2	3	4
Des	1981	0	7	0	•	1	30		0	0	0
Jan Feb	1962 1962	2	0 13	11 30	2	5	2 11		27	0	•
Mar	1982	•	33	•	13	2	10		10	22	5
Apr May	1962 1962	5	21 19	5 3	10	3	16		•	5 3	5 10
30	1982	•	1	•	;		ī		•	0	
Jul	1962 1962		3		0		9 27			7 0	
Aug Sep	1982		14		Ū		27			0	
		<b>0</b> -1-1-	h leaf pine		Smoo	th leaf pine		Ter	al pineapple		
			anas comes		An		<b>NS</b>	An			
MONTH	YEAR	Aiy/Ktu/Uka	Geraka	Hel Ai	y/Kiu/Uka	Gereins	Hel /	Vy/Kta/Uka	Gercka	Hal	
مىل لىل	1979 1979	0 0			5 9			5			
Ave	1979	•			•			•			
Sep Oct	1878 1878	2	4	1	9 27	31	•	11 28	35	1	
Nev	1979	•	0	1	15	10	Ó	20	16	i	
Des Jan	1979 1988	0 2	7	1	16 12	11	•	16 14	18 46	1	
Feb	1900	2	0	1	21	5	0	23	5	i	
Mar	1988	0	0	1	13 1	10 1	1	13 1	10 1	:	
Apr May	1980	0	0	0	•	15	0	•	15		
مد اد	1988	0	0	0	7	2	•	7	2 40	1	
Ave	1960	•	0	1	• 71	40		71	40	1	
Sep	1988	0	•	•	12	24	:	12	30	•	
Oct Nev	1960	0	11	0	34 33	33 16	0 1	34 34	44 24	0	
Dec	1980	0	0	0	35	1	•	35	1	1	
Jan Fab	1981 1981	1	3 5	0	13 34	86 52	0	14 34	60 57	•	
Mer	1981	0	0	0		45	0	9	45	1	
Apr May	1981	0	•	0 0	e 16	37 4	0	6 16	37 5	1	
Ja	1981	0	•	0	5	29	0	5	35	0	
Jul .	1981	0	1	0	13	17 10	0 0	13	18	0	
Aug Sep	1981	0	3	0 0	9 19	10 54	0	9 20	10 57	0	
Oct	1981	0	1		44	52		44	52		
Nev Dec	1981 1981	•	31		43 3	58 28		49 5	66 58		
Jan	1982	1	0		28	8.		28			
Feb Mer	1982 1982	0	1		21 38	105 47		21 38	108 47		
мыл Арт	1982	õ	2		:3	20		13	22		
May	1982	2	!		16	19		17	20		
مدر امد	1962 1962		1			17 17			17 16		
Aug	1982		2			40			42		
Sep	1982		0			10			10		

#### Table 8. Value (kina/day) of fruit on display at Alyura, Kainantu, Ukarumpa, Goroka and Hol markets, June 1979 to September 1982 (Source: Authors' surveys)

		Avocado		Grapefruit		Gua		Lem		Line	Mandarin		
		Person americ		Citrus para		Paidum g		Citrus In		Citra aurantilalia	Cinus rada		
MONTH		Aiy/Kas/Uka	Gereke	Aiy/Kta/Uka	Gereka	Aiy/Kiu/Uka	Gereka	Aiy/Kas/Uka	Contra	Aly/Khe/Uka	Aiy/Kha/Uka	Gereha	
Jan	1979	3		•		1		1		•	47		
<b></b>	1879	•		1		•		٠		•	53		
Aug	1070	•		2		0		2		•	•		
Sup .	1070	•		1		0		1		•	1		
Oet	1979	4	1	•	0	1	•	1	18	0	2	0	
Nev	1979	•	0	1	0	0	1	1	6	1	2	•	
Dee	1979	1	1	1	0	0	3	0	11	•	1	•	
Jun	1999	2	0	1	0	0	3	1	•	2	1	0	
Feb	1989	3	2	2	0	1	7	3	16	1	3	0	
Mar	1999	•	2	1	1	0	49	3	7	•	4	0	
Apr	1999	1	1	0	0	1	•	2	3	•	7	0	
May	1000	3	٠	3	1	4	3	6	•	1	54	•	
Jan	1999	•	82	3	•	0	2	•	5	0		48	
Jul	1960	1	•	1	0	0	•	2	. •	•	54	4	
Aug	1999	•	•	1	•	0	4	3	18	•	41	11	
Sup	1000	1	1	1	0	0	•	3	5	0	21	0	
Oet	1000	•	2	0	2	0	5	2	7	•	2	0	
Nev	1999	2	0	1	2	0	5	5	•	0	0	0	
Dee	1999	2	0	1	0	0	1	5	4	0	0	0	
Jan	1081	5	6	•	2	0	2	2	4	•	•	•	
Fab	1981	10	1	0	•	0	17	5	4	•	•	0	
Mar	1001	13	1	1	•	1	30	4	5	•	2	•	
Apr	1981	5	17	0	0	5	72	4	5	0	1	•	
May	1981	4	4	1	•	4	•	7	•	•	81	15	
.hen	1001	•	5	0	2 .	•	•	•		•	113	3	
<b></b>	1081	3	5	1	1	•		7	1	•	133	27	
Aug	1981	4	1	2			•	•		•	7	•	
<b>Sep</b>	1981	3	2	2			1		3		•	•	
Oet	1981											•	
Nev	1861		3									0	
Jan	1962		1	, ,				,				•	
File	1982		20	Ň				,		•			
	1982	,	3	ő			12	,			:		
Aar	1982	í	2		2	2	17	i					
	1982		-		-	2		Ā			45	÷	
30	1942	-		•	2	-	ī	-			••		
	1982				ā		;						
	1982						è		,				
	1992				ò		1		Ā			Ň	
-			•		•		•		-			v	

#### Table 9. Value (kina/day) of fruit on display at Alyura, Kainantu, Ukarumpa, Goroka and Hol markets, June 1979 to September 1982 (Source: Authors' surveys)

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\* Lemons and limes were not recorded separately at Goroka market,

Hoghin (ada)         Andrau analysis         Analysis of analysis         Analysis			Man	<b>9</b> 0*	Marita			Orang	•	Banana passionirult		Strawberry	
MXXHI         VBM         AppRimULs         Geneta         AppRes/Lis         AppRes/Lis         Geneta         AppRes/Lis			Mungilum in	dee	Pand	lenus senside		Clinus sine	naio	Pessilen me	llosine	Francia a	
Jul         1979         0         0         2         0         0           Jung         1970         0 <t< th=""><th>MONTH</th><th>YEAR</th><th>AlyKaduka</th><th>Gerates</th><th>Aly/Kha/Uka</th><th>Garaha</th><th>Hal</th><th>Aiy/Khu/Uka</th><th>Gorales</th><th>Aly/Kha/Lika</th><th>Gerates</th><th></th><th></th></t<>	MONTH	YEAR	AlyKaduka	Gerates	Aly/Kha/Uka	Garaha	Hal	Aiy/Khu/Uka	Gorales	Aly/Kha/Lika	Gerates		
Aug       1970       0       0       0       0       0       0       0         By       1970       2       0       1       0       0       4       0       0         Cut       1970       72       110       2       2       0       0       20       1       0       0         Low       1970       72       110       2       2       0       0       20       1       0       0         Low       1970       0       4       0       0       1       0 </th <th>Jan</th> <th>1979</th> <th>•</th> <th></th> <th>1</th> <th></th> <th></th> <th>14</th> <th></th> <th>•</th> <th></th> <th>0</th> <th></th>	Jan	1979	•		1			14		•		0	
best         1770         0 </th <th><b></b></th> <th></th> <th>٠</th> <th></th> <th>•</th> <th></th> <th></th> <th>2</th> <th></th> <th>•</th> <th></th> <th>0</th> <th></th>	<b></b>		٠		•			2		•		0	
Ori       1670       2       0       1       0       0       4       0       0       0         Hw       1670       72       116       2       2       0       0       1       0       1       0         Lin       1600       0       4       0       1       0       1       0       0       1       0         Lin       1600       0       20       10       17       0       1       0       0       1       0       1       0	Aug		•		•			•		٠		0	
Nor         1075         72         116         2         2         0         0         20         0         1         0           Jan         1080         0         1         0         0         1         0         0         0         1         0         0         0         1         0         1         0			٠		•		•	•		•		0	
Dar         1975         0         4         0         0         1         0         0         1           Jan         1000         0         28         17         0         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         <	Oet		-	-	1	-	•	0		•	0	0	
Jan       1990       0       1990       0       1990       0       1       0       0       1       0       1       0       1       0       1       0       1       0       1       0       1       0       1       1 <t< th=""><th></th><th></th><th></th><th></th><th>-</th><th></th><th>0</th><th>0</th><th>20</th><th>٠</th><th>1</th><th>0</th><th>3</th></t<>					-		0	0	20	٠	1	0	3
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	3ep	1982		0		0			0		0		0

\* Mangoes are grown in the Martcham valley and transported to the highlands for sale.

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		Dry cocc Cocce nucl		Green coconut *	Sprouted coconut *	Candie nut Alcuites malvesna		Caruka mw juliw		Ame	Peanute Vis Instant	
Land and	-	Alse/Kha/Uka		Ain/Kin/Like	Alw/Klu/Uka	Gernin	Aiy/Kha/Uka		Hal	Aly/Ktu/Uka		Het.
340	1979	28	Genera							21		1905
	1979	10								18		
	1979	7										
Aug	1979	13							1	32		
Sep Out	1879	42	٥	13		•		٥		26	5	10
Nev	1979		ŏ	10			:	1		36	,, ,,	
Des	1979	;					÷			30	28	17
	1000	,	å					3			17	
Jan Fah	1980	1				Ň			2	117	77	
	1999		50				21	35	13		169	14
	1988	11	0				2		7	51	14	35
Apr	1980	11	ő					š	~	32	80	38 24
May Jan	1980		š					-		34	174	16
	1980		19					5		34	79	10
	1980	10	34					11		36	157	5
Aug	1986	••	0							25	14	7
Sep	1000	2	0	22	, i					20	19	ś
Oet			0	22	•					37	45	15
Nev	1000	•	ő	23		U U				59	17	15
Dec	1999	24	-		, i i i i i i i i i i i i i i i i i i i					121	152	3
	1981	-	24				2			107	152	
Feb	1981	2	68 49				2	111	2	88		
Mar	1001			1	•				-	76	100	10
Apr	1081		20	•	•			12		34		10
May	1981	1	430 307	2 7				5		28	54	10
مىل	1981	33	829	1.				:		33		4
J.	1981	33	219					÷.		31		-
Aug	1981		53	25						35	26	2
Sep Out	1981	23	120	7					•		31	-
Nev	1961	21	22	<i>,</i>				2		47	24	
Des	1961		143					-		58	103	
	1982	1	132				23			103	145	
Feb	1962		132				50	1		105	150	
	1942	22	246				34	÷		75	217	
Am	1942		87	;	, in the second s		24			40	40	
May	1982	47		ŝ			5	õ		51	72	
	1992			-	-		-	ō				
	1942		125					0			4.	
Aus	1942		108			ī		Ó			60	
	1982		31			•		0			34	
						-						

### Table 10. Value (kina/day) of nuts on display at Aiyura, Kainantu, Ukarumpa, Goroka and Hoi markets, June 1979 to September 1982 (Source: Authors' surveys)

\* Dry coconut, green coconut and sprouted coconut are grown in the lowlands and transported to the highlands for sale.

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		Highland belei pepper truit Piper gibbilintum	Piper gi	el pepper leaves billindum	Highland be Areas means		Lowland batel papper fruit Piper bade
MONTH	YEAR	Aly/Kta/Uka	Aiy/Khe/Like	Hat	Aiy/Kha/Uka	Hel	Aiy/Kha/Lika
Jan	1878	•	•		21		30
J.	1979	•	•		20		17
Aug	1979	0		1	40		16
Sep Out	1979 1979	3		1	137	1	4
Nev	1979	i	1.		196	÷	25
Des	1979			ě.	80	ė	23
Jun	1880	t	•	0	74	0	40
Feb	1000	•	10	1	50	2	33
Mar	1880	•	5	1	21	1	51
Apr	1999	•	5	1	82	2	11
May	1980		• 14	1	70 38	2	34 24
مد لد	1988		•		107	;	25
Aug	1990		10	i	83	i	10
Sep	1999	•	10	1	100	2	7
Oet	1000	•	10	2	182	3	•
Nev	1980	•	18	1	132	2	18
Dec	1980	•	10	0	118	1	25
Jan	1981	•	11	0	31		30
Fab Mar	1981	1	4		36 49	1	47 20
Aer	1001		•		26		28
May	1981	•	12	1	62	2	25
Jun	1981	•	15	0	76	1	21
Jul .	1961	•	16	0	72	1	34
Aug	1981	•	•	0	88	2	34
Sep Oct	1981 1981	6	5 10	1	165 101	1	32 10
Nev	1981		13		110		24
Dee	1981	ě	•		98		102
Jun	1982	•	4		20		20
Feb	1982		3		34		\$7
Mar	1982		7		42		46
Apr	1982		10 5		83 48		30
May	1992		•		••		33
		Lowland beloi papper vine*	Botol mut*	Tobacco	)		
		Piper both	Areas catedra	Mootiana taka			
	YEVA	Piper bollo Aig/Kha/Uka	Areas catedar Aby/Kha/Ulta	Alexiana taka Aiy/Khu/Uka			
Jan	1879	Maar bada AiyMtarUha O	Areas astachu Aby/Kha/Lika 187	Alexiana taba Aiy/Che/Uka 17	a <b>m</b>		
an. Jul	1879 1879	Mpor bodo Aig/Kbs/Uka 0 1	Areas catadur Aiy/Khu/Uka 167 58	Neolana tuba Aiy/Khe/Uka 17 19	a <b>m</b>		
مد در ویک	1879 1979 1979	Minor bada AiyiKba/Uka O 1 1	Areas astachu Aby/Kha/Lika 187	Alexiana taba Aiy/Che/Uka 17	am Hui		
4 2 E S	1879 1879	Mpor bodo Aig/Kbs/Uka 0 1	Anne estadu Aiy/Klu/Uka 167 58 88	Alcolaria taba AlyriClu/Uka 17 19 12	a <b>m</b>		
5 3 8 5 5 8 5 5 8 5	1878 1978 1878 1878	Piper bodo Aiy/Kba/Uko 0 1 1 1	Anse estado Aly/Kb/Uka 167 58 6 6 14 26	Mootiena labe Aly/Kha/Uka 17 19 12 5 18 20	am Hul 13 8		
Jan Jal Aug Sep Oot Nov Doc	1878 1878 1878 1878 1878 1878 1878	Piper kodo Aly/KarUka 1 1 2 0	Anas astratu Aty/Kta/Utra 167 58 68 6 14 26 4	Afestena taba Aiy/Qu/Uka 17 19 12 5 18 20 52	aan Hud 13 8 8 15		
Jan Jal Aug Sep Col Nov Doc Jan	1878 1979 1879 1879 1879 1879 1879 1879	Piper bido Aly/Kar(Jia 1 1 2 0 0 1	Areas antrotu Abylitaultin 187 58 6 6 14 20 4 74	Mexica abe Aly/CorUta 17 19 12 5 18 20 5 5 37	aum Huui 13 9 8 15 12		
Jan Jal Sep Ost Nev Dec Jan Feb	1878 1878 1878 1878 1878 1878 1878 1878	Piper bodo Aiy/KarUka 0 1 1 2 0 0 0 1 0	Annos catocho Aby/Kia/Uka 167 58 68 6 14 20 4 74 30	Meetina laba Aiy/Khr/Uta 17 19 12 5 18 20 52 37 48	aum Hud 13 9 8 15 12 10		
Jan Jal Sep Ost Nev Des Jan Feb Ner	1878 1878 1878 1878 1978 1978 1978 1970 1970 1988 1988 1988	Piper body Aly/Kar(Ka 1 1 2 0 1 1 2 0 1 0 1 0	Areas antrotu Abylitaultin 187 58 6 6 14 20 4 74	Mexica abe Aly/CorUta 17 19 12 5 18 20 5 5 37	aum Huui 13 9 8 15 12		
Ja Ja Sep No Sep So So Sep So S So S	1878 1878 1878 1878 1878 1878 1878 1878	Piper bodo Aiy/KarUka 0 1 1 2 0 0 0 1 0	Areas salashu Abylitaullia 107 58 6 14 20 4 74 30 33	Alexiena taba AlyriQurUta 17 19 12 5 18 20 52 52 37 40 48	13 14 8 15 15 12 10 22		
25 25 25 25 25 25 25 25 25 25 25 25 25 2	1878 1878 1878 1878 1878 1878 1878 1878	Piper body Aly/Kar(Jia 1 1 2 0 1 1 2 0 1 0 1 0 0 0 0 0 0 0 0 0	Ames estratu Abylitaultin 107 58 6 14 20 4 74 30 33 110 114 60	Alexiena taba AlyriQurUta 17 19 12 5 18 20 52 37 40 48 30 44 48	13 13 8 15 12 10 22 10 10 10 10		
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55388858888888888888888888888888888888	1979 1979 1979 1979 1979 1979 1979 1979	Piper bodo Aly/Kar(Jia 1 1 2 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Areas catacha Aly/Kar/Uka 167 58 6 6 14 26 4 74 30 33 110 114 60 56 10	Mexica aba Aiy/CarUta 17 19 12 5 18 20 52 37 40 48 36 48 30 44 46 31 44	cum Hui 0 8 15 12 10 22 10 10 10 10 10 10 10 10 10 10 10 10 10		
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#### Table 11. Value (kina/day) of narcotics on display at Alyura, Kainantu, Ukarumpa and Hol markets, June 1979 to May 1982 (Source: Authors' surveys)

\* Lowland betel pepper fruit and vine, and lowland betel nut are grown in the lowlands and transported to the highlands for sale.

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Table 12. Monthly purchases (kg/week) of avocado, eating banana, common bean, beetroot, broccoli, Chinese cabbage, head cabbage, capsicum and carrots by the Food Marketing Corporation at Goroka, April 1976 to August 1981 (Source: FMC purchase records)

		Avocado			Beetroot	Broccoll	Chinese cabbage	Head cabbage	Capsicum	Carrots
MONTH	YEAR	Person americana	Muss ave	Phaseslus vulgaris	Bota vulgario	Brassics eleraces ver. betytis	Brassian polithonois	Brassics elerasse ver. capitots	Ceptiourn ennuum vec. grocoum	Deucus carela
Apr	1976	•		46	30	2	377	2804	28	122
i i i i i i i i i i i i i i i i i i i	1876			152	0	ē	43	683	14	122
	1976	missing data			•	-				
	1076	0		38	5	•	274	3518	31	217
Aug	1076	•		112	0	•	367	2687	30	238
Sup	1076	•		176	60	58	552	583	42	488
Oet	1976	•		38	15	0	413	2220	36	578
Nev	1876	•		251	7	٠	152	888	128	107
Des	1976	3		114	2	0	93	785	138	30
Jan	1977	•		56	0	5	155	946	260	38
Feb	1077	37		35	3	0	27	448	133	87
Mar	1877	10		32	2	0	45	424	70	110
Apr	1977	•		46	0	•	73	425	48	32
May	1077	1		171 200		3	578 188	694 522	62 105	54
مد لد	1077 1977			24	ő	ŏ	55	294	71	85 84
Aug	1977			22	ě	i	73	1023	57	112
	1977			57	15	ŏ	74	\$13	42	66
Oet	1977			55		i	118	369	30	16
Nev	1077	ŏ			2	ů.	127	445	52	199
Dee	1977			156	2	0	22	52	38	15
Jun	1978	15	87	150	0	•	•	681	10	75
Fab	1978	22	87	239	0	11	22	307	7	17
Mar	1878	10		127	2	4	<b>\$</b> 1	278	7	253
Apr	1076	26	35	101	0	•		443		84
May	1978	47	135	164	•	5	44	\$51	18	115
Jm	1978	40	57	91	•	•	22	230	18	114
JM	1078	38	27	42	•	•	10	853	•	
Aug	1878	57 53	59 54	34 19	25	0	20 44	1528 071	5	203
Sap Cat	1978 1978	nining data	34	19	3	•		•/1		87
Nev	1878	missing data								
Des	1078	45	44	142	0	3	181	1142	65	46
Jan	1879	147	57	53	ō	ō	105	2598	50	114
Feb	1970	117	70	186	1	5	107	702	44	62
Mar	1979	197	70	160	1	0	13	713		120
Apr	1879	63	**	116	1	0	90	858	4	61
May	1979	44		334	1	•	201	175	0	107
Jun	1979	74	34	113	0	2	16	347	0	180
<b></b>	1879	28	38	272	0	2 17	25	134 1726	0	86
Aug	1970 1979	109	24 53	49 24		i i	11 5	445	0	29 74
Sep Oet	1070	••	33	74		ò	22	100	ŏ	140
Nev	1079	3	50	112	0	ō	A1	633		71
Des	1979	44	10	428	õ	Ō	102	850	2	
Jan	1960	130	37	193	0	44	146	1003	18	300
Feb	1960	221	61	117	0		40	013	28	342
Mar	1988	174	39		0	1	35	500		448
Apr	1989	128	36	140	0	•	84	158	•	196
May	1980	02	37	280	•	•	60	466	10	211
Jan	1988	110	17 22	51 20	0	•	14	255 311	16 5	147
J.d.	1888	121 53	11	20			34	347	<b>9</b> 1	51
Aug Sap	1000	25	72	129		3	74	271		86 26
Oct	1980	25	58	185	0	59	134	278		10
Nev	1888	71	61	257	0	245	210	746	3	11
Dec	1980	14	39	255	ō	216	70	420	0	100
Jan	1981	126	51	102	0	212	181	444	ō	52
Feb	1981	184	34	17	0	0	181	1003	0	40
Mar	1981	95	62	19	0	•	21	717	0	10
Apr	1981	190	24	1	0	2	58	384	0	63
May	1981	80	34	57	0	•	102	109	2	112
Jan	1981	47	31	52	0	•	50	215	0	51
Jul	1981	44	17	15	0	4	110	464	10	47
Aug	1981	5	10	7	0	•	173	1193	0	20

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Jan 1981 Fab 1981 Mar 1981 May 1981 May 1981 Jan 1981 Jal 1981 Aug 1981

		Caulificwer	Celery	Chilles	Choico fruit	-	Cucumber	Eggplant	Ginger	Grapefruit	Gueva
MONTH	YEAR	Drassies eleraces var. betytic	Apium gravesiens var. duice	Capacium Invision	a Sachum adula	Zoe mays	Commis selvus	Solenum malangana	Zingiber ellicinale	Citve peradai	Peidum guejare
Apr	1976	10	18		•		0	0	2	165	20
May	1976	5	0		16		7	0	2	15	0
n. M	1976 1976	missing data B	2		0		٥		3		_
Aug	1976		6		ő		ŏ	ò	3	35 30	0
See	1076		i		ō		ō	2		4	0
Oet	1976	٠	177		o		1	2	0	•	0
Nev	1976	1	1		0		2	17	0	25	0
Des	1876 1977	2	0 127	0	0 3	57 138	0 38	23 50	4	13	0
Jan Fab	1977		50	1	16	228		41	0	17 ●	0
Har	1977		14	ż	62	272	i	12	ő	141	5
Apr	1977	•	0	0	15	55	0	13	0	25	2
May	1977	•	0	0	14	39	•	4	0	0	0
مد	1977	2	•	0	21	16	2	•	0	71	0
Jul Avg	1077 1077		40		12 16	183 406	0	0	0	26 32	0
Sep.	1977	44	40	ò	23	•	0	2	ŏ	0	0
Out	1977	11	5	2	23	0	0	ĩ	Ō	ō	ŏ
Nev	1977	0	5	0	28	14	2	0	0	0	ō
Des	1077	0	0	3	3	33	•	0	0	0	0
Jan Feb	1978 1978	•	13 0	•	21 28	329 325	10		9 0	5	0
Mar	1978	ÿ	0	. 4	41	763	i.	2	0	175	0
Apr	1078	•	37	0	14	234	0	ē	i	30	ō
May	1978	•	48	4	7	135	٠	1	3	178	0
aL bL	1078	2	5	•	3	306	•	0	2	46	0
Aug	1078 1978	3	0	0	1	269 58	•	1	•	7 0	0
Sep	1078	ě	i	2	ċ	3	4	;	ŏ	ŏ	0
Oet	1078	missing data							-	•	•
Nev	1978	missing data									
Des	1078	5	•	•	1	301	•	55	0	0	0
Jan Fab	1979 1979	•	•	11 2	3 5	953 379	25 57	30 18	0	0	0
Mar	1070		ò	-	4	244	74		2	20	0
Apr	1979	0	0	0	0	162	0	1	ō	288	
May	1979	•	0		0	63	0	0	•	13	0
مد اد	1979 1979	•	8 7		1	0 56	0	0	2	17	0
Aug	1070		á		ő	0	ő	0	0	50 17	0
	1979	33	ō		ō	ō	õ	õ	ò	0	ŏ
Oet	1070	•	٠		٥	0	7	0	0	•	0
Nev	1979	•	18		•	50	30 73	2	•	•	0
Dec Jan	1979				18	248 316	112	0 12	0	0	0 0
	1966		14		21	202	45	12	i	12	ő
Mar	1980	•	14		3	169	180	0	5	4	ō
	1980	•	•		4	11	0	0	•	34	0
	1989	3	•		3 12	3	0	1	0	21	0
	1000				7	2	,		0	19 19	0
	1980	•	ő		3	•	0	ō		1	0
	1988	•	0		4	0	0	3	0	•	0
	1988	•	0		0	1	0	7	0	2	0
	1980 1988	0	0		0	15 15	0 26	5 5	0	0	0
	1981	0	ŏ		3	33	2• 7	21	1	0 29	0
	1961	õ	2		7	27	13	2	•	14	0
Mer	1961	0	2		0	82	0	0	0	22	0
	1981	•	1		4	3	0	0	1	31	0
	1981	•	0		0	0	0	0	0	29	0
	1981 1981	0	7		0	0	0	0	0	37 0	0
	1981	354	3		õ	ò		ő	0	3	0
			-					-	-	-	•

Table 13. Monthly purchases (kg/week) of cauliflower, celery, chillies, choko fruit, corn, cucumber, eggplant, ginger, grapefruit and guava by the Food Marketing Corporation at Goroka, April 1976 to August 1981 (Source: FMC purchase records)

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Result         Result         Litter active fibre metable         Catachis presentes discussio Presentes of any sequence of			Kohirabi	Leek	Lemon/lime	Lettuce	Mandarin	Marrow	Orange	Pak chol	Parsley
Apr.         1970         0         0         10         0         4           Apr.         1970         Number         10         0         10         0         10         0           Apr.         1970         Number         10         0         10         0         10         0         10         0         10         0         10         0         10 <t< th=""><th></th><th></th><th></th><th></th><th></th><th>Lactors sativa</th><th>Citrue rolloulete</th><th>Cucurbita ap.</th><th>Citrus sinenais</th><th>Brassica chinensi</th><th>Potresellnum eriepum</th></t<>						Lactors sativa	Citrue rolloulete	Cucurbita ap.	Citrus sinenais	Brassica chinensi	Potresellnum eriepum
intintintintintintintintintAlt1070661984013677Alt10706110001111Alt107067301444000233Alt1071677304464000233 </th <th></th> <th></th> <th></th> <th></th> <th></th> <th>3345</th> <th>•</th> <th></th> <th>•</th> <th>•</th> <th></th>						3345	•		•	•	
Ame         1070         0         13         0         7         5           Max         1070         10         0         13         0         7         5           Max         1070         11         2         0         44         0         7         6         7         5         7         6         7         6         7         6         7         6         7         6         7         6         7         6         7         6         7         6         7         6         7         6	Hing				•		i				
Ame         1070         0         13         0         7         5           Max         1070         10         0         13         0         7         5           Max         1070         11         2         0         44         0         7         6         7         5         7         6         7         6         7         6         7         6         7         6         7         6         7         6         7         6         7         6         7         6         7         6	Jun										-
kp         is70         35         10         0         1644         0         0         0         1           Kp         1071         1         3         0         1644         0         7         0         2         1           Kp         1071         1         2         0         640         0         7         0         2         3           Kp         1077         1         0         2         0         2         0         10         0         2         3         3           Kp         1077         2         0         2         2         2         2         2         2         2         2         2         3         3         3           Kp         1077         2         0         2         2         2         2         2         2         2         2         3	Jul						3				
Core         1876         17         3         0         440         0         7         0         2         0           Date         1877         13         2         0         50         3         0         2         2         3           Date         1877         13         2         7         200         1         0         2         2         2           Date         1877         1         0         164         242         0         32         0         35         3           May         18777         1         0         164         242         0         32         0         1 <th1< th="">         1         1         <th< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th>0</th><th></th><th></th><th></th><th></th></th<></th1<>							0				
Dec         1970         11         2         0         81         0         2         23           Feb         1977         32         1         40         260         0         11         4         34         13           Feb         1977         3         0         1 </th <th>Oet</th> <th>1976</th> <th>47</th> <th></th> <th></th> <th></th> <th>•</th> <th></th> <th></th> <th>2</th> <th></th>	Oet	1976	47				•			2	
June         1007         17         2         7         200         6         61         0         10         20           Kab         1077         3         6         144         242         6         32         0         30         3           Kar         1077         1         0         144         242         0         32         0         30         3           Kar         1077         1         0         144         242         0         32         0         10         6         1           Kar         1077         1         0         10         10         10         0         0         0         0         0         10         10           Kar         1077         0         1         0         100         20         10         0<					-		•				
Field         10         204         0         12         4         24         13           Apr.         1077         0         0         14         24         440         0         0         0         0         1           Apr.         1077         0         0         74         440         0         0         0         0         1           Apr.         1077         0         0         74         24         440         0         0         0         0         1           Apr.         1077         0         0         1         1         24         24         0         0         0         0         1         1           Apr.         1077         0         0         0         25         25         25         25         25         25         25         25         27         0 <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>•</th> <th></th> <th></th> <th></th> <th></th>							•				
Mar         1877         0         0         144         242         0         32         0         33         3           Mar         1877         0         0         783         0         1         1         0         0         1           Mar         1877         0         0         783         0         1         1         0         1         1           Mar         1877         0         1         0         184         0         0         0         1         0         1           Mar         1877         0         1         0         164         0 <th0< th=""></th0<>	Feb						0				
May     1077     1     0     703     0     1     1     6     1       Au     1077     0     1     1     188     0     0     172     0       Au     1077     0     1     1     188     0     0     0     172     0       Au     1077     0     1     0     0     0     0     0     0       May     1077     0     0     0     0     0     0     0     0       May     1077     0     0     0     0     0     0     0     0       May     1077     0     0     0     0     0     0     0     0       May     1077     0     0     0     0     0     0     0     0       May     1076     0     0     110     0     2     1     4     21     0       May     1076     0     0     107     144     0     1     0       May     1076     0     20     108     0     0     11     0       May     1076     0     21     128     0     14     1       <	Mer						•				
Au       1877       0       1       1       158       0       0       177       8         Boy       1077       2       10       0       2800       0       0       651       3         Boy       1077       1       0       0       2800       0       0       0       651       3         Boy       1077       0       0       0       1       0       0       1       0 </th <th>Apr</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>•</th> <th></th> <th></th> <th></th> <th></th>	Apr						•				
Au       1877       0       1       1       158       0       0       177       8         Boy       1077       2       10       0       2800       0       0       651       3         Boy       1077       1       0       0       2800       0       0       0       651       3         Boy       1077       0       0       0       1       0       0       1       0 </th <th></th> <th></th> <th></th> <th>•</th> <th></th> <th></th> <th>-</th> <th></th> <th></th> <th></th> <th></th>				•			-				
Ang         1077         2         10         0         200         0	Jul				1	158		0			
Cut         1977         1         0         371         0         0         81         0           Due         1977         0         0         45         64         0         371         0         6         0           Due         1977         0         0         45         64         0         371         0         6         0           Due         1976         0         0         145         64         0         21         4         21         0           Feb         1976         0         0         21         4         21         0         0           Mor         1976         0         22         1         4         21         0           Mor         1976         0         23         24         0         1         2         277         4           Mor         1976         0         24         128         0         0         1         2           Mor         1976         0         0         13         327         2         1         17         3           Mor         1976         0         0         13         327	Aug						•				-
May         1077         0         2         35         324         0         14         0         11         1           Jac         1076         0         0         101         100         2         1         43         42         10           Jac         1076         0         0         101         100         2         1         43         42         10           Jac         1076         0         0         223         244         0         2         0         46         0           Jac         1070         0         0         230         244         0         0         2         24         0         11         2         17         4           Jac         1070         0         0         20         11         0         20         11         1         0           Jac         1070         0         0         20         10         11         0         20         11         0         20         11         100         20         10         10         20         10         10         20         10         10         10         10         10							-				•
Dec         1977         0         0         0         145         64         0         377         0         0         0           Fab         1976         0         0         141         100         2         1         43         42         16           Fab         1976         0         0         143         29         0         21         4         21         0           Arr         1970         0         0         124         144         0         0         2         24         0           Arr         1970         0         0         124         144         0         0         2         24         0           Arr         1970         0         0         15         128         0         11         0         1         0           Arr         1970         0         0         13         177         0         23         0         11         0         13           Arr         1970         0         23         0         11         0         13         13         0         0         13         13         145         14         14 <t< th=""><th></th><th></th><th>•</th><th></th><th></th><th></th><th>•</th><th></th><th>-</th><th>••</th><th>•</th></t<>			•				•		-	••	•
Fab         1970         0         0         84         28         0         21         4         21         0           Apr         1970         0         0         128         144         0         0         2         24         0           Apr         1970         0         0         11         2         17         4           Aut         1970         0         28         186         0         11         0         25         1           Aut         1970         0         28         186         0         14         1         0           Aut         1970         0         28         186         0         14         1         0           Aut         1970         0         29         0         11         0         25         11         0           Star         1970         0         24         488         0         44         12         38         3           Bor         1970         0         24         488         0         450         13         37         3         0         0         34         1           Dat	Dee	1977	•	•			•			0	
Mar.         1976         3         0         223         244         0         2         0         444         0           Mar.         1976         0         0         117         146         0         11         2         177         4           Mar.         1976         0         0         117         146         0         11         2         177         4           Mar.         1976         0         0         26         11         0         25         332         15         0         11         0           Stop         1976         0         0         0         177         9         28         0         11         0           Stop         1976         0         0         428         0         44         12         38         2           Gen         1976         0         0         64         331         0         64         12         38         1           Jack         1977         0         28         13         37         0         64         10         11         10           Jack         1977         197         0			•				2				
Apr.         1970         0         110         114         0         0         2         24         0           Jun         1070         0         0         20         254         0         11         0         255         1           Jun         1070         0         0         20         136         0         11         0         255         1328         15         0         14         1         0           Sup         1070         0         0         21         137         0         0         11         0           Sup         1070         0         0         21         137         0         0         14         1         0           Sup         1070         0         0         24         428         0         442         1         97         2           Sup         1070         0         2         164         331         0         16         12         0         14           May         1070         0         2         16         313         0         0         34         1           Jun         1070         0         2											
June         1070         0         29         254         0         11         0         28         1           June         1070         0         25         333         15         0         14         1         0           June         1070         0         0         25         333         15         0         14         1         0           Cort         1070         0         0         21         0         0         11         0           Cort         1070         0         0         22         333         15         0         14         1         0           Dist         1070         0         0         24         428         0         441         12         36         2           Dist         1070         0         0         24         438         0         441         14         0           Main         1070         0         2         10         10         10         10         10         11           Dist         1070         0         2         10         10         10         10         10         10         10         10			i					•			-
July         1975         0         26         1986         0         0         11         4           Jury         1976         0         26         128         15         0         14         1         6           Sup         1976         0         0         178         0         29         0         11         0           Mar         1976         0         0         178         0         29         0         11         0           Mar         1976         0         0         178         0         24         0         44         12         38         2           Data         1977         0         0         24         422         0         44         12         38         0 </th <th>May</th> <th></th> <th>•</th> <th></th> <th></th> <th></th> <th>•</th> <th></th> <th></th> <th></th> <th>4</th>	May		•				•				4
Aug         1978         0         0         25         328         15         0         14         1         0           Oct         1976         0         0         178         0         14         1         0           Oct         1976         mixeling data         0         141         12         36         2           Data         1970         0         0         28         428         0         441         12         36         2           Jata         1970         0         0         166         331         0         0         96         233         0           May         1970         0         2         66         301         0         633         8         1           Jata         1970         0         0         23         373         8         0         0         34         1           Jata         1970         0         0         13         372         27         0         240         10         1           Jata         1970         0         0         13         377         0         0         0         0         0         <	Jun		•				-				1
Sup         1978         0         0         178         0         28         0         11         0           Det         1978         mixing data											
Her       1978       minimized abla         Der       1978       0       0       24       42       0       42       1       97       3         Jan       1979       0       0       64       442       0       42       1       97       3         Feb       1979       0       0       164       331       0       6       23       0         Apr       1979       0       2       00       345       0       6       10       22       0         Apr       1970       0       2       00       345       0       0       05       8       1         Jul       1970       0       2       0       44       0       1000       17       0         Jul       1970       0       0       23       73       B       0       0       0       34       1         Apr       1970       0       115       00       0       1       12       1         Apr       1970       0       1       12       37       7       0       0       0       0       21       1         100 <th>Sep</th> <th></th> <th>•</th> <th>0</th> <th>•</th> <th>178</th> <th>٠</th> <th>28</th> <th>0</th> <th>11</th> <th>0</th>	Sep		•	0	•	178	٠	28	0	11	0
Der         1978         0         6         28         428         0         44         12         38         2           Fub         1978         0         0         0         04         442         0         7         64         14         0           Fub         1979         2         21         57         972         0         7         64         14         0           Mar         1979         0         2         0         345         0         0         19         222         0           Mar         1979         0         2         0         345         0         0         0         0         13           Jain         1979         0         0         13         372         27         0         0         0         34         1           Jain         1978         0         0         0         1         12         1           Jain         1978         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0			missing data								
Image         Image <th< th=""><th></th><th></th><th></th><th>0</th><th>28</th><th>428</th><th>0</th><th>44</th><th>12</th><th>36</th><th>2</th></th<>				0	28	428	0	44	12	36	2
Mar         1979         0         168         331         0         0         99         23         0           Apr         1979         0         2         60         345         0         0         18         22         0           Apr         1979         0         0         68         201         0         63         8         1           Jan         1979         2         0         46         013         4         0         100         17         0           Jan         1979         0         0         23         373         8         0         0         34         1           Jan         1979         0         0         13         372         27         0         26         18         7           Stor         1979         0         0         115         80         0         0         0         0         0         112         1           Dat         1979         0         0         115         80         0         0         0         0         0         21         22           Lat         1970         0         0 <t< th=""><th>Jan</th><th>1979</th><th>•</th><th></th><th>88</th><th></th><th></th><th></th><th>1</th><th>97</th><th></th></t<>	Jan	1979	•		88				1	97	
Apr         1070         0         2         66         345         0         8         19         22         0           May         1070         0         0         65         6         1           Jul         1070         2         0         45         013         4         0         1090         17         0           Jul         1070         0         23         273         9         0         0         34         1           Aug         1070         0         24         16         7         0         24         16         7           Aug         1070         0         23         377         76         0         0         0         34         1           Cot         1577         76         0         0         0         0         0         0         0         0         0         12           Das         1050         0         14         07         1064         0         0         20         0         4         7         114           Jas         1060         0         102         637         1         0         165 <t< th=""><th></th><th></th><th>2</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>0</th></t<>			2								0
May         1976         0         64         301         0         63         6         1           Jul         1976         2         0         46         613         4         0         106         17         0           Jul         1976         0         23         373         8         0         0         344         1           Aug         1876         0         13         372         27         0         24         18         7           Sep         1970         0         5         16         176         0         1         12         1           Get         1876         0         0         0         0         8         2           Div         1976         0         1         12         16         0         0         9         86         22           Div         1976         0         2         102         1644         0         0         9         87         14           Jam         1980         0         0         183         21         28         14           Jam         1980         0         0         13											0
Jul         1970         0         23         273         8         0         0         34         1           Aug         1970         0         13         372         27         0         28         16         7           Get         1970         0         15         179         0         0         0         1         12         1           Get         1970         0         16         57         76         0	May	1979	0	0				•		•	1
Aug         1979         0         13         372         27         0         28         18         7           Sup         1979         0         1         12         1           Sup         1970         0         1         12         1           Mur         1970         0         1         12         1           Mur         1970         0         1         12         1           Jan         1970         0         6         0         0         0         0         0         0           Jan         1970         0         2         102         544         0 </th <th>Jun</th> <th></th> <th>2</th> <th>•</th> <th></th> <th></th> <th></th> <th>•</th> <th></th> <th></th> <th>0</th>	Jun		2	•				•			0
Sep       1678       0       0       1       12       1         Cut       1978       0       18       178       0	ابنال مستق			-				ŏ			1
Nov       1770       0       0       115       00       0	Sap	1979	Ō					•			i
Due       1979       0       2       192       544       0       0       6       67       14         Jan       1860       0       14       97       1004       0       0       200       67       21         Feb       1860       0       0       192       637       1       0       163       21       28         Mar       1860       0       0       192       637       1       0       163       21       28         Mar       1860       0       0       192       642       0       0       163       21       28         Mar       1860       0       0       1020       0       0       163       21       16         Jan       1860       0       0       32       423       0       0       51       1       1         Jan       1860       0       32       423       0       0       51       1       1         Jan       1860       0       33       161       0       0       1       3         Jan       1860       0       1       33       111       1			•				-	•	-		•
Jan       1980       0       14       97       1984       0       0       200       67       21         Feb       1880       0       0       192       637       1       0       143       21       28         Mar       1980       0       1       120       442       0       0       44       7       16         Mar       1980       0       0       67       1020       0       0       44       7       16         Mar       1980       0       0       54       823       0       0       51       1       1         Jun       1980       0       0       32       423       0       0       51       1       1         Jun       1980       0       0       32       423       0       0       1       3       3         Jun       1980       0       0       33       181       0       0       1       3       <				•				•	•		
Mar       1000       0       1       120       442       0       0       4       7       16         Apr       1000       0       0       0       0       0       0       0       0       1         Jan       1000       0       0       56       623       0       0       0       51       1         Jan       1000       0       32       423       0       0       51       1       1         Jan       1000       0       32       423       0       0       51       1       1         Jai       1000       0       1       52       84       0       0       6       2       4         Jai       1000       0       1       3	Jan	1980	•	14	97	1084	0	-		67	
Apr       1860       0       6       7       1920       0       0       6       51       1         May       1860       0       54       623       0       611       4       3         Jan       1860       0       32       423       0       0       51       11       1         Jan       1860       0       32       423       0       0       51       11       1         Jan       1860       0       32       423       0       0       51       11       1         Jan       1860       0       1       52       84       0       0       6       2       4         Aug       1860       0       0       1       3 <th></th> <th></th> <th>•</th> <th>0</th> <th></th> <th></th> <th>1</th> <th></th> <th></th> <th></th> <th></th>			•	0			1				
May       1860       0       56       623       6       61       4       3         Jam       1860       0       0       32       423       0       0       51       11       1         Jam       1860       0       1       52       64       0       0       51       11       1         Jai       1860       0       1       52       64       0       0       51       11       1         Jai       1860       0       0       6       2       4         Aug       1860       0       0       0       0       1       3         Sage       1860       0       0       0       0       14       20         Oct       1860       0       0       0       14       20         Nev       1860       0       0       0       22       12       12         Jain       1860       0       0       0       22       12       12         Jain       1860       0       0       0       22       12       12         Jain       1860       0       0       22											
Jam       1060       0       32       423       0       0       51       11       1         Jul       1060       0       1       52       64       0       0       51       11       1         Jul       1060       0       1       52       64       0       0       6       2       4         Aug       1060       0       47       136       0       0       6       2       4         Sep       1960       0       6       63       181       0       0       0       140       21         Out       160       2       49       166       0       0       0       1400       21         Out       1960       0       16       28       186       0       0       2       41       20         New       1960       0       1       47       700       0       0       22       12       12         Jan       1961       0       30       377       0       0       22       2       11         May       1961       0       0       14       196       0       0       <			ě	ě			•				
Aug       1860       0       47       136       0       0       1       3         Sep       1960       0       0       63       181       0       0       0       140       21         Dat       1960       0       16       28       186       0       0       2       41       20         New       1960       0       1       47       790       0       0       22       41       20         Des       1960       0       1       47       790       0       0       0       35       27         Jan       1961       0       30       377       0       0       22       2       11         Mar       1981       0       0       14       198       0       0       0       35       27         Jan       1981       0       30       377       0       0       22       2       11         Mar       1981       0       0       14       198       0       0       0       1         Jan       1981       0       0       28       446       0       0       25	Jun		0	0			•				1
Sup       1990       0       0       03       101       0       0       140       21         Oct       1990       0       16       28       186       0       0       2       41       20         Nev       1990       0       2       40       264       0       0       2       41       20         Nev       1990       0       2       40       264       0       0       0       22       12         Des       1990       0       2       40       264       0       0       0       22       12         Des       1990       0       2       40       264       0       0       0       22       12         Jan       1991       0       50       424       0       0       0       48       31         Fub       1981       0       0       14       196       0       0       0       11         Apr       1981       0       0       144       196       0       0       22       2       11         Apr       1981       0       148       148       0       0			•	1			•				
Out         1000         0         16         28         186         0         0         2         41         20           Nur         1000         0         2         41         20         12         12           Nur         1000         0         2         41         20         12         12           Jan         1000         1         47         700         0         0         22         12           Jan         1001         0         50         424         0         0         0         48         31           Fub         1981         1         0         30         377         0         0         22         2         11           Mar         1981         0         0         14         186         0         0         22         2         11           Mar         1981         0         0         14         186         0         0         22         2         11           Mar         1981         0         0         14         186         0         0         25         0         3           Jan         1981         0	200						•				
Date       1980       0       1       47       780       0       0       35       27         Jan       1981       0       59       424       0       0       0       48       31         Feb       1981       1       0       30       377       0       0       22       2       11         Mar       1981       0       0       14       198       0       0       22       2       11         Apr       1981       0       0       14       198       0       0       22       2       11         Apr       1981       0       0       14       198       0       0       22       2       11         Apr       1981       0       0       144       198       0       0       25       0       3         Jun       1981       0       0       29       364       0       0       25       0       3         Jun       1981       305       0       9       525       0       0       12       20       0	Oet	1980	0		28	166	•	0	2	41	20
Jan         1981         0         50         424         0         0         0         48         31           Fub         1981         1         0         30         377         0         0         22         2         11           Mar         1981         0         0         14         198         0         0         22         2         11           Mar         1981         0         0         14         198         0         0         0         1           Apr         1981         0         0         50         446         0         0         25         0         3           May         1981         0         0         104         147         0         0         16         0         2           Jan         1981         305         0         9         525         0         0         12         20         0			•				-				
Fab         1981         1         0         30         377         0         0         22         2         11           Mar         1981         0         0         14         1986         0         0         0         0         1           Apr         1981         0         0         14         1986         0         0         0         0         1           Apr         1981         0         0         50         488         0         0         25         0         3           May         1981         0         0         108         147         0         0         14         0         2           Jun         1981         0         0         29         364         0         0         34         17         1           Jul         1981         305         0         9         525         0         0         12         20         0			:	•							
Mar         1981         0         0         14         1984         0         0         0         0         1           Apr         1981         0         0         50         440         0         0         25         0         3           May         1981         0         0         100         147         0         0         16         0         2           Jun         1981         0         6         29         364         0         0         34         17         1           Jul         1981         305         0         9         525         0         0         12         20         0	Feb	1981	ī	Ō	30	377	0	٥	22	2	11
May         1981         0         0         106         147         0         0         16         0         2           Jun         1981         0         0         29         364         0         0         34         17         1           Jul         1981         305         6         9         525         0         0         12         20         0	Mar		•	•							
Jun 1981 0 0 29 364 0 0 34 17 1 Jul 1981 305 0 9 525 0 0 12 20 0				0							
Jul 1981 305 0 9 525 0 0 12 20 0				ŏ				-			
Aug 1981 2 0 125 306 0 0 0 9 1	Jul	1981		-							
	Aug	1981	2	0	125	304	0	0	0	•	1

