REPUBLIC OF BOTSWANA

# National Master Plan for the Arable Agriculture and Dairy Development

# (NAMPAADD)

## IMPLEMENTATION GUIDELINES

## Ministry of Agriculture

Printed by Government Printer, Gaborone**Statement of Intent**

NAMPAAD should make agriculture competitive and reduce the country's reliance on imports of agricultural produce that can be viably produced locally.

It should make arable and dairy farming more attractive and profitable to farmers and thereby create employment opportunities, increase rural incomes and reduce rural to urban migration.

It is intended to achieve this objective through programmes that should enable traditional/subsistence farmers to transform their operations to commercial level, as well as to enable commercial farmers upgrade their level of management and technology application.

## How is NAMPAADD Different?

NAMPAADD seeks to improve the performance of the agricultural sector, by modernising it through the introduction of improved technologies and efficient use and management of land and water resources and by commercialising it. For this to happen, agricultural policies should shift from the current welfare oriented approach to a business oriented approach.

NAMPAADD is different, in that:

- It is expected to reform small scale farming by introducing modern agricultural and commercially orientated practices.
- Subsidies will be limited and targeted to farmers and farmer groups that adopt practices that would enable them to increase production thereby graduate from subsistence to commercial farming.
- It will identify and target high potential production areas and plan their development in phases.
- It will encourage more involvement of the private (business) sector and civil society in farming. This will among others be achieved by promoting smart partnerships between investors and land owners and among farmers themselves.
- It will put in place a contributory insurance scheme to insure qualifying investors in farming against production losses due to natural disasters.
- It will enable investors with viable agricultural projects to have access to finance from existing financial institutions including CEDA.
- It is expected to succeed in transforming the sector because it commences at a time when public sector reforms are being put in place to improve performance, in which clear goals are set for each member of staff, unit etc. to achieve within a specified period.

## 1.0 Background

1.1 Over the years, the Ministry of Agriculture has put in place a number of agricultural programmes with the aim of promoting rainfed, irrigated and dairy farming by providing an enabling environment for farmers and producers.

1.2 Such programmes include Arable Lands Development Programmes, Irrigation and Water Development Project, Development of Extension Services, Dairy Improvement, Pandamatenga developments and other agricultural projects funded under the Financial Assistance Policy.

1.3 The success of these programmes in transforming the sector to meet the agricultural policy objectives has been minimal for a number of reasons that include, untargeted support services such as extension services, lack of draught power for farming and lack of sector-wide strategies, which often led to disruptions caused by some policy interventions. This has over the years led to the decline in the agricultural sector's contribution to the country's Gross Domestic Product.

1.4 It is against this background that the Ministry of Agriculture engaged the services of TAHAL Consulting Engineers Ltd of Israel in the preparation of the National Master Plan for Arable Agriculture and Dairy Development (NAMPAADD).

## 2.0 Guiding Principles

The following guiding principles were developed within the framework of the National Master Plan for Arable Agriculture and Dairy Development.

2.1 Food security remains cornerstone of the current agricultural policy and NAMPAADD.

2.2 Arable agriculture remains a major source of employment and income for the rural population. About 50% of the total population still resides in rural areas and about half of this population largely depends on arable farming for its income.

2.3 To counter the current trend in which agriculture is being abandoned, by perpetuating land tillage as a noble and commercial pursuit.
NAMPAADD Guidelines

2.4 It has been established that current production levels in all the sub-sectors investigated by the NAMPAADD study are far below the potential that can be achieved with modest technological and management interventions.

2.5 The adoption of suitable policies and strategies can facilitate
Exploitation of the enormous potential thus makes primary agriculture and related support services such as processing to be more profitable and make a more significant contribution to the national economy.

2.6 There is a significant potential for the production of non-traditional cash crops such as cotton and fruits i.e. citrus, grapes and others, which can be produced to satisfy local demand, and the surplus exported.

2.7 On account of globalisation, farmers and producers should be able to exploit comparative advantages available to them to produce and compete in markets anywhere in the world thus earn foreign exchange for Botswana. Botswana like her neighbours in the southern hemisphere can capture a significant market share for fresh tropical and deciduous fruits, taking advantage of seasonal differences with the consumer countries in the northern hemisphere:

**3.0 Objectives**

3.1 The policy objectives for the agricultural sector, which guided the study are:

- Improvement in food security at both 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 a secure and productive environment for agricultural producers; and
- Conservation of scarce agricultural and land resources for future generations.

