## SUB-REGIONAL OFFICE FOR THE PACIFIC ISLANDS

# REPORT TONGA DOMESTIC MARKET STUDY USING THE DOMESTIC MARKET SURVEY REPORT TO INVESTIGATE SELECTED POLICY ISSUES

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## FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

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## **List of Abbreviations**

СТИ	Common Trade Unit	
FAO	Food and Agriculture Organization	
MAFFF	Ministry of Agriculture and Food, Forests & Fisheries	
RSES	Recognized Seasonal Employer Scheme	
TSTF	Tonga's Strategic Development Framework	

## **Executive Summary**

Tonga has maintained over recent years a relatively strong and extensive market data collection system relative to other countries in the region. However, even though this data has been made available in the quarterly Domestic Market Reports, limited opportunity has been taken to analyze the data in order to better inform policy decisions. Therefore, despite the high costs involved in collecting this data its true value has not yet been fully realized through improved policy decisions. An express aim of this study has been to demonstrate the policy value of domestic market data and thus raise the profile and importance of maintaining appropriate collection systems.

The study helps provide a clearer understanding of the structure and functionality of domestic markets including trade flows and prices, and evolution of the domestic market for the past few years to help determine the net benefit of any current or planned policy interventions aimed at improving market functionality.

The study also attempts to shed light on the possible impact of some specific government policies such as the Recognized Seasonal Employer (RSE) scheme and the MAFFF promotion of off-season crop production to help stabilize market prices and raise total farm output and incomes.

The study analysis demonstrates that the existing domestic market data set already provides a strong basis for making improvements in the process of policy formation by providing evidence that can be used to better inform policy decisions. But it also highlights that additional data will often be needed to supplement the data in the domestic market survey to fully address specific policy issues.

It concludes with some recommendations high amongst which is to direct efforts toward ensuring better analysis and use of existing data as well as maintaining the integrity of the current collection systems and extending them as deemed necessary

#### Introduction

There are three main municipal markets in Tonga; Talamahu Market, Fanga'ihesi Market and 'Utukalongalu Market (in Vavau). Historically, these were the main outlets for domestic agricultural production in Tonga until the civil unrest in 2006 when traders also started operating at roadside markets in Tongatapu. The emergence of these new channels has created a number of challenges to data collection exercises and to the analysis and interpretation of the data collected.

Tonga has done a commendable job of collecting basic data (volumes and prices) of traded agricultural commodities on the domestic market. The Statistics and Economic Unit, which is part of the Policy and Planning Section of the Corporate Services Division of the Ministry of Agriculture and Food, Forests and Fisheries (MAFFF), has the main role to collect data, compile data sets, analyze and publish this information. The Unit produces a quarterly market report — the "Domestic Market Survey Report". Initially, this report only sampled the central Talamahu Market, but in 2009 the survey report was extended to include data on roadside markets in Tongatapu and the Utukalongalu Market in Neiafu, Vava'u. There have also been aspirations to extend this survey further and also include the Ha'apai market. Unfortunately, however, budget constraints in 2011 have instead seen a cut back in the scope of data collection with the removal of the Utukalongalu Market from the regular market survey.

The market report has information on: monthly and quarterly average weights in kg of common trade units (CTU) of produce sold at the markets; monthly and total quarterly supplies of agriculture produce in CTU and in tonnes; monthly and quarterly average prices of agricultural produce sold in the market in price per CTU and in price per kg.

The first extended quarterly 'Domestic Market Survey Report' for October-December 2009 highlighted how significant trade is in agricultural products at 'Utukalonga Market in Vavau and on roadside markets in Tongatapu with around 15% of total food supply being traded at 'Utukalongalu Market and 64% on the roadside markets during that period. But a clearer understanding of the structure and functionality of domestic markets including trade flows and prices, and evolution of the domestic market for the past few years is needed to help determine the net benefit of any current or planned policy interventions aimed at improving market functionality. Such data might also shed light on the possible impact of related policies such as freight subsidies and the Recognized Seasonal Employer (RSE) scheme.

