

CHAPTER 10

AGRICULTURE

INTRODUCTION

10.1 Despite its comparatively low contribution to GDP, the Agricultural sector remains an important source of food and provides income, employment and investment opportunities for the majority of the population in rural areas. The agricultural sector is also important for providing linkages in the economy with upstream and downstream industries. It is the supplier of raw materials for agro-based industries such as meat processing, tanning, milling, oil, soap, brewing, furniture manufacturing and industries that supply agricultural inputs, both of which have a potential to create more jobs, when the agricultural sector grows.

10.2 The main challenges facing the Ministry of Agriculture in pursuit of Vision 2016 and its Strategic Plan is to make agriculture productive, profitable and sustainable in order to contribute effectively to economic development, poverty alleviation, food security, improvement of the quality of life and the sustainable utilization of natural resources. In order to enhance productivity and performance of the agricultural sector new policies, programmes and strategies have been formulated to overcome or reduce the effects of these constraints. These include the fencing component of the 1991 Agricultural Policy, and the National Food Strategy. Other programmes and strategies soon to be implemented include the National Master Plan for Arable Agriculture and Dairy Development (NAMPAADD), gazettement of agricultural land, provision of infrastructure, and the review of agricultural subsidies. Diversification into ostrich farming and

commercialization are some of the initiatives that Government has taken to increase agricultural output. Increased agricultural output is likely to enhance export earning and create more jobs.

REVIEW OF PERFORMANCE DURING NDP 8

10.3 During NDP 8, the policy objectives of the national agricultural sector were:

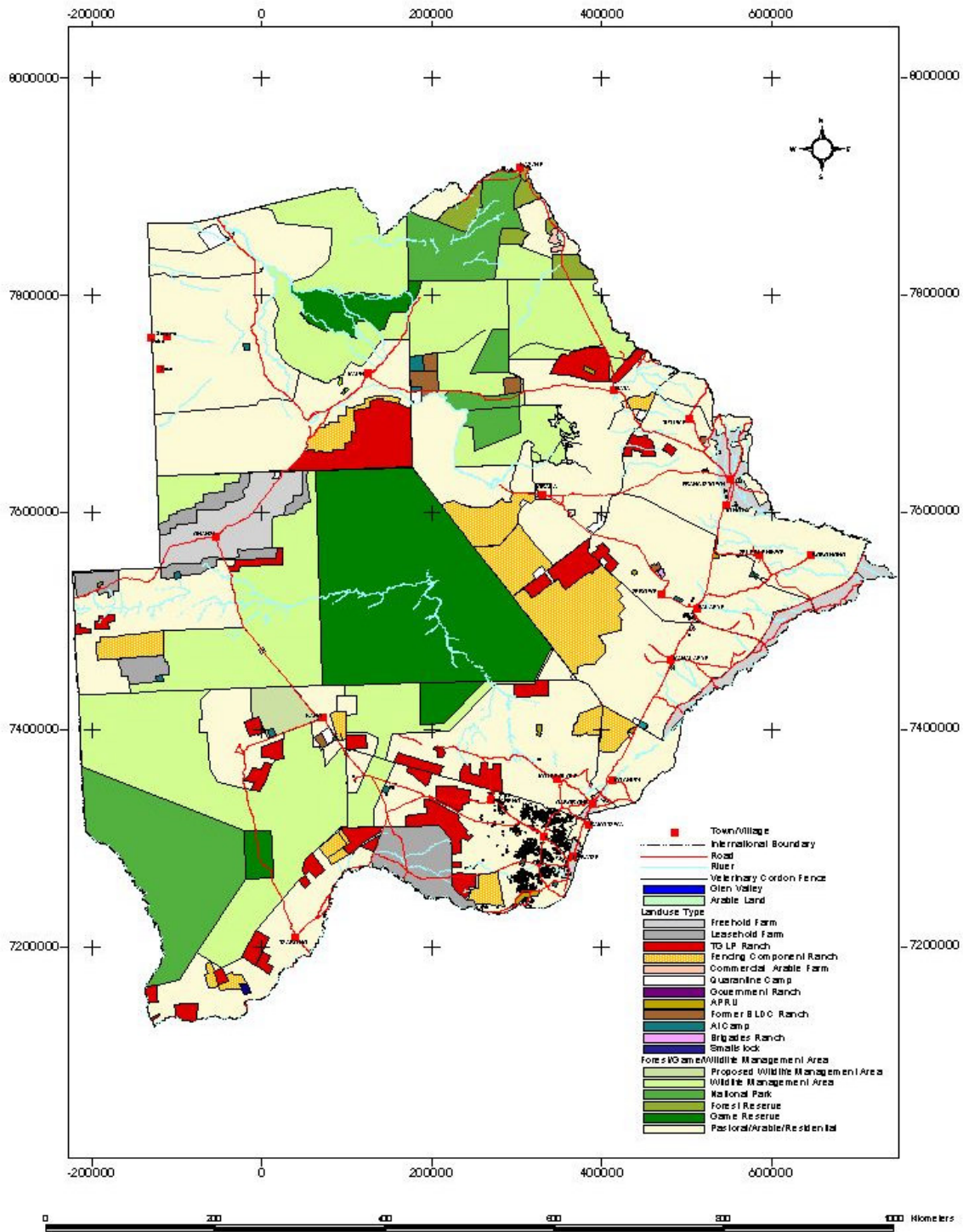
- Improvement in food security at the household and national levels;
- Diversification of the agricultural production base;
- Increased agricultural output and productivity;
- Increased employment opportunities for the fast growing labour force;
- Provision of secure and productive environment for agricultural producers; and,
- Conservation of scarce agricultural and land resources for future generations.

10.4 In order to achieve these policy objectives, the Ministry was guided by the following broad strategies:

- Provision of assistance for both livestock, arable farmers and cooperative members;
- Provision of physical infrastructure e.g. roads, marketing facilities, power, communication facilities etc. in major production areas;

Map 10.1

AGRICULTURAL LANDUSE MAP



Draft as at beginning of NDP 9

Designed & Printed by: Factors Survey & Cartography Services
 Division of Land Utilisation
 Ministry of Agriculture

Source: Department of Survey and Mapping

- Technology development and dissemination/transfer;
- Human resource development and management;
- Strengthening of extension service;
- Agricultural resources conservation;
- International Cooperation [Southern Africa Customs Union (SACU), Southern Africa Development Community (SADC) Trade Protocol, Agreement on Agriculture of the World Trade Organisation (AoA of the WTO)];
- Diversification of the production base
- Policy development, coordination, monitoring and evaluation;
- Implementation of Public Service Reforms;
- Information systems development.

10.5 During the National Development Plan 8 period, the agricultural sector's performance declined, as a share of GDP between 1997/98 and 1999/2000

(Table10.1). Average annual growth of the agricultural sector also fell during the same period, mainly due to endemic drought, unfavourable agricultural conditions (poor soils, low rainfall, insufficient infrastructure, diseases and pest outbreaks, poor farming practices, low adoption of technologies to enhance productivity, lack of security of tenure, poor organization of markets for domestic produce), conflict of government policies, (e.g. drought relief programmes during the ploughing season; Dual Grazing Rights; Agricultural Districts vs Administrative District boundaries), high input costs, inaccessible credit for agriculture and consequent inability of the sector to attract able-bodied labour and innovative entrepreneurs who could improve productivity. The sector nevertheless remains an important economic activity because of its strong linkages with urban and rural households, agro-processing, manufacturing and foreign trade.

Table 10.1: Agricultural Contribution to the Economy

<i>Sector Contribution to Total GDP</i>	1997/98	1998/99	1999/00
Nominal GDP (P Million)	20,162.6	21,523.7	25,362.7
<i>Contribution in percentage</i>			
Agriculture	3.4	3.0	2.6
Mining	38.0	31.1	33.1
Other	58.6	65.9	64.3
<i>Annual Average Growth (%)</i>			
Total GDP (1993/94 prices)	8.1	4.1	8.1
Agriculture	5.9	0.9	0.9
Mining	9.5	1.0	12.1
Other	8.4	8.4	7.1

Source: Adapted from 2001 Republic of Botswana, Annual Economic Report

Review of implementation of stated Policy Objectives

Food Security

10.6 During NDP 8 food security at the national level was met through domestic production and imports. Domestic

production of staple cereals, which provided fifty percent of energy equivalents, met only about 10% of the national cereal requirements and the balance was met through imports. Recurring droughts and low productivity of the dominant subsistence farming sector contributed to low production and cereal deficits as indicated in Table 10.2.

