

## FOREWORD

*This strategy document derives from the urgent need to reappraise the situation outside of the sugar sector, not only as a follow-up to the Non-Sugar Sector Strategic Plan 2003/2007, but also in the context of fast-changing circumstances such as the instability being brought by globalisation, international trade, changes in international supply/demand and food stocks; agro-fuels and energy supply; the global climate change; and of more domestic interest, the eroding protective nets in the sugar and other economic sectors; all of which are already adversely affecting availability and prices of various foodstuffs and animal feeds, i.e. our food security; and the economy in general.*

*The initial step was the preparation, under the aegis of my Ministry, of a draft Consultation document titled “Strategic Options in Crop Diversification and Livestock Sector (2007-2015)”, which was based on solicited inputs from all stakeholders, and further discussed at a Consultative meeting held on 21 August, 2007.*

*This blueprint now defines the Sustainable Diversified Agri-food Strategy for Mauritius, incorporating all the deliberations of the Consultative meeting and further additional inputs from various parties.*

*It synthesizes afresh the stakeholders’ contributions, analysis and vision of the agricultural/agro-industrial sector, in light of the above-mentioned circumstances and with horizon 2015 in view; its challenges and expected outputs; listing the priority foodcrops, fruits and ornamentals, including promising crops; and the important species of farm animals and poultry (including apiculture) that require promotion particularly for enhancing food security; and all the backup measures necessary to achieve the objectives set.*

*The inputs from all stakeholders are gratefully acknowledged.*

*It is more than time to ACT now, and sustainably; no longer just to react and transiently, as has often been the case in former crises.*

*The implementation is surely not going to be a straight course sail to success. Sustained political will and national collective and coordinated efforts are needed.*

*Government will play its role effectively. We rely on the rest of the stakeholders to show as similar a response.*

Dr Arvin Boolell  
Minister of Agro Industry and Fisheries

## INTRODUCTION

### GLOBAL SCENE

Food, water and energy have become the biggest global challenges - and agriculture a fundamental instrument for sustainable development - in the 21<sup>st</sup> Century.

Many developing countries, in particular, are presently facing serious difficulties of food supply and security with the recent explosion in food prices. Indeed, it is stated that this escalating 'global food crisis', except for the war periods, is unprecedented and likely to persist because of some structural changes in the world food system.

The causes are multifarious.

The demand for food from emerging and highly populated countries has been increasing considerably, associated with changes in food habits as a result of higher standards of living.

The seeming benefits of globalisation and liberalisation of international trade are yet to be realised for the agri-food sectors in the developing world. On the other hand, there certainly has been underinvestment (and malinvestment) in the agricultural sector of most developing countries.

The adverse impacts of climate change are already visible, with increased incidence of extreme weather conditions such as droughts and floods that are causing more crop failures in countries such as India, New Zealand, Australia and China, resulting in decreased exports of cereals and dairy products.

High prices of fossil fuels are triggering considerable demand for bio-energy, thus shifting production from agro-foods to agro-fuels.

Food and agricultural commodities have even become assets for financial speculation.

Consequently some major food exporting countries have already started imposing a ban on exports, and it is clear therefore that financial resources alone can no longer guarantee food procurement and security.

The era of cheap food may well be over. Physical access to some food items may even be in jeopardy. Hence, the call of R. Zoellick of the World Bank and other international organisations for all nations to brace themselves to face these harsh realities, and for governments, in particular, to devise **immediate national responses** to the challenge of securing their food needs.

### LOCAL CONTEXT

That urgency to respond of course must have particular resonance for Mauritius, a small island state (SIDS) **prone** to many characteristic limitations thereof: smallness; isolation; small internal markets; high vulnerability to natural and environmental disasters - and high dependency on imports. Which have made us a net importer of food, and therefore especially

sensitive to external shocks including the recent hikes in the prices of food and feeds, as further compounded by escalating freight charges and exchange rate fluctuations.

### **Food Demand and Supply Trends and Patterns**

Our net food requirement is estimated at 690,000 t annually, up to 75% of which is made up of agricultural and food products imports which peaked at some Rs 23.4 billion in 2007, indicating a high level of trade dependency.

Crop derived foodstuffs accounted for Rs 9 300M with the bulk consisting of the staples (rice and flour); while animal food items (including live slaughter stock) amounted to Rs 7 100M. The totality of our requirement in edible oil is imported.

The food import bill on a net basis has more than doubled during the period 2001/2007, from Rs 8.4 billion to Rs 21.0 billion. A closer scrutiny, while showing a stability in the total volume of food commodities imported (at around 500,000 t including the volume of staples) indicates on the other hand a dramatic expansion of the import bill (CIF).

The major cause is the drastic increase in the import of processed food items (including vegetables) over the short span 2001 to 2006, from around a mere Rs 0.2 billion to Rs 9.0 billion, respectively. This trend is expected to continue. In fact, the share of processed food in our diet now almost matches that of developed countries (which highlights the scope for agro industrial development in Mauritius).

Mauritius imports only a restricted number of fresh vegetables, in small amounts, mainly for the hotel industry and during calamity times. The major imports of fruits are limited to apple, citrus and grapes.

The food habits of Mauritian consumers have shifted towards processed and convenience foods, with an exigency on quality, food safety and brands. According to the latest Household Expenditure Survey (2005–2006), the average household devotes around 31% of its total expenditure on food. Considering the above-mentioned factors and trends, this percentage should be on the increase by now. Such evolution adds further pressure to our food procurement strategy, in addition to the CPI and inflation.

Mauritius historically has been securing its food supply mostly by an indirect use of its agricultural system, that is, focusing on a monocrop (sugar cane) that offered many advantages: bioclimatic adaptability and economic/marketing/strategic benefits; generating enough foreign currency to more than cover the import of most of our food requirements.