These objectives remain relevant but the difference as articulated by NAMPAADD is that more emphasis will be on promoting agriculture as a business by investing in both primary production and processing to exploit the existing potential.

**Sub Sector Guidelines**

**4.0 Rainfed Agriculture**

Rainfed crop production is dominated by small traditional farms of an average size of 5 ha. Most of these use only animal draught power which provides inadequate tillage. They also don't use agrochemicals nor practise row planting and generally fail to adhere to proper cultivation calender. As a result they achieve very poor crop yields.

Even in good years small farms are unable to produce enough to feed and provide adequate income for an average family. Research results show that yields can be increased from a current average of 0.3 tons/ha. of grain up to 1-3tons/ha under the same climatic conditions with improved technologies.

4.1 Target areas for development of rainfed agriculture are prioritised as follows: **First priority districts are**, Barolong, Bamalete/Tlokweng, Tutume, Chobe, Ngwaketse South, Tonota, Tati, Kgatleng, Machaneng and Mahalapye. **The second priority districts are**, Serowe, Ngwaketse Central and North, Bobonong and Palapye. The three Kweneng districts which are Kweneng North, Kweneng South and Kweneng West **will be third priority areas.** It has been found that rainfed crop production is economically non-viable in the greater part of Ngamiland East and West, Ghanzi, Boteti, Tsabong and Hukuntsi Agricultural Districts.

**4.2 [1]Accurate maps showing the location of lands suitable for rainfed farming in the target districts will be prepared as a first step in the implementation of NAMPAADD.**

**4.3 The Ministry of Agriculture will assess social and physical conditions in each of the selected areas to determine a suitable development path, le. whether to apply a socially oriented policy or an economically oriented policy.**

[1]Bold text throughout the document identifies "critical path" actions which must be taken to trigger a change in agriculture as a result of the implementation of NAMPAADD.

'4.4 **To be economically viable rainfed arable farming should be mechanised. Mechanization would enable farmers to be punctual in preparing their land and improve their chances of getting good yields.**

4.5 The NAMPAADD implementation programme will target fulltime, dedicated and committed traditional farmers 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.

4.6 The minimum size of land that can be farmed viably under mechanised rainfed conditions is 150 hectares. This farm size would enable large machinery to operate at optimal production rates. Traditional farmers with land duly allocated by land authorities will be encouraged to join cultivation groups to form units of 150 hectares each.

4.8 **Group formation will be initiated in production zones and the Ministry of Agriculture will publicise 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.**

4.9 Farmers participating in group enterprises will qualify for financial assistance through existing financial institutions and CEDA to procure equipment for tillage operations, other necessary farm requisites and the crop insurance facility.

4.10 To access financial assistance, all farmers, be they an individual investor, a group or a company will be required to produce a good production plan and a bankable business proposal.

4.11 Where an individually held unit is large but not large enough (ie. less than 150 hectares), the individual may lease land from his neighbours, to reach or exceed the minimum critical size.

4.12 Procedures for leasing and consolidation of land units will be developed during implementation in consultation with stakeholders, such as Land Boards, Farmers Associations, etc.

4.13 Farmers interested in leasing their land will be required to obtain common law leases from the relevant authorities.

4.14 **Agricultural Service Centres will be located within production areas to serve several cultivation units by providing farming inputs, mechanised cultivation and harvesting services, machinery advisory services for hire, etc.**

4.15 **The Pilot Agricultural Service 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.**

4.16 Where a sufficiently large unit of 150 ha or more, is owned by an individual or a group, such an individual or group may as advised by mechanisation specialists purchase and operate its own array of machinery. They may also sell cultivation and harvesting services to other farmers within a production zone.

4.17 Government commits to undertake socio-economic studies on leasing and renting of agricultural land as well as on group formation and dynamics.

4.18 In view of the prevailing agro climatic conditions in the country, sorghum, maize, millet, cowpeas, groundnuts, sunflower and cotton will constitute the main crops.