Table 10.2: Annual Cereal Balance Sheet during NDP 8

Year	Maize/ sorghum (' 000 metric tons)		
	Requirements	Gross Harvests	Deficit
1997/98	230.5	28.4	-202.1
1998/99	214.5	10.2	-204.3
1999/00	218.9	18.7	-200.2
2000/01	209.0	20.7	-188.3
2001/02	181.0	11.2	-169.8

Source: Botswana National Early Warning Unit, 1997/98 2001/02

10.7 It is important to note that during periods of cereal deficit, the prices of basic staples escalate, making these unaffordable to the poorer section of the population, thereby posing a threat to food security. As a result, Government has had to mount programmes, such as public works, as a short-term measure in order to reduce the effects of drought on the population, especially in rural areas, where most of the people directly depend on agriculture for food and employment.

10.8 In the long term, Government has had to support the development and

rehabilitation of the commercial cereal production sector in order to improve its contribution to food security. The contribution of Pandamatenga commercial farmers to domestic cereal (maize/sorghum) production ranged from 9.5% to 92.5% during the Plan period (Table 10.3). The decline at the beginning of the plan period was due to a shift from cereals to sunflower and cotton, largely due to favourable South African market for these commodities. However, towards the end of the plan period, the trend was reversed towards producing more sorghum in response to improved producer prices within the country.

Table 10.3: Annual Total National Production of Maize/Sorghum (' 000 MT)

Year	National Production	Pandamatenga Commercial Farm Production	Proportion of Output from Pandamatenga Commercial Farms
1997/98	28.4	2.7	9.5
1998/99	10.2	4.1	40.2
1999/00	18.7	17.3	92.5
2000/01	20.7	8.0	38.6
2001/02	11.2	--	--

Source: Adapted from Botswana National Early Warning Unit, 1997/98-2002/02.

10.9 The intake of proteins and other dietary requirements is also an important factor in food security, particularly because of the changes already evident in consumption patterns. The livestock and the horticultural sub-sectors are therefore becoming increasingly important contributors to food security. Botswana meets all her domestic requirements and is a net exporter of beef. The poultry sector has recorded remarkable growth during NDP 8, and this has not only resulted in Botswana being almost self sufficient in poultry products, but the per capita consumption of chicken meat has increased from 10.9 kg in 1999 to 16.1 kg in 2000.

Diversification

10.10 Agricultural diversification was pursued on a narrow range of products and resource uses. Import statistics indicate a high potential for diversification into horticulture, oilseeds and dairy products. The broadening of agricultural production through new enterprises has been further improved with the introduction and promotion of ostrich farming. At the beginning of the Plan period there was one major ostrich farmer with 200 breeding birds, and by the end of the Plan there were 34 small-scale farmers holding between 2 to 20 pairs of breeding birds and two major

farmers with over 200 breeding birds. An ostrich abattoir was constructed to support the development of the industry.

Agricultural output and productivity

10.11 The crop sub-sector is dominated by the traditional production system in terms of area cultivated and the cultivation of cereal crops, mainly sorghum. The commercial sector on the other hand, specialises in high value crops such as vegetables, fruits, sunflower, cotton and others.

10.12 The performance of arable agriculture during NDP 8 did not improve. Total annual domestic production of major cereals was on average 17,840 metric tons against an average annual requirement of 210,750 metric tons, thus meeting about 10% of the national cereal requirements (Table 10.2). The county therefore continued to be a net importer of food grains.

10.13 Horticulture was identified in NDP 8 as a priority area for diversifying the agricultural production base, with a potential to increase agricultural production improvements and employment creation. Recent studies by Tahal (2000) estimate that current horticultural production accounts for 15-20 percent and 24 percent of the national demand for vegetables and fruits, respectively. The average yields for

horticultural crops remained at 20 tons/ha during the plan period, although the potential yields are estimated at 50-80 tons/ha. This is primarily due to low technology adoption and poor management in addition to other constraints. It is estimated that local production accounts for only 20% of the national demand and imports meet the remaining 80%.

10.14 In order to encourage domestic production of horticultural products, two wholesale markets were to be constructed in Francistown and Palapye. Due to the escalation of costs only the Francistown market was completed. The Palapye market and additional ones at Mahalapye and Sherwood are to be constructed during NDP9.

Livestock Production

10.15 As part of the diversification of livestock production the following has been achieved;

- An export abattoir for ostriches and other animals has been built at Sebele.
- There are about 103 pig farmers in the country.

10.16 Other opportunities in agriculture exist in game farming, veld products harvesting and processing and adoption of new technologies such as biotechnology.

10.17 Significant achievements towards diversification were made in the livestock sub-sector during the plan period. Hides and skins production increased substantially; and milk production rose two-fold from the 1997 level to 6.0 million litres in 2001 due to availability of Financial Assistance Policy (FAP) financing (Table 10.4)

10.18 Hides and skins production has also increased over the Plan period. Skin collections rose from 133 682 in 1997 to 167 214 in 2001, representing an increase of 25.1% in five years. This is one area that created most employment and secondary leather industries in the rural areas.

10.19 In order to improve dairy productivity, Government established a dairy herd multiplication facility for sale of pregnant heifers and bullocks to farmers to make quality dairy animals affordable to farmers. The available breeds are Friesian, Brown Swiss and Jerseys. As shown in Table 10.4 the dairy herd increased substantially since the beginning of NDP 8. Some of these were financed through FAP.

Table 10.4: National Dairy Herd Survey

Year	Diary herd	Milking Cows	Litres/Yr (000,000)
1997	2,629	1,414	3.0
1998	3,021	1,572	3.8
1999	2,673	1,384	3.5
2000	2,919	1,458	3.8
2001	3,936	2,552	6.0

Source: Division of Animal Production, 2001

10.20 Productivity indicators for cattle showed a marked improvement (Table 10.5). Off-take under the traditional production system increased from 8% to 10%, while mortality rates decreased from 15% to 12%. Calving rates only increased marginally to 50% in the traditional sub-sector. However, in the commercial sub-sector where *on-farm artificial insemination* is practiced, conception rates had increased from 60% to 80%, implying calving rates were higher.

10.21 Botswana's export beef markets in the European Union require high standards of disease control to be met in order to ensure market access. Through a system of cordon fences and strict animal

movement control measures, 80% of Botswana is now classified by the international animal health organization, Office International des Epizooties (OIE) FMD-free without vaccinations. Despite the recent outbreak of FMD in the Matsiloje and Matopi areas near Francistown in February 2002, and January 2003, respectively, Botswana has generally maintained FMD-free status since the 1980s. Throughout the Plan period, the Ministry of Agriculture focused on prevention and vigilant control of animal diseases of economic importance to the country including FMD. These included the construction of a 646 km double electric cordon fence at Ngamiland and Bobirwa/Zimbabwe border fence to control diseases.

10.22 With respect to *Bovine Spongiform Encephalopathy (BSE)*, Botswana has earned a geographical BSE risk level I. This classification confirms the unlikelihood of domestic cattle being infected with the BSE agent. Such a qualification demonstrates confidence in Botswana's strategies in controlling trans-boundary diseases and border controls that are expeditiously implemented once such diseases are reported. This classification also ensures international market access for Botswana beef.

10.23 Since the year 2000, the Ministry has been implementing the *Livestock Identification and Trace-back System (LITS)*. The LITS programme has entailed identification of individual animals by reticular bolus in accordance with the latest beef export market requirements of the European Union (EU). The LITS has also improved cattle data collection within the country using a computerized system.

10.24 In the livestock sub sector, marketing facilities were constructed at

strategic production locations throughout the country and the distribution of these facilities has led to increased cattle off-take from the communal areas. The Botswana Meat Commission (BMC) plant in Francistown operated at 89% capacity utilization in 2001 as compared to 65% in 2000. The BMC also responded to current eating habits or preferences by selling lean meat, which has a long shelf life. The fact that the Botswana beef is raised on rangelands free of chemical treatment gave it a competitive edge in world markets.

