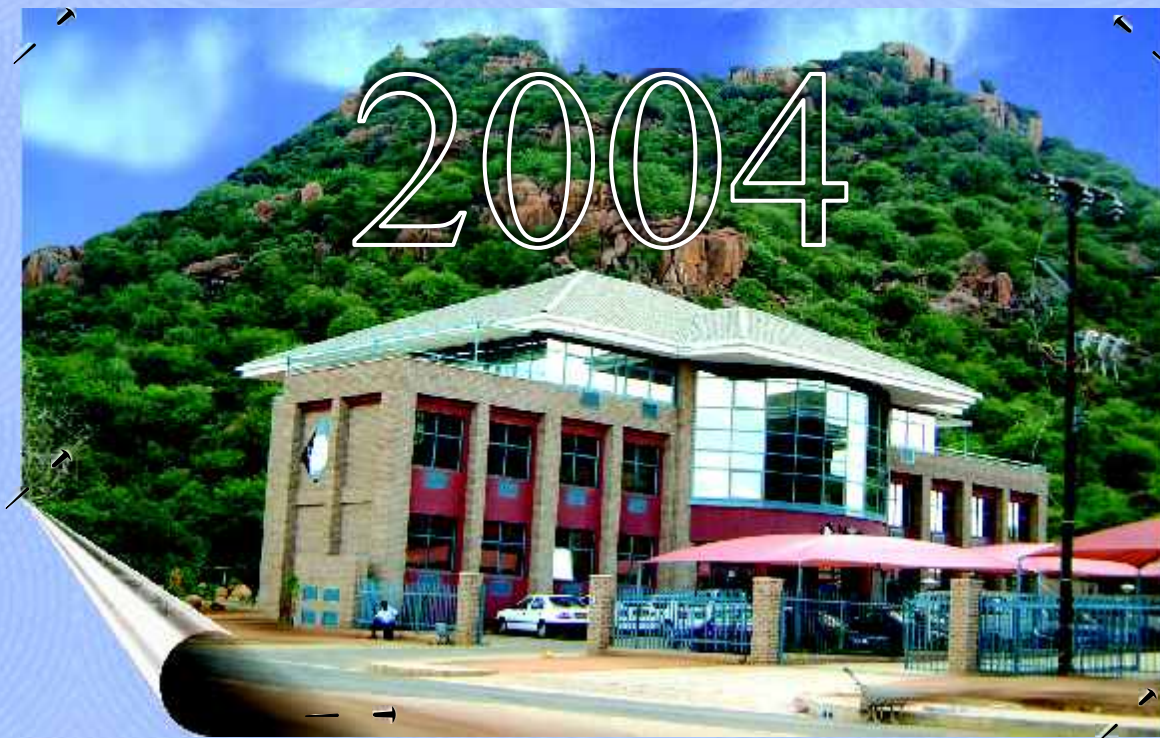




# **Diversification in Botswana's Agricultural Sector: Issues, Prospects and Challenges**

**BIDPA Publication Series**



**Tebogo B. Seleka**

**BOTSWANA INSTITUTE FOR DEVELOPMENT POLICY ANALYSIS (BIDPA)**

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**2004**

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## ABSTRACT

Traditionally, Botswana's agricultural sector was dominated by beef cattle production, followed by dry-land production of staple cereals. Public policy is geared at promoting horizontal diversification into the non-traditional sub-sector and oilseed production. This paper shows that not much success has been seen in diversifying the dry-land arable agriculture to reduce its dependence on cereals, through the promotion of cash crops (oilseed). Firstly, the sub-sector continues to be dominated by the major staples of maize and sorghum. Secondly, cultivated area, output and yields (output per hectare) of oil-crops have remained stagnant over time. Some diversification of the sector has been seen through the expansion of the non-traditional sub-sector, particularly poultry meat and table egg production, where domestic production meets a significant proportion of the national requirements. However, domestic production of horticultural products, pig meat, milk, and starchy roots has expanded at a slower pace than imports, implying increasing import dependence over time. Thus, these commodities have contributed only marginally to overall agricultural diversification. While the beef sub-sector has contributed significantly to agricultural value added and Botswana's commodity export earnings, it has not seen much diversification over time. Hence, public policy should emphasize the promotion of vertical diversification of beef and beef by-products through agro-processing.

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## 1. INTRODUCTION

At independence in 1966, the majority of Botswana's population was largely dependent on Agriculture to derive a livelihood (as a source of food, income, and employment). Agriculture then was the main economic activity, contributing about 40 percent to the country's Gross Domestic Product (GDP) (MFDP, 1997; MoA, 1990). Following the discovery of minerals in the late 1960s to the 1970s, the agricultural sector began to decline in relative economic importance, and by 2000/01, its share in GDP had plummeted below 3 percent (CSO, 2002). In the 2000/01 financial year, Agriculture ranked the second least significant economic activity, in terms of contribution to total GDP. If past trends continued into the early 2000s, it is safe to conclude that the sector has now been relegated to the last position.

Agriculture's relative decline ran concurrently with substantial public support to the sector, meant to promote output and productivity growth, and to contribute positively to the achievement of the government objectives of income generation, employment creation and economic diversification. Thus, agricultural diversification has been one of the key reasons for government intervention in the sector. Diversification efforts within the sector have mainly gone into promoting the development of non-traditional activities such as dairy, poultry, piggyery, horticulture, fisheries and beekeeping.

Although massive public support has gone into promoting agricultural diversification, it is unclear as to whether there have been achievements along these lines. What is clear is that such support has generally not yielded success in reversing the downward trend in the sector's relative performance. This paper conducts preliminary analysis to provide background information for in-depth studies on diversification in Botswana's agricultural sector. The objective is to identify success areas, bottlenecks and future opportunities and challenges. The paper progresses as follows. We begin with a brief discussion of how agriculture fits in the country's macro-economy. We then discuss land and water resources. This is followed by a brief discussion of the evolution of agricultural policies. We then present intra-sectoral trends to provide some preliminary insights into agricultural diversification. The paper is then concluded.

## 2. AGRICULTURE IN THE MACRO-ECONOMY

To help understand how the agricultural sector has relatively fared and evolved over time, Table 1 provides real GDP figures and shares by sector for the period from 1974/75 to 2000/01- we only show selected years for ease of presentation of the table. As seen, in 1974/75, Agriculture was the leading economic activity contributing P1, 005 million in 2000/01 prices. The sector's share in total GDP stood at about 31 percent in the same year, indicating a decline from a share of 40 percent at independence in 1966. Mining then contributed only P 303 million, and its share was recorded at only 9 percent. Over time, agriculture's share in GDP witnessed consistent decline, to a share of 2.4 percent in 2000/01. The sector then ranked the second least important economic activity, marginally outperforming Water and Electricity. If past trends are anything to go by, it is arguable that agriculture will soon become the least contributor to the national economy.

It has been argued that Agriculture's relative decline was primarily driven by the rapid growth of other economic activities, particularly mining (MFDP, 1997). While this is the case, it is also clear from Table 1 that Agriculture's relative decline was also partly due to its stagnant growth. For example, the sector grew at an annual rate of zero percent during the period from 1974/75 to 2000/01, whereas all other sectors recorded positive growth rates during the same period.<sup>1</sup> As seen from the table, aside from Agriculture, the least growing sectors, Construction, Manufacturing, and Water and Electricity, grew at annual rates of 7.4, 7.5, and 7.6 percent, respectively. These are substantial figures compared to what was attained in the agricultural sector. Therefore, when viewed independently, Agriculture witnessed stagnant growth during the period under consideration, implying that, in addition to extra-sectoral factors, there have been some intra-sectoral trends that have led to the declining trend in the sector's relative contribution to the economy.

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<sup>1</sup>Note from Table 1 that the estimated annual growth rate for Agriculture stands at -0.16, but it is statistically not different from zero.

Table 1: Gross Domestic Product by Type of Economic Activity, Millions of Real 2000/01 Pula

Economic Activity	Real Sectoral GDP [Percentage Share]							Annual Growth Rate (Percent) <sup>†</sup>
	1974-75	1979-80	1984-85	1989-90	1994-95	1999-00	2000-01	
Agriculture	1,005 [30.9]	815 [13.1]	566 [6.5]	908 [4.7]	786 [3.9]	718 [2.6]	716 [2.4]	-0.16 (-0.33) <sup>ns</sup>
Mining	303 [9.3]	1,943 [31.2]	3,615 [41.5]	8,647 [44.7]	6,738 [33.8]	9,055 [33.1]	10,287 [35.0]	12.24 (10.57) <sup>+</sup>
Manufacturing	218 [6.7]	230 [3.7]	419 [4.8]	942 [4.9]	1,002 [5.0]	1,338 [4.9]	1,368 [4.7]	7.45 (17.55) <sup>+</sup>
Water and Electricity	99 [3.1]	122 [2.0]	205 [2.4]	466 [2.4]	441 [2.2]	613 [2.2]	692 [2.4]	7.63 (15.91) <sup>+</sup>
Construction	325 [10.0]	472 [7.6]	466 [5.4]	1,377 [7.1]	1,260 [6.3]	1,537 [5.6]	1,563 [5.3]	7.36 (12.06) <sup>+</sup>
Trade, Hotels and restaurants	257 [7.9]	512 [8.2]	533 [6.1]	1,359 [7.0]	1,915 [9.6]	2,952 [10.8]	3,198 [10.9]	9.85 (25.13) <sup>+</sup>
Transport	98 [3.0]	107 [1.7]	216 [2.5]	527 [2.7]	755 [3.8]	1,010 [3.7]	1,089 [3.7]	10.08 (19.89) <sup>+</sup>
Finance	210 [6.5]	477 [7.7]	561 [6.4]	1,382 [7.1]	2,186 [11.0]	2,980 [10.9]	3,159 [10.8]	11.02 (32.05) <sup>+</sup>
General Government	421 [13.0]	808 [13.0]	1,263 [14.5]	2,371 [12.3]	3,062 [15.4]	4,430 [16.2]	4,654 [15.9]	8.98 (33.37) <sup>+</sup>
Social and Personal Services	126 [3.9]	170 [2.7]	262 [3.0]	695 [3.6]	870 [4.4]	1,073 [3.9]	1,090 [3.7]	9.47 (20.49) <sup>+</sup>
Total GDP	3,251	6,222	8,700	19,352	19,934	27,376	29,353	8.76 (20.77) <sup>+</sup>

Source: Seleka, et. al. (2003)

<sup>†</sup>: based on data for the period 1974-75 through 2000-01; figures in parentheses are estimated t-statistics; ns: statistically not different from zero. +: statistically significant at 1%.

Agriculture's relative contribution to formal employment has also declined over time. In 1972, Agriculture's share in total formal employment stood at about 12 percent: agricultural workers totaled 4.8 thousand, compared with 41.3 thousand for all economic activities, including Government (see CSO, various). Agriculture then ranked the third most significant employer, surpassed only by Government and Commerce. Table 2 shows employment levels and annual growth rates by economic activity for the period from 1980 to 1998.<sup>2</sup> As seen therein, by 1980, Agriculture's share in total employment had dwindled to 5.2 percent. The sector was still surpassed by Government and Commerce, had been overtaken by Construction, Mining and Quarrying, and Manufacturing, and it shared the sixth position with Finance and Business Services. Agriculture continued to decline into the 1980s and 1990s, and by 1998, its share in formal employment had fallen to 1.7 percent: it now ranked ninth, outstripping only two economic activities, Education, and Electricity and Water. This trend is consistent with what was attained for GDP (Table 1). Therefore, since Agriculture has declined in relative contribution to total GDP and was stagnant over time, it is not surprising that it also witnessed a steadfast decline in relative contribution to total formal employment.