## **Purpose of the study**

The main purpose of this study is to map the structure of the domestic fresh produce market (including Talamahu Market, roadside markets and 'Utukalongalu Market in Vava'u) in order to identify key supply and functionality characteristics, including trade flows and prices, volumes traded and prices received on different markets at different points in time, and the main actors

(buyers, traders, sellers) in these markets. Subsequently to then undertake an analysis of this data to assess the potential impact of some key policy interventions on agricultural production and marketing.

A primary objective of the study is to demonstrate to decision makers the potential value of data/evidence (in this case market data) for improving policy decisions

#### **Policy Issues**

#### Recognized Seasonal Employer (RSE) schemes

Under the RSE scheme, workers from Tonga, Samoa, Tuvalu, Vanuatu and Solomon Islands go to New Zealand for up to seven months out of eleven months in a year to work in the horticulture and viticulture industries in planting, maintaining, harvesting, and packing crops. The enormous interest in the RSE scheme is evidenced by about 20 percent of working-age men becoming part of the work-ready pool, with over 1,971 workers in the first two years (2007-2009) having had the opportunity to work in New Zealand. The process of village-level nomination of workers and Government-orchestrated recruitment has resulted in the RSE workers being largely agricultural workers with lower than average incomes and schooling. Hence the scheme appears to have created new opportunities for migration for a large sector of the population that previously had no available mechanism for working abroad. However, if the absences of this labour pool impose either monetary or non-monetary costs on the family and community members who are left behind, the net development benefit of seasonal migration will be less than what it appears from remittances and repatriated foreign earnings (Gibson and McKenzie, 2008). One potential cost is that there may be a reduction in labour available for local food production and thus reduced local surpluses may raise food prices.

#### **High Food Prices**

During recent years, the steep increase in food and fuel prices has been one of the most distinctive characteristics of the world economy. Prices peaked in 2008, but have remained high and volatile since then. Tonga, which is heavily dependent on food and fuel imports, remains particularly vulnerable to escalating global commodity prices. Higher food prices and a larger import bill pose a major challenge, putting stress on limited foreign exchange availability and spurring inflation. Poorer households with a larger share of food in their total expenditures suffer the most from high food prices, due to the erosion of purchasing power, which has a negative impact on food security, nutrition and access to school and health services.

Tonga's local food production capacity, both for subsistence and for sale, offers potential resilience in the face of high global food prices. However, local production for several key food crops exhibits seasonal trends in production impacting availability and price stability. Indeed price volatility, with high prices in off-seasons, constitutes an additional inflationary threat and

negative impact on household budgets. A key policy response of the MAFFF is to promote off season production of crops for the domestic market. An analysis of seasonal trends in production and prices for key local crops could help inform this policy.

## **Methodology**

The study approach involved an extensive review of existing secondary data sources supplemented with surveys to collect primary market data and information on farmer characteristics and market participation.

Secondary data were sourced from various reports prepared by the MAFFF, the Government Statistic Department, Ministry of Labor and Commerce and the Talamahu Market Limited. A principal source of data was the Domestic Market Survey Report prepared by MAFFF on a quarterly basis.

Primary data were collected through interviews and sample surveys to determine; (i) farmer characteristics and production trends, (ii) numbers of farmers supplying the various domestic market outlets and (iii) the types, quantities and prices of crops that they supplied to the market. Included in the survey interviews were:

- Sellers and re-sellers at Road Side Markets
- Sellers and re-sellers at Talamahu Market
- Workers at Talamahu and Utukalongalu Market.

#### **Definitions**

#### **Semi-subsistence Farmers:**

These farmers do not supply the market on a regular basis, but only supply when they have surplus crops to their family needs. The main crops grown are roots and tubers, bananas and other fruits. These farmers sell at all market outlets.

#### **Semi-commercial Farmers:**

Semi-commercial farmers supply the market with various types of root crops, vegetable crops and fruits on a small scale, but cannot supply the domestic market consistently. These farmers sell at all market outlets.

#### **Commercial Farmers:**

Generally larger farmers who plan production to supply the market consistently and on a regular basis. Commercial farmers sell at all outlets in Tongatapu, but not at Utukalongalu Market in Vavau.

#### **Resellers:**

These are traders who purchase produce directly from farmers or from the Talamahu Market and resell this on the roadside market stalls. They mainly trade in vegetables, but also sell to a lesser extent root/tuber crops and fruits.