**4.19 Government will establish pilot farms in production areas to demonstrate new technologies to facilitate quick adoption by farmers.**

**4.20 The Ministry of Agriculture will offer professional advice in the research, culturing, harvesting, production and marketing of Veld Products in collaboration with other stakeholders. In so doing attention will be paid to their sustainable use.**

**5.0 Irrigated Agriculture**

The NAMPAADD study confirmed that the potential for commercial horticultural production is largely under utilized. Yields of horticultural crops can be increased four fold in some cases, if modern technologies are adopted. Fragmentation of production units and

their size denies growers the potential economies of scale resulting in high marketing and production costs.

Priority areas for vegetable production were identified on the basis of soil suitability, availability of water, production parameters and marketing aspects as follows: Bamalete/Tlokweng, Kweneng South, Kgatleng, Palapye, Ngwaketse South, Ngwaketse Central and Selebi Phikwe. In addition to these areas, Bobonong, Tonota, Barolong, Chobe, Tsabong, Machaneng and Ngwaketse West have also been identified as priority areas for fruit production.

**5.1 To address problems of fragmented horticultural production units, clusters of horticultural farms will be formed around one large production unit. A larger nucleus farm will be identified within the cluster to serve as a source of inputs, management advisory services and assist in the packaging and marketing of produce for the smaller satellite farms**.

5.2 The minimum viable size of a horticultural farm participating in a cluster should be one hectare, with sufficient water resources and duly allocated by land authorities.

**5.3 Horticultural Officers will be strategically placed near production clusters to provide dedicated technical advice to farmers within the cluster.**

5.4 The horticulture officer servicing a production cluster will on a regular basis collect and disseminate market information to producers.

5.5 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.

5.6 Farmers participating in a cluster will be assisted to acquire the necessary horticultural requisites for the development of the enterprise through CEDA and other financing institutions, based on the viability of the project and management capacity.

5.7 Green house production of horticultural crops is highly capital-intensive, with high operating costs and requires highly skilled manpower. Under NAMPAADD this technology is therefore expected to be utilized by a small number of entrepreneurs to produce specialised crops.

**5.8 Pilot projects will be strategically located in production zones to demonstrate advanced technologies to farmers.**

**5.9 The Ministry of Agriculture will recruit experts in the fields of irrigation, horticulture and marketing to train farmers and local officers, as well as to supervise the establishment and operation of pilot and demonstration farms.**

**6 Dairy Farming**

Average milk production per cow is generally very low, due to inadequate feed in terms of quantity and quality. In addition milking cows are neither given proper housing conditions nor individual attention to their physical and production needs. With improved housing, feeding and farm management practices output could be improved from the current average of 2000 litres to 6000 litres/annum.

It is important to note that given the perishability of the dairy products particularly fresh milk, dairy farms should be located within 50 km radius of major fresh milk consumption centres. Hence priority areas identified for dairy production are around Maun, Francistown, Gaborone and other centres where there is good market for milk products.

6.1.1 The Ministry of Agriculture will collaborate with interested investors to promote fodder production using treated sewage water. This will be achieved by:

- Identifying and quantifying the amount of treated sewage water.
- Identifying suitable irrigable land for fodder production.
- Providing the necessary infrastructure.
- Enabling access to financial assistance through existing financial institutions for projects that are financially viable.

**6.2 The Ministry of Agriculture will establish a modernised and suitably equipped dairy farm to demonstrate methods of operating and managing an advanced dairy enterprise.**

**6.3 The Ministry of Agriculture will recruit dairy experts who will be assigned to:**

- **Supervise the selection and procurement of dairy feed, equipment and animals.**
- **Impart skills and knowledge to local counterparts and producers.**
- **Manage dairy pilot and demonstration farms.**

6.4 The Government will set quality standards and put in place procurement procedures for importation of dairy animals to avoid importation of low quality dairy cows.

6.5 The Ministry of Agriculture will prepare a catalogue of suppliers of quality dairy animals to help investors to procure good quality dairy stock.

6.6 Government will set quality standards for dairy feeds to reduce the problem of sale of sub-standard feeds to dairy farmers.

**6.7 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.**

6.8 Dairy farmers will be advised to maintain a minimum herd size of 50 milking cows which is considered to be a viable herd size.