<sup>2</sup>We began with data for 1980 because prior to this period, data for some of the economic activities were constructed differently than was the case for the period from 1980 to 1998.

Table 2: Number of Paid Employees By Sector and Economic Activity, 1980-1998 (Selected Years)<sup>a</sup>

Economic Activity	Number of Persons Employed [Percentage Share]					Annual Growth Rate - Percent <sup>†</sup>
	1980	1985	1990	1995	1998	
Agriculture <sup>b</sup>	4,300 [5.2]	4,000 [3.4]	6,400 [3.1]	4,500 [1.9]	4,000 [1.7]	-0.23 (-0.30) <sup>ns</sup>
Mining and Quarrying <sup>b</sup>	7,200 [8.6]	7,300 [6.3]	8,100 [3.9]	8,100 [3.5]	8,600 [3.6]	1.13 (9.08) <sup>+</sup>
Manufacturing <sup>b</sup>	5,600 [6.7]	9,900 [8.5]	24,300 [11.6]	24,000 [10.3]	23,100 [9.6]	8.35 (9.03) <sup>+</sup>
Electricity and Water <sup>b</sup>	1,500 [1.8]	1,900 [1.6]	2,100 [1.0]	2,500 [1.1]	2,700 [1.1]	2.78 (8.31) <sup>+</sup>
Construction <sup>b</sup>	13,400 [16.1]	11,500 [9.8]	31,000 [14.8]	22,400 [9.6]	25,100 [10.4]	4.98 (4.21) <sup>+</sup>
Commerce <sup>b</sup>	10,400 [12.5]	18,300 [15.7]	38,300 [18.3]	45,700 [19.6]	43,200 [17.9]	7.99 (11.60) <sup>+</sup>
Transport and Communication <sup>b</sup>	3,400 [4.1]	5,700 [4.9]	8,500 [4.1]	8,700 [3.7]	8,500 [3.5]	5.74 (7.93) <sup>+</sup>
Finance and Business Services <sup>b</sup>	4,300 [5.2]	6,800 [5.8]	6,100 [2.9]	17,700 [7.6]	15,800 [6.5]	8.34 (8.41) <sup>+</sup>
Community and Personal Services <sup>b</sup>	2,400 [2.9]	3,900 [3.3]	7,200 [3.4]	9,800 [4.2]	4,700 [1.9]	5.36 (3.58) <sup>+</sup>
Education <sup>b</sup>	1,300 [1.6]	1,900 [1.6]	2,100 [1.0]	3,800 [1.6]	3,900 [1.6]	6.37 (14.53) <sup>+</sup>
Government (local and central)	29,500 [35.4]	45,600 [39]	65,100 [31.1]	86,200 [36.9]	102,000 [42.2]	6.88 (32.78) <sup>+</sup>
Total	83,300	116,800	209,000	233,400	241,700	6.42 (12.98) <sup>+</sup>

Source: Author computed from CSO (various).

<sup>a</sup>: does not include self-employment. <sup>b</sup>: includes private sector and parastatal (excludes government). <sup>†</sup>: based on data for the period 1980-1998 (annual growth rates were computed as in Gujarati (1988)). <sup>ns</sup>: statistically not different from zero. <sup>+</sup>: statistically significant at 1%.

Table 2 also shows annual growth rates in formal employment by economic activity. As indicated, agricultural employment rose at an annual rate of zero percent during the period from 1980 to 1997 -- the annual growth rate estimate stands at -0.23 percent, but it is statistically insignificant, implying that employment in the sector was stagnant during the review period. All other economic activities evidenced positive growths in employment during the same period - thus, Agriculture was the only economic activity that witnessed stagnant growth in employment. Sectors with the least growths in employment, Mining and Quarrying and Electricity and Water, grew at annual rates of 1.1 and 2.8 percent, respectively. These are substantial growth rates compared with what was realized in the agricultural sector.

Table 3 shows average monthly cash earnings by economic activity for the period from 1980 to 1997. Evidently, agricultural wages were far exceeded by those for other economic activities throughout the period under consideration. For example, in 1997, agricultural wages were recorded at P 266 per month (in 1995 prices), and were recorded at about half those for Manufacturing and Construction, the second and third least ranking economic activities in terms of the levels of wages. Although real agricultural wages were the lowest during the review period, they witnessed some positive growth - they grew at about 1.6 percent per year, a figure which is higher than the national average of about 1.3 percent. In terms of growth in real wages, Agriculture outperformed most economic activities, including, Manufacturing, Construction, Community



and Personal Services, Government, Transport and Communication, and Commerce. Although this is the case, such growth was not adequate enough to bring agricultural wages at par with those of any of the economic activities.

Table 3: Average Monthly Cash Earnings By Economic Activity, 1980-1997

Economic Activity	Average Monthly Cash Earnings in 1995 Price					Annual Growth Rate (Percent) <sup>†</sup>
	[Percent of National Average]					
	1980	1985	1990	1995	1997	
Agriculture	238 [24.5]	189 [20.1]	269 [25.3]	250 [24.5]	266 [24.9]	1.61 (2.76) <sup>‡</sup>
Mining and Quarrying	921 [94.9]	1,032 [109.7]	1,517 [142.8]	1,185 [115.9]	1,482 [138.9]	2.38 (5.43) <sup>+</sup>
Manufacturing	683 [70.4]	779 [82.8]	695 [65.4]	582 [56.9]	500 [46.9]	-0.71 (-1.33) <sup>ns</sup>
Electricity and Water	1,124 [115.9]	1,041 [110.6]	1,599 [150.6]	1,350 [132.1]	1,597 [149.7]	3.11 (6.27) <sup>+</sup>
Construction	594 [61.2]	590 [62.7]	615 [57.9]	633 [61.9]	552 [51.7]	0.74 (2.68) <sup>‡</sup>
Commerce	525 [54.1]	549 [58.3]	635 [59.8]	580 [56.8]	672 [63.0]	1.45 (4.90) <sup>+</sup>
Transport and Communication	1,000 [103.1]	808 [85.9]	1,167 [109.9]	1,206 [118.0]	1,404 [131.6]	1.43 (4.45) <sup>+</sup>
Finance and Business Services	1,045 [107.7]	1,088 [115.6]	1,321 [124.4]	1,265 [123.8]	1,301 [121.9]	1.98 (6.35) <sup>+</sup>
Community and Personal Services	787 [81.1]	723 [76.8]	780 [73.4]	776 [75.9]	1,062 [99.5]	0.90 (2.57) <sup>‡</sup>
Education	985 [101.5]	997 [106.0]	1,372 [129.2]	1,618 [158.3]	1,563 [146.5]	3.91 (7.13) <sup>+</sup>
Government	na	1,676 [178.1]	1,789 [168.5]	2,015 [197.2]	1,987 [186.2]	1.39 (2.31) <sup>‡</sup>
National Average	970 [100.0]	941 [100.0]	1,062 [100.0]	1,022 [100.0]	1,067 [100.0]	1.27 (5.13) <sup>+</sup>

Source: Author computed from CSO (various). <sup>†</sup>: based on data for the period 1980-1997 (growth rates for Government are based on data for 1985-1997). --annual growth rates were computed as in Gujarati (1988). <sup>+</sup>, <sup>‡</sup>: statistically significant at 1%; 5% (t-values are reported in parentheses).

Although agriculture has declined in relative economic importance, the direct and indirect linkages of the sector to other economic activities are very important (MFDP, 1997). For example, Agriculture is an important source of raw materials for the milling and meat-processing industries. Therefore, Agriculture contributes toward the development of the manufacturing sector (agro-processing), although some agro-processing industries partly depend on imported raw materials. This also implies that agriculture contributes positively toward employment creation in the manufacturing sector. For example, in 1996, there were 2,018, 2,280 and 71 employees in meat processing, dairy and leather/tanning industries, respectively (BoB, 2003). Employment estimates for meat processing and dairy industries were only exceeded by those for textile and metal. The agricultural sector also contributes a significant proportion to informal and self-employment (MFDP, 1997).

### 3. LAND AND WATER RESOURCES

Botswana, a landlocked country located in Southern Africa (North of South Africa), has a surface area of 582,000 km<sup>2</sup> (TAHAL, 2000; MFDP, 1997). The country's land tenure consists of three systems: tribal land, freehold land and state land (MFDP, 1991; MLGL, 1992). Tribal land occupies 77 percent of Botswana's total surface area, whereas state land and freehold land occupy 23 and 6 percent, respectively. Since independence, land reform initiatives have mainly involved the conversion of state land into tribal land. Tribal land, also known as communal land, is found in rural areas and is community owned. Individuals and households are only granted the right of use to the land, for residential, communal grazing, and cultivation purposes. Each household has been allocated land for residential use, and most households have land for cultivation of field crops (grains/cereals). Livestock grazing under this system is communally based, with no household having exclusive use rights. However, since some individuals/households have exclusive use rights over privately developed artificial water sources (e.g. boreholes), such arrangement has provided some form of *de facto* grazing rights around water sources (MFDP, 1991). Leasehold arrangements have also been made to grant eligible cattle owners exclusive use rights in ranches issued under the Tribal Grazing Land Policy (TGLP), for a period of 50 years (for a brief discussion of TGLP, see the forthcoming section on policies).

State land includes National Parks and Game Reserves, and Wildlife Management Areas (WMAs). The state land is under the control of the president of Botswana. Freehold land consists of privately owned farms, with exclusive and perpetual right of use by title holders (MFDP, 1991). This land tenure system was created during the colonial times and made accessible only to colonizing expatriates, with citizens/natives denied access (Machacha, 1986). Titles for freehold land are issued by the state, and they confer permanent ownership to holders.

With average annual rainfall ranging from 650 mm in the extreme northeast to 250 mm in extreme southwest, Botswana is classified as a semi-arid to arid country (TAHAL, 2000; MFDP, 1997). The rainy season occurs during October to April, while the dry season occurs during May to September. Rainfall is generally variable across time and space. Average daily maximum temperatures are recorded at 33°C and 22°C in January and July, respectively. However, extreme temperatures of 43°C in January and 32°C in July may be reached. Average daily minimum temperatures stand at 19°C in January and 5°C in July. However, extreme minimums of 7°C and -5°C may be attained in January and July, respectively.

In the Southwestern part of the country lies the Kalahari Desert, which is an important habitat for wildlife, and is widely used for beef cattle farming, under both communal, leasehold and freehold arrangements. Besides the Okavango Delta in Northwestern Botswana, and areas around the Chobe River (Northern Botswana) and the Limpopo river (Eastern Botswana), the country generally lacks natural and perennial water sources. Thus, the potential for irrigation development is largely limited. The country's arable agriculture is largely rainfed, and livestock watering largely depends on underground water sources (boreholes). Estimates reveal that less than 5 percent of Botswana's land is suitable for arable agriculture (MFDP, 1997). This is largely due to low and unpredictable rainfall. Land suitable for arable agriculture is mainly situated in freehold areas in the eastern part of the country. Most of Botswana's agricultural land is suitable for extensive beef production. However, the expansion in beef production activities into fragile areas of the Kalahari has posed serious environmental challenges.

