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THE CONTRIBUTION OF BEEF INDUSTRY TO VANUATU'S GROWTH AND DEVELOPMENT

by

Michael Busai Naparau

A thesis submitted for the fulfillment of the

partial requirements for the completion of

Master of Commerce in Economics

School of Economics
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March, 2013

DECLARATION

Statement by Author

I, Michael Busai Naparau, declare that this thesis is my own work and that, to the best of my knowledge, it contains no material previously published, or any substantially overlapping with material submitted for the award of any other degree at any institution, except where due acknowledge is made in the text.

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Statement by Supervisor

The research in this thesis was performed under my supervision and to my knowledge is the sole work of Mr. Michael Busai Naparau.

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ABSTRACT

This thesis adds to the existing body of literature on trade-growth/development nexus by examining the growth contributions of Vanuatu's beef industry. It uses both field survey and time series econometric with data from 1980-2008 to show that while the growth effects are small and positive, they seem to have reversed after the government intervention in early 1990s. However, despite these, it is argued that the growth contributions may not be persistent because the supply of cattle is small and declining. It is argued that changes in the quality of farm technology, extension services, including market linkages and land reform to establish more small and medium farms would improve increase productivity and production levels as well as contributing to a sustainable beef industry.

An econometric analysis was used to show the growth effects of beef exports to total exports and total economic growth and developments. The results obtained were impressive and have clearly justified the impact of political instability as a major impediment to the growth of the beef industry. The econometric analysis has also justified that there is positive growth effects of beef exports, although insignificant. The insignificant result suggest that a number of policy measures need to be in place. The most significant recommendation is the need for good governance and political stability. Secondly, there needs to be a land reform policy to foster the establishment of small and medium farms and a general policy of the beef industry and the agriculture sector and trade policies. Third, is to improve infrastructure such as roads and feeder roads from beef farms to the main abattoir, to improve transport both land and shipping, to provide credit to farmers at more affordable interest rates. Training of farmers and research and technology would also play a crucial role in increasing production levels to meet the increase demand both domestic and international. The positive growth effects of beef exports suggest that Vanuatu has more comparative advantage in the beef industry and in particular the opportunity of Organic Beef production and that Vanuatu should specialize more in developing this sector, in light of, sustainable development and the current impacts of climate change.

The impacts of climate change and the vulnerability of the country to major natural disasters and external price shocks is pointing to the importance of sustainable

development of the beef industry and diversification to other related products and livestock. A number of opportunities

have been identified in this research which includes the exploration of different beef parts for exports to Asian countries, the development of the dairy industry, leather production, canned beef, the use of different beef parts for the production of cosmetics and pharmaceutical products, animal and fish feed, the development of integrated livestock, crops and aquaculture, Goat meat production, bio-fuel, organic manure and fertilizers which can be used for organic agriculture. Organic farming is an emerging and important area that is currently practiced in most small island states, in light of, the current impacts of climatic change. This would mean that the development of the beef industry must also accommodate these climate changes.

The field survey reveals a significant contribution of the industry to Vanuatu's economic development as incomes generated by smallholder farmers are used mainly for daily needs (livelihood chores, school fees, investment in small businesses and other important social obligations). Data also show that incomes from large ranches are mostly invested in sprouting business activities (expansion of cattle farm, establishment of coconut oil mill, wages for employees and improvement in infrastructure and transportation of cattle to the abattoirs). Given the very low growth effects and market share mainly of smallholder farmers to Vanuatu's beef exports, the thesis recommends a number of policies to localize the growth contributions. Firstly, market based policies and de-monopolization of the industry are suggested. Improvements in productive capacity, farm support, trade facilitation and infrastructure services, in addition to the establishment of small- medium sized organic beef farms (which can lead to significant welfare gains to the indigenous Ni-Vanuatu) are highly recommended.

LIST OF ABBREVIATIONS

ACP	– African Caribbean Pacific
ADB	– Asian Development Bank
BVC	– Bovine Venereal Campylobacteriosis
CD	– Central District
CEP	– Campagnie d'Elevage Pacifique
CPS	– Central Product Classification
CRP	– Comprehensive Reform Program
DFID	– Department for International Development
EAEs	– East Asian Economies
EPAs	– Economic Partnership Agreement
EU	– European Union
FAO	– Food Agriculture Organization
FDI	– Foreign Direct Investment
GATT	– General Agreement on Tariffs and Trade
GEC	– Global Economic Crisis
LDC	– Least Developed Countries
MFN	– Most Favored Nation
MSG	– Melanesian Spearhead Group
NAFTA	– North American Free Trade Agreement
NPSO	– National Planning and Statistics Office
NSO	– National Statistics Office
ODA	– Official Development Assistance
PAA	– Priority Action Agenda
PACER	– Pacific Agreement for Closer Economic Relations
PICs	– Pacific Island Countries
PICTA	– Pacific Island Countries Trade Agreement
PPLPI	– Pro-Poor Livestock Policy Initiatives
RBV	– Reserve Bank of Vanuatu
ROO	– Rules of Origin
SFNH	– Societie Francaise de Nouvelles Hebrides
SPARTECA	– South Pacific Regional Trade and Economic Co-operation Agreement
SSGR	– Steady State Growth Rate
TFP	– Total Factor Productivity
TRIPS	– Trade Related Aspects of Intellectual Property Rights
UNESCAP	– United Nations Economic and Social Commission for Asia and the Pacific
USDA	– United States Department of Agriculture
USMEF	– US Meat Export Federation
VLDC	– Vanuatu Livestock Development Corporation
VNSO	– Vanuatu National Statistics Office
WTO	– World Trade Organization

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CHAPTER 1: BACKGROUND AND SIGNIFICANCE OF THE STUDY

1.1 Introduction

This chapter provides a general overview of the thesis and the economy of Vanuatu. It includes the problem statement, research questions, hypothesis, research methodology, policy implications and outlines the structure of the thesis. On the economic front, it examines the gross domestic product (GDP), decomposed into three sectors (agriculture, industry and services), and the contribution of the beef industry to Vanuatu's economic growth. The chapter also examines the trends in beef industry, livestock production, farm size and location. One of the significant aspects outlined in this chapter is the percentage of total population residing in the rural areas and the portion that engages in cattle farming. The chapter also emphasizes the significance of the productive[1] sector as a major priority of investment that is outlined in the Government's Priority Action Agenda (PAA). These brief descriptive statistics and economic background are expected to set the stage for the following chapter.

1.2 The Economy

The Republic of Vanuatu (formerly known as the New Hebrides) comprises of a chain of more than 80 islands, of which about 65 are inhabited. These islands extend 1,300 kilometres in the Pacific Ocean in the North-East at 14,760 sq km off Australia. The first inhabitants of Vanuatu were the Melanesians (Shadrack and Cloe 2006). Following the English missionaries of the early 19th century, sandalwood traders explored Vanuatu and later began kidnapping the natives for sugar and cotton plantations in Australia. In 1887, the British government successfully stopped illegal human trade and placed Vanuatu under the French Naval Commission. During World War II, the islands served as naval base for allied forces in the Pacific and in 1980, it gained independence.

Vanuatu's population in 2009 was 234,023 (Vanuatu National Statistics Office, 2009), comprising predominantly (80 percent) Melanesians. The other 20 percent

[1] Agriculture is being emphasized as the main productive sector.

comprised of other Pacific Islanders, Chinese settlers, Vietnamese, Europeans and other ethnic groups. The English and French are the two official languages although the local Pidgin called Bislama (Bichelama) is also widely spoken. As a member of the Commonwealth of Nations, Vanuatu has a President, a Prime Minister and a Council, and a Unicameral Parliament which govern its 6 provinces (TAFEA, SHEFA, MALAMPA, PENAMA, SANMA and TORBA). The capital city Port Vila inhibits about 18.8 percent[2] of all population.

Vanuatu's economy is dual in nature, comprising mainly of the subsistence agriculture while about 20 percent of the population are part of the monetized economy mainly the services sector. In 2009, the agricultural sector accounted for about 18.8 percent of the value added GDP while industrial sector accounted for 9.5 percent. The rest of the activity was in the services sector. Despite the low value added for agriculture, the bulk of the population (80 percent is fully engaged in subsistence farming) and agriculture forms their main source of livelihood. Of the 80 percent rural population, about half are engaged in smallholder cattle farms (Banga, T. 2000). The others in the rural population are engaged in subsistence farming and small business activities in retail, wholesale as well as tourism. A snapshot data on sectoral contributions are in Table 1.1a.

Table 1.1(a): Sectoral Contribution to Real GDP (percent)

Sector	**1990**	**1998**	**2000**	**2004**	**2007**
Agriculture, Forestry and Fisheries	24.1	21.6	20.3	21.8	19.1
Industry	12.6	8.7	11.2	7.7	8
Services	63.2	63.2	60	63.2	63.9
Total Real GDP (million vt)	**31598**	**41569**	**44171**	**44274**	**53256**

Source: MFEM (2010)[3]

The data in Table 1.1(a) show that income is driven mainly by the services sector which accounted for 63.9 percent in 2007. Recent estimates from the Department of Finance and Treasury and MEC[4] (2010) indicates that the Services Sector accounted for 63.4 percent, a slight decline from 2007. The Agriculture and Industry Sector accounted for 19.2 percent and 9.3 percent of GDP respectively, although experienced a slight increase, the level is still lower compared to the levels in 1990,

[2] National Population and Housing Census, 2009. Vanuatu National Statistics Office, 2009.
[3] Ministry of Finance and Economic Management (2010)
[4] Macroeconomic Committee comprising of Department of Finance and Treasury, Reserve Bank of Vanuatu and the Vanuatu National Statistics Office, 2012.

1998 and 2000. These trends are partly explained by the change in new government since 1991 and the political instability during this period to date which affected investor confidence in this sector. In addition, the lack of national agricultural policy and poor extension services have all contributed to the decline in agricultural valued added. Industrial development has been hampered by the lack of technology and human capital.

The main agricultural commodities include copra, beef, cocoa, timber and kava. According to the Government's long term plan, the Priority Action Agenda (PAA), agriculture is a priority sector and that more resources should be invested for its development. These also make up Vanuatu's major exports. Table 1.1(b) shows the main exports earnings which comprised about 90 percent from agricultural commodities. Overall export earnings on all agricultural commodities have experienced a declining trend. Beef export earnings as a percentage of GDP has declined drastically from 1.2 in 1990 to 0.3 percent in 2007 (Table 1.2(b).

Table 1.1(b): Vanuatu's Main Export Earnings (in millions of vatu)

Main Export Earnings	1990	% of GDP	2007	% of GDP
Copra	598	1.90%	485	0.90%
Beef	368	1.20%	180	0.30%
Cocoa	248	0.80%	221	0.40%
Timber	91	0.30%	80	0.15%
Real GDP	**31598**		**53256**	

Source: RBV[5] and VNSO[6]

Data on fisheries are hard to reconcile - although export receipts of fisheries is negligible in national data, mirror data from ADB (2012) show that fisheries make up about 80% of Vanuatu's GDP. These trends are alarming and it is mainly due to inadequate fisheries management in Vanuatu. Kava and coffee exports, which are thought to be niche products, are of small scale as well. Interestingly, most of these exports fail to respond to export price signals (details later) and consequently fail to benefit from external markets. Vanuatu is part of the major trade agreements in the Pacific and with Australia, New Zealand and EU and it is now a member of the World Trade Organization (WTO).

[5] Reserve Bank of Vanuatu (1990 – 2008)
[6] Vanuatu National Statistics Office (2008).

1.3 The Beef Industry and Problem Statement

The Vanuatu Beef Industry is one of the longest serving industries with establishment dating back to 1854. It is now the second largest exports commodity, next to copra and one of the important contributors to Vanuatu's economic growth. According to ADB (2002), Vanuatu is noted to be the most conducive environment for raising Beef, branding most of Vanuatu grass fed-beef as organic. However, despite the favorable environment and potential for cattle production, there are a number of problems that hinder growth and production. The major problems are as follows:

(1) Limited supply of cattle which is declining;

(2) Political Instability leading to subsequent breakdown of extension services

(3) The increasing slaughter of young heifers

(4) Export of live cattle

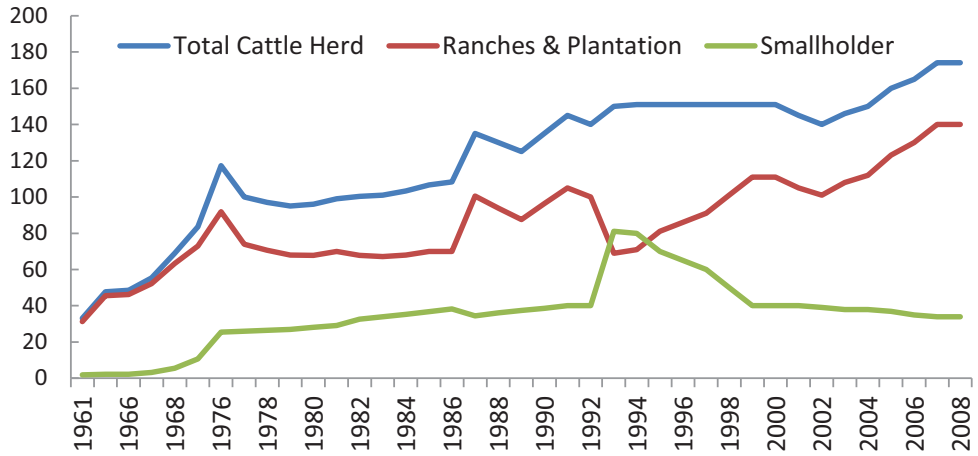
(5) Diversification to other lucrative crops such as Kava.

(6) Increased ownership of huge arable land by foreign investors

(7) Inconsistency in maintaining the required quantity of exports.

In addition, the industry lacks export capacity and this leads to difficulties in getting most of the existing animals to markets - simply Vanuatu cannot meet the volume and reliability specifications of the important Asian Beef Markets (ADB 2002), notwithstanding the increased domestic demand. Data also show a declining trends in cattle stocks, mostly from the small farmers especially after 1994 (see Figure 1.1) below.

Figure 1.1 Total Cattle Population, Plantation and Smallholders (In "000").



Source: Second National Development Plan (1987 – 1991, Volume 1. RBV QER[7]).

According to the ADB report 2002, the coming to power in the early 1990's of a Political Party which lacked proper Governance practice has led to a significant damage to the capabilities of the extension services and to the management of Vanuatu Livestock Development Corporation (VLDC), whose role was to provide breeding stock to smallholder farmers. It is also noted that the subsequent breakdown of services, progressive pasture deterioration, the difficulty of getting smallholder cattle to market combined with unfavorable prices, and opportunities for smallholders to engage in more lucrative enterprises such as Kava, combined to reduce smallholder interest in cattle production especially for exports. Data shows a significant increase in domestic consumption which picked up since 1987 due to increase in population in both urban centers of Port Vila and Luganville and increase consumption of expatriates and tourism. According to Shadrack and Cloe (2006), there is a large Veal market in Vanuatu, especially for Hotels and restaurants and Butchers in Port Vila. This has led to the increase slaughter of young heifers before they can reproduce.

The Santo Abattoir which is owned by a Japanese company secured a special market in Japan for young Heifers, thus, resulting in the increased slaughter of Young Heifers. The export of Live Cattle to Indonesia during the period (2001 – 2003) also

[7] Reserve Bank of Vanuatu Quarterly Economic Review.

contributed to the declining trend in total national cattle stock. The decline in total cattle herds was also attributed to the cattle disease (Bovine Venereal Campylobacteriosis (BVC)) which affected cattle in 2005 and 2006 and led to a decrease in the number of calves from 30 to 50 percent. In remedying the situation, the livestock and Quarantine Department introduced a vaccination program, aggressively treating the infected cattle around the country. The vaccination program started in early 2007 and it is believed that survival rate of young calves increased to 80 percent.

Table 1.3.2 shows the distribution of cattle in the six provinces of Vanuatu. While total number of cattle increased over the years since 1993, the growth rate shows a declining trend from 73 percent from 2006 to 21.8 percent in 2007 (Agriculture Census, NSO, 2007). This decline was attributed to decline in cattle numbers from Shefa and Malampa by 39.2 percent and 11.5 percent respectively. Other reasons for this drastic decline is poor fencing and pasture and most grazing areas are returning to bush as farmers move into lucrative commodities such as Kava and other crops. With the increasing demand for meat for domestic consumption and traditional ceremonies, a lot of cattle were slaughtered (Shadrack and Cloe, 2006).

Table 1.3.2: Number of Cattle in Vanuatu.

Province	Cattle No. 1993	Cattle No. 2007
Shefa	11,410	21,874
Sanma	26,520	91,839
Malampa	17,610	16,082
Penama	17,280	22,284
Tafea	6,620	19,344
Torba	2,710	2,729
Vanuatu	**82,140**	**174,152**
Growth Rate		**112%**

Source: Vanuatu National Statistics Office (2006, 2008).

Production of beef is very poorly related to its price. This is due to poor awareness of the price of beef among farmers. It is also noted that farmers cannot respond directly to increase in beef prices because they do not have the appropriate scale of production. Other reasons, according to Shadrack and Cloe (2006), are that smallholder farmers do not have the necessary knowledge to increase their herd size and instigate the supply response. This is reflected since year 2000 where Beef

export price shot up high while Beef export fell sharply. This trend continues from 2000 to 2005 (Shadrack and Cloe, 2006).

1.4 Research Questions

The thesis aims to answer the following research questions:

1. What are the beef production, consumption and export trends and potentials for Vanuatu?
2. What are the major problems in the beef industry and pragmatic options for policy?
3. Does the beef export have any growth effects in Vanuatu and how it contributes to Vanuatu's economic development?

1.5 Hypothesis

The increase in poverty level and low economic growth in Vanuatu is caused mainly by the impacts of Political Instability on the beef industry, inefficient allocation and distribution of the land and resources, poor infrastructure, weak laws and policies and lack of qualified human resource in the beef industry.

1.6 Research Methodology

Briefly, we will take a time series econometrics approach to determine the contribution of beef trade on Vanuatu economy and growth, which will be further, supplemented with a survey based on structured questionnaires (20 targeted at large cattle ranches and 40 at smallholders). Details of the econometric procedure are in Chapter 4. In addition, a field survey focused on the 5 major cattle producing islands in various islands of Vanuatu is discussed. Other information were obtained through literature survey on articles and journals, and also information sources obtained from Internet web sites on world Beef development reports and Quarterly Economic Reviews of the Reserve Bank of Vanuatu and Quarterly Statistical Indicators of the Vanuatu National Statistics Office (VNSO).

1.7. Policy Implications of the Research

This research is culminated from studies by previous scholars on Vanuatu's beef industry and its potential and contribution to the country's economic development.

The beef industry is not only significant but it has a long historical and interesting establishment which dates back to 1854. Significant developments have been achieved during the pre-Independence era which saw the establishment of the first cattle ranches and the efforts made on the first beef exports. The exports during pre-independence include Chilled Beef, Beef Offal, Salted Beef and Canned Beef.

Currently, the Government only exports chilled beef to Japan, Papua New Guinea, Solomon Islands and Australia. It is interesting to re-visit these export products and revived as the country can generate more foreign exchange earnings from the exports of other beef products of high value. Research has indicated the potential of different beef products which can be considered for export. Table 2.2.2 listed some of these potential beef parts for exports which include, Short ribs, Beef Tongues, Outside Skirt, Short plate, chuck eye roll, intestines, Tripe, Rib, Chuck flap tail and Rib eye roll.