10.25 In the poultry sub-sector, 98% self-sufficiency in eggs and meat requirements was achieved during the plan period (Chart 10.1). It is estimated that 300 000 layers were kept in 2000, while 21.5 million broiler chickens were slaughtered. The per capita consumption of chicken meat increased from 10.9 kg in 1999 to 16.1 kg in 2000. Despite an impressive performance of the poultry sub-sector, inputs such as feed and day-old chicks are still imported.

10.26 The national small stock (sheep and goats) population was estimated at 2.5 million in 1998 mostly raised under the traditional subsistence farming system. A total of 470 small-scale commercial producers benefited from the Financial Assistance Policy programme with a total of about 47,000 small stock.

10.27 The performance of small-stock (sheep and goats) was however not satisfactory since the kidding and off-take rates remained respectively, at 100% and 8% against targets of 150% and 15%. The mortality rate of small-stock worsened from 30% at the beginning of the plan period to 36% as compared to the 15% target for NDP 8.

Table 10.5: Livestock Productivity Indicators

	Cattle No.	Calving	Mortality	Offtake	CDM	Measles	Reliable Supply
Traditional Sector	86%	50%	12%	10%	200kg	15%	-
Freehold Sector	14%	60-70%+	5%	17%	220kg	-15%	60%+

Source: Department of Animal Health and Production

10.28 Despite the recurrence of drought and outbreaks of tsetse-fly and nagana, the livestock sub-sector proved to be resilient, thus sustaining rural livelihoods and ensuring food security. In this regard, the livestock population remained stable

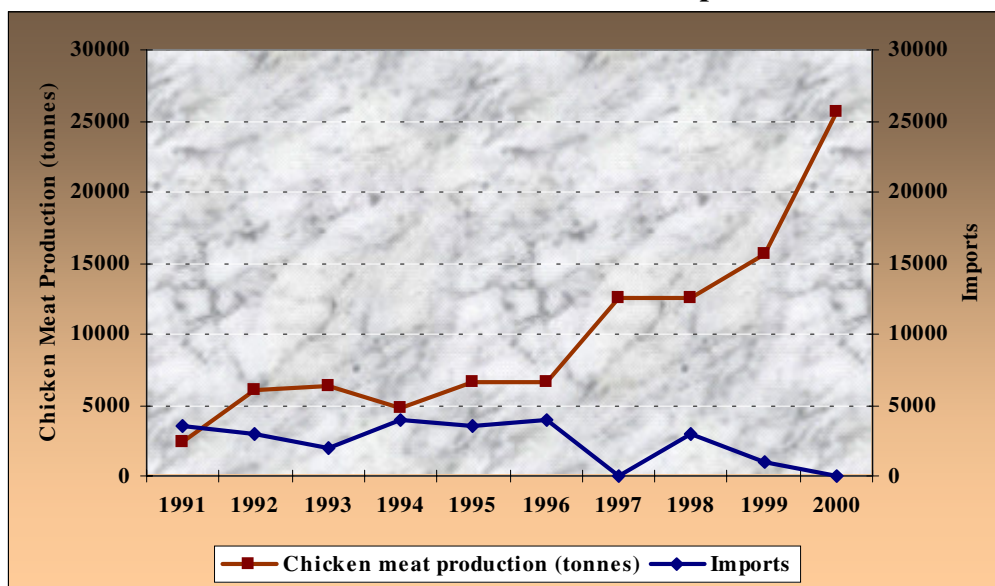
during the NDP 8 period (Table 10.6). Most recent veterinary counts in 2001 have shown that the livestock sector population has risen, comprising 2.5 million cattle, 2.5 million sheep and goats, 250,000 donkeys, 30,000 horses and 170 camels

Table 10.6: Livestock Population

Year	Population ('000)		
	Cattle	Goats	Sheep
1993	1,821	1,838	250
1994	n.a.	n.a.	n.a.
1995	2,530	2,622	337
1996	2,249	2,205	349
1997	2,212	2,615	409
1998	2,345	2,199	393

Source: Agricultural Statistics Unit, 1993-1998

Chart 10.1: Local Chicken Meat Production and Imports



Source: Division of Animal Production Reports 1997-2000

10.29 *Cooperatives* have also expanded business beyond consumer societies' activities to include institutional savings, credit and production activities. The registration of 7 new societies increased total savings from P38.6 million to P80 million, whilst credit to members increased from P37 to P79 million.

10.30 Government continued to enhance productive capacity of farmers and cooperative members through pooling of resources and provision of education and extension for marketing and production as well as retail businesses through Cooperatives.

Secure and Productive Environment

10.31 During NDP 8, Government continued to provide a secure and enabling environment for agricultural development, through research, training, extension and the provision of infrastructure, trek routes and essential services such as the control of diseases and migratory pests and access to credit. Due to heavy rains during the

1999/2000 seasons, the Okavango Delta associated flood plain of the Kwando/Linyanti river system were rendered inaccessible for purposes of controlling the Tsetse-fly, which resulted in the resurgence of the Tsetse infestation.

10.32 Pest management has the objective of maximizing the returns to farmers. Control of migratory pests such as *Quelea* birds, locust and army-worm continued to be the responsibility of government, whilst farmers were responsible for the control of non-migrant pests such as corn cricket, rats, aphids and others. Government promoted integrated pest management because of its potential benefits and affordability by the farming community. Agro-chemical legislation was enacted and stocks of obsolete pesticides, which had accumulated over the years, were repackaged and disposed.

10.33 The Botswana Vaccine Institute (BVI) produced and sold six types of vaccines, namely, Foot and Mouth Disease (FMD), Rinderpest, Contagious Bovine

Pleuro-Pneumonia.(CBPP), Pestes des Petit Ruminant (PPR), Anthrax and Blackleg. Botswana, Namibia and Zimbabwe accounted for 85 percent of FMD sales and the rest were sold in international markets. The availability of these vaccines has protected the national herd against diseases.

Conservation of Natural Agricultural Resources

10.34 The forests and woodlands of the country represent an important natural resource in terms of providing the majority of the rural population with a wide range of benefits entailing supply of wood for energy, construction, building and crafts; the supply of non-wood forest products such as honey, bee-wax, fruits, medicine; fodder and habitat for wildlife and livestock, and maintaining the environmental balance. However, these resources have lately come under severe pressure from over-exploitation and other natural phenomena such as drought and fire. The biggest challenge is to foster sustainable utilisation of these resources to ensure a continuous flow of goods and services from these forests without irreversibly damaging their capacity to recover.

10.35 Lack of an embracing legislation and policy to ensure sustainable utilisation of natural forest resources has been identified as a major problem. In this regard, a new National Forest Policy providing an enabling framework for achieving conservation, sustainable management and development of forestry has been initiated.

10.36 During the Plan period, emphasis was placed on capacity building and a limited land rehabilitation program. A National Action Program (NAP) for Botswana, which is a framework to Combat Desertification, was produced under United Nations

Convention to Combat Desertification (UNCCD).

10.37 A National Tree Seed Centre was established to collect and propagate indigenous tree species. In addition, more than 770km of firebreaks were constructed in the six forest reserves. Furthermore, two forest camps were established, and three fire towers were mounted.

10.38 Land Resources Inventory and Monitoring Programme was established and the national rangeland inventory and monitoring capacity to produce district-based land use maps was strengthened. At the end of the Plan, the project had achieved about 60% of the targets, priority having been given to ranch demarcations and development of methodologies for range inventory and monitoring, which were required for the implementation of fencing programme of the 1991 National Policy for Agricultural Development.

10.39 Water resources development for agricultural purposes is carried out as a joint venture between Government and individual farmers by way of drilling boreholes and construction of small dams for livestock watering and irrigation. There is high potential for the development of the aquaculture sub-sector using the available water resources. Already, the existing dams and rivers play an important role in the production of fish. The Glen Valley irrigation scheme, using treated effluent has also been designed and is about to be constructed.