Irrigated agriculture (horticulture), which is mainly infant, is concentrated in the Tuli Block area in Eastern Botswana, where irrigation water is sourced from the Limpopo river. Some irrigated agriculture is also situated in the Chobe area. Small-scale horticultural farms, mainly dependent on borehole water, are also found throughout the country. Some of these farms depend on river-side pumps and small dams for irrigation. According to TAHAL (2000), existing water resources are currently underutilized. It is estimated that, with existing fresh water resources (surface and groundwater) and the 1800 ha of land already developed for irrigation, there is scope for Botswana to satisfy 75 percent of her projected demand for horticultural products

by 2010, if more efficient production methods are adopted. Moreover, there is scope for developing 3,600 ha for irrigation with treated waste-water from urban centers.

## **4. EVOLUTION OF AGRICULTURAL POLICIES**

### **4.1. National Policies**

During the National Development Plan 9 period (2003 - 2009), agricultural policies include; improvement of food security at household and national levels; diversification of agricultural production base; increased agricultural output and productivity; increased employment opportunities for the fast growing labour force; provision of secure and productive environment for agricultural producers; and conservation of scarce agricultural and land resources for future generations (MFDP, 2003). These objectives have remained virtually unchanged since the commencement of the NDP 7 period in 1991 (Seleka, et al., 2003).

A review of agricultural objectives from the NDP 1 through NDP 9 periods indicates that most of the sector's objectives have remained virtually unchanged since the first NDP after independence (Seleka, et al., 2003). The only major exception is that from independence to the end of the NDP 6 period in early 1991, one of the major objectives was to achieve self-sufficiency in food production (MOA, 1990). This objective was abandoned at the commencement of NDP 7 and replaced with the broader objective “to improve food security at household and national levels”. The abandonment of the food self-sufficiency objective was in light of the fact that programs introduced to pursue this objective did not bring the country out of its food deficit situation, and were associated with huge social costs and government outlays (MoA, 1990). Moreover, adopting the broader food security strategy, instead, would ensure that households acquired imported food at reasonable prices.<sup>3</sup>

The emphasis of food security as an agricultural objective was also highlighted in the revised national food strategy, which replaced the national food strategy of 1985 (MFDP, 2000). Unlike the 1985 national food strategy which called for the achievement of food self-sufficiency at all cost and means possible, the revised national food strategy points to the promotion of those commodities for which the country has comparative advantage. The revised national food strategy further stipulates that emphasis in the future will be placed on technology development, provision of infrastructure, and institutional and human capital development. The strategy would also ensure that border controls are kept at a minimum, to promote access to cheaper imported food. Such a move is consistent with current global trends, and the provisions of the World Trade Organization (WTO), the trade protocol of the Southern African Development Community (SADC), and the Southern African Customs Union (SACU), of which Botswana is one of the members.

### **4.2. Programs and Policy instruments**

#### ***Food Self-Sufficiency Period***

Programs of the 1970s and the 1980s were generally meant to achieve self-sufficiency in food production. In the grain sub-sector, producer prices were supported from the establishment of the Botswana Agricultural Marketing Board (BAMB), in 1974, to the end of the NDP 6 period in early 1991. While both maize and sorghum prices were supported, the pricing system ensured that sorghum prices were higher than maize prices (Arup Atkins, 1989). The idea was to promote a bias towards producing sorghum, relative to maize, since the former was found more suited to Botswana's agro-ecological conditions. Moreover, sorghum was perceived to be the major staple commodity. During the food self-sufficiency period, BAMB was also awarded a monopsony position in the importation of sorghum. This meant that private traders could not

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<sup>3</sup>We do not wish to suggest that “food self-sufficiency” and “food security” are mutually exclusive concepts. In fact, it would be proper to infer that before 1991, food self-sufficiency was seen as a viable strategy for achieving food security. However, due to its failure to eliminate food deficits, and because programmes meant to pursue the strategy were associated with phenomenal social costs, food self-sufficiency became no longer seen as a viable policy option for achieving food security, and, hence, was abandoned at the commencement of the NDP 7 period in 1991.



participate in the importation of the commodity, unless they acted on behalf of BAMB. The implication of these policy instruments was that taxpayers and consumers paid a huge bill to ensure continued support to producers.

The 1980s saw the introduction of two major farm-level support programs, the Arable Lands Development Programme (ALDEP) and the Accelerated Rainfed Arable Programme (ARAP), which were meant to improve dryland arable agricultural production and productivity. ALDEP was designed to assist resource-poor farmers through the provision of animal draft power (oxen, mules or donkeys), animal drawn implements (ploughs, planters, cultivators and harrows), fencing materials, scotch carts, water catchment tanks and fertilizers (Seleka and Mmofswa, 1996). However, ALDEP was not effective in transforming smallholder arable agriculture - at an aggregate level, yields and output saw no visible growth during programme implementation (Centre for Applied Research, 2002). One of the drawbacks of this program was that some farmers acquired capital implements and left them idle, implying that the utilization of the scheme was not translated into improved technology adoption.

An implicit assumption of ALDEP was that access to improved technological packages was a necessary and sufficient condition for achieving an expansion in arable output and yields - hence, farmer access to such technological packages would readily translate into utilization/ adoption. However, as it turned out, this assumption was erroneous. What was overlooked was that technology adoption is a function of a multiplicity of factors, including the technical and socio-economic environments under which farmers operate.<sup>4</sup> ALDEP, which has so far run in two phases, has recently been reviewed, and policymakers are yet to decide on whether or not it should be continued as a poverty alleviation (welfare) program to aid resource poor rural households (Centre for Applied Research, 2002).

During its implementation, ARAP literally paid producers to engage in arable production activities. The program provided grants for ploughing/planting, input (improved seeds and fertilizer) procurement, fencing, water development, and destumping (Kwelagobe, 1985). The central idea was that the use of these packages would demonstrate to farmers the benefits of adopting improved technologies. While ARAP had some positive impact on cultivated area, grain output and yields, such benefits were not sustained beyond the program's implementation period (Seleka, 1999a). A major drawback of this program was that it led to an unprecedented transition away from animal traction to tractor traction, since farmers could afford to hire-in tractor ploughing services. However, following the termination of the program, a backward transition was hardly evidenced, and since farmers could no longer afford to hire-in tractor services, arable activity was severely reduced.

During the food self-sufficiency period, the non-traditional sub-sector also received substantial public attention. Such effort was largely aimed at promoting economic diversification, employment creation and income generation. This period saw the introduction of a variety of programs geared at providing grants to farmers to establish new or expand existing non-traditional enterprises. Notable among these programs was an economy-wide program named the "Financial Assistance Policy" (FAP), which operated during the period from 1982 to 2000. FAP may have so far been the major assistance program to the non-traditional agriculture in terms of total government outlays, program duration, and the number of enterprises assisted. Its objectives

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<sup>4</sup>For example, the skill levels of technology users may be a critical determinant of the rate of technology adoption. Therefore, the strategy should have been to provide on-farm technical support as one of the ALDEP packages, to demonstrate the benefits of technology adoption. One other factor involved the perceived production (yield and output) risk associated with the adoption of a technological package. For example, after it rains, smallholder farmers usually broadcast the seeds and plough them under, and when it rains again, this process is repeated on a different piece of land, until the end of the ploughing/planting season. Crop yields would then vary greatly with intra-seasonal rainfall distribution - it is unknown, *a priori*, which of the first, second, third, etc plough-planting(s) would yield fruition or fail. Therefore, adopting a technology such as harrowing or row planting may be viewed as riskier than broadcasting the seeds, ploughing them under and moving to a new piece of land when it rains again - the latter may be viewed as a production risk management strategy.

were to promote the creation of sustainable employment, to diversify the economy to reduce its dependence on large-scale mining, cattle farming and the public sector, to promote import substitution, to promote export oriented production, and to promote citizen participation in the economy through ownership of productive ventures (Molokomme, 1992).

According to Rebaagetse (1999), there was a total of 781 FAP funded non-traditional enterprises (excluding those that had collapsed) in 1998, with total employment of 1,268 people. The majority of these were poultry, horticulture and dairy projects. Although FAP did stimulate growth in the number of non-traditional enterprises in the country, experience indicates that supported projects were unsustainable in the long-term. For example, By 1998, FAP had funded 357 horticultural projects. Of these, only 167 (48 percent) were operational, and the remaining 52 percent had collapsed. This is a substantial failure rate. While the exact causes of the high failure rate of FAP funded projects are unknown, one of the plausible causes is that the lifespan of projects may have been limited to the lifespan of the capital assets acquired through the program (Seleka, et. al., 2002). This would reflect the inability of entrepreneurs to invest in capital asset replacement, once the initial capital assets (obtained through FAP funding) have become obsolete. New entrants would also go through the same process, and as long as public funding was available, the process would go on and on. Due to the continued entry of newly funded projects as the old ones exited/collapsed, a snapshot of the non-traditional sector at any particular time may have yielded a false indication that non-traditional industries were sustainable.

Non-traditional activities have also been nurtured through border policies (Seleka and Dambuza, 2000). An import permit system was introduced during the 1980's to protect the so-called infant industries from fierce cross-border competition. Such protection, which is still in place today, is applied on horticultural, dairy, and poultry products. In horticulture, import permits are not issued when domestic output is at its peak, to allow domestic produce easy access to the domestic market. In dairy, monthly import quotas of fresh milk are allocated to dairy processors engaged in trade, and other dairy products are not subjected to import permit requirements. Retailers are prohibited from importing fresh milk - they can only buy from domestic processors. Such permits are only meant to meet excess demand at processor level, over and above what domestic producers can supply to processors.

In the poultry industry, permits are not issued for the importation of un-processed chicken meat and table eggs, unless it has been established that there are some shortfalls in domestic supply - the ministry of agriculture reports that this is rarely the case. However, permits are usually issued for the importation of production inputs such as hatching eggs, point-of-lay pullets, and day-old chicks (broilers). Additionally, permits have been issued for the importation of value-added products such as chicken nuggets, chicken burgers, marinated chicken wings, etc. Similarly, in the pig industry, the importation of whole pork cuts is not permitted. Permits are only issued for the importation of special cuts such as spare ribs, etc.

One of the concerns in the non-traditional agriculture is the practice of cross-border supermarkets, retailers, and restaurants (between Botswana and South Africa), which commonly prefer to procure supplies through centralized sources in South Africa. This behavior is seen by some as a way to deny local products access to these markets. This situation is complicated by the fact that value-adding activities are specialized across the players involved, causing these institutions to insist on purchasing from their central sources in South Africa. For example, most restaurants selling spare-ribs have them supplied vacuum packed from South Africa, and the ingredients used in processing of this product may differ across the different restaurants, and cannot be disclosed.