Table 14. Monthly purchases (kg/week) of kohirabi, leek, lemon/lime, lettuce, mandarin, marrow, orange, pak choi and parsley by the Food Marketing Corporation at Goroka, April 1976 to August 1981 (Source: FMC purchase records)

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		Paranip Paranip	PassionIruit Passion edula (, edula	Pawpaw	Pees	Pineapple	Potato Selerum tuberecum	Pumpkin truit	Radish	Rhubarb
MONTH	YEAR			Cana behave				Cucurbits meeches	Nephenus settus	Ahoum Mapanécum
Apr	1976	•	•	•	•	•	115	286	48	1
May	1976	•	0	0	10	0	83	46	26	0
مدر اود	1976 1976	missing data 1		•		3	24	<b>e</b> 1	12	٥
Ave	1976	à	0	0	11	0	725	243	28	0
Sup	1076	20	0	0	1.	•	242	€1	11	•
Out	1978	8 13	•	0	0	5 11	45	140 75	1	1
Nev Des	1976 1976	3		2	5		479	27	23 13	0
Jan	1977		2188	ē	ň	02	495	97	28	
Feb	1977	•		3	2	163	885	••	16	0
Mar	1977	•	5466 786	•	4	85 22	587 233	279 135	15 5	0
Apr May	1877 1977	•	4	•		0	92	135	5 19	•
	1877	3	ò	1	Ō	10	12	122	13	0
<u>للد</u>	1977	٠	0	14	0	•	46	24	0	0
Aug Sep	1077 1077		0	40 26		•	234 569	145 124	21	0
Out	1077	i	ŏ	26	ő	ő	272	155	26	0
Nev	1977	•	0	25	0	4	126	278	12	2
Des	1977	•	•	15	0	0	85	74	•	0
Jan Fab	1978 1978	:	54 607	17 18	0	10 50	685 261	70 10	64 8	0
Mar	1978		6800	21		12	622	202	38	0
Apr	1078	74	1063	4	0	0	306	46	34	2
May	1978	•	167	1	•	•	144	218	46	0
هد اد	1978 1978	•	18	1	3	4	73 215	136 108	23 14	0
Aug	1978			02	•	ė	73	375	4	0
Sup	1878	•	0	14	6	2	115	30	2	ō
Oet	1978	missing data missing data								
Nev Dec	1976		•	20	21	•	157	252	28	3
Jun	1979	÷		3	21	•	823	260	105	7
Feb	1879	4	829	30	5	77	500	114	•	7
Mar Agr	1879 1879	2	1857 799	48 64	4	67 29	302 17	185 84	<b>5</b> 1	0 3
	1978	3	101	21	2	19	321	235	ò	3 11
Ja	1979	•	4	114	•	25	14	71	2	0
	1979 1979	2	10 1	37 40	•	30 0	29 33	4 <b>3</b> 77	•	0
	1979	3		51		10	284	56	<b>0</b> 1	0
	1979	•	0	32	•	19	186	33	0	ō
	1979	•	•	25 24	12 4	52 10	335	53	0	4
	1878 1988		0	24 15	•	100	30 543	267 647	e 0	•
	1980		607	27	ō	134	1142	231		4
	1980	•	2347	24	•	106	2482	466	0	0
	1960 1969		621 54	e 15	•	12 0	1845 221	102 33	4	1
	1980		1	13		10	140	60	3	10
JM	1980	0	0	20	0	0	192	38	0	ō
	1980	•	0	54 58	•	0 64	511	85	0	0
	1960		•	32	0	27	345 5	41 51		0
	1980	•	2	19	0	13	834	113	O	•
	1980	•	•	2	•	25	127	40	1	13
	1981 1981	•	3 910	4	0	40 154	203 420	40 103	1	0
	1981		471	7	0	27	258	78	0	0
Apr	1981	0	171	1	0	0	172	11	5	õ
	1981	•	10	0	0	0	12	4	0	0
	1981 1981	0	0	2	0	0	37 12	3 15	4	0
	1961	•		12		0	274	38	0	0
-										

Table 15. Monthly purchases (kg/week) of parsnip, purple passionfruit, pawpaw, peas, pineapple, potato, pumpkin fruit, radish and rhubarb by the Food Marketing Corporation at Goroka, April 1976 to August 1981 (Source: FMC purchase records)

Table 16. Monthly purchases (kg/week) of silverbeet, spring onion, strawberry, sweet potato, tomato, tree tomato, turnip and zucchini by the Food Marketing Corporation at Goroka, April 1976 to August 1981 (Source: FMC purchase records)

		Silverbeet	Spring onion	Strawberry	Sweet potalo	Tomato	Tree tomalo	Turnip	Zucchini
	-	Boto vulgario	Allum cope	Fragasia ap.	ipernees beloiss	Lycopersicen esculentum	Cyphemendre beiacea	Brassica repa	Curavbila pape
MONTH	YEAR 1976	41	vec. cepe 471	•	2482	401	•	0	ver. modullese 3
Apr May	1876	14	136		1674	225			•
3.0	1976	missing data		•	1042		•	•	
	1076	•1	86	4	761	237	0	7	1
Aug	1976	267	465	5	691	550	0	0	10
Sep	1976	178	153	1	430	107	0	52	10
Oct	1978	205	235	2	605	118	0	5	10
Nov	1976	53	103	2	1564	150	•	2	•
Dee	1078	52	138	1	3331	87	0	4	2
Jan Fab	1077 1077	137 100	80 154	•	1833 945	112	•	0	3
Ner	1977	38	207	ő	2348	428	84	0	1 2
Apr	1977	28	156	ě	2177	190	15	3	0
May	1977	73	225	0	2892	192	15	ō	1
Jun	1977	42	120	0	4080	48	0	0	0
امد	1877	100	121	0	815	45	0	0	0
Aug	1977	82	445	0	15945	102	•	0	0
Sep	1977	40	80	0	3475	201 137	0	0	0
Oct Nev	1977 1977	32 31	105 123	0	938 157	41	0	0	0 1
Dec	1077	15	0	0	1668	13	ŏ	0	
Jan	1978	82	293		1491	34	0	ō	10
Feb	1878	5	172	0	3141	143	0	0	0
Mar	1978	72	310	•	3288	150	0	81	0
Apr	1978	21		0	4036	<b>P0</b>	0	•	3
May	1978	45	322	1	3218		0	1	1
مد لد	1070 1078	40 55	103 53	6 38	3029 2774	33 5	0	5	11
Aug	1978	15	28	94	6811	3	0	4	•
5	1978	4	32	118	1145	20	ŏ	1	5
Oet	1078	missing data					-	-	•
Nev	1978	missing data							
Dee	1978	21	204	56	23	108	•	•	3
Jan	1979	38	70	4	117	<b>90</b> 374	•	••	23
Fab Mar	1979 1979	43	77 200	0	1355 852	261	• 74	•	5 •
Aar	1979	4	101	0	377	105	24	ŏ	0
May	1978	4	88	15	506	100	3	ŏ	3
Jun	1979	13	83	118	482	62	0	0	0
<b></b>	1979	39	•	263	326	104	4	0	0
Aug	1979	27	160	290	61	61	0	0	0
Sep	1979	10	173 56	260 219	1557 1277	93 120	0	0	1
Oet Nev	1979 1979	17 21	132	84	1452	70	0	0	10
Dec	1979	33	130	0	293	75	ŏ	ő	11
Jan	1980	13	147	0	196	79	0	0	27
Feb	1980	20	104	0	150	328	0	0	•
Mar	1980	20	78	0	149	756	14	0	7
Apr	1980	•	83	•	408	187	•	0	4
May	1980 1980	36 23	104 79	0	727 600	138 137	0	0	1
مد اد	1980	25	35	0	777	77		0	3
Aug	1940	ī	42	ō	810	88	ů.	ō	ō
349	1980	5	72	0	890	42	•	0	0
Oet	1980	5	45	0	229	10	0	0	102
Nev	1980	20	83	0	167	30	0	0	114
Dec	1980	42	108 117	0	107 63	<b>49</b> 104	0	0	5 10
Jan Feb	1981 1981	13	117	0	6J 21	57	6	8	0
Feb Mer	1981	0	31	0	41	10		ŏ	5
Apr	1941	3	4	0	0	60	0	0	0
May	1981		56	0	108	84	0	ō	ō
Ju	1981	0	31	0	496	8	0	0	0
Jul	1981	4	36	•	289	29	0	0	0
Aug	1981	1	43	0	323	88	0	0	1

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Table 17. Monthly purchases (kg/week) of avocado, cooking banana, eating banana, common bean, broccoli and chinese cabbage by the Food Marketing Corporation for six buying centres, July 1979 to August 1981 (Source: FMC purchase records)

		Avocado Perses emeri							Coolding bas Mana avr	nana					
MONTH	YEAR	Part Marashy	معا م	Wew	Kainanta	Gereine	Mt Hager		Part Marada 785	y Lao 52	Wes				
Jul Ang	1878 1978	•	0 32	26 0	12 21	48 127	1	80 170	544	10	•	47	804 576		
Sep Oct	1070 1070	nining data nining data							864 373	37	18 0	•	866 373		
Nev Dec	1979		•	•	•	0 76	0	0 136	302 378	4 20	•	•	386 487		
Jan Feb	1000	6 30	19 30	88 196	3 31	138 221	54 43	284 488	260 332		•	20	200 332		
Mar	1000	12	11		294	174	26	008	227	,	0	•	228		
Apr May	1960 1960	•	•	270 121	40 19	141 62	31 7	400 210	488 489	0	•	•	488 499		
al. bl	1988		27 84	116 22	7 29	110 121	51 14	316 281	407 731	35 0	e 0	•	<b>532</b> 731		
Aug	1000	•	29 10	38 14		53 25	27 2	140 05	448 601	0 2	•		448		
Out	1960	•	10	10		25 71	0	50 155	012 003		•		612 963		
Nev Des	1960 1960	٠	10	60 125	i	14 126	•	183 297	548 301	0		ē	548		
Jan Fab	1961 1961	7 22	123	230	100	184	•	674	314	ō	•	•	361 314		
Mur Apr	1061 1061	:	77 14	278 299	22 47	95 199	25 16	408 556	454 421	•	•	•	454 421		
Niy Jan	1001 1001	0 27	50 24	217 00	81 12	<b>00</b> 47	4	300 100	047 010	1	•	•	848 810		
Jul Ang	1081 1081	10 0	23 12	32	*	44	50	174 73	1 <b>856</b> 1411	•	•	:	1 <b>056</b> 1411		
	Total	130	850	2292	767	2192	372	6423	15034	171	20	•7	15291		
		Ealing banan Mara ara							Common bea Phaseaks vulge						
MONIN	YENA	Part Manaday	Lao	West	Kainanta	Gerein	Mt Hagan	Total	Post Moresby	Lao	Wee	Kainantu	Gereke	Mt Hage	
Jul Ang	1879 1879	<b>300</b> 144	218 187	67 60	•	47 13	• >2	<b>000</b> 434	193 361	48 101	952 700	00 02	426 36	121 355	1800 1823
Sap Out	1070 1070	360 224	187 250	26 57	•	53 33	•	425 572	114 20	23 40	318 170	31 64	<b>24</b> 74	200 361	710 734
Nev Des	1879 1879	295	347 229	46 78	•	32 12	0	684 385	23 67	7 117	386 558	44 284	93 480	173 220	668 1730
Jan - Fab	1000	130	184	55 37	•	37 61	•	400 544	17 31	110 10	494 429	130 137	183 101	170	1132 724
Mar	1000	306 300	317 246	51 33		30 36	•	710	10 70	100 72	248 478	601 365	80 110	7	1064
Apr May	1000	327	178	\$3	Ō	37	•	585	111	225	406	300	205	224	1132 1563
مید. اید	1900 1900	276 383	200 237	44 36	•	17 22	0		54 144	65 3	304 197	453 253	51 20	364 101	1201 717
Aug Sep	1960	630 486	274 207	82 19	•	11 72	7 0	083 704	<b>95</b> 47	137 58	310 332	204 358	35 120	306 339	1005 1263
Oet Nev	1000 1000	483 474	131 297	30 17	10 46	58 01	•	851 985	114 130	85 37	308 317	436 831	185 302	546 293	1736 1916
Dee	1000	151	154	13 11	40	30 51	•	403 544	120	47 99	345 398	186	255	471	1406
Feb	1961	400	184 217	20	11	34 02	•	<b>666</b> 774	344	24 34	550 207	<b>80</b> 47	17	60 126	1000
Apr	1981	240	70	•	3	24	٠	361	65	27	112		1	94	500 306
May Jan	1081 1081	317 371	95 85	38 25	15 4	34 31	•	407 515	87 66	27 74	171 271	187 140	57 52	1172 276	1701 888
Jd Ang	1961 1961	385 385	81 117	13 25	3	17 10	•	400 517	76 179	23 18	101 253	146 118	15 7	240 348	681 924
	Tetal	8295	5208	964	217	842	58	15712	2710	1640	8482	5766	3083	8940	29621
		Broccoli Brassian elemen	na war, bad	ytio					Chinese cabba Brassics patinana	çe m					
HTMOM ML	YEAR 1979	Port Moresby 0	Lao O	West	Kainanta 17	Gerein 0	Mt Hegen 42	Total 59	Port Moresby 447	Lao 25	Wee 1517	Kainantu 280	Goraka 25	Mt Hagen 175	Total 24 <b>00</b>
Aug Sep	1979 1979		0	•	•	•	0 140	0 147	501 110	14	831 320	238 91	14	94 93	1775
Oet	1979		0	•	0	0	199 23	109	408 111	16	341 786	105	22 70	84 0	1016
Nev Dec	1979 1979	0	0	0	0	0	0	0	193	1	708	203	111	34	1171 1250
Jan Feb	1940 1940	•	0 0	0	3 3	44	50 41	77 52	157 357	25 0	528 278	185 27	141 38		1045 7 <b>09</b>
Mar Apr	1960 1960	•	7 0	1	0	1	60 48	88 50	004 1227	33 0	506 960	2	35 84	8 43	1248 2321
May Jun	1980 1980	0	0	0 2	0	•	7 35	13 37	473 890	0 0	749 1195	115 32	<b>00</b> 14	529 30	1 <b>935</b> 2170
Jul .	1980	0	0	1	45	0	29	74	524	0	1214	80	0	44	1841
Aug Sep	1980 1980	0	0	0	•	0 3	117 24	119 27	692 759	0 8	617 010	236 103	38 74	192 10 <b>6</b>	1775 1865
Oet Nev	1980 1980	• 22	•	1 5	•	50 245	48 208	113 477	716 483	12 7	708 617	310 145	134 210	94 21	1074 1462
Dec	1960	0	0	3	9	216 212	52 54	280	731 227	31	703 726	79 106	79 181	8	1629 1241
Feb	1001	0	0	0	0	0	17	17	329	0	483	57	181	12	1062
Mar Apr	1901 1981	•	0	0 3	0 0	0 2	67 6	76 10	104 1 962	27 0	414 510	43 0	21 58	251 240	1707 1770
May Jun	1981 1981	0 1	0	2 0	0	0 0	4	<b>6</b> 7	356 863	17 303	196 448	37 845	102 58	171 431	879 3066
J.d Aug	1001	0	0	2	12	4	46	62 18	1076	154	282 419	116	110 173	516 158	2256 2100
	Total	38	7	20	92	780	1322	2277	15650	885	16687	3763	2046	3342	42372

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Table 18. Monthly purchases (kg/week) of head cabbage, capsicum, carrots, cauliflower, celery and choko fruit by the Food Marketing Corporation for six buying centres, July 1979 to August 1981 (Source: FMC purchase records)

Vertex construction of the proper sector of the proper sec		•	Heed cabba				•			Capeloum						
A.         Open interface         Dist         Dist <thdist< th=""> <thdist< th="">         Dist</thdist<></thdist<>					•	<b></b>						-				
No.         No. <th></th> <th></th> <th></th> <th></th> <th></th> <th>430</th> <th>134</th> <th>15100</th> <th>16400</th> <th>5 113</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>						430	134	15100	16400	5 113						
No.         No. <th></th> <td></td> <td>-</td> <td></td> <td></td>														-		
Des         Des <thdes< th=""> <thdes< th=""> <thdes< th=""></thdes<></thdes<></thdes<>	Oet	1979	344	014	83						4	88	7	Ō	4	305
Note         Alte         Note         Note <th< th=""><th>Dec</th><th>1879</th><th>121</th><th></th><th>59</th><th>484</th><th>1005</th><th>4085</th><th>6630</th><th>310</th><th>-</th><th>238</th><th></th><th>Ū.</th><th>-</th><th></th></th<>	Dec	1879	121		59	484	1005	4085	6630	310	-	238		Ū.	-	
No.         No. <th></th> <th>-</th> <th></th> <th></th> <th></th> <th></th> <th></th>											-					
No.         No. <th>Mar</th> <th>1990</th> <th>546</th> <th>34</th> <th>150</th> <th>677</th> <th>500</th> <th>2006</th> <th>4815</th> <th>142</th> <th></th> <th>283</th> <th>-</th> <th>٠</th> <th>18</th> <th>460</th>	Mar	1990	546	34	150	677	500	2006	4815	142		283	-	٠	18	460
A.         Nome         Nome         No         No        No        No         N	May	1980	940	•	25	113	408	5413	6006	311	0	170	1	10	0	
A.e.         Mate         Mate <th< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>-</th><th></th><th>-</th><th></th><th>-</th><th></th></th<>											-		-		-	
Corr         Note of the set of th	Aug	1000											-	-	75	846
Line         Att         Att         State         Att         State         Tot         Tot         State	Out	1000	1007	362	360	1483	278	2721	6301	355	15	184	1	0	110	643
Res         1000         1000         1007         3353         11         312         230         2         0         0         1         535           No         1000         200         100         200         100         200         100         200         100         200         100         200         100					268	633	420	\$432	7200	73	276		٠			
No.         1681         168         16         36         1         0         0         353 130           No.         1681         376         168																
<pre>     tax         tax</pre>	Mar	1981		255								250	1	-	0	533
	May	1981		363	140	335	100	1210	2782	124	74	101	. A	2	30	401
Am19810.1910.1921780178018120.1213213215315100155Corrolm Toware mark Ame128018121111301780181218121812181218121812181218121812181218121812181218121814 <th></th> <td></td> <td>-</td> <td></td> <td></td>														-		
Currents	Aug													-		986
Tennerati         Desire         Second Secon													••		1200	14030
A.M.         1979         6         28         68         1         6         486         1979         1         6         486         1979         1         1070         1770         1         1770			-									hatytis				
Ang         1670         6         21         4.6         7.4         7         7         1.4         1720         1720           Con         1577         6         1         1         6         1         1         0         2550           Con         1577         6         1         1         0         2560         2         1         0         2560         2         2         1         0         2560         2         2         1         0         2560         2         2         1         0         2560         2         2         2         2         1         0         2																
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Aug	1079	•	21	48	134	23	1410	1633	•	0	7	7	14	1738	
New         1970         6         4         6         3         4         6         0         2338         2337           Des         1620         3         4         1																
No.         No. <th>Nev</th> <td></td> <td>-</td> <td></td> <td>2352</td>	Nev		-													2352
May         1866         2         79         24         223         448         1228         2137         0         0         0         0         0         110         1228           May         1660         2         257         1600         210         1124         1224         124         124         1221         2         0         36         2         3         134         1600           May         1660         0         163         27         160         210         1124         1231         123         134         100         3         2         3         134         100           May         1660         0         46         27         46         10         1135         11         21         2         0         0         135         134         10         0         20 <th20< th=""> <th20< th="">        20         &lt;</th20<></th20<>	Jan	1960	٠	4	110	124	300	3424	4370	•	0	3	0	0	215	218
her         1000         0         22         07         100         210         1124         1124         1124         0         0         21         2         3         134         1000           And         1000         0         64         21         210         51         1336         1713         38         0         14         0         0         142         164           Ang         1000         0         13         0         0         142         164		1860	2	70	24	325	448	1266	2137	•	٠		0	0		
Jac         1660         0         143         1660         0         143         1660         0         143         1660         0         143         1660         0         143         1660         0         143         1660         0         143         1660         0         143         1660         0         143         1660         0         146         1660         166         25         16         16         177         166         166         26 <th26< th=""> <th26< th="">         26         &lt;</th26<></th26<>																
Ang         1000         2         6.3         4.2         1.2         6.4         1.107         1.00         0         1.3         0         0         5.46         1.000           Cot         1.000         0         4.4         2.7         4.0         1.0         1.0         2.0         0         0         0         3.00         4.13         3.00         1.0         0         0         3.00 <th< th=""><th>Ja</th><td>1990</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>-</td><td></td><td></td><td></td><td>210</td><td>267</td></th<>	Ja	1990									-				210	267
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Aug	1999	2	63	42	122	84	881	1107	100	ē	13	•	0	56	
Des         1980         0         4         32         0         4         3         0         303         100           Les         1981         0         16         7         90         40         90         346         22         0         4         5         0         100         126           Ker         1681         2         74         22         40         45         346         7         100         46           Apr         1681         2         74         22         46         45         346         471         2         0         377         6         0         100         26         66           Apr         1681         3         0         81         81         227         344         20         91         1         356         265         71         71         71         74         246         30         90         91         11         356         257         713           Aug         1661         4         216         217         277         377         373         332         325         332         332         347         5         0         117 </th <th></th> <td></td> <td>-</td> <td>-</td> <td></td> <td></td>													-	-		
$\begin{array}{cccccccccccccccccccccccccccccccccccc$																
Line         163         0         17         17         307         13         0         5         0         0         10         26           Agr         161         2         74         17         17         112         246         471         2         0         37         0         0         174         213           May         161         3         26         71         17         112         240         634         0         0         26         64           Jan         161         3         9         81         61         227         313         644         0         12         61         13         356         332         250         252         283         332         250         252         283         332         250         252         28         464         171         134         13         160         111         13427           Mat         1970         6         8         440         7         0         562         28         30         47         5         0         1117           Mat         1970         6         6         310         642 <th< th=""><th>Jan</th><td>1981</td><td>•</td><td>15</td><td>7</td><td>99</td><td>52</td><td>675</td><td>848</td><td>2</td><td>24</td><td>2</td><td>1</td><td>•</td><td>107</td><td>136</td></th<>	Jan	1981	•	15	7	99	52	675	848	2	24	2	1	•	107	136
			•	12	17	143	10	177	367	13		5	0	•		
Jac         1961         3         3         0         51         81         227         344         2         31         14         0         0         10         57           Aug         1961         4         210         330         54         28         313         646         6         12         61         1         355         257         713           Total         393         1105         1520         2727         3379         2779         35633         332         250         552         28         26         464         1171         2         6         464         171         21         355         257         713           JAI         1979         6         5         468         2         7         0         562         28         464         0         111         134277           JAI         1979         6         2         468         4         7         0         562         28         47         5         0         111           JAI         1979         6         3         10         6         10         10         6         10         10         10     <																
Ang         181         3         218         333         544         6         12         61         1         356         227         713           Total         395         1185         1320         2727         3370         28729         35833         332         285         552         28         404         11781         13427           Lener Marcolspan         Las         Way         Kainanty         Calor         Color	Jun															\$7
Colory Apient generations rest date:         Choice fruit Sachiern state:           MCNNY         YEAP         Pet Maneable         Sachiern state:           MCNNY         YEAP         Pet Maneable         Choice fruit Sachiern state:           MARE         Choice fruit Sachiern state:           Mare this result in the state:         Tate of the state:           Add         9         Choice fruit           Add         Tate of the state:           Add         Choice fruit           Add         1         Choice fruit           Add         4         0         4         0         4         0         4         0         111           Add         4         0         0         0         0           Date         10         0         0         0         0         0         0         0		1981	4	216	330	54	29	313	946	•	12	81	1	356	257	713
April Part Marriely         Las         Was         Kainanta         Gamba         Mit Magen         Total         Pert Marriely         Las         Was         Kainanta         Gamba         Mit Magen         Total         Pert Marriely         Las         Was         Kainanta         Gamba         Total           Jul         1979         6         6         340         4         0         662         28         30         47         5         0         1111           Aug         1979         6         6         310         6         0         430         minining data				1185	1520	2/2/	3379	24/20			224	552	20	494	11761	13427
Jd         1978         6         5         448         4         7         0         562         28         36         47         5         0         111           Aug         1978         6         6         310         6         6         310         47         12         114         4         0         177           Sep         1979         6         6         310         6         6         310         rrising data         7         14         4         0         177           Oct         1979         16         6         420         0         0         35         7         6         14         4         0         35           Dec         1979         0         0         444         0         445         0         26         1         4         40           Jan         1960         0         3310         21         14         0         347         3         0         373         295         3         674           May         1960         0         310         21         14         0         347         3         0         373         295 <t< th=""><th></th><th></th><th>Celery Apium gravadan</th><th>e vac dela</th><th>•</th><th></th><th></th><th></th><th></th><th>Choko Iruk Sechian edule</th><th></th><th></th><th></th><th></th><th></th><th></th></t<>			Celery Apium gravadan	e vac dela	•					Choko Iruk Sechian edule						
Aug       1978       S       28       456       2       4       0       460       47       12       114       4       0       177         Sep       1979       0       0       316       0       0       310       miniming data       . <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>•</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>								•								
Sep         1979         0         0         310         rising data           Oct         1979         10         0         420         0         0         0         430         rising data           Nov         1979         0         0         420         0         0         430         rising data           Nov         1978         0         0         440         0         446         0         447         0         8         113         32         18         186           Jan         1980         0         0         333         3         4         10         346         0         5         113         32         18         186           Jan         1980         0         330         21         14         0         347         3         0         373         285         3         674           May         1980         0         331         9         0         321         0         373         285         3         215           Jan         1980         0         321         0         0         374         0         3         34         1         12										47						
Nev       1979       0       0       440       3       23       0       515       0       9       26       0       0       35         Dec       1979       0       0       353       3       4       10       360       0       9       26       1       4       40         Jan       1960       0       0       33       21       160       160       53       21       160         Feb       1960       0       3       310       21       14       0       417       0       8       160       53       21       260         May       1960       0       3       310       21       14       0       347       3       0       373       295       3       67         May       1960       0       2       26       0       0       377       6       0       118       1       4       123         Jan       1960       0       2       24       0       52       0       138       12       51         Jan       1960       0       470       40       24       63       14       123	Sep							-								
Jan       1960       0       293       8       44       0       448       0       5       113       32       18       168         Feb       1960       0       8       366       4       144       0       417       0       8       166       53       21       220         Mar       1960       0       3       310       21       14       0       417       0       8       166       53       21       220         Mar       1960       0       301       6       0       0       307       6       0       178       25       6       215         May       1960       0       2       266       20       0       0       374       0       118       1       4       123         Jun       1960       0       2       266       20       0       374       0       3       36       1       12       51         Jun       1960       0       0       374       0       3       36       1       12       51         Jun       1960       0       0       372       2       0       0	Nev	1979	0	0	400	3	23	0	515	٥						
Mar       1860       0       3       310       21       14       0       347       3       0       373       295       3       874         Apr       1860       0       301       8       0       0       307       6       0       178       25       6       215         Mar       1860       0       2       296       20       0       0       321       0       0       118       1       4       123         Jun       1960       0       2       296       20       0       0       321       0       0       118       1       4       123         Jul       1960       0       0       374       0       3       36       1       12       51         Jul       1960       0       0       314       0       8       170       0       3       162         Get       1960       0       3       466       11       0       0       502       missing data	Jan		0	-	303		44	0	445	0	5	113	32	18	166	
Apr       1860       0       0       307       6       0       178       25       6       215         May       1860       0       2       266       20       0       0       321       0       0       118       1       4       123         Jan       1860       0       15       343       19       0       0       376       0       3       36       i       12       51         Jal       1960       0       478       4       0       2       465       24       0       52       0       7       33         Aug       1960       0       0       314       0       8       170       0       3       162         Sep       1960       0       488       11       0       0       502       missing data       170       0       3       162         Sep       1960       0       548       11       0       0       502       missing data       170       0       3       22         Dec       1960       0       533       3       0       0       246       0       173       0       7			-	-												
Jan       1960       0       15       343       19       0       0       376       0       3       36       1       12       51         Jul       1960       0       0       479       4       0       2       485       24       0       52       0       7       a3         Aug       1960       0       0       312       2       0       0       314       0       8       170       0       3       162         Sep       1960       0       0       376       0       314       0       8       170       0       3       162         Sep       1960       0       0       476       3       0       0       479       40       24       45       0       14       123         Oct       1960       0       5476       0       0       552       missing data       -       -       -       -       -       -       -       -       -       14       123       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -	Apr		-	-				-		-						
Aug       1960       0       312       2       0       0       314       0       8       170       0       3       182         Sep       1960       0       476       3       0       0       479       40       24       45       0       14       123         Oct       1960       0       3       486       11       0       0       502       missing data       70       14       123         Oct       1960       0       3       486       11       0       0       502       missing data       70       714       123         Nov       1960       0       533       3       0       0       535       missing data       70       7179         Jan       1961       2       4       226       3       2       0       246       0       0       173       0       7       179         Mar       1961       2       4       226       3       2       0       154       74       0       103       0       0       177         Mar       1961       0       0       148       4       1       0	مىل	1980	0	15	343	19	0	0	376	0	3	36	1	12	<b>S</b> 1	
Sap       1960       0       476       3       0       0       476       40       24       45       0       14       123         Oct       1960       0       3       466       11       0       0       502       missing data       . <th></th> <td></td> <td>-</td> <td>-</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td></td> <td></td> <td></td> <td></td>			-	-							-					
Nov         1960         0         5         476         0         0         481         missing data           Dec         1960         0         533         3         0         0         535         missing data           Jan         1961         2         4         256         23         0         0         235         missing data           Jan         1961         2         4         256         23         0         0         246         0         16         2         3         22           Fab         1961         14         0         228         3         2         0         246         0         0         173         0         7         176           Mar         1961         0         0         147         5         2         0         154         74         0         103         0         0         177           Apr         1961         0         0         153         56         0         11         0         4         71           Jan         1961         2         0         221         8         7         0         239         78         0<	Sep	1960	0	0	476	3	0	0	479	40						
Jan       1961       2       4       256       23       0       0       286       0       16       2       3       22         Fab       1961       14       0       228       3       2       0       246       0       0       173       0       7       179         May       1961       0       0       147       5       2       0       154       74       0       103       0       0       179         May       1961       0       0       147       5       2       0       154       76       0       103       0       0       179         May       1961       0       0       148       4       1       0       153       56       0       11       0       4       71         May       1961       1       0       268       6       0       0       214       65       18       6       0       30         Jan       1961       2       0       221       8       7       0       239       78       0       12       0       0       90         Jan       1961       2<		1980	Ō	5	476	0	0	0	481	missing data						
Fab.         1961         14         0         220         3         2         0         246         0         0         173         0         7         176           Mar         1961         0         0         147         5         2         0         154         74         0         103         0         0         177           Apr         1961         0         0         148         4         1         0         153         56         0         11         0         4         71           Mar         1961         0         298         6         0         0         214         65         18         6         0         30           Jan         1961         2         0         221         8         7         0         239         78         0         12         0         0         90           Jai         1961         4         0         305         4         0         0         313         96         0         32         0         0         128           Jaid         1961         2         0         333         2         3         0 <td< th=""><th></th><th></th><th>-</th><th>-</th><th></th><th>-</th><th>-</th><th>-</th><th></th><th></th><th>0</th><th>16</th><th>2</th><th>3</th><th>22</th><th></th></td<>			-	-		-	-	-			0	16	2	3	22	
Apr         1961         0         140         4         1         0         153         56         0         11         0         4         71           May         1961         1         0         234         65         18         6         0         0         30           Jan         1961         2         0         221         8         7         0         239         78         0         12         0         0         90           Jad         1961         4         0         305         4         0         0         313         96         0         32         0         12         0         0         126           Jadi         1961         4         0         305         3         0         340         25         23         29         0         0         128           Aug         1961         2         0         333         2         3         0         340         25         23         29         0         0         77	Feb	1981	14	0	229	3	2	0	246	0	0	173	0	7	179	
May         1961         1         0         208         0         0         214         65         18         6         0         0         30           Jan         1961         2         0         221         8         7         0         239         78         0         12         0         0         90           Jai         1961         4         0         305         4         0         0         313         96         0         32         0         128           Jai         1961         2         0         333         2         3         0         340         25         23         29         0         0         77				ō	148	Ā	1	Ō	153	56	ō			4	71	
Jai         1961         4         0         365         4         0         0         313         96         0         32         0         128           Aug         1961         2         0         333         2         3         0         340         25         23         29         0         0         77	May							-								
	Jul	1981	4	Ō	305	4	Ó	0	313		0	75	0	0	128	
				-												