**7.0 Infrastructure**

Lack of infrastructure has been identified as one of the most serious constraints to agricultural production. Success in the implementation of NAMPAADD will require the development of basic infrastructure to service production zones.

7.1 The development of infrastructure will focus on areas of intensive, clustered, well-organised and strategically located crop and milk production areas. Not every small and isolated farm merits investment in public infrastructure.

7.2 New enterprises such as dairy farms and horticultural projects where possible will be advised to locate in areas where infrastructure already exists or is planned.

7.3 Infrastructure to be provided will include roads, power lines, telephone networks and a source of potable water for every rainfed Agricultural Service Centre, Post Harvest facilities and clusters of horticultural farms. Farmers will be expected to

make a contribution by paying a portion of the cost where the infrastructure they benefit from is a private good.[2]

**7.4 The actual location of Agricultural Service Centres to which roads and power lines should be extended will be prioritised according to districts/areas selected for priority development**.

**7.5 The Ministry of Agriculture extension staff will identify the Number and location of production units to be formed, where Agricultural Service Centres and horticultural production units will be established**.

**8.0 Post harvest facilities**

8.1 In addition to the existing horticultural produce collection and marketing outlets in Lobatse and Francistown, new ones will be established. The construction of post harvest facilities will be in accordance with the pace and priorities recommended for horticultural development.

**8.2 Government will support the establishment of post harvest facilities through the designation of land and the erection of `factory shells' for rent by the private sector.**

8.3 In order to ensure sustainability of the existing facilities and the planned ones, the managerial capabilities of the operators will be improved through a specially developed training programme.

8.4 The Ministry of Agriculture will strengthen the Marketing Section to enable it to carryout market intelligence and provide market information to producers and potential investors on appropriate products and niche markets in other countries.

8.5 The construction of a cotton gin in Pandamatenga will receive highest priority, to enable the potential of producing cotton in this area to be fully exploited. Once cotton production levels reach breakeven point in terms of the financial stability of the gin, Government may sell or lease the gin to a private entrepreneur or cotton producers in the area.

**9.0 Grain Storage Facilities**

[2]Some of the infrastructural developments will be in the form of a private good while others like roads will be public good

The Master Plan Study has concluded that silos of the BAMB and private millers have sufficient storage capacity to handle the planned production volumes.

9.1 The Ministry of Agriculture will however introduce measures to improve storage of grain through:

- Appropriate and rational use of existing facilities
- Promoting measures to reduce storage losses
- Training personnel involved in handling and maintaining grain storage facilities.
- Disseminating information on appropriate post-harvest technologies to small farmers.
- Facilitating access of farmer's produce to existing storage facilities.
- Support for the attainment of economies of scale that facilitate efficient transportation of products to storage facilities

- Publishing and enforcing food health regulations related to grain storage.

**10.0 Irrigation Water Supply**

Since most of the planned irrigation with fresh water is based on existing boreholes, wells, dams or riverside pumps, investment on these facilities will be minimal. Only 2000 ha under good management is required to satisfy vegetable requirements for the country over the next ten years. However if policy requires that field crops such as cotton be irrigated as well as the need to promote the export of fruits, new sources of water should be found.

Water resources that are not yet developed and will need detailed investigation and feasibility studies include the Chobe/Zambezi river system. There may also be a need to establish the true potential of underground water in and around the Tsabong area which has been found to be climatically suitable for commercial production of deciduous fruits such as grapes and others. Large scale development of the fringes of the Okavango Delta is not envisaged, because of environmental considerations.

10.1 **As part of its commitment to provide basic infrastructure for agricultural projects, Government will finance the construction of water conveyance and storage facilities to points where such water can be accessed by farmers. The cost of such investments will be recovered through water fees. Individual farmers will be responsible for the installation of in-field systems.**

**10.2 The Ministry of Agriculture will liaise closely with the Department of Water Affairs and District Councils on the provision of water to potential production areas.**

**10.3 Government will identify and designate suitable areas for irrigation around major centres. Such land will be gazetted for irrigation purposes using treated sewage water.**

10.4 Since water is a scarce resource in Botswana, farmers will be encouraged to use water efficient technologies for irrigation such as drip irrigation.