Research has also indicated the potential of other bi products that can be generated from beef parts such as cosmetics, pharmaceutical products, leather products, bio fuel, organic fertilizers and animal feeds from beef bones. These are some of the areas that need further research to generate more income. One of the potential areas for development is the Organic Beef production. There is increasing demand in the international markets as more people are now becoming health conscious. On the whole, one can say that demand for Organic Beef far exceeds supply. The Government needs to increase its investment in this sector not only to increase production but to ensure that there is also equal participation of this export market with local smallholder farmers. Most importantly, these issues should be accorded with high importance and priority, in light of the impacts of the current exogenous shocks from natural disasters, emanating from climatic changes. Vanuatu is being characterized as one of the vulnerable small island developing states, thus, it should consider this issues by building up a strong resilience based through exploring the three points emphasized. (Exploring the different beef parts for value added, diversification to minimize external risks, sustainable development of the beef sector, in light of the current climatic changes.

The outcomes and results of our analyses will provide meaningful information which can be used for national policy formulation and planning especially for the agriculture sector. The analysis will also be useful for students and academics

undertaking research at University levels. Importantly, it will contribute significantly to the existing body of knowledge of the beef industry in Vanuatu and the world.

1.8 Structure of Thesis

The thesis is divided into to six chapters; Chapter 1 provides an introduction, and general overview of the economy and the thesis. Chapter 2 is an overview of the beef industry. It also discusses historical production, consumption and export trends, and identifies the significant trends and challenges in the industry in Vanuatu. Chapter 3 discusses the important theories relating to growth. It also discusses the empirical modeling methodology. Chapter 4 shows major analysis and findings of the beef industry based on time series econometric analysis and also with data obtained from the Beef Survey conducted in 2006. Chapter 5 discusses the constraints confronting the beef industry in Vanuatu and provides a discussion of opportunities and policies that may be considered for the overall improvement of the Vanuatu Beef Industry. Finally, chapter 6 presents the major findings and concludes the thesis.

1.9 Conclusion

This chapter has outlined the evolution of Vanuatu's Beef Industry, dating back to 1854. The existence and progress of the cattle industry is evidenced by its best soil environment and that Vanuatu has more comparative advantage on Beef Production. The cattle industry has gradually developed over the years and currently it is one of the country's major contributors to its exports and economic growth and development. This chapter also outlined the major challenges confronting the beef industry with particular focus of the impacts of political instability as a major impediment. This chapter also explores the research questions which help further research into the industry by looking at production levels and trends, consumption and export trends. One of the questions is to examine the growth effects of the beef industry to exports and overall economic growth and development. This growth effects will be tested empirically with an econometric model and its findings will be used for policy formulations. The chapter also outlined the hypotheses to be tested, the methodology of how this research is being conducted. The methodology will provide a basis for validity of the research. Finally, the chapter looks at the Policy implications of this research and the structure of the thesis. The Policy Implications

will assist in providing validity and meaningful information for researchers and policy makers. It is expected that the thesis will contribute richly to the existing body of knowledge of the Vanuatu beef industry and it will also be beneficial as a model for other countries.

CHAPTER 2: AN OVERVIEW OF THE BEEF INDUSTRY

2.1 Introduction

This chapter presents an overview of the beef industry from the global, regional and national perspective. The purpose of this chapter is to explore what other authors have done in terms of research and development into the beef industry. The chapter also seeks to address the three questions on "What are the trends of beef production and consumption levels and the contribution of the beef exports and production to economic development." We first consider the developments in the international beef production, trade and trading arrangements since the 1960s. Consequently, we review the scale and composition of the Pacific beef industry including that of the other livestock, as they play an important role, not only for food security but as a major source of protein, income and for ceremonial activities. We also review some of the major problems encountered in the beef industries of these countries and the lessons learned. On the national front, we provide an overview and discussion on historical developments of the industry from the mid-1960s to 2010 and consider government's major policy initiatives including the comprehensive reform programs in the post 1997. An important aspect of the latter has been to improve the welfare and production infrastructure of smallholders. Finally, it discusses the development and challenges of export markets and concludes with a way forward as anticipated by the government and major stakeholder.

2.2 (a) Beef Industry: A Global Perspective

The world beef trade, according to the International Beef Overview (2006 and 2009) has been increasing since the early 1960's and has doubled between the early 1970's, after several high income markets that were opened following a series of trade agreements. It is also noted that the world trade in beef contributed significantly to economic growth of most of the exporting countries, such Australia, USA, Brazil, Canada and New Zealand. Some of the important international agreements facilitating international trade have been the Tokyo Round of General Agreement on Tariffs and Trade (GATT) in 1978, the Beef Citrus Agreement between the United States and Japan in 1988, the North American Free Trade Agreement (NAFTA) and the Uruguay Round of the GATT, both in 1994. The rapid growth in beef trade in the

years following these agreements suggests that improved market access could further increase income and growth potentials of livestock producing countries. The world beef markets are concentrated among a selected group of 13 countries, who consume nearly 85% in total and account for about 90% of world beef production. Apart from USA, Russia, Mexico, Japan and South Korea, also have greater consumption than their production levels. The countries with beef production exceeding consumption (major exporters) are the European Union, Brazil, Argentina, Australia, India, Canada and New Zealand. These countries, however, are major importers as well.

An analysis of different beef products reveals the following on the international scene. Table 2.2.2 found that Short Ribs is being ranked top with the highest value of U$388 million in 2006 prices, imported mainly by ASEAN, Hong Kong/China, Japan, Taiwan, Korea and Russia. The second major imported beef item is beef tongue with total value of US$328 million with Japan as the main importer. Outside skirt is also the major beef item followed by Short Plate, Chuck Eye Roll, Intestine, Tripe, Rip Finger, Chuck Flap, Tail and Rib Eye Roll. These niche products, no doubt presents excellent trading opportunities for a developing beef producer like Vanuatu. The United States Meat Exports Federation (USMEF) estimates show that Short rips export accounted for 57 percent of total production, Beef tongue accounted for 70 percent, Outside Skirt with 61 percent, Short plate 68 percent, Rib finger accounted for 94 percent of total production.

Other beef export parts with average of 10 to 15 percent of total production of the major exporters.

Table 2.2.2: U.S. and International Prices of Beef Export Items					
Item	US Value (US$/KG)	International Value (US$/kg)	Exported Volume (metric tons)	Total extra Value (millions US$)	International Market(s)
Short Ribs	1.33 - 2.09	4.00 – 10.00	121,395	$388	ASEAN, HK/China, Japan, Korea, Russia, Taiwan
Beef Tongue	0.22	9.92	35,310	$328	Japan
Outside Skirt	2.09	3.50 – 6.00	50,516	$166	CS America, Japan, Korea, Mexico
Short Plate	0.96	1.74 – 2.65	162,690	$63	ASEAN, HK/China, Japan, Russia, Taiwan, Middle East
Chuck Eye Roll	2.62 – 2.68	3.50 – 6.00	71,223	$43	ASEAN, Japan, Korea, Taiwan
Intestine	0.1	.90 – 1.70	31,814	$35	Japan, Korea
Tripe	0.1	.50 – 3.00	38,520	$35	Caribbean, CS America, HK/China, Europe, Mexico.
Rib finger	1.33	2.94 – 3.80	13,883	$27	Korea, Taiwan
Chuck Flap Tail	1.25 – 1.30	3.46 – 6.17	9,548	$26	Japan, Taiwan
Rib Eye Roll	8.18 – 9.23	11	18,212	$23	Caribbean, Japan
ALL Items	-	-	921,558	$1,212	-

Source: USMEF Estimates

Farming[8], according to Perkins and Gillis, 2001, play a crucial role in economic development but he also pointed out that not all increases in farm output benefit the majority of rural people. The creation of mechanized large scale farms in place of small, peasant farms actually make the majority of the population worse off (Perkins and Gillis, 2001). According to FAO (2010), Animal Production and Health Division, Livestock contribute to the livelihood of an estimated 600 to 700 million rural poor by providing a small but steady stream of food and income, raising farm productivity, increasing assets and savings and diversifying risks.

[8] This includes Livestock Farming.

However, the growing demand arising from the increasing population provides an opportunity for poor livestock farmers to improve their livelihoods. But this depends on Government Policies and appropriate institutional framework (FAO, 2010). Currently, the world population is increasing while at the same time there are challenges such as natural disasters emanating from the global climatic and environmental changes, which is affecting food supplies in most of the vulnerable countries, thus increasing demand and driving up food prices.

The advancement of the agriculture sector and increase in food production must be accorded high priority, in light of, the availability of good arable land and the impacts of the current climatic changes and political commitments. There is a need to identify the land problems and the way it is owned and organized. Conditions of land tenure need to be well defined and sorted out with some legal procedure in place with approved titles as this will create security and confidence for the farmers. These conditions will act as incentives which will induce farmers to increase investment and use the land more efficiently as well as increase production. The land need to be secured with some form of legal arrangements.

2.3 An Overview of the Pacific Livestock

Agriculture forms the backbone of most of the Pacific Island Countries (PICs) – The bulk of its total population is engaged in agriculture and resides in the rural areas. In Vanuatu alone, the latter is about 80%. Government investment in agriculture and its trade facilitation has proven to have contributed significantly to these economies. According to Mohammed (2001), livestock plays a crucial role in the socio-economic developments of these nations as it represents an important source of food and financial security for many small farmers. Beef and other livestock (including fish) provide the main source of protein reducing malnutrition in these societies. It is noted that while pigs and poultry are recognized as dominant livestock throughout the PICs the ruminant animals particularly cattle, are mostly limited to the larger island nations such as Papua New Guinea, Fiji, Vanuatu, Solomon Islands, Samoa, Tonga and New Caledonia.

Reddy (2001) states that the increasing demand for livestock products has raised a heavy burden of livestock producers to increase production thus saving the economy from significant amount of import expenditure. With increasing population, the

overall demand for livestock products will escalate in the near future and therefore PICs must increase productivity to meet this high demand. One of the most important catalysts for this is through research on livestock production, breeds, feed types, and cost and livestock diseases. Manueli et. al (1996) also emphasized the significant role ruminant livestock play in all emerging economies in the world including the PICs. It is evidenced from research that the majority of ruminant livestock production is in the hands of smallholder farmers. Livestock is seen as the crank-handle of both sustainable and intensified agricultural production at the smallholder level. They are used for food security, a major source of income; help in poverty alleviation and in natural resource management. According Parkinson (2004) many animals make good use of the proteins in vegetable foods. The cows for example get its proteins by eating a lot of grass and pastures and broken down into smaller units of amino acids. The amino acids then combined to become meat and milk in the cow. It was also noted that an ideal balanced meal provides plant protein from vegetables, together with a little animal or fish protein, plus green vegetables and fruits for vitamins and carbohydrates, root crops or rice to give energy. Reddy (2001) states that meat plays a very important role in meeting the nutritional requirements of human body and Calloway, (1995), Latham (1997) and Newman and Harris (1999) find that that animal product play an important role in providing absorbable forms of iron, zinc, vitamin B12, retinol, thiamin, calcium, Vitamin B6, riboflavin and Vitamin A. It was also noted that in terms of calories and protein, livestock product provides 24.7% of adult body calorie requirement and approximately 50% of protein requirement (Reddy, 2001:49).

The above results indicate that both the amount and balance of dietary intake is important for healthy development of the human body. There are nine special amino acids, which cannot be made in our body, and must therefore be obtained from food. These nine special amino acids are known as essential amino acids, and are vital for growth and health. They are mainly found in foods produced by living creatures like meat, eggs and fish. Food containing essential amino acids are said to have high body building value. They are very important for pregnant and breast-feeding women and for growing children of all ages. Children of Pacific region, according to Parkinson (2004) may suffer from malnutrition if they are fed too little protein, together with too little energy from fats and carbohydrate meals. This leads to poor

growth in children, weight loss and wasting in adults. Without adequate nutrition, muscles including heart muscles waste are weakened. Brain development can also be stunted and learning impaired. A lack of the amino acids needed to build tissue cells and blood causes growth in children to slow down. At the same time they may show a low resistance to diseases; and infection of the skin, throat, chest, stomach, and intestine become more frequent.

Ruminant Livestock industry plays an important role in all emerging economies of the world including the PICs. According to recent FAO 2009 database (Table 2.3(a) the current ruminant livestock population in the PICs comprises about 1,161,000 and out of this, total number of cattle stands at 778,100, 30,100 dairy cattle, 336,000 goats and 16,800 sheep. Research has shown that the majority of ruminant livestock production is in the hands of the smallholder farmers.

Table 2.3(a): Ruminant Livestock population in the Southwest Pacific in 2007 ('000 head)

Major	Beef Cattle	Dairy cattle	Sheep	Goats
Fiji	315	26	6	270
New Caledonia	115	1	2.4	8.2
Papua New Guinea	94	-	7	3
Samoa	29	0.5	-	1
Solomon Islands	13.6	-	-	1
Tonga	11.2	2.2	-	14
Vanuatu	174	0.4	1	12
Sub-total	**751.8**	**30.1**	**16.4**	**309**
Minor				
Cook Islands	0.1	-	-	7
French Polynesia	12	-	0.4	16
Micronesia	14	-	-	4
Niue	0.1	-	-	-
Wallis and Futuna	0.1	-	-	-
Sub-total	26.3	0	0.4	27
Total	**778.1**	**30.1**	**16.8**	**336**

Source: Adapted from MacFarlane (1998), FAO database (2009)

Ruminant livestock is important to the PICs, not only for food security but as a reliable source of income for school fees, important ceremonial occasions and daily household expenditure. Livestock is found to be a more secured form of farming as Aregheore (2001) notes that smallholder farmers in Samoa and Vanuatu have shifted to cattle enterprises (after having bad experiences from severe cyclones) for self

crop-insurance. Experiences of the regional farmers have highlighted a long list of constraints in livestock farming. Tamani (2001) states that land is a major constraint for livestock in Fiji as almost all flat land is used for crop production and only the poor-quality hills are available for cattle grazing. Data show that there are about 170,000 hectares of total available land in Fiji for cattle grazing of which only 40,000 hectares are under improved natural pastures. However, a further 6,000 hectares improved with exotic species are mainly used for dairying farming. Other constraints include lack of breeders and farm productivity.

In PNG, it was noted that many smallholders have ceased operations due to the lack of government support for increased production and market access.

In 1992, the PNG government endorsed a Food and Livestock strategy with an intention of reviving the cattle industry. However, policies laid out by authorities were not really clear or well-communicated to the field staff. In addition, there were concerns of escalating local price of beef which discouraged domestic consumption. Lack of finance for improved research investment, customary land problems, lack of clear government policy directions, low standard abattoir and most importantly the stringent bank lending policies and very high interest rates are other constraints faced by livestock farmers in PNG.

In the Solomon Islands, pastures are being overgrazed leading to lack of legumes in most pastures while some pastures are underutilized due to insufficient cattle numbers. In addition, customary land ownership militates against the use of land for pastoral development and there is a lack of capital for starting and maintenance of cattle farms. It is noted that investment in cattle has stopped because further ADB and possible bilateral aid funding to restructure and rehabilitate the industry are not forthcoming. There has also been an allegation that a recent Korean grant for livestock being mismanaged by government officials. According to Tevita (1995), Samoa is currently experiencing a shortfall of about 900 tons of beef that is imported per year which lead to persistent trade deficits. Against this background, the Government of Samoa has prioritized development of cattle industry. According to Nafetalai Situa, 1993, Agriculture contributes the bulk of Tonga's exports representing 75 percent of total exports in 1992. Village livestock in Tonga are mainly used for food and social occasions. There is an active local demand for live animals for social functions. In Tonga, Cattle are mainly tethered to graze fallow

land, and have entered the social system as most are traded and exchanged for feasts (Situa, 1993). According to Situa, 1993, a total of 9,318 cattle were recorded of which 2,158 (23 percent are male) and 7,160 (77 percent are female). A total of 2,212 household (15 percent of total household) owned cattle of which over half have either one or two heads.

2.4 An Overview of Vanuatu's Beef Industry.

This section provides an overview and discusses the historical developments of Vanuatu's beef industry from pre-independence (1845 – 2008) to the recent times. It summarizes the government's major policies of the industry in the early years of independence as well as during and after the comprehensive reform programs in the post 1997. The section also examines some of the strategies put in place to achieve the objectives of these policies. An important aspect of government policy has been to improve the welfare of smallholders and therefore, in this section, we also address the government's efforts in fostering development of smallholder cattle farmers. Finally, we discuss the development of beef export market and challenges confronting the industry following the reforms.

ADB (2002) characterizes Vanuatu as one of the most conducive environments in the world for raising beef cattle and for producing organically crops and livestock, as well as other specialty crops such as spices and medicinal plant. The ADB also commented for the rich soil content and excellent growing conditions, free from most serious livestock pest and diseases. Weightman (1989) also noted that Vanuatu is well endowed with great potential (41% of total surface area) of the most fertile soil (mostly of volcanic origin and coral reef deposit) that is believed to be more favorable to pastoral development. Vanuatu grass-fed beef was also noted for its tenderness, texture and taste and that the country needs to capitalize on the development of organically grown beef as there is a large and growing world market for certified organically grown beef. Vanuatu beef has, recently, been certified organic thus led to increasing demand in the export markets and providing lucrative investment opportunities. According to Hamilton (2007), Vanuatu beef has been certified Organic in the year 2003, first with only one farm with about 5,000 to 10,000 cattle. Currently there are a total of about eight certified major cattle farms, which are mostly established on Efate.

According to Banga (1994), the beef industry is being commented for being a thriving in Vanuatu, which includes both large and small-scale producer. Data show that about half of the rural population owned cattle and the cattle population, according to the latest 2007 agricultural census, is 174,152. This has placed Vanuatu as the second largest cattle producing country in the Pacific after Fiji. Vanuatu accounts for about 20 percent of total cattle herd in the PICs. Banga's report also indicates that about 58.6 percent or 82,000 of cattle are estimated to comprise the smallholder sector.

While the country is well endowed with all these opportunities with comparative advantage on the beef industry, there are still some impediments that need to be addressed to improve this sector. According to ADB report, the current supply base of national cattle herd is very small and is on a declining trend. This coupled with poor management and services resulting from political instability and the current increasing sale of good arable land to foreign investors and increase in live cattle export is already creating social problems, poverty and a worrisome trend for indigenous smallholder cattle farmers, rural people and the country as a whole.

There has been growing consensus over the past year's that the country's economic structure is imbalanced as more weight is being rested on the services sector while very little attention is being placed on the development of the agricultural sector. The concern was raised as a result of anticipated risks and speculations believed that might arise due to collapse of the main tourism and the offshore finance center industry, as these markets tend to be more volatile and are very much dependent upon external factors. It is against this background that more emphasis was made to shift more resources to expand the agricultural sector.

According to Natapei (2003), 2003 was the year of livestock for Vanuatu. The following was a quotation from the former Prime Minister Natapei (2003).

> *"Vanuatu's Prime Minister Natapei says that he wants to see livestock farming across the country and pledged for training and land for the purpose. He went on to say that he wants Vanuatu to remain the only country in the region producing high quality Organic Beef."*

Prior to the country's independence in 1980, about 30 percent of the land in Vanuatu

was acquired by foreigners for cattle industry. The desire to recapture the land from the control of foreigners was the single most important factor in the struggle for independence that was achieved in 1980. Weightman (1989) documents that cattle were first introduced in Vanuatu from Australia mainly for dairy supply and beef for the community. As a result of growing cattle herd, some were distributed by the Presbyterian mission to other stations. Other cattle were distributed to the European plantations on West Tanna in late 1860s and possibly for those of Havannah Harbour in 1870s.