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Table 19. Monthly purchases (kg/week) of coconut, corn, cucumber, eggplant, ginger and grapefruit by the Food Marketing Corporation for six buying centres, July 1979 to August 1981 (Source: FMC purchase records)

		Coconut			•		•	•	Com						
		Coses musica	•						Zon mayo						
MONTH	YEAR	Pert Merceby	lae 154	Waa 43	Keinentu 2	Geraka 0	Mt Hagan O	Total 1999	Port Morealy 180	7 Lao 144	Waa 48	Kainantu 18	Geraka 56	Mt Hage	
Jul Aug	1879 1879	1711 360	134	•			•	488	115	24		7	•	•	485 236
Sap Oct	1079 1079	missing data missing data							162 42	87 34	18 47	1	•	• 12	266 136
Nev	1979	848	• 24	•	•	0	0	848 834	151 72	30 40	50 448	• 12	20 203	54 24	330
Dee Jan	1979 1969	666 178	24	•	•	٠	•	176	277	32	727	133	316	•	858 1483
Feb Mar	1960	346 325	203	:	28	0		578 440	786	10	75 111	92 147	202	0 151	1185 1122
Apr	1990	\$75	163	. i	•	Ō	177	915	344	111	25	20	11	•	535
May Jun	1980	274	*	14	•	•	•	284 189	342 94	351 58	38 29	• 2	3	0	743 266
<b></b>	1980	637 263	250	:	:	2	•	888 283	e 267	3 5	16 80	3	2	0 5	34 354
Aug Sep	1980	147	230	Ū.	•	٠	٠	377	167	2	\$7	19	0	1	246
Oet Nev	1980	511 336	:		:	•	•	511 336	162 135	22 165	93 39	10	1	8	306 422
Dee	1980	210	9		•	0	•	219 433	• 107	31 72	63 65	87 26	15	0	195
Jan Fab	1961 1961	34	•		•	0	٠	34	536	100	53	16	27	•	<b>302</b> 74 <b>0</b>
Mar Apr	1961 1961	360 254	260 825	;	•	•	0	618 879	548 262	20 215	18	•	82 3	0	673 486
Mar	1961	886	•		•	0	•	806 344	1023	81	3	07	0	•	1107
مد اند	1061 1061	344 264			•	Ō	•	294	100	45	41	11	0	•	465 267
Aug	1981 Total	542 10210	2267	* \$7	•	2	• 177	542 12760	23 8719	176 2235	75 2036	2 711	1306	0 250	277 13648
		Cucumber				-			Eggplent						
		Cummie settre	•						Salanum malan	gana					
MONITH Jul	YENR 1979	Pert Merceby 284	Lao 48	Www 247	Kainantu O	Gerein. Ø	Mt Hagen 72	Total 840	Port Moreaby 34	معا 1	Wax 136	Keinente S	Goraha 0	Mt Hagan O	Total 173
Awe	1070	344		180	1	•	•	504	71	•	29	•	•	0	106
Sep Oct	1979 1979	302 750	23	37 40	1	• 7	30 0	482 868	60 60	10	20 34		0	•	114 129
Nev Dec	1979	712	120 69	144	1 112	29 88	0	1005 1962	168 117	1	61 40	10 26	1 5	•	200
Jan	1880	222	102	755	720	112	0	1900	121	0	46	10	12	0	188
Feb Mar	1960 1960	300 846	100 28	805 388	41 32	45	•	1411 1 <b>078</b>	50 04	1	27 27	1 2	12	0	100 124
Apr	1960	502 501	7	143 69	1	0	0	743 651	75 27	0 2	32 50	1 2	0 2	0	100
May Jun	1980	750	70	70	Ō	1	Ō	801	128	1	43	1	0	•	172
Jul Aug	1000	202 545	44 307	106 115	•	•	•	443 971	118 361	0	45 30	•	•	•	163 366
Sep	1999	575	1750	45	10	•	0	2300 1778	48	• 17	44	•	3	•	97
Oct Nev	1 <b>980</b> 1 <b>980</b>	662 531	887 383	24 36	2	•	•	951	130 135	•	40 87	1	5	0 11	200 226
Dee Jan	1988	400 307	1400 326	90 200	24 25	20 7	7 10	2021 1024	63 86	34	00 02	10 7	5 21	•	181 264
Feb	1061	300	84 32	500	2	13	•	1040	22	10	08 48		2	2	117
hilar Apr	1961 1961	377	272	29	ē	Ū.	Ō	678	183		38	0	•	•	212 141
May Jan	1981	224	1318 524	8 188	0	•	23 1	1574 1080	133	2	28 24	•	•	:	163 136
Jul .	1961	330 515	334 327	540 292	1		• 15	1263	54 74	2 18	18	2	0	0	78 101
Aug	Tetal	12007	8760	7995	•77	331	163	20303	2000	130	1184	108	74	25	4171
		Ginger							Grapefruit						
		Zingibor officing	lo						Citra peredei						_
HTMOM	YEAR 1979	Pert Merceby 27	6	Wee 3	Kainantu B	٥	Nit Hagen O	Total 36	Part Merceby 21	1.00 3	Wex 13	Kainantu 4	Gereke 59	Mt Hagen 0	Total 99
Aug Sep	1979	22	•	10 0	2	0	:	34	33 missing data	٠	٠	•	10	0	59
Oet	1979	missing data	•	•	·	•	-	-	missing data					-	
Nev Dec	1979 1979	missing data missing data							•	• 1•	130 3	0	0	0	138 19
Jan Feb	1960 1960	•	0 3	0 87	1	0 8	0 0	1 78	30 42	0	04 49	0	0 11	0 358	103 450
rao Mar	1960		э	0	4	5	0	11	0	23	148	4	4	450	435
Apr May	1980 1980	3	0	•	10 11	0 0	0	13	12 5	0 2	90 250	5	34 15	0	141 278
.au	1980	74	0	5	4	0	0	43 20	0	41	55 37	0	10	15	130
Jul Bug	1980 1980	0 22	•	0	2 0	0	•	30	•	0	89	29	1	0 146	147 273
Sep Oct	1960	32 0	0	0	0	0 0	0	32 0	0	0	32 85	52 10	8 2	0 14	92 111
Nev	1980	2	0	0	Ō	0	0	2	2	14	35	5	0	0	56
Dec Jan	1980	0	0	0	0	0 1	0	0 1	0	0 18	11 12	0	0 29	0 82	11 130
Feb	1981	7	5	2	0	0	0	14	12	0 21	34	0	14	7	44
Mer Apr	1981	10 71	0	0	1 0	0 1	Ó	11 75	48	21	101	0	22 31	0 0	105 178
May	1981	23 26	0	0 0	4	0	0 0	26 35	25 146	11	38 44	8 7	29 37	0	110 242
. ML	1881		0	Ō	0	0	0		0	9	37	0	0	0	46
	1961 Total	15 355	6 40	0 93	45	0 15	0 9	15 558	0 465	8 182	43 1473	57 202	3 346	0 1080	111 3747
						-				-		-	-		

(000		Leek			,				Lemon/Lime						
		Allum ampole	-	at penum					Citrus Imen/Ci	itus aura	ndialia				
HTHOM	YEAR 1979	Part Maraday 0	lan 0	Was 83	Kainantu O	Goroina 0	Mt Hagen Ø	Total 63	Part Marashy 66	Lao 97	Waa 58	Keinentu 10	Gereien 23	Mt Hegen S	Total 257
Aug	1979			65 25	•	0	:	85 38	298 missing data	92	89	•	12	5	402
Sep Oct	1979	Ū	0	33	1	19	0	52	missing data	_					
Nev Dec	1878	•	•	55 43	0	4	4	83 47	16 37	•	36 40	0	57 123	0	100 206
Jun	1980	•	•	01	1	14	2	98 83	13 1 25 6	80 38	41	4	07 102	10	342
Feb Mer	1980	•	•	83 78	2	1	0	81	250	30	148	4	120	8 40	614 580
Apr	1980		•	80 83	1	•	0	89	179 237	•	344 121	11	67 56	7 37	607 450
May عد	1960	•	Ō		•	0	Ō	96	106	52		2	32	20	280
Jul Aug	1980	•	0	88 57	•	1	0	89 87	337 38	103 112	7	12 5	52 81	33 17	543 284
Sep	1980	•	Ō	70	•	0		81	25	185	26	10	63	7	324
Cel Nev	1880 1880	•	22 0	44 66	•	18 2	4 2	87 73	177 95	24 114	40 41	4 262	28 49	21 38	203 508
Des Jan	1980	10	•	79 198	•	1	2	105 111	40 87	24 1 <b>99</b>	23 44	• 13	47 50	11	152 307
Feb	1981	10	0	108	1	1	0	120	124	63	120	10	30	11	367
Mar Apr	1981 1981	0 3	•	67 49	3	0	26 0	95 55	192 123	158 73	81 255	10 11	14 50	52 0	503 522
May	1981	4	1	00 70	1	•	•	75 85	225 131	31 113	100 77	7	108 29	0	470
مدر اند	1981 1981	13		77	ė	305	ŏ	305	141	141	49	2	•	•	333
Aug	106 1 Total	7	0 22	120 1879	0 24	2 370	0 #3	138 2427	136 3600	217 1857	42 1949	0 401	125 1530	0 324	520 8560
									Mandarin						
		Lettuce Lastras autre							Citus ministe						
MONTH	YEAR	Port Morseby	Lee	Wex	Kainantu	Gerein	Mt Hagen	Tetal	Part Manaday	Las	Was	Kainantu	Gereim	Mt Hagen	Total
Jd Aug	1878 1979	• 22	147 02	3483	552 677	373 388	110 02	4074 8135	11 14	* 1•	3	21	•	0	50 24
Sep	1979	12	126	4312	626	179	100	5363	missing data missing data						
Oet Nev	1070 1079	0	87 46	1 <b>050</b> 1488	166 384	78 63	02 101	2044 2091	0	0	0	•	0	0	0
Dee Jan	1979	60 15	63 17	2384 1944	318 458	774 750	144 1 <b>06</b>	3723 3 <b>209</b>	0	0 5	0	0	0 5	0	0 10
Fab	1980	10	10	1252	339	637	107	2364	•	22	•	3	1	0	26
Ner Apr	1960 1960	21 204	27 3	1484 2130	572 390	375 1020	85 66	2584 3873	•	5	•	•	0 0	0	5
May	1960	•	17 21	2190 2063	738 903	023 423	33 7	3606 3418	• 10	29 55	3 12	26 21	•	0	87 97
مد اند	1980	10	•	2651	750	84	176	3884	35	50	100	24	•	13	238
Aug Sep	1980 1980	124 43	34 69	2463	556 781	138	174 380	3487 5409	121	21	19	4	0	0	165
Oct	1980	•1	59	3486 2586	781	100 254	68 1 363	5242 3450	•	• 14	•	•	•	•	0 14
Nev Dec	1980 1980	30 2	03 2	879	1775	799	136	3593	10	•	•	0	0	0	10
Jun Fab	1081	11 25	100 84	911 1008	980 488	424 377	138 257	2545 2908	e 30	0		0 2	0	0 35	8 67
Mar	1981	10	0	2005	371	196	233	2906	5	0	0	0	0	0	•
Apr May	1981 1981	33 40	38 8	1500 050	213 470	4 <b>88</b> 147	622 402	2000 1777	10	113	0			0	75 123
مد اند	1981 1981	48 50	353 221	1916 4069	957 768	364 525	314 258	3854 5893	122 52	37 10	30 1	0	0	0	180 63
Aug	1981		4	4010	881	306	206	5474	2	0	0	0	0	0	2
	Total	985	1630	84253	16451	10126	5380	98835	471	418	178	102	24	48	1242
		Orange Citrus sinonsis							Pak choi Brussics chinensis						
MONTH	YEAR	Port Monoby	معا	Was	Keinente	Genta	Mt Hegen	Total	Port Moreeby	معا	Waa	Kainantu	Geraius	Mt Hagen	Total
J.	1979	•	102	22	•	4	0	195	138	40	462	83	83	0	786
Aug Sap	1878 1879	0 missing data	24	10	2	28	0	67	114 90	12 5	86 15	1 <b>89</b> 104	18 12	0	200 145
Oet	1979	rrissing data	1	22	0	0	0	23	50 92	13 122	32 129	81 129	0 67	4	1 1 3 4 3 2
Nev Dec	1079 1079	•	0	7	ŏ	0	•	15	41	1	852	126	97	•	1051
Jen Feb	1980 1980	•	35 77	27 13	0	200 163	16 172	278 430	223 103	2	340 333	254 180	67 21	0 2	852 554
Mar	1980	0	138	48	5	4	•	198	192	5	603	201	7	0	810
Apr May	1980 1960	22 0	73 284	24 122	10 35	6 81	38 0	182 521	200 - 187	0	418 380	121 147	51 4	0	702 620
n.	1980		397	134	45	51	9	733 843	284 298	0 0	313 230	123 128	11 2	19 0	652 543
اسد وسک	1980 1980	452 392	300 33	20 43	66 43	•	0	511	298	17	342	108	1	109	818
Sep	1980	<b>8</b> 1 11	0 2	0	13 0	0 2	28 0	122 15	125 44	11 48	451 208	270 227	163 41	20 20	779 486
Oct Nov	1980 1980	0	5	12	31	17	2	66	142	38		215	22	2	310
Dec Jan	1980 1981	0 38	15 14	4	4	0 0	0	23 53	325 81	0	70 277	71 35	35 48	0 4	438 429
Feb	1981	85	21	10	1	22	0	119	177	0	140	35	2	0	321
Mer Apr	1981	12 101	35 64	108 18	18	0 25	5 4	177 225	358 247	•	121 183	4 2	0	0 3	479 421
May	1981	106	232	55	62	18	0	473	233	0	102	13	0	0	336
مىل لىل	1981 1981	248 88	0 18	46 101	0	34 12	0 14	328 213	02 253	8 21	82 159	48 58	17 20	0 46	217 525
Aug	1961	12	4	29	0	0	0	45	287	3 351	101 6530	1087 3997	9 794	78 305	467
	Total	1713	1932	\$77	362	867	303	5854	4656	331	9290	300/	/ • •	303	13340

Table 20. Monthly purchases (kg/week) of leek, lemon/lime, lettuce, mandarin, orange and pak chol by the Food Marketing Corporation for six buying centres, July 1979 to August 1981 (Source: FMC purchase records)

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Table 21. Monthly purchases (kg/week) of parsley, passionfruit, pawpaw, pineapple, potato and pumpkin fruit by the Food Marketing Corporation for six buying centres, July 1979 to August 1981 (Source: FMC purchase records)

•		Passiey Petersinum	eriepuern		•		-		Passioniru Passilon es		<b>4</b>				
HTNOM bl	<b>YEAR</b> 1979	Part Manada	۔ معا ر 0	<b>Wee</b> 13	Kainanta 18	, Gereka	Mt Hage	in Total 31	Post Moreel		• Wa	e Kainante	Goraha	Teta	
Aug Sup	1879 1979	•	•	13	10 14	•	•	20 21	minaing dat	•	•	0	1	1	
Out Nev	1070 1079	2	1 2	•	25 23	•	1	46 47	missing dat 0	•	•	•	0	0	
Des Jan	1979 1980 1980		5	14 18 15	24 26 4	10 21 7	0 0 0	58 65 27	•	0 2 5	9 30 336	0 4	0 0 007	0 52	
Feb Mar Apr	1986		•	15	30	10	•	70 25	•	4	327 140	11	2347 621	909 2688 785	
Ney Jan	1000		•	15 18	18 13	3	0	35 33	4	2	7	4	<b>5</b> 4	70	
hi. Aug	1980 1988	•	•	24 20	14 10	4	0	42 42	•	•	•	•	0	0	
Sep Oet	1000	•	•	20 20	14	21 20	•	63 60	•	•	•	0	•	•	
Nev Due Jan	1988 1988 1981	•		18 30 20	6 6 14	12 27 31	3	40 71 73		•	• 3 2	•	2 0 3	2	
	1941			23 11	13	11	0	47	1	3 5	13	•	910 471	835 506	
Apr May	1861 1861	40 3	:	15 37	3	3 2	•	66 46	4	•	•	3 1	171 10	178 10	
at. ht	1961 1961	•	•	20	3	•	•	24 45 37		•	•	•	0	•	
Aug	1981 Total	1 67	•	33 543	2 325	1 222	•	1105	25	0 40	0 842	• •5	0 5196	0 6208	
		Panpan Cadao papaya							Pineappie Ananas asmas						
MONTH Jul	<b>YEAR</b> 1979	Pert Menaby 201	Lao 306	Www 20	Kainantu O	Gerein 37	Mt Hagan 0	Total 731	Pest Manaday 1	2 Las	Was B	Kainantu 43	Gereine 30	Mt Hagan O	Total 84
Aug Sup Cut	1070 1070 1070	300 missing data missing data	190	54	٠	44	1	630	•	٠	\$7	23	1	\$	92
Nev	1878	100	258 107	40 40	•	19 24	•	488 385	0 267	282 19	250 287	52 30	30 13	38 82	<b>44</b> 1 <b>44</b> 7
Jan Feb	1980 1980	<b>224</b> 117	223 84	20 44	0 27	15 27	0 7	488 307	220 200	4	184 72	332 92	270 134	225	1215 547
Mer Apr	1980 1980	314 010	110 210	66 29	•	24	•	518 884	46	2	150 24	37 27	106 12	82 41	423 27 1
May Jan Ja	1000 1000 1000	527 470 1034	266 233 226	42 31 47	3	15 13 22	•	875 747 1320	47 35 221	0	0 2 22	37 4 19	0 10 0	43 0 0	127 51 243
Aug Sep	1980	343 332	241 111	84 18	•	54 90	•	733	871 110	2	24 84	20 14	0	1 33	925
Oet Nev	1000	582 885	148 229	20 32	•	32 10	•	790	1027 805	5 114	44 87	17 62	27 13	55 19	1174 1158
Dee Jan Feb	1999 1991 1991	430 276 179	201 104 125	18 17 27	3	2 4	1	656 464 327	1196 581 399	114 25 11	147 198 88	72 0 5	23 49 154	211 42 36	1785 875 882
Mar Apr	1961	170 237	190	30 1	•	7	•	403	658 107	16	50	12	27	34 40	804 153
May Jun	1981 1981	666 522	102 223	14 26	•	• 2	•	723 773	305 176	•	5 17	3 5	0	10	413
Jul Aug	1981 1981 Total	140 248 8383	50 88 4187	48 49 831	• • 34	0 12 400	•	244 377 1486 1	30 346 7901	500	1 70 1846	\$ 15 951	0 0 962	0 0 1922	45 439
		Potato			•		•	I	Pumpkin Iruit					1444	13360
MONTH	YEAR	Pert Merceby	Lao	Was	Kainantu	Gersha i	Mt Hegen	Total	Post Moresby	Las	Wex	Kainantu	Goreka	Mt Hegen	Total
Jul Bug	1879 1979	•	32 100	18 27	5 64	28 39	257 1183	340 1482	858 88	200 165	190 400	2	38 50	23	1384 809
Sep Cet Nev	1979 1979 1979	• 0 17	93 241 70	50 40 23	21 45 31	284 189 338	843 2960 4725	1201 3407 5202	missing data missing data 55	47	120	•	•	0	
Dec	1879	• 7	111 256	71 103	92 214	34	3078 7083	3045	1520 1400	328 132	134	10 196	255 647	18	222 2267 2860
Feb Mar	1980	•	247 1350	01 43	240 2107	576 2482	7980 8374	0100 14421	1174 1022	26	300 485	164 160	231 70	4	1808
Apr May	1980 1980	40 22	78 132	80 57	330 112	1 <b>625</b> 221	4035 859	7100 1203	504 683	130 88	188 87	80 84	102 33	0	1103 960
مەل لىل	1980 1980	25 0	97 94	80 45	52 20	140 192	809 14	1202 337	4090 1728	272 201	92 60	52 9	60 38	42 0	4007 2696
Aug Sep	1980 1980	0	70 237	16 28	25	511 305	451 2313	1056 2968	1534 1042	543 418	82 180	0 18	95 41	43	2287 1898
Oct Nev Des	1980 1980 1980	0 0 12	428 904 46	45 4	202 333 140	5 934 127	4926 4740 9	5569 8956 340	1012 627 572	461 766 146	91 98 152	30 199 30	51 113 40	25 138 36	1870 1942 877
Jan Feb	1980 1981 1981	20	8181 1110	50 •	147	203 420	1778 2977	10379 4961	415 1482	153 70	145	30 7 43	40 40 103	30 4 71	077 764 1077
Mar Apr	1981	40 28	2740	46 25	48 84	250 172	3850 1705	8987 2258	1676 556	98 173	133 42	4 <b>8</b> 10	78 11	133	2160 791
May Jun	1981 1981	22 3	158 82	70 13	210 60	12 37	1790 2886	2262 3061	1095 1490	277 248	4 <b>5</b> 35	4 30	4 3	0 16	1426 1826
Jd guð	1981 1981	0	55 534	13 32	141 105	12 27	1941 297	2162 994	1867 1098	50 668	25 23	10 0	15 30	2 0	1988 1824
	Total	230	17712	1071	5348	8788	73179	107336	28307	5838	3741	1120	2149		41821

Table 22. Monthly purchases (kg/week) of Queensland blue pumpkin, radish, rhubarb, rockmelon, silverbeet and spring onion by the Food Marketing Corporation for six buying centres, July 1979 to August 1981 (Source: FMC purchase records)

		Pumpidn tri Cusulaite ma		i bnelane	blue)				Recteh Anphanus an	tnu					
MONTH	YEAR	Post Moreals	y <sup>.</sup> Lao	Was	Kainantu	Gereka	Mt Hager	. Total	Part Mercek		Wex			Mt Hag	en Telel
Jd Aug	1070 1078	•	•	51	•	13	•	64	•	4	5	1 0	•	• 12	24 24
Sup Out	1878 1979	missing data missing data	•						1	•	1 2	•	1	<b>a</b> 0	11
Nev Des	1979	•	:	• 54	•	3 11	0 18	•	•	•	* 5	3 1		0	12
Jun	1980	ě	•	•	Ō	•	•	•	•	0	3	2	Ū	ō	14 5
Feb Mar	1999 1999	•	•	•	0	•	•	•	1	0	● 7	2 5	• 0	0	17 10
Apr May	1000	•	:	•	•	<b>0</b> 11	0	0 21	₿ 7	2	5 10	•	4	0	23 22
است. البتار	1988		•	:	5	75 13	0	85 15	•	• 2	2	•	3	0	16
Aug	1988	•	4	12	Ō	6	Ō	22	•	ē	14	1	0	0	e 21
Sep Out	1940 1940	•	:	5	•	•	0	11	• 11	12	4	3	<b>6</b> 1	0	24 23
Nev Dec	1988	0 184	• 347	27	0	•	0 53	e 425	7	0	4	3	0	0 2	13 18
Jan Feb	1961	17	•	66 19	35 •	58	•	187 18	3 13	•	20 1	•	1		30
Mar	1981	٠	•	•	٠	•	0	0	10	44	0	1	0	Ō	14 64
Apr May	1981 1981	•	•	•	2	•	0 20	2 21	34 9	0	1	2	5	0 4	42 16
نمد. اند	1981 1961	•		•		•	79 0	70 0	13 5	0	0 15	4	4	0	21 32
Aug	1981	0 207	25 377	200	215	13 215	0 178	253 1501	40 194	0 77	9 143	0 63	e 33	•	57
	Tetal	Rhuberb	•//	~~~	204	219		1901	Recimelon		143	•3	33	54	570
		Aharm shapen	íam						Commis male						
HTMOM	YEAR 1070	Post Moreeby	<b>مع</b> ا •	<b>Wau</b> 41	Kainantu B	Gereka 0	Mt Hagen 0	Total 57	Part Manuaby 0	<b>لەت</b> 1	Wee	Gerein. Ø	Tetal 0		
Aug Sep	1879 1879		15	• 21	18 42	•	•	37 63	0 missing data	0	٥	٠	٠		
Oet	1070	•	i	53 63	10		0	72	missing data 50	0		0	54		
Nev Dec	1979	•	•		20	•	0	101	47	0	35	12	84		
Jan Feb	1 <b>880</b> 1 <b>88</b> 0	•	•	<b>86</b> 141	109 36	5 4	0 15	210 186	186	54 0	0	0	241 0		
Mar Apr	1980 1980	1	33	107 85	41 132	0 1	0	181 217	0	0	•	e 0	•		
May Jan	1980	0	:	80 49	7 21	10 0	•	97 70	65 0	3	•	•	<b>60</b>		
	1980	•	•	37	18	•	0	58	14 16	Ō		Ō	14		
Aug Sep	1980 1980	3 21	•	100 170	51 83	Ō	Ō	182 254	40	12 1955	÷	0	28 1995		
Oet Nev	1988 1988	•		81 72	18 22	•	0	107 04	4 204	1653 1435	•	0	1657 1699		
Dee Jaan	1080 1981	•	;	78 44	4 <b>6</b> 11	13	•	141 56	5 18	301 0	•	0	305 16		
Fab Mar	1981 1981	:	•	38 53	17 17	•	•	53 60	20 0	0	•	•	20		
Apr	1981	•	•	11	3	•	•	14 112		•	40 183	0	40		
May Jun	1981 1981	•	•	38	23	Ō	1	82	•	0	11	0	183 20		
J.I Aug	1981 1981	• 7	•	42 58	8 15	0	0	50 91	•	0	0	0	0		
	Total	45	73	1718	850	44	10	2747	740	5504	270	12	6525	,	
		Silverbeet Bete vulgerie							Spring onion Mium cape ver.						
MONTH	YEAR	Part Manaday	Lao	Wes	Kainanto	Gereks I	At Hagen	Total	Port Monaday	Lao	Wes	Keinentu	Geroka	Mt Hegen	Total
Jul Aug	1979 1979	2	3	1 <b>50</b> 145	84 46	30 33	171 1 <b>93</b>	4 <b>66</b> 435	11 10	20 27	0 13	•	21 155	3	82 209
Sep	1979	•	•	210	32	10 17	14 2	271 233	10 32	12 29	59 70	0 25	173	1	262
Oet Nev	1070 1070	0 3	4	137	81	21	26	272	30	10	81	7	137	0	211 273
Dee Jan	1979 1980	2 7	0	181 83	73 85	35 34	15 32	308 250	7 33	13 16	0 36	53 47	153 147	7 2	232 281
Feb Mar	1980 1980	4	2	92 97	30 38	20 15	0 51	148 202	48 31	9 29	40 3	41 267	104 78	2	253 407
Арг	1980	•	0	102	33	•	5	149	78	10	33	53	83	•	283
May Jun	1980 1980	232	7 0	80 84	89 52	36 23	20 9	463 147	199 `37	1 10	88 47	80 39	103 79	23	512 224
امد وسک	1980 1980	9 55	0 12	34 42	52 95	7	2 15	104 221	87 81	2	38 30	44 37	35 82	0 ▲	206 223
Sep	1980	26 179	16	33	53	0 5	43 35	179 392	17	11	51	12	72 45	5	167
Oct Nev	1980		0	50	105	20	53	331	20	10	50	54	83	14	203 230
Dee Jan	1980 1981	38 11	23	34 45	152 73	17 13	50 10	313 159	17 51	11 15	01 73	20 58	108 117	7 18	262 332
Feb Mer	1981	3 0	31 1	85 87	32 91	0	0 7	131 186	25 10	12 20	85 88	4 <b>6</b> 41	126 31	0	273
Арг	1981	•	33	35	44	3	11	131	7	7	34	20	•	0	71
May Jun	1981 1981	0 1	13 83	22 38	07 20	9 0	9 25	120 152	10 29	10 23	55 56	26 35	56 31	0	167 173
امد وسک	1981 1981	5	96 213	74 142	97 139	4	50 60	333 564	44 34	12 20	35 83	24 21	36 43	1	152 181
	Total	881	508	2319	1788	376		8657	1014	386	1231	1134	2134	109	6004

Table 23. Monthly purchases (kg/week) of sweet potato, tomato, watermelon and zucchini by the Food Marketing Corporation for six buying centres, July 1979 to August 1981 (Source: FMC purchase records)