The traditional livestock industry has also received substantial attention from government, during the food self-sufficiency period. Programmes in this industry have mainly been geared at improving animal husbandry and management practices, and at promoting resource conservation. One of the key programmes was the Tribal Grazing Land Policy (TGLP), which was introduced in 1975 to prevent overstocking and land

degradation, and to commercialise the livestock industry (Machacha, 1986). TGLP demarcated grazing areas into communal, commercial and reserve areas (Hichcock and Nkwe, 1982; Machacha, 1982; Seleka, 1997). According to the plan, communal areas were meant to continue to serve smallholder farmers, commercial areas would be allocated on leasehold basis to grant producers exclusive grazing rights, and reserve areas are those which would be set-aside for future allocation - to protect the interests of future generations.

The TGLP did not progress as initially envisaged. Ranchers in commercial areas generally did not observe livestock and range management practices - they generally overstocked and overgrazed their ranches, and then moved some of their livestock to communal areas, further exacerbating the land degradation problem in the latter (Machacha, 1986). This is because they enjoyed dual grazing rights - they had exclusive rights in their ranches and enjoyed common property rights in communal areas. As an attempt to arrest the continued range degradation in the country, the government introduced the fencing policy in 1991, as a modification of the TGLP program. The aim of this program would be to fence-off communal areas and grant communities residing in those areas exclusive grazing rights. The idea was that exclusive grazing rights would encourage communities to manage grazing resources responsibly. The fencing policy has generally not yet succeeded, except in cases where virgin land was opened up and allocated (Seleka, 1997).

Cattle farmers have also been assisted through free vaccination programmes to prevent diseases of economic importance. This is particularly important since there is need to comply with sanitary and phytosanitary (SPS) measures in the country's export market - beef is a substantial earner of foreign exchange. Another programme introduced in the 1970s to assist improve productivity in communal areas was Services to Livestock Owners in Communal Areas (SLOCA). This programme, which is still operating today, provides financial support for developing livestock infrastructure. Public support under SLOCA has included (i) establishment of demonstration facilities for improved livestock management practices in communal areas, (ii) provision of grants to farmers for putting up facilities for improved management practises, (iii) provision of material for fencing and improving water supply, and (iv) improvement of farmer ability to efficiently and sustainably manage their livestock and range (Centre for Applied Research, 2002).<sup>5</sup> SLOCA has so far operated in three phases covering the periods 1979-84, 1985-93, and 1994 to present.

The livestock industry has also received public assistance through the Livestock Water Development Programme (LWDP), which was introduced during the NDP 6 period (1985-91) to provide grants to farmers for drilling and equipping boreholes. According to the programme, farmers with 60-200 and 201-500 cattle would receive grants amounting to 60 and 40 percent of drilling costs, respectively (Centre for Applied Research, 2002). Moreover, farmer groups would each be eligible to receive a maximum grant of P30,000 for equipping a borehole and/or water reticulation. Smallholder farmers with 1-60 cattle could only benefit from LWDP if they formed syndicates. Utilization of the LWDP funds has been very slow, with annual expenditures ranging from P0.8 million in 1995/96 to P4.7 million in 1999/00 - some projects took long before they could take-off, following the approval of funding.<sup>6</sup>

### ***Food Security Period***

Two major developments occurred following the replacement of the food self-sufficiency objective with the broader food security strategy in early 1991. Firstly, a decision was made to adopt import parity pricing on grain producer prices. This would align grain prices to regional/international trends, and would ensure that households had access to cheaper imported food (MoA, 1990). Secondly, BAMB's monopsony on sorghum imports was removed in 1992, to further liberalize the grain market. BAMB was further pressurized by government to operate without dependence on government outlays (grants). These developments would promote competitiveness in the grain markets, and further ensure that the consumers paid competitively

<sup>5</sup>SLOCA demonstration projects have covered water development, land rehabilitation, fencing plots, firebreaks, dipping systems, and fodder production. At community (farmer) level, SLOCA assistance included construction of dipping facilities, drift fences, fire breaks, cattle crushes and kraals, water reservoirs, and water and feeding troughs; and equipping of boreholes.

<sup>6</sup>This situation appears to have been caused by the 40-60 percent contribution required from farmers.



determined prices. Such a move would also improve national and household food security and welfare. The food security period also saw the termination or review of some of the major programs that had been established to advance the food self-sufficiency objective. ARAP was terminated following the 1989-1990 cropping season and its packages were reintroduced under a drought relief program during the 1992-1993 through 1995-1996 cropping seasons, and terminated thereafter. While ALDEP is still in place, it has recently been reviewed to determine if it has to be continued, modified or terminated.

One thing clear is that the current economy-wide policy direction seems to point towards moving away from the provision of grants (free money) toward subsidized loan schemes. A step in this direction was taken through the termination of FAP in 2000, and its replacement with the Citizen Entrepreneurial Development Agency (CEDA) in 2001. Also an economy-wide program, CEDA aims to: support enterprises adding value to the economy; promote entrepreneurship among citizens; promote economic diversification; promote the development of viable and sustainable citizen-owned enterprises; promote sustainable employment creation; promote backward linkages of citizen-owned value-adding enterprises with primary industries; and promote improved efficiency in service delivery (CEDA, ND). CEDA, is a subsidized loan scheme meant to promote the development of small-, medium-, and large- scale projects. Interests rates of 5 and 7 percent are applied on loans not exceeding P 150,000 and those falling within the range P150,001 to P 2 million. Loans in excess of P 2 million are issued at the market rate of interest, and they require investors to contribute 25 percent of total project cost. Since CEDA is still a new initiative, its contribution towards improving diversification in agriculture is yet to be determined.

In 2002, the government introduced the National Master Plan for Arable Agriculture and Dairy Development (NAMPAADD) as yet another initiative to reverse the declining trend in agricultural growth, and to further improve the sector's contribution to the overall economy. NAMPAADD primarily intends to commercialize the agricultural sector, to make it more competitive, and to reduce the country's high dependence on imports (MOA, 2002). The program would target farmers in dryland arable agriculture, dairy and irrigated arable agriculture (horticulture). In the dryland arable agriculture, the major activity would be to encourage smallholder farmers to form large units (clusters) of at least 150 hectares (ha), to establish service centers for providing inputs and other services at each unit, to develop infrastructure at each unit, and to promote the adoption of mechanized farming. The idea is that through collective action, smallholder farmers would realize the benefits of mechanized farming.

In horticulture, the intention is to promote the establishment of production clusters, each with at least one large farmer with 20 or more hectares of cultivated land. Cluster formation would promote collective action in input procurement, product marketing and production, and thereby promote improved marketing and farm-level production efficiency - thus, it is hoped that collective action at cluster-level would promote market coordination. It is also expected that smallholder farmers would learn improved farming techniques from the large-scale farmer at each cluster, and that farmers would benefit from the bulk procurement of inputs and collective product marketing. Moreover, an extension worker would be placed at each cluster to promote effective service delivery to farmers. In dairy, NAMPAADD's main activity would be the implementation of on-farm demonstrations to show the benefits of adopting improved management practices. Moreover, emphasis will be placed on the development of facilities such as government demonstration farms and milk testing centers.

It is worth highlighting that NAMPAADD will not provide grants (free money) or free inputs to farmers, as was the case under FAP, ARAP and other more liberal public support initiatives. One of the activities under NAMPAADD would be to assist farmers with economically viable projects to acquire loans through CEDA. One feature of NAMPAADD, which seems to cut across the three commodity groups, is that farmer collective action is perceived to be the potential source of agricultural productivity growth.

## 5. DIVERSIFICATION IN AGRICULTURE: SIGNS AND ISSUES

### 5.1. Diversification as an Agricultural Development Strategy

What is agricultural diversification and why has it received much attention as an agricultural development strategy? Tabora (1992) defines agricultural diversification as “spreading the investments and benefits among various commodities to increase the variety of commercial products and benefits from agriculture” (p. 93). From an economic standpoint, diversification involves spreading risks and benefits across commodities/enterprises to guard against the negative impacts of “fluctuations encountered in exchange economies” (p. 94).

Kasrino (1992) identifies three forms of diversification: (1) horizontal diversification, (2) vertical diversification and (3) diversification through off-farm employment. Horizontal diversification entails “combining of crop and livestock operations to minimize risk and optimize the utilization of . . . resources to maximize income” (p.135). Therefore, horizontal diversification entails the adjustment of product-mix or enterprise-mix to respond to changes in relative prices and the risks associated with alternative economic activities. However, it must be borne in mind that, although it is a risk management strategy, enterprise diversification may result in losses in potential efficiency gains from specialization (Petit and Barghouti, 1992).

Vertical diversification involves the addition of value-adding activities through agro-industrial development - it “includes processing and the multiple use of agricultural products and by-products to improve their quality and value, generate higher prices, and increase comparative advantage” (Manwan, et al., 1992). Therefore, efforts to develop a country's upstream and downstream agro-industries are important aspects of vertical diversification. Diversification through off-farm employment is “a process of broadening and maintaining the sources of income for rural households” (p.135). These three dimensions of diversification imply that agricultural diversification entails “the movement of resources across activities, industries, and sectors” (Adriano and Cedillo, 1992). Agricultural diversification may occur at farm, sectoral, regional and national levels (Zandstra, 1992; Petit and Barghouti, 1992).

Timmer (1992) identifies three main reasons to justify the promotion of agricultural diversification. Firstly, diversification - in production and/or trade - promotes flexibility in the agricultural economy, further leading to stable incomes, and thus guarding against the negative effects of unstable prices. Thus, finding alternative uses and markets for products, and “having a broader portfolio of” products “enables farmers and firms to cope with and flexibly respond to changes in weather, market conditions, policies, etc” (Jaffee, 1992)

Secondly, a well-diversified agricultural sector promotes rural income growth, improves the standard of living for rural households, and further reduces labor migration to urban areas in search of more lucrative job opportunities (Timmer, 1992). The existence of upstream and downstream linkages would also stimulate growth in service and manufacturing sectors. For instance, diversification into labor intensive, high value activities, such as horticulture, may have positive effects on incomes and employment, both at the farm level and at upstream and downstream industries (Jaffee, 1992). Such growths may contribute positively to the balance of payments position of a country, by substituting local production for imports or increasing foreign exchange earnings, and may improve food security at household and national levels. Lastly, in the case of crops, for example, diversification at farm level implies reduced vulnerability to pests and diseases in the long run, compared to situations where monocultures are practiced (Timmer, 1992). Thus, agricultural diversification “offers opportunities to reduce production and price risk, increase flexibility, increase agricultural income, and sustain productivity and growth” (Petit and Barghouti, 1992; p. 1).

From the standpoint of the entire economy, diversification efforts in Botswana have mainly been geared at reducing the economy's dependence on minerals, cattle farming and the public services - FAP was created to advance this purpose. In addition to minimizing the risks associated with heavy dependence on these

economic activities, it was hoped that expansion into other economic activities would promote economic growth, and offer more investment and job creation opportunities. Agriculture was not left out in the quest for economic diversification - in this sector, expansion into non-traditional activities, such as horticulture, poultry, dairy, beekeeping and fisheries, was seen as a viable option for promoting diversification and sectoral growth. Therefore, at national level, agricultural diversification was meant to expand existing enterprises, particularly non-traditional, or where possible introduce new products/enterprises. However, since FAP also promoted the development of the manufacturing sector, it is also true that vertical diversification, through expansion of agro-processing, has also been an important consideration for promoting economic growth and employment creation. FAP's successor program, CEDA, is also meant to pursue the economic diversification objective.