10.40 The Ministry, jointly with the Food and Agricultural Organization of the United Nations (FAO), has developed a regional farm animal genetic project whose aim is to encourage conservation of native breeds.

Characterisation of indigenous small stock and poultry has been completed.

Technology Development

10.41 Production-enhancing and labour-saving technologies were released to match the varied agro-climatic regions and customers. Following extensive countrywide testing for yield stability and desirable qualities, three groundnuts, one mung-bean, three sorghums, two millet varieties were released, in addition to one sorghum hybrid. Furthermore, eight cabbage, five tomato, and four sweet potato varieties were released. A Field Crops Handbook was released to provide pertinent information that is site specific on crop production methods, pest and disease control recommendations to farmers and extension staff.

10.42 Control methods for such problem weeds as *Cynodon dactylon*, have been released and proved effective in reclaiming land. The method involves double ploughing techniques.

10.43 In order to promote horticultural production, irrigation production efficiencies for vegetables were developed in Maun. The drip irrigation method coupled with 80% evaporation replenishment was profitable for rape, cabbage, broccoli and carrots. Irrigation water would be allocated within and between crops for optimum returns. (Table 10.7).

Table 10.7: Yield and Net Returns per ha of high value vegetables at Maun

	Ton/ha	Net Return
Rape	61.8	81,200
Cabbage	97.2	71,900
Broccoli	19.1	71,600
Carrot	58.9	59,400

Source: Department of Agricultural Research 2000

10.44 Dairy research established a cross breeding program that generates the necessary information on the performance of the dairy crosses (crosses of Simmental, Jersey, Friesian, Dairy Swiss) for increased milk production for small-scale farmers. A new composite beef breed, a cross between the indigenous and exotic breeds was developed in order to increase growth rate and carcass yield.

Cooperative Development

10.45 The major thrust of the Cooperative sub sector was to promote domestic savings for re-investment in agricultural activities. Cooperatives have diversified business activities to include marketing of member livestock and crop commodities, provision of livestock and crop inputs, savings and credit as well as production of agricultural commodities such as horticultural and poultry products. The Botswana Agricultural Marketing Cooperative Union (BAMCU) share of the BMC throughput dropped from 18% to 14%, mainly due to stiff competition from private cattle agencies.

Pricing

10.46 The import parity pricing policy was continued in determining the prices of grain crops. Prices for livestock and products continued to be determined by lucrative export markets.

Subsidies

10.47 Agricultural subsidies are a common feature of the agricultural sectors of most of the developed and developing world. Government continued to support the agricultural sector through subsidy schemes such as the Arable Land Development Programme (ALDEP), Services to Livestock Owners in Communal Areas (SLOCA), Livestock Water Development Project

(LWDP), and Emergency Plant Protection (Drought Relief). However, most of these subsidies were inadequately targeted and therefore had limited impact on poverty reduction and food security. During NDP 8, the Ministry of Agriculture recognized the need to review the major agricultural subsidy schemes in order to assess their relevance, effectiveness, efficiency and sustainability, the extent to which they contribute to economic growth and poverty reduction.

Human Resources Development and Extension Service

10.48 A major extension effort was put in the implementation of support programmes such as ALDEP and FAP. During the plan period, a total of 35,187 of ALDEP packages were established. In addition 78 ALDEP demonstration farms were established to foster technology adoption by ALDEP beneficiaries.

10.49 In addressing the problem of poor performance of the sector, the Ministry undertook a consultancy on the skills development and career paths of its staff. This consultancy revealed that 71% of total establishment of 8,947 in year 2001/02 was made up of unskilled and semi-skilled staff. This staff complement comprised mainly industrial class employees, normally classified as General and Field staff. The administrative and secretarial staff comprises 4%, while the remainder or 25% is management, professional, technical staff and artisans.

10.50 The consultancy study also revealed that current farmer to frontline extension agent ratio in the arable sub-sector is 1:378 as against the optimum 1:250, implying that the Ministry may well be inadequately staffed at the frontline extension worker level. This means that

staffing is unlikely to adequately meet farmer expectations for technical assistance in the future. The consultancy recommended amongst others, that the training of staff be linked to the technical assistance and information transfer needs such as agribusiness skills for diverse, segmented and clearly defined target groups.

10.51 In the livestock sub-sector the Ministry uses a ratio of one extension agent to a cattle herd. Current ratio is 1:7,650 cattle as against the optimal 1: 6,000 head of cattle, implying that the ability of the Ministry staff to provide technical assistance and support to the livestock sector may be inadequate.

10.52 Given the foregoing, there is clearly an obvious information asymmetry in the composition of manpower in the Ministry of Agriculture, in terms of higher numbers of unskilled and semi-skilled labour relative to skilled manpower that warrants redress. In carrying out this exercise, emphasis will increasingly reflect government policy on manpower growths in the medium – term.

10.53 The BCA has reviewed the college curricula in order to effectively address the needs of its customers and has thus, added two Diploma Programmes in Horticulture, and Forestry and Range. Student Enrolment has risen from 430 in 1997/98 to 800 in 2002/2003.

10.54 A major constraint in Human Resource Development and Management has been the HIV/AIDS epidemic. The Ministry ensured measures were put in place for HIV/AIDS Awareness and the training of peer educators and counsellors. To drive these programmes, workplace committees were established, workplace programmes drawn up, including the appointment of an HIV/AIDS coordinator.

National Master Plan for Arable Agriculture and Dairy Development (NAMPAADD)

10.55 During NDP 8, the Ministry commissioned a Consultancy (TAHAL) to carry out a National Master Plan for Arable Agriculture and Dairy Development based on a comprehensive analysis of the country's natural and agricultural resource, rural infrastructure, dairy, socio-economic environmental issues. The implementation of NAMPAADD will bring about positive developments in the agricultural sector and improve the sector's contribution to food security and rural development. The main thrust of the National Master plan for Arable Agriculture and Dairy Development is to provide an opportunity for addressing some of the issues that arose from the change in policy focus i.e., from self-sufficiency to food security at national and household levels. The objective of the Master Plan was "to improve that performance and ensure sustainable use of the country's natural resources".

AGRICULTURAL POLICY AND STRATEGY FOR NDP 9

10.56 Government will continue to facilitate the process of agricultural development through research, training, extension, the provision of infrastructure, and access to credit. In addition, privatisation and hiving off of certain activities and services, which can be carried out more efficiently by the private sector, will be pursued. Production and marketing functions will remain the responsibility of the farmer and private sector, while government creates an enabling environment. Prices will continue to be left to market forces.

10.57 Botswana is a signatory to a number of regional and international trade agreements such as the re-negotiated Southern African Customs Union Agreement, the SADC Trade Protocol, the Cotonou Agreement and the Agreement on Agriculture of the World Trade Organization. The country is obliged to comply with the provisions of these trade agreements, which could have an effect on both production and trade. The country also has to meet the requirements of environmental agreements under Agenda 21 of the United Nations Conference on the Environment and Development (UNCED 1992), including the Convention on Biological Diversity (CBD) and the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES).

10.58 Based on the lessons learnt from NDP 8, the country's natural resource endowment and the prevailing agro-climatic environment, the main focus of NDP 9 strategies will revolve around development and adoption of appropriate agricultural technology, conservation of agricultural land resources, development of drought management schemes, mechanization and commercialisation of agricultural operations, disease control, farmer education as well as timely provision of agribusiness information. Effective and successful implementation of these strategies will require a strong extension delivery system and a strong policy framework. A lot of emphasis will therefore be placed on strengthening the extension system and policy analysis. The Ministry will also continue to collaborate with other ministries in implementing other national policies and programmes such as the Poverty Reduction Strategy.

Policy Statement

10.59 The policy objectives of the National Agricultural Policy will be pursued during NDP 9. These policy objectives are as follows:

- Improvement in food security at the household and national levels; emphasis will be laid on household food security;
- Diversification of the agricultural production base (e.g. pulses, dairy, poultry, piggyery, forestry beekeeping ostrich farming and veld products);
- Increased agricultural output and productivity. This will ensure the long-term viability of the agricultural sector and its competitiveness in both the domestic and international markets. Increases in agricultural productivity will also assist to meet the needs of the fast growing population;
- Increased employment opportunities for the fast growing labour force. The emphasis on diversification of the sector accompanied by improvement in productivity has the potential to provide employment opportunities derived directly from agricultural production and its linkage effects;
- Provision of secure and productive environment for agricultural producers;
- Conservation of scarce agricultural and land resources for future generations. This objective is consistent with the broader Agricultural Strategy for developing

the agricultural economy, while conserving its natural resources.