#### **Common Trade Unit (CTU)**

Fresh produce is packaged for sale in different ways. Root crops are most frequently sold by basket or in bundles with several harvested plants tied together by their stems (e.g. Colocasia taro). But larger crop varieties such as Giant taro are sold by piece. Green bananas are sold by bunch, but ripe banana is sold by 'hand' or heap. Fruits are sold by pieces (e.g. pineapple, pawpaw, and watermelon), heaps (e.g. mango, avocado and limes) or baskets (breadfruit and mature coconut). Vegetables are sold in heaps (e.g. beans, capsicums and tomato) or bundles (e.g. taro leaf, pele and spring onions) or pieces (e.g. head cabbage, lettuce and pumpkin). A full list of CTU is included as Annex 1.

#### **Results and Discussion**

#### Mapping the domestic fresh produce market channels

Figure 1 below maps the fresh produce domestic market channels in 2010. There are three major market outlets covered - Utukalongalu Municipal Market in Vava'u, Talamahu Municipal Market in Nuku'alofa and the Roadside Markets in Tongatapu. Market outlets in other islands of the Kingdom of Tonga, such as in Ha'apai, are not covered in this map as no formal data collection is currently being undertaken at such sites.

Whilst the map gives an overall picture of supply and demand channels there are some limitations due to lack of information on the following supply channels:

- There are no data available that could identify the amount of crops bought by resellers from Talamahu market and from farmers who sell at the road side market.
- There are no data to identify the amount of crops coming from outer islands of Tonga to the Talamahu and other market outlets in Tongatapu.

At this point of time there is also no available data on demand from the different consumer groups.

In 2010 the total supply of fresh produce passing through the three markets amounted to 3,149 tonnes with the Talamahu market having at least 55.7% of the share, Roadside Markets having 36.5% and Utukalongalu Market only a 7.7% share. These numbers are significantly lower than the peaks in 2009.

Interestingly, trade through the roadside markets which commenced in late 2006 following the civil disturbances in Nukualofa, had gained considerable momentum in 2009. The first domestic

survey data on roadside markets was reported in the fourth quarter Domestic Market Survey Report for 2009. At this time the Roadside Markets were recorded to have 64% of total market share with Talahmahu having 21% share and Utukalogalu having 15% share. With stability having returned to the capital Nukualofa a concerted government effort has been directed to enforce Market Ordinance which prohibits roadside trading in downtown urban areas and trade at the Talamahu Market may have been reinvigorated at the expense of the roadside markets. Figure 8 below shows the change in volumes of root crops supplied through the two market outlets during 2010. However, because of data limitations it is not possible to estimate how much produce from Talamahu now recycles through the roadside markets.

244 tonnes Customers Semi-Commercial Utukalongalu **Farmers** Consumer **Suppliers** Market **Business** 7.7 % Total Market Market Semi-Subsistence Share Individuals & Restaurants & **Farmers** 126 farmers Households. Hotels. Talamahu Market Volume? 55.7% Total 1,755 tonnes Share Vol.? Semi-Commercial Customers **Farmers Reseller Markets** Semi-**Suppliers** Consumer **Business** Vegetables Subsistence Reselllers Market Market **Farmers** Fruits Resellers **Individuals** Restaurants & 1243 farmers Commercial RootCrop Resellers Households Hotels **Farmers** 109 farmers ---- **→ Road Side** Market Volume? 1,150 tonnes 36.5% Total Share

Figure 1: Tonga Fresh Produce Domestic Market Map 2010

The data presented in this market map are taken from the 2010 Domestic Market Reports.



Figure 2. Road Side market(above) at Ha'ateiho selling a mixture of root crops, fruits and vegetables which are locally grown.



Figure 3. (below) Road Side market at Fanga selling a mixture of root crops, fruits and vegetables which

are locally grown.

Figure 4. (left) Sellers and Customers at the Utukalongalu market.



Figure 5. (right) vendors at Utukalongalu market selling watermelons and leafy vegetables.



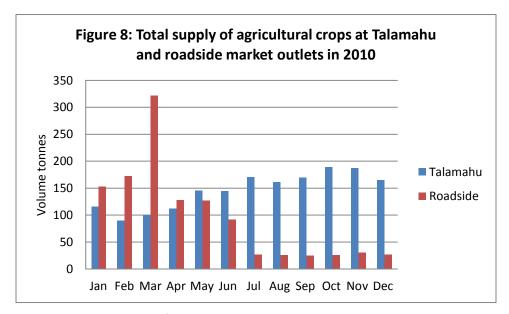
Figure 6. (left) The side View of the Talamahu market building.