Circumstances, however, are changing and dramatically so, as above-mentioned, and aggravating our vulnerability as a net food importing country. The sugar sector no longer provides full coverage of our agricultural and food imports, and this capacity is still to further erode in years to come.

Clearly a new strategy is needed for our Agri-food system, and particularly so for a diversified agri-food industry.

## **The Role and Contribution of Agricultural Diversification**

Our diversified agri-food sector has been fulfilling the food function in a direct manner, in kind, although not meeting domestic demand in either quantity or quality, with an overall self-sufficiency ratio of less than 30%. It generates a gross output of Rs 8.3 billion annually, employing around 50 000 persons directly or indirectly in various activities related to crop and livestock production, and agri-business.

The crops sector involves around 13, 000 small growers cultivating 0.25 to 2.5 hectares, and some 30 growers operating over larger areas. The production mainly caters for the local market. In addition, some 216 hydroponic agro-entrepreneurs are also producing selected vegetables and flowers over some 12.3 ha of protected structures.

A reasonable level of self-sufficiency has been achieved in some plant-derived food items: almost 100% for fresh vegetables, with some 100 000 t produced annually over an estimated land area of 4,200 ha. An average annual production of 13 000 t of potato accounts for 60% self-sufficiency in this foodcrop; while some 5 000 t of onion production makes up for one-third self-sufficiency in onion. The average total annual supply of vegetables, potato and onion including imports is estimated at 126,000 t.

Fruit production consists of mainly banana, pineapple, and seasonal fruits such as litchi and mangoes, estimated at over 20,000 t annually, covering 46% of our needs in a total annual supply of fruits estimated at 47, 000 t, over an equivalent of 725 ha of land. Up to 200 t of litchi are exported at reasonably high prices during November to January.

The local requirement of flowers and ornamentals is entirely met from local production. Anthurium blooms are exported and the production is estimated at 5 million blooms annually. Ornamental supply has been diversifying towards rose production for the local market. Around 1,000 small and some 20 large growers are involved in ornamental production valued at around Rs230 Million in 2007.

Livestock production is being undertaken mostly by some 3 500 small breeders and around 100 medium to large producers including the poultry sector. Production is mainly for the domestic market, equivalent to an average of 46, 000t annually. Some 38,300 t of meat and poultry, including venison, were produced in 2007, of a gross value of Rs800M, over some 700ha of land (excluding *chassée*).

Overall local production in the livestock sector excluding poultry accounts for around 5% of our total requirement in meat and for only 2% in milk. Although the country is considered self sufficient in poultry and eggs (almost 100%), this sector relies almost entirely on imported raw materials (approximately 145,300 tonnes annually) representing 80% of total feed requirements.

Significant attempts have been made in recent decades to develop the agro industry for the diversified agricultural sector. Its contribution in food and feed production is estimated at Rs 8.3 billion in 2007. Its weakness, however lies in its continuing over-dependency on imported raw materials, which may well be unsustainable now.

The crop-based agro-processing sector is still in its early stages of development, some 405 t of produce being made available to consumers either from local or imported raw materials.

## WHAT THE CHALLENGE IS

The threats have been exposed.

But the opportunities are there as well: the surging prices of food, feeds, compounded by increasing fuel and freight charges, are certainly shifting the economics of production under local conditions of most agri-commodities to more competitive positions; and the political will and bipartisan and national concerns over the food issue are no less driving forces to move ahead.

Our strengths lie, amongst others, in our historical attachment to agriculture; national ingenuity; resilience of the small agriculture sector in food production; and relatively good public infrastructure and institutional system.

The overall strategy then would be to build on these strengths and seize the opportunities offered to address the weaknesses of our agri-food system, if we are to make our agri-food system deliver in an efficient and effective manner the goals and objectives assigned to it.

Our agri-food sector, and mostly the diversified component of it, has had a very slow and inadequate structural reform, with very little expansion in scale of operation and modernisation; hence limiting both its food and some other multifunctional roles.

This has arisen mostly from the following weaknesses:

- (i) the historically dominant position of the sugar commodity and the subservience to sugar of other sugar industry options and diversifications;
- (ii) an aging and declining agricultural population, with inadequate replacement;
- (iii) underinvestment and incorrect investment;
- (iv) inadequacy of the marketing system (for the diversified agriculture component)
- (v) limitations of land, water and human resources;
- (vi) supply inadequacies and Increasing costs of agricultural inputs;
- (vii) risk Management; and
- (viii) absence of stability/sustainability in the Policy Framework, probably arising from failure to legislate Previous Plans into e.g. the equivalence of a “Farm Bill” as in the US.

The overarching national challenge thus is to realize a **vision** of a Mauritian Agri-Food system which, by 2015 and beyond, would have been restructured to become:

- (i) diverse and multifunctional; yet, given the indispensable role of **food** and the basic need for **food supply stability**, playing an enhanced role than hitherto in securing domestic food supply and improving nutrition and health;
- (ii) modern and competitive; sustainable economically, socially and environmentally;
- (iii) an integrated and enhanced part of the rural/whole socio-economy; and
- (iv) flexible and responsive to changes in consumer demand.

Addressing this challenge effectively demands a multi-pronged approach, with actions and interventions at various levels of the agri-food supply chain: resource management and

utilisation and production systems; marketing systems and regulatory framework; international trade and distribution systems; and consumer demand.

And where the players are multiple as well:

- Government and its institutions;
- the Private Sector as constituted by producers/farmers and their organizations, the agro-industry, traders and distribution agents; financing institutions;
- international inputs; and
- ultimately the consumer that includes the tourism industry/in fact the civil society in general.

## **IMMEDIATE MEASURES FOR FOOD SECURITY**

Given the urgency of the Food Security issue, the following measures are being proposed as high-priority action.