10.60 To drive the policy objectives, the Ministry has adopted both broad and specific strategies. Specific Strategies will be discussed under the different Sub-sectors. Broad strategies include: Infrastructure, diversification, National Master-Plan on Arable Agriculture and Dairy Development (NAMPAADD), credit, subsidies, pricing, cost recovery measures and human resources strategies. In addition, a strategic plan has been developed with the Ministry's vision, mission and values. These will help the Ministry to refocus its efforts in attaining sustainable agricultural development during NDP 9 in line with Vision 2016.

Productivity

10.61 There has been a growing concern about the continued decline of productivity in the Agricultural Sector. In recognition of this, a Strategic Plan has been developed to refocus the Ministry's direction to ensure the sector's viability and competitiveness globally. To this end, Vision, Mission and Values have been developed in line with Vision 2016. The Ministry *Vision is: "provision of dynamic leadership in the development of sustainable, diversified agriculture and conservation of natural resources". The vision* recognizes the Ministry's pivotal role in contributing to the achievement of food security, poverty alleviation, and sustainable utilization of natural resources.

10.62 The Strategic Plan also ensures that fundamental changes are introduced in service delivery as well as inculcating desirable behavioural practices in staff in order to perform productively and competitively. To operationalise this, six Key Result Areas have been developed with

which the Ministry's success/failure will be judged.

10.63 Furthermore, strategic goals and objectives have been developed which are resident in each Key Result Area. To achieve these, relevant strategies have been put in place to drive the strategic goals and finally lead to the attainment of our vision.

Arable Agriculture

10.64 NAMPAADD seeks to improve the performance of the agricultural sector, by modernising it through the introduction of improved technologies, efficient use and management of human, land and water resources, mechanization and commercialisation of agricultural operations. The plan focuses on three sub-sectors of agriculture, viz., rain-fed, irrigated and dairy farming.

10.65 Performance of the rainfed agricultural sub-sector under NAMPAADD would be improved by adopting the following strategies:

- Accurate maps showing the location and lands suitable for rainfed farming in the target districts will be prepared as the first step in the implementation of NAMPAADD.
- Targeting of fulltime dedicated and committed traditional farmers, many of whom may be women, who aspire to progress to commercial level through mechanized and modern farming systems. The programme will also assist commercial farmers to upgrade technology and management levels.
- Group formation, taking into consideration gender issues, will be initiated in production zones. The Ministry of Agriculture will publicize

the advantages and benefits of forming cultivation groups, provide training and guidance on group formation, crop husbandry practices, cropping plans and the use and the sharing of farm machinery.

- Agricultural Service Centres will be established and located within production areas to serve several cultivation units by providing farming inputs, mechanized cultivation and harvesting services, machinery, advisory services, etc.
- Pilot Agricultural Services Centres will initially be set up and managed by Government, but will subsequently be acquired or leased and operated by the private entrepreneurs or farmers associations once their viability is proven.
- Government will establish pilot farms in production areas to demonstrate new technologies to facilitate quick adoption by farmers.

Irrigated Agriculture

10.66 The horticultural sub-sector is fragmented, comprising of numerous small-scale farms, mostly of one (1) hectare or less, mainly because of low borehole yields. This tends to deny growers the potential economies of scale, including the possibility of dealing with market fluctuations, and post harvest and transportation costs. Performance of irrigated agriculture will be improved through the following strategies:

- Horticultural Officers will be strategically placed near production clusters to provide dedicated technical advice to farmers within the cluster.
- Demonstration of new technologies to facilitate quick adoption by farmers and assist in the packaging

and marketing of produce for the smaller satellite farms.

- In order to enhance coordinated production of the four (4) main crops (Cabbage, potatoes, tomatoes and onions), producers and their associations will be assisted to develop cropping and marketing plans.

Dairy Farming

10.67 The following strategies are to be adopted for dairy development to improve productivity:

- The Ministry of Agriculture will establish a modernized and suitably equipped dairy farm to demonstrate methods of operating and managing an advanced dairy enterprise.
- Milk quality test laboratories and veterinary services will be established in production areas and will be increased in line with the expansion of the dairy herd and milk production.
- Ministry of Agriculture will prepare a catalogue of suppliers of quality dairy animals to help investors to procure quality dairy stock.
- Development of treated wastewater irrigation schemes for fodder production.

Agricultural Insurance and Credit

10.68 In order to minimize farmer risks resulting from annual and seasonal climatic variability and from other natural disasters as well as facilitate investments in agriculture, an insurance fund will be established to cover crop or milk production losses during such emergencies. Thus, affected regions would be eligible for compensation on a selective basis. The proposed crop-loss

insurance would be offered to farmers only in areas where the mean annual yield is economically viable.

10.69 Insufficient credit facilities are one of the major constraints facing farmers. The National Development Bank (NDB) has not adequately addressed credit needs of farmers. In order to facilitate adoption of sustainable technologies as well as implement natural resource conservation practices, access to credit will increasingly become necessary. Efforts will be made through NAMPAADD to improve access to credit through specialised agricultural credit institutions, which can provide short to long-term credits for farm inputs to poor farmers engaged in agriculture. These credit institutions will recognize loan securities of agricultural nature e.g. cattle, land etc. In addition these institutions will be required to periodically align loan repayment schedules to coincide with the revenue flows of specific agricultural enterprises.

Diversification

10.70 The emphasis for agricultural development during NDP 9 will be on sustainable agricultural diversification. Substantial benefits will be realised through diversifying agricultural products, product development, use of natural resources, creation of markets and through use of improved technologies of agricultural production. More resources will continue to be devoted to the development of dairy, poultry, piggery, fisheries, ostrich farming, horticulture, forestry, beekeeping, veld products and hides and skins in order to create employment and income generating opportunities.

10.71 Policies will be developed to promote competition in both the domestic and international markets within the

framework of existing trade agreements. Agro-businesses will be promoted in collaboration with the Ministry of Trade and Industry and other relevant organizations. Examples include leather, oilseeds, milk and other dairy products, and cotton ginneries.

10.72 The export for beef is well established. However, as international trends towards free trade continue, prices for beef within European Union (EU) market will inevitably fall. Contingency planning for diversifying Botswana's export beef markets is therefore essential. Similarly, export markets for small-stock and poultry will be explored, as there is a need to diversify markets for as well as improve efficiency and competitiveness in the production of these commodities.

Subsidies

10.73 To enhance agricultural production, subsidies would be targeted to those beneficiaries who can use them efficiently, including women, in order to access improved seeds, commercial fertilizers and pesticides. Efficient programming, monitoring and evaluation of subsidies can be used to achieve socio-economic growth, development and technology adoption.

Agricultural Commodity Pricing

10.74 Prices of agricultural commodities strongly influence the performance of the sector and the well-being of both producers and consumers. The parity pricing system for food-grains will therefore be continued. Thus, producer prices will be based on import parity; while export parity prices will be used for export crops. Such a pricing system will ensure that consumers can obtain the product at the lowest possible prices and producers are guided in their production decisions by competitive domestic and international prices. The policy

will also contribute to the achievement of food security at the household and national levels. Beef producer prices will continue to be based on the world market prices since beef is an export commodity.

Cost Recovery Measures in Agriculture

10.75 Government has adopted cost recovery strategy in order to ensure access and sustainability of services offered to farmers. This will ensure that Government progressively gets 'value for money' invested in order to add new stocks of capital and provide for the replacements of the same over time. In order to help Government achieve this, consideration will continue to be given to progressive introduction of user fees for some of the services that are currently being offered free or at minimal cost. Services for which user fees would be introduced include animal vaccinations, and plant and animal laboratory services.