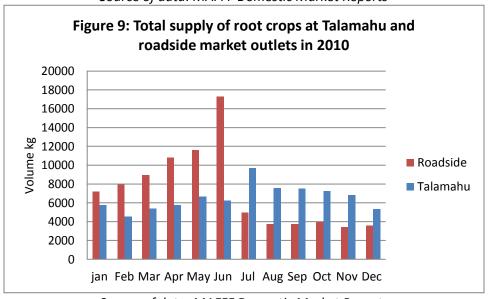
Figure 7. (right) Vendors at Talamahu Market



The data in Figures 8 and 9 below clearly show the relative shift in supply from the roadside markets to the Talamahu market in the latter half of the year. The data presented in Figure 8 show a steep decline in supply of total produce to the roadside markets from mid-year onwards with a corresponding increase in supply to the Talamahu Market. Whilst there is a usual seasonal decline in root crops supply towards the end of the year there is still evident a significant shift in the relative proportions marketed through the two channels (Figure 9). This data could be viewed as a positive indication of the implementation of the market regulations which limit trading through roadside outlets.



Source of data: MAFFF Domestic Market Reports



Source of data: MAFFF Domestic Market Reports

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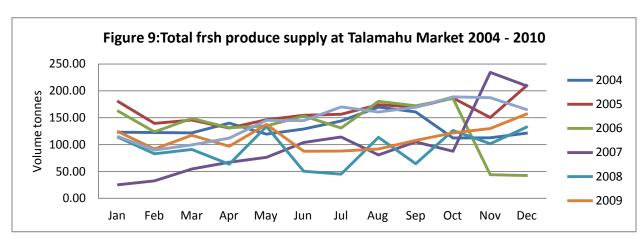
<sup>&</sup>lt;sup>1</sup> Market Act 1976: An Act to provide the establishment and regulation of markets

## The implication of Recognized Seasonal Employer Scheme on market supply

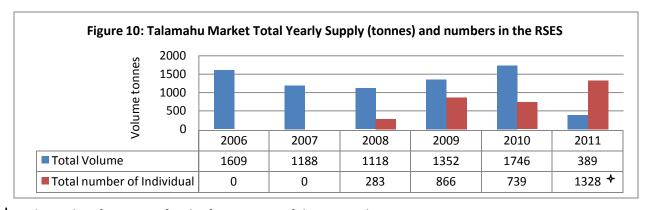
RSE scheme initiated activity in 2007/2008 when individuals from various villages throughout the main island groups of Tonga namely, Vava'u, Ha'apai, 'Eua and Tongatapu were selected to take part in the temporary migrant labor scheme in New Zealand.

Whilst studies associated with the RSE scheme have been conducted by various organizations, such as the Waikato University and the World Bank, no local or overseas studies have really addressed the implication of RSE scheme on the domestic agricultural markets in Tonga. In an attempt to identify any gross impact of the temporary labour migration as measured through total fresh produce supply on the Talamahu Market the supply data from year 2004 to 2010 have been reviewed (Figures 9 and 10).

The impact of the civil disturbances in Nukualofa in November 2006 is clearly evident in the data with a dramatic fall in supply through the Talamahu Market. However, although supplies remained somewhat depressed during 2007 to 2009, levels of supply had by 2010 again reached pre-November 2006 levels. But at this level of data aggregation no impact of the RSE scheme on supply to the market could be discerned.



Source of Data: MAFFF Domestic Market Reports



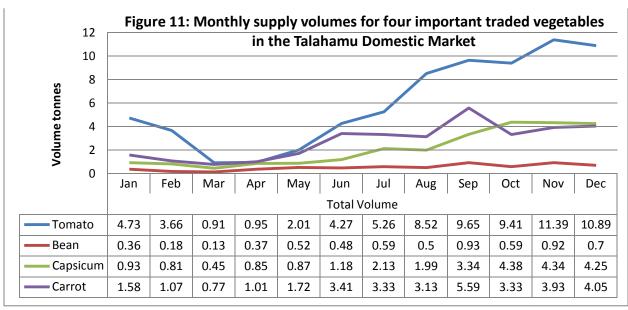
<sup>→</sup> Volume data for 2011 is for the first quarter of the year only.