### **INTERNATIONAL TRADE/ FOOD IMPORT LEVEL**

One immediate action for food security should be the exertion of all diplomatic efforts to ensure the continued supply of some basic food items, mostly the staples, through trade/import; while concurrently initiating joint ventures and contractual arrangements for production of certain foodcrops in the short-term in friendly countries in the framework of international cooperation.

### **DEMAND-SIDE/CONSUMPTION LEVEL**

For sustained food security it is also a critical prerequisite that Mauritian consumers do away with the luxury of choice and brand. Consumers should adapt to locally produced food items, while also taking initiatives at household level in terms of kitchen and roof gardening, urban agriculture, and diminishing food wastage. A recent study for the UK indicates such wastage stands at £10 Billion per annum!

### **CBI LEVEL**

The region can be a producer and supplier of staples and raw materials for the requirement of agro industry in the **longer-term**. Government should, however, **now itself** put at the disposal of investors the necessary incentives and facilities to initiate and conclude such regional cooperation initiatives (under the CBI). That is the premium to pay for us to insure our food production, procurement and security in the longer term.

### **DOMESTIC PRODUCTION, MARKETING & DISTRIBUTION LEVELS**

1. Concurrent to consumers' goodwill to adapt, producers and the rest of the supply chain should spare no effort to be innovative. They should produce and supply the quality in terms of safe food required by consumers with transparency and at reasonable prices.

2. Measures to consolidate the 'acquis' of current domestic production levels, (especially for the livestock sector which is a high-investment and long-range venture) with the urgency to stop declining trends.
3. To undertake the production of a strategic volume of selected basic products of the Mauritian diet (end-products and inputs/planting materials) to maintain a dignified level of food sovereignty and nutritional security even if the economics of production is not in favour. These food commodities include, potato and other starchy crops; pulses; onion and tomato; and require specific action agenda/plans which should also include measures specified at (2) above.
4. The marketing and distribution system should be reviewed and made more farmer friendly.
5. Specific interventions from Government are imperative to achieve objectives at (2), (3) and (4) above.

## **LONG-TERM STRATEGY**

The **Sustainable Diversified Agri-food Sector Strategy** proposal in the rest of this document takes care of the medium to longer-term developmental issues of the sector.

## **COMMODITY DEVELOPMENT PROGRAMME**

It is now recognised that financial means alone do not offer guarantee to a sustained and secure food supply. Hence, there is an urgent need to domestically produce as much of our food demand as techno-economically possible, in order to reduce our trade dependency and the vulnerability associated with it.

Support measures are vital to improve self-sufficiency. In general terms, they relate to access to land, water, planting materials, finance, technical/scientific inputs, and a conducive policy environment.

In the crop sector, one certainty to contend with is our inability to produce the main staples, rice and wheat, under local conditions; and if ever this is attempted, it would still be negligible given our resource availability.

Similarly, in view of our limited land and their competitive uses, achieving a significant level of self-sufficiency in livestock and dairy products also appears remote.

While food security remains a priority consideration, opportunities also exist for other export-potential commodities and sectors where already we have developed adequate know-how and a competitive edge. Such crops, including promising crops, would also target the tourist and the agro-processing sectors.

With the recent observed trend of an expanding consumption of processed food items, considerable scope exists for the development of the agro-processing sector thereby warranting an urgent action to boost up production of the raw materials.

## **Crop Development Programme**

The commodity development programme is thus categorised under *six sub-programmes*:

- strategic crops for food sovereignty and nutritional security;
- vegetable crops for higher self-sufficiency;
- fruits;
- ornamentals;
- agro-processing and
- promising crops and sustainable agriculture.

The overall goal of this programme is to facilitate commercial production of such crops to ensure food security and quality, foreign exchange savings and sustainable development as well as improving the diet and health of the nation.

The specific objectives of the commodity development programme include the production of these crops to meet consumption; extending the period of vegetable and fruit production, **improving food quality and safety through adoption of Good Agricultural and Management Practices and certification**; producing novel and healthy food crops, **increasing export**; **strengthening of farmer organizations**; **improving research, farmer training and extension delivery systems**.

### **Sub-programme 1 - Strategic crops for food sovereignty and nutritional security**

This sub-programme is for **immediate priority action** and includes potato, onion, pulses and maize. For the medium term, other crops may have to be included, such as oil and other root crops.

The targets for production which are being set are based on conditions existing as at May 2008. Depending on developments under the CBI, these targets may have to be reviewed in the sense that a larger volume of production by Mauritian entrepreneurs will come from the region.

#### **Potato**

Current consumption is estimated at some 25 000 t yearly, of which around 11 000 t (46%) are imported. Over the period 2001-2005, the cost of imports alone has risen by 47%. Moreover, the country imports annually around 1 400 t of potato in processed form as chips and powder for mash, amounting to Rs 100 M in 2007.

Critical areas that need immediate attention are the rising cost of production and access to finance; unreliable supply and rising cost of seeds; land availability; irrigation; crop protection and risk mitigation.

The target is to attain total self sufficiency by 2010. It is encouraging to note that the corporate sector and the small producers have all agreed to contribute fully to achieve this objective.

## **Onion**

The onion industry represents an annual value of over Rs 125 M. Consumption has been increasing over the recent years and is presently at 14 000 t/year. A third of our requirement is produced locally, while the rest is met through imports worth around Rs168 M in 2007.

A production target of 19 000 t is envisaged by 2015 to meet our total requirement, which signifies an almost three fold increase in our domestic production.

Such a production target can only be met if more producers get engaged in onion cultivation. With the recent liberalisation in the retail price and with the increase of the floor price to producers at the AMB from Rs 11,000 to Rs 17,000 per tonne, it is expected to attract new entrants, and more land especially in the north where irrigation is possible, will be devoted to onion production.

Farmers will be encouraged to adopt new improved high-yielding varieties like Bellarose and Francia (already released by AREU) which have the added advantage of a prolonged shelf life.