Privatisation

10.76 In order to improve efficiency and effectiveness in the delivery of services and as a cost saving measure to Government, privatisation and hiving off of certain activities and services will be pursued. While recognizing potential benefits of privatisation, it is important not to overlook the capacity of the private sector to absorb privatised activities at reasonable costs. Therefore, privatisation should go hand in hand with the establishment of a strong regulatory mechanism. Consideration would be given to privatisation of such services and activities as Livestock Advisory Centres (LACs), Cordon Fence maintenance, building and maintenance of crushes, construction of earth dams, development of wells, design of irrigation schemes, Environmental Impact Assessment (EIA) studies, production of topographical and agricultural land-use maps, and the printing/reproduction of magazines.

Basic Infrastructure for Agricultural Development

10.77 The low productivity observed during NDP 8 is partially attributable to lack of basic infrastructure for agriculture. The success in the implementation of the NAMPAADD and other NDP 9 programmes will depend on provision of basic infrastructure in areas identified for agricultural production. This includes roads, power and telecommunication network, potable water and post-harvest facilities. To this end, a policy on agricultural infrastructure will be developed.

Gazettement of Agricultural Land

10.78 One of the factors contributing to low agricultural output is the continuing loss of productive agricultural land to non-agricultural uses. In order to address the problem, the NDP 9 strategies for the agricultural sector, will entail gazettement of agricultural land. The strategy to gazette agricultural land will include identification and mapping of land suitable for agricultural purposes. This process started during NDP 8 and will continue into NDP 9. To date, 13.37% of the total area of the country has been mapped.

Extension Delivery Strategy

10.79 Improvement to agricultural performance is dependent on application of appropriate technology by farmers which, in turn depends on the effectiveness of extension service delivery system.

10.80 In order to improve the extension delivery system and consequently, the productivity of the sector, the following interventions will be pursued;

- Establishment of a unified extension system for the sector.

- Provision of transport for extension workers in order to improve extension outreach, thus covering more farmers, than was the case before.
- Improvement of the work environment for extension agents through provision of office and residential accommodation.
- Increasing the knowledge base of farmers, especially the women farmers through targeted technology-based training.
- Improvement of extension outreach also through organised learning groups within Extension Areas as well as strengthening/diversifying mass media coverage (radio, television, pamphlets and posters) to reach a wider spectrum of farmer-customers.
- Expansion of farm demonstrations to cover all sub-sectors in agriculture.
- Stratification of target groups in order to assist in developing and targeting of technical messages.
- Improvement of Rural Training Centres as institutions of change for all identified target groups including commercial / advanced farmers.
- Relieving extension officers of non-extension duties to ensure programme effectiveness.
- Establishing a Cooperative Training Centre.
- Improve production of audits and inspections of co-operative societies through computerised database.

Human Resource Management

10.81 The total establishment of the Ministry of Agriculture stands at 9 011 at the beginning of the NDP 9. It is estimated that the growth during this plan period would be by 441 posts, thereby bringing the total establishment to 9 452 for NDP 9. Of this total, an estimated 71% are unskilled and semiskilled employees. To keep this work

force productive and motivated, the following programmes will be embarked upon:

Organisation and Management (O&M) Exercise

10.82 An O&M study was undertaken towards the end of NDP 8. The Ministry of Agriculture will continue implementing the recommendations of this study during NDP 9 period. The study identified the need for the following interventions in support of the Ministry's Vision, Mission and Values: to develop organizational relationships; to improve the extension service delivery; to promote customer focus; to provide the opportunity for team work and better working practices as well as being in step with public sector-wide reforms.

Skills Development and Career Paths

10.83 At the end of NDP 8 period the Ministry of Agriculture embarked on a study to develop skills and career paths for the majority of its staff. The recommendations of the study will be implemented during NDP 9. The study looked at the constraints to adequate training; review of the adequacy of the human resource; operational needs of staff in terms of disciplines and training needs; developing criteria for training/development needs; designing of skills and career paths for all staff; localization strategy; determination of adequacy of training facilities and monitoring and evaluation of the training programmes.

10.84 In line with the above areas, the Ministry will develop long-term training plans and programmes aimed at closing the existing skills gaps. The revised training and development strategy will ensure that staff

training does have a direct measurable impact on production.

Staff Accommodation

10.85 The growth of the establishment during NDP 9 will require improvements in the work environment in terms of office and residential accommodation. To this end, therefore, offices will be built at the Ministry Headquarters as well as in the districts. This infrastructure will be provided as a package, comprising of both office and house accommodations for staff to alleviate the existing shortages.

HIV/AIDS

10.86 The impact of HIV/AIDS on Ministry of Agriculture staff is presumed to be serious. Reported deaths increased from an average of 7 people per month between 1999 and 2001 to 10 people per month by May 2002. HIV/AIDS is suspected to be the main cause of these deaths.

Prioritised Response for NDP 9

10.87 Recognising the potential impact that the epidemic will have on the sector, during NDP 9 the Ministry of Agriculture intends to strengthen and scale-up its responses, targeting its own staff (internal response) and the external customers, mainly the farming community (external response) in the following areas:

Internal Response

- Strengthening workplace Information Education and Counselling (IEC) programme through regular education, counselling etc.
- Intensifying peer education programme across the sector.
- Forming support groups for persons infected and affected by HIV/AIDS.

- Initiating regular education on the effects of alcohol abuse
- Training an additional 70 counsellors to assist with the workplace programmes.
- Undertaking an HIV/AIDS impact assessment study.

External Response

- Intensifying the sensitisation and education of farmers on HIV/AIDS through targeted IEC programmes.
- Integrating HIV/AIDS into agricultural policies.
- Enhancing income-earning capacities of those infected and affected by HIV/AIDS.
- Streamlining reporting and monitoring of HIV/AIDS - related programmes.
- Strengthening inter-sector collaboration with Health and Local Government sectors, among others, and with the development partners, generally.
- Defining indicators to monitor the effect of HIV/AIDS interventions.
- Facilitating group formation and cooperatives of People Living with AIDS (PLWHA), engaged in farming in order to access funding for their projects.
- Initiating regular education on the effects of alcohol abuse to farmers.

Human Resource Strategy for BCA

10.88 The strategies that will be pursued by the BCA management will include the following interventions:

- Continuing the production of graduates at Certificate, Diploma and Degree levels equipped with requisite knowledge and skills in the science and practice of agriculture in order to empower them to have a positive impact on agricultural development and production.

- Introducing Post-graduate (MSc and PhD) programmes in areas such as Crop Science and Animal Science.
- Ensuring that the College's programmes are relevant and responsive to the human resource needs of agriculture and its allied fields within a changing and diversified economy and the society at large. To this end, more young women will be encouraged to study agricultural sciences and technology.
- Conducting research and consultancy work in agriculture to address agricultural problems faced by farmers and the sector as a whole.
- Providing in-service training to staff and also outreach services to the farming community.
- Encouraging and training more women into decision-making positions within the college's administrative structures.
- Training more female extension personnel to realise gender balance, implicit in the current composition of the agricultural households.

SPECIFIC STRATEGIES

Livestock Sub-Sector

Animal Disease and Pest Control

10.89 One of the major constraints to livestock productivity is the continuous threat of transboundary diseases such as Contagious Bovine Pleuropneumonia (CBPP) and Foot and Mouth Disease (FMD). In order to intensify the control and prevention of diseases, the following specific strategies will be pursued:

- Maintain annual sero-surveillance for disease of economic threat to the country (FMD, CBPP and New Castle Disease) in high-risk areas.

- Intensify border patrols through a system of picketing and construction of disease control fences along international borders.
- Conduct regular workshops for staff and stakeholders on disease emergency prevention preparedness
- Maintain cordon fences and other disease control infrastructure.
- Conduct feasibility studies on the establishment of an emergency Animal Disease Control Fund.
- Eradication of tsetse in the Okavango Delta through aerial spraying and the use of biological technique called Sterile Insect Technique (SIT).

Veterinary Public Health and Food Safety

10.90 In order to ensure fair practices in the food trade and also protect the health of consumers the following specific strategies will be pursued:

- Harmonise regulations for the inspection of meat products from slaughter facilities countrywide and transfer them to the Department of Animal Health and Production to ensure regular inspections.
- Intensify implementation of the livestock identification and trace-back system (LITS) programme.
- Conduct regular residue test to ensure that maximum residue limits for agricultural and veterinary chemicals is maintained.
- Control and regulate use of veterinary drug

Range Resource Management

10.91 In order to ensure proper management and sustainable use of our

resource base i.e. land and the range, the following specific strategies will be adopted.