However, if numbers of seasonal workers travelling out of the Kingdom continues to rise, which is possible with schemes currently established in both New Zealand and Australia and the possibility also that the USA may introduce a similar scheme; a more disaggregated data collection and focused analysis would be needed. This should include monitoring production and marketing activities from districts where significant numbers of labourers are participating in the scheme. It would also be interesting to compare impact on production of particular crops which have high labour demands for planting or harvesting in seasons when labourers are absent overseas.

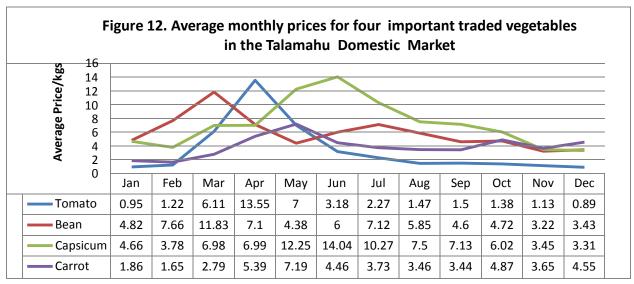
#### High food prices and the promotion of off-season production.

Under the new Government's National Strategic Development Framework, MAFFF is required to improve the output of the Agricultural Sector which has prompted MAFFF to initiate the promotion of off-season production. The promotion is mainly targeted at vegetable crops as they are mostly seasonal in their production characteristics. However, there are a number of root crops which are affected by seasonality factors, particularly early yams, and therefore have potential to be included in the policy.

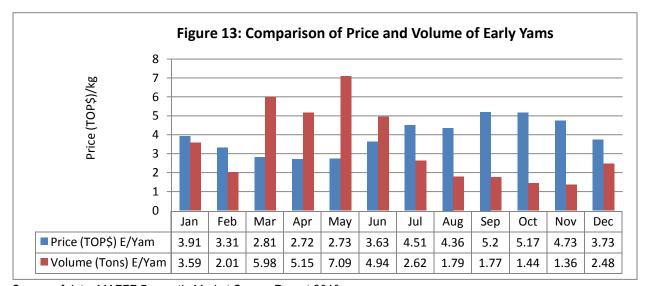
Figures 11-13 below present data on seasonal supply volumes and average monthly prices for four important vegetables and early yams traded on the Talamahu Market. During the "off-season", approximating to the first half of the year for vegetables, volume supply is relatively low whilst prices are high and vice versa for the latter half of the year. The reverse situation is true for yams with the off-season being the latter half of the year.



Source of data: MAFFF Domestic Market Survey report 2010



Source of data: MAFFF Domestic Market Survey Report 2010



Source of data: MAFFF Domestic Market Survey Report 2010

A closer examination and analysis of monthly price data for early yams and the four traded vegetables, tomato, bean capsicum and carrot over the last three years reveals some interesting findings (Tables 1.1 & 1.2)

Comparing average yearly price inflation (year-on-year) against within-year price inflation due to seasonality, a stark contrast is seen for all food crops reviewed. Within-year price inflation due to seasonality can exceed annual year-on-year inflation by several orders of magnitude. Indeed, for some crops in some years, year-on-year prices have declined, whilst in contrast within-year price volatility due to seasonal effects has show high price variation between lowest and highest price levels. In the case of tomatoes, the price difference can be up to fourteen times greater in the offseason compared to the high season (Table 1.1)!

Table 1.1 - Seasonal variation in average monthly price (TOP\$/kg) for selected agricultural products over the last three years