From the period 1882 to 1885 there were great interest in the development of cattle in Vanuatu as a major industry due to the availability of best quality pasture and potential land for cattle grazing especially in the island of Erromango, Efate, Epi, Malekula and Santo (Weigthtman, 1989). By 1894 – the Societe Francaise de Nouvelle Hebrides (SFNH) owned 200 cattle, which were put under coconut plantations to keep down the grass and weeds. In 1908 large herds were developed on Epi and Santo. In the mid-1950s, the Department of Agriculture imported a pedigree Illawarra Bull and Heifer from Sydney for the newly established agricultural station at Tagabe for the purpose to sell the progeny to local farmers to upgrade their herds (Weightman, 1989). The breed was so popular and highly demanded that two more bulls and two Heifers were imported in 1960, Weightman, 1989. Cattle were almost found on all coconut plantations by 1960s (ADB, 2002). During the 1970s and 1980s, ranches specializing in cattle became established and on a number of coconut plantations cattle became the primary enterprise with copra playing a secondary role.

In 1966, the Department of Agriculture imported from France the first *Charolaise* into Vanuatu, seven heifers and four bull calves. In 1970, the Department of Agriculture commenced the dispersal of its *Tagabe* herds by sending one of the first imported *Charolais* bulls to *Saroutu* in Santo (Weightman, 1989). In 1971, the new breeds were diagnosed and confirmed for the presence of Brucellosis. In 1972, a new breeding station, named 'Compagnie d'Elevage Pacifique' (CEP) had a herd population of 364. The first breeding stock of 33 cows and six bulls were distributed to various farms around Efate. By 1974 total herd for 'Compagnie d'Elevage Pacifique' stood at 1,000 and has increased to 1,386 in 1977 (Weightman, 1989).

In 1980, the Department of Agriculture sought for advice to define a long-term

national cattle-breeding programmed. A number of recommendations were made which include the wider use of the Brahman breed to infuse greater tropical adaptation, a more objective selection of bulls, and seasonal restricted mating, and that different cattle types would be required for different management systems and objectives such as specialist beef producers, cattle under coconut, smallholders, and veal production. Consequently, in 1981, the Vanuatu Government purchased CEP with 1,000 herds of cattle, for purpose of breeding the right kind of animal at the right price for smallholders and to improve the national herd (Weightman, 1989).

Table 2.4: CATTLE POPULATION AND DISTRIBUTION (1961–1983)

Year	Smallholder Plantation	Northern District	CD2[1] [9]	CD1[2][10]	Southern District	Total
1961	S[11]	700	385	808	106	1,999
	P[12]	16,200	2,270	12,494	166	31,130
1965	S					
	P	26,000	4,600	16,700	400	47,700
1968	S					
	P	29,500	8,600	20,450	350	68,900
1971	S	3,752	3,733	2,135	1,121	10,741
	P	44,543	5,909	21,661	703	72,814
1976	S	9,597	9,766	3,456	2,457	25,376
	P	60,000	6,000	25,000	800	91,800
1983	S	14,335	9,894	3,460	4,229	31,918
	P	36,923	5,724	23,865	0	66,512

Source: Weightman (1989).

Table 2.4 shows the census[13] results on cattle population and distribution to districts, by smallholders and plantations, from the early years of 1961 to 1983. In 1961 number of cattle owned by smallholder was 1,999 while numbers of cattle in plantations were 31,130. At the end of 1983 number of cattle from smallholders increased to 31,918 while that of plantations increased to 66,512. According to the

[9] CD2: Central District Number 2

[10] CD1: Central District Number 1
[11] S: Smallholder Cattle
[12] P: Plantation cattle ranche
[13] This census results were authorized to be carried out by the French High Commissioner in Noumea for the purpose of determining the potential for renewing their trade agreements.

1999 household census, some 40 percent of Vanuatu households owned cattle. This was down from approximately 50 percent of the households in 1993. One reason for this was the very rapid growth that has occurred in the urban population during this period. Beef production peaked in 1997 at 3,826 tons with a fall in production in 2000 to 3,754 tons. The downward trend in production was evidently accounted for by a decrease in smallholder cattle numbers. The beef cattle sector in Vanuatu consists of large and medium cattle ranches as well as smallholders with a few animals. There are some 30 commercial cattle ranches with 200-10,000 animals. Six of the 30 run 4,000 – 10,000 cattle each.

Vanuatu has two abattoirs, one on Santo, owned by Nitchuku, a Japanese company, and another at Port Vila, which is 85% government owned. Each abattoir slaughters about 9,000 cattle annually. About 90% of the beef slaughtered by the Japanese abattoir in Santo are exported to Japan while in Port- Vila abattoir most beef are exported to Papua New Guinea and Solomon Islands, Kiribati and Australia. Increased beef production is needed to support abattoir operations and to take advantage of opportunities to develop premium niche markets for organically and naturally grown grass-fed beef, which would be a much more valuable export commodity than live cattle. With the prevailing sustainable herd, the export of live cattle could be an inappropriate direction to take. It was noted that according to research findings, other countries that have engaged in large-scale exports of live cattle from a relatively low cattle population could impact national breeding herds.

The Santo abattoir currently kills around 200 cattle a week, the bulk of which goes to local butcheries. One of the worrisome trends that appear to be occurring is the slaughter of animals that should be retained for breeding. Cattle numbers and production appears to have been decreasing for several years. Yet, until early 2001, slaughter and beef production remained approximately the same. This indicates that potential breeding animals, particularly heifers, are being slaughtered rather than kept for breeding. Since it takes approximately three years from calving to production of the next generation, this would indicate that the supply situation might be more critical than currently acknowledged.

2.4 (c). Government Policies

The initial Government Vision as it was preparing towards its independence in 1980,

was to increase its National Cattle Herd to meet the increasing demand of both the local population, international markets as well as contributing to the nation's economic growth and development. Government policies and priorities of the Beef Industry have been reviewed since independence and after the Comprehensive Reform Program (CRP) in 1997, in light of, the challenges confronting the country and the Beef Industry. These revised policies are reflected in the recent Government's long-term development plan, the Priority Action Agenda (PAA 2006 to 2016).

According to the Government's long term plan, the PAA, Vanuatu has one of the most conducive environments in the world for raising beef cattle. Government's major priorities as indicated in the country's priority's Action Agenda (PAA) include increase in exports through improved overseas country export requirements, improve capacity of export processors to meet overseas country requirements, gaining market access for beef to higher value export market such as the European Union, Develop and marketing branding strategy for Vanuatu Beef exports, improve market structure for the transport and sale of cattle, improve livestock extension services, provide better access for smallholder farmers to credit, diversification by developing other livestock such as Goats, Pigs and Poultry and development of locally organic produced feed rations, improve income for farmers through improved infrastructure and establishment of more rural butcheries.

In the early years since 1980s the Government adopted the inward looking policy of import substitution to protect the local infant industries but recently in the 1990s the Government adopts the outward looking policies and encourages exports. Given the high quality of Vanuatu Beef there is increasing demand in the international market. The government's target for 2010 to 2012 was to increase cattle stock to around 200,000 herds. Although the development of the agricultural sector has been given top priority for development, the Government has also emphasized the importance of sustainable[14] use of resources and the conservation and careful exploitation of the fragile rural ecosystems. Government's strategic policies and action plan, according to ADB report (2002), are focused mainly in the following areas:

[14] The Vanuatu Government, while pursuing into policies towards economic development, has also placed more emphasis on sustainable development, in light of environment protection and conservation and protection of biodiversity.

(a). Increasing cattle numbers and productivity for the small to medium producers.

(b). Conduct of a special cattle census to determine the actual cattle numbers.

Livestock industry stakeholders should cooperate in determining the type of private sector led-growth organization that would be more effective in carrying out and fostering those activities that will result in herd expansion. The Government and the industry need to cooperate on effective market promotion programs for Vanuatu's organic beef. According to the Department of Livestock and Quarantine, Port Vila (2006) the Government has placed more emphasis on maintaining high quality certified organic beef with the aim of being the only country in the Pacific that produce the best quality beef. The Government's trade policy, according to Vanuatu Department of Trade, is to continue to promote the development of the export industries in the private sector and to adopt an outward looking policy of export led growth oriented export diversification and export promotion and gradually removing protection measures (trade liberalization), to encourage more competition and improve social welfare. It was also noted that there are no export restrictions on export (including beef products) from Vanuatu under the SPARTECA agreement[15]. Under this agreement, all export goods from Vanuatu are allowed to enter duty free into the Australian and New Zealand market provided they effectively satisfy the country's quarantine requirements.

2.5 Developments of the Beef Industry since 1980

In 1980, the Department of Agriculture sought advice to define a long-term national cattle-breeding programme (Weightman, 1989). A number of recommendations, according to Weightman 1989, were made which include the wider use of the Brahman breed to infuse greater tropical adaptation, a more objective selection of bulls, and seasonal restricted mating, and that different cattle types would be required for different management systems and objectives – such as specialist beef producers, cattle under coconut, smallholders, and veal production. It was also recommended that there should be a state farm for the breeding of local cattle and that CEP would be an excellent choice for this. In 1981, the Vanuatu government purchased CEP

[15] SPARTECA Agreement is now being replaced by PACER Plus.

with 1,000 herds of cattle, for purpose of breeding the right kind of animal at the right price for smallholders and to improve the national herd. The property CEP, was then renamed Vanuatu Livestock Development Ltd (Weightman, 1989). With the benefits of Australian aid, VLD commenced in clearing the remaining 500 hectares of dark bush for the establishment of improved pasture and establishment of new fencing and water supply to serve all parts of the property.

During the 1980s a number of influences including an effective livestock extension service, well managed programs assisted by funding agencies in support of livestock and pasture development, an active government program to provide improved breeding animals through the government owned Vanuatu Livestock Development Corporation and better market outlets resulted in a dramatic build-up in smallholder participation. According to Banga, (1994) significant growth in the Beef Industry was recorded during the period 1984 and has peaked in 1994. This growth was attributed mainly by efforts from the government and the assistance of ODA in the eradication of Brucellosis in 1984 as well as the AUSAID program of improved pasture management and training of Agricultural Officers. Smallholder ownership of the national cattle herd increased from 6 percent in 1961 to 54 percent in 1993. At the same time, the size of the national cattle herd increased from 30,000 to 150,000 respectively. While the beef industry was flourishing, the coming to power in the early 1990s of a political party, which lacked proper governance practice, led to a significant damage to the capabilities of the extension service and to the management of VLD. The subsequent breakdown of services, progressive pasture deterioration, the difficulty of getting smallholder cattle to market combined with unfavourable prices, and opportunities for smallholders to engage in more lucrative enterprises such as kava, combined to reduce smallholder interest in cattle production.

2.5(a) Government Investment program into the Beef Industry

The Vanuatu Government, during the first few years after Independence, (1982 to 1984) has embarked on a number of important programs directed for the improvement and increase in the national cattle herd. Beside the pasture and animal health and disease program the Government has also contributed significantly to the sector through the development fund, in the improvement of small holder cattle development, Brucellosis eradication, the development of Vanuatu Livestock

Development Ltd, South Santo Cattle project which was the government state owned cattle ranch. The Government also assist in the development of the agricultural extension training project which focused on research and training *(National Planning and Statistics Office (1984: 116).*

Table 2.5: Government capital expenditure program ('000 Vatu)						
Projects	**1982**	**1983**	**1984**	**1985**	**1986**	**Total**
VLD Ltd	7,410	22,626	7,800	-	-	37,836
Small holder Cattle Dev	34,911	5,039	3,600	5,400	-	42,789
Brucellosis eradication	1,934	2,516	-	-	-	4,450
South Santo Cattle project	-	-	-	25,000	30,000	55,000
Agriculture extension project	-	-	23,780	85,846	74,864	184,490

Source: National Planning and Statistics Office (1984: 116).

Table 2.5 shows Government's contribution to the beef industry, particularly the smallholder cattle producers and the Vanuatu Livestock Development Limited. The period 1982 to 1986 saw a significant contribution by the Vanuatu Government by way of investing through capital injection.

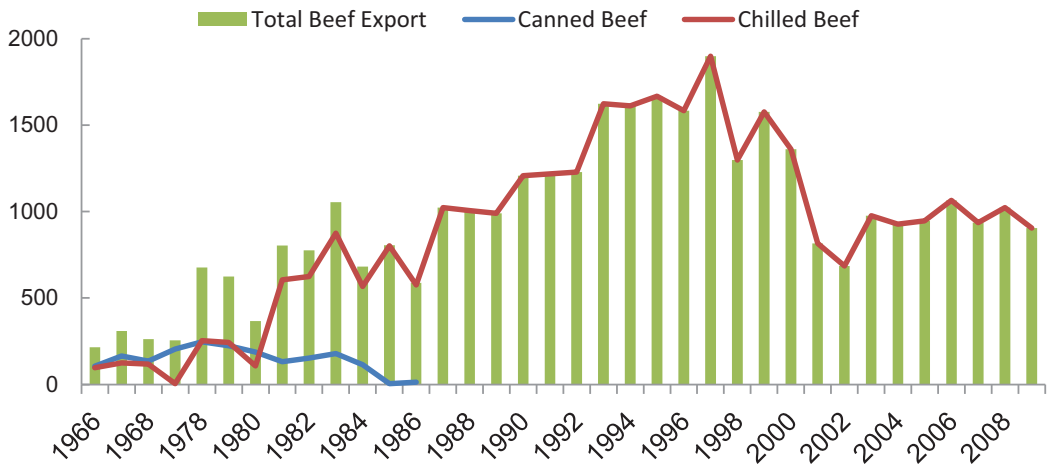
2.6 Development of the Beef Export Markets.

According to Flemming (2003) the Beef Industry in Vanuatu was oriented to meet the domestic market demand until 1958. Its export sector developed from humble beginnings as an export niche exploiting links with French territories in early 1960's. A rapid expansion of cattle numbers on smallholding and to a lesser extent estates in the 1960's and 1970's and new markets prospects provided the impetus to expand exports (Weightman, 1989). The possibility to export to neighbouring countries began to be explored in the early 1960's and exports were soon being made, predominantly from islands of Efate and Santo. The establishment of a meat cannery in 1960 and three additional canneries during the 1960's combined with an increase in the number of slaughter houses during the 1960's to boost beef throughput capacity (Foy, Skea and Kamphorst, 1992) and usher in a period of export in the 1970's. The value of beef exports rose quickly from negligible levels in the early

years of the study period to some US$2.8 million by 1972. Considerable progress was made in the 1970's, boosted by the commencement of operations of an abattoir on Efate in 1974 that enabled the export volume to increase from 408 tons in 1970 to 625 tons in 1975 (Foy et.al. 1992). The annual average export value of US$1.94 million in 1970's compared with US$0.44 million in the 1960's. The highest value reached was US$3.0 million in 1978.

Beef export continued in the 1980's much as they had in the 1970's, averaging US$1.91 million annually. An increase in export volume to an average of 1,018 tons in the period 1987 to 1989, from an average 781 tons during the first development planning period (1982 to 1986) was offset by lower export prices (National Planning and Statistics Office 1992). The export decline was due primarily to weakening world prices and a higher proportion of export of manufacturing beef to Japan (NPSO, 1992). Japan had become a major destination with the opening in 1978 of a second abattoir operated by a Japanese company. Located on Santo, its output geared almost entirely to export production (Foy et.al, 1992). Exporters diversified their destinations but market expansion was being held in check by production constraints (Central Bank of Vanuatu, 1982). According to Vanuatu National Statistics Office, the three important commercial agricultural commodities were coconut, cocoa and beef. During the period from 1966 to 1968 the average percentage of beef export to total export was 1.8 percent. In 1980 it accounted for 3.4 percent.

Chart 2.6 (a) Vanuatu Beef Export Trend from 1966 - 2008 (tons).



Source: Vanuatu National Statistics Office, RBV Quarterly Economic Reviews (1986 to 2008)

Chart 2.6(a) depicts trends in total beef exports since 1966 to 2008. During the period 1966 to 1978, total beef exports were around 250 tons on average. From 1982 onwards total beef exports increased and reached peak level in 1996 then it experienced a downward trend to 2008. Export of canned beef commenced in 1966 and ceased in 1984. From 1986 to date, total beef exports were in the form of frozen or chilled beef. The output of the beef export industry has fluctuated in the first four years beginning 1983 to 1986 with an average growth rate of 4.5 percent then picked up dramatically in 1987 to 16 percent and reached a peak level of 22 percent in 1993. From 1993 to 2004 there was a gradual down trend of total beef export. This was due to the major civil servant strike occurred in 1993, which saw a dismissal of a number of key staff of the agriculture sector. The downward trend was also associated to the change of Government in 1992 with new administration and policies. Recent economic data sourced from the National Statistics Office also shows that beef export further declined from 1,050 tons in 2006 to 936 tons in 2007.

Beef export, although increased at the end of 2008 to 1,023 tones, is still lower than in 2006 by 2.5 percent. Currently beef exports accounted for 13 percent of the total export, which is ranked second after copra. Although there was fluctuation and deterioration in the services, the beef industry remains profitable to date. According to Laughman, J. P. (2000) the recent upgrade of the Vanuatu Abattoir and the introduction of the modern hygiene system has greatly contributed to the increased volume of exports and markets. Vanuatu currently exports beef to Japan, New Caledonia, Papua New Guinea, Solomon Islands, Kiribati, Wallis and Futuna and recently has opened beef export to New Zealand and Australia in 2003.

Table 2.6(b) shows total beef exports by components and destinations. Although there is an increase in total exports from 676 ton in 1978 to 803 tons in 2008, there was a decline in the export of canned beef from 246 to zero. Canned beef was originally exported to a number of Pacific countries of which the major ones were New Caledonia with market share of 90 percent and French Polynesia, Fiji and PNG comprised the other 10 percent. Export of canned beef ceased in 1985, a few years after Vanuatu achieved its independence. Exports of other beef components such as Beef Oval and salted beef also ceased, except export of chilled beef which increased in demand over the years, particularly the Japanese market. Recently Vanuatu established new markets for chilled beef in Australia, PNG, and New Caledonia.

Table 2.6(b): Beef Exports by components and destinations (in tons)		
	1978	**2008**
Canned Beef		
Fiji	7	*0*
French Polynesia	23	*0*
New Caledonia	209	*0*
PNG	7	0
Total	**246**	**0**
Chilled Beef		
Wallis	1	*0*
France	252	*0*
Japan		*700*
Others		*103*
Total	**253**	**803**
Beef Offals		
New Caledonia	11	0
Wallis		0
France	8	*0*
Total	**19**	**0**
Salted Beef		
Japan	120	*0*
Total	**120**	**0**
Life Cattle		
New Caledonia	30	*0*
French Polynesia	8	*0*
Total	**38**	**0**
Total	**676**	**803**

Source: Vanuatu National Statistics Office; RBV Quarterly Economic Review

Table 2.6(c): Beef parts and prices	
Parts of Beef	**Price (Vatu /kg)**
Veal Shanks	590
Veal Shoulder	700
Veal Mince	520
Veal Neck	690
Veal Stew	500
Veal Chops	695
Veal Brisk Bone	500
Beef Blade (Shoulder)	780
Beef Shoulder	695
Round Steak (Leg)	790
Rum Steak (Leg)	790
Beef Sirloin (Leg)	795
Beef Silver Side	695
Scotch Villet	850
Top Side Steak	685
Beef Shanks	450
Beef Brisket	460
Villet	1740

Source: Center Point Butchery (July, 2006). Author's field survey

Table 2.6(c) shows parts of beef components that are sold domestically and exported in one of the Supermarket in Port Vila. The bulk of these beef parts are sold domestically while a few parts including Beef Sirloin, Scotch Villet and top side steak are exported to New Caledonia.