		Sweet pola Ipomoce betw							Tomalo Lyceponicen	eeculenty	-				
MONTH	YEAR	Port Moreeby	معا	Wes	Kainantu	Goroica	Mt Hager		Pert Merceby		Was	Kainantu	Gereka	Mt Hegen	Telei
<b></b>	1979	2825	1941	348	29	326	0	5469	870	64	2192	142	105	3	3378
Aug	1979	888	2100	345	48		0	3548	000	136	2180	183	56	96	3350
Sep Out	1878 1979	2132	1723	1230 1359	0 10	1557 1277	0	6641 7865	1450	330 254	2012 2242	188 223	93	60	\$032
Nev	1070	2267	457	1641	44	1700	ő	4317	304	111	2032	115	120 43	137 42	4175
Dee	1979	2185	849	1502	4	293	0	4872	675	41	2106		101	24	2648 3037
Jan	1940	1172	2133	1110	34	196	ō	4451	423	11	2382	194	78	63	3151
Feb	1980	1200	3234		0	159	0	5376	376	13	1077	638	328	44	2377
Mer	1980	2460	2001	2188	121	149	0	7530	285	243	2446	1328	756	5	5063
Apr	1999	3771	810	1675	47	408	0	6716	841	27	2008	346	187	0	3466
May	1980	0052	1782	822 708	187 23	727	38	10187	805 55	111	1208 1314	149	138	18	2420
Jun .	1980	5000 7800	3145 1950	553	23	777		11201	2554	121	1314	265	137 77	25 87	1780
Jd Aug	1980	5847	2147	254	395	810		8454	1375	31	1753	348		80	4363 3706
5.0	1986	2135	713	120	739		ō	4405	737	449	1948	384	42	20	3500
Oet	1980	1426	1543	125	768	229	0	4004	1181	521	2055	307	10	31	4165
Nev	1980	3201	774	186	761	167	0	\$150	1072	186	2374	375	30	396	4436
Dee	1988	1848		11	103	107	0	2530	830	130	2026	370	49	130	3550
Jun	1981	1023	1195	51	106	03	0	2438		324	1367	317	104	24	2233
Feb Mar	198 1 198 1	2141 271	1801 2228	246 64	76	21 81	0	4376 3041	<b>00</b> 271	831 1882	1301	418 348	57 10	35	2792
Aer	1001	2511	1502	100	34			4337	476	594	4474	139	80	45 26	5086 6371
	1961	0554	2047	384	114	108	ě.	9241	306	771	1505	80		18	2062
, and the second se	1981	7556	2975	218	84	496	ŏ	11331	282	3745	580	42	•		4475
J	1981	2656	1225	86	21	280		4176	220	2756	519	76	20	•1	3490
Aug	198 1		1370	50	3	323	0	8355	900	2055	1137	151		28	4425
	Tetal	86241	45643	16255	4154	11717	38	163647	18816	15002	50886	7516	2880	1557	86757
		Watermelon Citudus Innova							Zucchini Cucubita papa s	ver, medu	fices				
MONTH	YEAR	Claubus Janatus Part Manaday	Lao	Wes	Kainentu	Geroin	Mt Hagen	Total	Cucurbits pape : Part Mereeby	Lao	Wes	Kainantu	Goraka	Mt Hagen	Total
м	1070	Claudus Innotus Part Massalay 0		Was 1	Kainantu O	Gorala O	Mt Hagen O	Total 11	Cucurbits pape : Port Mereeby 0	Lao O	Wex 290	•	0	50	356
Jul Aug	1979 1979	Climitus Innotus Part Messalay e missing data	Lao						Cucurbits pape 1 Port Merceby 0 0	Lao 0 0	Wes 200 103	•	0	54 64	356 183
Jul Aug Sep	1070 1070 1079	Claudus Inness Pert Messaby e rrissing data missing data	Lao 10	1	•	0	0	11	Cucuidita pape : Port Moresby 0 0 21	Lan 0 0 0	Wau 200 103 80	• 4 0	0 0 1	56 66 22	356 103 132
Jul Aug Sep Oct	1979 1979	Climitus Innotus Part Messalay e missing data	Lao						Cucurbits pape 1 Port Merceby 0 0	Lao 0 0	Wes 200 103	•	0	56 60 22 0	366 103 132 05
Jul Aug Sep	1070 1670 1679 1079	Claudice Inneter Part Manaday Princing data missing data 21	Lao 10	1 30	•	0	0	11	Cucurbits pape : Post Merceby 0 21 16	Lao 0 0 0	Wau 200 103 80 23	• 4 0	0 0 1 20	56 66 22	356 103 132
Jul Aug Sep Oct Nev Dec Jun	1070 1670 1670 1070 1670 1670 1670	Claudian January Port Manaday e mining data 21 146 321 1276	Lao 10 473 671 274	1 39 0 7 32	0 0 21	0 31 0	0 0 0 0	11 650 1010 1506	Cuculdia pape 1 Port Merceby 0 21 16 70 47 0	0 0 0 0 0 0 0 0	Wax 200 103 80 23 23 21 22	0 0 1 1	0 1 20 5 20 27	50 80 22 0 10 90 29	366 103 132 05 110
Jul Aug Sep Oct Nev Des Jan Feb	1979 1979 1979 1979 1979 1979 1980 1980	Claudian lanasar Port Manaday minning data minning data 21 148 321 1270 1180	Lao 10 473 671 274 631	1 39 9 7 32 100	9 0 21 8 9	0 31 0 6 20	0 0 0 0 0	11 650 1010 1506 1031	Cucutitis pape ( Post Moreaby 0 21 16 70 47 0 0	<b>0</b> <b>0</b> <b>0</b> <b>0</b> <b>0</b> <b>0</b> <b>0</b> <b>0</b> <b>0</b>	Wau 200 103 00 23 23 21 22 57	8 4 9 1 9 1 7	0 1 20 5 20 27 6	54 84 22 0 10 90 29 60	356 193 132 65 110 180 70 130
Jd Aug Sep Oct Nov Dec Jan Fdo Mar	1070 1070 1070 1070 1070 1070 1070 1000 1000	Claudus known Part Mensaby e missing data 21 148 321 1278 1180 848	Lao 10 473 671 274 631 0	1 9 7 32 100 3	9 0 21 8 9 0	0 31 0 8 20 7	0 0 0 0 0 4 1	11 148 659 1019 1596 1831 1097	Constituti pape 1 Port Moresby 0 21 16 70 47 0 0 0		Wan 200 103 80 23 23 21 22 57 57 5	8 9 1 1 7 1	0 1 20 5 20 27 6 7	56 66 22 0 10 60 29 60 21	356 193 132 65 110 188 70 130 35
Ja Ag So Os No So So So So So So So So So So So So So	1070 1070 1070 1070 1070 1070 1070 1000 1000 1000	Claudia known Part Merceky erissing data wiceing data 21 146 321 1276 1160 848 100	Lao 10 473 071 274 031 0 100	1 39 9 7 32 100 3 8	0 0 21 8 0 0	0 31 0 5 20 7 0	0 0 0 0 0 4 1 0	11 148 659 1019 1566 1931 1007 349	Consublia pape : Port Manashy 0 21 16 70 47 0 0 0 0 0 0	<b>C</b> <b>C</b> <b>C</b> <b>C</b> <b>C</b> <b>C</b> <b>C</b> <b>C</b> <b>C</b> <b>C</b>	Wan 200 103 80 23 23 21 22 57 5 5 5 5	6 6 1 1 7 1	0 1 20 5 20 27 6 7 4	56 66 22 0 10 90 29 60 21 0	356 103 132 05 110 140 70 130 35 8
34 80 8 8 9 8 8 9 8 9 8 9 8 9 8 9 8 9 8 9	1070 1070 1070 1070 1070 1070 1070 1000 1000	Claudus known Part Mensaby e missing data 21 148 321 1278 1180 848	Lao 10 473 671 274 631 0	1 9 7 32 100 3	9 0 21 8 9 0	0 31 0 8 20 7	0 0 0 0 0 4 1	11 148 659 1019 1596 1831 1097	Constituti pape 1 Port Moresby 0 21 16 70 47 0 0 0		Wan 200 103 80 23 23 21 22 57 57 5	8 9 1 1 7 1	0 1 20 5 20 27 6 7	56 66 22 0 10 60 29 60 21	356 193 132 65 110 188 70 130 35
Ja Ag So Os No So So So So So So So So So So So So So	1078 1679 1679 1679 1679 1679 1660 1860 1860 1860	Citable Ansatz Port Monoday mining data 21 146 321 1270 1100 848 100 063	Les 10 473 671 274 631 6 180 415	1 39 9 7 32 100 3 0 4	0 0 21 0 0 0 0	0 31 0 5 20 7 0 0	0 0 0 0 4 1 0 0	11 148 659 1019 1596 1931 1097 349 1063	Conside pape ( Pert Marcaby 0 0 21 10 70 47 0 0 0 0 0 0 0 0 0 0 0 0 0		Wm 200 103 80 23 23 21 22 57 5 5 5 5 7	8 8 1 9 1 7 1 8 8	0 1 20 5 20 27 6 7 4 1	56 80 22 0 10 90 29 60 21 0 11	356 183 132 65 110 186 78 130 35 8 19
	1979 1979 1979 1979 1979 1979 1979 1979	Charles known Part Manually e relating data 21 146 321 1270 1100 640 100 665 605 605 82 14	Lao 10 473 671 274 631 8 180 415 92 307 210	1 39 7 32 100 3 0 4 1	0 0 21 8 0 0 0 0 0 0 0 0 0	0 31 0 8 20 7 0 0 0 0 0	0 0 0 0 41 0 0 0 25	11 148 659 1019 1584 1931 1007 349 1063 698 450 249	Coondrifts pape 1 Port Moreoday 0 21 10 21 10 47 0 0 0 0 0 0 0 0 0 0 0 0 0	Lan 0 0 0 0 0 1 0 0 1 54	Waa 200 103 80 23 21 22 57 5 5 7 14 1 104	8 8 1 9 1 9 1 8 9 8 9 9 1	0 1 20 5 20 27 6 7 4 1 0 3 0	56 64 22 0 10 90 29 60 21 0 11 3 0 3	356 103 132 05 110 140 70 130 35 8 19 17
Ji Asp Oliv Da So Hot Sa Sa Sa Sa Sa Sa Sa Sa Sa Sa Sa Sa Sa	1979 1979 1979 1979 1979 1979 1980 1980 1980 1980 1980 1980 1980	Charles Ansatz Port Manaday missing data 21 146 321 1276 1100 540 100 603 600 82 14 120	Lao 10 473 671 274 631 80 415 92 307 210 10	1 39 7 32 100 3 0 4 0 1 0 2	0 21 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 31 0 6 20 7 6 0 8 0 8 14	0 0 0 0 4 1 0 0 0 25 0	11 148 659 1019 1584 1931 1067 349 1063 698 450 249 182	Conside page 1 Port Moreceby 0 21 16 70 47 0 0 0 0 0 0 0 0 0 0 0 0 4 0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0	Lan 0 0 0 0 0 1 0 10 54 347	Waa 200 103 00 23 23 21 22 57 5 5 5 5 7 14 104 132	8 9 1 7 1 6 8 9 1	0 0 20 5 20 27 6 7 4 1 0 3 0 0	56 66 22 0 10 90 20 60 21 0 11 3 0 3 54	256 103 132 85 110 140 70 130 35 8 19 17 26 102 574
34 89 80 80 80 80 80 80 80 80 80 80 80	1979 1979 1979 1979 1979 1980 1980 1980 1980 1980 1980 1980 198	Citable Ansatz Port Manaday o missing data missing data 21 146 321 1270 1180 840 100 805 82 14 129 70	Lao 10 473 671 274 631 6 100 415 92 307 210 10 1001	1 39 9 7 32 100 3 0 4 9 1 9 2 500	6 0 21 6 0 6 0 6 0 0 0 0 0 0	0 31 0 8 20 7 0 0 0 0 0 14 8	0 0 0 0 4 1 0 0 0 25 6 6	11 148 659 1019 1596 1931 1067 349 1063 698 450 249 162 2270	Conside page 1 Port Morecely 0 21 16 70 47 0 0 0 0 0 0 0 0 0 0 0 0 0	Las 0 0 0 0 0 0 1 0 0 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0	Www 200 103 80 23 23 21 22 57 5 5 5 7 14 1 104 132 256	6 6 1 1 7 1 6 6 9 1 1 1	0 0 1 20 5 20 27 6 7 4 1 0 3 0 8 102	56 60 22 0 10 90 29 60 21 0 11 3 54 340	256 103 132 05 110 146 70 130 36 8 19 17 28 162 574 467
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34 89 80 80 80 80 80 80 80 80 80 80 80	1979 1979 1979 1979 1979 1980 1980 1980 1980 1980 1980 1980 198	Citable Ansatz Port Manaday o missing data missing data 21 146 321 1270 1180 840 100 805 82 14 129 70	Lao 10 473 671 274 631 6 100 415 92 307 210 10 1001	1 39 9 7 32 100 3 0 4 9 1 9 2 500	6 0 21 6 0 6 0 6 0 0 0 0 0 0	0 31 0 8 20 7 0 0 0 0 0 14 8	0 0 0 0 4 1 0 0 0 25 6 6	11 148 659 1019 1596 1931 1067 349 1063 698 450 249 162 2270	Conside page 1 Port Morecely 0 21 16 70 47 0 0 0 0 0 0 0 0 0 0 0 0 0	Las 0 0 0 0 0 0 1 0 0 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0	Www 200 103 80 23 23 21 22 57 5 5 5 7 14 1 104 132 256	6 6 1 1 7 1 6 6 9 1 1 1	0 0 1 20 5 20 27 6 7 4 1 0 3 0 8 102	56 60 22 0 10 90 29 60 21 0 11 3 54 340	366 163 132 65 146 76 130 35 8 19 17 26 162 574 667 1378 323
Jul Aug Sep Oct Nev Den Feb Mer Jun Jun Jun Jun Sep Out Nev Des	1979 1979 1979 1979 1979 1979 1980 1980 1980 1980 1980 1980 1980 198	Checker known Port Mannahy minning data 21 146 321 1276 1100 849 100 603 605 62 14 125 76 100 629	Lao 10 473 473 473 631 6 307 415 92 307 210 10 100 100 100 1172	1 39 9 7 32 100 3 0 4 0 1 1 9 2 500 8 9	0 21 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 31 0 20 7 0 0 0 0 0 14 0 14 0 35	0 0 0 0 41 0 0 0 25 0 0 0 0	148 659 1506 1506 1931 1003 696 450 249 162 2270 1400	Conside page 1 Port Moreceby 0 21 16 70 47 0 0 0 0 0 0 0 4 0 0 4 0 0 4 0 0 0 0 0 0 0 0 0 0 1 0 0 1 0 0 21 1 0 0 0 21 1 0 0 0 21 1 0 0 0 0 21 1 0 0 0 0 0 0 0 0 0 0 0 0 0	Las 0 0 0 0 0 0 1 0 54 347 40 316 154	Week 200 103 80 23 23 21 22 57 5 5 7 14 1 1 132 256 220 00	6 6 1 1 7 1 6 6 1 1 6 1 1 5 1 1	0 1 20 5 20 27 6 7 4 1 0 3 0 102 114 5	56 66 22 0 10 90 20 60 21 0 11 3 0 3 54 346 706 54	256 103 132 05 110 140 70 130 35 0 130 35 0 19 19 19 102 574 007 1378
Ji Age Otive Ja Ferrary Ja Age Otive Ja Ferrary Ja Age Otive Ja	1979 1979 1979 1979 1979 1979 1980 1980 1980 1980 1980 1980 1980 198	Choke basis Port Mennedy missing data 21 144 321 1276 1100 540 100 603 605 622 14 126 70 100 629 677 622	Lao 10 473 274 631 6 180 415 92 307 210 18 1401 1200 1172 1200 721 1055	1 39 7 32 100 3 0 4 0 1 9 2 2 560 8 9 22 10 9	0 21 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 31 0 6 20 7 0 0 0 0 0 0 0 0 14 6 35 0 0 0 0	0 0 0 0 0 41 0 0 0 25 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	11 148 650 1010 1506 1007 340 1007 340 1007 340 1007 140 2270 1420 2270 1446 1007 1506 1007 1506	Conside page 1 Port Moreceby 0 21 16 70 47 0 0 0 0 0 0 0 41 0 14 0 14 0 14 0	Las 0 0 0 0 0 0 1 0 0 1 0 0 1 5 4 0 3 1 5 4 0 0 1 5 4 5 4 5 6 0 0 0 0 0 0 0 0 0 0 0 0 0	Wess 290 103 23 23 21 22 57 5 5 5 7 14 1 104 132 260 00 320 126 8	6 6 1 1 7 1 6 6 1 1 6 1 1 6 1 1 6 1 1 6 1 1 6	0 0 1 20 5 20 27 6 7 4 1 0 3 0 102 114 5 10 5	56 64 22 0 10 29 60 21 0 11 3 0 34 54 700 54 18	256 103 132 05 110 146 70 130 36 8 19 17 28 192 574 067 1378 323 3360
Ji Ang Soti ve Ja Ferrariy Ja Ang Soti ve Ja Ferrariy Ang Nove Ja Ferrariy Ang Nove Ja Ferrariy Ang	1979 1979 1979 1979 1979 1979 1970 1980 1980 1980 1980 1980 1980 1980 198	Citable Ansatz Port Manaday o mining data mining data 21 144 1270 1100 040 100 040 100 040 100 040 100 040 100 040 100 040 100 040 100 040 100 040 100 040 100 040 100 040 04	Lao 10 473 473 274 431 274 431 409 415 92 307 210 1641 1200 1172 1200 721 1200 721 1200 721 132	1 30 7 32 100 3 0 4 0 1 1 2 500 8 0 22 10 0 0	0 21 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 31 0 6 20 7 0 0 0 0 0 0 14 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 4 1 0 0 0 0 2 5 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	11 148 659 1018 1596 1596 1591 1593 1693 656 249 1495 2270 1440 1997 1697 1697 1697 1697	Conside page 1 Pert Merceby 0 21 16 70 47 0 0 0 0 0 0 0 0 0 0 0 0 0	Las 0 0 0 0 0 0 0 0 0 0 0 0 0	West 200 103 23 23 21 22 57 5 5 7 14 1 104 132 200 08 220 08 320 126 8 3	6 6 1 1 7 1 6 6 1 1 1 5 1 1 1 1 1 1 6 1 1 0	0 0 1 20 5 20 27 6 7 4 1 0 3 0 102 114 5 10 5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 5 5 5 5 5 5 5 5 5 5 5 5	56 64 22 0 10 29 60 21 0 11 3 54 340 700 54 18 17 11 16	256 103 132 05 110 146 70 130 36 9 17 26 167 17 26 167 17 328 329 340 143 24 173
Ji Jago Otto Jaco Jaco Jaco Jaco Jaco Jaco Jaco Jac	1979 1979 1979 1979 1979 1960 1960 1960 1960 1960 1960 1960 196	Clocks bases Part Mensaly e missing data 21 148 321 1270 148 948 100 045 606 82 14 129 76 14 129 76 607 607 607 607 607 607 607	Las 10 473 471 274 631 8 100 415 52 307 210 10 104 1200 1172 1200 1172 1200 1172 1200 1172 1205 54	1 30 7 32 100 3 0 4 0 1 0 2 5 50 8 0 22 10 0 0 0 0	0 21 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 31 0 6 20 7 0 0 0 0 0 0 0 0 14 0 0 0 0 0 0 0 0 0 0	0 0 0 0 41 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	11 148 659 1010 1546 1047 348 1047 348 1048 2270 1440 1046 1046 1046 1047 1457 1677 466 1333	Coondrine page of Port Moreolary 0 21 16 21 17 0 47 0 0 0 0 0 0 0 0 0 0 0 0 0	Las 0 0 0 0 0 0 1 0 0 1 5 4 0 0 1 5 4 0 0 1 5 4 1 5 4 0 0 1 5 4 1 5 4 1 5 4 1 5 5 5 5 5 5 5 5 5 5 5 5 5	Wmu 200 103 23 23 23 23 23 23 5 5 7 14 1 132 5 6 7 14 132 220 06 320 124 6 3 3 3	6 6 1 7 1 6 6 9 1 1 8 1 1 6 1 1 6 1 1 6 0 1 1 6 0 1 0 0 0 1 0 0 0 0	0 0 1 20 5 20 27 6 7 4 1 0 3 0 0 102 114 5 19 0 5 0 0 0 0 0 0 0 0 0 0 0 0 0	56 60 22 0 90 29 60 21 0 21 0 11 3 54 340 54 16 16	366 163 132 65 110 160 76 130 35 8 19 17 26 574 867 162 574 867 1378 323 300 143 24 173 164
Ja Asp Other Dis Ferries Ja Asp Other Ja Ferries Ja Sot Not Ja Ferries Ja	1979 1979 1979 1979 1979 1979 1960 1960 1960 1960 1960 1960 1960 196	Choke basis Port Mennedy missing data 21 148 321 1276 1180 848 100 603 604 82 14 125 70 100 629 679 622 330 879 565	Lao 10 473 274 631 0 10 415 92 307 210 10 10 10 10 10 10 20 721 10 65 132 754 315	1 30 7 32 100 4 0 1 0 2 550 8 0 22 10 0 0 0	0 21 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 31 0 6 20 7 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 41 0 0 0 25 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	11 148 650 1010 1504 1504 1007 340 1007 340 450 240 2270 142 2270 1440 1007 1607 1607 1607 1607 1607 1607 1607 1607 1607 1607 1608 1607 1608 1607 1606 1607 160	Conside page 1 Port Moreceby 0 21 16 70 47 0 0 0 0 0 0 0 41 0 14 0 14 0 14 0 0 0 0 0 0 0 0 0 0 0 0 0	Las 0 0 0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0	Wmu 290 103 23 23 21 22 57 5 5 5 7 14 1 104 132 366 220 00 020 126 8 3 1 31 31	6 6 1 1 7 1 6 6 1 1 6 1 1 6 1 1 7 1 6 1 1 6 1 1 6 0 0 0 0 0 0 0 0 0 0 0 0	0 0 1 20 5 20 27 6 7 4 1 0 3 0 102 114 5 10 5 0 0 0 0 0 0 0 0 0 0 0 0 0	56 66 22 0 10 20 60 21 0 11 3 0 3 54 340 766 54 16 17 11 16 16 4	366         163         132         65         110         144         76         130         35         8         19         17         26         182         574         647         1378         323         300         143         24         173         164         30
Ja Age Otas Ja Ferrary Ja Age Otas Ja Ferrary Ja	1979 1979 1979 1979 1979 1979 1979 1980 1980 1980 1980 1980 1980 1980 198	Checker known Port Menneday oriening data mineing data 21 144 21 146 321 1276 1100 040 040 040 040 040 040 04	Lao 10 473 471 274 431 409 415 92 307 210 1641 1200 1172 1200 721 1200 721 132 754 315 21	1 39 7 32 100 3 0 4 0 1 1 2 506 8 0 22 10 0 0 0 0 0 0	0 21 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 31 0 5 20 7 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 41 0 0 0 25 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	148 659 1018 1506 1931 1003 696 450 249 1403 696 249 1405 1402 1277 1607 1607 1607 1607 1607 1607 1607 16	Conside page 1 Pert Merceby 0 21 16 70 47 0 0 0 0 0 0 0 0 0 0 0 0 0	Las 0 0 0 0 0 0 0 0 0 0 0 0 0	Wee 200 103 23 23 21 22 57 5 5 7 14 1 104 132 200 08 220 08 320 126 8 3 31 31 31 8	6 6 1 1 7 1 6 6 1 1 6 1 1 6 1 1 6 1 1 6 1 1 6 0 6 0	0 0 1 20 5 20 27 4 1 0 3 0 102 114 5 10 0 5 0 0 0 0 0 0 0 0 0 0 0 0 0	56 64 22 0 10 90 29 60 21 0 11 3 0 34 340 700 54 18 17 11 16 4 73	356         103         132         65         110         144         70         336         8         19         17         26         187         867         1323         380         143         24         173         184         30         620
Ja Asp Other Dis Ferries Ja Asp Other Ja Ferries Ja Sot Not Ja Ferries Ja	1979 1979 1979 1979 1979 1979 1960 1960 1960 1960 1960 1960 1960 196	Choke basis Port Mennedy missing data 21 148 321 1276 1180 848 100 603 604 82 14 125 70 100 629 679 622 330 879 565	Lao 10 473 274 631 0 10 415 92 307 210 10 10 10 10 10 10 20 721 10 65 132 754 315	1 30 7 32 100 4 0 1 0 2 550 8 0 22 10 0 0 0	0 21 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 31 0 6 20 7 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 41 0 0 0 25 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	11 148 650 1010 1504 1504 1007 340 1007 340 450 240 2270 142 2270 1440 1007 1607 1607 1607 1607 1607 1607 1607 1607 1607 1607 1608 1607 1608 1607 1606 1607 160	Conside page 1 Port Moreceby 0 21 16 70 47 0 0 0 0 0 0 0 41 0 14 0 14 0 14 0 0 0 0 0 0 0 0 0 0 0 0 0	Las 0 0 0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0	Wmu 290 103 23 23 21 22 57 5 5 5 7 14 1 104 132 366 220 00 020 126 8 3 1 31 31	6 6 1 1 7 1 6 6 1 1 6 1 1 6 1 1 7 1 6 1 1 6 1 1 6 0 0 0 0 0 0 0 0 0 0 0 0	0 0 1 20 5 20 27 6 7 4 1 0 3 0 102 114 5 10 5 0 0 0 0 0 0 0 0 0 0 0 0 0	56 60 22 0 20 20 20 21 0 21 0 21 0 11 3 54 340 54 16 17 11 16 4 73 95	366         163         132         65         110         144         76         130         35         8         19         17         26         182         574         647         1378         323         300         143         24         173         164         30

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Table 24. Mean monthly price (toea/kg) and standard deviation for aibika, cooking banana, eating banana and common bean at five urban markets, January 1971 to December 1992, in constant 1991 prices

Albika		Abelmoschus	: manihot							
	Rab	aul	Port M	loresby	Ĺ	.ce	Ma	dang	Go	vroka
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
Jan	49.5	14.6	74.9	13.5	36.8	6.8	29.4	5.1	45.2	7.2
Feb	60.2	18.2	71.9	9.5	38.9	6.6	30.0	6.6	45.8	7.2
Mar	61.6	16.4	73.4	10.3	38.0	5.8	30.3	6.2	47.2	8.4
Apr	63.2	20.0	74.8	10.3	39.5	6.4	29.6	<b>5.8</b>	50.1	10.3
May	69.1	18.8	7 <b>8.9</b>	10.7	37.5	6.5	30.1	5.5	50.7	11.0
Jun	71.1	18.0	84.7	14.1	40.8	7.8	33.7	7.3	56.9	15.0
Jul	72.8	20.7	97.6	17.5	41.8	8.1	35.4	8.5	57.0	17.5
Aug	69.4	18.8	97.9	24.3	43.0	10.3	38.9	10.1	66.2	28.9
Sep	62.5	16.4	95.5	19.2	44.8	7.3	45.3	18.3	82.4	36.1
Oct	52.2	8.5	90,1	17.9	45.8	8.0	38.0	12.2	67.1	32.6
Nov	53.3	13.9	84.2	15.0	41.7	6.5	33.1	6.3	64.3	34.1
Dec	48.2	10.4	83.4	16.8	42.8	8.1	30.9	6.0	60.3	43.5
		10.4	<b></b>	10.0	-2.0	0.1	00.7	0.0	00.5	43.5
Cooking t	~~~~	Musa cvs								
	Rabo		Port Me	orestov	10	<b>)e</b>	Moo	iang	Gon	oka
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
Jan	31.2	8.6	63.8	11.7	29.6	6.0	25.1	5.1	83.8	28.7
Feb	33.1	11.6	71.6	17.2	28.8	5.1	22.5	3.2	81.4	
Mar	35.1	12.0	76.4	18.9	30.2	5.0	22.5	3.2 2.8	74.9	21.3
	32.6	12.5	75.7	19.7	31.1	5.0	21.8	2.8	74.9 84.1	18.7
Apr	34.2		75.1	18.3	31.4	5.3	21.8	2.1		31.2
May	34.∠ 33.1	11.1 11.5	73.7	13.3	33.1	5.5 6.4	23.2 22.9	2.3 3.2	81.3 85.4	23.7
Jun			73.0	15.5	32.7	6.5	23.4	3.2 3.3		33.7
Jul	35.5	13.9	73.0	13.5	31.7	6.3	23.4 24.4	3.3 4.9	87.1	32.2
Aug	35.0	11.2		12.4	31.7	5.2	24.4 25.6		87.8	23.4
Sep	35.7	14.1	73.4			5.2 5.9		6.6	83.9	24.8
Oct	35.3	14.7	71.9	12.4	35.2		24.7	6.2	89.4 85 0	27.7
Nov	36.4	15.4	71.5	12.8	31.4	4.9	24.2 25.1	4.1	85.0	24.7
Dec	37.1	12.6	69.9	12.6	32.2	3.2	23.1	4.9	89.3	31.0
		· · · · · · · · · · · · · · · · · · ·								
Catlas has										
Eating ban		Musa cvs	Port Mo	voshv	10	A	Mod		Com	ka
Eating ban	Raba	ul	Port Mo	•	La	-	Mad		Goro	
•	Raba Mean	ul St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
Jan	Raba Mean 27.1	ul St. Dev. 4. 1	Mean 41.6	St. Dev. 8.1	Mean 33.6	St. Dev. 7.1	Mean 28.2	St. Dev. 4.2	Mean 69.8	St. Dev. 18.5
Jan Feb	Raba Mean 27.1 27.8	ul St. Dev. 4. 1 4.8	Mean 41.6 46.2	St. Dev. 8.1 11.0	Mean 33.6 34.8	St. Dev. 7.1 8.5	Mean 28.2 28.1	St. Dev. 4.2 6.5	Mean 69.8 69.7	St. Dev. 18.5 18.7
Jan Feb Mar	Raba Mean 27.1 27.8 27.7	ul St. Dev. 4.1 4.8 6.5	Mean 41.6 46.2 50.7	St. Dev. 8.1 11.0 13.7	Mean 33.6 34.8 35.3	St. Dev. 7.1 8.5 5.6	Mean 28.2 28.1 28.5	St. Dev. 4.2 6.5 4.9	Mean 69.8 69.7 65.9	St. Dev. 18.5 18.7 15.5
Jan Feb Mar Apr	Raba Mean 27.1 27.8 27.7 27.2	ul St. Dev. 4. 1 4.8 6.5 4.5	Mean 41.6 46.2 50.7 49.6	St. Dev. 8.1 11.0 13.7 9.9	Mean 33.6 34.8 35.3 36.0	St. Dev. 7.1 8.5 5.6 7.2	Mean 28.2 28.1 28.5 28.5	St. Dev. 4.2 6.5 4.9 5.2	Mean 69.8 69.7 65.9 68.5	St. Dev. 18.5 18.7 15.5 21.6
Jan Feb Mar Apr May	Raba Mean 27.1 27.8 27.7 27.2 28.2	ul St. Dev. 4.1 4.8 6.5 4.5 5.4	Mean 41.6 46.2 50.7 49.6 49.5	St. Dev. 8.1 11.0 13.7 9.9 10.3	Mean 33.6 34.8 35.3 36.0 35.3	St. Dev. 7.1 8.5 5.6 7.2 6.2	Mean 28.2 28.1 28.5 28.5 28.5	St. Dev. 4.2 6.5 4.9 5.2 3.9	Mean 69.8 69.7 65.9 68.5 70.9	St. Dev. 18.5 18.7 15.5 21.6 18.7
Jan Feb Mar Apr May Jun	Raba Mean 27.1 27.8 27.7 27.2 28.2 28.4	ul St. Dev. 4.1 4.8 6.5 4.5 5.4 5.7	Mean 41.6 46.2 50.7 49.6 49.5 47.3	St. Dev. 8.1 11.0 13.7 9.9 10.3 8.5	Mean 33.6 34.8 35.3 36.0 35.3 35.9	St. Dev. 7.1 8.5 5.6 7.2 6.2 8.4	Mean 28.2 28.1 28.5 28.5 28.5 28.5 29.2	St. Dev. 4.2 6.5 4.9 5.2 3.9 5.2	Mean 69.8 69.7 65.9 68.5 70.9 72.9	St. Dev. 18.5 18.7 15.5 21.6 18.7 18.8
Jan Feb Mar Apr May Jun Jul	Raba Mean 27.1 27.8 27.7 27.2 28.2 28.4 29.0	ul St. Dev. 4.1 4.8 6.5 4.5 5.4 5.7 6.6	Mean 41.6 46.2 50.7 49.6 49.5 47.3 47.1	St. Dev. 8.1 11.0 13.7 9.9 10.3 8.5 7.3	Mean 33.6 34.8 35.3 36.0 35.3 35.9 38.3	St. Dev. 7.1 8.5 5.6 7.2 6.2 8.4 9.0	Mean 28.2 28.1 28.5 28.5 28.5 28.5 29.2 30.1	St. Dev. 4.2 6.5 4.9 5.2 3.9 5.2 5.2 5.4	Mean 69.8 69.7 65.9 68.5 70.9 72.9 69.0	St. Dev. 18.5 18.7 15.5 21.6 18.7 18.8 18.2