As onion production is quite seasonal, good cultural and post harvest practices must be promoted for a prolonged storage. Curing and storage of onion at farmer level have to be given high priority in order to ensure good storability.

## **Pulses**

Pulses are consumed almost daily by Mauritians and constitute the main source of protein for vegetarians. The import bill for pulses has more than doubled in the last 5 years (from Rs131 M to Rs272 M), although the import volume has remained stable at around 11,500 tonnes.

Local experience in bean production is already acquired, and with sufficient effort at least 50% of our requirements can be produced domestically (i.e. around 5,500t). Land availability should not constitute a constraint, because it is a short cycle crop and it can also be produced in Rodrigues and Agalega. Cultural practices may be mechanised depending on the scale of production.

## **Maize**

Grain maize is mainly used for livestock feed and imports peaked at 89,000 t over the last five years with an import value of Rs553 M in 2007. The average price of imported maize has drastically risen from Rs5 200/t c.i.f. to Rs8 500/t over the last three years and undoubtedly it will continue to rise, as major producing countries such as Canada, Brazil and the US are making increasing use of it for biofuel production.

As self sufficiency in poultry and eggs and livestock is highly dependent on this commodity it is time to revisit the economics of maize production in Mauritius and the outer islands. Under the prevailing conditions, large-scale production may well prove to be feasible if production is made at industrial level using optimal inputs and techniques.

As mentioned earlier we have to pay a premium for our food security and maize is definitely one of the products that warrants such a treatment.

Given our limited land resources and the competing uses to which they are subjected it is unrealistic to target 100% self-sufficiency which would require 2 000 ha of land full stand under maize assuming 3 crops per year on the same area. A safe and realistic target would be 25% substitution of our total imports by 2015, which requires an additional 500 ha of land.

The remaining 75% of our requirements may be produced under the CBI.

### **Action Plan for the strategic crops:**

- Review the supply regime (local production and import) of the strategic crops.
- Offer credit facilities with attractive conditions (by the banking sector): crop loans for mechanization of operations; irrigation and fertigation; and the use of other emerging technologies.
- Make special budgetary allocation to Research institutions via FARC, to boost up the production of the newly released potato variety Belle Isle; the rapid multiplication of the onion varieties Bellarose and Francia; and for a re-appraisal of grain maize production.
- Offer facilities for land preparation similar to those for sugar cane planters under the MAAS.
- Extend and enhance the existing Potato Booster Scheme to onion, maize and pulses; and propose a floor price to producers of all these products (by AMB).
- Devise an improved Crop Insurance Scheme for all the strategic crops (by SPWF).
- Provide fiscal incentives such as rebates on income tax payable to all planters cultivating the strategic crops.
- Sub-contract part of the seed production of potatoes, onions and pulses in low cost countries like India where the know how already exists.
- Provide special incentives to planters producing the strategic crops under the CBI.

## **Sub-programme 2: - Vegetable Production for enhanced self-sufficiency**

### **Priority Commodities**

#### **Tomato**

Estimated production in 2007: 10 150 t.

Estimated area under cultivation in 2007: 700 ha.

Targeted production by 2015: 28 000 t.

Main constraints: Lack of good quality and certified planting materials and varieties.

#### **Actionable Strategies:**

- Introduction and adoption of new high yielding varieties
- Facilitating access to seeds of the new varieties
- Allocate more land to tomato cultivation
- To promote good agricultural practices and IPM
- Improve yield by better cultural practices and new technologies.
- Promote cultivation of tomato varieties with extended shelf life (with good storability characteristics) to cater for the local market during cyclones and floods.

### **Chillies**

Estimated production in 2007: 1 200 t.

Estimated area under cultivation in 2007: 230 ha.

Estimated imports of dry and processed chillies in 2007: 400 t (for around Rs 8 M)

Targeted production by 2015: 3 000 t.

Main constraints: Lack of good quality and certified planting materials.

#### **Actionable Strategies:**

- Promote cultivation of varieties that have a higher percentage of flesh for the agro-industry. Extend the varietal base to cater for different market segments e.g. sweet chillies, decorative chillies, etc.
- Allocate more land to chilli cultivation
- Improve yield by better cultural practices and new technologies.
- To adopt improved fertigation practices

### **Crucifers (Cauliflower, Cabbage & Broccoli)**

Estimated production in 2007: 6 200 t.

Estimated area under cultivation in 2007: 315 ha.

Targeted production by 2015: 7 400 t.

Main constraints: Lack of good quality and certified planting materials.

#### **Actionable Strategies:**

- Enhance access of seed of high yielding varieties
- Improve yield and off-season production particularly of cauliflower and broccoli.
- Promote IPM for safer food.
- Promote use of biofertilisers.

### **Carrot**

Estimated production in 2007: 4 200 t.

Estimated area under cultivation in 2007: 276 ha.

Targeted production by 2015: 8 000 t.

Main constraints: Inadequacies at level of land preparation and adoption of good agricultural practices. Inadequacy of good quality and certified planting materials.

#### **Actionable Strategies:**

- Promote mechanical land preparation
- Enhance quality of locally produced carrots to standards levelling those of imported carrots.
- Improve yield through better cultural practices.
- Extend the shelf life by using packaging techniques
- Promote the use of micro-storage systems adapted to carrots
- Promote plantation of baby carrots.

### **Cucurbits**

Cucurbits comprise pumpkin, cucumber, watermelon, squash (patisson), zucchini (courgette), melon, chayote (chouchou), bottlegourd (calabash), ridgegourd (pipengaille), bittergourd (margoze) and snakegourd (patole).

Estimated production in 2007: 27 500 t.

Estimated area under cultivation in 2007: 1 850 ha.

Targeted production by 2015: 33 500 t.

Main constraints: - Fruit fly infestation

- Inadequacies of good quality and certified planting materials.