Table No 2.6(d): Overall export trend since 1966 to date (millions of Vatu)										
Year	**Copra**	**Cocoa**	**Beef**	**Timber**	**Kava**	**Others**	**Squash Pumpkin**	**Manganese**	**Coconut Oil**	**Total**
1966	378	23.3	13.6			206*		162.5		798
1967	490	27.3	16.8			175*		184.5		915
1968	482	46.1	14.1			206*		129.9		894
1977	257	39.3	10.4	3.8		245*		14.7	0	573
1978	269	40	29.3	8.2		225*		14.1	17.9	608
1979	347	19.1	25.8	1.24		188*		5.7	33.6	626
1980	360e	25e	30e	5.20e		30e				880
1981	680e	40e	50e	15.6e		40e				1402
1982	890e	80e	90e	25e		50e				1027
1983	1308	183	193	31		65				1781
1984	2734	135	142	147		62				3221
1985	1392	133	198	136		121				1970
1986	443	196	151	63		103				970
1987	719	207	251	208		117				1502
1988	955	117	268	106		189				1558
1989	750	174	262	204		222				1612
1990	598	248	368	91		301				1606
1991	526	272	360	70	6	432				1660
1992	829	165	336	146	19	512	1			2018
1993	706	150	470	270	21	389	129			2758
1994	894	226	452	308	57	353	108			2911
1995	1100	126	427	252	48	443	148			3173
1996	1240	175	430	358	64	442	0			3369
1997	2004	240	418	513	102	288	0			4087
1998	1704	165	325	521	888	304	0			4323
1999	1384	143	404	331	313	393	0			3327
2000	1096	147	380	415	478	698	0		127	3341
2001	323	64	239	334	503	477	0		158	2098
2002	340e	144	193	198	435	518	0		470	1958
2003	360e	296	287	249	223	878	0		382	2315
2004	445	159	283	247	440	694	0		1026	3294
2005	126	181	302	203	477	909	0		734	2932
2006	324	277	332	306	698	470	0		194	2601
2007	485	221	180	80	442	328	0		492	2228
2008	1079	241	385	80	487	337	0		727	3336

Source: Vanuatu Bureau of Statistics, Vila, and Reserve Bank of Vanuatu. VNSO, 2008.

** Frozen Fish, e = estimates*

Table 2.6(d) shows the overall trend in Vanuatu's major export commodities since 1966 to date. The table also shows the trend in the Beef export earning in relation to other agricultural exports and total overall exports. From the table, we see that the evolution of Vanuatu Beef export dates back to 1966 and as of 2008 it accounted for 7.1 percent of total export which is fourth to Copra, Coconut Oil and Kava. Since 1966 to 1979 the major export commodities are Copra, Cocoa, Beef, Fish export and minerals. Interestingly, frozen Tuna Fish, from the Palekula Fish factory in Santo was the major producer of Tuna, from 1966 to 1979 and it accounted for 37 percent of total export. The frozen fish are exported to the US market.

The table 2.6(d) also shows that Vanuatu has been exporting mineral mainly manganese from 1966 to 1979, which originates from the east island of Efate. Vanuatu needs to resurrect these sectors as it has great potential in contributing to Vanuatu's economic growth as well as improving the trade balance in the country's Balance of Payments and also create employment opportunities. Vanuatu, with the assistance from the Chinese Government has recently revived and established the Fish factory at Blacksands in the island of Efate. The Tuna Fish factory, which is currently awaiting the Environmental Impact Assessment, is targeting the re-export and repackaging of Fresh Tuna to the Japanese market and this should contribute significantly to the Vanuatu's economy.

Table 2.6(e): Export market share, and share of GDP								
Year	Copra as % of Export	Cocoa as % of Export	Beef as % of Export	Timber as % of Export	Kava as % of Export	Others as % of Export	Total Export (in millions (vt)	% of Total Export to total GDP
1983	73.4	10.2	10.8	1.7			1780	17.5
1984	84.9	4.2	4.4	4.5			3220	26.1
1985	70.3	6.7	10	6.8			1980	15.7
1986	45.6	20.2	15	6.4			970	7.9
1987	47.8	13.7	16.7	13.8			1502	11.2
1988	58.4	7.1	16.3	6.4			1635	10.8
1989	46.5	10.7	16.2	12.6			1612	9.8
1990	37.2	15.4	22.9	5.6			1606	8.9
1991	32	16	22	4	0	26	1666	8.2
1992	41	8	17	7	1	25	2027	9.4
1993	33	7	22	13	1	20	2140	8.9
1994	37	9	19	13	2	19	2402	9.6
1995	43	5	17	10	2	23	2544	10.4
1996	46	6	16	13	2	16	2709	11
1997	56	7	12	14	3	8	3565	14.1
1998	44	4	8	13	23	8	3907	14.3
1999	47	5	14	11	11	13	2968	10.7
2000	33	4	11	12	14	21	3341	12.1
2001	15	3	11	16	24	23	2098	7.6
2002	17	7	10	10	22	26	1958	7.2
2003	16	13	12	11	10	38	2315	8.9
2004	17	12	12	12	15	34	3294	9.2
2005	17	12	13	10	14	35	2932	8.9
2006	12.4	10.6	12.8	11.6	26.8	18.1	2601	5.3
2007	21.7	9.9	8.1	3.6	19.8	14.7	2228	4.3
2008	32.3	7.2	11.5	2.4	14.6	10.1	3336	5.6

Source: Vanuatu Bureau of Statistics, Vila, and Reserve Bank of Vanuatu

Table 2.6(e) provides data on the export market share of each component of agricultural export commodities to total exports and the market share of total exports to total GDP. The share of the beef export market to total export which reached

peaked level in 1990 has certainly saw a declining trend over the years, but average trend seemed to be steady at around 11 percent of total exports. The trend of total export ratio to total GDP has also declined drastically from the level attained in 1984 of 26.1 percent to 5.6 percent in 2008.

2.7 Value Added Exports

One of the significant elements in the export sector since 1966 to 1985 was the export of canned beef, especially to New Caledonia which is the major market, French Polynesia, PNG and Fiji. There is a need to revive the export of canned beef as this contributes to generate foreign exchange earnings. Vanuatu has a great potential for the production of Organic Beef to meet the increase international demand. In order to achieve these, Government need to develop a National Sustainable Agricultural policy, and Trade policy that favours the development of smallholder farmers, to ensure that small holders fully participate in Organic Beef production and to ensure they have a fair market share of the Beef export Industry. The Vanuatu Government need to provide the necessary infrastructure, policies and institutional framework to assist small holder farmers participate effectively in the organic beef production and beef exports. In order to increase production, local farmers need to increase local feeds from crop residues as recommended by Aregheore. 2001.

2.8 Conclusion

This chapter provided a global overview, in particular the global beef trends since the 1960's. It was noted that beef output trends has increased since the 1960s due to increase in the number of markets that have been opened up through a series of international trade agreements. It was also noted that world trade in beef has contributed significantly to economic growth of most exporting countries. It shows that Beef play a significant role in the livelihood of Pacific countries as source of income, food security as well as a source of protein. It also examines the major constraints faced by Pacific beef producers, of which a major one is lack of pasture and animal feed, lack of Government and political support, lack of finance and shortage of land. On the national perspective, the chapter provides an overview of the Vanuatu Beef Industry and a discussion on historical development of the Vanuatu's

Beef Industry from pre-independence (1845 – 2008). It looks at the government's major policies of the Beef Industry in the early years of independence as well as examining the policies during and after the comprehensive reform programs in the post 1997 period in light of the challenges confronting the industry.

CHAPTER 3: A THEORETICAL SURVEY OF TRADE AND GROWTH

3.1 Introduction

This chapter is divided into four major sections. First, we discuss the prominent growth theories with a perspective of their application/usefulness to developing trade based growth policies. These growth theories seek to address the question on what are the pragmatic options for policies. It is vital that sound policies must be based on empirical growth theories that have been tested and approved. In so doing, we explain how the growth effects of trade openness (beef trade in the Vanuatu context) can be estimated within a sound theoretical framework. Second, we examine how the WTO has contributed to trade facilitation and liberalization particularly in the small and vulnerable economies for them to be able to compete in the global markets. We also highlight some of the important trade related issues affecting developing economies, in general and the region, including Vanuatu as well. The tentative conclusions are stated in the final section.

3.2.1 Growth Theories: A Brief Overview

There are two major theories of economic growth; the Exogenous growth model of Solow (1956) and the Endogenous model, originating from the Work of Romer (1986), although Solow (2008) himself believes that the latter is still "dwindling in the normal flow of science". While growth policy based on Solow is limited by its nature that the sole determinant of long-run growth (total factor productivity, TFP henceforth) is exogenous, models of endogenous growth have opened a very wide avenue for growth policy. Starting from the works of Barro (1990) and led by an army of economists, it now seems that almost any growth factor that might generate externalities can be modelled within the endogenous framework, either correctly or not, because recent empirical evidence, details later, doubt the abilities of endogenous models. Consequently, there is a little consensus on the sources of economic growth, although the elusive quest for growth has forced growth economists and policy makers to explore a variety of growth enhancing factors. While traditional forces of growth were seen in population, capital accumulation and innovations, more recent analyses have considered technical progress through research and development (Romer, 1986), human capital (Barro, 1988) and Mankiew

Romer and Weil (1992), trade openness (Frankel and Romer (1998), Easterly et.al (2004), macro policy environment (Barro 1990) and financial development (Levine and Kunt (2008) as the main sources of growth[16]. However, the literature on sources of growth seems to be quite unsettled, see Singh (2008) for the reasons for this observation. Briefly, the applied growth economists and technocrats have twisted discussions in many directions, and at times for personal proliferation. Second, while the empirical growth literature seems to have broken barriers in analysing growth factors, in our view, all that it has done is to have shown how to utilize the endogenous growth models with country specific or multi-country datasets. Rao and Cooray (2008) and Solow (2008) also have similar views on such conventional growth regressions which claim to be rooted to endogenous theory, or otherwise. However, "no numbers, no arguments," and these works just provided the numbers aided by the release of powerful econometric software and extensive datasets like the Penn World Tables and the back-up theory of endogenous growth.

However, now it seems that the ideas on enhancing growth rates are too diverse as the empirical growth literature presents a non-exhaustive list of growth factors. Durlauf et.al (2005, 2008) conclude that they could be as many as 145 in their survey of cross country studies. Griener, Semler and Gong (2004) explain that there are different forces of growth at work which may not be uniform in all countries at all points in time, and this is highly valid. Therefore drawing a list of possible growth enhancing factors is not easy and inconclusive. Those familiar with exploratory exercises of Levine and Renelt (1992) and Sala-I-Martin (1995/6) will agree. Although, Levine and Renelt found only (equipment) investment ratio to be significant, Sala-I-Martin's less restrictive test showed eight important factors, and there could have been more if his original pool of factors were over sixty-two that he tried with.

Convincingly enough, these works suggest that the job of policy makers has not become any easier. On the other hand Pritchett (2008) is very sceptical about the type of policy information that we obtain from these long-run models in relation to what policy makers require - more of short-term stabilization policies[17]. In this regard, the

[16] These are some of the few but impressive studies, there are many others.
[17] One way is to use the extreme bounds analysis in the likes of Levine and Renelt (1992) or Sala-I-Martin (1995/6). However, these experiments are data expensive.

Harrod-Domer (H-D) model gained popularity in late 1940s because its implications were strongly in line with the stabilization policies based on savings and investment. However, Solow (1956) disapproved the conclusions of Harrod-Domer by showing that its underlying assumptions were flawed and policies based on investment or savings rate had no long-run, but transitory growth effects. However, this goes against the main conclusions of the H-D that savings/investment have long run growth effects. In this regard, most serious texts on growth such as Romer (2005), Jones (1992), Barro and Sala-I-Martin (2002) do not discuss the H-D model[18].

Therefore, in summary, Solow (1956) clearly identifies that TFP is the sole determinant of long-run growth. However, its determinants are not known in the Solow model, and this limits the use of the Solow model for growth and development policy. There are some extensions to the Solow model, the earliest being the Mankiew, Romer and Weil (1992, MRW henceforth) and others, details later, to either to test the conclusions of Solow or to test the effects of other plausible growth factors. Endogenous models are useful because of their strong micro foundations, but are theoretically unstable. As acknowledged by Solow (2008), models of endogenous growth have required researchers to think about how the TFP is generated and this has the actual contribution of the Endogenous growth theory originating from the works of Romer (1986) and excelled by Lucas (1988), Grossman and Helpman (1991a, 1991b), Barro (1991a, 1991b) and others. Broadly, these studies argue that innovations, RandD, ideas, adequate social infrastructure and human capital could provide incentives for productivity growth. However recent evidences, see for example Jones (1995a), Kocherlakota and Yi (1996), Greiner. et, al (2004) and Parante (2001), find little support for endogenous models. Further, estimating endogenous models are hard and often require pre-determined estimates of some of its useful parameters. Therefore, in our view, the exogenous growth model of Solow still persists to be the model for explaining growth rates over long-run. However, while our understanding of the growth factors may have stalled, data show that global growth trends have varied widely. Further, there is no clear-cut explanation of the sources of growth in developed and developing countries alike,

[18] Even standard graduate courses on macro and growth have shifted discussions of H-D model to the likes of developments economists, an area of study which Lucas (1988) jokes to be unsystematic without any sound theoretical perspective.

despite our understanding and the insights obtained from the growth literature.

3.2.3 Recent Developments in Neo-Classical Approach

Recent estimates of growth effects have taken two major paradigms within the Solow approach. First, is advanced in Senhadji (2000) which has used the total factor productivity (TFP) approach and showed that the growth effects of these factors are significant. Senhadji conducted growth accounting exercises by decomposing the contribution of factor accumulation and technical progress onto growth. His regression results of the second stage of the estimated technical progress (TFP) on some potential determinants (initial conditions, life expectancy, external shocks, macro variables, trade regime and political stability show support for conditional convergence, thus validating the use of the augmented Solow model for a large number of countries and with diverse economic structures.

However, there are two major problems in this approach. First, it requires extensive growth accounting exercises which often times produce implausible results. For example, Senhadji's own estimates average around 50% and 60% respectively. Similar estimates by Bosworth and Collins (2004) reveals for developed and developing economic. Bosworth and Collins concluded that growth accounting and growth regressions, the main tools for empirical analysis of cross national differences in economic growth, can both yield consistent and useful results. They also argued that much of the variability in the conclusion from earlier studies can be traced to measurement problems, differences in data definition, and, in the regression analysis, failure to include other conditioning variables. In addressing some of these problems, Bosworth and Collins developed a set of growth accounts over a period of 1960 to 2000 capturing 84 countries which represent a preponderance of the world economy. Combining these data with additional variables has allowed them to examine a wide range of competing hypothesis over a common group of countries and common traits. Bosworth and Collins found that cross national variations in economic growth experiences over the past 40 years can be related to differences in initial conditions, and quality institutions.

To address these limitations in the Senhadji's approach, Rao and Singh (2007) has developed a policy based stochastic method. They have developed extension to the exogenous growth model of Solow (1956) to make TFP endogenous. Although their

method did not use an inter-temporal optimization model, such as the one used in the endogenous growth models, their reasoning was based on common sense and empirical in nature. The method developed by Rao and Singh is simpler and akin to an extension to the Solow model with in an endogenous framework than a full-fledged endogenous growth model. The empirical results by Rao and Singh to capture the permanent growth effects of trade liberalization policies have been impressive. Rao and Singh also found that good policy environment has increased the permanent growth effects of trade liberalization in countries like Singapore. In Hong Kong these effects have been small and in Malaysia the Steady State Growth Rate (SSGR) seems to have decrease after the Asian financial crisis and some political developments. Both in India and Thailand, the effects of good policy environment is small, implying that these two countries must pay attention to other factors to improve the SSGRs[19].

3.2.4 Capturing Growth Effects of Trade Openness

This section explains the role of trade and how our preferred Solow growth framework can be used to measures its effects. International trade is important because there is an uneven endowment and distribution of resources across the globe and therefore, trade allows individual countries to make the most efficient use of their scarce resources through specialization[20]. However, the measurement of the growth effects of trade is hard in the traditional model of Solow because estimating growth effects of factors apart from savings rate and population growth was not possible in this exogenous framework. In this sense, Rao and Singh (2007) approach can be used which nests the inclusion of endogenous factors within the exogenous growth framework. In standard notations, the production function in Rao (2008) in its intensive form with the assumption that the index of technology $\left(A_t\right)$ is a function

[19] Other applications of this approach have been in Rao (2008a, 2008b), Rao and Cooray (2008), Rao, Tamazian, Singh (2008), Rao, Tamazian, Singh, and Vadlamannati (2008) and Rao and Hussan (2009), Rao and Vadlamannati (2009) and Rao and Singh (2010), Singh (2012). These results are not summarized here for brevity; however, interested readers may read these papers as indicated in the reference section.

[20] The uneven distribution of resources can be seen in large oil deposits mostly concentrated in Arabian nations but oil is a major source of energy in all countries of the world. The same is true for other basic natural resources such as coal, timber, iron ore which are concentrated in tropical regions, including certain consumer goods such as tea, coffee and banana are only grown in this region.

of the hypothesized growth factor $\left(Z_{it}\right)$ is written as follows:

$$y_t = A_t e^{\left(g_0 + g_j Z_{it}\right)T} k_t^{\alpha} \qquad (3.2.1)$$

Where $y_t = \left(\frac{Y_t}{H_t \times L_t}\right)$ and $k_t = \left(\frac{K_t}{H_t \times L_t}\right)$

Or Z can be a (limited) set of (due to possible multi-co linearity) other hypothesized determinants of growth. As usual, Y is aggregate output; K and H are the stocks of physical and human capital. This produces the following general unrestricted model (GUM) for estimation with LSE-Hendry's (1988) GETS method.

$$\Delta \ln y_t = -\lambda[\ln y_{t-1} - [\alpha_0 + (g_0 + g_i Z_{it-1}) \times T + \alpha \ln k_{t-1}] + \beta_{1i} \sum_{i=1}^{n} \Delta \ln y_{t-i} + \beta_{2i} \sum_{i=0}^{n} \Delta \ln k_{t-i} + \beta_{3i} \sum_{i=0}^{n} \Delta \ln Z_{it-i} + \varepsilon_t \qquad (3.2.2)$$

This is a variant of (3.2.1) where Z resembles beef trade for Vanuatu, amongst other conditioning variables, which the literature finds important. Our time-series country specific analysis within (3.2.2) would explore with up to 2 period lags in the ARDL in order to avoid overly large GUMs hinging on the degrees of freedom, increasing the likelihood of path-dependency bias and for managing the laborious estimation routines involved with GETS[21]. Nevertheless, the parsimonious equations show that most of the dynamics are adequately captured within the specified lag periods, as is usual in time series methods. Results of the trade effects on growth will be discussed in the preceding chapter. It is noteworthy that test for unit root and co integration is not required in Hendry's method, in addition to (3.2.2) being an estimate of the steady state growth rate's equation via the production functions approach.

However, trade facilitation does not circumvent the international trade policy, some of which are under the direct jurisdiction of the WTO. These impinge upon small developing economies ability to produce and compete in the world market. These include (i) rules of origin, (ii) Sanitary and Phytosanitary Conditions (SPS), (iii) Customs Valuation and (iv) Antidumping. Implications of trade agreements for

[21] Although Hendry and Krolzig (2001) automatic lag selection software (PcGets) is useful, we found that it is a bit hard to implement because of the non-linearities involved in Rao specification.

Vanuatu in general, however, are not clear. According to Narsey opening up of economies to free trade in goods and services, with lower or zero tariffs, and relaxing of regulations to allow for the free flow of investment and capital, is a contentious issue for the small vulnerable economies with a narrow resource base and heavy reliance on a few industries. He argued that trade liberalization will greatly affect the local industries as they cannot compete with foreign competition, and this would directly impinge on government revenue. The question is how will the Government make up for these revenue losses from trade liberalisation?