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
E/Yams(2008)	3.23	2.12	2.02	<mark>1.42</mark>	2.94	2.61	3.62	3.2	3.94	3.25	2.6	2.95
E/Yams(2009)	2.89	2.67	2.27	2.33	<mark>2.14</mark>	2.65	3.56	3.56	3.88	3.88	4.14	3.99
E/Yams(2010)	3.91	3.31	2.81	<mark>2.72</mark>	2.73	3.63	4.51	4.85	5.20	5.17	4.73	3.73
Tomato2008	1.7	3.13	8.28	9.3	5.13	3.93	3.52	3.17	1.6	<mark>1.02</mark>	1.13	1.5
tomato2009	4.73	6.73	11.97	13.13	10.51	3.76	2.32	1.97	2.1	1.65	1.2	<mark>0.84</mark>
tomato2010	0.95	1.22	6.11	13.55	7	3.18	2.27	1.47	1.5	1.38	1.13	<mark>0.89</mark>
Beans2008	6.08	9.06	7.72	11.11	6.46	5.84	5.8	10	<mark>4.92</mark>	4.96	5.15	7.35
Beans2009	10.18	11.36	10.83	12.05	7.92	4.99	3.8	7.52	5.56	4.39	<mark>2.79</mark>	5.08
Beans2010	4.82	7.66	11.83	7.1	4.38	6	7.12	5.85	4.6	4.72	<mark>3.22</mark>	3.43
Capsicum2008	<mark>2.50</mark>	2.85	3	15.79	8.67	10.13	9.68	7.73	7.87	5.65	5.05	10
Capsicum2009	11.21	15.12	12.49	16.61	18.15	10.61	8.57	6.5	6.54	6.67	<mark>5.26</mark>	6.82
Capsicum2010	4.66	3.78	6.98	6.99	12.25	14.04	10.27	7.5	7.13	6.02	3.45	<mark>3.31</mark>
Carrot2008	2.96	6.58	<mark>8.96</mark>	8.06	7.2	7.51	6.74	3.37	3.52	1.74	<mark>1.53</mark>	2.2
Carrot2009	3.71	4.83	7.01	11.91	7.73	5.19	3.69	2.9	2.27	<mark>2.04</mark>	<mark>2.04</mark>	2.22
Carrot2010	1.86	<mark>1.65</mark>	2.79	5.39	7.19	4.46	3.73	3.46	3.44	4.87	3.65	4.55

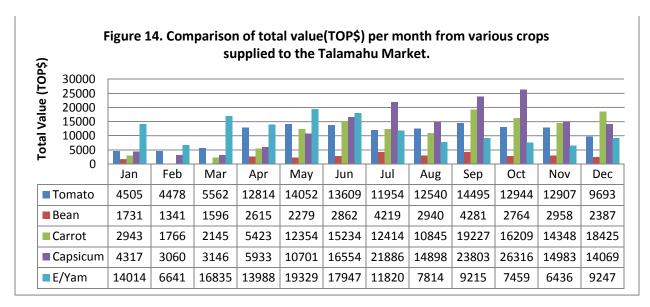
Lowest seasonal average monthly prices are highlighted yellow and highest prices are highlighted green

Table 1.2: Yearly average price inflation compared to seasonal price inflation

Crop	Year	Year Average	Yearly price inflation	seasonal price inflation
E/Yams	2008	2.83		177%
	2009	3.16	11.60%	93.50%
	2010	3.94	24.60%	91%
Tomato	2008	3.62		803%
	2009	5.08	41%	1463%
	2010	3.39	-33%	1422%
Beans	2008	7.04		125%
	2009	7.21	2.40%	332%
	2010	5.89	-18.30%	267%
Capsicum	2008	7.41		531%
	2009	10.38	40%	245%
	2010	7.20	-30.6%	270%
Carrot	2008	5.03		486%
	2009	4.63	-7.90%	484%
	2010	3.92	-15.3%	336%

These findings have profound implications for policy and underline the importance of the offseason production policy to tackle the extreme seasonal volatility in supply and consequently price of key food crops. Undertaking research to explore ways to stabilize year-round production should be given the highest priority. Possible fertile areas for investigation could be:

- Screening of different varieties for off-season production
- Use of irrigation in the dry season and plastic cover in the wet periods
- Soil amendments and mulching
- Hydroponics.