## **5.2. Dryland Arable Agriculture and Diversification**

Crops grown under dryland farming include sorghum, maize, cowpeas, sunflower, groundnuts, melons, sweet-reed and pumpkins. Sorghum, which accounts for over 80 percent of cultivated area, is the prominent commodity, followed by maize (Seleka and Mmofwa, 1996). These crops are grown under both subsistence and commercial arrangements. The subsistence system, which accounts for over 85 percent of total cultivated area, is the most common. However, yields under subsistence arrangements are much lower than they are in the commercial system. For example, during the 1979-90 period and 1993, mean sorghum yields in the subsistence sector were recorded at 108 kg/ha, compared with 525 kg/ha under commercial arrangements (Seleka and Dambuza, 2000).<sup>7</sup> Similar situations were evidenced for other crops. Although the commercial system has consistently outperformed the subsistence system, yields under the former system are also low, relative to what is attained in other SADC countries (see the forthcoming section on cross-border competition and diversification).

It appears that no case can be made that dryland arable farming has been a source of diversification in the sector, although one of the government objectives has been to diversify dryland crop farming into cash crops, such as oilseeds. In fact, yields have been very low and variable in this sector due to the high dependence on rainfall - which is unpredictable and generally low. When considering the 1979-1990, 1993, 1995, and 1996 data, the highest average yield of sorghum, for example, was recorded at 685 kg/ha (in 1995) (CSO, 2000). However, by 1996, average sorghum yield had fallen to 310 kg/ha. Several factors have been advanced to explain agriculture's poor performance. They include, poor soil fertility, low and erratic rainfall, poor farm management, low adoption of improved technologies, inadequate farm inputs, poor access to credit, and inadequate knowledge and training of farmers and extension staff (see Seleka, 1999a). However, efforts to address these factors appear to have not yielded much, if any, productivity growth in the sector.

It also appears that there has been massive out-migration from dryland arable agriculture, implying that the sub-sector may have lost its competitiveness, and that it may be disintegrating. Therefore, it is safe at this stage to conclude that dryland arable agriculture has not been a significant source of growth or diversification. In fact, it appears to have been the major source of the sector's stagnant growth. For example, as seen from Table 4, average cereal yield for the period from 1961 to 2000 stood at 307 kg/ha.

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<sup>7</sup>Note, however, that although the low yields were partly due to the severe and continuous droughts of the early to mid 1980s, yields have generally been recorded at about 300 kg/ha in normal years, which is still too low.

Table 4: Average Annual Production and Trade of Traditional Commodities, 1961 -2000

Crop:	Variable	Average Annual Crop Statistics					Annual Growth Rate (Percent) <sup>†</sup>	
		1961-70	1970-80	1980-90	1990-00	1961-00		
Cereals	Area Planted (ha)	108,766	151,932	151,936	174,949	144,447	1.66	(2.19) <sup>‡</sup>
	Output (mt)	30,926	61,656	39,532	41,580	44,299	0.12	(0.11) <sup>ns</sup>
	Yield (kg/ha)	284	406	260	238	307	-1.54	(-2.40) <sup>‡</sup>
	Imports	69,646	74,266	168,115	183,666	126,079	4.00	(9.03) <sup>+</sup>
	% Production <sup>#</sup>	31	45	19	18	26	-2.72	(-2.64) <sup>‡</sup>
Pulses:	Area Planted (ha)	20,300	27,273	30,273	32,182	27,700	1.41	(11.43) <sup>+</sup>
	Output (mt)	12,233	16,182	15,727	16,182	15,083	0.74	(3.40) <sup>+</sup>
	Yields (kg/ha)	603	593	520	503	545	-0.67	(-4.68) <sup>+</sup>
	Imports	263	131	1,961	4,079	1,722	15.04	(7.36) <sup>+</sup>
	% production <sup>#</sup>	98	99	89	80	90	-1.13	(-4.64) <sup>+</sup>
Oil Crops:	Area Planted (ha)	4,194	9,136	4,060	4,580	5,421	-0.35	(-0.43) <sup>ns</sup>
	Output (mt)	1,114	1,356	700	1,550	1,190	0.29	(0.38) <sup>ns</sup>
	Yields (kg/ha)	265	148	172	338	220	0.64	(1.18) <sup>ns</sup>
	Imports (mt)	0	76	256	2,057	639	15.56	(11.23) <sup>+</sup>
	% production <sup>#</sup>	100	98	92	70	86	-4.16	(-5.41) <sup>+</sup>
Beef and Veal:	Output (mt)	22,780	36,437	40,949	40,145	35,522	1.67	4.56 <sup>+</sup>
	Exports (mt)	9,790	28,908	30,950	22,617	23,729	3.01	(3.76) <sup>+</sup>
	% Exports <sup>±</sup>	43	79	76	56	67	1.35	(2.55) <sup>‡</sup>
Mutton and Goat Meat:	Output (mt)	2,893	3,722	4,453	7,599	4,701	3.18	(12.42) <sup>+</sup>
	Exports (mt)	0	102	208	338	171	-3.39	(-0.19) <sup>ns</sup>
	% Exports <sup>±</sup>	0	3	5	4	4	-7.59	(-0.44) <sup>ns</sup>

Source: FAO (2004); Author Computed. <sup>†</sup>: based on data for the period 1961-2000 (growth rates for imports of pulses and oil crops are based on data for 1974-2000) - annual growth rates were computed as in Gujarati (1988). <sup>ns</sup>: statistically not different from zero. <sup>+</sup>, <sup>‡</sup>: statistically significant at 1%; 5% (t-values are reported in parentheses). <sup>#</sup>: records the percentage of domestic production in the sum of domestic production and net imports. <sup>±</sup>: records the percentage of exports in domestic output.

Table 4 indicates that the highest average yield, recorded at 406 kg/ha, was realized during the 1970-80 period, in comparison to the 1961-70, 1980-90 and 1990-00 periods. When considering the 1961-2000 period, cereal yield fell at 1.54 percent per year. A similar pattern was evidenced for pulses: the yield of pulses declined at a rate of 0.67 percent per year during the period from 1974 to 2000. The yield of oil-crops, on the other hand, exhibited zero growth during the same period. Due to declining or stagnating yields, imports of cereals, pulses and oil-crops expanded at annual rates of 4, 15 and 16 percent, respectively, during the same periods. There is currently no evidence of significant changes in the crop-mix in the sub-sector. Sorghum is still the dominant commodity, followed by maize. Therefore, it is doubtful that the sub-sector has witnessed much, if any, diversification over time -- through changes in crop-mix or the introduction of new crops.<sup>8</sup>

Although it appears that not much success was evidenced with regard to horizontal diversification at the farm level (changing crop-mix), substantial progress has been made with regard to vertical diversification, particularly in sorghum milling. According to Rohrbach, et al. (2000), about 20, 13, 41 and 89 sorghum mills

<sup>8</sup> It is, however, worth noting that some commercial farmers at Pandamatenga, in northern Botswana, have switched to sunflower and cotton production. However, it is unclear as to whether such progress would constitute meaningful diversification at an aggregate level, since this is an isolated case.

were established during 1980-84, 1985-89, 1990-94 and 1995-99, respectively. Therefore, there has been tremendous growth in sorghum milling in the country. Such growth was largely attributed to government financial support through FAP. The study by Rohrbach et al. further revealed that all of the then existing sorghum mills had received some form of financial support, to expand existing business or to create new ones.

### **5.3. Non-Traditional Agriculture and Diversification**

As pointed out earlier, the non-traditional activities such as horticulture, dairy, piggery and poultry (egg and broiler production) have been viewed as a major source of sectoral diversification, and have received substantial government support. The question is whether they may have contributed to some, albeit minimal, diversification. Table 5 indicates that cultivated area (output) of fruits, vegetables and starchy-roots expanded at annual rates of 1.5 (2.1), 1.7 (1.5) and 1.0 (2.4) percent, respectively, during the period from 1961 to 2000. Moreover, yields of fruits and starchy-roots grew at 0.6 and 1.4 percent per year (respectively) during the review period, whereas vegetable yield declined at an annual rate of 0.7 percent. If these data are anything to go by, it appears that the growth in the outputs of these crops may have been a source of diversification. Although this is a positive development, it is worth noting that such growth did not keep up with the country's expanding demand. Therefore, imports of these crops played an increasing role over time: fruit, vegetable, and starchy-root imports grew at yearly rates of 11, 12 and 13 percent, respectively, during the period from 1961 to 2000.

The outputs of poultry meat, pig meat and milk expanded at 11, 1.4 and 1.7 percent per year, respectively, during the period from 1974 to 2000 (Table 5). Egg production increased at 6.5 percent per year from 1961 to 2000. Thus, the growth in the outputs of these commodities may have also been an important source of agricultural diversity. In particular, poultry meat and egg production have expanded much faster than imports: imports of poultry meat and eggs grew at 7.3 and 1.7 percent, respectively. Therefore, domestic production of these commodities became increasingly important in meeting domestic demand over time: currently, domestic production of these commodities meets about 80 percent of local demand, with the remaining 20 percent met through imports. However, imports of pig meat and milk grew much faster than domestic production, at annual rates of 19 and 12 percent, respectively. It is also important to note that diversification efforts in non-traditional agriculture have also gone into ostrich farming: although this industry is still at an infant stage of development.

Although positive developments have been observed regarding the contribution of the non-traditional agriculture to overall agricultural diversification, it is worth noting that such growth was artificially induced through the provision of FAP grants to business owners. The competitiveness of domestic enterprises was also strengthened/ enhanced through the implementation of quantitative import restrictions. Hence, progress that has been made may generally not be sustained in the long-term since quantitative import restrictions are now being challenged within SACU and SADC, and FAP funding is no longer available.

Table 5: Average Annual Production of Non-Traditional Commodities, 1961-2000.