According to Yari (2002)[22], Pacific Island Economies are relatively open and face many constraints in seeking to diversify their exports. This includes the scarcity of domestic resources, shortage of skilled manpower, lack of economic infrastructure, geographical isolation from major trading partners and higher transportation costs. Most of their export bases are basically comprised of primary commodities and the net export/GDP ratio are quite highly negative for the larger countries. Yari also argued that the Terms of Trade (TOT) facing the Pacific countries have been generally adverse for some twenty years and instability in export earnings has been greatest for countries with the least export diversification. Vanuatu could gain a stable trading environment and protection from unfair practices by other countries via joining the WTO. This will create a form of insurance against adverse trade practices held against it in the future and on the grounds that other than that there is little to be gained or lost.

3.4 Conclusion

This chapter discusses the two major theories of growth and compromises to a synthesis provided by Rao and Singh (2007) for analysis of the growth effects of trade for the following chapter. In addition, we have also discussed the role WTO has played in contributing to world trade and economic growth. We also discussed, although briefly, the important trade issues on such global and regional arrangements on Vanuatu.

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[22] **Marin Yari** is an Economic Affairs Officer at UNESCAP Headquarter (Bankok). Mr. Yari wrote a research paper titled'' Export Diversification in Pacific Island Countries'', 2002. ESCAP.

CHAPTER 4: EMPIRICAL ANALYSES

4.0 Introduction

This chapter seeks to provide some quantitative and empirical analysis to address the question on the growth effects of beef trade on Vanuatu's economy. It also provides qualitative analysis based on Beef Survey on sixty farmers, 20 large cattle ranches and 40 smallholder farms. The empirical analysis also seeks to test the hypothesis of this thesis. Empirical analyses that have been tested are useful in formulation of Government Policies and it also creates confidence to Policymakers. We first do some basic statistics of the beef production and export data in the first section, and then go into the methodology of the econometric estimations and analysis. Section 2 has two types of econometric growth estimates based on Barro (1990/1) and Rao and Singh (2007). In the final section 3, we summarize the survey results and use them together with the econometric estimates to provide some tentative conclusions in the final section.

4.1: Descriptive Statistics of Beef industry in Vanuatu

The descriptive analysis on beef production and export are based on data obtained from quarterly publications of the Reserve Bank of Vanuatu (Quarterly Economic Review, QER) and the Quarterly Statistical (QSI) Indicators of the Vanuatu National Statistics Office. Other statistical data are obtained from the Pacific Collection, University of the South Pacific Library, Suva. This section also provides a thorough analysis on results from the beef survey that conducted in 2006. Table 4 shows a summary of data which ranges from 1961 to 2008 on total cattle population, the share of smallholders and large plantations and total beef export to total export. The table shows a significant increase in total cattle population from 33,100 cattle in 1961 to 174,000 as of 2008. Beef exports have contribute significantly towards the country's economic growth with substantial foreign exchange earnings.

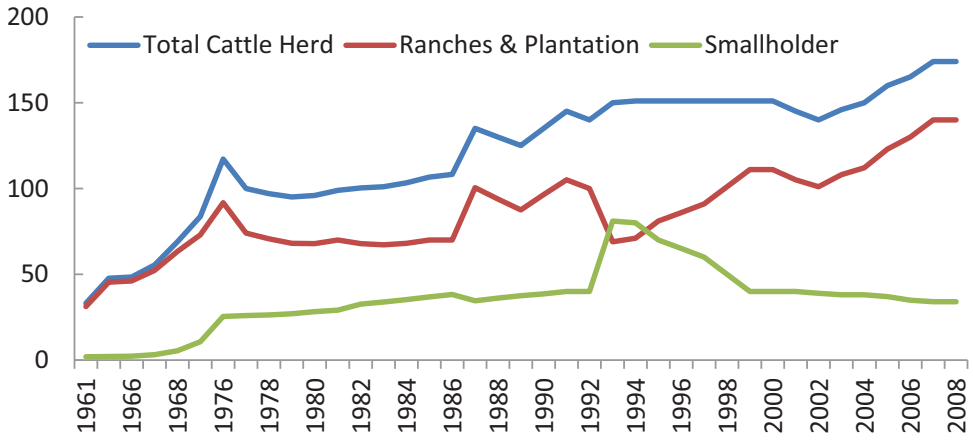
Table 4: Summary of total cattle population, Beef Production and Exports (1961 - 2008)						
Year	Total Cattle Production	Number of cattle	Beef Production	Total Beef Exports	Total Beef Exports	Life Cattle Exports
	000'	000'	000' tons	in '000' tons	in Million Vatu	(in tons)
1961	33.1	4.2	0.3	Na	na	0
1971	83.6	10.3	0.55	0.43	16.2	0
1981	97	10.5	0.8	0.6	100	0
1991	145	17	3.4	1.2	340	0
2001	145	10.3	3	0.82	239	525
2008	174	15.8	3.3	1	475	0

Source: Vanuatu National Statistics Office and Reserve Bank of Vanuatu QER 1986 to 2009

The analysis on cross sectional data from the beef survey focused more on the efficiency of big plantations and smallholder farms and other important industry dynamics. Specifically, the trends in the total cattle population and that of the Smallholder farms and large plantation cattle farms are in Figure 4.1.1(a) below. The trend of total cattle population picked up dramatically from the initial years in 1961 and reached peak level in 1976 then experienced a downtrend towards 1980 as the country was preparing towards its independence. Total number of cattle gradually picked up again to another peak level of 135,000 herds in 1987 but gradually dropped in the following four years from 1988 to 1989 and increase to new peak level of 151,000 herds in 1994, a level that was maintained up to 2000 then increase again to 174,000 in 2008. The increase trend in total cattle population from 1976 to 1994 was due mainly to stable Government since 1980 to 1991 and also due to increase Government investment into the beef sector as well as the improvement of pasture funded by the AUSAID program from 1984 to 1994. A summary of cattle

population trend is shown below.

Chart 4.1.1(a) Total Cattle Population, Plantation and Smallholders (in ''000'').



Source: RBV QER (1986 to 2005), NSO[23].

This improved pasture program has resulted in the increased trend in the smallholder farmers to peak level in 1994. It is interesting to note that in 1994 total cattle owned by smallholders exceeded the total cattle by large plantation cattle owners. However, since 1994 to date the trend in smallholder cattle experienced a continued downward trend while the trend in large plantation owners increased steadily. This has resulted in the slow and down ward trend in total supply of cattle stock as depicted in chart 4.1.1(a). The continued downward trend of smallholder was attributed to a number of factors of which the major ones was the political instability, diversification to new products such as Kava with attractive prices, while at the same time copra prices were lower. The downtrend was also attributed to the increase rural-urban migration in search for jobs at higher wages and also attracted by the bright city life with entertainments.

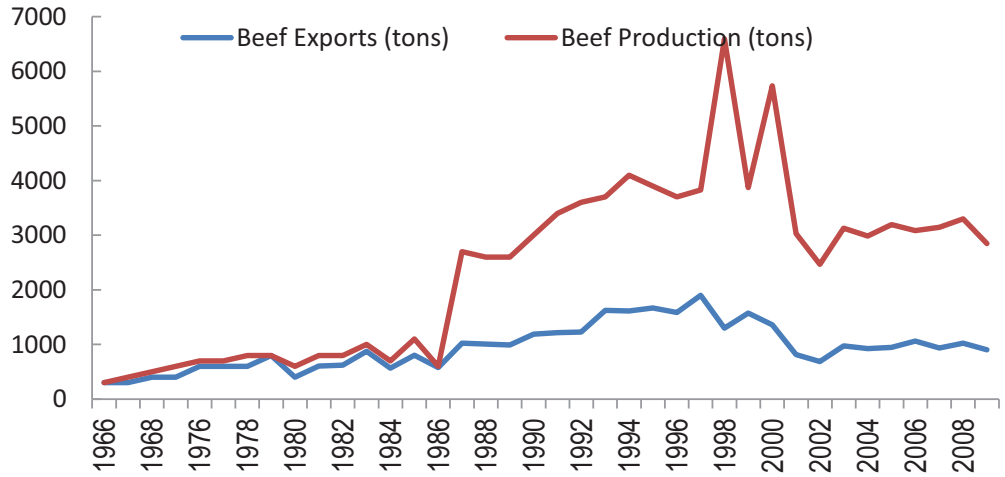
4.1.3 Analysis of total beef production and exports

The following graph 4.1.3 depicts total beef production and total exports in tons. The gap between total production and total exports is domestic consumption. Since 1961 to 1986, total beef production and total beef exports remained at lower levels at

[23] Reserve Bank of Vanuatu Quarterly Economic Reviews (1986 to 2005) and National Statistics Office. Port Vila.

around average of 600 tons. In 1987 total beef production increase to an average of 3,500 tons up to 1997 while export trends gradually increased at steady rate. The dramatic increase was due to increase domestic demand.

Chart 4.1.3. Beef Production and Exports (Tons)



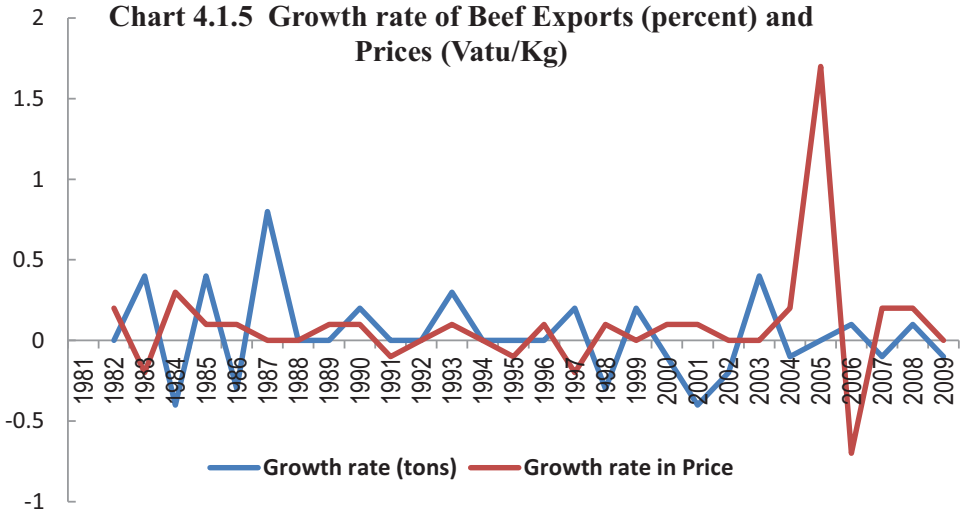
Source: Reserve Bank of Vanuatu Quarterly Economic Reviews (1986 – 2005), NSO: 2007 - 2009.

Beef export earnings seemed to be steady since 1980 to 2004 then increase in 2005. The earnings from domestic consumption commenced in 1986 with a sharp increase to 1987 and this level was maintained to 1997 then rise to peak level in 1998 and also in 2000. The increase in domestic demand is due to the increase population in the urban areas, increase rural urban drift, increase number of tourist arrivals and increase demand in beef for ceremonial occasions and social obligations.

4.1.4 Total volume of Beef export to price

One of the important findings in the Vanuatu Beef Industry is the low levels of export which is attributed to the poor response of farmers to price changes. In fact, it does not correlate with the theory of supply where there is a direct relationship between price changes and output. This scenario is well explained from the chart (4.1.5) where at most instances farmers do not response to price changes. For example in 1983, 1997 and 2006 when the beef price was low there was increase in beef production for exports (chart 4.1.5). On the other hand in 1984, 2001 and 2005 the prices were high while beef production for exports failed to correspond to the price increase and remained at low levels. This unusual behaviour could be explained

by the lack of information between farmers and the Government and also the smallholders only produced whenever they need money to meet their basic needs. In other words the response of the quantity of beef supply is inelastic to price changes.



Source: Vanuatu National Statistics Office 1985 – 2010.

4.2 Beef Survey Analysis

Table 4.2(B1): No of Cattle, Output Slaughtered and Labour Employed

Farm	No of Cattle	Output Slaughtered per Year (tons)	No of labour Employed
Big Farms	55176	4157	401
Medium Farms	2510	80.5	45
Small Farms	1233	48	156
Total	**58,919**	**4286**	**602**

Source: BS[24]

Table 4.2(B1) above provides a summary from the beef survey outcome on total number of cattle, output slaughtered and number of employment by big farms, medium cattle farms and smallholder cattle farms. In terms of number of cattle, the big farms accounted for 93.5 percent, medium farms 4.3 percent and smallholder cattle farms accounted for only 2.2 percent. In terms of employment big cattle ranches employed about 66.6 percent; medium farms employed 7.5 percent while smallholders employed 30 percent. On the output slaughtered, the big cattle farms

[24] Beef Survey conducted by Michael Busai in 2006.

accounted for 96.9 percent while the medium and smallholder farms accounted for only 3.1%.

The Table 4.2(B2) shows the analysis of total cattle herd size, value of cattle and machineries and the size of hectares of each farm as major factors of production. In terms of total cattle herd size in tons, the big farms comprised of 93.6 percent while medium and smallholder cattle farms accounted for only 6.4 percent. In terms of value of cattle, total value for all types of farms amounted to 1.7 billion vatu of which big farms accounted for 88.2 percent, medium cattle farms accounted for 6.3 percent while smallholder accounted for only 1.6 percent. Total machineries and equipment utilized by Cattle farmers amounted to 1.15 billion vatu of which big farms forms about 82.6 percent while the others about 17.4 percent. In terms of farms size big cattle farms owned about 41,860 hectares under cattle grazing which is about 94.2 percent of total, medium cattle farms form about 4.0 percent while smallholders only about 1.8 percent. Refer to annex table 2.0 for details.

Table 4.2(B2): Total Cattle Herd Size, Value of Cattle and Machineries and Farm Size

Farm Type	Total Cattle Herd Size	Value of Cattle	Machinery and Equipment	Farm Size Hectares
	Stock (in tons)	(in '000' vt)	Value ('000' vt)	
Big Farms	16,553	1,570,630	946,935	41,860
Medium Farms	753	108,210	52,448	1,816
Small Farms	370	26,836	147,266	746
Total	**17,676**	**1,705,676**	**1,146,649**	**44,422**

Source: Beef Survey by Michael Busai, 2006.

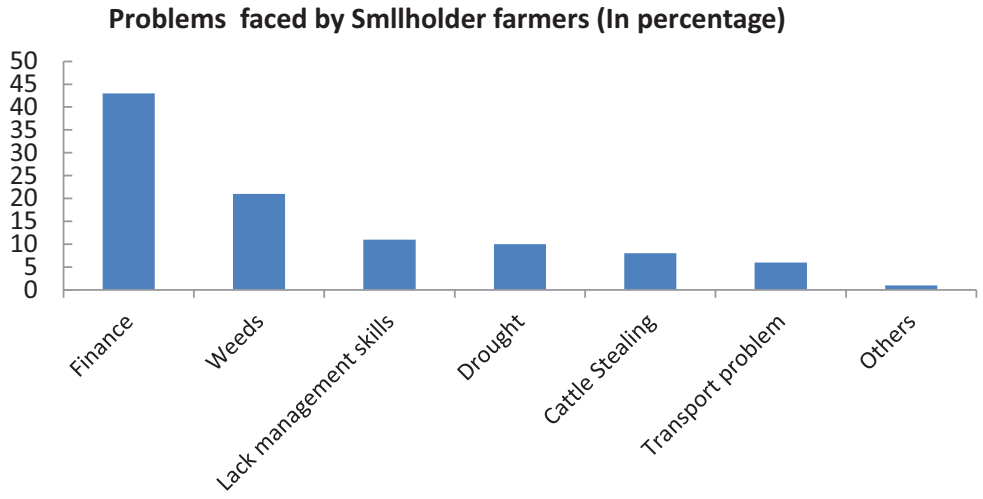
Data from the survey also showed beef sales outside abattoir for both small farms and big farms. For small farms the trend in total sales average to around 2.3 million vatu per annum. Compared to average sales of Life cattle exports outside abattoir the sale of small farmers is insignificant at 2.6 percent of bag farms. Abattoir beef sales form a significant income to the national economy with an average amount of around 561 million vatu per annum. This includes sales for both exports and domestic. However, despite the significant turnover, the share of smallholder farms is far insignificant at an average of 13.0 million vatu which is 2.3 percent to total sales of big cattle farms.

Table 4.2(B5): Beef Sales Analysis In (000vt)					
Year	Beef Sales Outside Abattoir	Beef Sales From Abattoir	Total Beef Sales	Total Beef Sales	Beef sales Small Farms as
	Small Farms	Small Farms	Small Farms	Big Farms	% of Big farms
1990	1,414	1,372	2,786	408,494	0.7
1991	1,380	1,374	2,754	408,492	0.7
1992	1,498	1,386	2,884	408,492	0.7
1993	1,498	2,000	3,498	478,000	0.7
1994	1,620	3,718	5,338	468,000	1.1
1995	1,549	4,824	6,373	436,132	1.5
1996	1,571	3,378	4,949	534,060	0.9
1997	1,660	4,145	5,805	562,596	1
1998	1,826	4,228	6,054	575,628	1.1
1999	1,840	4,764	6,604	572,280	1.2
2000	2,068	10,600	12,668	588,480	2.2
2001	1,157	12,066	13,223	671,665	2
2002	1,189	13,917	15,106	680,408	2.2
2003	1,422	15,025	16,447	712,512	2.3
2004	7,920	25,763	33,683	733,662	4.6
2005	2,621	25,303	27,924	647,847	4.3
2006	3,000	16,389	19,389	630,111	3.1
2007	3,500	18,890	22,390	632,110	3.5
2008	4,000	12,889	16,889	662,111	2.6

Source: Beef Survey by Michael Busai, 2006

The above table 4.2(B5) shows total beef sales of small farms both outside abattoir and from abattoir and also the total beef sales of big farms and the share of sales of small farms to big farms. Even the combined sales of small farms outside abattoir and from abattoir form an insignificant portion to total beef sales of big cattle farms. In this case it is around an average of 2.0 percent. An analysis of total sales of big farms from abattoir and those big farms outside abattoir shows that the growth rate fluctuated over the years due to price changes and poor response of farmers to price changes and other factors such as cyclones and other natural calamities. Life cattle exports commenced in 2001 and ended in 2005. The Cattle were normally exported to Indonesia from South Santo Cattle project. South Santo Cattle project also purchased life cattle from smallholders.

Chart 4.2(B7): Cross Sectional Analysis based on Beef Survey



Source: Beef Survey by Michael Busai, 2006.

One of the findings from the beef survey analysis is the constraints that are faced by cattle farmers. From the survey, about 90 percent of these constraints are faced by smallholder farmers. The Big cattle farmers reported that they are well off and faced only minimal problems. Chart 4.2(B7) shows the major constraints encountered by smallholder cattle farmers that have been visited in the survey. The constraints are listed in order of magnitude. With these summary statistics, we now go into the more advanced econometric analysis and surveys. This is useful to identifying the contribution to growth and the underlying dynamics of beef production and trade.

4.2 Econometric Analysis

Beef is part of total exports and therefore our measure of exports excludes beef exports. These two variables (XRAT)[25] and (BFRAT)[26] then are regressed with coefficient constraints in all the regressions. Results from Barro regressions showed some important insights. These are stated in Table 4.1 below. The period 1981 to 2010 shows that beef contributed positively to growth but only insignificantly. However, failure to achieve growth convergence mandated us to use the Rao and Singh (1997) approach. The results became much more apparent and we found

[25] Export Ratio
[26] Beef Ratio

significant and positive growth effects of around 1.1% of Beef industry in the growth rate of Vanuatu. Other coefficients such as for government expenditure policy, investment policy all shows negative effects. It may be possible that investment is channelled into wrong places, but the effects of government spending are justifiable. The Political dummy variable (DUM) showed small negative growth effects.

4.2.1 Analysis for the two sub periods (1981 – 1992), and (1993 – 2010).

Analysis for the two sub-periods[27] from 1981-1992 and 1993-2010 showed further insights, although the estimation periods are a bit small. In the period 1981-1992, we noted a positive contribution of beef to the growth rate, but in the period 1993-2010, the growth effects became negative. These two sets of results have well reflected the developments and events in these two periods and are in the last two columns of Table 4.1.