**Actionable Strategies:**

- Implement and monitor fruit fly control programme.
- Introduce and adopt superior varieties for higher yield and pest resistance.
- Promote production of very tender cucurbits
- Promote production of baby squash, baby zucchini, and melons.

**Ginger**

Estimated production in 2007: 1 300 t.

Estimated area under cultivation in 2007: 80 ha.

Targeted production by 2015: 2 500 t.

Main constraints: Inadequacy of clean planting materials.

**Actionable Strategies:**

- Improve access to quality and certified planting materials
- Devote additional land area to ginger
- To adopt GAP to minimise soil borne disease.

**Garlic**

Estimated production in 2007: 60 t.

Estimated area under garlic cultivation in 2007: 10 ha.

Import in 2007: 1 500 t

Targeted production by 2015: 500 t.

Main constraints: Inadequacy of clean and high yielding planting materials.

**Actionable Strategies:**

- Introduce and promote new HY clones (AVRDC)
- Develop a rapid multiplication for certified and quality planting materials.
- Clean existing planting materials and multiply selected accessions from local germplasm (tissue culture)
- Allocate additional land area.

## **General Actionable Strategies for sub-programme 2**

Improve yield and quality and provide the following:

- Service for soil analysis and interpretation of results to planters within 21 days.
- Credit facilities (by banking sector) at attractive terms for land preparation and irrigation.
- Training and specific inputs for IPM.
- Post-harvest handling incentives such as exemption of customs duties and value added tax on crates and refrigerated vehicles.
- Research and development support to farmers to improve yield and quality.

## **Subprogramme 3 - Fruits**

Commercial production of fruits is mainly restricted to pineapple, banana and litchi and undertaken mostly on land that was not suitable for sugarcane, and with limited utilisation of resources such as irrigation and know-how. Yet numerous opportunities exist for expansion.

- Fruit consumption is still low in Mauritius (estimated at 30 kg/capita per annum) compared to European intakes (45-90 kg).
- The climatic and soil conditions of Mauritius allow the growth of up to 50 fruit species, with minimal inputs.
- Two fruit species, pineapple and litchi, already enjoy a good name on the European market.
- The tourist industry which is already accommodating 850 000 tourists annually and targeting 2 M in the coming 3 years, constitutes a significant domestic market for fresh fruits, fruit juices and processed fruits. More importantly, the judicious integration of local fruits in the tourism cuisines and tour operations (the agro-tourism concept) can act as a local window for expanding our export market.
- Many fruit species are already growing with minimal chemical inputs throughout the island and can be exploited as bio-fruits for niche/ethnic markets or for innovative processed products.
- New promising germplasm, production techniques, postharvest and processing technologies are now available for commercial exploitation of locally adapted fruit species.
- The small size of Mauritius can be a strength in the export of fresh fruits because any commodity harvested in the morning can be air freighted on the same day and can reach most overseas destinations within hours, thus conserving the freshness of the produce.
- The opening of our air space to new and more airlines expands access opportunities for new niche markets of high purchasing power (e.g. Dubai).

Subject to a change in our fruit consumption habits, the production of fruits offers perhaps the greatest potential for import substitution for the following reasons:

- The growing number of tourists would have preferred exotic (any indigenous) fruits compared to the imported alternatives.
- With the growing health concerns of the Mauritian population and to cater for people who are already health conscious, fruits are not only a good source of vitamins but also of anti-oxidants; some local fruits are even attributed medicinal properties e.g jamoon (jamblon); guava; passion fruit, star fruit, amongst others.

To reap such import substitution potential, however, requires quality standard comparable to imported produce. Such fruits on sale should also display characteristics of convenience through value addition.

In order to enhance the development of the fruit sector it is proposed through an integrated approach, to devise a national plan that would enable optimum utilisation of suitable land and other inputs. Hence the valid concept of delineating suitable zones for the production of specific fruits is valid. This would enable:

- optimisation of limited areas for high value output;
- better logistics support for the activity;
- integration of fruit production in agro-tourism;
- improved cost-effectiveness of businesses annexed to primary production; and
- development of quality products.

## **Litchi**

Estimated production in 2007: 750 - 1300 t.

Estimated equivalent area under plantation (including backyards) in 2007: 155 ha.

Targeted production by 2015: 4 000 t.

Main constraints: - Inadequacy of planting materials.

- Fruits spoilage and loss by bats.

### **Actionable Strategies:**

- Setting up private nurseries to increase production of layers and grafts from an actual average of 10 000 to 15 000 per year.
- Annually establish 100 ha of professionally managed orchards up to 2015.
- Expand productivity and production with irrigation; orchard management and by extending the season.
- Extend the shelf life of litchi through the use of new film techniques like Xtend.
- Establish certification programmes like Global Gap for export purposes.
- Initiate action to develop protocols for export of litchi by sea freight.

## **Pineapple**

Estimated production in 2007: 6 400 t.

Estimated area under plantation in 2007: 200 ha.

Targeted production by 2015: 15 000 t.

Main constraints: - High plantation cost  
- Black Spot Disease

### **Actionable Strategies:**

- Promote mechanical operations for planting and maintenance to minimise cost
- Extend land area considered as marginal for sugarcane under the MAAS to pineapple production through irrigation.
- Establish the protocol for exporting pineapple by sea freight
- Establish the protocol for vacuum packing
- Adopt GAP for minimising incidence of Black Spot Disease

## **Banana**

Estimated production in 2007: 8 500 t.

Estimated area under plantation in 2007: 435 ha.

Targeted production by 2015: 26 000 t.

Main constraints: - Inadequacy of planting materials  
- Poaching/theft

### **Actionable Strategies:**

- Extend land area considered as marginal for sugarcane under the MAAS to banana production through irrigation.
- Improve Post-harvest handling
- Expand production of planting materials.
- Adopt good cultural practices to improve quality.