Jan Feb Mar Apr May Jun Jul Aug	Raba Mean 27.1 27.8 27.7 27.2 28.2 28.4 29.0 30.9	ul St. Dev. 4.1 4.8 6.5 4.5 5.4 5.7 6.6 7.5	Mean 41.6 46.2 50.7 49.6 49.5 47.3 47.1 45.3	St. Dev. 8.1 11.0 13.7 9.9 10.3 8.5 7.3 9.0	Mean 33.6 34.8 35.3 36.0 35.3 35.9 38.3 38.3	St. Dev. 7.1 8.5 5.6 7.2 6.2 8.4 9.0 6.6	Mean 28.2 28.1 28.5 28.5 28.5 29.2 30.1 30.1	St. Dev. 4.2 6.5 4.9 5.2 3.9 5.2 5.4 5.2	Mean 69.8 69.7 65.9 68.5 70.9 72.9 69.0 74.5	St. Dev. 18.5 18.7 15.5 21.6 18.7 18.8 18.2 13.9
Jan Feb Mar Apr May Jun Jul Aug Sep	Raba Mean 27.1 27.8 27.7 27.2 28.2 28.4 29.0 30.9 30.1	ul St. Dev. 4.1 4.8 6.5 4.5 5.4 5.7 6.6 7.5 5.8	Mean 41.6 46.2 50.7 49.6 49.5 47.3 47.1 45.3 47.8	St. Dev. 8.1 11.0 13.7 9.9 10.3 8.5 7.3 9.0 8.5	Mean 33.6 34.8 35.3 36.0 35.3 35.9 38.3 38.3 39.9	St. Dev. 7.1 8.5 5.6 7.2 6.2 8.4 9.0 6.6 7.3	Mean 28.2 28.1 28.5 28.5 28.5 29.2 30.1 30.1 31.5	St. Dev. 4.2 6.5 4.9 5.2 3.9 5.2 5.4 5.2 5.4 5.2 7.2	Mean 69.8 69.7 65.9 68.5 70.9 72.9 69.0 74.5 76.6	St. Dev. 18.5 18.7 15.5 21.6 18.7 18.8 18.2 13.9 15.6
Jan Feb Mar Apr May Jun Jul Aug Sep Oct	Raba Mean 27.1 27.8 27.7 27.2 28.2 28.4 29.0 30.9 30.1 31.4	ul St. Dev. 4.1 4.8 6.5 4.5 5.4 5.7 6.6 7.5 5.8 7.3	Mean 41.6 46.2 50.7 49.6 49.5 47.3 47.1 45.3 47.8 46.3	St. Dev. 8.1 11.0 13.7 9.9 10.3 8.5 7.3 9.0 8.5 10.5	Mean 33.6 34.8 35.3 36.0 35.3 35.9 38.3 38.3 39.9 40.1	St. Dev. 7.1 8.5 5.6 7.2 6.2 8.4 9.0 6.6 7.3 8.0	Mean 28.2 28.1 28.5 28.5 28.5 29.2 30.1 30.1 31.5 30.6	St. Dev. 4.2 6.5 4.9 5.2 3.9 5.2 5.4 5.2 7.2 6.4	Mean 69.8 69.7 65.9 68.5 70.9 72.9 69.0 74.5 76.6 72.7	St. Dev. 18.5 18.7 15.5 21.6 18.7 18.8 18.2 13.9 15.6 15.1
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov	Raba Mean 27.1 27.8 27.7 27.2 28.2 28.4 29.0 30.9 30.1 31.4 31.0	ul St. Dev. 4.1 4.8 6.5 4.5 5.4 5.7 6.6 7.5 5.8 7.3 5.2	Mean 41.6 46.2 50.7 49.6 49.5 47.3 47.1 45.3 47.8 46.3 49.1	St. Dev. 8.1 11.0 13.7 9.9 10.3 8.5 7.3 9.0 8.5 10.5 11.0	Mean 33.6 34.8 35.3 36.0 35.3 35.9 38.3 38.3 39.9 40.1 40.1	St. Dev. 7.1 8.5 5.6 7.2 6.2 8.4 9.0 6.6 7.3 8.0 7.0	Mean 28.2 28.1 28.5 28.5 28.5 29.2 30.1 30.1 31.5 30.6 31.6	St. Dev. 4.2 6.5 4.9 5.2 3.9 5.2 5.4 5.2 7.2 6.4 3.4	Mean 69.8 69.7 65.9 68.5 70.9 72.9 69.0 74.5 76.6 72.7 74.4	St. Dev. 18.5 18.7 15.5 21.6 18.7 18.8 18.2 13.9 15.6 15.1 17.3
Jan Feb Mar Apr May Jun Jul Aug Sep Oct	Raba Mean 27.1 27.8 27.7 27.2 28.2 28.4 29.0 30.9 30.1 31.4	ul St. Dev. 4.1 4.8 6.5 4.5 5.4 5.7 6.6 7.5 5.8 7.3	Mean 41.6 46.2 50.7 49.6 49.5 47.3 47.1 45.3 47.8 46.3	St. Dev. 8.1 11.0 13.7 9.9 10.3 8.5 7.3 9.0 8.5 10.5	Mean 33.6 34.8 35.3 36.0 35.3 35.9 38.3 38.3 39.9 40.1	St. Dev. 7.1 8.5 5.6 7.2 6.2 8.4 9.0 6.6 7.3 8.0	Mean 28.2 28.1 28.5 28.5 28.5 29.2 30.1 30.1 31.5 30.6	St. Dev. 4.2 6.5 4.9 5.2 3.9 5.2 5.4 5.2 7.2 6.4	Mean 69.8 69.7 65.9 68.5 70.9 72.9 69.0 74.5 76.6 72.7	St. Dev. 18.5 18.7 15.5 21.6 18.7 18.8 18.2 13.9 15.6 15.1
Jan Feb Mar Apr May Jun Jul Jul Sep Oct Nov Dec	Raba Mean 27.1 27.8 27.7 27.2 28.2 28.4 29.0 30.9 30.1 31.4 31.0 28.2	ul St. Dev. 4.1 4.8 6.5 4.5 5.4 5.7 6.6 7.5 5.8 7.3 5.2 4.2	Mean 41.6 46.2 50.7 49.6 49.5 47.3 47.1 45.3 47.8 46.3 49.1 45.6	St. Dev. 8.1 11.0 13.7 9.9 10.3 8.5 7.3 9.0 8.5 10.5 11.0	Mean 33.6 34.8 35.3 36.0 35.3 35.9 38.3 38.3 39.9 40.1 40.1	St. Dev. 7.1 8.5 5.6 7.2 6.2 8.4 9.0 6.6 7.3 8.0 7.0	Mean 28.2 28.1 28.5 28.5 28.5 29.2 30.1 30.1 31.5 30.6 31.6	St. Dev. 4.2 6.5 4.9 5.2 3.9 5.2 5.4 5.2 7.2 6.4 3.4	Mean 69.8 69.7 65.9 68.5 70.9 72.9 69.0 74.5 76.6 72.7 74.4	St. Dev. 18.5 18.7 15.5 21.6 18.7 18.8 18.2 13.9 15.6 15.1 17.3
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov	Raba           Mean           27.1           27.8           27.7           27.2           28.2           28.4           29.0           30.9           30.1           31.4           31.0           28.2	ul St. Dev. 4.1 4.8 6.5 4.5 5.4 5.7 6.6 7.5 5.8 7.3 5.2 4.2 haseolus vulga	Mean 41.6 46.2 50.7 49.6 49.5 47.3 47.1 45.3 47.8 46.3 49.1 45.6 xxis	St. Dev. 8.1 11.0 13.7 9.9 10.3 8.5 7.3 9.0 8.5 10.5 11.0 11.3	Mean 33.6 34.8 35.3 36.0 35.3 35.9 38.3 38.3 39.9 40.1 40.1 40.6	St. Dev. 7.1 8.5 5.6 7.2 6.2 8.4 9.0 6.6 7.3 8.0 7.0 6.6	Mean 28.2 28.1 28.5 28.5 28.5 29.2 30.1 30.1 31.5 30.6 31.6 31.0	St. Dev. 4.2 6.5 4.9 5.2 3.9 5.2 5.4 5.2 7.2 6.4 3.4 4.7	Mean 69.8 69.7 65.9 68.5 70.9 72.9 69.0 74.5 76.6 72.7 74.4 67.8	St. Dev. 18.5 18.7 15.5 21.6 18.7 18.8 18.2 13.9 15.6 15.1 17.3 13.4
Jan Feb Mar Apr May Jun Jul Jul Sep Oct Nov Dec	Raba           Mean           27.1           27.8           27.7           28.2           28.4           29.0           30.9           30.1           31.4           31.0           28.2           wean         P           Rabox	ul St. Dev. 4.1 4.8 6.5 4.5 5.4 5.7 6.6 7.5 5.8 7.3 5.2 4.2 Trasectus vulgo J	Mean 41.6 46.2 50.7 49.6 49.5 47.3 47.1 45.3 47.1 45.3 47.8 46.3 49.1 45.6 2015 Port Mor	St. Dev. 8.1 11.0 13.7 9.9 10.3 8.5 7.3 9.0 8.5 10.5 11.0 11.3	Mean 33.6 34.8 35.3 36.0 35.3 35.9 38.3 38.3 39.9 40.1 40.1 40.6	St. Dev. 7.1 8.5 5.6 7.2 6.2 8.4 9.0 6.6 7.3 8.0 7.0 6.6	Mean 28.2 28.1 28.5 28.5 28.5 29.2 30.1 30.1 31.5 30.6 31.6 31.0 Madda	St. Dev. 4.2 6.5 4.9 5.2 3.9 5.2 5.4 5.2 7.2 6.4 3.4 4.7	Mean 69.8 69.7 65.9 68.5 70.9 72.9 69.0 74.5 76.6 72.7 74.4 67.8 Gorok	St. Dev. 18.5 18.7 15.5 21.6 18.7 18.8 18.2 13.9 15.6 15.1 17.3 13.4
Jan Feb Mar Apr Jun Jul Jul Sep Oct Nov Dec Common b	Raba           Mean           27.1           27.8           27.7           27.2           28.2           28.4           29.0           30.9           30.1           31.4           31.0           28.2           ean           Raba           Mean	ul St. Dev. 4.1 4.8 6.5 4.5 5.4 5.7 6.6 7.5 5.8 7.3 5.2 4.2 <b>haseolus vulga</b> JI St. Dev.	Mean 41.6 46.2 50.7 49.6 49.5 47.3 47.1 45.3 47.8 46.3 49.1 45.6 2015 Port Mor Mean	St. Dev. 8.1 11.0 13.7 9.9 10.3 8.5 7.3 9.0 8.5 10.5 11.0 11.3 resby St. Dev.	Mean 33.6 34.8 35.3 36.0 35.3 35.9 38.3 38.3 39.9 40.1 40.1 40.6	St. Dev. 7.1 8.5 5.6 7.2 6.2 8.4 9.0 6.6 7.3 8.0 7.0 6.6 51. Dev.	Mean 28.2 28.1 28.5 28.5 28.5 29.2 30.1 30.1 31.5 30.6 31.6 31.0 Madda Mean	St. Dev. 4.2 6.5 4.9 5.2 3.9 5.2 5.4 5.2 7.2 6.4 3.4 4.7 St. Dev.	Mean 69.8 69.7 65.9 68.5 70.9 72.9 69.0 74.5 76.6 72.7 74.4 67.8 Gorok	St. Dev. 18.5 18.7 15.5 21.6 18.7 18.8 18.2 13.9 15.6 15.1 17.3 13.4 St. Dev.
Jan Feb Mar Apr Jun Jun Jul Aug Sep Oct Nov Dec Common b	Raba           Mean           27.1           27.8           27.7           27.2           28.2           28.4           29.0           30.9           30.1           31.4           31.0           28.2           wean           Rabax           Mean           81.1	ul St. Dev. 4.1 4.8 6.5 4.5 5.4 5.7 6.6 7.5 5.8 7.3 5.2 4.2 <b>haseolus vulgo</b> JI St. Dev. 23.2	Mean 41.6 46.2 50.7 49.6 49.5 47.3 47.1 45.3 47.8 46.3 49.1 45.6 Port Mor Mean 113.3	St. Dev. 8.1 11.0 13.7 9.9 10.3 8.5 7.3 9.0 8.5 10.5 11.0 11.3 resby St. Dev. 20.1	Mean 33.6 34.8 35.3 36.0 35.3 35.9 38.3 38.3 38.3 39.9 40.1 40.1 40.6 Late Mean 81.1	St. Dev. 7.1 8.5 5.6 7.2 6.2 8.4 9.0 6.6 7.3 8.0 7.0 6.6 51. Dev. 22.8	Mean 28.2 28.1 28.5 28.5 28.5 29.2 30.1 31.5 30.6 31.6 31.0 Made Mean 38.8	St. Dev. 4.2 6.5 4.9 5.2 3.9 5.2 5.4 5.2 7.2 6.4 3.4 4.7 St. Dev. 6.2	Mean 69.8 69.7 65.9 68.5 70.9 72.9 69.0 74.5 76.6 72.7 74.4 67.8 Gorok Mean 52.8	St. Dev. 18.5 18.7 15.5 21.6 18.7 18.8 18.2 13.9 15.6 15.1 17.3 13.4 c St. Dev. 12.4
Jan Feb Mar Apr Jun Jul Jul Sep Oct Nov Dec Common b Jan Feb	Raba           Mean           27.1           27.8           27.7           27.2           28.2           28.4           29.0           30.9           30.1           31.4           31.0           28.2           wean           Rabax           Mean           81.1           96.1	ul St. Dev. 4.1 4.8 6.5 4.5 5.4 5.7 6.6 7.5 5.8 7.3 5.2 4.2 <b>haseolus vulgo</b> J St. Dev. 23.2 31.9	Mean 41.6 46.2 50.7 49.6 49.5 47.3 47.1 45.3 47.8 46.3 49.1 45.6 Mean 113.3 116.5	St. Dev. 8.1 11.0 13.7 9.9 10.3 8.5 7.3 9.0 8.5 10.5 11.0 11.3 resby St. Dev. 20.1 19.5	Mean 33.6 34.8 35.3 36.0 35.3 35.9 38.3 38.3 39.9 40.1 40.1 40.6 Lae Mean 81.1 73.8	St. Dev. 7.1 8.5 5.6 7.2 6.2 8.4 9.0 6.6 7.3 8.0 7.0 6.6 St. Dev. 22.8 17.8	Mean 28.2 28.1 28.5 28.5 28.5 29.2 30.1 31.5 31.6 31.6 31.0 Made Mean 38.8 39.5	St. Dev. 4.2 6.5 4.9 5.2 3.9 5.2 5.4 5.2 7.2 6.4 3.4 4.7 St. Dev. 6.2 7.3	Mean 69.8 69.7 65.9 68.5 70.9 72.9 69.0 74.5 76.6 72.7 74.4 67.8 Gorok Mean 52.8 57.5	St. Dev. 18.5 18.7 15.5 21.6 18.7 18.8 18.2 13.9 15.6 15.1 17.3 13.4 ct St. Dev. 12.4 13.7
Jan Feb Mar Apr Jun Jul Jul Sep Oct Nov Dec Common b Jan Feb Mar	Raba           Mean           27.1           27.8           27.7           27.2           28.2           28.4           29.0           30.9           30.1           31.4           31.0           28.2           wean           81.1           96.1           101.3	ul St. Dev. 4.1 4.8 6.5 4.5 5.4 5.7 6.6 7.5 5.8 7.3 5.2 4.2 <b>haseolus vulgo</b> ul St. Dev. 23.2 31.9 34.1	Mean 41.6 46.2 50.7 49.6 49.5 47.3 47.1 45.3 47.8 46.3 49.1 45.6 Mean 113.3 116.5 116.3	St. Dev. 8.1 11.0 13.7 9.9 10.3 8.5 7.3 9.0 8.5 10.5 11.0 11.3 resby St. Dev. 20.1 19.5 17.3	Mean 33.6 34.8 35.3 36.0 35.3 35.9 38.3 38.3 39.9 40.1 40.1 40.6 Kean 81.1 73.8 72.1	St. Dev. 7.1 8.5 5.6 7.2 6.2 8.4 9.0 6.6 7.3 8.0 7.0 6.6 St. Dev. 22.8 17.8 16.3	Mean 28.2 28.1 28.5 28.5 28.5 28.5 29.2 30.1 30.1 31.5 31.6 31.6 31.6 31.0 Maada Mean 38.8 39.5 44.4	St. Dev. 4.2 6.5 4.9 5.2 3.9 5.2 5.4 5.2 7.2 6.4 3.4 4.7 St. Dev. 6.2 7.3 10.1	Mean 69.8 69.7 65.9 68.5 70.9 72.9 69.0 74.5 76.6 72.7 74.4 67.8 Gorok Mean 52.8 57.5 55.6	St. Dev. 18.5 18.7 15.5 21.6 18.7 18.8 18.2 13.9 15.6 15.1 17.3 13.4 St. Dev. 12.4 13.7 11.7
Jan Feb Mar Apr Jun Jul Jul Sep Oct Nov Dec Common b Jan Feb Mar Apr	Raba           Mean           27.1           27.8           27.7           27.2           28.2           28.4           29.0           30.9           30.1           31.4           31.0           28.2           wean           81.1           96.1           101.3           109.6	ul St. Dev. 4.1 4.8 6.5 4.5 5.4 5.7 6.6 7.5 5.8 7.3 5.2 4.2 *********************************	Mean 41.6 46.2 50.7 49.6 49.5 47.3 47.1 45.3 47.8 46.3 49.1 45.6 Mean 113.3 116.5 116.3 114.8	St. Dev. 8.1 11.0 13.7 9.9 10.3 8.5 7.3 9.0 8.5 10.5 11.0 11.3 resby St. Dev. 20.1 19.5 17.3 22.5	Mean 33.6 34.8 35.3 36.0 35.3 35.9 38.3 38.3 39.9 40.1 40.1 40.6 Kean 81.1 73.8 72.1 78.1	St. Dev. 7.1 8.5 5.6 7.2 6.2 8.4 9.0 6.6 7.3 8.0 7.0 6.6 St. Dev. 22.8 17.8 16.3 20.5	Mean 28.2 28.1 28.5 28.5 28.5 28.5 29.2 30.1 30.1 31.5 31.6 31.6 31.0 Mean 38.8 39.5 44.4 51.4	St. Dev. 4.2 6.5 4.9 5.2 3.9 5.2 5.4 5.2 7.2 6.4 3.4 4.7 St. Dev. 6.2 7.3 10.1 6.6	Mean 69.8 69.7 65.9 68.5 70.9 72.9 69.0 74.5 76.6 72.7 74.4 67.8 Gorok Mean 52.8 57.5 55.6 53.8	St. Dev. 18.5 18.7 15.5 21.6 18.7 18.8 18.2 13.9 15.6 15.1 17.3 13.4 St. Dev. 12.4 13.7 11.7 9.8
Jan Feb Mar Apr Jun Jul Jul Sep Oct Nov Dec Common b Jan Feb Mar Apr May	Raba           Mean           27.1           27.8           27.7           27.2           28.2           28.4           29.0           30.9           30.1           31.4           31.0           28.2           wean           81.1           96.1           101.3           109.6           98.8	ul St. Dev. 4.1 4.8 6.5 4.5 5.4 5.7 6.6 7.5 5.8 7.3 5.2 4.2 <b>*********************************</b> 5.2 4.2 <b>************************************</b>	Mean 41.6 46.2 50.7 49.6 49.5 47.3 47.1 45.3 47.1 45.3 47.8 46.3 49.1 45.6 Mean 113.3 116.5 116.3 114.8 126.1	St. Dev. 8.1 11.0 13.7 9.9 10.3 8.5 7.3 9.0 8.5 10.5 11.0 11.3 resby St. Dev. 20.1 19.5 17.3 22.5 22.3	Mean 33.6 34.8 35.3 36.0 35.3 35.9 38.3 39.9 40.1 40.1 40.6 Late Mean 81.1 73.8 72.1 78.1 77.3	St. Dev. 7.1 8.5 5.6 7.2 6.2 8.4 9.0 6.6 7.3 8.0 7.0 6.6 St. Dev. 22.8 17.8 16.3 20.5 22.6	Mean 28.2 28.1 28.5 28.5 28.5 29.2 30.1 30.1 31.5 31.6 31.6 31.6 31.0 Mean 38.8 39.5 44.4 51.4 58.9	St. Dev. 4.2 6.5 4.9 5.2 3.9 5.2 5.4 5.2 7.2 6.4 3.4 4.7 St. Dev. 6.2 7.3 10.1 6.6 15.2	Mean 69.8 69.7 65.9 68.5 70.9 72.9 69.0 74.5 76.6 72.7 74.4 67.8 Gorok Mean 52.8 57.5 55.6 53.8 57.9	St. Dev. 18.5 18.7 15.5 21.6 18.7 18.8 18.2 13.9 15.6 15.1 17.3 13.4 St. Dev. 12.4 13.7 11.7 9.8 13.4
Jan Feb Mar Apr Jun Jul Jul Sep Oct Nov Dec Common b Jan Feb Mar Apr May Jun	Raba           Mean           27.1           27.8           27.7           27.2           28.2           28.4           29.0           30.9           30.1           31.4           31.0           28.2           wean           81.1           96.1           101.3           109.6           98.8           94.5	ul St. Dev. 4,1 4,8 6,5 4,5 5,4 5,7 6,6 7,5 5,8 7,3 5,2 4,2 Thaseolus vulgo J St. Dev. 23,2 31,9 34,1 30,2 28,1 22,9	Mean 41.6 46.2 50.7 49.6 49.5 47.3 47.1 45.3 47.1 45.3 47.8 46.3 49.1 45.6 Mean 113.3 116.5 116.3 114.8 126.1 135.7	St. Dev. 8.1 11.0 13.7 9.9 10.3 8.5 7.3 9.0 8.5 10.5 11.0 11.3 resby St. Dev. 20.1 19.5 17.3 22.5 22.3 29.5	Mean 33.6 34.8 35.3 36.0 35.3 35.9 38.3 39.9 40.1 40.1 40.6 Mean 81.1 73.8 72.1 78.1 77.3 84.8	St. Dev. 7.1 8.5 5.6 7.2 6.2 8.4 9.0 6.6 7.3 8.0 7.0 6.6 St. Dev. 22.8 17.8 16.3 20.5 22.6 23.6	Mean 28.2 28.1 28.5 28.5 28.5 29.2 30.1 30.1 31.5 31.6 31.6 31.6 31.0 Mean 38.8 39.5 44.4 51.4 58.9 70.6	St. Dev. 4.2 6.5 4.9 5.2 3.9 5.2 5.4 5.2 7.2 6.4 3.4 4.7 St. Dev. 6.2 7.3 10.1 6.6 15.2 23.5	Mean 69.8 69.7 65.9 68.5 70.9 72.9 69.0 74.5 76.6 72.7 74.4 67.8 Gorok Mean 52.8 57.5 55.6 53.8 57.9 61.1	St. Dev. 18.5 18.7 15.5 21.6 18.7 18.8 18.2 13.9 15.6 15.1 17.3 13.4 St. Dev. 12.4 13.7 11.7 9.8 13.4 14.5
Jan Feb Mar Apr Jun Jul Jul Sep Oct Nov Dec Common b Jan Feb Mar Apr May Jun Jul	Raba           Mean           27.1           27.8           27.7           27.2           28.2           28.4           29.0           30.9           30.1           31.4           31.0           28.2           wean           81.1           96.1           101.3           109.6           98.8           94.5           90.4	ul St. Dev. 4,1 4,8 6,5 4,5 5,4 5,7 6,6 7,5 5,8 7,3 5,2 4,2 Thaseolus vulgo J St. Dev. 23,2 31,9 34,1 30,2 28,1 22,9 25,7	Mean 41.6 46.2 50.7 49.6 49.5 47.3 47.1 45.3 47.1 45.3 47.8 46.3 49.1 45.6 Mean 113.3 116.5 116.3 114.8 126.1 135.7 139.0	St. Dev. 8.1 11.0 13.7 9.9 10.3 8.5 7.3 9.0 8.5 10.5 11.0 11.3 vesby St. Dev. 20.1 19.5 17.3 22.5 22.3 29.5 39.8	Mean 33.6 34.8 35.3 36.0 35.3 35.9 38.3 39.9 40.1 40.1 40.6 Mean 81.1 73.8 72.1 78.1 77.3 84.8 106.4	St. Dev. 7.1 8.5 5.6 7.2 6.2 8.4 9.0 6.6 7.3 8.0 7.0 6.6 St. Dev. 22.8 17.8 16.3 20.5 22.6 23.6 38.0	Mean 28.2 28.1 28.5 28.5 28.5 29.2 30.1 30.1 31.5 31.6 31.6 31.6 31.6 31.6 31.6 31.6 51.4 51.4 58.9 70.6 79.8	St. Dev. 4.2 6.5 4.9 5.2 3.9 5.2 5.4 5.2 7.2 6.4 3.4 4.7 St. Dev. 6.2 7.3 10.1 6.6 15.2 23.5 20.5	Mean 69.8 69.7 65.9 68.5 70.9 72.9 69.0 74.5 76.6 72.7 74.4 67.8 Gorok Mean 52.8 57.5 55.6 53.8 57.9 61.1 61.7	St. Dev. 18.5 18.7 15.5 21.6 18.7 18.8 18.2 13.9 15.6 15.1 17.3 13.4 St. Dev. 12.4 13.7 11.7 9.8 13.4 14.5 17.8
Jan Feb Mar Apr Jun Jul Jul Sep Oct Nov Dec Common b Jan Feb Mar Apr May Jun	Raba           Mean           27.1           27.8           27.7           27.2           28.2           28.4           29.0           30.9           30.1           31.4           31.0           28.2           wean           81.1           96.1           101.3           109.6           98.8           94.5           90.4           81.3	ul St. Dev. 4,1 4,8 6,5 4,5 5,4 5,7 6,6 7,5 5,8 7,3 5,2 4,2 Traseolus vulgo J St. Dev. 23,2 31,9 34,1 30,2 28,1 22,9 25,7 17,7	Mean 41.6 46.2 50.7 49.6 49.5 47.3 47.1 45.3 47.1 45.3 47.8 46.3 49.1 45.6 Mean 113.3 116.5 116.3 114.8 126.1 135.7 139.0 157.5	St. Dev. 8.1 11.0 13.7 9.9 10.3 8.5 7.3 9.0 8.5 10.5 11.0 11.3 resby St. Dev. 20.1 19.5 17.3 22.5 22.3 29.5 39.8 35.2	Mean 33.6 34.8 35.3 36.0 35.3 35.9 38.3 39.9 40.1 40.1 40.6 Mean 81.1 73.8 72.1 78.1 77.3 84.8 106.4 88.7	St. Dev. 7.1 8.5 5.6 7.2 6.2 8.4 9.0 6.6 7.3 8.0 7.0 6.6 St. Dev. 22.8 17.8 16.3 20.5 22.6 23.6 38.0 28.9	Mean 28.2 28.1 28.5 28.5 28.5 29.2 30.1 30.1 31.5 30.6 31.6 31.0 Madda Mean 38.8 39.5 44.4 51.4 58.9 70.6 79.8 73.7	St. Dev. 4.2 6.5 4.9 5.2 3.9 5.2 5.4 5.2 7.2 6.4 3.4 4.7 St. Dev. 6.2 7.3 10.1 6.6 15.2 23.5 20.5 16.9	Mean 69.8 69.7 65.9 68.5 70.9 72.9 69.0 74.5 76.6 72.7 74.4 67.8 Gorok Mean 52.8 57.5 55.6 53.8 57.9 61.1 61.7 71.6	St. Dev. 18.5 18.7 15.5 21.6 18.7 18.8 18.2 13.9 15.6 15.1 17.3 13.4 St. Dev. 12.4 13.7 11.7 9.8 13.4 14.5
Jan Feb Mar Apr Jun Jul Jul Sep Oct Nov Dec Common b Jan Feb Mar Apr May Jun Jul	Raba           Mean           27.1           27.8           27.7           27.2           28.2           28.4           29.0           30.9           30.1           31.4           31.0           28.2           wean           81.1           96.1           101.3           109.6           98.8           94.5           90.4	ul St. Dev. 4,1 4,8 6,5 4,5 5,4 5,7 6,6 7,5 5,8 7,3 5,2 4,2 Thaseolus vulgo J St. Dev. 23,2 31,9 34,1 30,2 28,1 22,9 25,7	Mean 41.6 46.2 50.7 49.6 49.5 47.3 47.1 45.3 47.1 45.3 47.8 46.3 49.1 45.6 Mean 113.3 116.5 116.3 114.8 126.1 135.7 139.0	St. Dev. 8.1 11.0 13.7 9.9 10.3 8.5 7.3 9.0 8.5 10.5 11.0 11.3 vesby St. Dev. 20.1 19.5 17.3 22.5 22.3 29.5 39.8 35.2 48.0	Mean 33.6 34.8 35.3 36.0 35.3 35.9 38.3 38.3 39.9 40.1 40.1 40.6 Mean 81.1 73.8 72.1 78.1 77.3 84.8 106.4 88.7 90.8	St. Dev. 7.1 8.5 5.6 7.2 6.2 8.4 9.0 6.6 7.3 8.0 7.0 6.6 St. Dev. 22.8 17.8 16.3 20.5 22.6 23.6 38.0 28.9 21.0	Mean 28.2 28.1 28.5 28.5 28.5 29.2 30.1 30.1 31.5 30.6 31.6 31.0 Madda Mean 38.8 39.5 44.4 51.4 58.9 70.6 79.8 73.7 71.1	St. Dev. 4.2 6.5 4.9 5.2 3.9 5.2 5.4 5.2 7.2 6.4 3.4 4.7 St. Dev. 6.2 7.3 10.1 6.6 15.2 23.5 20.5 16.9 21.8	Mean 69.8 69.7 65.9 68.5 70.9 72.9 69.0 74.5 76.6 72.7 74.4 67.8 Gorok Mean 52.8 57.5 55.6 53.8 57.9 61.1 61.7 71.6 73.3	St. Dev. 18.5 18.7 15.5 21.6 18.7 18.8 18.2 13.9 15.6 15.1 17.3 13.4 St. Dev. 12.4 13.7 11.7 9.8 13.4 14.5 17.8
Jan Feb Mar Apr Jun Jul Jul Sep Oct Nov Dec Common b Jan Feb Mar Apr May Jun Jul Aug	Raba           Mean           27.1           27.8           27.7           27.2           28.2           28.4           29.0           30.9           30.1           31.4           31.0           28.2           wean           81.1           96.1           101.3           109.6           98.8           94.5           90.4           81.3	ul St. Dev. 4,1 4,8 6,5 4,5 5,4 5,7 6,6 7,5 5,8 7,3 5,2 4,2 Traseolus vulgo J St. Dev. 23,2 31,9 34,1 30,2 28,1 22,9 25,7 17,7	Mean 41.6 46.2 50.7 49.6 49.5 47.3 47.1 45.3 47.1 45.3 47.8 46.3 49.1 45.6 Mean 113.3 116.5 116.3 114.8 126.1 135.7 139.0 157.5	St. Dev. 8.1 11.0 13.7 9.9 10.3 8.5 7.3 9.0 8.5 10.5 11.0 11.3 resby St. Dev. 20.1 19.5 17.3 22.5 22.3 29.5 39.8 35.2	Mean 33.6 34.8 35.3 36.0 35.3 35.9 38.3 39.9 40.1 40.1 40.6 Mean 81.1 73.8 72.1 78.1 77.3 84.8 106.4 88.7	St. Dev. 7.1 8.5 5.6 7.2 6.2 8.4 9.0 6.6 7.3 8.0 7.0 6.6 St. Dev. 22.8 17.8 16.3 20.5 22.6 23.6 38.0 28.9	Mean 28.2 28.1 28.5 28.5 28.5 29.2 30.1 30.1 31.5 30.6 31.6 31.0 Mean 38.8 39.5 44.4 51.4 58.9 70.6 79.8 73.7 71.1 61.3	St. Dev. 4.2 6.5 4.9 5.2 3.9 5.2 5.4 5.2 7.2 6.4 3.4 4.7 St. Dev. 6.2 7.3 10.1 6.6 15.2 23.5 20.5 16.9	Mean 69.8 69.7 65.9 68.5 70.9 72.9 69.0 74.5 76.6 72.7 74.4 67.8 Gorok Mean 52.8 57.5 55.6 53.8 57.9 61.1 61.7 71.6	St. Dev. 18.5 18.7 15.5 21.6 18.7 18.8 18.2 13.9 15.6 15.1 17.3 13.4 St. Dev. 12.4 13.7 11.7 9.8 13.4 14.5 17.8 26.4
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Common b Jan Feb Mar Apr May Jun Jul Aug Sep	Raba           Mean           27.1           27.8           27.7           27.2           28.2           28.4           29.0           30.9           30.1           31.4           31.0           28.2           Mean           81.1           96.1           101.3           109.6           98.8           94.5           90.4           81.3           69.1	ul St. Dev. 4,1 4,8 6,5 4,5 5,4 5,7 6,6 7,5 5,8 7,3 5,2 4,2 thaseolus vulgo al St. Dev. 23,2 31,9 34,1 30,2 28,1 22,9 25,7 17,7 20,2	Mean 41.6 46.2 50.7 49.6 49.5 47.3 47.1 45.3 47.1 45.3 47.8 46.3 49.1 45.6 Mean 113.3 116.5 116.3 114.8 126.1 135.7 139.0 157.5 144.6	St. Dev. 8.1 11.0 13.7 9.9 10.3 8.5 7.3 9.0 8.5 10.5 11.0 11.3 wesby St. Dev. 20.1 19.5 17.3 22.5 22.3 29.5 39.8 35.2 48.0	Mean 33.6 34.8 35.3 36.0 35.3 35.9 38.3 38.3 39.9 40.1 40.1 40.6 Mean 81.1 73.8 72.1 78.1 77.3 84.8 106.4 88.7 90.8	St. Dev. 7.1 8.5 5.6 7.2 6.2 8.4 9.0 6.6 7.3 8.0 7.0 6.6 St. Dev. 22.8 17.8 16.3 20.5 22.6 23.6 38.0 28.9 21.0	Mean 28.2 28.1 28.5 28.5 28.5 29.2 30.1 30.1 31.5 30.6 31.6 31.0 Madda Mean 38.8 39.5 44.4 51.4 58.9 70.6 79.8 73.7 71.1	St. Dev. 4.2 6.5 4.9 5.2 3.9 5.2 5.4 5.2 7.2 6.4 3.4 4.7 St. Dev. 6.2 7.3 10.1 6.6 15.2 23.5 20.5 16.9 21.8	Mean 69.8 69.7 65.9 68.5 70.9 72.9 69.0 74.5 76.6 72.7 74.4 67.8 Gorok Mean 52.8 57.5 55.6 53.8 57.9 61.1 61.7 71.6 73.3	St. Dev. 18.5 18.7 15.5 21.6 18.7 18.8 18.2 13.9 15.6 15.1 17.3 13.4 St. Dev. 12.4 13.7 11.7 9.8 13.4 14.5 17.8 26.4 23.6
Jan Feb Mar Apr Jun Jul Aug Sep Oct Nov Dec Common b Jan Feb Mar Apr May Jun Jul Aug Sep Oct	Raba           Mean           27.1           27.8           27.7           27.2           28.2           28.4           29.0           30.9           30.1           31.4           31.0           28.2           Mean           81.1           96.1           101.3           109.6           98.8           94.5           90.4           81.3           69.1           67.6	ul St. Dev. 4,1 4,8 6,5 4,5 5,4 5,7 6,6 7,5 5,8 7,3 5,2 4,2 Thoseolus vulge J St. Dev. 23,2 31,9 34,1 30,2 28,1 22,9 25,7 17,7 20,2 21,6	Mean 41.6 46.2 50.7 49.6 49.5 47.3 47.1 45.3 47.1 45.3 47.8 46.3 49.1 45.6 Mean 113.3 116.5 116.3 116.5 116.3 114.8 126.1 135.7 139.0 157.5 144.6 150.0	St. Dev. 8.1 11.0 13.7 9.9 10.3 8.5 7.3 9.0 8.5 10.5 11.0 11.3 wesby St. Dev. 20.1 19.5 17.3 22.5 22.3 29.5 39.8 35.2 48.0 40.8	Mean 33.6 34.8 35.3 36.0 35.3 35.9 38.3 38.3 39.9 40.1 40.1 40.6 Mean 81.1 73.8 72.1 78.1 77.3 84.8 106.4 88.7 90.8 89.5	St. Dev. 7.1 8.5 5.6 7.2 6.2 8.4 9.0 6.6 7.3 8.0 7.0 6.6 5t. Dev. 22.8 17.8 16.3 20.5 22.6 23.6 38.0 28.9 21.0 32.8	Mean 28.2 28.1 28.5 28.5 28.5 29.2 30.1 30.1 31.5 30.6 31.6 31.0 Mean 38.8 39.5 44.4 51.4 58.9 70.6 79.8 73.7 71.1 61.3	St. Dev. 4.2 6.5 4.9 5.2 3.9 5.2 5.4 5.2 7.2 6.4 3.4 4.7 St. Dev. 6.2 7.3 10.1 6.6 15.2 23.5 20.5 16.9 21.8 14.1	Mean 69.8 69.7 65.9 68.5 70.9 72.9 69.0 74.5 76.6 72.7 74.4 67.8 Gorok Mean 52.8 57.5 55.6 53.8 57.9 61.1 61.7 71.6 73.3 67.1	St. Dev. 18.5 18.7 15.5 21.6 18.7 18.8 18.2 13.9 15.6 15.1 17.3 13.4 St. Dev. 12.4 13.7 11.7 9.8 13.4 14.5 17.8 26.4 23.6 18.7