The general beef trend and contribution to growth as depicted in table 4.1, using the Barro method, shows a positive contribution of 0.397 but with an insignificant t ratio of 1.22. We then analysed the two sub periods 1981 to 1992 and from 1993 to 2010, using the Barro method. The first sub period 1981 to 1992 shows a higher positive contribution of beef exports to growth with beef ratio of 0.862 with a significant t-ratio of 2.09.

[27] The two periods reflects some of the major developments and structural changes that took place in the Government. From 1992 onwards to 1998 there were political turbulences which result in frequent changes in Government. During this time the government introduced a Comprehensive Reform Program (CRP). This affected agriculture and tourism industries**.** This partitioned the full into the two subsamples.

Table 4.1: Alternative Estimates of Growth Effects: OLS approach based on Barro (1991) and Rao and Singh (2007)				
	1980-2010		1980-1991	1992-2010
	Barro	Rao and Singh	Barro	Barro
Const.	0.167 (0.87)	6.061 (47.47)*	0.259 (0.55)	0.598 (1.10)
$\ln y_{t-1}$	-0.034 (-1.71)**	-0.283 (-3.05)*	-0.174 (-1.85)**	-0.039 (-1.33)
$\Delta XRAT_t$	-0.013 (-0.77)	0.136 (4.18)*	-0.037 (-0.75)	-0.051 (-1.07)
$\Delta BFRAT_t$	0.397 (1.22)	0.011 (1.84)**	0.861 (2.09)*	-0.068 (-0.10)
$\Delta GRAT_t$	-1.91 (-5.66)*	-0.033 (-1.62)*	-1.707 (-3.25)*	-1.743 (-2.42)*
$\Delta IRAT_t$	-0.702 (-2.49)*	-0.854 (c)	-1.404 (-2.65)*	-0.818 (-1.27)
$\Delta \ln K_t$	0.601 (1.77)**	0.854 (2.75)*	2.358 (2.03)*	0.527 (0.89)
$\Delta \ln P_t$	-0.034 -1.71	---	-0.174 (-1.85)**	-0.039 (-1.33)
$\overline{R}^2$	0.71	0.77	0.85	0.37
SER	0.044	0.039	0.040	0.049
SC	1.051 [0.31]*	1.106 [0.29]*	0.979 [0.32]*	0.514 [0.47]*
FF	3.011 [0.08]**	4.319 [.04]*	7.292 [.01]*	6.508 [0.01]*
Nom	2.720 [0.26]	0.154 [0.93]	0.594 [0.74]	0.239 [0.88]
Hks	0.531 [0.47]	12.841 [0.00]*	6.325 [0.12]	3.116 [0.78]

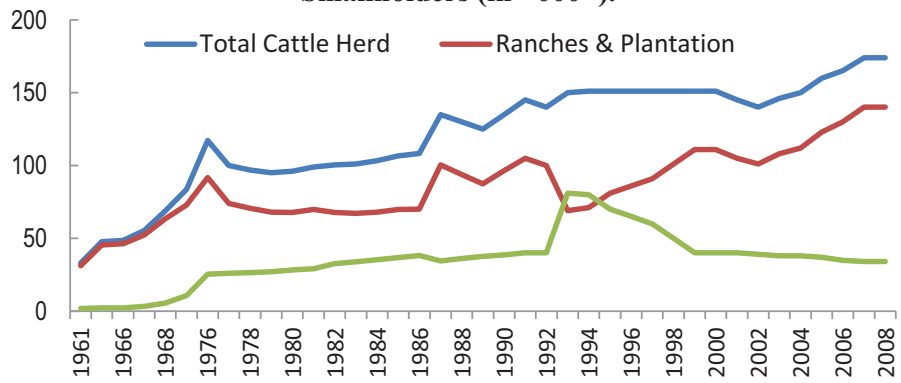
Notes: (i) Absolute t-ratios are reported below the coefficients and those significant at 5% and 10% are indicated with ** and*, respectively. (iii) P-values are listed in brackets below the summary statistics for the diagnostic tests. Based on Chi-square statistics (F-version) with the null of the presence of autocorrelation, heteroscedasticity, non-normality in residuals and mis-specified functional form are reported. (iv) (c) stands for constraint estimates.

The analysis of the other sub period from 1993 to 2010 shows both negative relationships of - 0.068 and insignificant t ratio of - 0.098. Analysis of Beef export ratio to growth (1981 to 2010) using the Rao and Singh method shows positive relationship of 0.010978 and a significant t-ratio of 1.84.

The results can be supported with some evidences on the trends of total number of

herds (large cattle ranches and smallholder) during the period 1980-1993. Charts 4.1.1(a) show an upward trend and smallholder cattle peaked in 1993. Since then, smallholder cattle herds experience a downward trend as a result of political instability. Total herds from large cattle ranches also increased but at a gradual pace.

Chart 4.1.1(a) Total Cattle Population, Plantation and Smallholders (in "000").



4.2.2 Analysis of R-Bar-Squared of Barro and Rao and Singh Method.

The R-Bar-Squared for the Barro Method, 1981 to 2010 is 0.71 percent which is better. The R-Bar-Squared for Rao and Singh method is 0.77 percent which is higher than Barro. The R-Bar-Squared from 1981 to 1992 for Barro method is 0.85 while the period 1993 to 2010, the R-Bar-Squared is 0.37. The results from the two sub periods has justified that Political Instability has been one of the major inhibitor to Beef export growth and overall economic growth.

4.2.3 Analysis of other variables (SER, SC, FF, Nom and Hks)

According to table 4.1, the functional forms (FF) are all positive and greater than 1. The functional form for Barro (1981 to 2010) is 3.01 and for Rao and Singh is 4.3185. The functional form for Barro for the two sub period (1981 to 1992) and (1993 to 2010) is 7.2915 and 6.5075 respectively. The Normality is greater than 0.1 for all the Barro and Rao and Singh method. The Heterosketasticity (Hks) is significant for both Barro and Rao and Singh. Hks for Rao and Singh is 12.8407 from the period 1981 to 2010 while that of Barro is 0.53 during the same period. When analysing the two sub period, the Hks for Barro (1981 to 1992) is 6.3248 and from the period 1993 to 2010 Barro Hks is 3.1162. Overall, the Hks results look

positive and show a positive contribution of beef to growth, but with a more superior results obtained from the Rao and Singh Method.

4.2.4 Summary and Conclusion

The econometric analysis based on the Barro and the Rao and Singh's methods show positive relationship of beef export to the rate of economic growth as well as beef export to total exports. The Barro method has been useful in providing evidence and justifications when used in analysing two period of time (a) Period from 1980 to 1992 and (b) Period from 1993 to 2010. However, although they show positive relationship it was insignificant and failed to achieve convergence. The Rao and Singh method showed much better results and showed that the growth contribution of beef was small but significantly positive. The estimate also passed the small sample correction test of Ericson and McKinnon (2004)[28].

There is strong evidence that political instability is one of the major factor that impacting negatively on beef growth as well as affecting total exports and economic growth of the country. Although there is a positive effect to growth and exports, the income share of Ni-Vanuatu Smallholder to the Beef export market is very insignificant, about 2 to 3 percent on average. There is very little value added to the economy in the form of wages and salaries and consumption. The Government needs to develop some policies to address the major constraints identified from this analysis and increase the market share of smallholder cattle farmers and establish land reform policy to allow smallholder and other disadvantage groups to have adequate access to land. While production does not match price signals, due to structural costs, it is argued that farmers must concentrate on niche exports of beef, which is now recognized as organic beef market.

[28] The t-ratio of the speed of adjustment parameter (represented against lny in Table-4.1 was -3.05 well over test statistic of 2.89.

CHAPTER 5: OPPORTUNITIES AND CONSTRAINTS

5.1 Introduction

This chapter seeks to address the question on what are the major constraints confronting the beef industry and to identify some potential opportunities that the Government in collaboration with beef sector and major stakeholders need to consider to further enhance the industry and contribute to the overall economic development of the country. The opportunities explored will assist to improve Vanuatu's Beef Industry while at the same time take into account environment sustainable development and the impact of climatic change on the beef industry. These opportunities have been based on research outcome on experiences and some successful cattle industry in the world. The chapter also discusses some constraints and issues confronting the beef industry development in Vanuatu and this will form the basis for designing of appropriate policies of the beef industry.

5.2 Section A. Opportunities

The opportunities that the Vanuatu beef industry has are several. These are related to farm size and land reforms, sustainable environment and biodiversity, improving productivity, having multipurpose functions; forming farmers association, value adding; and expanding the market both domestically and abroad.

5.2.1 Branding Vanuatu beef as Organic Beef

The expansion of Vanuatu's beef industry will largely depend on Vanuatu's potential to continue producing organically grown beef as it is currently doing. Vanuatu needs to exploit this potential and use it to its own advantage through extensive marketing campaign. Vanuatu has one of the best and favourable environments in the world for raising cattle. Given that Vanuatu Beef is rated among the top in the world, in particular, the Organic Beef. This is a very important opportunity for local farmers to develop in order to meet the increasing international demand. There are newly emerged market in China and Hong Kong which will operate in 2012. According to Vanuatu Abattoir, the first shipment is estimated at 15 tons per month but this amount is projected to double in 2014. Currently international demand exceeds domestic supply of beef. There is a need for replanting of young coconuts in cattle

raising as copra meal can be used for both cattle and other livestock feeding as well as for fertilizers, apart from its exports value. The development of organic agriculture products (beef, crops, vegetables etc.) needs increased production of organic feed from local crop residues, agro by products and organic fertilizers. This is known as Green Growth which is in line with current international policies of sustainable development and green growth as well as meeting the (MDG goals).

5.2.2 Organic Manure

Organic manure[29] contributes significantly to the development of organic agricultural products, which is highly demanded in the international markets of Australia, New Zealand, Europe and Asia and USA. Today's generation is more health conscious, as a result of more deaths and diseases occurred from manufactured foods which contains chemicals. The production of organic manure can be obtained efficiently from the integration of coconut and cattle and other crops.

5.2.3 Organic feed from crop residuals and other bi-products

According to Aregheore, 2001, there is a big demand for organic animal feed for the cattle industry in the Pacific region and for the international market. Organic animal feed play a crucial role in the improvement of meat quality and is important for human health and growth. Current situation shows that international demand for organic beef is far higher than domestic supply. In order to increase organic beef production, we need to increase cattle feed by utilizing the organic surplus agricultural residues and the agro-industrial bi products and copra meal. The production of organic feed will assist not only in the improvement of health and providing employment opportunities and income but it will also utilize resources more efficiently and effectively. The production of organic feed will also reduce the rate of urban drift of young people and will also contribute to development in the rural areas in terms of alleviating poverty. The development of smallholder is seen to be a more appropriate strategy in terms of increase productivity, increase efficiency and organic feed as well as increase in organic beef production. It will also contribute

[29] Organic manure/fertilizers are defined as those free from chemical inputs and pesticides. These organic fertilizers from cow dung and other animal wastes are important in the production of organic food and vegetables which is vital for human health.

to total national beef production and total beef export. The production of Organic feed will also create an opportunity for ni-Vanuatu to participate effectively in the beef industry, both for domestic consumption and export market).

5.2.4 Intercropping for sustainable development and increase productivity and production.

The concept of Sustainable Development is being internationally recognized. The concept was established by several UN resolutions, of which a major one was the UNGA[30] resolution 47/189 of December 1992 entitled ''Convening on a global conference on the sustainable development of Small Island Developing States (SIDS). Livestock and crop integration play a crucial role in its contribution to sustainable development, increase productivity and provide employment opportunities for the rural poor and local farmers, especially in small island countries where resource is scarce and that these countries are more vulnerable to natural disasters. Livestock and crop integration is being practiced in many countries and have proved to be successful. In Thailand livestock and crop integration is common and cattle are used as a major source of power to plough the land. The cow dung and other animal waste are used for crop fertilizers as well as for energy and gas. The crop residues from corn, peanuts, cowpeas, cassava are used as animal feed. According to Ewing and Flugge (1999), integrated crop livestock farming systems continue to dominate broad acre agriculture in southern and east Australia. During the period 1991 to 2002, the average total of the Wheat sheep zone is 1,979 hectares of which 427 hectares or 10 percent is allocated for crops (including wheat, grain legumes, Oilseeds, cereals and other similar crops). The success of these farms depended on integration of crop livestock farming leads to increase productivity, efficiency in the use of scarce resources while at the same time enable the developments of organic fertilizers and production of energy fuel and bio gas.

5.2.5 Fuel generation from animal waste – market in India and China

One of the potential opportunities in the cattle and livestock industry is fuel generation from animal waste. Research is showing that animal waste forms a

[30] UNGA refers to United Nations General Assembly.

significant part of fuel generation. Given the increasing demand and increase price of diesel fuel with its scarcity, therefore there is a need to develop alternative renewable energy sources which are not only cheaper and efficient but it is also sustainable and helps reduce global warming. The production of renewable energy from these sources is in supportive of the Kyoto Protocol, 1998, in reducing global warming. There is also increasing demand on fuel from animal waste in countries like China and India with a large and growing population and heavy industrial activities. According to State Energy Conservation Office, the development of large feedlots for livestock has created economic opportunity for agribusiness in Texas[31]. Animal manure can also be used to produce energy, Power and biogas through biological decomposition. Manure can also be used to reduce emissions from traditional fuels. Wet manure that is produced from dairy cattle and hogs produces biogas when confined in enclosed areas. In the anaerobic digestion process, manure is collected and broken down by bacteria in a low oxygen environment which generates methane emission (biogas). This is called Anaerobic Digestion. The biogas produced contains 60 percent methane, which are a primary component of natural gas and an important source of energy. The gas is then used to run an engine /generator to produce electricity. In addition, biogas from manure can be captured and purified to yield pipeline grade methane that is chemically the same as natural gas. Pipeline grade methane can be transported by pipeline for sale to the local power grid to run generators.

5.2.6 Cosmetic and Pharmaceutical ingredients to US and UK

According to Mohammed (2003), Human food is not only ‘’product’’ derived from bodies of factory farmed and other animals. Animals or their parts not considered suitable for dinner table are typically sent to rendering plants for processing and used for cosmetic products. Rendering plants, according to Renea, 2003, absorbs a wide variety of source materials that include parts such as eyeball, spinal cords, intestines, bones. These source materials are processed into ingredients used in a number of products such as soap, toothpaste, mouthwash, hair dyes, nail polish, photographic

[31] Hogs, beef and dairy and poultry are often fed in close proximity to maximize efficient production and keep costs low. At the same time, nitrus oxide, practice produces large amounts of animal manure that may omit odors, methane, nitrous oxide, carbon dioxide, antibiotics, and ammonia.

film, crayons, glue, shoe polish, toys, anti-freeze, ornaments, pharmaceutical products and cosmetics, shampoos, lipsticks ointments. Other products include lubricants, candles, hair spray, deodorants, creams, food flavouring. Meat meal and bone meal is used for livestock feed and pet food.

5.2.7 Inter Pacific Trade

Diversification of the livestock industry is important in Pacific Island countries, given their vulnerability to natural disasters and external price shocks. One of the significant opportunities that need careful attention by Policy makers, especially in the case of Vanuatu, is the production of Goat as there is a big demand for Goat Meat in Fiji and in many Asian countries and India. Goat meat is important in spiritual occasions and special ceremonies in India and most Asian countries. Closer to Vanuatu is the Indo-Fijian population which demanded about 2 to 3 tons per month. Vanuatu has one of the best soils suitable for livestock production of which Goat meat will be an important source. In order to be more competitive in the international markets of Asia and Europe, Vanuatu needs to start off with regional trade within the Pacific region, to improve trade performance under the current MSG trade agreement, the PICTA and Pacer Plus and SPARTECA[32] agreement. Currently, Vanuatu exports its beef to Papua New Guinea and Solomon Islands under the MSG Trade Agreement, but it can also export to other Polynesian and Micronesian countries under the PICTA and PACER agreement.

5.2.8 Quarantine standards and requirements

One of the barriers to trade between Vanuatu and other overseas countries is the absence and poor quarantine standards. Countries like Australia, New Zealand, Europe and other Asian countries have strict quarantine regulations for entry of products from other countries. If Vanuatu intends to be more competitive in trade with these countries on beef and livestock products, it must first improve its quarantine requirements in order to meet international standards, particularly to Australia, New Zealand, China, Hong Kong, Europe and other Asian markets.

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[32] SPARTECA is now being replaced by PACER Plus of which Australia and New Zealand are part of.

5.2.9 Farm size and land reforms

Vanuatu's beef development efforts must be centred on the small and medium producers with 20-100 cattle and the other number of smallholders in the rural with 1 – 10 cattle. The larger cattle ranches should be seen as nucleus enterprises but the medium producers also need to be developed. According to Ray (2004) the development of small and medium farms can be brought about by land reforms through the redistribution of land from the hands of the rich landlords to the poor peasants and farmers who are without land and those with low income earners and the poor. In the case of Vanuatu, given that 80 percent of the total population resides in the rural and the majorities are engaged in subsistence farming, not all people have access to land as some small islands with increased population are facing land shortages. On the other hand there are some bigger islands with more good arable land with low population. Therefore, there is a need for land reform policies to allow for subdivisions of land for small and medium cattle producers. Bigger islands like Efate, Erromango, Tanna, Santo and Malekula are potential islands to be considered for such reforms. The success of Vanuatu's beef industry in relation to increased production and productivity level and to maintain the organic beef market will be determined by the considerations and implementation of these recommendations.

In addition, agricultural research reveals that the re-distribution of land to landless and land-poor rural families can be a very effective way to improve rural welfare. Sobhan (1993) examined the outcome of every land reform program undertaken in most Developing countries since World War II and has discovered that when quality land was really distributed to the poor, and the power of the rural oligarchy to distort and 'capture' policies broken, real, measurable poverty reduction and improvement in human welfare has invariably been the result. It was noted that Japan, South Korean, Taiwan and China are all good examples. In contrast, countries with reforms that gave only poor quality land to beneficiaries, and/or failed to alter the rural power structures that work against the poor, have failed to make a major dent in rural poverty. Mexico and the Philippines are typical cases of the latter (Sobhan, 1993 and Lappé et al., 1998).

Additional research also shows that there is a strong relationship between land reform and the reduction of poverty in Brazil (Stédile, 1998).This provides a powerful argument that land reform to create a small farm economy is not only good

for local economic development, but is also more effective social policy than allowing business-as-usual to keep driving the poor out of rural areas and into burgeoning cities. Given that small farms are more labour intensive it is believed that it absorbs far more people into productive activity and reduces the increasing rate of out-migration from rural areas. The post-war experiences of Japan, South Korea and Taiwan demonstrate how equitable land distribution fuels economic development, Sachs (1987).

Land reform, as experienced in Taiwan can be seen as a redistribution strategy or a tunnel effect where huge hectares of land are confiscated and are subdivided and redistribute to small farmers (Debraj Ray, 2004).This will help alleviate poverty in Vanuatu and reduce inequality as stated by the Kuznet's Theory, where the 40 percent lower income poor are being suppressed and are experiencing poverty due to low wages and salary. These, coupled with the high cost of living, high interest rates charged by Commercial Banks, high Municipal and Government taxes, external shock and natural disasters have direct impact on the poor and the most vulnerable groups. The establishment of Small farm size will fulfil the notion of economic self-reliance and economic independence as well as providing a firm base for the country's economy. More rural people (80% of total population) will participate. Small farms, as experienced in Taiwan and Korea, will provide land for the poor peasants as well as increasing the savings and investment base on capital thus will contribute significantly to economic growth of the country.