## **Other fruit species**

Mauritius has a very diverse fruit germplasm, with around 50 or more species grown in the wild or in private yards. The underutilised fruit species are: the annona group (ate, coeur de boeuf, atemoya, corosol); papaya; mango; starfruit; guava; avocado; passion fruit; strawberry; acerola, etc; and neglected ones such as tamarind, jambelon, jambos, jamalac, jamrosat, jujube bergamotte, bilimbi, coeur demoiselle, fig, pomegranate, breadfruit, jackfruit, mulberry, jaboticaba, local cherries, vavangue, local olive, loquat, pamplemousse; where tremendous opportunity exists for tapping their full potential. A whole gamut of fresh tropical fruits and their juice forms should be offered to the expected 2 million tourists by 2010.

A targeted area of 100 ha under these minor fruit species will, in addition to constituting a gene bank for all these species, provide an economic production potential of around 3 000 t of exotic fruits by 2015, excluding goyave de chine. The fruit village programme will be consolidated.

## **Subprogramme 4**

### **Ornamentals**

Ornamental crop production is an economically important sector, dominated mainly by Anthurium of which 294t of blooms were exported in 2006, for an export value of Rs 96 M. However, a lot of interest has been shown in recent years on the production of other ornamentals such as Gerbera, Rose, Orchids, Foliage species, Heliconia, Strelitzia, Hanging lobster claw, Alpinia, Gladiolus, Liliun and various seasonal flowers.

In 2005 cut flowers and foliage were exported for Rs 100 M while import of ornamental crop species was valued at Rs 8.6 M (2004). This indicates a definite potential for the expansion of the ornamental industry for export as well as import substitution. The industry can be promoted through the empowerment of farmers, the provision of infrastructure facilities for intensive cultivation and additional technical know-how.

The increase in the number of tourists, hotels, and integrated resort schemes definitely warrants a more extensive range of ornamentals. Furthermore, as most of the major hotel groups are aiming five-star standards new avenues are opening up for high-value flowers like orchids.

The targets for the ornamental sector for 2015 are as follows:

Anthurium:	1 million blooms
Tropical flowers:	600,000 units
Bromeliads:	300,000
Rose:	7 million stalks
Gerberas:	6 million stalks
Orchids:	2 million blooms by 2010 (1 orchid bloom per tourist)

These will require around 19 ha of additional land.

The main constraint in this sector derives from restrictive plant import permit conditions imposed which seemingly are more rigorous than what applies in the EU, US and Japan. This warrants a whole review of all the conditions for plant introduction in Mauritius and a review particularly of the Anthurium case in order to re-launch the industry. Mauritius which had hitherto been a huge exporter of Anthurium blooms can still produce novel varieties to be marketed by multinationals.

AREU has already taken such steps by asking the Dutch firm Anthura BV to look into the marketability of its newly developed varieties.

**Actions proposed:**

- Introduction of new germplasm of the ornamentals species
- Facilitation of procedures for import of planting materials
- Provision of facilities for protected cultivation of ornamentals
- Technical support to producers and exporters to meet Global GAP standards

**Subprogramme 5: Agro processing**

It has been observed over the last 5 years that Mauritians are shifting their consumption habits towards processed vegetables and fruits. As an example, just for the year 2007, 52% of vegetables imported were in processed form and valued at Rs259 M. Similarly, the demand for processed fruits is also on the increase reaching a value of Rs243 M in 2007. Other commodities like mushroom and soya-based products are entirely imported with almost negligible local production.

Considerable opportunities exist also for minimal processing and transformation as the demand for convenience food is on the increase. The following examples are revealing: in 2007, tomato ketchup import stood at Rs13.5 M out of a total value of Rs 140 M of processed tomato; and minimally processed cabbage and cauliflower represented Rs 4 M while chilli sauce was imported for some Rs 5 M.

Small and medium enterprises have the opportunities to enter into such import substitution activities provided that there is adequate guidance, protocol, norms, support and technical

know-how. This will also provide a market for primary producers of the various commodities, where specific varieties for the purposes of processing have to be identified.

The scope for agro-processing is already visible in nearly all vegetable fairs and supermarkets where products like minimally processed jackfruit and taro leaves (songe) are making headway for the convenience of consumers.

Similarly, there is still a huge market for fresh and preserved fruit juices to be derived from local production. Just to cite an example, the import of pineapple juice exceeded Rs 5 M in 2007.

**Actionable Strategies** for the agro-processing sector:

- Encourage production of vegetables and fruits with suitable processing qualities.
- Develop protocols, norms and standards for minimally processed and preserved products and fruit juices.
- Initiate a project on setting up of an incubator to offer the opportunity (to entrepreneurs) to try and venture in processing; and to use such facilities also for training and acquainting producers with latest technologies and equipment.
- Offer financial support and banking facilities at attractive terms and conditions

## **Subprogramme 6:**

### **Promising Crops and Sustainable Agriculture**

#### **Soyabean**

A wide range of soyabean products is currently being imported including crude oil, soya sauce, dried soyabean, soya chunks, burgers, soyabean cake and soyabean milk. A total of 37 000 t of cooking oil worth Rs 720 M is imported annually, 70% of which consist of soyabean oil.

Soyabean has a great potential as an import substitution crop, especially for the production of cooking oil for the local market. The by-product soyabean cake can be used as an animal feed ingredient.

Soyabean is well adapted to our local agro-climatic conditions and to a wide range of soil types. It grows all year round with better yields in summer and requires a low input. Apart from its use in oil production, soyabean can be grown and consumed as a green vegetable.

It is proposed to conduct a pilot study on soyabean cultivation and the associated technology for transformation into oil and soyabean derived products. Opportunity for growing soyabean under the cross border initiative also exists.