**11.0 Institutional Reforms**

To successfully implement the Master Plan requires reforms in the Ministry of Agriculture. Through PMS a new vision, mission and values have been developed and it is expected that this will prepare staff for the implementation of NAMPAADD as they will be made more accountable to their clients.

11.1 **Front line extension workers will be required to spend 80°I° of their working time in the field on extension duties, giving farmers individual attention.**

11.2 Targeted messages combined with clear performance objectives and measurable targets will be developed.

11.3 Farmers will be encouraged to form associations, and existing ones will be strengthened and institutionalised to facilitate implementation of improved production systems and marketing of agricultural produce. This will be achieved through continuous guidance and training so as to be able to control and guide the formation of cultivation groups, production and marketing of crops and dairy products.

11.4 **Government will develop special programmes, including improved access to credit and land for young farmers and**

**female-headed households to enable them to venture into commercial agriculture.**

11.5 **The Ministry of Agriculture will develop specific policies to guide the development of urban agriculture, irrigation and horticultural development to support the implementation of NAMPAADD.**

## 12.0 Promoting Business Opportunities

The implementation of NAMPAADD has the potential to open several business opportunities for the private sector. Government will play an active role in promoting business opportunities and attracting investors.

12.1 The NAMPAADD Implementation Unit in liaison with other stakeholders will market NAMPAADD to farmers and potential investors by addressing kgotla meetings, business seminars (BOCCIM, BEDIA), farmers committees etc. and through the mass media. The current Ministry of Agriculture radio programmes will be reviewed to make sure that they promote NAMPAADD.

12.2 Government will develop specific guidelines for promoting smart partnership arrangements between landowners and investors and put in place a monitoring system to ensure fair business practices.

## 13.0 Risk Minimization

13.1 To minimise farmer's risk caused by annual and in-season climatic variability and by other extreme natural disasters, an insurance fund will be established to cover crop or milk production losses in years and in specific regions declared as eligible for compensation. This will in turn increase confidence in investing in agriculture and new technologies.

13.2 As part of the modalities of operation of the insurance fund, farmers will be required to pay an insurance premium to qualify for coverage. The conditions justifying the payment of damages will also be clearly defined and transparent.

## 14.0 Environment Aspects

14.1 An environmental impact assessment (EIA) is a requirement when major new agricultural projects or areas are to be developed. Major agricultural activities, associated with NAMPAADD such as irrigation using treated waste water will be subjected to an EIA to minimize negative impact that might occur.

## 15.0 Plan Implementation

15.1 **To oversee the implementation of the plan, a NAMPAADD Implementation Unit will be established in the Permanent Secretary's office. The Unit will be headed by a Coordinator, assisted by a deputy, with a small team of support staff. An Inter-ministerial Task force will be established to assist in implementation. To strengthen the Unit, the Permanent Secretary may establish Technical Committees to undertake specific assignments**.

15.2 Relevant Departments within Ministry of Agriculture will participate fully in the implementation of the Master Plan at headquarters, regional/district and extension area levels. The implementation process at Regional/District level will consist of the following sequences of activities.

**15.3 Public awareness campaigns will be mounted to explain to farmers and the general public on:**

- The principal implications of NAMPAADD and alert entrepreneurs to business opportunities.

- The advantages of grouping (and the process) to benefit from better and less costly shared services such as machinery, agricultural inputs, supply and produce marketing.

- Business opportunities such as agricultural service centres, professional services, machinery services, agricultural inputs supply, produce marketing and export, agro industries, advanced dairy farming and milk processing etc.

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- Assistance programmes to be offered to farmers who form
- Group cultivation units, horticultural production clusters and diary farms.

- The crop loss insurance plan to be made available to participating farmers.

15.4 A detailed survey of the farms located on suitable lands and possibilities to form rainfed cultivation units of 150 hectares or more and formation of horticultural clusters.

15.5 biting of agricultural service centres at strategic locations with respect to farmlands to be serviced.

15.6 Establishing the scope of services for every agricultural service centre, the required array of agricultural machinery, inputs and other services to be provided such as post-harvest facilities, produce storage, extension services and preparing the outline plans for civil structures.

15.7 Identifying development or upgrading of rural infrastructure as required for the operation of agricultural service centres and horticultural clusters

15.8 Reorganising the extension services to be extended through agricultural `services centres and the nucleus farms of horticultural clusters