Crop:	Variable	Average Annual Crop Statistics					Annual Growth Rates (Percent) <sup>†</sup>	
		1961-70	1970-80	1980-90	1990-00	1961-00		
Fruits:	Area Planted (ha)	1,451	1,786	2,178	2,266	1,926	1.49	(13.34) <sup>+</sup>
	Output (mt)	5,540	7,774	10,055	10,318	8,451	2.05	(11.28) <sup>+</sup>
	Yield (kg/ha)	3,818	4,352	4,616	4,553	4,389	0.56	(6.35) <sup>+</sup>
	Imports (mt)	2,240	3,989	12,685	59,264	20,290	10.66	(17.60) <sup>+</sup>
	Ratio of Production <sup>#</sup>	71	66	44	15	29	-5.05	(-10.52) <sup>+</sup>
Vegetables:	Area Planted (ha)	1,997	2,736	3,529	3,378	2,938	1.67	(15.37) <sup>+</sup>
	Output (mt)	10,250	14,105	16,045	16,314	14,223	1.51	(10.35) <sup>+</sup>
	Yield (Kg/ha)	5,132	5,156	4,547	4,830	4,840	-0.65	(-2.52) <sup>+</sup>
	Imports (mt)	739	3,793	11,636	32,040	12,484	12.21	(21.82) <sup>+</sup>
	Ratio of Production <sup>#</sup>	93	79	58	34	53	-3.11	(-17.61) <sup>+</sup>
Starchy Roots:	Area Planted (ha)	1,120	1,282	1,300	1,527	1,315	1.01	(12.43) <sup>+</sup>
	Output (mt)	4,570	6,155	7,136	9,455	6,918	2.40	(19.75) <sup>+</sup>
	Yield (kg/ha)	4,080	4,801	5,490	6,190	5,260	1.39	(16.68) <sup>+</sup>
	Imports (mt)	660	1,444	6,280	22,521	8,108	12.92	(28.87) <sup>+</sup>
	Ratio of Production <sup>#</sup>	87	81	53	30	46	-3.61	(-13.93) <sup>+</sup>
Poultry Meat:	Output (mt)	268	520	1,989	6,166	2,327	10.86	(34.18) <sup>+</sup>
	Imports	0	232	519	1,662	583	7.33	(2.37) <sup>#</sup>
	Ratio of production <sup>#</sup>	100	69	79	79	80	1.00	(2.11) <sup>#</sup>
Pig Meat	Output (mt)	249	444	362	459	380	1.35	(2.16) <sup>#</sup>
	Imports (mt)	0	31	212	1,435	442	18.97	(21.38) <sup>+</sup>
	Ratio of production <sup>#</sup>	100	93	63	24	46	-7.71	(-8.38) <sup>+</sup>
Milk, excluding butter:	Output (mt)	61,978	77,648	101,539	102,455	86,004	1.74	(12.82) <sup>+</sup>
	Imports (mt)	0	12,188	44,183	104,993	41,899	12.33	(9.45) <sup>+</sup>
	Ratio of production <sup>#</sup>	100	86	70	50	67	-2.96	(-12.31) <sup>+</sup>
Eggs:	Output (mt)	301	529	1,158	2,008	1,014	6.52	(21.35) <sup>+</sup>
	Imports (mt)	90	282	177	481	259	1.66	(1.41)
	Ratio of production <sup>#</sup>	77	65	87	81	80	1.02	(4.18)

Source: FAO (2004); author computed. ) †: based on data for the period 1961-2000 (growth rates for imports of poultry meat, pig meat and milk are based on data for 1974-2000) - annual growth rates were estimated as in Gujarati (1988). \*, #: statistically significant at 1%; 5% (t-values are reported in parentheses). #: records the percentage of domestic production in the sum of domestic production and net imports.

Several constraints have been identified as plausible causes of low output and productivity in the non-traditional agriculture. Amongst others, they are: fragmentation of smallholder production units; lack of coordination (collective action) in input procurement, production, and product marketing; low production efficiency; acute shortage of qualified manpower at the farm level; inadequate smallholder farmer access to markets (due to irregular or inconsistent supply on their part); and inadequate rural infrastructure (Republic of Botswana, 2002). Without doubt, these constraints have thwarted the development of the non-traditional agriculture, and have therefore slowed-down the process of agricultural diversification.

#### 5.4. Traditional Livestock Industry and Diversification

Traditional livestock farming includes cattle, sheep and goats production activities.<sup>9</sup> This system is dualistic in nature, characterized by the co-existence of communal (also known as traditional) and commercial sub-sectors.<sup>10</sup> Communal farming is the most predominant in terms of total livestock population and the number of households involved. On average, the communal sector accounted for 84, 97 and 87 percent of the country's cattle, goats and sheep populations, respectively, during the period from 1979 to 1990 and 1993: there were about 2.2 (0.4), 1.2 (0.03) and 0.2 (0.03) million cattle, goats and sheep, respectively, kept under communal (commercial) arrangements (Seleka and Mmofswa, 1996). During the same period, there was an average of about 56,000 (421) cattle, 57,000 (267) goats, and 14,000 (227) sheep holdings under communal (commercial) arrangements. Although the communal system is more significant when viewed at an aggregate level, it is characterized by relatively small farm sizes: an average communal (commercial) farm kept 39 (1,033), 20 (113) and 13 (120) cattle, goats and sheep, respectively. In general, Botswana's livestock population has witnessed positive growth over time. For example, during the 1961-98 period, cattle, sheep and goats population rose at 1.6, 1.3 and 3.9 percent per year, respectively (Seleka, 1999b). This has caused serious environmental degradation, due to overgrazing, particularly in drought years, and in more fragile parts on the country.

The livestock industry is characterized by low productivity levels, particularly under traditional production systems. Table 6 provides key productivity indicators for cattle, sheep and goats for selected years, to shed some light into the industry performance. As seen therein, there are no discernable differences between birth rates under communal and commercial sub-sectors. However, mortality rates are generally higher for the communal system, relative to its commercial counterpart. This is especially pronounced for the cattle industry. Sales rates are also generally low, and this is particularly the case for the communal system. While cattle home slaughter rates are generally low, this is not the case for sheep and goats. Goat home slaughters in particular have exceeded sales during most of the years reported in Table 6, implying that they (goats) are primarily kept for home consumption, rather than for cash sales.

Table 6: Livestock Productivity Indicators, Selected Years<sup>†</sup>

Year	SYS <sup>+</sup>	Cattle (percent)				Sheep (percent)				Goats (percent)			
		B	D	S	H	B	D	S	H	B	D	S	H
1980	TRA	58	14	8	1	70	32	6	12	83	34	4	5
	COM	60	4	22	1	73	16	3	12	74	21	3	11
1985	TRA	54	24	10	2	60	21	8	5	78	20	3	5
	COM	56	6	31	2	68	11	14	7	71	19	6	9
1990	TRA	62	13	7	2	76	43	21	8	72	20	6	8
	COM	70	4	38	1	69	39	18	15	82	17	12	10
1995	TRA	61	14	7	1	63	17	4	4	80	19	2	5
	COM	60	8	39	0	65	18	19	6	79	23	7	7

Source: author computed from MoA and MFDP (1980, 1985, 1995, 1999). <sup>†</sup>: B=births; D = deaths; S = sales; H = home slaughters. <sup>+</sup>: SYS= production system; TRA= Traditional (communal); COM= commercial.

<sup>9</sup> These livestock activities are called "traditional" because they have a long history of existence in the countries. They should be distinguished from "non-traditional" livestock production activities such as poultry and piggery, which have a short history of existence in the country.

<sup>10</sup> The traditional system is predominant in communal grazing areas, where farmers do not have exclusive rights over the utilization of rangeland resources. However, ownership of water sources (for example, boreholes) provides some form of *de facto* rights over the utilization of grazing resources around such water sources. The communal system is characterized by low-input use. The major inputs used under this system include water (mainly from underground resources - open wells and boreholes - during the dry season) and labor (for herding and watering livestock). Under the commercial system, farmers have exclusive rights over the utilization of rangeland resources. Some commercial farms are private (freehold farms) while others are owned by the state and used by title holders on a leasehold basis. The latter also grant individuals exclusive rights of use of grazing resources over a given period of time.

The cattle industry has in the past dominated the agricultural sector. For example, during 1990-91 through 1994-95, the industry accounted for about 60 percent of agricultural GDP (Deloitte and Touche, 1996). As seen from Table 4, beef/veal output expanded at 1.7 percent per year during the period from 1961 to 2000. Mutton/goat meat production expanded at 3.2 percent per year during the period from 1974 to 2000. Beef production far dominates mutton and goat meat production, in terms of volume. Although beef production has expanded during the period from 1961 to 2000, it might be nearing a peak: for example, mean annual production during the 1980-1990 and 1990-2000 periods was recorded at 40.9 and 40.1 thousand metric tons, respectively, implying that it might have reached a plateau (Table 4). Therefore, future diversification efforts in the industry may have to be redirected toward promoting the development of value-adding activities, rather than only placing much emphasis on primary production activities.

The beef industry has been an important source of foreign exchange for the country. In 2000, for example, Meat, Live Animals and Hides and Skins exports ranked the second prominent source of foreign exchange earnings from commodity exports, after Minerals. Therefore, in the exclusion of minerals, which account for over 90 percent of the country's export revenue, the beef industry is a significant earner of foreign exchange. Beef exports have witnessed positive growth over time: at 3 percent per year during the period from 1961 to 2000 (Table 4). Mutton/goat-meat exports have been sporadic and negligible during the review period, and have generally exhibited a downward trend.

Table 7 shows the value of Botswana's meat exports by destination, in constant 1995 prices, and the percentage shares across export markets. As seen from the table, the United Kingdom (UK) accounts for the largest share of Botswana's meat exports: during the period from 1989 to 2001, meat exports to the UK were recorded at P 933 million (or P 72 million per year), yielding a share of 36 percent. Germany, South Africa, and Reunion ranked second, third and fourth: export shares for these countries stood at 19, 17 and 14 percent, respectively. It is also evident that the UK, Germany, SA and Reunion were the most consistent export markets for Botswana's meat. When viewed as a unit, the EU accounted for 62 percent of Botswana's meat exports during the review period. Total exports to the EU market stood at P 1,610 million (or P 124 million per year). The significance of the UK, relative to other EU destinations, is worth highlighting: the UK market accounted for over 50 percent of Botswana's exports to the EU. If Reunion is combined with the EU, total exports to this combined market stand at P 1,982 million (or P 152 million per year), accounting for about 77 percent of Botswana's total beef exports. In conclusion, the EU is the largest export market for Botswana meat, followed by SA. With a 5 percent market share, Norway is the third most significant export market, when the EU is treated as a single market.

It is important to determine if the traditional livestock industry has become diversified over-time. One of the most important questions is whether the BMC has over time diversified its production and exports through addition of new product-lines, or whether it still, in the main, sells raw beef and beef by-products. According to CSO (various), BMC products sold in both the local and export markets include boneless beef, corned beef, wet blue hides, edible and compound offal, and pet food. Therefore, it appears that BMC has emphasized the production of raw products, including by-products. The question is whether or not it is possible for BMC to diversify into other value-added product-lines, so as to expand the country's foreign exchange earnings capacity and to further create employment domestically - of course we need to note that value-added products may have to be subjected to stringent SPS measures in the EU market, where most of Botswana's beef is destined. It is also evident that hides and skins are exported in raw form. Therefore, there is need to promote the development of leather-based manufacturing industries in the country, to further create jobs and to improve the country's balance of payments position - this is a policy question that the government needs to address.