- Promote the fencing of communal areas and provide technical support in managing these integrated resource systems.
- Upgrade Ramatlabama Management Centre so as to provide better quality training

10.92 In an effort to increase milk production and maintain high quality standards the following strategies will be pursued:

- Sale of dairy pregnant heifers and bullocks to dairy farmers.
- Establishment of dairy quality control standards and implementation of a dairy quality control regulation.

Poultry Production

10.93 Although local broiler and meat production meet national demands the supply of breeder stock and feed is still problematic. In order to improve the situation the following strategies will be pursued:

- Promote investment in poultry feed production
- Encourage private investment in the establishment of a hatchery and breeder stock.
- Establish poultry abattoirs in the main producing areas.
- Establish export regulations
- Improve management of indigenous breeds of poultry through research

Pig Production

10.94 Feed and breeder stock availability are limiting factors to pig

production. In order to improve the situation the following specific strategies will be pursued:

- Encourage private investment in feed production.
- Upgrade the Sebele nucleus demonstration farm.
- Improve management skills through farmer training.
- Encourage private investment in slaughtering and marketing facilities.

Fishery

10.95 To support the conservation, improvement and sustainable use of the fishery resources the following specific strategies will be pursued:

- Undertake fish stock assessment in order to develop management plan of the Okavango Delta.
- Establish fisheries regulations.
- Establish fish hatchery at Letsibogo dam.
- Improve management skills through training of fishermen.
- Encourage fish farming through aquaculture.

10.96 Hides and Skins have been exported raw to other countries. To encourage hides and skins development locally the following strategies will be pursued:

- Encourage investment in establishment of tanneries countrywide.
- Improve collection and harvesting of hides and skins in the rural areas through extension education.

Animal Breeding/Artificial Insemination

10.97 Artificial insemination (A.I.) is aimed at improving the genetic pool of the national herd. Genetic diversity enables

livestock to adapt to diseases and parasites. To achieve this, the following specific strategies will be followed:

- Promotion and establishment of breed societies.
- Improve service delivery through establishment of more distribution centres.
- Expansion of National A.I. Laboratory.
- Promote conservation of indigenous genetic resources through breed registration

Ostriches

10.98 Ostrich farming is a new concept to most farmers and to ensure growth and more farmer participation in the industry the following specific objectives will be followed:

- Train extension staff and farmers on ostrich farming.
- Establish an ostrich demonstration farm to facilitate training and provision of breeding stock to farmers.
- Establish ostrich production guidelines for export markets.

Smallstock

10.99 Constraints to smallstock production are management-related, mostly characterized by high mortalities caused by disease and external parasites. To improve the situation, the following specific strategies will be pursued:

- Train farmers on smallstock management.
- Encourage smallstock breeder's societies to improve availability of breeding stock.
- To promote establishment of smallstock handling and marketing facilities.

Livestock Marketing

10.100 To help farmers market their products and take advantage of the opportunities offered by globalisation the following specific strategies will be pursued:

- Provide marketing infrastructure services such as watering facilities, kraals and crushes and loading rumps.
- Compile and analyse data on livestock marketing in order to assist farmers to benefit from liberalized world markets.
- Intensify livestock marketing education
- Encourage private sector participation in transportation of slaughter animals to markets.

Arable Sub-Sector

10.101 The arable sub-sector is performing poorly as a result of various factors among which are the frequent droughts, low technology adoption and poor crop management practices. Despite these, efforts will be made to improve performance of the arable sub- sector.

Field Crops

10.102 In an effort to increase the production of field crops the following strategies will be employed:

- Carrying out on-farm crop demonstrations to enhance adoption of appropriate and relevant technologies such as promoting moisture conservation practices and the use of drought tolerant and early maturing varieties.
- Promoting the production of cash crops such as cowpeas, sunflower, groundnuts, etc.
- Commercialising the arable sub-sector in line with NAMPAADD,

which calls for full mechanisation of the sub-sector.

- Design and construct a road network and drainage system in Pandamatenga.

Horticulture

10.103 Horticulture industry has been identified as one of the priority areas for diversification of the agricultural production base and creation of employment for many people especially in the rural areas. The approach adopted for NDP 9 will put emphasis on:

- The mobilization and formation of producer associations,
- Strengthening of the Horticultural Council, consisting of a fully-fledged secretariat.
- Formulation of a Horticultural Development Policy,
- Promotion of urban agriculture and backyard gardening as a poverty reduction strategy.
- Carrying out farm demonstrations to enhance technology adoption.

Crop Marketing

10.104 The challenges brought by free trade have necessitated the development of a competitive crop marketing system. This will ensure that marketing information is readily available to producers for informed decision-making. This will be achieved through the following strategies:

- Development of crop marketing information system to enable free flow of market information to end-users.
- Construction of horticulture markets at strategic production areas (Palapye, Mahalapye and Sherwood) to reduce marketing

costs and link producers and traders to improve the efficiency of the marketing system.

- Intensification of training of extension staff and farmers in the field of marketing and business management.
- Encouragement of farmers to produce identified high value crops with competitive advantage and addition of value to the existing crops through processing.

Plant Protection

10.105 The main interventions under plant protection will include:

- Establishment of plant quarantine station,
- Disposal of obsolete pesticide stocks,
- Environmental impact assessment
- Assessment and analysis of post harvest needs and constraints,
- Implementation of the agrochemicals act
- Education of communities on safe handling of chemicals.

Natural Resources Management

10.106 Natural resource constitutes the production base for the sustainable development of agriculture. The growing population and demand for agricultural produce have the tendency to increase exploitation and erode the potential of these resources to support production. The depletion of natural resources affects sustainability of life systems. Thus there is a need to pay attention to their management. To improve the implementation of existing policies and legal instruments to enhance the conservation and management of agricultural

resources, the following strategies will be adopted:

- ♣ Review of the Agricultural Resources Conservation and the Herbage Preservation Acts.
- ♣ Formulation of a Fire Management Policy:
- ♣ Continue annual maintenance of the 10,000 km firebreaks:
- ♣ Production of a fire hazard maps as a basis for developing fire management plans/strategies.
- ♣ Liaise with District Disaster Management Committees for annual fire suppression programmes (Contingency Plans)
- ♣ Conduct environmental impact assessment on the effects of veld fires and harvesting of veld products.
- ♣ Promote appropriate land utilisation through generating and providing baseline data on agricultural land use resources.
- ♣ Produce Vegetation Inventory Monitoring and agro-ecological zone maps.
- ♣ Continue Ranch Demarcation.

Irrigation and Water Development Strategies

10.107 To promote diversification of agricultural production the following strategies will be employed:

- Development of a gender - sensitive Irrigation Policy.
- Establishment of two irrigation schemes using treated effluent at Lobatse and Francistown.
- Establishment of an Irrigation Systems Testing Centre.
- Constructing new dams and assisting farmers in rehabilitating existing dams and, upgrading some to multipurpose status.

- The Well rehabilitation program will continue.
- Development of the Ramotswa Wellfields. An Environmental Impact Assessment (EIA) is planned as a pre-cursor to establishing an irrigation scheme.
- Rainwater harvesting technologies will be explored in settlements to promote backyard gardening.
- Contracting of private companies to complement government efforts in the development of irrigation and water resources.

Soil Conservation

10.108 In order to ensure sustained agricultural land resources for future generations the following strategies will be implemented to promote conservation of agricultural land resources nationwide:

- ♣ Rehabilitation of degraded lands at catchments level (Mokoloboto 11,900 ha, Matshelagabedi 470 ha and Sakutswane-Mogobane 13,000 ha).
- ♣ Implementation of community anti-desertification projects.
- ♣ Production of a national soil erosion hazard map and guidelines for land resources management.
- ♣ Public awareness campaigns targeted especially at women and other marginalized groups, will be intensified in order to ensure full participation of stakeholders in the implementation of soil conservation projects.