In the case of Vanuatu, although there are some bigger islands like Santo, Malekula, Efate, Tanna, Erromango who are benefiting from the wealth of these resources, there are also small islands and atolls with very limited resources, poor soils and are more vulnerable and subjected to natural disasters such as cyclones, droughts, volcanic activities as well as external price shocks. With the current climatic change, a number of small islands, with increasing population, are already affected, especially the drought which leads to food shortage and affecting pasture for cattle and other livestock. The Government needs to look into the most vulnerable groups or the small islands and atolls and design appropriate strategies to remedy the situation. One of the possible solutions is for land reform by creating policies and proper mechanisms in place that will foster the development of small farm size. This will provide an opportunity for the vulnerable groups to acquire land and this will

alleviate poverty.

5.3 Sustaining Environment and Bio Diversity

Sustainable development, environment and biodiversity are currently the subject of debate in the international arena. This is resulted from the impact of the current climatic changes emanating from substantial gas emissions, deforestation which cause global warming and sea level rise and affecting almost all aspects of live, in particular, the agriculture sector and social and economic development. Small Cattle farms play a crucial role in protecting the environment and biodiversity. Small farmers can be very effective stewards of natural resources and the soil. Small farmers utilize a broad array of resources and have a vested interest in their sustainability. At the same time, their farming systems are diverse, incorporating and preserving significant functional biodiversity within the farm. By preserving biodiversity, open space and trees, and by reducing land degradation, small farms provide valuable ecosystem services to the larger society. In the United States, small farmers devote 17% of their area to woodlands, compared to only 5% on large farms. Small farms maintain nearly twice as much of their land in "soil improving uses," including cover crops and green manures (D'Souza and Ikerd, 1996). In the developing countries peasant farmers show a tremendous ability to prevent and even reverse land degradation, including soil erosion (Templeton and Scherr, 1999).

Compared to the ecological wasteland of a modern export plantation, the small farm landscape contains a myriad of biodiversity. The forested areas from which wild foods, and leaf litter are extracted, the wood lot, the farm itself with intercropping, agro forestry, and large and small livestock, the fish pond, the backyard garden, allow for the preservation of hundreds if not thousands of wild and cultivated species. While biodiversity, environmental issues are greatly emphasized as an important global issue as well as nationally, it is therefore important that the preservation and promotion of small, family farm agriculture is a crucial step to take. As depicted in the chart 4.1.1(a), the trend in cattle from smallholders is decreasing and also total cattle herds are on a declining trend. Current trend also shows increasing purchase of prime land by foreign investors for other commercial activities thus crowding out indigenous farmers from expanding and to actively participate in the cattle industry.

Vanuatu has comparative advantage on Beef as well as there is a big opportunity in the Organic Beef market. While beef export is thriving, the share of indigenous ni-Vanuatu is very minimal about 2 - 3 percent as of 2008. Given the Government's commitment to the significance of environmental conservation and sustainable development, the smallholder and medium cattle farms would be more ideal and relevant, in light of sustainable development as well as increase productivity, production, manageable, efficient and it provide more employment opportunities as well as ensure equitable distribution of resources to those who are disadvantaged, particularly the small islands with limited resources. Currently, Vanuatu has no proper policies and laws regarding to national sustainable development that integrate Economic development, Environment and Social development. In addition, there is no national agriculture policy in place. A national agriculture policy for Vanuatu was recommended, as a way forward, during the recent Global Economic Crisis (GEC) conference that was held in Vanuatu in early February 2010. It was highly recommended that the Government need to move urgently to endorse this recommendation and start developing this policy.

5.3.1 Improving Productivity

According to the U S Department of Agriculture (1998), small farms produce more output per unit area or (two to ten times) more productive than larger farms. (Netting, 1993; Lappé et al. 1998). It is noted that small farmers especially in the developing countries are much more likely to plant crop mixtures, intercropping where the empty niche space that would otherwise produce weeds instead is occupied by other crops. Smallholder farmers also tend to combine or rotate crops and livestock, with manure serving to replenish soil fertility. Vanuatu, according to Weightman, 1989, has one of the best soils for pasture growth and raising cattle that can effectively contribute to organic beef. The major constraint is lack of a good national agricultural policy and research to support effective policies. Recently, Vanuatu hosts the Global Economic Crisis forum. One of the recommendations for Vanuatu as a way forward is to develop a sustainable national agriculture system so as to encourage and foster the development of smallholder cattle farms as well as moving into Organic Beef production and targeting the export market as well as the increasing domestic demand. With the Smallholder farm system, sustainable agriculture, intercropping with other crops, coconuts and other crops could be

introduced to increase productivity as well as ensure sustainable development and protecting the environment, biodiversity and valuable cultural heritage. The South Pacific Community based in Suva, the University of the South Pacific and the Alafua School of agriculture are highly recommended to assist Vanuatu in developing such sustainable agriculture policy with specific focus on smallholder farms, environment and biodiversity as well as preservation of significant art and cultural heritage. Education in terms of farm management would contribute significantly in increasing productivity, production and efficiency in the use of resources.

5.3.2 Small Farms as Multi-Purpose Functions

The development of small farms has been proven worldwide and recognized as contributing to more sustainable development. According to Rosset, P, M, et. al (1999) he emphasized on the importance of small farm size as to be more sustainable and high productivity compared to large farms. These authors noted that more productive, efficient farms contribute more to economic development than large inefficient farms. He also added that small farmers can also make better stewards of natural resources, conserving biodiversity and safe-guarding the future sustainability of agricultural production. Rosset, P, M, et. al (1999) has strongly emphasized on the importance of multiple functionality of small farms, for both human society and for the biosphere and the important role played by farmers. It is against this background that he posed an important message for authorities to stop and review or even reverse trade policies which lead to the erosion and destruction of the viability of small farms and to create policies that are more favourable and further encouraged the development of small farms. Review of these trade policies should be more favourable for small farmers as 80 percent of Vanuatu's population residing in the rural areas is fully engaged in subsistence farming. These policies could assist people in the rural areas to shift from subsistence farming into more semi-formal sector of small to medium farms. The policies should include access to Finance and more affordable rates, and that Government to provide subsidies and price incentives so that smallholders can improve their farms and increase beef production. Government also needs to improve transportation and other infrastructure facilities to foster the development of the cattle industry.

5.3.3 The Benefits of Grass Fed Beef

Current research is showing that there is more concern on Nutrition and Health related issues. Most people in the world are now more conscious on health and nutrition value of food. According to Kerryg (2010), Grass fed beef is recommended to be substantially healthier as it contains lower total fat, cholestoral, and calories than Grain fed beef. Grass fed beef contains Omega 3 fatty acids which protects against heart attacks and several kinds of cancer and are especially good for mental health. Grass fed beef is also four times higher in Vitamin E. It is also higher in beta-Carotine (Vitamin A) and the B Vitamins thiamin and riboflavin. Grass fed beef is also higher in several important minerals, including calcium, magnesium and potassium.

The Vanuatu Government should develop a policy to encourage Organic Grass Fed Beef which is good for health.[33] Grass fed beef is very important to the environment as they naturally spread their manure out across the field, thus, improving the fertility of the soil. This also helps protect bio-diversity.

5.3.4 Research on Sustainable Beef System

A group of researchers from the University of Saskatchewan, Saskatoon in Canada has undertaken some special research which focuses on how to raise beef cattle in an environmentally sustainable system. This research covers breeding, genetics, reproduction, health, feeding/nutrition, behaviour, welfare, meat quality, economics and sustainable production system. The health side looks at the spread and prevention of disease in beef cattle populations and the possible risks to human health of some diseases. The endogenous growth models have emphasized the importance of education, research and technology as the main driving factors for increased growth and production. With that line of argument, it is important that the Vanuatu develops Livestock and Beef Cattle Policy which focuses on research and technology.

5.4 Creative Industry

To make the industry more viable and meaningful to local communities, there is a

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[33] (http://hubpages.com/hub/The Benefits of Grass Fed Beef.2010

need for the establishment of a farmers' association to look after the welfare and protect the industry from external threats while at the same time build up the industry and to seek potential investment avenues and opportunities in marketing and exports. At present Vanuatu has no Farmers Association as a voice to Government in terms of policy making as well as collective voices for farmers. This will keep farmers better informed on issues relating to the beef industry as well as allow a better means on communicating on commercial and other institutional policies that can affect the beef industry and its stakeholders. Research shows that most countries with successful economies are those that have shift from primary agriculture production to more value adding and processing. Vanuatu, like other small pacific countries has limited and scarce resources, therefore value adding would be a better strategy to consider. There is a need to diversify to other potential livestock production such as Poultry, Goat and Piggery which has great potential demand in the domestic as well as export market. Value adding, through the development of the light industry, in the production of leather products from the surplus cowhides is a great potential for Ni-Vanuatu and help in providing employment opportunities. Processing of canned beef is not new to Vanuatu as it commenced in the early 1960s with most of its exports made to New Caledonia, Tahiti and Fiji. In the early 1990's there were two local Beef canneries the Port Vila Meat cannery and the Santo Meat packers; the former ceased operation in 1998. Given the increasing domestic and international demand and country's comparative advantage in the production of beef, therefore, the country need to specialize and increase investment to boost production. The increase in production calls for the importance of increase in animal feed.

5.5 Animal Feed

There is a potential to produce local feed which are plentiful in most of the islands throughout the country. There is a need to move into beef processing with more emphasis on high quality beef products. Beef cannery could be established in Malekula and Tanna in order to boost beef production in these areas as well as utilizing the existing surplus of crop residues. This will be a great opportunity for employment in the rural and reduce the rate of rural urban drift. The significance of processed animal feed using organic crops, pasture, crop residue and other local products would help rural people where transport is difficult to access, provide a constant supply of feed, wise and efficient use of scarce resources and storage ability

using scientific methods, and also contribute to the increase in the beef production to meet the high demand both in the domestic and export market.

5.5.2 Development of the Dairy Industry

There is a potential for the development of this sector and to producing dairy for pre export market. Fiji, although is a major dairy producer, it has shortfall and high demand for the local market. In Vanuatu, there is high demand for dairy products but limited supply. Currently Vanuatu imports 100 percent of its dairy products from International markets. By opening up the market, Vanuatu can exports quality and cheap dairy products to Fiji as well as to other Pacific Island countries and other international markets. The development of the dairy industry can easily be carried out given farms basic knowledge of animals' husbandry practices. The major investment will be in stock and infrastructure such as dairy sheds, cool storage, and milk processing factories. The following are some of the important areas of developing policies to support the industry.

5.5.3 Constraints

5.5.3 (a) International Trade Issues

In terms of external constraints, falling prices of agricultural commodities including beef are largely connected with the current agricultural trade negotiations as part of the wider liberalization of the agricultural sector as espoused by the World Trade Organization (WTO). It is argued that current on-going process of liberalization in international agricultural trade and DOHA discussion of World Trade Organization (WTO), IFAD and FAO is widely recognized to have impacted on sustainability, environmental issues and small agricultural producers. The opening up of trade is believed to affect smallholder cattle farmers in terms of low prices and reduced profit margins. The reasons are that small farmers reside in the rural areas, isolated from major markets and that transportation is difficult as well as costly to get their cattle to the major markets. According to Halderman and Nelson (Pro-poor Livestock Policy Initiatives, 2010) they argued that Export Subsidies and protectionist trade barriers have resulted in negative consequences on economies of both developed and developing countries. In terms of marketing, Current Sanitary and Phytosanitary

standards of developing countries are not meeting international standards, to allow their beef exports to the European markets.

The Doha Round of multilateral trade negotiations, according to Halderman and Nelson, is critical as it provides the best opportunity to achieve a global trading system that has fairer rules for developing countries. Multilateral Trade negotiations are also the most effective way for developing countries to have influence on EU policy making. Without such influence, developing country interest will not receive adequate consideration. It is clear, however, that most poor developing countries need considerable assistance to more effectively determine their own best trade-related interests and then to promote them (Michael Halderman et al. 2010).

5.5.3(b) Trade Price Shock

Vanuatu is a price taker and therefore is more vulnerable to external Price Shocks, particularly the effect on price changes on beef export price, volume exported and foreign exchange earnings. The recent financial crisis which leads to the appreciation of the vatu against the Australian dollar has greatly impacted on Vanuatu Beef export price, as Vanuatu Beef becomes more expensive compare to Australia. Vanuatu is a competitor to Australia in their Beef exports to the Japanese market.

5.5.3(c) Livestock Production Management System and Environment

The FAO has conducted research which focuses on the best practices in Beef Cattle management, in light of, the environment and current climatic changes that are now discussed globally and affecting almost all sectors and livelihood. Some of the major problems addressed by FAO in relation to Beef cattle farming are land degradation due to deforestation. Some examples provided include large cattle ranches in Central and South America, and to a lesser extend to Central Africa and South East Asia, where huge forest is being cleared for cattle farms. The increase rate of deforestation is leading to land degradation, pollution, destruction of bio-diversity, gas emission which is contributing to global warming is affecting cattle in terms of pasture, too much rain and drought and other climatic factors. It was also argued that the granting of fiscal incentives as well as acquiring of huge land areas has encouraged extensive grazing and large scale clearance of forest.

One of the problems emphasized was the continuous imported feed and its impact on the environment leading to contamination of groundwater, soil pollution and loss of bio-diversity. Continuing population pressure also leads to the decreasing in farm size. One of the main problems identified in developing countries is related to slaughtered houses or Abattoirs which releases large amounts of waste (blood, offal and other waste products) into the environment, polluting land and surface waters as well as posing a serious human health risk.

FAO Proposed Policies to address the above problems:

1. Integrated Animal Waste management
2. Donors funded projects to reduce pollution
3. Promote environmentally friendly contract farming options for large and smallholder cattle farmers.
4. Develop policy options to manage livestock-wildlife interactions (addressing competition for resources, land use planning, wild life reservoirs)[34]

5.5.4 The impact of imported feeds and pesticides on Beef, pasture, human health and biodiversity and pollution.

One of the major constraints according to research involves countries who use more imported feeds and use of pesticides which are causing detrimental effects to human health as the beef consumed contain chemicals absorbed from pastures and imported feeds. The chemicals and pesticides used in pastures are washed down to rivers thus causing polluting and destroy bio-diversity. CAP policies were also strengthened in the area of food safety due to the BSE and other animal health and food safety crisis and the activities of consumer and other advocacy groups.

5.5.5 Feed resources as a major constraint in Pacific Island Countries.

Local feed resources as emphasized by Aregheore, (2001), play an important role in the development of the Beef Industry, particularly to increase the level of productivity of cattle herd, improve nutrition value and to maintain a constant beef supply to meet increasing demand at the domestic as well as international markets.

[34] http://www.fao.org/bestpractices/content/02/02_02_en.htm

According to Aregheore, (2001), lack of feed resources often imposes constraints on the development of animal production in the South Pacific Region. In the region, several agro-industrial bi-products and other feed resources are generated that could be blend to provide nutritious feeds for livestock. However these bi-products are lost and underutilized yearly. The problem is that farmers are not aware of these resources. It is argued that for Pacific Island countries to become self-sufficient in Livestock products they should look inward and use locally available feed resources in the nutrition of livestock, rather than depend on the importation of compounded feed from overseas. The present trend all over the world is to match Livestock production with locally available feed resources and since majority of the livestock population is in the hands of the smallholder farmers, it is imperative therefore to address their feed needs in order to improve their production level. Aregheore, (2001) also pointed out that in the region crop such as Cassava, Taro, breadfruit; Yams are the major traditional stable foods. When these crops are harvested and processed, various residues and bi-products remains. Crop residues are produced on farms and therefore widely spread in farming communities in the South Pacific Region. Since agriculture crops are pre-dominant occupation in the region it is envisaged that large quantities of crop residues would be generated annually. Also from the agro-industrial sector, unspecified quantities of agro-industrial bi-products are generated annually.

Major questions that were posed include: What are these resources, whether the farmers are aware of these resources? If they are aware, do they utilize them in the feeding of their livestock?

It is found that most small farmers in the Pacific countries lack the required knowledge of how to effectively utilize these products for sustainable livestock feed production. The availability and quality pasture and feed contribute significantly to animal nutrition, proteins and nutrients and good for health and growth. In Vanuatu, the Government is emphasizing more on Organic Beef to meet the increasing international markets, therefore quality pasture and other feeds (from agro-industrial and crop residues) plays an important role in the beef Industry. According to Aregheore (2001), there are no current accurate data and detail research undertaken on the quantity of crop residues and agro-industrial by-products generated annually from the seven major Pacific countries of Papua New Guinea, Fiji, The Solomon

Islands, Vanuatu, Tonga, and Samoa, New Caledonia. This is also the situation in minor livestock producing countries of Cook Islands, Federated States of Micronesia, French Polynesia, Kiribati, Marshall Islands, Niue, Tokelau, Tuvalu and Wallis and Futuna.

5.5.6 Internal constraints to Vanuatu's Beef Industry

The Vanuatu beef industry does face some major constraints that hinder its rapid development. Most of these are largely to do with internal structural factors that can be addressed through good government policies targeting their root causes. Some of the major constraints to the agriculture sector and the development of Vanuatu's Beef Industry are: High cost of doing business, Lack access to land, Domestic market is small, Exports market are far and difficult to penetrate, Production or supply are not consistent, Lack access to credit for agribusiness and smallholders hinder the ability of commercial agribusiness to expand their operation and move to value added processing. The high interest rates and collateral deposits by commercial Banks is a major impediment for farmers. Currently, there is weak lending to the agriculture sector by Commercial Banks due to risks associated, poor loan repayment, low net returns on investment, failure of agriculture projects due to poor management.

There is lack of markets access and proper marketing facilities that meets international standards. One of the major constraints that affect agriculture and livestock development, according to the PAA, includes low smallholder productivity which holds back the commercialization of agriculture. Vanuatu is a price taker and most of its agriculture export commodities are more vulnerable to external price shocks. Research also shows that most agriculture donor funded projects in the past have failed due to poor management and lack of sustainability plans in the long term.

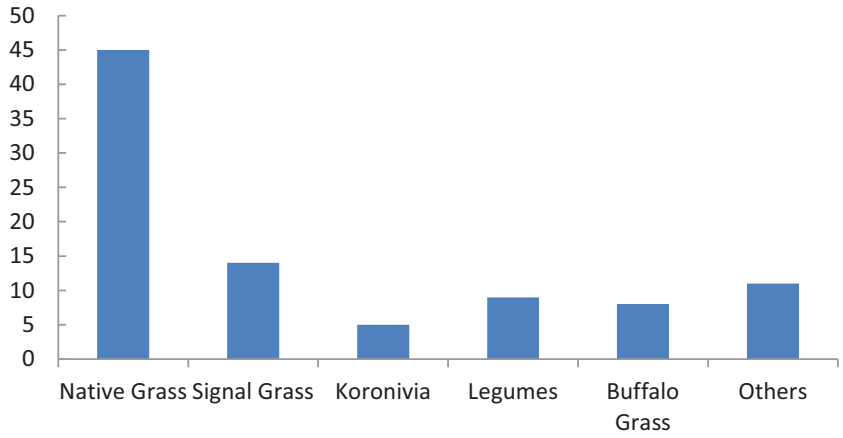
Falling stock numbers is another constraint. The ADB report (2002) highlighted that the volume of beef for the export market is too small to enable Vanuatu to take full advantage of these market opportunities. It pointed out that increasing slaughter of young heifers and the declining trend in the number of cattle over the past years is causing a worrisome trend for the country. Lack of appropriate transportation and storage facilities also is a major constraint to the Vanuatu's beef industry; the problems faced by smallholders are transport problems. The lack of transport

facilities for smallholders to transport their cattle to abattoirs or to beach collection point resulted in the killing of cattle for consumption and for distribution under the traditional food exchange obligations. Most of the small holders are forced to sell their cattle to large cattle ranches at lower price due to lack of transportation and high shipping costs.