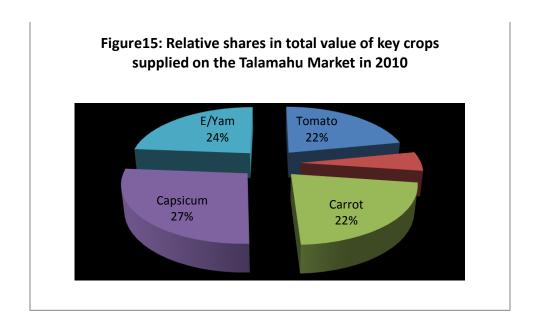


Figure 14 compares the total value (TOP\$/month) for the five crops discussed, and Figure 15 depicts the relative shares in total annual value of these crops supplied to the Talamahu Market in 2010. Capsicum, with an annual value of supply of TOP\$159,666 commands the largest share in value (27%) followed by E/Yam with an annual value of TOP\$140,745 (24%). Next and almost equal, come carrots at an annual value of TOP\$131,325 and tomatoes at TOP\$129,553; and last with only a small 5% share is beans at an annual value of TOP\$31,910.

Clearly the four leading crops – capsicum, early yam, carrot and tomatoes are ones to prioritize under the off-season promotion policy. But tomatoes with its extreme within year price volatility could offer distinct opportunity for significant gains through extending the off-season production.

#### **Conclusion and Recommendations**

Tonga has maintained over recent years a relatively strong and extensive market data collection system relative to other countries in the region. However, even though this data has been made available in the quarterly Domestic Market Reports, limited opportunity has been taken to analyze the data in order to better inform policy decisions. Therefore, despite the high costs involved in collecting this data its true value has not yet been fully realized through improved policy decisions. An express aim of this study has been to demonstrate the policy value of domestic market data and thus raise the profile and importance of maintaining appropriate collection systems.

The Domestic Market Survey report has been used to investigate two policy issues, the implications of the RSE scheme for domestic agriculture production and the value of promoting off-season production of selected food crops.

Whilst no apparent impact of the RSE could be detected from the total supply of fresh produce to the Talamahu Market, the analysis was somewhat confounded by the negative impacts on supply experienced following the civil disturbance in November 2006 which disrupted trade in central Nukualofa. Therefore it is recommended that a continued effort is made to monitor any possible impact on domestic production if the labour mobility programs involve increasing numbers of agricultural labourers. Furthermore, it is recommended that specific surveys are designed to focus data collection on districts from which the maximum numbers in the RSE program are drawn.

By contrast, the review of domestic market data on seasonality and prices reveals important policy insights. Significant within-year fluctuations in the prices of a number of vegetable products are detected and this data can be used to provide an indication of the potential returns to extending the production seasons of individual crop types. Considering the potential benefits in terms of improved farm incomes, more stable consumer prices, increased

contribution of the agriculture sector to the economy and enhanced food security it is strongly recommended that the promotion of off-season crops is accorded high priority and appropriate research and extension capacity and resources are directed to achieving this policy goal.

Whilst additional data will often be needed to supplement the data in the domestic market survey when attempting to address specific policy issues, the existing domestic market data set already provides a strong basis for making improvements in an evidence-based policy process. It is therefore recommended that effort is directed toward ensuring better analysis and use of the existing data source as well as maintaining the integrity of the current collection systems and extending them as deemed necessary.

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## Annex 1

Table 2 CTU of each product sold at the Domestic Market of Tonga

Crop	СТИ			
Early Yams	Basket			
Late Yams	Basket			
Sweet Yams	Basket			
Giant Taro	Piece			
Swamp Taro	Bundle			
Taro Tarua	Basket			
Sweet Potato	Basket			
Cassava	Basket			
Potato	Plastic Bag			
Banana	Bunch			
Plantain	Bunch			
Pata	Bunch			
R/Banana	Hand			
Pawpaw	Piece			
Pineapple	Piece			
Avocado	Неар			
Orange	Неар			
Lemon	Неар			
Cola	Неар			
Mango	Неар			
Watermelon	Piece			
Breadfruit	Basket			
Mature Coconut	Basket			
Green Coconut	Piece			
Tomato	Неар			
Beans	Неар			
Capsicum	Неар			
Carrot	Неар			
Onion (bulb)	Plastic Bag			
Onion (Spring)	Bundles			
Lettuce	Piece			
Head Cabbage	Piece			
Chinese Cabbage	Piece			
Cucumber	Неар			
Pumpkin	Piece			
Eggplant	Piece			
Zucchini	Неар			
Lu	Bundles			
Pele	Bundles			
Corn	Неар			
Ginger	Неар			
Chilli	Неар			
Peanut	Plastic Bag			