Table 7 : Botswana's real meat exports in millions of 1995 BWP, Selected Years (1989-2001)†

Destination	Year						Total (1989-2001)	Mean (1989-2001)
	1990	1992	1994	1996	1998	2000		
South Africa (SA)	43.5 (22.6)	35.0 (19.6)	38.3 (19.0)	32.6 (17.4)	24.8 (10.6)	11.6 (6.6)	442.7 (17.1)	34.1 (17.1)
Reunion	36.4 (18.9)	28.9 (16.1)	31.0 (15.4)	14.9 (7.9)	19.7 (8.4)	12.2 (6.9)	371.7 (14.4)	28.6 (14.4)
United Kingdom	50.7 (26.4)	55.7 (31.2)	62.7 (31.2)	77.6 (41.4)	90.4 (38.6)	84.8 (47.9)	932.5 (36.0)	71.7 (36.0)
France	1.1 (0.5)	1.7 (1.0)	2.1 (1.1)	0.8 (0.4)			12.3 (0.5)	0.9 (0.5)
Germany	39.4 (20.5)	38.8 (21.7)	49.2 (24.5)	32.2 (17.2)	45.9 (19.6)	40.2 (22.7)	484.1 (18.7)	37.2 (18.7)
Netherlands	20.2 (10.3)	12.6 (7.0)	12.1 (6.0)	8.1 (4.3)	0.0 (0.0)	2.2 (1.2)	104.6 (4.0)	8.0 (4.0)
Greece		3.8 (2.1)		6.6 (3.5)	17.7 (7.6)	12.7 (7.2)	76.2 (2.9)	5.9 (2.9)
Norway			1.7 (0.8)	14.2 (7.6)	33.0 (14.1)	11.9 (6.8)	130.6 (5.0)	10.0 (5.0)
Other	0.9 (0.5)	2.3 (1.3)	3.9 (1.9)	0.4 (0.2)	2.5 (1.1)	1.3 (0.7)	33.1 (1.3)	2.5 (1.3)
European Union	111.4 (58.0)	112.6 (63.0)	126.1 (62.7)	125.3 (66.9)	154.0 (65.8)	139.9 (79.1)	1609.7 (62.2)	123.8 (62.2)
EU and Reunion	147.7 (76.9)	141.4 (79.1)	157.2 (78.2)	140.1 (74.8)	173.8 (74.2)	152.1 (86.0)	1981.5 (76.6)	152.4 (76.6)
Total	192.2 (100)	178.8 (100)	201.0 (100)	187.3 (100)	234.0 (100)	177.0 (100)	2,587.8 (100)	199.1 (100)

Source: author computed from data obtained from CSO; BWP: Botswana Pula. †: Figures reported in parentheses are export shares for each destination.

The livestock industry has witnessed the development of some, albeit minimal, value-added activities (for instance, meat processing) in the past decade or so. However, the growth of these activities may be constrained by the fact that meat processing firms, aside from BMC, are not permitted to engage in cross-border trade - BMC has a monopoly on meat exports. The concern has been that allowing individual firms to engage in cross-border trade may make compliance with SPS measures in the export market difficult - and perhaps put the competitiveness of the country's beef in the export market into serious jeopardy. It appears, however, that there is need to open up debates to explore the feasibility of removing BMC's export monopoly. However, such move should consider all the potential benefits and risks associated with liberalizing meat exports.

### 5.5. Cross-Border Competition and Diversification

Although some progress seems to have been made in promoting diversification in the agricultural sector, such developments have not led to the transformation of the sector - as evident from the stagnant growth of the sector. One of the most important questions is whether the sector is competitive compared to its counterparts in South Africa and Zimbabwe. As seen from Table 8, Botswana's imports mainly originate from the SADC region - SADC accounts for 95 percent of Botswana's agricultural imports. It is also evident that, South Africa, with a share of 83 and 87 percent in Botswana's total and intra-SADC imports, respectively, is the leading source of imports. Zimbabwe, with a share of about 12 percent of Botswana's intra-SADC imports, is the second prominent source of imports. The high dependence on imports from these countries seems to suggest that the development of Botswana's agriculture might be dependent on its (the sector) relative competitiveness in the region.

Table 8: Botswana's Real Agricultural Imports in Thousands of 1995 BWP, 1989-2001 (Selected Years)

Country	Year						Total (1989-2001)	Mean (1989-2001)
	1990	1992	1994	1996	1998	2000		
Angola								
Lesotho	294	172	140	113	133	515	2,273	175
Malawi	2,301	2,675	1,052	1,044	2,477	1,122	19,904	1,531
Mauritius		52				3	55	4
Mozambique		95					104	8
Namibia		65	431	3,239	2,841	2,479	22,024	1,694
South Africa (SA)	492,758	676,567	592,685	593,457	692,056	710,433	7,888,320	606,794
Swaziland	21	593	1				736	57
Tanzania	559	489	95	123	543	691	5,309	408
Zambia	983	955	2,046	1,996	351	556	13,248	1,019
Zimbabwe (ZIM)	99,761	55,706	70,062	96,914	101,774	78,329	1,113,168	85,628
SADC	596,676	737,369	666,511	696,886	800,176	794,128	9,065,142	697,319
Non-SADC	26,821	41,328	40,726	41,776	7,068	40,275	465,255	35,789
TOTAL	623,497	778,696	707,237	738,661	807,244	834,404	9,530,397	733,107
Percent SADC in Total	95.70	94.69	94.24	94.34	99.12	95.17	95.12	95.12
Percent SA in SADC	82.58	91.75	88.92	85.16	86.49	89.46	87.02	87.02
Percent ZIM in SADC	16.72	7.55	10.51	13.91	12.72	9.86	12.28	12.28
Percent SA in Total	79.03	86.88	83.80	80.34	85.73	85.14	82.77	82.77
Percent SA plus ZIM in Total	95.03	94.04	93.71	93.46	98.34	94.53	94.45	94.45

Source: Seleka (2003)

The data suggests that the agriculture and food markets in Botswana and South Africa, in particular, are highly integrated. Such integration may be due to the proximity of South Africa, the common membership of the two countries in the Southern Africa Customs Union (SACU): with South Africa being the dominant player, the fact that South Africa is the largest economy in the SADC region, and the existence of cross-border businesses between the two countries (Seleka et. al., 2003). Such integration may have been one of the contributory factors to the stagnant growth of Botswana's agricultural sector, and the inadequate development of vibrant agro-processing industries in Botswana. Thus, while these trends may suggest that Botswana enjoys easy access to cheaper imported food, they also indicate that the country may be faced with fierce cross-border competition.

Table 9 compares Botswana's crop yields with those for South Africa and Zimbabwe to shed light on the relative productivity levels. As seen, farm-level crop productivity appears generally lower in Botswana, compared with South Africa and Zimbabwe. Crop yields in South Africa far outstrip those for Botswana, and the yield-gaps between the two countries are very wide. For example, when considering the average cereal yield for the period from 1961 to 2000, Botswana recorded 307 kg/ha, compared with 1,620 kg/ha for South Africa - implying that the South African yield was over five times that for Botswana. Yield-gaps are also wide for starchy-roots, vegetables and Fruits (Table 9). The situations of pulses and oil-crops are somewhat different: both Botswana and South Africa recorded low yields, although South Africa is still relatively more productive, and yield-gaps are comparatively narrower. Therefore, we can conclude that South Africa's crop agriculture is more productive than its Botswana counterpart, implying that the former is more competitive than the latter.

Table 9: Cross-Border Comparison of Average Crop Yields By Period, 1961 -2000

Crop:	Country	Average Annual Crop Yield				Annual Growth Rate (percent) <sup>†</sup>	
		1961-1970	1970-1980	1980-1990	1990-2000		
Cereals:							
	Botswana	284	406	260	238	307	-1.54 (-2.40) <sup>‡</sup>
	South Africa	1,121	1,588	1,720	2,098	1,620	1.94 (5.60) <sup>+</sup>
	Zimbabwe	981	1,313	1,328	1,230	1,228	0.41 (0.90) <sup>ns</sup>
Pulses:							
	Botswana	603	593	520	503	545	-0.67 (-4.68) <sup>+</sup>
	South Africa	394	627	989	974	646	2.92 (8.81) <sup>+</sup>
	Zimbabwe	576	587	695	719	662	0.82 (6.65) <sup>+</sup>
Oil Crops:							
	Botswana	265	148	172	338	220	0.64 (1.18) <sup>ns</sup>
	South Africa	239	321	296	379	315	1.18 (3.25) <sup>+</sup>
	Zimbabwe	185	204	163	145	167	-1.02 (-2.80) <sup>+</sup>
Starchy Roots:							
	Botswana	4,080	4,801	5,489	6,192	5,261	1.39 (16.68) <sup>+</sup>
	South Africa	7,960	11,830	14,125	20,453	14,070	3.13 (18.29) <sup>+</sup>
	Zimbabwe	3,999	3,981	4,468	4,653	4,415	0.62 (6.90) <sup>+</sup>
Vegetables:							
	Botswana	5,133	5,155	4,547	4,829	4,841	-0.65 (-2.52) <sup>+</sup>
	South Africa	14,815	16,234	16,744	17,008	16,370	0.45 (8.33) <sup>+</sup>
	Zimbabwe	6,608	6,232	6,471	7,181	6,628	0.32 (4.60) <sup>+</sup>
Fruits:							
	Botswana	3,818	4,353	4,617	4,553	4,389	0.56 (6.35) <sup>+</sup>
	South Africa	11,251	11,911	14,937	16,017	13,860	1.28 (17.76) <sup>+</sup>
	Zimbabwe	4,012	4,460	4,926	5,425	4,876	1.02 (29.69) <sup>+</sup>

Source: author computed from FAO (2004). <sup>†</sup>: based on data for the period 1961-2000 - annual growth rates were computed as in Gujarati (1988). <sup>ns</sup>: statistically not different from zero. <sup>+</sup>: statistically significant at 1%; 5% (t-values are reported in parentheses).

South Africa does not only outperform Botswana in terms of the levels of yields at any particular time, but also in terms of growth in yields over time, implying that yield-gaps between the two countries have widened over time (Table 9). Annual growth rates for cereal, pulses, and vegetables yields for Botswana (South Africa) were recorded at -1.5 (1.9), -0.7 (2.9) and -0.7 (0.5) percent, respectively, implying declining yields for Botswana and rising yields for South Africa. While Botswana's oil-crop yield remained stagnant during 1961-2000, South Africa witnessed an annual increase of about 1.2 percent in oil-crop yields, during the same period. Starchy-roots and fruit yields for Botswana portrayed a promising picture: they grew at 1.4 and 0.6 percent per year, respectively. However, these growths were exceeded by their South African counterparts: South Africa's starchy roots and fruits yields grew at annual rates of 3.1 and 1.3 percent, respectively.

A similar, though somewhat different, picture is portrayed when comparing yields for Botswana and Zimbabwe - Zimbabwe is generally more productive than Botswana, although yield-gaps are much narrower than those between Botswana and South Africa (Table 9). When evaluating the period from 1961 to 2000, the average cereal yield for Zimbabwe is 4 times that for Botswana. Moreover, while Zimbabwe witnessed stagnant growth in cereal yields, it outperformed Botswana since the latter experienced declining cereal yields. Even though Zimbabwe is still more productive in vegetables, fruits and pulses, yield-gaps for these crops are much narrower than it is the case for cereals. Oil-crops and Starchy-roots portray a totally different picture: Botswana's average yields and their annual growth rates surpass those for Zimbabwe (Table 9). Therefore, Zimbabwe outperformed Botswana in the yields of cereals, pulses, vegetables and Fruits, but the reverse was true for oil-crops and starchy-roots. Based on the number of crops and the fact that cereals are the major crop-category, it can be concluded that the Zimbabwean crop agriculture is more productive than its Botswana counterpart.

Although there has been some, albeit minimal, success through the expansion of the non-traditional agriculture, such trend was partly attributed to the use of import permits in horticulture, dairy, piggery and poultry. According to the SADC protocol on trade and the renegotiated SACU agreement, of which Botswana is one of the signatories, such quantitative import restrictions are to be eliminated. Current trends suggest that domestic producers in the non-traditional agriculture are not as competitive as their cross-border counterparts. A survey of traders in the horticultural industry indicated that they preferred sourcing their products from South Africa, rather than from domestic sources (Seleka, et al., 2002). They cited consistency/regularity in supply and diversity of products supplied as major reasons for preferring the South African market to local sources. More advanced traders such as retailers, wholesalers and horticultural specialist traders indicated that they sourced produce from the local market only when import permits were not issued. Therefore, the removal of import permits to comply with the provisions of the SADC protocol on trade, the renegotiated SACU agreement and the World Trade Organization (WTO) would present an added threat to the development of Botswana's non-traditional agriculture, both from the standpoint of primary production and agro-processing.