Source: Weekly prices recorded for the consumer price index for the National Statistics Office



Table 25. Mean monthly price (toea/kg) and standard deviation for betel nut, cassava, coconut and com at five urban markets, January 1971 to December 1992, in constant 1991 prices

<b>Betel nut</b>		Areca cal	echu							
	Rat	baul		Moresby	1	Lae	Ma	idang	Go	roka
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
Jan	86.1	40.4	361.9	241.6	230.7	107.6	145.9	42.6	416.3	139.6
Feb	83.7	38.1	393.1	264.2	205.3	93.2	140.4	46.5	338.4	108.7
Mar	67.6	22.3	370.3	117.3	169.9	90.4	141.7	55.2	333.8	107.6
Apr	54.8	15.6	300.1	85.8	151.3	47.0	149.7	62.4	290.0	113.8
May	50.3	8.7	256.8	70.6	134.5	53.0	155.8	60.2	322.0	106.3
Jun	48.8	8.9	227.5	60.7	127.2	44.7	177.2	81.6	284.1	87.5
Jul	50.2	9.8	210.4	63.2	162.8	70.4	158.8	71.1	287.6	111.8
Aug	56.7	15.8	210.5	79.7	171.7	84.1	179.5	82.5	393.2	144.5
Sep	72.0	21.3	213.5	78.6	247.7	143.3	236.0	169.5	420.2	121.9
Oct	105.6	39.5	244.4	117.0	261.0	122.8	199.7	79.4	406.5	99.1
Nov	106.6	46.0	268.3	147.2	316.4	143.1	197.3	70.6	415.0	141.0
Dec	111.1	42.2	324.3	195.1	235.4	91.9	181.7	52.0	426.0	172.0
Cassava		Manihot es	culenta							
	Rab	aul	Port N	Aoresby	L	08	Mad	dang	Gon	oka
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
Jan	17.3	3.6	38.5	9.1	22.8	5.9	17.2	3.0	21.1	7.2
Feb	17.1	3.7	39.0	7.4	21.4	5.3	18.3	3.3	20.0	5.1
Mar	18.1	5.3	38.3	6.9	19.6	3.5	18.4	6.8	19.7	6.3
Apr	18.0	4.5	37.2	5.9	20.4	4.0	18.0	4.5	20.1	6.1
May	17.9	3.9	36.2	6.8	20.8	4.7	20.0	4.3	18.4	4.9
Jun	18.0	3.6	34.6	7.5	22.0	8.7	19.8	3.7	17.0	3.3
Jul	19.6	6.2	36.0	8.1	21.1	6.6	17.4	4.7	19.2	4.7
Aug	18.5	5.6	36.1	7.3	20.7	3.7	17.7	5.0	18.0	3.5
Sep	17.8	3.7	38.9	8.2	19.7	4.2	21.4	7.4	19.9	5.1
Oct	17.3	3.8	38.2	7.4	22.3	5.4	19.6	8.0	22.0	11.9
Nov	17.7	3.7	43.1	11.6	22.4	5.9	22.7	7.0	22.4	11.1
Dec	18.4	4.8	40.0	11.2	24.7	6.8	20.7	2.4	23.4	13.3
		Cocos NIC								
Coconut	Dah	Cocos nucl		ween		-	Mad	<b>~</b> ~~	Gom	ka
Coconut	Rab	aul	Port M	loresby St. Dev	Lo		Mad	•	Goro	
	Mean	oul St. Dev.	Port M Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
Jan	Mean 11.2	oul st. Dev. 3.7	Port M Mean 38.8	St. Dev. 8.1	Mean 23.4	St. Dev. 4.9	Mean 13.3	St. Dev. 4.0	Mean 40.2	St. Dev. 7.3
Jan Feb	<b>Mean</b> 11.2 11.1	aul St. Dev. 3.7 2.5	Port M Mean 38.8 38.6	St. Dev. 8.1 7.7	Mean 23.4 23.5	St. Dev. 4.9 3.4	Mean 13.3 12.6	St. Dev. 4.0 2.9	<b>Mean</b> 40.2 43.3	St. Dev. 7.3 4.6
Jan Feb Mar	Mean 11.2 11.1 11.8	aul St. Dev. 3.7 2.5 4.5	Port M Mean 38.8 38.6 39.3	St. Dev. 8.1 7.7 9.7	Mean 23.4 23.5 22.9	St. Dev. 4.9 3.4 3.5	Mean 13.3 12.6 13.0	St. Dev. 4.0 2.9 3.2	Mean 40.2 43.3 47.6	St. Dev. 7.3 4.6 8.4
Jan Feb Mar Apr	Mean 11.2 11.1 11.8 11.6	aul st. Dev. 3.7 2.5 4.5 3.2	Port M Mean 38.8 38.6 39.3 38.9	St. Dev. 8.1 7.7 9.7 7.3	Mean 23.4 23.5 22.9 23.0	St. Dev. 4.9 3.4 3.5 4.4	Mean 13.3 12.6 13.0 12.6	St. Dev. 4.0 2.9 3.2 2.7	Mean 40.2 43.3 47.6 44.2	St. Dev. 7.3 4.6 8.4 10.6
Jan Feb Mar Apr May	Mean 11.2 11.1 11.8 11.6 11.2	aul St. Dev. 3.7 2.5 4.5 3.2 2.4	Port M Mean 38.8 38.6 39.3 38.9 41.0	St. Dev. 8.1 7.7 9.7 7.3 9.6	Mean 23.4 23.5 22.9 23.0 23.2	St. Dev. 4.9 3.4 3.5 4.4 5.0	Mean 13.3 12.6 13.0 12.6 13.0	St. Dev. 4.0 2.9 3.2 2.7 3.1	Mean 40.2 43.3 47.6 44.2 42.3	St. Dev. 7.3 4.6 8.4 10.6 7.8
Jan Feb Mar Apr May Jun	Mean 11.2 11.1 11.8 11.6 11.2 10.8	cul St. Dev. 3.7 2.5 4.5 3.2 2.4 2.4	Port M Mean 38.8 38.6 39.3 38.9 41.0 40.9	St. Dev. 8.1 7.7 9.7 7.3 9.6 8.4	Mean 23.4 23.5 22.9 23.0 23.2 23.2	St. Dev. 4.9 3.4 3.5 4.4 5.0 4.5	Mean 13.3 12.6 13.0 12.6 13.0 12.7	St. Dev. 4.0 2.9 3.2 2.7 3.1 3.2	Mean 40.2 43.3 47.6 44.2 42.3 42.5	St. Dev. 7.3 4.6 8.4 10.6 7.8 11.6
Jan Feb Mar Apr May Jun Jul	Mean 11.2 11.1 11.8 11.6 11.2 10.8 10.8	cul St. Dev. 3.7 2.5 4.5 3.2 2.4 2.4 2.9	Port M Mean 38.8 38.6 39.3 38.9 41.0 40.9 41.7	St. Dev. 8.1 7.7 9.7 7.3 9.6 8.4 9.4	Mean 23.4 23.5 22.9 23.0 23.2 23.2 23.2 24.1	St. Dev. 4.9 3.4 3.5 4.4 5.0 4.5 4.7	Mean 13.3 12.6 13.0 12.6 13.0 12.7 13.0	St. Dev. 4.0 2.9 3.2 2.7 3.1 3.2 3.6	Mean 40.2 43.3 47.6 44.2 42.3 42.5 46.7	St. Dev. 7.3 4.6 8.4 10.6 7.8 11.6 5.2
Jan Feb Mar Apr May Jun Jul Aug	Mean 11.2 11.1 11.8 11.6 11.2 10.8 10.8 10.8	cul St. Dev. 3.7 2.5 4.5 3.2 2.4 2.4 2.9 2.6	Port M Mean 38.8 38.6 39.3 38.9 41.0 40.9 41.7 43.2	St. Dev. 8.1 7.7 9.7 7.3 9.6 8.4 9.4 11.2	Mean 23.4 23.5 22.9 23.0 23.2 23.2 23.2 24.1 22.5	St. Dev. 4.9 3.4 3.5 4.4 5.0 4.5 4.7 5.0	Mean 13.3 12.6 13.0 12.6 13.0 12.7 13.0 12.9	St. Dev. 4.0 2.9 3.2 2.7 3.1 3.2 3.6 3.8	Mean 40.2 43.3 47.6 44.2 42.3 42.5 46.7 47.6	St. Dev. 7.3 4.6 8.4 10.6 7.8 11.6 5.2 7.6
Jan Feb Mar Apr May Jun Jul Aug Sep	Mean 11.2 11.1 11.8 11.6 11.2 10.8 10.8 10.8 10.5 11.3	cul St. Dev. 3.7 2.5 4.5 3.2 2.4 2.4 2.9 2.6 2.9	Port M Mean 38.8 38.6 39.3 38.9 41.0 40.9 41.7 43.2 44.1	St. Dev. 8.1 7.7 9.7 7.3 9.6 8.4 9.4 11.2 10.4	Mean 23.4 23.5 22.9 23.0 23.2 23.2 24.1 22.5 23.7	St. Dev. 4.9 3.4 3.5 4.4 5.0 4.5 4.7 5.0 5.2	Mean 13.3 12.6 13.0 12.6 13.0 12.7 13.0 12.9 13.6	St. Dev. 4.0 2.9 3.2 2.7 3.1 3.2 3.6 3.8 6.2	Mean 40.2 43.3 47.6 44.2 42.3 42.5 46.7 47.6 44.9	St. Dev. 7.3 4.6 8.4 10.6 7.8 11.6 5.2 7.6 8.7
Jan Feb Mar Apr May Jun Jul Aug Sep Oct	Mean 11.2 11.1 11.8 11.6 11.2 10.8 10.8 10.8 10.5 11.3 11.2	Cul St. Dev. 3.7 2.5 4.5 3.2 2.4 2.4 2.9 2.6 2.9 2.6 2.9 2.7	Port M Mean 38.8 38.6 39.3 38.9 41.0 40.9 41.7 43.2 44.1 43.4	St. Dev. 8.1 7.7 9.7 7.3 9.6 8.4 9.4 11.2 10.4 8.5	Mean 23.4 23.5 22.9 23.0 23.2 23.2 24.1 22.5 23.7 23.9	St. Dev. 4.9 3.4 3.5 4.4 5.0 4.5 4.7 5.0 5.2 4.1	Mean 13.3 12.6 13.0 12.6 13.0 12.7 13.0 12.9 13.6 13.2	St. Dev. 4.0 2.9 3.2 2.7 3.1 3.2 3.6 3.8 6.2 4.1	Mean 40.2 43.3 47.6 44.2 42.3 42.5 46.7 47.6 44.9 46.2	St. Dev. 7.3 4.6 8.4 10.6 7.8 11.6 5.2 7.6 8.7 9.4
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov	Mean 11.2 11.1 11.8 11.6 11.2 10.8 10.8 10.8 10.5 11.3 11.2 11.2	Cul St. Dev. 3.7 2.5 4.5 3.2 2.4 2.4 2.9 2.6 2.9 2.6 2.9 2.7 2.4	Port M Mean 38.8 38.6 39.3 38.9 41.0 40.9 41.7 43.2 44.1 43.4 41.1	St. Dev. 8.1 7.7 9.7 7.3 9.6 8.4 9.4 11.2 10.4 8.5 8.2	Mean 23.4 23.5 22.9 23.0 23.2 23.2 24.1 22.5 23.7 23.9 24.3	St. Dev. 4.9 3.4 3.5 4.4 5.0 4.5 4.7 5.0 5.2	Mean 13.3 12.6 13.0 12.6 13.0 12.7 13.0 12.9 13.6 13.2 12.7	St. Dev. 4.0 2.9 3.2 2.7 3.1 3.2 3.6 3.8 6.2 4.1 2.7	Mean 40.2 43.3 47.6 44.2 42.3 42.5 46.7 47.6 44.9	St. Dev. 7.3 4.6 8.4 10.6 7.8 11.6 5.2 7.6 8.7 9.4 7.9
Jan Feb Mar Apr May Jun Jul Aug Sep Oct	Mean 11.2 11.1 11.8 11.6 11.2 10.8 10.8 10.8 10.5 11.3 11.2	Cul St. Dev. 3.7 2.5 4.5 3.2 2.4 2.4 2.9 2.6 2.9 2.6 2.9 2.7	Port M Mean 38.8 38.6 39.3 38.9 41.0 40.9 41.7 43.2 44.1 43.4	St. Dev. 8.1 7.7 9.7 7.3 9.6 8.4 9.4 11.2 10.4 8.5	Mean 23.4 23.5 22.9 23.0 23.2 23.2 24.1 22.5 23.7 23.9	St. Dev. 4.9 3.4 3.5 4.4 5.0 4.5 4.7 5.0 5.2 4.1 3.5	Mean 13.3 12.6 13.0 12.6 13.0 12.7 13.0 12.9 13.6 13.2	St. Dev. 4.0 2.9 3.2 2.7 3.1 3.2 3.6 3.8 6.2 4.1	Mean 40.2 43.3 47.6 44.2 42.3 42.5 46.7 47.6 44.9 46.2 47.3	St. Dev. 7.3 4.6 8.4 10.6 7.8 11.6 5.2 7.6 8.7 9.4
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	Mean 11.2 11.1 11.8 11.6 11.2 10.8 10.8 10.8 10.5 11.3 11.2 11.2 11.2 11.2	Cul St. Dev. 3.7 2.5 4.5 3.2 2.4 2.4 2.9 2.6 2.9 2.7 2.4 2.6	Port M Mean 38.8 38.6 39.3 38.9 41.0 40.9 41.7 43.2 44.1 43.4 41.1	St. Dev. 8.1 7.7 9.7 7.3 9.6 8.4 9.4 11.2 10.4 8.5 8.2	Mean 23.4 23.5 22.9 23.0 23.2 23.2 24.1 22.5 23.7 23.9 24.3	St. Dev. 4.9 3.4 3.5 4.4 5.0 4.5 4.7 5.0 5.2 4.1 3.5	Mean 13.3 12.6 13.0 12.6 13.0 12.7 13.0 12.9 13.6 13.2 12.7	St. Dev. 4.0 2.9 3.2 2.7 3.1 3.2 3.6 3.8 6.2 4.1 2.7	Mean 40.2 43.3 47.6 44.2 42.3 42.5 46.7 47.6 44.9 46.2 47.3	St. Dev. 7.3 4.6 8.4 10.6 7.8 11.6 5.2 7.6 8.7 9.4 7.9
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov	Mean 11.2 11.1 11.8 11.6 11.2 10.8 10.8 10.5 11.3 11.2 11.2 11.2 11.2	Cul St. Dev. 3.7 2.5 4.5 3.2 2.4 2.4 2.9 2.6 2.9 2.7 2.4 2.6 2.9 2.7 2.4 2.6	Port M Mean 38.8 38.6 39.3 38.9 41.0 40.9 41.7 43.2 44.1 43.4 41.1	St. Dev. 8.1 7.7 9.7 7.3 9.6 8.4 9.4 11.2 10.4 8.5 8.2 8.1	Mean 23.4 23.5 22.9 23.0 23.2 23.2 24.1 22.5 23.7 23.9 24.3	St. Dev. 4.9 3.4 3.5 4.4 5.0 4.5 4.7 5.0 5.2 4.1 3.5 4.6	Mean 13.3 12.6 13.0 12.6 13.0 12.7 13.0 12.9 13.6 13.2 12.7 13.5	St. Dev. 4.0 2.9 3.2 2.7 3.1 3.2 3.6 3.8 6.2 4.1 2.7 2.9	Mean 40.2 43.3 47.6 44.2 42.3 42.5 46.7 47.6 44.9 46.2 47.3	St. Dev. 7.3 4.6 8.4 10.6 7.8 11.6 5.2 7.6 8.7 9.4 7.9 13.7
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	Mean 11.2 11.1 11.8 11.6 11.2 10.8 10.8 10.5 11.3 11.2 11.2 11.2 11.2 11.2 11.8	Cull St. Dev. 3.7 2.5 4.5 3.2 2.4 2.4 2.4 2.9 2.6 2.9 2.6 2.9 2.7 2.7 2.4 2.6 <b>Zea mays</b> Cull	Port M Mean 38.8 38.6 39.3 38.9 41.0 40.9 41.7 43.2 44.1 43.4 41.1 41.9	St. Dev. 8.1 7.7 9.7 7.3 9.6 8.4 9.4 11.2 10.4 8.5 8.2 8.1	Mean 23.4 23.5 22.9 23.0 23.2 24.1 22.5 23.7 23.9 24.3 23.5	St. Dev. 4.9 3.4 3.5 4.4 5.0 4.5 4.7 5.0 5.2 4.1 3.5 4.6	Mean 13.3 12.6 13.0 12.6 13.0 12.7 13.0 12.9 13.6 13.2 12.7	St. Dev. 4.0 2.9 3.2 2.7 3.1 3.2 3.6 3.8 6.2 4.1 2.7 2.9	Mean 40.2 43.3 47.6 44.2 42.3 42.5 46.7 47.6 44.9 46.2 47.3 46.6	St. Dev. 7.3 4.6 8.4 10.6 7.8 11.6 5.2 7.6 8.7 9.4 7.9 13.7
Jan Feb Mar Apr Jun Jul Jul Sep Oct Nov Dec Com	Mean 11.2 11.1 11.8 11.6 11.2 10.8 10.8 10.8 10.5 11.3 11.2 11.2 11.2 11.2 11.8 Raba Mean	Cul St. Dev. 3.7 2.5 4.5 3.2 2.4 2.4 2.9 2.6 2.9 2.6 2.9 2.7 2.4 2.6 <b>Zea mays</b> cul St. Dev.	Port M Mean 38.8 38.6 39.3 38.9 41.0 40.9 41.7 43.2 44.1 43.4 41.1 41.9 Port M Mean	St. Dev. 8.1 7.7 9.7 7.3 9.6 8.4 9.4 11.2 10.4 8.5 8.2 8.1 0resby St. Dev.	Mean 23.4 23.5 22.9 23.0 23.2 24.1 22.5 23.7 23.9 24.3 23.5	St. Dev. 4,9 3.4 3.5 4.4 5.0 4.5 4.7 5.0 5.2 4.1 3.5 4.6	Mean 13.3 12.6 13.0 12.6 13.0 12.7 13.0 12.9 13.6 13.2 12.7 13.5 Mode	St. Dev. 4.0 2.9 3.2 2.7 3.1 3.2 3.6 3.8 6.2 4.1 2.7 2.9	Mean 40.2 43.3 47.6 44.2 42.3 42.5 46.7 47.6 44.9 46.2 47.3 46.6	St. Dev. 7.3 4.6 8.4 10.6 7.8 11.6 5.2 7.6 8.7 9.4 7.9 13.7
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Com	Mean 11.2 11.1 11.8 11.6 11.2 10.8 10.8 10.8 10.5 11.3 11.2 11.2 11.2 11.8 Raba Mean 49.2	Cuul St. Dev. 3.7 2.5 4.5 3.2 2.4 2.4 2.9 2.6 2.9 2.6 2.9 2.7 2.4 2.6 <b>Zea mays</b> Cuul St. Dev. 15.0	Port M Mean 38.8 38.6 39.3 38.9 41.0 40.9 41.7 43.2 44.1 43.4 41.1 41.9 Port M Mean 78.2	St. Dev. 8.1 7.7 9.7 7.3 9.6 8.4 9.4 11.2 10.4 8.5 8.2 8.1	Mean 23.4 23.5 22.9 23.0 23.2 23.2 24.1 22.5 23.7 23.9 24.3 23.5 Lo Mean 36.0	St. Dev. 4,9 3,4 3,5 4,4 5,0 4,5 4,7 5,0 5,2 4,1 3,5 4,6 St. Dev. 8,7	Mean 13.3 12.6 13.0 12.6 13.0 12.7 13.0 12.9 13.6 13.2 12.7 13.5 Mack Mean 27.9	St. Dev. 4.0 2.9 3.2 2.7 3.1 3.2 3.6 3.8 6.2 4.1 2.7 2.9 St. Dev.	Mean 40.2 43.3 47.6 44.2 42.3 42.5 46.7 47.6 44.9 46.2 47.3 46.6 Gorok Mean 30.9	St. Dev. 7.3 4.6 8.4 10.6 7.8 11.6 5.2 7.6 8.7 9.4 7.9 13.7 8 5. Dev. 5.5
Jan Feb Mar Apr May Jun Jun Jul Aug Sep Oct Nov Dec Corn Jan Feb	Mean 11.2 11.1 11.8 11.6 11.2 10.8 10.8 10.8 10.5 11.3 11.2 11.2 11.2 11.8 Robo Mean 49.2 51.0	Cul St. Dev. 3.7 2.5 4.5 3.2 2.4 2.4 2.9 2.6 2.9 2.6 2.9 2.7 2.4 2.6 <b>Zea mays</b> Cul St. Dev. 15.0 12.5	Port M Mean 38.8 38.6 39.3 38.9 41.0 40.9 41.7 43.2 44.1 43.4 41.1 41.9 Port Me Mean 78.2 76.9	St. Dev. 8.1 7.7 9.7 7.3 9.6 8.4 9.4 11.2 10.4 8.5 8.2 8.1 Oresby St. Dev. 14.1	Mean 23.4 23.5 22.9 23.0 23.2 23.2 24.1 22.5 23.7 23.9 24.3 23.5 La Mean	St. Dev. 4,9 3,4 3.5 4,4 5,0 4,5 4,7 5,0 5,2 4,1 3,5 4,6 St. Dev. 8,7 6,4	Mean 13.3 12.6 13.0 12.6 13.0 12.7 13.0 12.9 13.6 13.2 12.7 13.5 Made Mean	St. Dev. 4.0 2.9 3.2 2.7 3.1 3.2 3.6 3.8 6.2 4.1 2.7 2.9 St. Dev. 8.8	Mean 40.2 43.3 47.6 44.2 42.3 42.5 46.7 47.6 44.9 46.2 47.3 46.6 Gorok Mean	St. Dev. 7.3 4.6 8.4 10.6 7.8 11.6 5.2 7.6 8.7 9.4 7.9 13.7
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Com	Mean 11.2 11.1 11.8 11.6 11.2 10.8 10.8 10.5 11.3 11.2 11.2 11.2 11.2 11.8 Robo Mean 49.2 51.0 54.1	Cuul St. Dev. 3.7 2.5 4.5 3.2 2.4 2.4 2.9 2.6 2.9 2.6 2.9 2.7 2.4 2.6 <b>Zea mays</b> Cuul St. Dev. 15.0	Port M Mean 38.8 38.6 39.3 38.9 41.0 40.9 41.7 43.2 44.1 43.4 41.1 41.9 Port M Mean 78.2	St. Dev. 8.1 7.7 9.7 7.3 9.6 8.4 9.4 11.2 10.4 8.5 8.2 8.1 0resby St. Dev. 14.1 10.8	Mean 23.4 23.5 22.9 23.0 23.2 23.2 23.2 24.1 22.5 23.7 23.9 24.3 23.5 Lo Mean 36.0 35.2	St. Dev. 4,9 3,4 3,5 4,4 5,0 4,5 4,7 5,0 5,2 4,1 3,5 4,6 St. Dev. 8,7	Mean 13.3 12.6 13.0 12.6 13.0 12.7 13.0 12.9 13.6 13.2 12.7 13.5 Mack Mean 27.9 27.1	St. Dev. 4.0 2.9 3.2 2.7 3.1 3.2 3.6 3.8 6.2 4.1 2.7 2.9 St. Dev. 8.8 5.4	Mean 40.2 43.3 47.6 44.2 42.3 42.5 46.7 47.6 44.9 46.2 47.3 46.6 Gorok Mean 30.9 29.2	St. Dev. 7.3 4.6 8.4 10.6 7.8 11.6 5.2 7.6 8.7 9.4 7.9 13.7 3.7 St. Dev. 5.5 6.8
Jan Feb Mar Apr May Jun Jun Jul Aug Sep Oct Nov Dec Com	Mean 11.2 11.1 11.8 11.6 11.2 10.8 10.8 10.5 11.3 11.2 11.2 11.2 11.2 11.8 Rabo Mean 49.2 51.0 54.1 54.7	Cul St. Dev. 3.7 2.5 4.5 3.2 2.4 2.4 2.9 2.6 2.9 2.7 2.4 2.6 Zea mays St. Dev. 15.0 12.5 15.7 12.8	Port M Mean 38.8 38.6 39.3 38.9 41.0 40.9 41.7 43.2 44.1 43.4 41.1 41.9 Port Me Mean 78.2 76.9 80.0 75.1	St. Dev. 8.1 7.7 9.7 7.3 9.6 8.4 9.4 11.2 10.4 8.5 8.2 8.1 0000000 St. Dev. 14.1 10.8 11.0	Mean 23.4 23.5 22.9 23.0 23.2 23.2 24.1 22.5 23.7 23.9 24.3 23.5 24.3 23.5 Loc Mean 36.0 35.2 39.0	St. Dev. 4.9 3.4 3.5 4.4 5.0 4.5 4.7 5.0 5.2 4.1 3.5 4.6 St. Dev. 8.7 6.4 6.2	Mean 13.3 12.6 13.0 12.6 13.0 12.7 13.0 12.9 13.6 13.2 12.7 13.5 Mack Mean 27.9 27.1 28.5	St. Dev. 4.0 2.9 3.2 2.7 3.1 3.2 3.6 3.8 6.2 4.1 2.7 2.9 St. Dev. 8.8 5.4 6.5	Mean 40.2 43.3 47.6 44.2 42.3 42.5 46.7 47.6 44.9 46.2 47.3 46.6 Gorok Mean 30.9 29.2 29.0	St. Dev. 7.3 4.6 8.4 10.6 7.8 11.6 5.2 7.6 8.7 9.4 7.9 13.7 St. Dev. 5.5 6.8 6.7
Jan Feb Mar Apr May Jun Jun Jul Aug Sep Oct Nov Dec Corn Feb Mar Apr May	Mean 11.2 11.1 11.8 11.6 11.2 10.8 10.8 10.5 11.3 11.2 11.2 11.2 11.2 11.2 11.8 Rabo Mean 49.2 51.0 54.1 54.7 58.1	Cul St. Dev. 3.7 2.5 4.5 3.2 2.4 2.4 2.9 2.6 2.9 2.7 2.4 2.6 Zea mays St. Dev. 15.0 12.5 15.7 12.8 15.8	Port M Mean 38.8 38.6 39.3 38.9 41.0 40.9 41.7 43.2 44.1 43.4 41.1 41.9 Port Me Mean 78.2 76.9 80.0 75.1 81.9	St. Dev. 8.1 7.7 9.7 7.3 9.6 8.4 9.4 11.2 10.4 8.5 8.2 8.1 0000000 St. Dev. 14.1 10.8 11.0 7.1	Mean 23.4 23.5 22.9 23.0 23.2 23.2 24.1 22.5 23.7 23.9 24.3 23.5 Lo Mean 36.0 35.2 39.0 39.3	St. Dev. 4.9 3.4 3.5 4.4 5.0 4.5 4.7 5.0 5.2 4.1 3.5 4.6 St. Dev. 8.7 6.4 6.2 8.7	Mean 13.3 12.6 13.0 12.6 13.0 12.7 13.0 12.9 13.6 13.2 12.7 13.5 Mode Mean 27.9 27.1 28.5 31.0	St. Dev. 4.0 2.9 3.2 2.7 3.1 3.2 3.6 3.8 6.2 4.1 2.7 2.9 St. Dev. 8.8 5.4 6.5 7.3	Mean 40.2 43.3 47.6 44.2 42.3 42.5 46.7 47.6 44.9 46.2 47.3 46.6 Gorok Mean 30.9 29.2 29.0 30.1	St. Dev. 7.3 4.6 8.4 10.6 7.8 11.6 5.2 7.6 8.7 9.4 7.9 13.7 St. Dev. 5.5 6.8 6.7 6.6
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Com Feb Mar Apr May Jun	Mean 11.2 11.1 11.8 11.6 11.2 10.8 10.5 10.5 11.3 11.2 11.2 11.3 11.2 11.2 11.8 Rabo Mean 49.2 51.0 54.1 54.7 58.1 58.5	Cul St. Dev. 3.7 2.5 4.5 3.2 2.4 2.4 2.9 2.6 2.9 2.7 2.4 2.6 Zea mays St. Dev. 15.0 12.5 15.7 12.8 15.8 17.6	Port M Mean 38.8 38.6 39.3 38.9 41.0 40.9 41.7 43.2 44.1 43.4 41.1 41.9 Port Me Mean 78.2 76.9 80.0 75.1 81.9 85.1	St. Dev. 8.1 7.7 9.7 7.3 9.6 8.4 9.4 11.2 10.4 8.5 8.2 8.1 000000 St. Dev. 14.1 10.8 11.0 7.1 11.8 9.6	Mean 23.4 23.5 22.9 23.0 23.2 23.2 24.1 22.5 23.7 23.9 24.3 23.5 24.3 23.5 Lo Mean 36.0 35.2 39.0 35.2 39.0 39.3 37.5 38.9	St. Dev. 4.9 3.4 3.5 4.4 5.0 4.5 4.7 5.0 5.2 4.1 3.5 4.6 St. Dev. 8.7 6.4 6.2 8.7 5.0 5.4	Mean 13.3 12.6 13.0 12.6 13.0 12.7 13.0 12.9 13.6 13.2 12.7 13.5 Mode Mean 27.9 27.1 28.5 31.0 34.8 39.3	St. Dev. 4.0 2.9 3.2 2.7 3.1 3.2 3.6 3.8 6.2 4.1 2.7 2.9 St. Dev. 8.8 5.4 6.5 7.3 6.5 13.0	Mean 40.2 43.3 47.6 44.2 42.3 42.5 46.7 47.6 44.9 46.2 47.3 46.6 Gorok Mean 30.9 29.2 29.0 30.1 32.6 32.7	St. Dev. 7.3 4.6 8.4 10.6 7.8 11.6 5.2 7.6 8.7 9.4 7.9 13.7 St. Dev. 5.5 6.8 6.7 6.6 6.6 4.7
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Com Feb Mar Apr May Jun Jul	Mean 11.2 11.1 11.8 11.6 11.2 10.8 10.5 10.5 11.3 11.2 11.3 11.2 11.2 11.8 Rabo Mean 49.2 51.0 54.1 54.7 58.1 58.5 61.4	Cul St. Dev. 3.7 2.5 4.5 3.2 2.4 2.4 2.9 2.6 2.9 2.7 2.4 2.6 Zea mays St. Dev. 15.0 12.5 15.7 12.8 15.8 17.6 13.7	Port M Mean 38.8 38.6 39.3 38.9 41.0 40.9 41.7 43.2 44.1 43.4 41.1 41.9 Port Me Mean 78.2 76.9 80.0 75.1 81.9 85.1 87.4	St. Dev. 8.1 7.7 9.7 7.3 9.6 8.4 9.4 11.2 10.4 8.5 8.2 8.1 0000000 St. Dev. 14.1 10.8 11.0 7.1 11.8 9.6 11.0	Mean 23.4 23.5 22.9 23.0 23.2 23.2 24.1 22.5 23.7 23.9 24.3 23.5 24.3 23.5 Lo Mean 36.0 35.2 39.0 35.2 39.0 35.3 37.5 38.9 45.6	St. Dev. 4.9 3.4 3.5 4.4 5.0 4.5 4.7 5.0 5.2 4.1 3.5 4.6 St. Dev. 8.7 6.4 6.2 8.7 5.0 5.4 14.7	Mean 13.3 12.6 13.0 12.6 13.0 12.7 13.0 12.9 13.6 13.2 12.7 13.5 Mode Mean 27.9 27.1 28.5 31.0 34.8 39.3 40.1	St. Dev. 4.0 2.9 3.2 2.7 3.1 3.2 3.6 3.8 6.2 4.1 2.7 2.9 St. Dev. 8.8 5.4 6.5 7.3 6.5 7.3 6.5 13.0 8.8	Mean 40.2 43.3 47.6 44.2 42.3 42.5 46.7 47.6 44.9 46.2 47.3 46.6 Gorok Mean 30.9 29.2 29.0 30.1 32.6 32.7 34.1	St. Dev. 7.3 4.6 8.4 10.6 7.8 11.6 5.2 7.6 8.7 9.4 7.9 13.7 St. Dev. 5.5 6.8 6.7 6.6 6.6 4.7 4.0
Jan Feb Mar Apr May Jun Jul Aug Oct Nov Dec Com Feb Mar Apr May Jun Jul Aug	Mean 11.2 11.1 11.8 11.6 11.2 10.8 10.5 10.5 11.3 11.2 11.3 11.2 11.2 11.3 Kaba Mean 49.2 51.0 54.1 54.7 58.1 58.5 61.4 62.3	Cul St. Dev. 3.7 2.5 4.5 3.2 2.4 2.4 2.9 2.6 2.9 2.7 2.4 2.6 Zea mays St. Dev. 15.0 12.5 15.7 12.8 15.8 15.8 17.6 13.7 13.6	Port M Mean 38.8 38.6 39.3 38.9 41.0 40.9 41.7 43.2 44.1 43.4 41.1 41.9 Port Me Mean 78.2 76.9 80.0 75.1 81.9 85.1 81.9 85.1 87.4 92.0	St. Dev. 8.1 7.7 9.7 7.3 9.6 8.4 9.4 11.2 10.4 8.5 8.2 8.1 000000 St. Dev. 14.1 10.8 11.0 7.1 11.8 9.6 11.0 12.6	Mean 23.4 23.5 22.9 23.0 23.2 23.2 24.1 22.5 23.7 23.9 24.3 23.5 24.3 23.5 Lor Mean 36.0 35.2 39.0 39.3 37.5 38.9 45.6 44.5	St. Dev. 4.9 3.4 3.5 4.4 5.0 4.5 4.7 5.0 5.2 4.1 3.5 4.6 St. Dev. 8.7 6.4 6.2 8.7 5.0 5.4 14.7 6.7	Mean 13.3 12.6 13.0 12.6 13.0 12.7 13.0 12.9 13.6 13.2 12.7 13.5 Mode Mean 27.9 27.1 28.5 31.0 34.8 39.3 40.1 38.0	St. Dev. 4.0 2.9 3.2 2.7 3.1 3.2 3.6 3.8 6.2 4.1 2.7 2.9 St. Dev. 8.8 5.4 6.5 7.3 6.5 13.0 8.8 6.5	Mean 40.2 43.3 47.6 44.2 42.3 42.5 46.7 47.6 44.9 46.2 47.3 46.6 Gorok Mean 30.9 29.2 29.0 30.1 32.6 32.7 34.1 39.2	St. Dev. 7.3 4.6 8.4 10.6 7.8 11.6 5.2 7.6 8.7 9.4 7.9 13.7 St. Dev. 5.5 6.8 6.7 6.6 6.6 4.7 4.0 7.1
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Com Feb Mar Apr May Jun Jul Aug Sep	Mean 11.2 11.1 11.8 11.6 11.2 10.8 10.5 11.3 10.5 11.3 11.2 11.2 11.2 11.3 Rate Mean 49.2 51.0 54.1 54.7 58.1 58.5 61.4 62.3 59.8	Cul St. Dev. 3.7 2.5 4.5 3.2 2.4 2.4 2.9 2.6 2.9 2.7 2.4 2.6 Zea mays St. Dev. 15.0 12.5 15.7 12.8 15.8 15.8 15.8 15.8 15.8 15.8 15.8 15	Port M Mean 38.8 38.6 39.3 38.9 41.0 40.9 41.7 43.2 44.1 43.4 41.1 41.9 Port Me Mean 78.2 76.9 80.0 75.1 81.9 85.1 81.9 85.1 87.4 92.0 94.6	St. Dev. 8.1 7.7 9.7 7.3 9.6 8.4 9.4 11.2 10.4 8.5 8.2 8.1 000000 St. Dev. 14.1 10.8 11.0 7.1 11.8 9.6 11.0 12.6 14.4	Mean 23.4 23.5 22.9 23.0 23.2 23.2 24.1 22.5 23.7 23.9 24.3 23.5 24.3 23.5 24.3 23.5 24.3 23.5 24.3 23.5 24.3 23.5 24.3 23.5 24.3 23.5 24.1 23.5 23.7 23.9 24.3 23.5 23.9 24.3 23.5 24.1 23.5 23.9 24.3 23.5 24.1 23.5 23.9 24.3 23.5 24.1 23.5 23.9 24.3 23.5 23.9 24.3 23.5 24.1 23.5 24.1 23.5 24.1 23.5 24.1 23.5 23.9 24.3 23.5 24.1 23.5 24.1 23.5 24.1 23.5 24.1 23.5 24.1 23.5 24.1 23.5 24.1 23.5 24.3 23.5 24.5 24.5 24.5 24.5 24.5 24.5 24.5 24	St. Dev. 4.9 3.4 3.5 4.4 5.0 4.5 4.7 5.0 5.2 4.1 3.5 4.6 St. Dev. 8.7 6.4 6.2 8.7 5.0 5.4 14.7 6.7 10.3	Mean 13.3 12.6 13.0 12.6 13.0 12.7 13.0 12.9 13.6 13.2 12.7 13.5 Mode Mean 27.9 27.1 28.5 31.0 34.8 39.3 40.1 38.0 39.4	St. Dev. 4.0 2.9 3.2 2.7 3.1 3.2 3.6 3.8 6.2 4.1 2.7 2.9 St. Dev. 8.8 5.4 6.5 7.3 6.5 13.0 8.8 6.5 13.0 8.8 6.5 8.9	Mean 40.2 43.3 47.6 44.2 42.3 42.5 46.7 47.6 44.9 46.2 47.3 46.6 Gorok Mean 30.9 29.2 29.0 30.1 32.6 32.7 34.1 39.2 38.6	St. Dev. 7.3 4.6 8.4 10.6 7.8 11.6 5.2 7.6 8.7 9.4 7.9 13.7 St. Dev. 5.5 6.8 6.7 6.6 6.6 4.7 4.0 7.1 7.6
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Com Jan Feb Mar Apr May Jul Aug Sep Oct	Mean 11.2 11.1 11.8 11.6 11.2 10.8 10.5 10.5 11.3 11.2 11.2 11.3 11.2 11.2 11.3 Mean 49.2 51.0 54.1 54.7 58.1 58.5 61.4 62.3 59.8 56.6	Cul St. Dev. 3.7 2.5 4.5 3.2 2.4 2.4 2.9 2.6 2.9 2.7 2.4 2.6 Zea mays St. Dev. 15.0 12.5 15.7 12.8 15.8 17.6 13.7 13.6 10.6 11.4	Port M Mean 38.8 38.6 39.3 38.9 41.0 40.9 41.7 43.2 44.1 43.4 41.1 41.9 Port M Mean 78.2 76.9 80.0 75.1 81.9 85.1 81.9 85.1 87.4 92.0 94.6 89.5	St. Dev. 8.1 7.7 9.7 7.3 9.6 8.4 9.4 11.2 10.4 8.5 8.2 8.1 000000 St. Dev. 14.1 10.8 11.0 7.1 11.8 9.6 11.0 12.6 14.4 12.0	Mean 23.4 23.5 22.9 23.0 23.2 23.2 24.1 22.5 23.7 23.9 24.3 23.5 23.7 23.9 24.3 23.5 24.3 23.5 24.3 23.5 24.3 23.5 24.1 23.5 24.1 23.5 24.1 23.5 24.1 23.5 24.1 23.5 23.7 23.9 24.3 23.5 24.1 23.5 23.9 24.3 23.5 24.1 23.5 23.9 24.3 23.5 23.9 24.3 23.5 24.1 23.5 24.1 23.5 24.1 23.5 23.9 24.1 23.5 23.9 24.3 23.5 24.1 23.5 24.1 23.5 23.9 24.3 23.5 24.1 23.5 23.9 24.3 23.5 24.3 23.5 24.1 23.5 24.1 23.5 23.9 24.3 23.5 2 23.5 24.5 24.5 24.5 24.5 24.5 24.5 24.5 24	St. Dev. 4.9 3.4 3.5 4.4 5.0 4.5 4.7 5.0 5.2 4.1 3.5 4.6 St. Dev. 8.7 6.4 6.2 8.7 5.0 5.4 14.7 6.7 10.3 11.1	Mean 13.3 12.6 13.0 12.6 13.0 12.7 13.0 12.9 13.6 13.2 12.7 13.5 Mode Mean 27.9 27.1 28.5 31.0 34.8 39.3 40.1 38.0 39.4 36.1	St. Dev. 4.0 2.9 3.2 2.7 3.1 3.2 3.6 3.8 6.2 4.1 2.7 2.9 St. Dev. 8.8 5.4 6.5 7.3 6.5 7.3 6.5 13.0 8.8 6.5 13.0 8.8 6.5 13.0 8.8 6.5 13.0 8.8 6.5 13.0 8.8 6.5 13.0 8.8 6.5 13.0 8.8 6.5 13.0 8.8 6.5 13.0 8.8 6.5 13.0 8.8 6.5 13.0 8.8 6.5 13.0 8.8 6.5 13.0 8.8 6.5 13.0 8.8 6.5 13.0 8.8 6.5 13.0 8.8 6.5 13.0 8.8 6.5 7.3 6.5 7.3 6.5 7.3 6.5 7.3 6.5 7.3 6.5 7.3 6.5 7.3 6.5 7.3 6.5 7.3 7.3 7.3 7.3 7.3 7.3 7.3 7.3 7.3 7.3	Mean 40.2 43.3 47.6 44.2 42.3 42.5 46.7 47.6 44.9 46.2 47.3 46.6 Gorok Mean 30.9 29.2 29.0 30.1 32.6 32.7 34.1 39.2 38.6 39.4	St. Dev. 7.3 4.6 8.4 10.6 7.8 11.6 5.2 7.6 8.7 9.4 7.9 13.7 St. Dev. 5.5 6.8 6.7 6.6 6.6 6.6 4.7 4.0 7.1 7.6 7.9
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Com Feb Mar Apr May Jun Jul Aug Sep	Mean 11.2 11.1 11.8 11.6 11.2 10.8 10.5 11.3 10.5 11.3 11.2 11.2 11.2 11.3 Rate Mean 49.2 51.0 54.1 54.7 58.1 58.5 61.4 62.3 59.8	Cul St. Dev. 3.7 2.5 4.5 3.2 2.4 2.4 2.9 2.6 2.9 2.7 2.4 2.6 Zea mays St. Dev. 15.0 12.5 15.7 12.8 15.8 15.8 15.8 15.8 15.8 15.8 15.8 15	Port M Mean 38.8 38.6 39.3 38.9 41.0 40.9 41.7 43.2 44.1 43.4 41.1 41.9 Port Me Mean 78.2 76.9 80.0 75.1 81.9 85.1 81.9 85.1 87.4 92.0 94.6	St. Dev. 8.1 7.7 9.7 7.3 9.6 8.4 9.4 11.2 10.4 8.5 8.2 8.1 000000 St. Dev. 14.1 10.8 11.0 7.1 11.8 9.6 11.0 12.6 14.4	Mean 23.4 23.5 22.9 23.0 23.2 23.2 24.1 22.5 23.7 23.9 24.3 23.5 24.3 23.5 24.3 23.5 24.3 23.5 24.3 23.5 24.3 23.5 24.3 23.5 24.3 23.5 24.1 23.5 23.7 23.9 24.3 23.5 23.9 24.3 23.5 24.1 23.5 23.9 24.3 23.5 24.1 23.5 23.9 24.3 23.5 24.1 23.5 23.9 24.3 23.5 23.9 24.3 23.5 24.1 23.5 24.1 23.5 24.1 23.5 24.1 23.5 23.9 24.3 23.5 24.1 23.5 24.1 23.5 24.1 23.5 24.1 23.5 24.1 23.5 24.1 23.5 24.1 23.5 24.3 23.5 24.5 24.5 24.5 24.5 24.5 24.5 24.5 24	St. Dev. 4.9 3.4 3.5 4.4 5.0 4.5 4.7 5.0 5.2 4.1 3.5 4.6 St. Dev. 8.7 6.4 6.2 8.7 5.0 5.4 14.7 6.7 10.3	Mean 13.3 12.6 13.0 12.6 13.0 12.7 13.0 12.9 13.6 13.2 12.7 13.5 Mode Mean 27.9 27.1 28.5 31.0 34.8 39.3 40.1 38.0 39.4	St. Dev. 4.0 2.9 3.2 2.7 3.1 3.2 3.6 3.8 6.2 4.1 2.7 2.9 St. Dev. 8.8 5.4 6.5 7.3 6.5 13.0 8.8 6.5 13.0 8.8 6.5 8.9	Mean 40.2 43.3 47.6 44.2 42.3 42.5 46.7 47.6 44.9 46.2 47.3 46.6 Gorok Mean 30.9 29.2 29.0 30.1 32.6 32.7 34.1 39.2 38.6	St. Dev. 7.3 4.6 8.4 10.6 7.8 11.6 5.2 7.6 8.7 9.4 7.9 13.7 St. Dev. 5.5 6.8 6.7 6.6 6.6 4.7 4.0 7.1 7.6

Source: Weekly prices recorded for the consumer price index for the National Statistics Office



Table 26. Mean monthly price (toea/kg) and standard deviation for cucumber, peanuts, pineapple and pumpkin trutt at five urban markets, January 1971 to December 1992, in constant 1991 prices