#### **Palm Shoot Production from Pejibaye**

Palm trees are widely grown for their edible heart or cabbage. Traditionally, the only cultivated local species was the palmiste blanc de Maurice (*Dictyosperma album* var *album*). A new fast-growing species known as Pejibaye (*Bactris gasipaes*) has been introduced in recent years. It has no major pests and diseases and is therefore a low management crop.

Palm production has steadily increased over the past years reaching an estimated 850 000 plants in 2007. A production of 400 000 palm heart units is targeted by 2015 to cater for the increasing tourist and export niche markets. To attain the expected output an additional 225 ha of land will be required.

### **Pitaya**

Pitaya is a new fruit unknown on the local market. The fruit is very attractive, refreshing, has a good shelf-life and fetches a high price on the export market (Rs 200/kg). Low-grade fruits can be processed into jam and wine. Fruits are obtainable one year after crop establishment and a stable yield of 75 000 fruits/ha may be achieved after 3 years of plantation. The crop is not prone to major pests and diseases, and can be grown in difficult areas, specially the dry regions.

### **Aloe Vera**

Aloe Vera commonly referred to as the miracle plant has a significant potential as a diversification crop. It already has numerous applications in the pharmaceutical and cosmetic industries. It is a low maintenance crop and may even be grown in marginal and difficult areas. Some 25 t of stabilized Aloe Vera gel costing around Rs 1 M is already being imported annually, excluding imports in other forms such as juice, pharmaceutical and cosmetic products. It is targeted to produce some 300 t of leaves annually by 2015.

Specific measures for sub-programme 6

- Offer Credit facilities at attractive terms from the banking sector for land preparation and irrigation.
- Initiate Research and Development projects to improve yield and quality.
- Offer Post-harvest handling incentives like exemption of custom duties and value added tax on equipments.
- Diffuse information on cultural practices and setting up of pilot projects including processing equipment and establishment of protocols.
- Initiate import of seed and a programme for seed production

### **Aromatic Herbs**

Mauritius is self sufficient in most culinary herbs such as coriander, thyme, mint, bunching onion, leek and parsley. However around 1.5 t of fresh temperate herbs (sweet basil, rosemary, chervil, dill, tarragon, sage, bayleaf and salsify) and 10 t in their dried forms are imported annually to meet the local and tourist market.

Opportunities exist for fresh herbs due to increased awareness of consumers for a healthy lifestyle. There is also good scope for transformation into dried or powdered form to add value to a wide range of dishes in hotels and restaurants. This represents a good potential for unemployed women wishing to embark as entrepreneurs in an agri-based business.

With a view to substituting imports, production is targeted at around 7.5 t of fresh herbs and 15 t of mixed dried herbs by 2015. This will require cultivation under 30 ha of land.

There are two main strategies to meet the above production level, namely:

- i. to extend production throughout the year; and
- ii. to promote intensive cultivation under protected structures.

To achieve the expected output some 30 ha of land will be require. The starting point will be 1 ha for culinary herb production, gradually increasing to reach 30ha by 2015.

### **Support Measures:**

- Loan facility for De-rocking, installation of irrigation, and purchase of machinery.
- Technical support in agronomy, pest and disease control and agro-processing.
- Facility for soil analysis conducted by the MSIRI and the Chemistry Division of MAIF
- Facilities to set up SME in agro-processing (SEHDA)
- Financial support in the form of grants for setting up of the processing plant.
- Technical support:
  - Information from Research and Extension staff on the GAP for production of aromatic herbs.
  - Expertise from consultants for setting up the technology for culinary herb drying.

### **SUSTAINABLE AGRICULTURE**

Sustainable agriculture is an approach that maximises reliance on natural renewable on-farm inputs while ensuring long term environment stability and health benefits. Under the current intensive foodcrop production systems, farmers rely heavily on the use of agrochemicals, particularly pesticides and chemical fertilisers. This practice is not environment friendly and is a threat to food quality and safety. The promotion of sustainable agriculture through innovations and environmentally safe practices can propel our agricultural sector to a new dimension.

Nutrient from organic sources like farm manure, scum and crop residues converted into compost provides an opportunity to reduce the use of chemical fertilizers. This will provide the possibility for waste management strategy, sustaining production and minimizing of offsites environmental hazards.

The use of proper irrigation methods viz drip irrigation and fertigation techniques can help to improve crop productivity while optimising water use and minimising runoff and risk of salinity.

With the increasing consumer awareness of safer food and environment friendly practices coupled with the implementation of the zero pesticides residue regulations in the European Union, there is an urgent need to encourage an IPM approach for pest and disease control.

### **Actions proposed:**

- Regular training of farmers on sustainable agricultural practices.

- Use of compost, bio-fertilisers comprising of beneficial microorganisms which help to maintain soil productivity through organic matter decomposition, biological nitrogen fixation and phosphate solubilisation.
- Large scale production of compost and in-situ composting of crop and animal waste.
- Soil fertility conservation and management practices e.g. use of cover crop.
- Bio-fortification of composts using earthworms.
- Customise fertiliser recommendation based on soil analysis and crop requirements.

## **ORGANIC AGRICULTURE**

The potential of producing organic fruits and vegetables for niche markets, tourist industry, the agro-processing sector and the export market exists in Mauritius. Organic production can help us to differentiate our export of horticultural commodities such as litchi, pineapple and access to viable and value-added markets and benefit from higher prices. Presently there is only one commercial organic production of vanilla destined for the European market.

The major constraints in developing organic production locally are the absence of an organic production zone and the absence of a national organic food inspection and certification system. However, there is the potential to develop organic agriculture in Agalega where there are around 1000ha of land available. Opportunity for the production of some 1 000 t of dry beans by 2015 can be realized. A study should be commissioned to this specificity.

## **APICULTURE**

Apiculture has up to now been considered solely in the light of production of honey. However, with greater emphasis on sustainable agriculture, apiculture is fast turning into one of the best pollinating agents. It is common knowledge that good pollination by bees yields the best fruits and vegetables.