According to the Beef Survey that I undertook in 2006 about 80 percent of constraints are faced by smallholders while large cattle holdings experience minimal constraints. Almost all large cattle ranches that I visited have responded positively on the operations and reporting on increase production and profit with very minimal constraints of which the major ones are stealing and political instability. Other constraints faced by large cattle ranches which are similar to small holder farmers are droughts, heavy rain which contribute to cattle disease and reduce weight of cattle.

The outcome of my analysis on the beef survey undertaken shows that smallholder farmers are the most vulnerable and have encountered during the course of their operations numerous constraints of which the major ones are listed below in order of priority. Most smallholder farmers visited have raised their concern on lack of Finance. Most smallholder cattle farmers reported that they acquired the land but lack the finance to improve pasture and for expansion and improvement of their farms as well as weed control, expansion of the number of herds and hectares of land, improve water system and provide transport for workers, purchase pipes and materials for fencing. The survey shows that the main pasture by smallholders is mostly native grass with little legumes, Koronivia, Buffalo and Signal grasses. The lack of proper pasture which resulted from lack of Finance is impacting more on the quality of beef provided to the local abattoirs. This is very critical as the Japanese Abattoir in Santo (Santo Meat Export) impose strict measures on the quality of beef as an important requirement. All cattle that are brought to the Santo Abattoir must be tested to meet the standard that is required by the Japanese market.

Chart 5.1 Types of pasture used by Smallholders (Per cent)



Source: Beef Survey 2006.

5.5.7 Drought and volcanic activity

Dry season as well as volcanic activity greatly affects pasture for cattle and water for both the workers and cattle in the plantations. Most of the workers and families reside in the big plantations and during long period of droughts, it affects both the workers as well as the cattle in terms of weight and lack of nutritious pasture which leads to reduction in cattle production and exports.

5.5.8 Cattle stealing, broken fences

Cattle stealing are common mostly in large cattle plantations where the workers reside and where there is no strict supervision. Stealing also occurred in small farms but to a lesser degree. Broken fences are also a major constraint faced by many smallholder cattle farmers in the rural areas. Too much rain at times also affects pasture and contributes to cattle diseases such as diarrhoea. Most of the cattle farms visited have reported that too much rain have contributed to cattle disease and has affected the quality of both pasture and beef which leads to a decrease in production. Shortage of land is another major constraint that is confronting the small farmers. This is due to a number of factors of which a major one is increase in population and secondly is the increase purchase of huge hectares and good arable land by foreign investors thus squeezing smallholder farmers into small marginal land.

Most of the smallholder farmers visited have reported that they have difficulty in accessing credit from Commercial Banks and the interest rates charged is so high. At

the end of the day they only achieve a small profit margin and some even operate at breakeven point. Commercial Banks have been very strict in providing credit to farmers especially in the rural areas with a reason that there is high risk involved. One of the major **c**onstraints faced by farmers is shortage of cattle due increased local and international demands (from the international markets especially in Japan, Australia and Papua New Guinea). Related productivity constraints confronting the cattle farmers is the high transport cost as well as the poor transport from farms to ports, lack of communication and most farmers operate on their own and not receiving information on prices and markets.

Social obligations is also a major constraints faced by smallholders where most of the cattle were purchase at low price and some are taken free. Like any other Pacific countries, social obligations are common and play a vital role in communities and societies. With the increasing population, the demand for beef to meet these obligations is also increasing while there is shortage of supply of cattle. The increasing social activities is often impeding on small holder farms as most cattle are taken for free or negotiated at lower prices. This continuation of such practice has forced more smallholder farms to close down.

5.5.9 Conclusion

This chapter examine some of the potential opportunities of the beef industry based on the experienced and success from other countries and research findings from reputable international organizations such as FAO, ADB, WTO, IFAD, UNGA, US Department of agriculture and other reputable organizations. Some of the major opportunities emphasized are as follows:

1. The production of Organic Beef
2. Production of Animal Feed, using the surplus crop residuals. This will increase production of beef and provide employment opportunities.
3. The production of Organic manure for fertilizers
4. Fuel generation from animal waste and manure
5. Cosmetic and pharmaceutical products
6. Engage in Inter Pacific Trade
7. Farm size and Land reform program, to encourage small and medium farms for the poor and landless.

8. Sustainable environment development and protection of biodiversity
9. The production of dairy products
10. Increase value added by establishment and production of beef cannery.

This chapter also identified some of the major constraints hindering the development of the beef industry. The constraints are classified into international and internal constraints. International constraints include the falling prices of agricultural commodities resulting from trade liberalization under the WTO trade regime. This has adverse effects on small agricultural producers, the environment and the sustainability of the smallholder farmers and producers. In addition, Vanuatu is a small island country and price taker thus is more vulnerable to external price shocks. With this constraints Vanuatu needs to diversify its Agricultural exports commodities. Poor sustainable beef management with waste disposal has adverse effects on the environment. The chapter also noted the shortage of animal feed resources which is confronting the Pacific Island countries cattle producers. The impact of imported feeds and use of pesticides is also major constraints faced and is impacted negatively on human health and the environment. The major internal constraints identified include finance, weeds, lack of management skills by farmers, cattle stealing, transport problem and poor road conditions.

CHAPTER 6: CONCLUSION AND POLICY IMPLICATIONS

6.1 Introduction

This chapter presents the conclusions and some of the major findings on analysis of the Vanuatu's Beef Industry based on the three questions on level and trends of the beef production and beef trade and the potential for further development of this industry. It also summarizes some of the major constraints that the beef industry has encountered since its establishment during the Pre and Post-Independence era to date. The chapter also provide some pragmatic and policy directions for implementation. On the final section, it provides some empirical and econometric analysis time series data from 1962 to date supplemented by a Beef Survey data undertaken in 2006. The conclusion will also highlight the development trends, major constraints and the strategies that need to be adopted to enhance the beef industry's contribution to Vanuatu's economic growth and development.

6.2 Summary of Finding

This research shows that Beef contributes significantly to total exports and economic growth in Vanuatu. Besides exports, it serves the local market as domestic demand has also increased due to higher population, increased social obligations and heightened market demand from Hotels and Restaurants. Vanuatu Beef is recognized for its high quality and tenderness which adds to its brand of Organic escalating demand in the international market. The development of the Beef Industry, in particular the smallholder farms has proven to provide income and employment opportunities as well as encourage food security. Organic Beef is a potential investment opportunity for Ni-Vanuatu (especially small and medium sized farmers) as it has increasing demand in the international markets. This will increase demand for production of local feed from agriculture bi-products, or crop residues and agro-industrial bi-products, thus provide employment opportunities for rural people.

There is a need to improve pasture, legumes in light of quality and nutrition. There is a need for land reform to foster the development of small farms and the vulnerable people in small islands. This will meet Governments Priorities of ensuring equitable development as embedded in the Governments Priority Action Agenda (PAA). There is a need to foster the developments of smallholders and medium producers as

appropriate model that is sustainable, protecting the environment and biodiversity, cultural heritage. Small farms have been proven, according to research, to be more manageable, profitable, increase productivity, efficient, provides employment opportunities and income for the people and the most vulnerable groups (Women, Poor, Youths and school drop outs).

There is also a need to control the sale of land to foreign investors. This can be achieved by amending the laws and land lease policies to control the size of hectares granted to Investors and to review the agriculture lease charged per hectare on an annual basis. The Government should also review the national constitution to deal with the issues of increasing subdivisions and selling of agricultural lease land. Vanuatu, like any other Pacific countries relies entirely on agricultural products for economic developments as is a main income earner for the 80 percent population residing in the rural area. Given that these resources are scare and thin, therefore, it is very important to shift into value added products in order to increase revenue and contribute to economic growth.

The country has got a good history of the development of Canned Beef, which were exported mainly to the French territories of New Caledonia and French Polynesia, small to PNG and Fiji. However, these trade activities cease operation in 1985 after Independence. The two recent ones, Port Vila Meat and Santo meat also recently ceased. The former cannery ceased operation due to the 1998 riot in Port Vila. The other may have been closed down due to shortage of Beef and also there is no specialization for quality. It is, therefore, important to revive the Beef cannery, and establish light industries for leather production, Dairy products, Organic Animal feeds and fertilizers.

6.3 Policy Directions

6.3.1 Increase domestic production

The Government's initial vision after independence is to increase the National Cattle Herd to meet the increasing demands both domestic and international market. This will also assist in improving the Balance of Payments, generate foreign exchange earnings and contribute to the country's economic growth and social development. There is a need to maintain a constant supply of cattle stock and export quantity to

maintain the market. In order to meet these conditions farmers need to increase the Supply base and this will depends on a number of factors of which the main ones are low costs, improve technology, increase investment on capital machineries and equipment, increase Labour skills and productivity, increase local feed from crop residues and agro-industrial products and to encourage smallholder and medium cattle farms.

6.3.2 Allocate more land for cattle farming

More land should be made available for cattle farming across the country. This will require the development of small and medium farms. A number of Pacific countries who have experience decline in cattle production are resulted from insufficient land. The Government must develop appropriate policies to allocate more land to smallholders, in particular, the most vulnerable groups in smaller islands, to acquire land in bigger islands for cattle farming.

6.3.3 Improve communication

Communication breakdown has affected the development of the beef industry in most countries in the Pacific. This problem arises between the Policy makers, Directors and fieldworkers. With the current technology, it is important that Government inject some of its investment on new technology that will enhance communication.

6.3.4 Beef Growth and Investment

The growth of any industry depends on the amount of Investment made to the factors of production of Land, machineries and equipment, Labour, technology and research. Countries such as Taiwan and South Koreas have invested more on the initial stages, which is Land Reforms, by creation of small farms size. This has formed the basis for Savings and Investment which eventually leads to higher economic growth in these countries (Ray. D, 2004). Vanuatu soil is characterized to be well suited to cattle grazing and Vanuatu also has more comparative advantage on beef production, therefore it should specialize more on organic beef production. The growth of Vanuatu's beef industry would need a long term planning with a clear vision, medium as well as short term planning which outlines the strategies and annual work

plans. These plans must outline priorities and should be built into the national budget process for financing. The success of the Beef Industry also depends on better infrastructure, especially good roads and feeder roads to the main cattle producing areas and efficient transport from farm to Ports and also good shipping services and storage facilities. The Government also needs to improve the extension services in the rural areas, as well as improvement of the training facilities and training programs in some basic management and bookkeeping skills, research and new technology. More emphasis must also be placed on pasture improvement, nutrition and local feed to improve the quality of Organic Beef for the international markets. The need to establish good database system in the rural areas is crucial in providing reliable and accurate statistics data for planning and policy purposes.

6.3.5 Access to credit, subsidies and incentives for farmers

Credit Policy arises due to the results collected from Beef Survey analysis. According to the Beef Survey, the major problem faced by Local smallholder cattle farmers are lack of finance to improve their farms, fence maintenance, undertake research and technology on improvement of feeding and grazing methods, weed killing, transport and other similar needs. The lack of access to credit is due mainly to high interest rates charged by Commercial Banks, high collateral deposits and complicated procedure for acquiring a loan. This has impacted on the level of production. The Government needs to provide some incentives by subsidizing interest rates as well as providing some guarantees on collateral deposits. This will assist and induce farmers to increase beef production.

6.3.6 Beef Trade and Export

The Government needs to develop its Trade Policies on Beef, in light of important organizations such as MSG, PICTA, and EPAs and through the MSG and Forum Secretariat, should seek to establish fair trade policies within the Pacific Region, so that Vanuatu can also export to other Pacific island countries. The opening up of trade will make Vanuatu Beef more competitive in terms of price thus will leads to more foreign exchange earnings. Since Vanuatu has comparative advantage for Beef and Organic Beef, therefore it should specialize on the product to further improve its quality. In order to penetrate the international markets there are certain quarantine

requirements and standards under the Sanitory and Phyto-Sanitory conditions, which need to be maintained.

6.3.7 Marketing and Management

Marketing Policies is crucial in the beef export industry and this depends solely on quality beef products and constant supply of beef. Advertisement and promotion should be made once all these standard requirements are fulfilled. In addition to marketing, the overall management process forms an integral part of the success of the Beef Industry. The Department of Industry and stakeholders should develop some Corporate Plans, highlighting the Vision, Mission, Goals and strategies of the Beef Industry into the long run, medium and short terms objectives. This will provide a good roadmap, and will lead to a successful Beef Industry. A good corporate plan will provide justifications for donors to inject more funds as well as for the Government to increase its budgetary allocations to the sector.

6.3.8 Increase Smallholder production and access to export market

The Government, through the Department of Livestock and Quarantine, should develop some long term policies to encourage smallholder cattle farmers to increase production and to increase their market share in the beef export market. Currently Ni-Vanuatu market share of the beef export market is around 2 to 3 percent. The other 97 percent accounted for resident expatriate and non-indigenous[35] Ni-Vanuatu. Ni – Vanuatu farmers should also be encouraged to tap the Organic Beef Market for export. Access to small farms will require some guarantees or mortgage from a National Agriculture Bank or a National Development Bank where the Banks provide mortgage to farmers. In this case, the farmers deposit a certain percentage of say 20 percent deposit on the amount of land lease. There is also a need for training on basic management skills, improve pasture and information access. The Vanuatu Livestock Development needs to be improved to provide breeding of young calves for the farmers and sold at affordable price.

[35] This category represents Vietnamese, Chinese and other non indigenous groups, residing in Vanuatu.

6.4 Food and Nutrition and Health Safety.

Health is one of the Government Vision and is also emphasized in the Millennium Development Goals. Good health depends on the level of nutrition in food. Improve animal nutrition through better pastures, better infrastructure, and animal management, including the control of disease and parasites are the success of cattle industry in Latin America). This involved Investment on private ranches, pasture improvement and management to avoid overgrazing, fencing, and machinery, watering points and breeding stocks, financing to long term credit to farmers. The Vanuatu Government should adopt these policies in order to improve the level of Nutrition in its Beef Industry. Animal Health programmes involving the collection of industry and animal health data, supervision of health regulations, and quality controls on Vaccines.

6.4.1 Research and Technology

There are evidences that research and technology are important for the success of any cattle Industry. Therefore, the Government needs to invest on human resources (by providing scholarships to student to undertake studies in Agriculture Science with specific focus on the beef industry. This will need the establishment of Science laboratory to enable development of new technology to increase beef production while at the same time ensure sustainable environment and cultural development. Agriculture Economic Research also plays a vital role in the enhancement of Vanuatu's beef industry.

6.4.2 Environment and Waste Management

This is a very serious issue in most developing countries who increase beef production and slaughter but have no proper waste management disposal. This leads to pollution, affects the environment and is risky to Human Health. The Government should establish proper facilities for waste management, in light of, the environment, pollution and human risk.

6.4.3 Value adding

Given the narrow base of exports, the country needs to move into value adding or processing, especially in the Beef Industry. Vanuatu has a good history of export of

Canned Beef in the 1970's to early 1980'. Although Canned Beef exports ceased in the early 1980's it has formed a significant part of total exports and contribute significantly to the country's economic growth. This industry can be revived with emphasis on small and medium scale production plant (Establishment of Light and Medium Beef Processing Industry).

6.4.4 Animal Feed

One of the major constraints is shortage of animal feed, although there is high demand. Increase in animal feed will definitely contribute to increase in production level, thus will meet the increasing demand both domestic and international. Local feed from crop residues and agro industrial products, copra meal etc.

6.4.5 Conclusion

This thesis has shown that there is growth and wider economic development potential in the beef industry. The empirical results show that there is a positive relationship between beef export and growth but insignificant only for the period 1980 to 2010. In the period, 1993 to 2010, with changes in government policies, the growth effects are negative. However, this failed to show any growth convergence. Rao and Singh's approach show positive and more robust relationships between beef exports and economic growth of about 1.1 percent. However, the contributions are small because the only income that trickles down to the rural Ni-Vanuatu is in the form of low wages and salaries. Export earnings of major abattoirs are mostly repatriated as profits of large foreign investors. The study also notes some important infrastructure, technical and marketing problems that undermine the real contribution, when addressed could potentially contribute to the wider economy more sustainably.

6.4.6 Implications of Further Research.

The outcome of this research has provided some empirical evidence on the potential of the beef industry and its contribution to exports and economic development of Vanuatu. It also shows positive growth effects of beef exports to Vanuatu's economic growth. While there is potential opportunity in this sector, finding has also indicated that a small portion of Indigenous Ni Vanuatu, about 2 to 3 percent has

access to the beef export market. There are several factors that have contributed to this of which a major one is poor infrastructure and high transport cost, high interest rates and lack of access to bigger land size. Given the impact of the current climatic change, it has therefore call for the importance of sustainable beef production, in light of the potential of organic beef production and diversification to other livestock. While considering the potential of organic beef; it also calls for the importance of strategic realignment of the industry. It is envisaged that these would be pursued in future research on Vanuatu beef industry.

APPENDICIES

Annex Table 1.0: Total Cattle Population, Production and Export.								
Year	Cattle nos. (,000)	Large Cattle ranches	Smallholder cattle '000	No of Heads Slaughtered ('000)	Beef and veal prod. ('000 mt)	Beef exports (tons) '000 t	Total beef exports (millions vatu)	Live Cattle exports (tons)
1976	117.2	91.8	25.4	14.2e	0.7e	0.6e	18.2e	na
1977	100e	74e	26.0e	12.3e	0.73e	0.6e	10.4	34
1978	97e	70.6e	26.4e	11.2e	0.76e	0.6e	29.3	38
1979	95e	68.0e	27e	10.1e	0.8e	0.8	139	13
1980	96e	67.8e	28.2e	10.2e	0.6e	0.4	75	na
1981	97e	69.9e	29.1e	10.5	0.8	0.6	100	na
1982	98	67.8e	30.2e	11.9	0.8	0.6	125	na
1983	99	67.1	31.9	13	1	0.9	142	na
1984	100	68	32	12.6	0.7	0.6	118	na
1985	101	69.9e	33.1e	12.6	1.1	0.8	185	na
1986	102	67.8e	34.2	11.2	0.6	0.6	146	na
1987	135	100.5e	34.5	16.5	2.7	1.1	251	na
1988	130e	93.9e	36.1e	14.6	2.6	1.1	243	na
1989	125e	87.5e	37.5e	13.8	2.6	0.9	267	na
1990	135e	96.4e	38.6e	14.5	3	1.2	365	na
1991	145e	105e	40e	17.1	3.4	1.2	340	na
1992	140	100e	40e	16.2	3.6	1.2	336	na
1993	150	69	81**	17.7	3.7	1.6	470	na
1994	151	71	80	19	4.1	1.6	452	na
1995	151	81e	70e	18.5	3.9	1.6	427	na
1996	151	86e	65e	16.2	3.7	1.5	430	na
1997	151	91e	60e	16.7	3.8	1.9	418	na
1998	151	101e	50e	37.8	9.1	1.3	325	na
1999	151	111	40**	16.9	3.9	1.6	404	na
2000	151	111	40e	16.4	5.7	1.4	380	na
2001	145e	105	40e	10.3	3	0.8	239	525
2002	140e	101	39e	11.6	2.5	0.7	193	598
2003	146e	108	38e	14.7	3.1	0.9	287	614
2004	150e	112	38e	13.6	2.9	0.9	315	742
2005	160e	123	37e	14.3	3.1	0.9	870	168
2006	165e	130	35e	14.1	3.1	1.1	336	0
2007	174	140e	34e	14.8	3	0.9	352	0
2008	174e	140e	34e	15.0e	3.0e	1	475	0

Source: NSO 2010, FAO Database 2002; Reserve Bank Quarterly Economic Reviews (1986 to 2006), NSO Annual Statistical Indicators, 2002. n.a. = not available. ** fig based on Banga's report. e = estimates

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