Cucumb	her	Cucumis s	athus							
Cocont		baul		Moresby	L	œ	Mac	dang	60	roka
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
Jan	46.7	11.5	69.3	10.7	46.4	11.1	21.9	6.7	38.6	4.2
Feb	53.7	14.8	69.6	10.6	46.3	8.7	23.5	5.3	38.9	8.0
Mar	59.8	17.8	71.8	7.9	46.6	8.3	28.0	6.6	38.9	8.3
Apr	57.8	16.5	75.9	11.0	50.5	12.5	36.3	9.3	45.5	13.2
May	54.5	14.1	76.0	8.9	56.2	11.3	35.4	5.8	56.0	15.4
Jun	52.4	10.7	82.7	10.1	63.8	12.2	41.2	7.0	61.5	21.8
Jul	57.4	16.5	88.8	19.8	61.0	13.5	45.1	12.1	65.9	24.6
Aug	53.6	12.3	88.0	16.5	58.5	8.7	53.1	9.5	71.0	32.2
Sep	48.5	9.9	89.0	17.5	60.4	8.9	44.4	6.0	76.5	26.4
Oct	47.8	10.8	92.3	18.5	62.0	11.2	48.3	12.0	65.2	20.4
Nov	45.2	14.3	84.3	14.4	59.8	8.2	32.1	5.4	69.4	23.1
Dec	46.1	15.4	81.1	10.1	52.8	13.5	25.6	7.4	54.2	18.5
			•							10.0
Peanuts		Arachis hyp	pogoed							
	Rab			<b>fores</b> by	La	0	Mad	ang	Gord	ka
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
Jan	116.3	21.8	360.7	30.1	199.7	48.4	199.3	42.8	147.8	38.8
Feb	138.6	40.5	347.7	43.2	202.8	36.5	199.1	50.9	127.2	30.5
Mar	152.8	42.9	370.2	59.7	198.9	53.2	214.5	42.7	118.6	24.7
Apr	152.0	45.6	347.2	58.0	193.4	48.3	229.0	47.2	134.0	42.9
May	159.8	42.4	342.3	54.2	200.5	47.7	220.2	52.3	152.7	40.7
Jun	154.7	41.1	348.6	53.3	203.0	47.3	220.1	46.4	156.7	43.6
Jul	171.7	38.2	392.3	42.7	213.7	55.6	234.3	54.1	154.2	35.5
Aug	181.8	41.7	406.1	36.3	235.4	<b>57.3</b>	220.6	57.1	162.3	49.2
Sep	166.0	51.2	434.1	54.0	235.6	61.6	236.8	75.3	183.2	40.6
Oct	151.7	48.8	424.9	63.1	248.5	71.2	237.9	61.8	174.5	44.9
Nov	131.1	29.0	423.4	56.5	237.9	59.7	222.8	64.7	187.9	45.2
Dec	129.5	25.2	381.0	32.6	224.0	67.0	238.0	49.2	173.4	38.9
Pineapple		Ananas con	nosus							
	Rabo		Port M	•	Lo		Mada		Gorol	a
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
Jan	<b>Mean</b> 40.0	St. Dev. 12.9	Mean 66.2	St. Dev. 12.0	<b>Mean</b> 67.0	St. Dev. 9.8	Mean 38.1	St. Dev. 7.5	Mean 67.6	St. Dev. 9.0
Feb	<b>Mean</b> 40.0 41.2	St. Dev. 12.9 12.6	Mean 66.2 73.0	St. Dev. 12.0 17.5	Mean 67.0 71.4	St. D <b>ev.</b> 9.8 9.5	Mean 38.1 39.3	St. Dev. 7.5 8.6	Mean 67.6 66.7	St. Dev. 9.0 11.3
Feb Mar	Mean 40.0 41.2 49.1	St. Dev. 12.9 12.6 19.5	Mean 66.2 73.0 81.2	St. Dev. 12.0 17.5 11.3	Mean 67.0 71.4 84.7	St. Dev. 9.8 9.5 16.7	Mean 38.1 39.3 45.2	St. Dev. 7.5 8.6 7.4	Mean 67.6 66.7 67.6	St. Dev. 9.0 11.3 11.0
Feb Mar Apr	Mean 40.0 41.2 49.1 61.6	St. Dev. 12.9 12.6 19.5 21.1	Mean 66.2 73.0 81.2 90.0	St. Dev. 12.0 17.5 11.3 13.5	Mean 67.0 71.4 84.7 87.5	St. Dev. 9.8 9.5 16.7 17.6	Mean 38.1 39.3 45.2 48.8	St. Dev. 7.5 8.6 7.4 12.2	Mean 67.6 66.7 67.6 70.5	St. Dev. 9.0 11.3 11.0 13.6
Feb Mar Apr May	Mean 40.0 41.2 49.1 61.6 69.3	St. Dev. 12.9 12.6 19.5 21.1 29.0	Mean 66.2 73.0 81.2 90.0 93.7	St. Dev. 12.0 17.5 11.3 13.5 19.1	Mean 67.0 71.4 84.7 87.5 91.8	St. Dev. 9.8 9.5 16.7 17.6 13.4	Mean 38.1 39.3 45.2 48.8 46.3	St. Dev. 7.5 8.6 7.4 12.2 15.3	Mean 67.6 66.7 67.6 70.5 77.1	St. Dev. 9.0 11.3 11.0 13.6 12.9
Feb Mar Apr May Jun	Mean 40.0 41.2 49.1 61.6 69.3 73.7	St. Dev. 12.9 12.6 19.5 21.1 29.0 32.2	Mean 66.2 73.0 81.2 90.0 93.7 92.1	St. Dev. 12.0 17.5 11.3 13.5 19.1 15.1	Mean 67.0 71.4 84.7 87.5 91.8 87.2	St. Dev. 9.8 9.5 16.7 17.6 13.4 15.0	Mean 38.1 39.3 45.2 48.8 46.3 46.0	St. Dev. 7.5 8.6 7.4 12.2 15.3 5.7	Mean 67.6 66.7 67.6 70.5 77.1 75.2	St. Dev. 9.0 11.3 11.0 13.6 12.9 11.4
Feb Mar Apr May Jun Jul	Mean 40.0 41.2 49.1 61.6 69.3 73.7 63.4	St. Dev. 12.9 12.6 19.5 21.1 29.0 32.2 24.8	Mean 66.2 73.0 81.2 90.0 93.7 92.1 93.0	St. Dev. 12.0 17.5 11.3 13.5 19.1 15.1 17.2	Mean 67.0 71.4 84.7 87.5 91.8 87.2 92.0	St. Dev. 9.8 9.5 16.7 17.6 13.4 15.0 16.8	Mean 38.1 39.3 45.2 48.8 46.3 46.0 50.0	St. Dev. 7.5 8.6 7.4 12.2 15.3 5.7 9.9	Mean 67.6 66.7 67.6 70.5 77.1 75.2 75.9	St. Dev. 9.0 11.3 11.0 13.6 12.9 11.4 11.7
Feb Mar Apr May Jun Jul Aug	Mean 40.0 41.2 49.1 61.6 69.3 73.7 63.4 59.7	St. Dev. 12.9 12.6 19.5 21.1 29.0 32.2 24.8 22.7	Mean 66.2 73.0 81.2 90.0 93.7 92.1 93.0 95.6	St. Dev. 12.0 17.5 11.3 13.5 19.1 15.1 17.2 20.0	Mean 67.0 71.4 84.7 87.5 91.8 87.2 92.0 87.8	St. Dev. 9.8 9.5 16.7 17.6 13.4 15.0 16.8 19.4	Mean 38.1 39.3 45.2 48.8 46.3 46.0 50.0 49.3	St. Dev. 7.5 8.6 7.4 12.2 15.3 5.7 9.9 10.2	Mean 67.6 66.7 67.6 70.5 77.1 75.2 75.9 83.3	St. Dev. 9.0 11.3 11.0 13.6 12.9 11.4 11.7 21.9
Feb Mar Apr May Jun Jul Aug Sep	Mean 40.0 41.2 49.1 61.6 69.3 73.7 63.4 59.7 57.9	St. Dev. 12.9 12.6 19.5 21.1 29.0 32.2 24.8 22.7 25.6	Mean 66.2 73.0 81.2 90.0 93.7 92.1 93.0 95.6 93.1	St. Dev. 12.0 17.5 11.3 13.5 19.1 15.1 17.2 20.0 18.9	Mean 67.0 71.4 84.7 87.5 91.8 87.2 92.0 87.8 85.0	St. Dev. 9.8 9.5 16.7 17.6 13.4 15.0 16.8 19.4 18.1	Mean 38.1 39.3 45.2 48.8 46.3 46.0 50.0 49.3 47.6	St. Dev. 7.5 8.6 7.4 12.2 15.3 5.7 9.9 10.2 10.2	Mean 67.6 66.7 67.6 70.5 77.1 75.2 75.9 83.3 78.8	St. Dev. 9.0 11.3 11.0 13.6 12.9 11.4 11.7 21.9 10.3
Feb Mar Apr Jun Jul Aug Sep Oct	Mean 40.0 41.2 49.1 61.6 69.3 73.7 63.4 59.7 57.9 55.1	St. Dev. 12.9 12.6 19.5 21.1 29.0 32.2 24.8 22.7 25.6 17.5	Mean 66.2 73.0 81.2 90.0 93.7 92.1 93.0 95.6 93.1 88.5	St. Dev. 12.0 17.5 11.3 13.5 19.1 15.1 17.2 20.0 18.9 14.2	Mean 67.0 71.4 84.7 87.5 91.8 87.2 92.0 87.8 85.0 79.6	St. Dev. 9.8 9.5 16.7 17.6 13.4 15.0 16.8 19.4 18.1 16.8	Mean 38.1 39.3 45.2 48.8 46.3 46.0 50.0 49.3 47.6 46.7	St. Dev. 7.5 8.6 7.4 12.2 15.3 5.7 9.9 10.2 10.2 7.1	Mean 67.6 66.7 67.6 70.5 77.1 75.2 75.9 83.3 78.8 75.9	St. Dev. 9.0 11.3 11.0 13.6 12.9 11.4 11.7 21.9 10.3 11.5
Feb Mar Apr Jun Jul Aug Sep Oct Nov	Mean 40.0 41.2 49.1 61.6 69.3 73.7 63.4 59.7 57.9 55.1 51.9	St. Dev. 12.9 12.6 19.5 21.1 29.0 32.2 24.8 22.7 25.6 17.5 18.3	Mean 66.2 73.0 81.2 90.0 93.7 92.1 93.0 95.6 93.1 88.5 81.1	St. Dev. 12.0 17.5 11.3 13.5 19.1 15.1 17.2 20.0 18.9 14.2 13.0	Mean 67.0 71.4 84.7 87.5 91.8 87.2 92.0 87.8 85.0 79.6 80.3	St. Dev. 9.8 9.5 16.7 17.6 13.4 15.0 16.8 19.4 18.1 16.8 11.9	Mean 38.1 39.3 45.2 48.8 46.3 46.0 50.0 49.3 47.6 46.7 46.3	St. Dev. 7.5 8.6 7.4 12.2 15.3 5.7 9.9 10.2 10.2 7.1 9.3	Mean 67.6 66.7 67.6 70.5 77.1 75.2 75.9 83.3 78.8 75.9 77.3	St. Dev. 9.0 11.3 11.0 13.6 12.9 11.4 11.7 21.9 10.3 11.5 11.6
Feb Mar Apr Jun Jul Aug Sep Oct	Mean 40.0 41.2 49.1 61.6 69.3 73.7 63.4 59.7 57.9 55.1	St. Dev. 12.9 12.6 19.5 21.1 29.0 32.2 24.8 22.7 25.6 17.5	Mean 66.2 73.0 81.2 90.0 93.7 92.1 93.0 95.6 93.1 88.5	St. Dev. 12.0 17.5 11.3 13.5 19.1 15.1 17.2 20.0 18.9 14.2	Mean 67.0 71.4 84.7 87.5 91.8 87.2 92.0 87.8 85.0 79.6	St. Dev. 9.8 9.5 16.7 17.6 13.4 15.0 16.8 19.4 18.1 16.8	Mean 38.1 39.3 45.2 48.8 46.3 46.0 50.0 49.3 47.6 46.7	St. Dev. 7.5 8.6 7.4 12.2 15.3 5.7 9.9 10.2 10.2 7.1	Mean 67.6 66.7 67.6 70.5 77.1 75.2 75.9 83.3 78.8 75.9	St. Dev. 9.0 11.3 11.0 13.6 12.9 11.4 11.7 21.9 10.3 11.5
Feb Mar Apr Jun Jul Aug Sep Oct Nov Dec	Mean 40.0 41.2 49.1 61.6 69.3 73.7 63.4 59.7 57.9 55.1 51.9 47.1	St. Dev. 12.9 12.6 19.5 21.1 29.0 32.2 24.8 22.7 25.6 17.5 18.3 16.0	Mean 66.2 73.0 81.2 90.0 93.7 92.1 93.0 95.6 93.1 88.5 81.1 73.8	St. Dev. 12.0 17.5 11.3 13.5 19.1 15.1 17.2 20.0 18.9 14.2 13.0	Mean 67.0 71.4 84.7 87.5 91.8 87.2 92.0 87.8 85.0 79.6 80.3	St. Dev. 9.8 9.5 16.7 17.6 13.4 15.0 16.8 19.4 18.1 16.8 11.9	Mean 38.1 39.3 45.2 48.8 46.3 46.0 50.0 49.3 47.6 46.7 46.3	St. Dev. 7.5 8.6 7.4 12.2 15.3 5.7 9.9 10.2 10.2 7.1 9.3	Mean 67.6 66.7 67.6 70.5 77.1 75.2 75.9 83.3 78.8 75.9 77.3	St. Dev. 9.0 11.3 11.0 13.6 12.9 11.4 11.7 21.9 10.3 11.5 11.6
Feb Mar Apr Jun Jul Aug Sep Oct Nov	Mean 40.0 41.2 49.1 61.6 69.3 73.7 63.4 59.7 57.9 55.1 51.9 47.1	St. Dev. 12.9 12.6 19.5 21.1 29.0 32.2 24.8 22.7 25.6 17.5 18.3 16.0 Cucurbila m	Mean 66.2 73.0 81.2 90.0 93.7 92.1 93.0 95.6 93.1 88.5 81.1 73.8 weechata	St. Dev. 12.0 17.5 11.3 13.5 19.1 15.1 17.2 20.0 18.9 14.2 13.0 13.1	Mean 67.0 71.4 84.7 87.5 91.8 87.2 92.0 87.8 85.0 79.6 80.3 70.2	St. Dev. 9.8 9.5 16.7 17.6 13.4 15.0 16.8 19.4 18.1 16.8 11.9 11.4	Mean 38.1 39.3 45.2 48.8 46.3 46.0 50.0 49.3 47.6 46.7 46.3 44.6	St. Dev. 7.5 8.6 7.4 12.2 15.3 5.7 9.9 10.2 10.2 7.1 9.3 8.8	Mean 67.6 66.7 67.6 70.5 77.1 75.2 75.9 83.3 78.8 75.9 77.3 75.2	St. Dev. 9.0 11.3 11.0 13.6 12.9 11.4 11.7 21.9 10.3 11.5 11.6 12.5
Feb Mar Apr Jun Jul Aug Sep Oct Nov Dec Pumpidin fi	Mean 40.0 41.2 49.1 61.6 69.3 73.7 63.4 59.7 57.9 55.1 51.9 47.1 wult (	St. Dev. 12.9 12.6 19.5 21.1 29.0 32.2 24.8 22.7 25.6 17.5 18.3 16.0 Cucurbila m sul	Mean 66.2 73.0 81.2 90.0 93.7 92.1 93.0 95.6 93.1 88.5 81.1 73.8 weechata Port Ma	St. Dev. 12.0 17.5 11.3 13.5 19.1 15.1 17.2 20.0 18.9 14.2 13.0 13.1 presby	Mean 67.0 71.4 84.7 87.5 91.8 87.2 92.0 87.8 85.0 79.6 80.3 70.2	St. Dev. 9.8 9.5 16.7 17.6 13.4 15.0 16.8 19.4 18.1 16.8 11.9 11.4	Mean 38.1 39.3 45.2 48.8 46.3 46.0 50.0 49.3 47.6 46.7 46.3 44.6 Madar	St. Dev.         7.5         8.6         7.4         12.2         15.3         5.7         9.9         10.2         10.2         7.1         9.3         8.8	Mean 67.6 66.7 67.6 70.5 77.1 75.2 75.9 83.3 78.8 75.9 77.3 75.2 Goroka	St. Dev. 9.0 11.3 11.0 13.6 12.9 11.4 11.7 21.9 10.3 11.5 11.6 12.5
Feb Mar Apr Jun Jul Aug Sep Oct Nov Dec Pumpidin fi	Mean 40.0 41.2 49.1 61.6 69.3 73.7 63.4 59.7 57.9 55.1 51.9 47.1 wuit Rabo Mean	St. Dev. 12.9 12.6 19.5 21.1 29.0 32.2 24.8 22.7 25.6 17.5 18.3 16.0 Cucurbila m St. Dev.	Mean 66.2 73.0 81.2 90.0 93.7 92.1 93.0 95.6 93.1 86.5 81.1 73.8 Noechala Port Ma Mean	St. Dev. 12.0 17.5 11.3 13.5 19.1 15.1 17.2 20.0 18.9 14.2 13.0 13.1 presby St. Dev.	Mean 67.0 71.4 84.7 87.5 91.8 87.2 92.0 87.8 85.0 79.6 80.3 70.2 Lae Mean	St. Dev. 9.8 9.5 16.7 17.6 13.4 15.0 16.8 19.4 18.1 16.8 11.9 11.4 St. Dev.	Mean 38.1 39.3 45.2 48.8 46.3 46.0 50.0 49.3 47.6 46.7 46.3 44.6 Madar Mean	St. Dev.         7.5         8.6         7.4         12.2         15.3         5.7         9.9         10.2         10.2         7.1         9.3         8.8         St. Dev.	Mean 67.6 66.7 67.6 70.5 77.1 75.2 75.9 83.3 78.8 75.9 77.3 75.2 Goroka Mean	St. Dev. 9.0 11.3 11.0 13.6 12.9 11.4 11.7 21.9 10.3 11.5 11.6 12.5 St. Dev.
Feb Mar Apr Jun Jul Aug Sep Oct Nov Dec Pumpidin fi	Mean 40.0 41.2 49.1 61.6 69.3 73.7 63.4 59.7 57.9 55.1 51.9 47.1 wult Rabo Mean 23.4	St. Dev. 12.9 12.6 19.5 21.1 29.0 32.2 24.8 22.7 25.6 17.5 18.3 16.0 Cucurbila m St. Dev. 4.7	Mean 66.2 73.0 81.2 90.0 93.7 92.1 93.0 95.6 93.1 88.5 81.1 73.8 meechaka Port Me Mean 50.4	St. Dev. 12.0 17.5 11.3 13.5 19.1 15.1 17.2 20.0 18.9 14.2 13.0 13.1 presby St. Dev. 7.7	Mean 67.0 71.4 84.7 87.5 91.8 87.2 92.0 87.8 85.0 79.6 80.3 70.2 Lae Mean 28.1	St. Dev. 9.8 9.5 16.7 17.6 13.4 15.0 16.8 19.4 18.1 16.8 11.9 11.4 St. Dev. 4.7	Mean 38.1 39.3 45.2 48.8 46.3 46.0 50.0 49.3 47.6 46.7 46.3 44.6 Madar Mean 19.0	St. Dev.         7.5         8.6         7.4         12.2         15.3         5.7         9.9         10.2         10.2         7.1         9.3         8.8         St. Dev.         3.1	Mean 67.6 66.7 67.6 70.5 77.1 75.2 75.9 83.3 78.8 75.9 77.3 75.2 Goroka Mean 22.9	St. Dev. 9.0 11.3 11.0 13.6 12.9 11.4 11.7 21.9 10.3 11.5 11.6 12.5 St. Dev. 6.4
Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Pumpikin fi Jan Feb	Mean 40.0 41.2 49.1 61.6 69.3 73.7 63.4 59.7 57.9 55.1 51.9 47.1 wult Rabo Mean 23.4 23.6	St. Dev. 12.9 12.6 19.5 21.1 29.0 32.2 24.8 22.7 25.6 17.5 18.3 16.0 Cucurbila m st. Dev. 4.7 4.7	Mean 66.2 73.0 81.2 90.0 93.7 92.1 93.0 95.6 93.1 88.5 81.1 73.8 000000000 Port Mean 50.4 53.6	St. Dev. 12.0 17.5 11.3 13.5 19.1 15.1 17.2 20.0 18.9 14.2 13.0 13.1 presby St. Dev. 7.7 8.2	Mean 67.0 71.4 84.7 87.5 91.8 87.2 92.0 87.8 85.0 79.6 80.3 70.2 Lae Mean 28.1 29.0	St. Dev. 9.8 9.5 16.7 17.6 13.4 15.0 16.8 19.4 18.1 16.8 11.9 11.4 St. Dev. 4.7 3.7	Mean 38.1 39.3 45.2 48.8 46.3 46.0 50.0 49.3 47.6 46.7 46.3 44.6 Madar Mean 19.0 18.1	St. Dev.         7.5         8.6         7.4         12.2         15.3         5.7         9.9         10.2         7.1         9.3         8.8         St. Dev.         3.1         3.4	Mean 67.6 66.7 67.6 70.5 77.1 75.2 75.9 83.3 78.8 75.9 77.3 75.2 75.9 83.3 78.8 75.9 77.3 75.2 Goroka Mean 22.9 22.8	St. Dev. 9.0 11.3 11.0 13.6 12.9 11.4 11.7 21.9 10.3 11.5 11.6 12.5 St. Dev. 6.4 5.3
Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Pumpkin fi Feb Mar	Mean 40.0 41.2 49.1 61.6 69.3 73.7 63.4 59.7 57.9 55.1 51.9 47.1 mult Rabo Mean 23.4 23.6 23.8	St. Dev. 12.9 12.6 19.5 21.1 29.0 32.2 24.8 22.7 25.6 17.5 18.3 16.0 Cucurbila m st. Dev. 4.7 4.7 5.3	Mean 66.2 73.0 81.2 90.0 93.7 92.1 93.0 95.6 93.1 88.5 81.1 73.8 000000000 Port Mean 50.4 53.6 50.5	St. Dev. 12.0 17.5 11.3 13.5 19.1 15.1 17.2 20.0 18.9 14.2 13.0 13.1 presby St. Dev. 7.7 8.2 5.8	Mean 67.0 71.4 84.7 87.5 91.8 87.2 92.0 87.8 85.0 79.6 80.3 70.2 Lae Mean 28.1 29.0 32.1	St. Dev. 9.8 9.5 16.7 17.6 13.4 15.0 16.8 19.4 18.1 16.8 11.9 11.4 St. Dev. 4.7 3.7 6.8	Mean 38.1 39.3 45.2 48.8 46.3 46.0 50.0 49.3 47.6 46.7 46.3 44.6 Madar Mean 19.0 18.1 18.9	St. Dev.         7.5         8.6         7.4         12.2         15.3         5.7         9.9         10.2         7.1         9.3         8.8         St. Dev.         3.1         3.4         5.4	Mean 67.6 66.7 67.6 70.5 77.1 75.2 75.9 83.3 78.8 75.9 77.3 75.2 Goroka Mean 22.9 22.8 24.4	St. Dev. 9.0 11.3 11.0 13.6 12.9 11.4 11.7 21.9 10.3 11.5 11.6 12.5 St. Dev. 6.4 5.3 7.1
Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Pumpkin fi Feb Mar Apr	Mean 40.0 41.2 49.1 61.6 69.3 73.7 63.4 59.7 57.9 55.1 51.9 47.1 rult Rabo Mean 23.4 23.6 23.8 24.8	St. Dev. 12.9 12.6 19.5 21.1 29.0 32.2 24.8 22.7 25.6 17.5 18.3 16.0 Cucurbila m st. Dev. 4.7 4.7 5.3 4.4	Mean 66.2 73.0 81.2 90.0 93.7 92.1 93.0 95.6 93.1 88.5 81.1 73.8 000000000 Port Mean 50.4 53.6 50.5 49.1	St. Dev. 12.0 17.5 11.3 13.5 19.1 15.1 17.2 20.0 18.9 14.2 13.0 13.1 St. Dev. 7.7 8.2 5.8 5.7	Mean 67.0 71.4 84.7 87.5 91.8 87.2 92.0 87.8 85.0 79.6 80.3 70.2 Lae Mean 28.1 29.0 32.1 31.5	St. Dev. 9.8 9.5 16.7 17.6 13.4 15.0 16.8 19.4 18.1 16.8 11.9 11.4 St. Dev. 4.7 3.7 6.8 9.8	Mean 38.1 39.3 45.2 48.8 46.3 46.0 50.0 49.3 47.6 46.7 46.3 44.6 Madar Mean 19.0 18.1 18.9 19.0	St. Dev.         7.5         8.6         7.4         12.2         15.3         5.7         9.9         10.2         7.1         9.3         8.8         St. Dev.         3.1         3.4         5.4         3.8	Mean 67.6 66.7 67.6 70.5 77.1 75.2 75.9 83.3 78.8 75.9 77.3 75.2 Goroka Mean 22.9 22.8 24.4 25.7	St. Dev. 9.0 11.3 11.0 13.6 12.9 11.4 11.7 21.9 10.3 11.5 11.6 12.5 St. Dev. 6.4 5.3 7.1 7.0
Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Pumpkin fi Feb Mar Apr May	Mean 40.0 41.2 49.1 61.6 69.3 73.7 63.4 59.7 57.9 55.1 51.9 47.1 rult Rabo Mean 23.4 23.6 23.8 24.8 25.2	St. Dev. 12.9 12.6 19.5 21.1 29.0 32.2 24.8 22.7 25.6 17.5 18.3 16.0 Cucurbila m st. Dev. 4.7 4.7 5.3 4.4 6.2	Mean 66.2 73.0 81.2 90.0 93.7 92.1 93.0 95.6 93.1 88.5 81.1 73.8 Noechata Port Ma Mean 50.4 53.6 50.5 49.1 48.8	St. Dev. 12.0 17.5 11.3 13.5 19.1 15.1 17.2 20.0 18.9 14.2 13.0 13.1 St. Dev. 7.7 8.2 5.8 5.7 6.2	Mean 67.0 71.4 84.7 87.5 91.8 87.2 92.0 87.8 85.0 79.6 80.3 70.2 Late Mean 28.1 29.0 32.1 31.5 33.6	St. Dev. 9.8 9.5 16.7 17.6 13.4 15.0 16.8 19.4 18.1 16.8 11.9 11.4 St. Dev. 4.7 3.7 6.8 9.8 11.5	Mean 38.1 39.3 45.2 48.8 46.3 46.0 50.0 49.3 47.6 46.7 46.3 44.6 Madar Madar 19.0 18.1 18.9 19.0 21.6	St. Dev.         7.5         8.6         7.4         12.2         15.3         5.7         9.9         10.2         7.1         9.3         8.8         St. Dev.         3.1         3.4         5.4         3.8         5.8	Mean 67.6 66.7 67.6 70.5 77.1 75.2 75.9 83.3 78.8 75.9 77.3 75.2 Goroka Mean 22.9 22.8 24.4 25.7 25.4	St. Dev. 9.0 11.3 11.0 13.6 12.9 11.4 11.7 21.9 10.3 11.5 11.6 12.5 St. Dev. 6.4 5.3 7.1 7.0 5.8
Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Pumpkin fi Feb Mar Apr May Jun	Mean 40.0 41.2 49.1 61.6 69.3 73.7 63.4 59.7 57.9 55.1 51.9 47.1 rult Rabo Mean 23.4 23.6 23.8 24.8 25.2 25.3	St. Dev. 12.9 12.6 19.5 21.1 29.0 32.2 24.8 22.7 25.6 17.5 18.3 16.0 Cucurbila m St. Dev. 4.7 4.7 5.3 4.4 6.2 4.1	Mean 66.2 73.0 81.2 90.0 93.7 92.1 93.0 95.6 93.1 88.5 81.1 73.8 Mean 50.4 53.6 50.4 53.6 50.5 49.1 48.8 49.9	St. Dev. 12.0 17.5 11.3 13.5 19.1 15.1 17.2 20.0 18.9 14.2 13.0 13.1 St. Dev. 7.7 8.2 5.8 5.7 6.2 6.4	Mean 67.0 71.4 84.7 87.5 91.8 87.2 92.0 87.8 85.0 79.6 80.3 70.2 Late Mean 28.1 29.0 32.1 31.5 33.6 35.6	St. Dev. 9.8 9.5 16.7 17.6 13.4 15.0 16.8 19.4 18.1 16.8 11.9 11.4 St. Dev. 4.7 3.7 6.8 9.8 11.5 15.8	Mean 38.1 39.3 45.2 48.8 46.3 46.0 50.0 49.3 47.6 46.7 46.3 44.6 Madar Madar 19.0 18.1 18.9 19.0 21.6 22.7	St. Dev.         7.5         8.6         7.4         12.2         15.3         5.7         9.9         10.2         7.1         9.3         8.8         St. Dev.         3.1         3.4         5.4         3.8         5.8         4.3	Mean 67.6 66.7 67.6 70.5 77.1 75.2 75.9 83.3 78.8 75.9 77.3 75.2 Goroka Mean 22.9 22.8 24.4 25.7 25.4 25.2	St. Dev. 9.0 11.3 11.0 13.6 12.9 11.4 11.7 21.9 10.3 11.5 11.6 12.5 St. Dev. 6.4 5.3 7.1 7.0 5.8 5.4
Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Pumpkin fi Feb Mar Apr May Jun Jui	Mean 40.0 41.2 49.1 61.6 69.3 73.7 63.4 59.7 57.9 55.1 51.9 47.1 Rabo Mean 23.4 23.6 23.8 24.8 25.2 25.3 27.2	St. Dev.         12.9         12.6         19.5         21.1         29.0         32.2         24.8         22.7         25.6         17.5         18.3         16.0         Cucurbila m         xul         St. Dev.         4.7         5.3         4.4         6.2         4.1         6.4	Mean 66.2 73.0 81.2 90.0 93.7 92.1 93.0 95.6 93.1 88.5 81.1 73.8 Port Mc Mean 50.4 53.6 50.5 49.1 48.8 49.9 52.6	St. Dev. 12.0 17.5 11.3 13.5 19.1 15.1 17.2 20.0 18.9 14.2 13.0 13.1 St. Dev. 7.7 8.2 5.8 5.7 6.2 6.4 7.6	Mean 67.0 71.4 84.7 87.5 91.8 87.2 92.0 87.8 85.0 79.6 80.3 70.2 Late Mean 28.1 29.0 32.1 31.5 33.6 35.6 35.1	St. Dev. 9.8 9.5 16.7 17.6 13.4 15.0 16.8 19.4 18.1 16.8 11.9 11.4 St. Dev. 4.7 3.7 6.8 9.8 11.5 15.8 15.4	Mean 38.1 39.3 45.2 48.8 46.3 46.0 50.0 49.3 47.6 46.7 46.3 44.6 Madar Madar 19.0 18.1 18.9 19.0 21.6 22.7 23.6	St. Dev.         7.5         8.6         7.4         12.2         15.3         5.7         9.9         10.2         7.1         9.3         8.8         St. Dev.         3.1         3.4         5.4         3.8         5.8         4.3         4.6	Mean 67.6 66.7 67.6 70.5 77.1 75.2 75.9 83.3 78.8 75.9 77.3 75.2 Goroka Mean 22.9 22.8 24.4 25.7 25.4 25.2 28.4	St. Dev. 9.0 11.3 11.0 13.6 12.9 11.4 11.7 21.9 10.3 11.5 11.6 12.5 St. Dev. 6.4 5.3 7.1 7.0 5.8 5.4 8.7
Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Pumpkin fi Feb Mar Apr May Jun Jul Aug	Mean 40.0 41.2 49.1 61.6 69.3 73.7 63.4 59.7 57.9 55.1 51.9 47.1 Rabo Mean 23.4 23.6 23.8 24.8 25.2 25.3 27.2 26.7	St. Dev.         12.9         12.6         19.5         21.1         29.0         32.2         24.8         22.7         25.6         17.5         18.3         16.0         Cucurbila m         xul         St. Dev.         4.7         5.3         4.4         6.2         4.1         6.4         5.6	Mean 66.2 73.0 81.2 90.0 93.7 92.1 93.0 95.6 93.1 88.5 81.1 73.8 Port Mc Mean 50.4 53.6 50.5 49.1 48.8 49.9 52.6 52.2	St. Dev. 12.0 17.5 11.3 13.5 19.1 15.1 17.2 20.0 18.9 14.2 13.0 13.1 St. Dev. 7.7 8.2 5.8 5.7 6.2 6.4 7.6 8.3	Mean 67.0 71.4 84.7 87.5 91.8 87.2 92.0 87.8 85.0 79.6 80.3 70.2 Lae Mean 28.1 29.0 32.1 31.5 33.6 35.6 35.1 35.8	St. Dev. 9.8 9.5 16.7 17.6 13.4 15.0 16.8 19.4 18.1 16.8 11.9 11.4 St. Dev. 4.7 3.7 6.8 9.8 11.5 15.8 15.4 13.1	Mean 38.1 39.3 45.2 48.8 46.3 46.0 50.0 49.3 47.6 46.7 46.3 44.6 Madar Madar 19.0 18.1 18.9 19.0 21.6 22.7 23.6 24.2	St. Dev.         7.5         8.6         7.4         12.2         15.3         5.7         9.9         10.2         7.1         9.3         8.8         St. Dev.         3.1         3.4         5.4         3.8         5.8         4.3         4.6         7.0	Mean 67.6 66.7 67.6 70.5 77.1 75.2 75.9 83.3 78.8 75.9 77.3 75.2 Goroka Mean 22.9 22.8 24.4 25.7 25.4 25.2 28.4 29.6	St. Dev. 9.0 11.3 11.0 13.6 12.9 11.4 11.7 21.9 10.3 11.5 11.6 12.5 St. Dev. 6.4 5.3 7.1 7.0 5.8 5.4 8.7 10.7
Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Pumpkin fi Feb Mar Apr May Jun Jul Aug Sep	Mean 40.0 41.2 49.1 61.6 69.3 73.7 63.4 59.7 57.9 55.1 51.9 47.1 Rabo Mean 23.4 23.6 23.8 23.8 24.8 25.2 25.3 27.2 26.7 26.0	St. Dev.         12.9         12.6         19.5         21.1         29.0         32.2         24.8         22.7         25.6         17.5         18.3         16.0         Cucurbila m         xul         St. Dev.         4.7         5.3         4.4         6.2         4.1         6.4         5.6         2.9	Mean 66.2 73.0 81.2 90.0 93.7 92.1 93.0 95.6 93.1 88.5 81.1 73.8 Port Mc Mean 50.4 53.6 50.5 49.1 48.8 49.9 52.6 52.2 50.9	St. Dev. 12.0 17.5 11.3 13.5 19.1 15.1 17.2 20.0 18.9 14.2 13.0 13.1 St. Dev. 7.7 8.2 5.8 5.7 6.2 6.4 7.6 8.3 7.5	Mean 67.0 71.4 84.7 87.5 91.8 87.2 92.0 87.8 85.0 79.6 80.3 70.2 Late Mean 28.1 29.0 32.1 31.5 33.6 35.6 35.6 35.8 34.3	St. Dev. 9.8 9.5 16.7 17.6 13.4 15.0 16.8 19.4 18.1 16.8 11.9 11.4 St. Dev. 4.7 3.7 6.8 9.8 11.5 15.8 15.4 13.1 13.8	Mean 38.1 39.3 45.2 48.8 46.3 46.0 50.0 49.3 47.6 46.7 46.3 44.6 Madar Madar 19.0 18.1 18.9 19.0 21.6 22.7 23.6 24.2 25.2	St. Dev.         7.5         8.6         7.4         12.2         15.3         5.7         9.9         10.2         7.1         9.3         8.8         St. Dev.         3.1         3.4         5.4         3.8         5.8         4.3         4.6         7.0         6.1	Mean 67.6 66.7 67.6 70.5 77.1 75.2 75.9 83.3 78.8 75.9 77.3 75.2 Goroka Mean 22.9 22.8 24.4 25.7 25.4 25.2 28.4 29.6 30.2	St. Dev. 9.0 11.3 11.0 13.6 12.9 11.4 11.7 21.9 10.3 11.5 11.6 12.5 St. Dev. 6.4 5.3 7.1 7.0 5.8 5.4 8.7 10.7 8.5
Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Pumpkin fi Feb Mar Apr May Jun Jul Aug Sep Oct	Mean 40.0 41.2 49.1 61.6 69.3 73.7 63.4 59.7 57.9 55.1 51.9 47.1 Kaba Mean 23.4 23.6 23.8 24.8 25.2 25.3 27.2 26.7 26.0 24.2	St. Dev. 12.9 12.6 19.5 21.1 29.0 32.2 24.8 22.7 25.6 17.5 18.3 16.0 Cucurbila m St. Dev. 4.7 4.7 5.3 4.4 6.2 4.1 6.4 5.6 2.9 2.7	Mean 66.2 73.0 81.2 90.0 93.7 92.1 93.0 95.6 93.1 88.5 81.1 73.8 Port Mc Mean 50.4 53.6 50.5 49.1 48.8 49.9 52.6 52.2 50.9 53.9	St. Dev. 12.0 17.5 11.3 13.5 19.1 15.1 17.2 20.0 18.9 14.2 13.0 13.1 St. Dev. 7.7 8.2 5.8 5.7 6.2 6.4 7.6 8.3 7.5 7.2	Mean 67.0 71.4 84.7 87.5 91.8 87.2 92.0 87.8 85.0 79.6 80.3 70.2 Lae Mean 28.1 29.0 32.1 31.5 33.6 35.6 35.6 35.1 35.8 34.3 34.7	St. Dev. 9.8 9.5 16.7 17.6 13.4 15.0 16.8 19.4 18.1 16.8 11.9 11.4 St. Dev. 4.7 3.7 6.8 9.8 11.5 15.8 15.4 13.1 13.8 12.4	Mean 38.1 39.3 45.2 48.8 46.3 46.0 50.0 49.3 47.6 46.7 46.3 44.6 Madar Madar Madar 19.0 18.1 18.9 19.0 21.6 22.7 23.6 24.2 25.2 24.0	St. Dev.         7.5         8.6         7.4         12.2         15.3         5.7         9.9         10.2         7.1         9.3         8.8         St. Dev.         3.1         3.4         5.4         3.8         5.8         4.3         4.6         7.0         6.1         6.4	Mean 67.6 66.7 67.6 70.5 77.1 75.2 75.9 83.3 78.8 75.9 77.3 75.2 Goroka Mean 22.9 22.8 24.4 25.7 25.4 25.2 28.4 29.6 30.2 32.2	St. Dev. 9.0 11.3 11.0 13.6 12.9 11.4 11.7 21.9 10.3 11.5 11.6 12.5 St. Dev. 6.4 5.3 7.1 7.0 5.8 5.4 8.7 10.7 8.5 12.2
Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Pumpkin fi Feb Mar Apr May Jun Jul Aug Sep Oct Nov	Mean 40.0 41.2 49.1 61.6 69.3 73.7 63.4 59.7 57.9 55.1 51.9 47.1 Rabo Mean 23.4 23.6 23.8 24.8 25.2 25.3 27.2 26.7 26.0 24.2 24.3	St. Dev. 12.9 12.6 19.5 21.1 29.0 32.2 24.8 22.7 25.6 17.5 18.3 16.0 Cucurbila m St. Dev. 4.7 4.7 5.3 4.4 6.2 4.1 6.4 5.6 2.9 2.7 2.5	Mean 66.2 73.0 81.2 90.0 93.7 92.1 93.0 95.6 93.1 88.5 81.1 73.8 Port Mc Mean 50.4 53.6 50.5 49.1 48.8 49.9 52.6 52.2 50.9 53.9 56.2	St. Dev. 12.0 17.5 11.3 13.5 19.1 15.1 17.2 20.0 18.9 14.2 13.0 13.1 St. Dev. 7.7 8.2 5.8 5.7 6.2 6.4 7.6 8.3 7.5 7.2 8.3	Mean 67.0 71.4 84.7 87.5 91.8 87.2 92.0 87.8 85.0 79.6 80.3 70.2 Lae Mean 28.1 29.0 32.1 31.5 33.6 35.6 35.6 35.1 35.8 34.3 34.7 32.7	St. Dev. 9.8 9.5 16.7 17.6 13.4 15.0 16.8 19.4 18.1 16.8 11.9 11.4 St. Dev. 4.7 3.7 6.8 9.8 11.5 15.8 15.4 13.1 13.8 12.4 5.5	Mean 38.1 39.3 45.2 48.8 46.3 46.0 50.0 49.3 47.6 46.7 46.3 44.6 Madar Madar 19.0 18.1 18.9 19.0 21.6 22.7 23.6 24.2 25.2 24.0 22.6	St. Dev.         7.5         8.6         7.4         12.2         15.3         5.7         9.9         10.2         7.1         9.3         8.8         St. Dev.         3.1         3.4         5.4         3.8         5.8         4.3         4.6         7.0         6.1         6.4         2.9	Mean 67.6 66.7 67.6 70.5 77.1 75.2 75.9 83.3 78.8 75.9 77.3 75.2 Goroka Mean 22.9 22.8 24.4 25.7 25.4 25.2 28.4 25.2 28.4 29.6 30.2 32.2 31.7	St. Dev. 9.0 11.3 11.0 13.6 12.9 11.4 11.7 21.9 10.3 11.5 11.6 12.5 St. Dev. 6.4 5.3 7.1 7.0 5.8 5.4 8.7 10.7 8.5 12.2 9.0
Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Pumpkin fi Feb Mar Apr May Jun Jul Aug Sep Oct	Mean 40.0 41.2 49.1 61.6 69.3 73.7 63.4 59.7 57.9 55.1 51.9 47.1 Kaba Mean 23.4 23.6 23.8 24.8 25.2 25.3 27.2 26.7 26.0 24.2	St. Dev. 12.9 12.6 19.5 21.1 29.0 32.2 24.8 22.7 25.6 17.5 18.3 16.0 Cucurbila m St. Dev. 4.7 4.7 5.3 4.4 6.2 4.1 6.4 5.6 2.9 2.7	Mean 66.2 73.0 81.2 90.0 93.7 92.1 93.0 95.6 93.1 88.5 81.1 73.8 Port Mc Mean 50.4 53.6 50.5 49.1 48.8 49.9 52.6 52.2 50.9 53.9	St. Dev. 12.0 17.5 11.3 13.5 19.1 15.1 17.2 20.0 18.9 14.2 13.0 13.1 St. Dev. 7.7 8.2 5.8 5.7 6.2 6.4 7.6 8.3 7.5 7.2	Mean 67.0 71.4 84.7 87.5 91.8 87.2 92.0 87.8 85.0 79.6 80.3 70.2 Lae Mean 28.1 29.0 32.1 31.5 33.6 35.6 35.6 35.1 35.8 34.3 34.7	St. Dev. 9.8 9.5 16.7 17.6 13.4 15.0 16.8 19.4 18.1 16.8 11.9 11.4 St. Dev. 4.7 3.7 6.8 9.8 11.5 15.8 15.4 13.1 13.8 12.4	Mean 38.1 39.3 45.2 48.8 46.3 46.0 50.0 49.3 47.6 46.7 46.3 44.6 Madar Madar Madar 19.0 18.1 18.9 19.0 21.6 22.7 23.6 24.2 25.2 24.0	St. Dev.         7.5         8.6         7.4         12.2         15.3         5.7         9.9         10.2         7.1         9.3         8.8         St. Dev.         3.1         3.4         5.4         3.8         5.8         4.3         4.6         7.0         6.1         6.4	Mean 67.6 66.7 67.6 70.5 77.1 75.2 75.9 83.3 78.8 75.9 77.3 75.2 Goroka Mean 22.9 22.8 24.4 25.7 25.4 25.2 28.4 29.6 30.2 32.2	St. Dev. 9.0 11.3 11.0 13.6 12.9 11.4 11.7 21.9 10.3 11.5 11.6 12.5 St. Dev. 6.4 5.3 7.1 7.0 5.8 5.4 8.7 10.7 8.5 12.2

Source: Weekly prices recorded for the consumer price index for the National Statistics Office

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Table 27. Mean monthly price (toea/kg) and standard deviation for pumpkin tips, sweet potato and taro at five urban markets, January 1971 to December 1992, in constant 1991 prices

Pumpkin	Hps	Cucurbil	a moschała	1						
•	Ra	baul	Port I	Moresby	ι	ae	Ma	dang	Go	oroka
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
Jan	41.1	6.3	51.2	9.0	32.2	6.6	32.0	8.3	36.1	4.6
Feb	42.1	5.7	48.6	7.6	32.9	6.2	32.9	6.5	39.1	8.1
Mar	40.0	5.9	50.0	9.5	33.3	6.5	34.8	7.7	39.6	7.4
Apr	43.0	9.5	50.9	8.4	35.1	6.4	36.2	7.4	41.5	7.9
May	44.6	7.8	55.3	10.3	36.0	5.9	40.3	8.0	41.2	5.1
Jun	48.8	9.5	57.1	9.1	35.8	7.7	40.3	10.5	47.0	9.0
Jul	45.6	10.9	61.1	10.5	37.7	8.0	39.4	9.4	48.7	11.5
Aug	44.2	8.2	61.9	13.2	35.4	6.6	40.2	9.2	51.9	15.6
Sep	42.0	7.0	61.1	17.1	35.5	7.5	40.8	8.2	56.6	19.5
Oct	39.9	7.3	58.9	17.5	37.4	14.0	39.7	11.0	50.1	16.8
Nov	40.3	5.9	58.7	14.3	35.3	4.7	34.8	8.5	48.4	26.6
Dec	43.6	6.3	56.2	10.3	36.8	9.9	31.6	7.3	45.3	30.7
Sweet po	alo	loomoea	balalas							
		aul	Port M	loresby	La	e	Mac	lang	Gor	oka
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
Jan	24.1	10.6	67.1	15.3	26.8	8.0	32.4	11.0	30.2	10.5
Feb	21.1	3.6	66.8	16.0	26.9	6.9	30.6	7.9	28.9	8.9
Mar	24.0	7.0	65.0	17.7	26.0	7.1	29.1	5.0	25.7	6.1
Apr	26.6	9.0	64.1	16.1	26.8	7.8	28.2	5.6	26.3	6.1
May	27.4	7.6	64.1	15.5	27.2	9.7	27.6	4.4	26.7	7.3
Jun	28.7	6.1	62.2	12.4	27.8	10.5	27.1	4.9	25.6	5.0
Jul	28.9	5.5	65.9	11.9	30.6	10.4	25.9	4.3	25.7	6.2
Aug	26.3	4.8	65.0	11.0	28.0	8.9	25.8	3.8	27.0	6.8
Sep	27.1	5.3	68.3	13.1	32.8	9.4	28.7	6.9	29.4	9.7
Oct	26.1	7.1	70.2	11.6	33.4	8.8	29.6	6.7	30.9	12.8
Nov	22.6	6.4	72.6	13.8	31.0	8.7	32.5	8.1	32.7	13.3
Dec	24.9	6.1	74.9	17.3	30.5	9.2	33.8	8.6	34.9	16.3
Taro		Colocasia	esculenta							
	Rab	aul	Port M	oresby	Lo		Made	ong	Gord	ka
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
Jan	56.3	19.2	103.3	23.2	<b>59</b> .1	19.2	42.3	11.5	115.1	41.0
feb	52.9	11.4	102.3	25.1	56.9	20.1	49.8	13.2	106.5	34.5
Mar	50.4	9.4	93.1	20.1	53.2	17.8	47.9	10.3	110.5	36.3
Apr	51.1	14.5	108.4	24.4	58.9	18.8	42.6	10.2	107.5	38.2
May	53.3	11.4	100.0	18.6	62.2	22.0	39.3	8.3	113.8	37.4
Jun	54.6	12.5	115.1	23.5	61.4	23.1	41.5	9.5	117.9	44.3
Jul	58.8	11.5	120.6	29.1	63.1	20.1	39.2	7.4	108.6	44.5
Aug	56.6	13.7	1 19.9	26.5	60.3	20.9	39.5	8.5	111.0	45.0
Sep	60.9	15.2	1 19. 1	24.6	67.1	18.9	45.4	10.9	109.3	41.0
Oct	57.7	13.1	117.6	26.3	63.0	20.3	42.7	7.2	117.3	40.2
Nov	58.9	9.9	119.7	25.6	67.5	20.1	42.1	10.2	120.2	41.4
Dec	61.6	16.0	112.5	26.8	60.2	22.1	40.7	7.7	122.3	41.2

Source: Weekly prices recorded for the consumer price index for the National Statistics Office

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#### Table 28. Production (kg/ha) of durian, mangosteen, okari and rambutan at LAES Keravat, January 1989 to March 1993 (Source: S. Woodhouse)

			Durian			Mango			Oka		Rambutan
			Durie zibeth	inus		Garcinia ma	-		Torninsis	kaombachi	Nephelium Jappaceum
Series*		00	10	40	00	10	50	40	00	10	20
Year planted		1952	1963	1974	1963	1960	1973	1952	1963	1952	1073
Number of trees		1	5	7	10	18	135	2	10	22	32
MONTH	YEAR										
Jan	1980	6023	0	0	205	805	6	0		3	0
Feb	1989	352	258	0		256	2	0	0	0	326
Mer	1989	1362	6206	148	•	243 41	4	0	•	37	1235
Apr May	1989	:	385 0	0	0	41	•	•	186 563	1788 3434	558
34	1960	1403	ŏ	ŏ	0	0	ŏ		54	26	
	1940	0	0		ő	23	ě	ŏ	0		24
Aug	1940		ō	0	ō	12	0	0	15	1	0
Sep	1960	520	0	•	0	32	•	0	18	41	0
Oet	1888	٠	0	0	0	3	0	0	138	17	0
Nev	1980	2499	84	328	174	722	31	0	22	53	0
Dec	1988	444	21	2683	237	811	10	1389	36	•1	178
Jan	1990	1787	147	105	143	261	130	140	84	26	273
Feb	1960	404	0	162	162	651 0	170 0	945	15 13	116 304	1162
Mar	1988		0	0	0	0	0	8	13	304 \$52	10
Apr May	1990	ě	ŏ	0	0	0	ŏ	0		1070	0
	1999		ŏ	ě		ŏ	ŏ	ŏ	101	151	. 0
<u>.</u>	1999	1735	ō	41	ō	0	ő	ŏ	101	25	2
Aug	1980	716	ō	50	0	Ó	0	Ō	13	1	5
Sep.	1999	٠	0	•	0	0	0	0	31	33	ō
Oet	1990	•	0	0	0	0	0	0	11	10	0
Nov	1990	•	0	•	0	0	0	0	5	38	0
Des	1980	•	0 365	0	0	0	•	•	•	51	0
Jan Fab	1991 1991	2238	385	0 1234	24	65	1	0	•0	34 50	0 272
Mar	1001	447	0	304	16		3			50	272
Aer	1991	•	211	0	0	7	ō	ō	79	163	151
May	1991	451	1260		0	•	0	ō	62	407	1127
Jun	1001	•	7	0	0	0	0	0	76	424	Э
<b>b</b> L	1991	0	0	0	0	0	0	0	25	•	0
Aug	1991	0	0	0	0	0	2	0	103	10	0
Sep	1981	0 1560	21	0	4	30 96	• 137	465	30 2	6	0
Oct Nev	1991 1991	519	855	3097	213	709	215	4066	21	11	0 500
Dec	1991	0	0	1362	0	0	0	406	85	7	0
Jan	1992	õ	ō	0	ō	i	ō	0	14	4	0
Feb	1982	4642	7622	11	767	838	852	1108	•	217	10
Mar	1992	215	1664	1462	800	1038	448	2769	13	853	1
Арг	1992	0	0	0	10	0	21	0	138	1515	0
May	1982	0	17	0	0	0		0	118	735	192
مبد ليد	1982		ŏ			š			20		27 0
Aug	1992	0	0		ŏ	ŏ	ő	ŏ	13	•	0
Sep	1992		ō	ŏ	ō	ō	ě	0	29	0	0
Oet	1982	ō	Ō	0	Ō	0	0	0	99		Ö
Nev	1992	0	0	0	5	0	3	310	21	4	0
Dec	1982	•	0	•	0	0	٠	0	•	0	0
Jan	1983	0	0		1	0	•	•	28	0	0
Feb	1983	3550	2278	885	258	336	410	863	51	0	226
Mar	1983	367	2531	5368	1800	1152	462	3473	18	0	1320
Locations at th	e LAES.	Keravat ar	ne: C	)0 series	Near clubh	ouse					
	- •			0 series	Block 403						

20 series Experimental plantings (various locations) 40 series Arboretum

\*\* The 20 series of mangosteen commenced production only in 1987 and yields are still increasing. These trees are lertilized regularly.

\*\*\* These trees are fertilized regularly.

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### Table 29. Production (kg/ha) of carambola, eggtree, gallp, pulasan and santol at LAES Keravat, January 1990 to March 1993 (Source: S. Woodhouse)

		Carambola	Eggiree		Galip	Pulasan	Santol
		Aventes campbels	Garainia zanthodymus	Cana	iun indem	Nephalium mutabile	Sandorieum kootjapo
Series		40	••	00	10	00	40
Year planted	1	1963	1996 (7)	1952	1963	1973	1963
Number of 1		3		ิ่ง		10	3
		•	•	-	-		•
MONTH	YEAR						
Jun	1990	845	198	36	•	77	503
Feb	1000	2136	•	32	•	806	
Mar	1990	130	٠	7	•	•	0
Apr	1000	635	315	20	0	•	•
May	1999	714	1707	10	•	•	•
Jan	1000	837	300	10	33	•	•
	1000	677	2073	11	36	•	•
Aug	1000	100	••	37	32	•	0
Sup	1999	•	1335	22	43	•	•
Out	1998	675	1538	14	58	•	٥
Nev	1990	•	724	0	•	•	0
Des	1999	45	173	0	3	0	0
Jun	1001	1233	•	•	٠	•	•
Fab	1991	32	344	5	1	•	•
Mar	1991	•	2003	•	•	11	173
Apr	1001	1303	629	2	1	•	•
May	1991	1053	•	4	2	•	26
Jun	1001	25	372	15	1	•	•
	1991	350	•	54	125	0	0
Aug	1001	2104	•	10			•
3ap	1001	1682	0 4034	64	13		•
Out	1861		2201	18 47	3	•	•
Nev	1001 1001	100	2301	•7		1070	•
Dee	1992	817		75			063 870
Feb	1002	110	376	19			•
iler i	1002	03	44		3	3250	
Ā	1000	415	328				55
	1998	312	344				12
Jan	1992	40	564	15	57		
	1992	•	1020	2		ů l	
Ave	1992	429	102	25		ě	
Sep	1992	867	•	7		0	ě.
Out	1002		•	21	27	ō	ō
Nev	1002		•	115	18	0	
Dec	1982		•	0	0	0	•
Jan	1983		13	46	0	0	0
Feb	1983		•	0	0	0	45
Mar	1993		660	•	•	266	350

\* Locations at the LAES, Keravat are:

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Near clubhouse

Block 403 Experimental plantings (various locations)

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10 series 20 series 40 series

00 series

40 series Arboretum

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### Table 30. Harvesting periods of introduced mango (Mangifera indica)at Rabaul, Markham Valley and Port Moresby, 1979 to 1985

#### 1. Rabaul area, ENB

Regular observations: late 1980 to early 1986

Method of observation: Casual observations in local markets and fruit trees in the Rabaul area

Observers: A. Leng and R. M. Bourke (1980 to 1983); L. Kurika and T. Sitapai (1983 to 1986)

Harvesting period: December 1980 to January 1981; December 1981 to mid-January 1982; November 1982 to early January 1983 (good season); mid-November 1983 to mid-February 1984 (average season); July 1984 to January 1985 (extended season); November 1985 to December 1985 (average season).