Although the beef sub-sector has been relatively more successful than other agricultural activities, it also faces future challenges for its continued growth. As one of the African, Pacific (ACP) countries, Botswana has since 1975 been afforded preferential treatment in Caribbean and the European Union market. Such preferential treatment, initially made possible through the beef protocol of the Lomé convention and currently continued under the cotton agreement, has allowed for the duty free entry of Botswana's beef, under a tariff quota arrangement, into the EU markets: Botswana's beef has been exempt from EU's *ad valorem* duty levied on her non-ACP competitors in the EU market (Dunlop, 1999). Although Botswana has been the most consistent of the ACP suppliers, in terms of volume and frequency of deliveries, it has not been able to fill its annual quota of 18,916 tons. Due to the implementation of EU's Common Agricultural Policy (CAP), beef prices in the EU market have been higher than world market prices. For example, in 1996 the EU beef price was 50 percent higher than the world market price, implying that Botswana received higher than the world market price for its beef exports to the EU since it was exempt from EU's *ad valorem* duty. This has led to higher beef export earnings than would have been the case in the absence of the preferential treatment afforded to Botswana through the beef protocol.

Two future developments present a threat to the sustenance of Botswana's beef industry. Firstly, there is continued pressure from the World Trade Organization (WTO) for the EU to phase-out its special treatment of ACP countries - since such preferential treatment is incompatible with WTO provisions. Secondly, the EU has been facing pressure from WTO to reform its CAP. Such reforms would erode the benefits afforded to Botswana in the EU market - the price and value of beef exports would be reduced, further leading to a reduction in Botswana's foreign exchange earnings. The EU is now negotiating an Economic Partnership Agreement with ACP countries, individually or as trading blocs. One of the aims is for such negotiations to result in the formation of Free Trade Areas (FTAs) between the EU and ACP countries or regional groupings. Such FTAs would imply that trade between ACP countries and the EU would occur on reciprocal terms, implying that EU products would also be afforded preferential treatment in ACP countries. According to the plan, the current trade arrangements between the EU and Botswana will forgo gradual phasing out during 2008-2020, after which trade between the two parties should be fully WTO-compliant. These trends will lead to further challenges regarding the competitiveness of the country's beef sector.

## **5.6. Research and Development, and Extension<sup>11</sup>**

Agricultural research in Botswana is mainly undertaken under the auspices of the Department of Agricultural Research (DAR), which is one of the five departments of the Ministry of Agriculture. Research at DAR covers three broad areas, crops, livestock and rangelands, which are undertaken in two units: arable research and animal production research (Thirtle, et al., 2000). Research programmes in the arable research unit include cereals, grain legumes, horticulture, oilseeds, production systems, and soil and water

<sup>11</sup>Background information on DAR draws heavily from Thirtle, et al., 2000.

management. In the animal production research unit, research programmes are beef, dairy, feeds, range and pastures, small ruminants, and production systems. Other institutions engaged in agricultural research activities are the National Veterinary Laboratory (NVL) and the Botswana College of Agriculture (BCA). NVL conducts veterinary research, and undertakes disease diagnosis and quality control tests on beef. BCA, an associate institution of the University of Botswana, also undertakes research on primary crops and animals.

Research at DAR is mainly geared at developing on-farm technologies to promote improved farm level productivity, and at promoting the adoption of improved technologies and farming practices. In field crops, research activities have been directed at coming up with recommendations on drought tolerant varieties and improved cultural practices. Horticultural research has mainly emphasized variety evaluation, to identify varieties suitable for summer and winter seasons. Research on soil and water management has entailed the development of soil management techniques, implement design and testing, and fertilizer and herbicide studies. The production systems research entails on-farm testing of technologies to determine their appropriateness to the farmers' technical and socio-economic environments. The Animal Production Research Unit of DAR has mainly been engaged in running cross-breeding programmes between Tswana, Brahman, Tuli, and Simmental breeds. Crossbred bulls from this effort were released to farmers, by the Department of Animal Health and Production (which is responsible for livestock-related extension services), through the bull subsidy programme during 1972 through 1992. Since the termination of the bull subsidy scheme, such bulls have been sold to farmers through auctions.

According to Thirtle et al.(2002), public expenditure in the agricultural sector during the 1973-96 period stood at over 40 percent of Botswana's agricultural GDP, about ten times what is seen in most countries. Expenditure in the livestock sub-sector stood at about 30 percent of the value of output.<sup>12</sup> In crops, public expenditure was found to be slightly higher than the value of output. Such huge expenditures, which were sustained through mineral earnings, were accompanied by stagnant growth in the sector. It generally appears that the rates of technology adoption have been painfully low in both dryland arable agriculture and traditional livestock agriculture, since the majority of farmers, who mainly engage in communal livestock and/or subsistence crop farming, still use traditional methods of farming, characterized by poor management and husbandry practices.

There is, therefore, need to emphasize the promotion of on-farm technology adoption. It is unclear why the farming systems research approach, which was incepted in the 1970s and 1980s, and is currently being undertaken under the auspices of the production systems team of DAR, has not seen real success in transforming agriculture through technology diffusion. It would seem logical that future arable research effort should be directed at introducing new crops, including veld-products, since emphasis on traditional crops has not yielded positive results. Such effort is important since it may promote diversification and growth in arable agriculture. To promote vertical diversification, more effort may have to be placed on agro-processing/ food-technology research. Although a step in this direction has been initiated through the establishment of the National Food Technology Research Centre, there is still need to intensify food technology research activities, to foster the development of viable agro-processing industries in the country.

The ineffectiveness of the extension system to promote technology adoption has frequently been cited as one of the key causes of the slow to declining progress in agriculture. In 1995, the first national conference on agricultural extension was held at the Botswana College of Agriculture to examine the effectiveness of the country's extension system. In particular, the conference examined organizational structure, programme activities and constraints in the extension system (BCA/MOA, 1996). Concerning organizational and management structure, it was resolved that the system was characterized by (1) uncoordinated and fragmented extension services (2) lack of clearly articulated mission statement and (3) lack of equitable

<sup>12</sup>Thirtle, et al., point out that they based their calculation of the value of output on off-take, which understates the value of output in smallholder agriculture.

career progression for extension workers. Factors contributing to ineffective extension delivery included, among others, (1) concentration on administrative work and attending to emergencies, rather than on executing well-planned extension work, (2) uncoordinated extension system at grass-root level, (3) lack of specific extension programmes targeted at specific farmers, (4) low morale of extension workers, and (5) weak research-extension linkages. Similarly, a study in the horticultural industry concluded that the extension system was characterized by lack of defined extension programmes, lack of drive by extension staff to transform farming, and poorly structured lines of responsibility (Seleka, et al., 2002). Such ineffectiveness in extension delivery may have impacted negatively on agricultural growth and diversification. It is also clear that extension advisory services are particularly inadequate in the non-traditional agriculture, which is supposed to be the major source of agricultural diversification. There is, therefore, need for the extension system to be reformed to enable it to respond adequately to current challenges for promoting agricultural growth and diversification.

### **5.7. Credit and Diversification**

Not much work exists on the state of agricultural credit in Botswana. However, inadequate access to operating credit has often been cited as one of the constraints hindering the development of the agricultural sector. It appears that commercial banks are not keen on providing credit to agricultural enterprises. This might imply that lending to agricultural enterprises, particularly small-scale, is associated (if not perceived to be) with high risks. Smallholder farmers have often complained of such lack of access to credit, citing lack of collateral as one of the plausible reasons why banks are not keen to fully engage in agricultural lending. Since in the past the majority of agricultural enterprises, particularly non-traditional, have been established through government funding, the key issue has been inadequate access to operating credit.

## **6. FUTURE RESEARCH DIRECTIONS**

This paper has shown that diversification efforts in the past have been mainly directed at promoting growth in the non-traditional agriculture. Not much effort has been made towards stimulating vertical diversifying in the beef industry. However, this industry has potential as a future source of diversity. Since the industry currently relies on exports of primary products, it seems that future efforts should be redirected at promoting value-addition activities. This will not only promote diversification in the production base, but will also promote export diversification.

Beef by-products such as skins, horns, and bones can be processed to develop a viable agro-processing industry in Botswana. There is, therefore, need to conduct a detailed study of Botswana's beef sector to determine the feasibility of developing small- to medium-scale agro-processing firms in the country, with the view to target the export market. If viable, such industries can promote employment creation and spread the benefits from agro-processing more widely across investors and society.

There is need to also study, in great details, current production and marketing arrangements in Botswana's beef sector, looking at issues of supply response, competitiveness and the implications of future changes in trade policies on the competitiveness of the industry. Issues of sanitary and phyto-sanitary requirements in the export market would require detailed exploration, to determine how they would impact on Botswana's desire to develop value-added beef products for her export market (rather than concentrate on raw beef exports). The role of public policy in stimulating agro-processing in the beef sector needs to be fully examined.

As noted earlier, the failure rate of FAP funded non-traditional agricultural projects has been phenomenal. Therefore, it is important to fully understand the forces underlying this trend, with the view to devise some remedial measures. Since most of the industries within this sub-sector are protected from intensive cross-border competition, through quantitative imports restrictions, it would be in order to determine the impacts of removing such import restrictions on output and on the welfare of the various segments and interest groups in society.

Massive out-migration has also been evidenced from dry-land arable agriculture, where it would be useful to fully understand the socio-economic, farm and household characteristics influencing participation in this sub-sector. One of the testable hypotheses is that those still remaining or participating in this sub-sector have limited economic opportunities outside agriculture due to a number of forces, including socio-economic factors and household characteristics.

New industries such as ostrich farming and cut flower production also deserve further study to determine their viability as potential sources of diversification. Agricultural research efforts should thus shift emphasis towards exploring these new opportunities, since past research emphasis has not yielded much, if any, positive transformation and growth in the sector.

## **7. CONCLUSIONS**

The objective of this paper was to provide background information for in-depth studies on diversification in Botswana's agricultural sector. The paper indicates that agriculture has declined in relative economic importance since independence in 1966. Such decline occurred concurrently with massive public support to the sector, meant to promote, among others, income generation, employment creation and economic diversification.

In the absence of a formal treatment of agricultural diversification, it is currently unclear as to whether diversification efforts have yielded much, if any, fruition. What is clear is that sectoral transformation, or at best the reversal of the declining trend in the sector's performance, has not been evidenced as a result of such effort. Although this is the case, it appears that some, albeit minimal, success was evidenced in the country's non-traditional agriculture. However, the paper argues that there is need to shift emphasis towards promoting the development of agro-processing, rather than concentrate solely on primary production. Research efforts may also have to be diversified into exploring options for value-addition and new commodities, to promote the development of technologies that would transform the sector and improve its contribution towards the growth of the manufacturing sector. In light of the foregoing, a good starting point for research work would be the beef sector, which has not seen real progress in the development of value-addition activities. The paper further underscores the importance of studying socio-economic, farm and household characteristics that have contributed to out-migration from both dry-land arable agriculture and non-traditional agriculture.

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