Forestry and Beekeeping

10.109 In order to optimise the contribution of forestry sub-sector to long-term socio-economic development of Botswana to ensure an enhanced and sustained flow of benefits from forestry

activities to all segments of the population, the following strategies shall be pursued:

- Complete the Forestry Policy and review Legislation
- Continue with implementation of Chobe management plans
- Carry out forest inventories to facilitate implementation of community based woodland management programs
- Establish community based woodland management areas.
- Facilitate an increase in production of honey through establishment of farmer demonstration and community apiaries
- Upgrade the existing demonstration and community apiaries in six agricultural regions.

Agricultural Research and Technology Development

10.110 The role of agricultural research is to develop appropriate technologies that reduce production constraints and increase productivity of crop and livestock enterprises, while conserving the environment. In pursuance of the department's goals, the following strategies will be implemented:

- Institutional development that includes infrastructure, research equipment, regional cooperation and collaboration.
- Development of diversified agricultural products and adaptation of sustainable technologies (including indigenous seeds and livestock breeds) through farming systems approach.
- Development of gender-friendly technologies for agricultural

households, including on-farm and industrial processing of agricultural products to add value and enhance shelf life.

- Develop techniques for conservation and utilization of biodiversity (plant and animal genetic resources) in soils.
- Initiate biotechnology research that has potential for higher production and productivity; and the safe use of biotechnology.
- Establish an agricultural research priority committee to oversee and coordinate all agricultural research activities in the country.

Cooperative Sub-Sector

10.111 The cooperative sub-sector plays a vital role in the country's economy through production and income generating activities. To promote productivity in the sub-sector, the following strategies will be pursued:

- Promoting the diversification of the economic base of the co-operative sector through adoption of growth point approaches, linkage effects, and establishment of shared service co-operatives and branding of co-operative products as well as establishment of revolving funds to meet the specific needs of the co-operative sub sector.
- Developing professionalism in the co-operative movement to build capacity in order to promote innovative, competitive and result-oriented businesses.
- Promoting corporate governance in the co-operative movement to develop business ethics of transparency, accountability and control as well as results-oriented operations.
- Formulation of national co-operative policy and education advisory

committees to articulate the needs of the sub-sector.

- Promoting information and communication technology in the movement to provide quality service at competitive prices to the co-operative members and customers.
- Implementing the revised co-operative societies act and new co-operative development policy.
- Pursuing advocacy for the institutionalisation of co-operative education in schools at all levels of education, covering both the adult and youth.
- Promotion of production co-operatives to contribute to economic diversification and employment creation.
- Improvement of livestock marketing services.
- Intensifying the promotion of institutional savings and credit co-operatives to improve domestic savings mobilization for productive investments and access to credit.
- Re-organizing the department into critical core business areas to promote a sustainable and competitive co-operative sector.
- Introducing public relations desk in order to communicate with stakeholders.

Agricultural Planning and Statistics

10.112 The Division of Agricultural Planning and Statistics (DAPS) has the mandate for policy development, monitoring and evaluation, farm management and for the production of national statistical reports on livestock and crop production within the Ministry of Agriculture. In addition, the Division is also charged with the activities of the National Early Warning Unit. The Division's role within the Ministry will be strengthened during NDP 9 through the following strategies:

- Establishment of mechanisms for increasing stakeholder participation on policy dialogue through holding regular policy advocacy workshops.
- Monitoring and evaluation of the impacts of government policies in the agricultural sector.
- Product development that entails producing quality and timely information packages
- Facilitating farm level efficiency, profitability and competitiveness by providing information on investment, production, management and marketing practices on various enterprises.
- Contributing to agricultural sector competitiveness and sustainability through periodic assessments and analyses of sector performance and, also through making policy recommendations as appropriate to agricultural decision - making.
- Conducting first - ever study on farm labour productivity.
- Establishing inventories on forests, fisheries and veld products.
- Imparting farm business skills through training of farmers on farm management and agric-business.
- Promoting gender mainstreaming within the Ministry of Agriculture, developing and supporting gender-sensitive policies and youth programmes within agricultural establishments.

Food Insecurity and Vulnerability Information Strategy

10.113 The National Early Warning System (NEWS) serves as a framework for monitoring national food supplies. It also provides information on the status of food insecurity in order to aid decision-making. In the past, there have been limitations in the data collected within the system, particularly with respect to indicators of economic access, status of food security and nutrition at the household level. To this end, a comprehensive Management Information System (MIS) will be established during NDP 9 in order to provide information on household - level food vulnerability; ascertaining household coping strategies and associated nutrition issues, and identifying food un-availabilities in the country. In response to these structural deficiencies, the following strategies will be pursued:

- Providing advance information on food availability, requirements and access.
- Provision of policy information on incidence, nature and causes of chronic food insecurity and vulnerability.
- Rolling-out the National Action Plan on the 1996 World Food Summit commitments.
- Establishing a Food Insecurity and Vulnerability Information Mapping System (FIVIMS) framework to provide a comprehensive national Management Information System (MIS) for food insecurity monitoring.
- Strengthening networking and coordination in NEWS to enhance collaboration in the food security MIS through periodic vulnerability assessments.
- Capturing national food consumption patterns as well as updating the National Food Balance Sheet through inclusion of other food crops as necessary.

- In addition, the problem of lack of reliable statistics within the Ministry of Agriculture will be addressed by establishing a statistical database. The Ministry will also continue to computerize and network Regional and

District Agricultural Offices as part of a Ministry -wide information architecture.

Performance Targets for NDP 9

10.114 To improve performance during NDP 9 the following targets are set up: (Box 10.1):

Box 10. 1 MoA Performance Targets for NDP 9

	Base	Target by end of NDP 9
<i>I. Crop Sub-sector</i>		
A. Crops		
1.0 Cereal Yields: (Sorghum & Maize)		
1.1 Traditional Farms	200kg/ha	500kg/ha
1.2 Commercial Farms	1,000kg/ha	2,500kg/ha
Pulses:		
2.1 Traditional Farms	150kg/ha	300kg/ha
Oil Crops: Sunflower & G/nuts)		
3.1 Traditional Farms (S/Flower)	-	400kg/ha
3.2 Commercial Farms (S/flower)	700kg/ha	2,500kg/ha
3.3 Traditional Farms (G/nuts)	150kg/ha	250kg/ha
3.4 Commercial Farms (G/nuts)	300kg/ha	600kg/ha
3.5 Commercial Farms (Cotton, Pandamatenga)	800kg/ha	1,400kg/ha
Horticultural Crops:		
(Cabbage, Tomatoes, Potatoes)	20 tons p.a.	40 tons p.a.
4.1 Citrus Fruits	25 tons p.a.	30 tons p.a.
<i>II. Livestock Sub-sector</i>		
B. Cattle		
Calving Percentage:		
5.1 Traditional Farms	50%	70%
5.2 Commercial Farms	51.5%	70%
Off-take Rates:		
6.1 Traditional Farms	10%	15%
6.2 Commercial Farms	13.9%	20%
Mortality Rates:		
7.1 Traditional Farms	12%	5%
7.2 Commercial Farms	4.5%	4%

B. Small Stock			
8.0	Kidding Percentage	100%	150%
8.1	Off-take Rate	8%	30%
8.2	Mortality Rate	36%	15%
9.0		C. Dairy Industry	
9.1	Milk yield/cow	2,000lt	4,000lt
10	D. Fisheries	190 tons p.a.	300 tons p.a.
11	Poultry meat	98%*	100%
12	Honey Production (kg/colony)	5.03	25
13.1	Cooperative Members' Savings	P80 m	P120 m
13.2	Coop Turnover	P104 m	P110 m
13.3	Credit/loans to Coop Members	P79 m	P150 m

Assumptions:

1. Agricultural extension agents concentrate full – time on agricultural extension activities.
2. Farmers adopt improved farm management practices and other production technologies.
3. Severity of drought (if it occurs) during NDP 9 is no greater than in recent past.
4. Performance in the arable sub-sector is expected to increase three - fold due largely to introduction of improved technologies, mechanization and commercialisation of the sub-sector in line with NAMPAADD.

* Self –sufficiency ratio of poultry meat production to local demand

Source: Ministry of Agriculture