#### 2. Markham Valley, Morobe Province

Regular observations: late 1979 to early 1985

Method of observation: Casual observations in food markets in the Markham Valley and a formal regular survey in Kainantu market

Observers: R. M. Bourke and K. Nema

Harvesting period: November 1979 to mid-December 1979; October 1980 to November 1980; December 1981 (poor season); mid-October 1982 to mid-January 1983 (good season); mid-November 1983 to mid-December 1983 (average season); mid-November 1984 to mid-December 1984.

#### 3. Port Moresby-Laloki area, Central Province

Regular observations: late 1980 to early 1986

Method of observation: Casual observations in local markets and fruit trees in the Port Moresby and Laloki areas

Observers: G. King with additional observations by A. Rogers and G. Gorogo

Harvesting period: September 1980 to October 1980; November 1981 to December 1981; November 1982 to December 1982; mid-October 1983 to mid-January 1984 (good season); August 1984 to mid-December 1984 (extended season); November 1985 to December 1985 (good season).



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### Table 31. Harvesting periods of karuka nut pandanus (*Pandanus julianettii*) at six highland locations, 1976 to 1985<sup>1</sup>

### 1. Kainantu, EHP

Regular observations commenced: February 1979

Method of observation: Fortnightly count of value of nuts offered for sale in Kainantu market

Observers: R. M. Bourke and K. Nema (assisted by W. Akus, C. Tumana and A. Nigel)

Harvesting period: February-May 1979; February-March 1980; March-April 1981; November 1981; January-April 1982; January-May 1983; November 1983; February to May 1985. See Table 10 for market counts for the period 1979 to 1982. The surveys continued until the end of 1985 and the additional data are given in Bourke (1988:335). Note that market surveys include both recently harvested and stored nuts and thus tends to overestimate the length of the harvesting season. Karuka pandanus were in season in the nearby Okapa area in January- February 1978 (Jeffries, 1978:129fn), and were probably also bearing in the Kainantu area at about the same time.

#### 2. Goroka, EHP

Regular observations commenced: October 1979

Method of observation: Fortnightly counts of value of nuts offered for sale in Goroka market until September 1982, and then casual observations of market and village production

Observers: T. Tarepe (1979 to 1985) and B. Carrad (1983, 1984)

Harvesting periods: January-March 1980; August 1980; March-May 1981; November 1981; March-April 1982; January-March 1983 (very big); July-August 1984 (small); January-mid May 1985 (see Table 10)

#### 3. Wabag, Enga Province

Regular observations commenced: August 1978

Method of observation: Casual observations of sales in Wabag market and village production in Middle Lai Valley

Observers: M. Meggitt (1976), B. Carrad (1978 to 1980), E. Paugari (1981, 1982), L. Baldwin (1983), P. Wohlt (1984, 1985)

Harvesting periods: June-July 1976 (big); August-September 1978; February-March 1980 (some in December 1979 and January 1980 also); August-September 1981 (small); December 1982-April 1983 (very big); June-mid July 1985 (small)

#### 4. Mendi, SHP

Regular observations commenced: January 1979

Method of observation: Casual observation of sales in Mendi market and village production in Mendi Valley

Observers: J. Tompkins (1979, 1980), R. M. Bourke (1978 to 1981), M. Anders (1981 to 1983), R. Crittenden (1984, 1985), C. Floyd (1984)

Harvesting periods: September 1978; June-September 1979; February-May 1980; December 1980-January 1981 (small); February-March 1982 (big); mid-December 1982-March 1983 (very big); April 1984 (small); mid-February-April 1985 (big); June-July 1985. (Sillitoe (1983:108) gives data on bearing seasons for the Wage Valley near Nipa in 1977 and 1978)

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### 5. Tari, SHP

Regular observations commenced: January 1976

Method of observation: Regular observations of village production in North Tari Basin (1976 to 1980) (Rose, 1982); Casual observations in Tari market and village production in Tari Basin (1981 to 1985)

Observers: C. Rose (1976 to 1980), E. D'Souza (1981 to 1985)

Harvesting periods: January-February 1976 (small); December 1976-March 1977 (big); May-July 1978 (average); January-February 1979 (small); May-July 1979 (small); December 1979- March 1980 (big); September-October 1980 (small); February 1981 (small); February-March 1982 (small); July-August 1982 (small); February-March 1983 (very big); February-March 1984 (small); February-mid-March 1985 (average); June-July 1985

#### 6. Oksapmin, Sandaun Province

Regular observations commenced: September 1978

Method of observation: Casual and systematic observations of village production (Cape, 1981:156)

Observers: N. Cape (1978 to 1980), J. Darby (1981 to 1984), I. Davis (1984, 1985), J. O'Sullivan (1985, 1986)

Harvesting periods: February-March 1978 (big); July-August 1979 (small); February-March 1980 (big); December 1980-February 1981 (small); mid-December 1981-March 1982; June 1982 (very small); December 1982-March 1983 (very big); July-August 1983 (very small); February 1984 (very small); February-April 1985 (very big); June 1985; mid-December 1985-April 1986 (big)

#### Note:

<sup>1.</sup> These data are for the cultivated species only *(Pandanus julianettii)*. They were originally presented in Bourke (1988:333-338). Recordings ceased at all locations during 1986. The quality of the data varies because of the number of observers and the unavoidable subjectivity of assessment of crop size. The most consistent methods were used at Kainantu and Tari. Based on comments provided by observers, crop size has been classed as: very big, big, average, small and very small.

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# Table 32: Harvesting periods of kuruka nut pandanus (*Pandanus julianettii*) noted in patrol reports, Southern Highlands, 1949 to 1971<sup>1</sup>

Period	Location	Source
Jun-Ju1 1955	Tari	Tari 8 of 1954/55
Aug-Sep 1957	Koroba	Koroba 1 of 1957/58
Jan-Mar 1958	Koroba	Koroba 5,6,8 of 1957/58
Jan-Feb 1958	Erave, Kagua, Nembi	Erave 5 of 1957/58 Nipa, Tari <sup>2</sup>
Mar-Apr 1960	Tari	Tari 5 of 1959/60
Feb-Mar 1961	Ialibu	Ialibu 8 of 1960/61
May-Jun 1961	Margarima	Nipa 5 of 1960/61
Feb 1962	Tari	Kutubu 4 of 1961/62
Jan 1963	Lake Kopiago	Kopiago 5 of 1962/63
Jan-Feb 1964	Tari	Tari 15 of 1963/64
Feb 1965	Nipa Basin	Nipa 7 of 1964/65
Nov 1965-Mar 1966	Upper Mendi	Mendi 3,7 of 1965/66
Dec 1965-Feb 1966	Ialibu	Ialibu 5 of 1965/66
Early 1966	Tari	Tari 2 of 1965/66
Jan 1966	Margarima	Nipa 6 of 1965/66
Feb 1968	Ialibu	Ialibu 10,14 of 1967/68
Mar 1968	Nipa Basin	Nipa 15 of 1967/68
Feb 1970	Ialibu	Ialibu 14 of 1969/70
Feb-Mar 1970	Upper Mendi	Mendi 17 of 1969/70

### Notes:

<sup>1.</sup> The source is incidental comments made in patrol reports. The data under "source" is the unique patrol report number. This is not a systematic source of information on pandanus harvests, as are market surveys. Data from Bourke (1988:337).

<sup>2.</sup> Reported as the "best season for many years".

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# Table 33. Harvesting periods of wild karuka nut pandanus (Pandanus brosimos), Iumbisa Village, Kandep area, Enga (1972-1975, 1983-1986) and Tari Basin (1983-1986)

### 1. Iumbisa Village, Kandep area, Enga Province

Regular observations: April 1972 to April 1975; January 1983 to December 1986

Method of observation: Systematic observation of village production by P. Wohlt. The observations for the period 1972 to 1975 were published in Wohlt (1978:126-127)

Harvesting periods: January-February 1973 (large): January-February 1975 (large): January-February 1983 (average); April-beginning May 1984 (small); August 1984 (very small); June-mid-July 1985 (large); February 1986.

#### 2. Fringe of Tari Basin, Southern Highlands

Regular observations: 1983 to 1986

Method of observation: Casual observations on migration by villagers to high altitude locations (Tari Gap) to harvest nuts by E. D'Souza.

Harvesting periods January 1983-early March 1983 (large); early June-early July 1985.

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### Table 34a. Reported main harvesting season of breadfruit (Artocarpus altilis) at various locations

Location	Approximate altitude (m)	Harvest season	Source
Wogeo (Vokeo) <sup>1</sup> Is, ESP	0-100	May-Jun	Hogbin (1938-39:128)
Gazelle Pen, ENB	0-100	Feb-Mar	Aburu (1982:108)
Eastern Baining Mts	0-400	Sep-Nov	Villagers, Jun 1995
Gazelle Pen, ENB			
Inland Pomio	200-600	Jan-Mar	Villagers, Jun 1995
New Britain			
Karkar Is	0-200	Jun-Aug	Villagers, Jul 1991
Madang Prov			
Unea (Bali) Island WNB	0-50	Jul-Aug Nov-Jan	Villagers, Jul 1995
Hoskins area, WNB	0-100	Aug-Sep	Villagers, Jul 1995
Kandrian area, WNB	0-100	Dec-Mar	Hide (1985:18)
Kandrian area, WNB	0-100	Aug-Oct	Villagers, May 1993
South Bougainville	0-100	May-Jun	Oliver (1955:28, 37)
Kiriwina Is, MBP	0-10	Apr-May	Malinowski (1935:50, 314)
Islands <sup>2</sup> , MBP	0-100	Nov-Feb	Villagers, Feb 1994
Cape Vogel, MBP	0-50	Oct-Feb	Mogina (2002:65)
Dogura area MBP	0-100	Nov-Feb	Kahn (1986:46, 49, 164)
Milne Bay area MBP	0-100	Oct-Mar	Cheung (1980:14)

### Notes:

<sup>1.</sup> Hogbin notes that breadfruit bears at irregular intervals and the periods for the harvest cannot be accurately forecast; but the main crop was gathered during 3 or 4 weeks in May-June in his period of fieldwork.

<sup>2</sup> Villagers were asked at 15 locations on the following islands: Normanby, Fergusson, Goodenough, Kiriwina, Iwa, Gawa and Ianaba. The most common response was the November to February period, but most other months were mentioned by at least one respondent.



## Table 34b. Reported main harvesting season of breadnut (Artocarpus camansi)at various locations

Location	Approximate altitude (m)	Harvest season	Source
Dreikikir area, ESP	100-300	May-Jul	Obrist van Eeuwijk (1992:190)
Maprik area, ESP	100-300	Aug-Feb	Lea (1964:124)
Gogol Valley Madang Prov	0-100	Aug-Sep	Villagers, Jul 1991
Ningerum area Western Prov	50-100	Sep-Nov	R. Walsch (pers. comm., 1979)
Wasu area, Huon Pen, Morobe Prov	0-100	Jul-Sep	Villagers, Oct 1991
Mogulu area, Nomad Dist, Western Prov	100-400	May-Aug	van Beek (1987:23)
Mogulu area, Nomad Dist, Western Prov	100-400	Sep-Dec	Villagers, May 1992 (reported to B. J. Allen)
Bukaua area Morobe Prov	0-100	Jan-Mar	Villagers, Oct 1991
Obo (Fly/Strickland R junction)	50	Nov-Feb	Villagers, May 1992
Western Prov			
Lakekamu R Gulf Prov	0-100	Jan-Apr	Villagers, May 1992
Ioma area Oro Prov	0-100	Dec-May	Waiko and Jiregari (1982:25)
Cape Vogel, MBP	0-100	Sep-Nov	J. Mogina (pers. comm, 2002)
Mt Bosavi, SHP	200-400	Nov-Feb	Freund (1977:294)
Imonda area, Sandaun Prov	300	Apr-May	Gell (1975:161)
Anguganak area Sandaun Prov	400-600	Apr-Oct	Lewis (1975:54)
Swanson Valley Gulf Prov	600-700	Nov-Dec	R. Speece (pers. comm., 1980)
Ivori Valley Gulf Prov	600-1000	Jun	Bonnemère (1992:44)
Simbai Valley	700-900	Sep-Oct	Clarke (1971:183)
Tagui V, Simbai area, Madang Prov	800-1800	Jun-Aug	Wood (1980:39)
Karimui Plateau Simbu Prov	1000-1200	Sep-Oct	Wagner (1967: 11)
Karimui Plateau Simbu Prov	1000-1200	Sep-Oct	Hide et al. (1984:213)
Mt Sisa, SHP	1100	Apr-Jul	Kelly (1977 :45)

# Table 35. Reported main harvesting season of lowland pitpit (Saccharum edule) at various locations

Location	Approximate altitude (m)	Harvest season	Source
Maclay Coast Madang Prov	0-100	Jan-Feb	Miklouho-Maclay (1885:34)
Ulamona area <sup>l</sup> WNB	0-100	Apr	Villagers, Jul 1995
Hoskins area <sup>l</sup> WNB	0-100	Dec-Feb	Villagers, Jul 1995
Pomio area, ENB	0-100	Mar-Apr	Villagers, Jun 1995
Gloucester District, WNB <sup>2</sup>	0-100	Mar-Apr	Villagers, May 1993
Tinputz area Bougainville	0-100	Mar-Apr	Villagers, Sep 2002
Uvol area, ENB	0-100	Mar-Apr	Villagers, Jun 1995
Buin, South Bougainville	0-200	Mar-May	K. Billy (pers. comm., 1996)
Strickland R Western Prov	100	Dec-Mar	P. Dwyer and M. Minnegal (pers. comm., 1993)
Nomad R Western Prov	100	Feb-May	Shaw (1990:39-41)
Popondetta area Oro Prov <sup>3</sup>	100	Mar	Crocombe and Hogbin (1963:6)
Islands <sup>4</sup> , MBP	0-100	Mar-May	Villagers, Feb 1994
Dogura area, MBP	0-100	Feb-May	Kahn (1986:46, 50, 166)
Milne Bay area MBP	0-100	Feb-Apr	Cheung (1980:14)
Baining Mts ENB	200-400	Dec-Apr	Fajans (1985:73)
Eastern Baining Mts Gazelle Pen, ENB	0-400	Jan-Feb	Villagers, Jun 1995
Anguganak area Sandaun Prov	400-600	Jan-Dec	Lewis (1975:54)
Swanson Valley Gulf Prov	600-700	Dec-Feb	R. Speece (pers. comm., 1980)
Lake Kutubu, SHP	700	Jan-Mar	Williams (1976:166)
Karimui Plateau Simbu Prov	1000-1200	Nov-Apr	Hide et al. (1984:213)
Mt Sisa, SHP	1100	Dec-May	P. Dwyer (pers. comm., 1993)

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#### Notes:

<sup>1</sup> In the Hoskins and Ulamona areas of West New Britain, villagers stated that the traditional varieties of pitpit bear in about December to February, but recently introduced types bear in an irregular and non-seasonal manner.

<sup>2</sup> Based on statements by villagers at four locations between Kilenge and the Aria River.

<sup>3</sup> Crocombe and Hogbin note that the *pasiro* cultivar of edible *pitpit* ripens in about March.

<sup>4</sup> Villagers were asked at seven locations on the following islands: Basilaki, Normanby, Fergusson and Goodenough. The most common response was the March to May period, and the range was December to July.

### Table 36. Reported main harvesting season of tulip (Gnetum gnemon)leaves and fruit at various locations

Location	Approximate altitude (m)	Harvest season	Source
Young leaves			
Eastern Baining Mts Gazelle Pen, ENB	0-400	Jun-Jul	Villagers, Jun 1995
Imonda area, Sandaun Prov	300	Nov-Apr	Gell (1975:161)
Anguganak area <sup>l</sup> Sandaun Prov	400-600	Nov-Dec	Lewis (1975:54)
Lake Kutubu, SHP	700	Nov-Dec	Villagers, Nov 1990
Pindiu area Morobe Prov	800-1000	Oct-Dec	Villagers, Oct 1991
Fruit			
Oriomo Plateau Western Prov	0-50	Dec-Feb	Ohtsuka (1983:90)
Anguganak area Sandaun Prov	400-600	Dec-Feb	Lewis (1975:54)

#### Note:

<sup>1.</sup> Lewis indicates that leaves are available all year, but are most abundant in November–December.

### Table 37. Reported main harvesting season of Malay apple(Syzygium malaccense) at various locations

Location <sup>2</sup>	Harvest season	Source
Gazelle Peninsula, ENB	Nov-Jan	Aburu (1982:109)
Gazelle Peninsula, ENB	Dec-Feb	Villagers, Jun 1995
Eastern Baining Mts, ENB	May-Jun	Villagers, Jun 1995
Gazelle Peninsula, ENB	Dec-Jan	
Keravat, ENB	Dec-Feb	Aburu (1982:118)
Keravat, ENB	Jun-Aug	S. Woodhouse (pers. comm., 1993)
Talasea area, WNB	Jul Jan	Villagers, Jul 1995
Inland Pomio, ENB	Jan-Mar	Villagers, Jun 1995
Kandrian and Gloucester <sup>3</sup> areas, WNB	May-Jun	Villagers, May 1993
"Coastal" <sup>4</sup>	Sep-Dec	Kesavan and Kambuou (1991:21)
Kiriwina Islands <sup>5</sup> , MBP	Sep-Oct	Malinowski (1935:50, 311)
Islands <sup>6</sup> , MBP	Oct-Jan	Villagers, Feb 1994

#### Notes:

<sup>1.</sup> Some records may also be for Syzygium megacarpa.

<sup>2</sup>. All locations are at low altitudes (0-200 m).

<sup>3.</sup> Villagers were asked at six locations in Kandrian and Gloucester Districts. The most commonly stated period was May to June, and the range was April to October. Malay apple was fruiting at the time of fieldwork (May, 1993).

<sup>4</sup>. Observations are from Morobe and Sandaun Provinces (R. Kambuou, pers. comm., 1994).

<sup>5.</sup> The Kiriwinan name "mokakana" for Malay apple was used by Malinowski.

<sup>6</sup> Villagers were asked at four locations on Kiriwina, Kitava and Iwa Islands. The most common response was in the October to January period, and the range was September to February.



### Table 38. Reported main harvesting season of introduced mango(Mangifera indica) at various locations

Location	Approximate altitude (m)	Harvest season	Source
Inland Pomio area ENB	200-600	Jan-Feb	Villagers, Jun 1995
Unea (Bali) Island WNB	0-50	Dec-Jan	Villagers, Jul 1995
Gloucester area, WNB	0-100	Sep-Dec	Villagers, May 1993
Kandrian area WNB	0-100	Nov-Jan	Hide (1985:18)
Kandrian area WNB	0-100	Nov-Dec Apr <sup>1</sup>	Villagers, Feb 1990
Kandrian area <sup>2</sup> WNB	0-100	Dec-Feb May-Jun	Villagers, May 1993
Sialum area Morobe Prov	0-100	Oct-Jan	Villagers, Oct 1991
Finschhafen area Morobe Prov	0-100	Jan-Feb	Villagers, Oct 1991
Bukaua area Morobe Prov	0-100	Oct-Dec	Villagers, Oct 1991
Obo (Fly/Strickland R junction), Western Prov	50-100	Nov-Jan	Villagers, May 1992
Lakekamu R Gulf Prov	0-100	Oct-Nov	Villagers, May 1992
Islands <sup>3</sup> MBP	0-100	Nov-Dec	Villagers, Feb 1994
Dogura area, MBP	0-100	Oct-Jan	Kahn (1986:46,50,165)
Milne Bay area, MBP	0-100	Nov-Jan	Cheung (1980:13-14)
Dreikikir area, ESP	100-300	Dec-Jan	Obrist van Eeuwijk (1992:190)
Anguganak area Sandaun Prov	400-600	Oct-Nov	Lewis (1975:54)
Bulolo area Morobe Prov	600-700	Oct-Nov	J. Simpson (pers. comm., 1979)

### Notes:

<sup>1.</sup> There is less fruit in this second season than in the main earlier one.

<sup>2.</sup> Statements recorded in four villages in the Kandrian area in May 1993 were somewhat conflicting. Mangoes were maturing on both the south and north coast of New Britain at the time of fieldwork and this late season possibly contributed to the conflicting statements.

<sup>3</sup> Villagers were asked at 14 locations on the following islands: Normanby, Dobu, Fergusson, Goodenough, Kiriwina, Kitava, Iwa, Gawa and Ianaba.

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### Table 39. Reported main harvesting season of marita pandanus(Pandanus conoideus) at various locations

Location	Approximate altitude (m)	Harvest season	Source
Oriomo Plateau Western Prov	40	Jan-Dec	Ohtsuka (1983:101)
Kiunga area Western Prov	100	Jan-Dec	Villagers, May 1992
Strickland R Western Prov	100	Sep-Dec	P. Dwyer and M. Minnegal (pers. comm., 1993)
Ningerum area Western Prov	100-150	Jan-Dec	R. Walsh (pers. comm., 1979)
Dreikikir area, ESP	100-300	Jan-Dec	Obrist van Eeuwijk (1992:108, 190)
Mt Bosavi, SHP	200-400	Nov-Feb	Freund (1977:294)
Anguganak area Sandaun Prov	400-600	Sep-Jan	Lewis (1975:54)
Upper Karawari R ESP	400-900	May-Dec	Dornstreich (1973:221, 316)
Swanson Valley Gulf Prov	600- 700	Oct-Jul	R. Speece (pers.comm., 1980)
Ivori Valley Gulf Prov	600-1500	Sep-Apr	Bonnemère (1992:41)
Lake Kutubu, SHP	700	Nov-	Williams (1976:166)
Lake Kutubu, SHP	700	Dec-	Weiner (1983:26)
Hindenberg Ra Western Prov	700-1300	Dec-Mar	Hyndman (1979:120)
Mt Sisa, SHP Pindiu area	800 800-1000	Sep-Apr Oct-	Kelly (1977:32) Villagers, Oct 1991
Morobe Prov			
Simbai V Madang Prov	900-1500	Aug-	Rappaport (1968:174-176)
Karimui Plateau Simbu Prov	1000-1200	Nov-Apr	Hide et al. (1984:213)
Karimui Plateau Simbu Prov	1000-1200	Nov-Apr	Wagner (1967:11)
Mt Sisa, SHP	1100	Oct-Apr	Dwyer (1985)
Simbai V Madang Prov	1150	Sep-Mar	Buchbinder (1973:107)
Tagui V, Simbai area, Madang Prov	800-1800	Feb-Apr	Wood (1980:39).
Goroka area EHP	1450-1700	Jan-Apr	T. Tarepe (pers.comm., 1982)
Sinasina area Simbu Prov	1500-1700	Jan-Apr	Hide (1981:402)
Nembi Plateau SHP	1500-1700	Jan-Apr	Bourke (1988:129)
Kainantu area EHP	1550-1700	Jan-Apr	Bourke (1988:129)
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### Table 40. Reported main harvesting season of purple passionfruit(Passiflora edulis f. edulis) at various locations

Location <sup>1</sup>	Harvest season	Source
Goroka area	Dec-May	Charles (1972:893)
Goroka area	Feb-Apr <sup>2</sup>	Thomas (1982:413)
Mt Hagen area	Jan-Jun	Charles (1972:893)
Highlands	Jan-Apr	Densley (1978:30)
Highlands	Dec-Apr	Nitsche (1971:57)
Highlands	Jan-Apr	Tarepe and Bourke (1982:93)

### Notes:

<sup>1.</sup> All locations are at between 1400 and 2300 m altitude.

<sup>2</sup>. Thomas states that a minor second crop occurs around October.

### Table 41. Reported main harvesting season of pineapple (Ananas comosus) at various locations

Location <sup>1</sup>	Harvest season	Source
Keravat, ENB	Oct-Mar Mar-Jun <sup>2</sup>	Bourke (1976b)
Umboi Island Morobe Prov	Oct-Dec Jun-Jul <sup>2</sup>	Villagers, Oct 1991
Kandrian area, WNB	Nov-Jan Apr <sup>2</sup>	Villagers, Feb 1990
Sattleberg area Huon Peninsula Morobe Prov	Nov-Jan	Villagers, Oct 1991
Obo (Fly/Strickland R junction), Western Prov	•	Villagers, May 1992
Islands <sup>3</sup> , MBP	Oct-Jan	Villagers, Feb 1994
Dogura area, MBP	Aug-Dec	Kahn (1986:46, 168)

### Notes:

<sup>1.</sup> All locations are at low altitudes (0-200 m), except the Sattleberg area (800-1000 m).

<sup>2</sup>. There is less fruit produced in this second season than in the main earlier one.

<sup>3.</sup> Villagers were asked at six locations on the following islands; Normanby, Dobu, Fergusson, Goodenough and Iwa. At four locations, responses were within the period October to January, but at two locations villagers claimed that production was not seasonal.

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## Table 42. Reported main harvesting season of taun (Pometia pinnata) at various locations

Location	Approximate altitude (m)	Harvest season	Source
Manus Is	0-100	Nov-Dec	W. Rooney (pers. comm., 1980)
Manus Is	0-100	Nov-Dec	R. Croyden (pers. comm., 1981)
Lumi Sandaun Prov	500-700	Jan-Mar	Villagers, May 1982
Anguganak area Sandaun Prov	400-600	Sep-Nov	Lewis (1975:54)
Dreikikir, ESP	100-300	Aug-Oct	Obrist van Eeuwijk (1992:108, 190)
Dreikikir, ESP	200-400	Nov-Feb	Allen (1989b:283)
Prince Alexander and Torricelli Mts ESP and Sandaun	200-600	Nov-Mar	Swadling <i>et al</i> . (1991:102)
Maprik, ESP	100-300	Jan-Apr	Lea (1964:124)
Namatanai area New Ireland	0-100	Jan-Feb	R. Croyden (pers. comm., 1983)
Baining Mts, ENB	400-500	Dec-Jan	Villagers, Jun 1995
Unea (Bali) Island WNB	0-50	Nov-Dec	Villagers, Jul 1995
Coastal Pomio, ENB	0-100	Nov-Dec	Villagers, Jun 1995
Inland Pomio, ENB	200-600	Jan-Feb	Villagers, Jun 1995
Inland Kandrian, WNB	200-400	Nov-Dec	Villagers, Jun 1995
Kandrian, WNB	0-100	Dec-Jan	Villagers, May 1993
Santa Cruz Solomon Islands	0-100	Dec-Jan	Yen (1974:266)
Vanuatu	0-400	Dec-Jan	A. Walter (pers. comm., 1994)

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### Table 43. Reported main harvesting season of watermelon(Citrullus lanatus) at various locations

Location	Harvest season	Source
Ulamona area, WNB	Nov-Dec	Villagers, Jul 1995
Pomio area, ENB	Jan-Feb	V. Engelberg, pers. comm., 1995
Mamusi Plateau, WNB	Oct-Dec	S. Marogo, pers. comm., 1995
Markham and Ramu Valleys	Nov-Jan	Tarepe and Bourke (1982:89)
Obo (Fly/Strickland R junction) Western Prov	Dec-Jan	Villagers, May 1992
Kiriwina, Kitava and Iwa Islands, MBP	Nov-Jan	Villagers, Feb 1994
Dogura area, MBP	Aug-Mar	Kahn (1986:46, 168)

### Note:

<sup>1</sup> All locations are at low altitudes (0-300 m).

# Table 44. Reported main harvesting season of *Castanopsis acuminatissima* nut at various locations

Location	Approximate altitude (m)	Harvest season	Source
Strickland R Western Prov	100	Dec-Feb	P. Dwyer and M. Minnegal (pers. comm., 1993)
Nakanai Range, ENB	800-900	Sep-Oct	Panoff (1972:73)
Tauri V, Gulf Prov	1000-1100	Jul-Aug	Villagers, Aug 1980
Karimui Plateau Simbu Prov	1000-1200	Sep-Oct	Hide et al. (1984:213)
Kagua area, SHP	1600-1800	Dec-Mar	Villagers, Nov 1990
Lai V, SHP	1700-2000	Nov-Dec	Villagers, Nov 1990
Nembi Platcau, SHP	1700-2000	ca Dec	Villagers, Sep 1979

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### Table 45. Reported main harvesting season of sea almond1(Terminalia catappa) at various locations

Location <sup>2</sup>	Harvest season	Source
Watom Island, ENB	Apr-May	Villagers, Jun 1995
Karkar Is, Madang Prov	Nov-Dec	Villagers, Jul 1991
Marind-Anim area South coast, Irian Jaya	Feb	Luyken and Luyken-Koning (1955:333)
Islands <sup>3</sup> , MBP	Dec-Feb	Villagers, Feb 1994
Dogura area, MBP	Feb-May	Kahn (1986:49-50, 164)

#### Notes:

<sup>1</sup> Known as *talis* in Papua New Guinea Tok Pisin. Also known as Java almond.

<sup>2.</sup> All locations are at low altitudes (0-100 m).

<sup>3.</sup> Villagers were asked at 16 locations on the following islands: Normanby, Dobu, Fergusson, Goodenough, Kiriwina, Kitava, Iwa, Gawa and Ianaba. The most common period was December to February, and the range of responses covered November to March. At two locations, villagers claimed that a second season occurs in June and July.

# Table 46. Reported main harvesting season of galip nut(Canarium indicum) at various locations in Papua New Guinea,Solomon Islands, Australia, Vanuatu and Fiji

Location <sup>1</sup>	Harvesting season	Source
Wogeo (Vokeo) Island, ESP	Apr-Jun	Hogbin (1938-39:131)
Tanga Is New Ireland Prov	Jul-Aug	Bell (1948:247)
Anguganak area Sandaun Prov	Aug-Oct	Lewis (1975:54)
Dreikikir area, ESP	Nov Feb-Mar	Obrist van Eeuwijk (1992:190)
Keravat, ENB	Aug-Nov Apr-Jun	Aburu (1982:120)
Eastern Baining Mts Gazelle Peninsula, ENB	Jun-Aug	Villagers, Jun 1995
Karkar Island Madang Prov	Apr-Jun	Villagers, Jul 1991
Unea (Bali) Island, WNB	Jun-Aug	Villagers, Jul 1995
Hoskins area, WNB	Jun-Jul	Villagers, Jun 1995
Pomio area, ENB	Jun-Aug	Villagers, Jun 1995
Umboi Island Morobe Prov	Jun-Aug	Villagers, Oct 1991
Maclay coast Madang Prov	May-Jul	Miklouho-Maclay(1885:349)
Kandrian and Gloucester Districts, WNB <sup>2</sup>	May-Aug	Villagers, May 1993
Inland Kandrian, WNB	Jun-Jul	Villagers, Jun 1995
South Bougainville Bougainville Prov	Jul-Sep	Oliver (1949:57) Oliver (1955:28, 37)
Western Prov Solomon Islands	Jul-Oct	Evans (1991:56-57)
New Georgia Solomon Islands	Jun-Jul	Hviding and Bayliss-Smith (2000:99)
Other provinces Solomon Islands	Aug-Dec	Evans (1991:56-57)
Normanby and Dobu Islands, MBP	Sep-Nov	Villagers, Feb 1994
Innisfail, Australia	Aug-Sep	B. Evans (pers. comm., 1994)
Vanuatu <sup>3</sup>	Oct-Dec	A. Walter (pers. comm., 1994)
Fiji	Sep-Jan	Smith (1985:473)

#### Notes:

<sup>1.</sup> All locations are at low altitudes (0-300 m), except Anguganak (400-600 m).

<sup>2</sup> Based on interviews in eight villages on the north and south coast of New Britain.

<sup>3</sup> A second season is reported in March-July in Vanuatu (A. Walter, pers. comm., 1994).

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# Table 47. Reported main harvesting season of okari nut(Terminalia kaernbachii) at various locations

Location	Approximate altitude (m)	Harvest season	Source
Wewak area, ESP	0-100	Mar-May	Villagers, May 1982
Keravat, ENB	0-100	Mar-May	Aburu (1982:121)
Aria V, Gloucester area, WNB	0-100	Apr-Jun	Villagers, May 1993
Strickland V, Nomad Dist, Western Prov	100	Apr-Jun	P. Dwyer and M. Minnegal (pers. comm., 1993)
Kiunga area Western Prov	50-100	Apr-Jun	Villagers, May 1992
Mogulu area, Nomad Dist, Western Prov	100-400	May-Aug	van Beek (1987:23)
Mogulu area, Nomad Dist, Western Prov	100-400	May-Jul	Villagers, May 1992 (reported to B. J. Allen)
Putei area Tauri V, Gulf Prov	50-100	May-Jun	Villagers, May 1992
Bereina area Central Prov	0-100	Jul-Sep	Villagers, Aug 1984
Solomon Islands	0-100	Jun-Sep	Evans (1991:56)
Mt Dayman, MBP	300-800	May-Jul	Brass (1956:98)
Swanson V Gulf Prov	600- 700	Aug-Sep	Villagers, Aug 1980
Mt Sisa, SHP <sup>1</sup>	800	Jul-Sep	Kelly (1977:45)
Karimui Plateau Simbu Prov	1000-1200	May-Aug	Hide et al. (1984:213)

#### Note:

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<sup>1.</sup> Kelly (1977:45) gives the season for Tahitian chestnut as July to September, but this is almost certainly a misidentification for okari, as Tahitian (Polynesian) chestnut does not grow at this altitude.

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### Table 48. Reported main harvesting season of Polynesian chestnut<sup>1</sup> (Inocarpus fagifer) at various locations

Location <sup>2</sup>	Harvest season	Source
Watom Island, ENB	Jul-Aug	Villagers, Jun 1995
Gazelle Peninsula, ENB	Dec-Jan	Villagers, Jun 1995
Keravat, ENB	Jan-May	Aburu (1982:120)
Eastern Baining Mts Gazelle Peninsula, ENB	May-Jun	Villagers, Jun 1995
Nissan Island Bougainville Prov	Jun-Jul	S. Woodhouse (pers. comm., 1994)
Karkar Is, Madang Prov	Jun-Jul	Villagers, Jul 1991
Unea (Bali) Island, WNB	Dec-Feb	Villagers, Jul 1995
Pomio area, ENB	Sept-Oct	Panoff (1972:73)
Pomio area, ENB <sup>3</sup>	Jun-Jul	Villagers, Jun 1995
Gloucester District, WNB	Nov-Feb	Villagers, May 1993
Kandrian area, WNB	Apr-May	Villagers, Feb 1990
Islands <sup>4</sup> , MBP	Nov-Feb	Villagers, Feb 1994
Dogura area, MBP	Oct-Dec	Kahn (1986:49-50,164)
Milne Bay area, MBP	Oct-Jan	Cheung (1980:14)
Cape Vogel, MBP	Sept-Nov	J. Mogina (pers. comm., 2002)

### Notes:

<sup>1.</sup> Known as aila in Papua New Guinea Tok Pisin.

<sup>2</sup>. All locations are at low altitudes (0-200 m).

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<sup>3.</sup> At Buka Village east of Pomio, villagers reported the main harvest as being June-July, but in certain years an extended season occurs from April to September.

<sup>4</sup> Villagers were asked at 15 locations on the following islands: Normanby, Dobu, Fergusson, Goodenough, Kiriwina, Kitava, Gawa and Ianaba. The most common response was in the November to February period, and the range was October to March.

# Table 49. Reported main harvesting season of sis (Pangium edule)at various locations

Location	Approximate altitude (m)	Harvest season	Source
New Ireland	0-100	Jan-Feb Jul-Aug	Peekel (1984:384)
Inland Pomio, ENB	200-600	Jun-Jul	Villagers, Jun 1995
Kandrian, WNB	0-100	May-Jun	Villagers, May 1993
Upper Karawari V ESP	200	Aug-Sep	M. Dornstreich (in Morren 1979:5)
Islands <sup>1</sup> , MBP	0-100	Dec-Feb	Villagers, Feb 1994
Managalas Plateau Oro Prov	600-1000	Jun-Aug	Villagers, March 1982
Ivori V, Gulf Prov	600-1000	May-Aug	Bonnemère (1992:274)
Kaintiba area Gulf Prov	700	May-Aug	Villagers, Aug 1980
Paiela, Enga Prov	600-1000	Jun-Jul	F. Robinson (pers. comm., 1999)
Lake Kopiago, SHP	800-1000	Jun-Jul	N. Haley (pers. comm., 1998)
Nankina V, Huon Pen, Madang Prov	800-1000	Jul-Aug	Villagers, Nov 1991 (reported to M. Levett)
Karimui Plateau Simbu Prov	1000-1100	May-Aug	Hide et al. (1984:213)
Karimui Plateau Simbu Prov	1000-1100	May-Jul	Wagner (1967:11)

#### Note:

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<sup>1.</sup> Villagers were asked at seven locations on the following islands: Normanby, Dobu, Fergusson, Kiriwina and Kitava. The most common response was in the December to February period, and the range was September to February.

# Table 50. Reported main harvesting season of betel nut (Areca catechu) at various locations

Location <sup>1</sup>	Nuts most abundant	Source
Watom Island, ENB	Jun-Jul	Villagers, Jun 1995
Unea (Bali) Island, WNB	Apr-Jun	Villagers, Jul 1995
Tinputz area Bougainville	Mar-Oct	D. Tokapip (pers. comm., 1996)
Kandrian area, WNB	Feb-Aug	Villagers, Feb 1990
Nomad River Western Prov	Jun-Aug	Shaw (1990:39)
Tauri V, Gulf Prov	Jun-Dec	Villagers, May 1992
Murua area Gulf Prov	Jun-Jul	Villagers, May 1992
Islands <sup>2</sup> , MBP	May-Jul	Villagers, Feb 1994

#### Notes:

<sup>1.</sup> All locations are at low altitudes (0-200 m).

<sup>2.</sup> Villagers were asked at 11 locations on the following islands: Dobu, Fergusson, Goodenough, Kiriwina, Keileuna, Kitava, Iwa and Ianaba. The most common response was in the May to July period, and the range was April to August.

### Table 51. Published monthly production data for Arabica coffee

Location	Number of years	Period	Type of data	Source
Enga Prov	10	1969-1978	Mean monthly production	Carrad (1982:152)
Simbu Prov	4	1971-1974	Mean monthly production	Howlett <i>et al.</i> (1976:221, 231)
Kainantu area	2	1976-1977	Monthly production	Grossman (1984:199)
Kainantu area	7	1978-1984	Monthly production	Bourke (1988: 108-110, 328-329)
CRI, Aiyura, (13 experimental plots) and 2 plantations, WHP (6 blocks)	3	1987-1990	Monthly production	Harding (1991a: 14-16, 82-89)
Kainantu area (14 village plots)	3	1987-1990	Monthly production	Harding (1991b: 9, 57-61)

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This book describes the production patterns of 180 economic crops in Papua New Guinea, that is, the seasonality of production (or the lack of it) and year-to-year variation. It is based on extensive field recordings of availability of food and cash crops. The data sources are long-term market surveys; purchase figures for a governmentrun fresh food wholesaler; interviews with villagers; observations of village agriculture; experiments on research stations; and literature reviews. The data runs are between 1 and 22 years long, with most 3 to 5 years.

Thus the book is based on solid empirical evidence with exceptionally long data runs. For each crop, the producing pattern is described in terms of continuity of supply, seasonality and variation within the seasonal pattern. The information comes from all major environments in PNG which is unusual for such a diverse nation.

Where sufficient data are available for a crop, it is analysed to examine the relationship between the production patterns for that crop and environmental factors, such as temperature, day length and rainfall. The social contribution to the patterns observed are also noted, in particular, the influence of the local agricultural system.

Because the data sets are so extensive, the book will form a benchmark for future studies on crop production and the impact of climate change on crop production in the Pacific. The information provided here is basic for agricultural development in Papua New Guinea, and elsewhere in the Pacific.

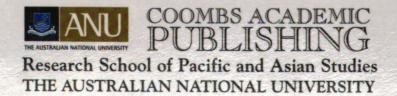
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