Consequently this plan puts special emphasis of apiculture both for honey production and for pollination. It is proposed to increase domestic production of honey from around 35 tonnes (2007) to around 60 tonnes (2015). On the other hand, adequate attention will be given to import, subject to such precautions needed, bumble bees which are known for their pollinating capacities.

## **Livestock development programme**

The aim of the livestock programme is to increase production and marketing of locally produced milk, meat, poultry and derived products. Three sub-programmes are being proposed: milk production; meat production; poultry and pork.

### **Sub-Programme 1 - Milk**

The sector has been facing several challenges including limited number of commercial farms; low input system of production; low adoption of improved husbandry skills; insufficient lands devoted to livestock development and insufficient fodder production.

The overall prices of milk and meat products continue to increase and this trend is expected to be more acute in the coming years. There is an urgent need to stop the decline, and even to increase local output as significant opportunities exist to expand production to meet our requirements.

Estimated production in 2007: 3.2 M litres (2% self sufficiency).

Projected production in 2015: 20 M litres (10% self sufficiency).

Targeted production to be achieved by increased herd size and adoption of high milk yielding breeds.

Constraints: Land; infrastructure cost for setting up farms; availability of breeding stocks; insufficient development in fodder and feed production.

**Actionable Strategy:**

Technical support in establishing around 30 new farms on around 300 arpents of state land and upgrading existing farms to village laitier system.

**Sub-Programme 2 - Meat Production**

	Estimated Production 2007 (t)	Self Sufficiency 2007 (%)	Forecasted Production 2015 (t)	Self Sufficiency 2015 (%)
Beef	100	< 1	1000	10
Goat	35	19	90	35
Venison	500	100	750	100
Pork	511	50	1500	100
Chicken	37 000	100	45 000	100
Duck	250	100	600	100
Eggs	125 M Units	100	165 M Units	100

**Supporting Measures:**

- Government to ensure at all times, that an adequate amount of state land and private land leased or sold to breeders are available to attain the targets.
- In view of the low rate of return inherent to livestock production (except for poultry and pork) special banking facilities to be made available to breeders for infrastructure development, import of breeding stock, equipment and fodder plantation.
- Training of farmers on modern methods of animal husbandry to improve productivity and bio-security.
- Veterinary Service of the Ministry to be accredited to international norms like ISO for delivery of services to breeders.
- Government to implement a system of veterinary vouchers to be give to breeders who would have recourse to private veterinary services.
- To devise risk management schemes and insurance of breeding stock.
- Government to ensure that 5% of bagasse and molasses produced by sugar factories to be made available to breeders.

- As the livestock feed factory cannot cope with the projected demand for feed, Government to implement a voucher system for breeders to access feed from private companies.

## **Marketing and Information**

Our farmers need to be adequately linked to the market and for this purpose a dynamic market system is required to serve as a catalyst between the producer and the consumer and to ensure efficient and profitable product absorption. The marketing system should be so designed to guarantee the sustainability of the Mauritian agricultural sector by efficiently reconciling the needs and expectations of all the stakeholders, be they farmers, marketing agents, food processors, exporters and consumers.

Information is an important component in the production and marketing activity where planning plays a key role. Further, collection of data to support an information system becomes crucial. Continuous and consistent knowledge of market segments and outlets for specific commodities will be the key instrument for sale of produce and the country's export strategy. A functional and effective marketing mechanism should allow agricultural producers to plan investment according to consumers' needs in terms of quantity, quality and timing with respect to product demand.

Supporting Measures:

- Setup a modern auction/wholesale market in accordance with international norms and regulations.
- Study the possibility of introducing a formal grading system for vegetables and fruits.
- Devise a price setting mechanism within the auction system to ensure that producers derive a decent margin of the profits.
- Regulate traders and operators in agriculture through a separate legislation falling under the MIAF.
- Reinforce the compilation of statistics and provide latest information on production, market segments, prices, volume traded etc through a national market management information system.
- Consider measures other than the freight rebate scheme (which is bound to disappear) to promote export.

## **Networking and Institutional Linkages**

In order to achieve the objectives and the targets set, institutions should not work in isolation and networking among institutions at local, regional and international level is crucial. A special fund should be earmarked to operationalise the different MoUs which have been signed by the different institutions. The fund should also cater for expenditure associated with the use and sharing of laboratory equipment, resources and infrastructural facilities.

## **Funding of the Programme**

The implementation of the programme will require funding and the sources identified are as follows:

- a. the Ministry of Finance has already agreed to fund the programme associated with potato seeds Belle Isle, onion seeds Bellarose and Francia, and the programme associated with tomatoes, all totaling Rs10 M from the present budget of 2007/2008.
- b. The Ministry of Finance and the MSA have also agreed to extend the actual programme of land preparation available to cane planters to include food crop planters through funds from the EU.
- c. Funding has already been secured for the incubation centre for agro-processing
- d. All the other programmes are being proposed to be funded through the budget of the Ministry.
- e. Food security can be sustained when the whole population is engaged. It is not the concern of Government or a Ministry. All stakeholders have to participate. There is a premium that the population has to pay in order to sustain food security.
- f. Opportunities for funding should be maximized from various sources to include ACP Agricultural Commodities Programme and the Diversification programme in the MAAS.

### **Monitoring of the Plan**

The implementation of all the measures proposed in this plan shall be done through a formal committee chaired by the Minister. A Programme Manager responsible for the implementation and monitoring has been proposed for each programme and will report to the main committee. The secretariat shall be provided by the FARC.

## Annex

### Foodcrop Annual Total Production (t)

Crop	2000	2001	2002	2003	2004	2005	2006	2007
Bean	1707.8	2003.4	2239.9	2010.0	2130.5	1600.1	1472.3	1427.3
Broccoli	92.6	268.1	298.9	237.5	169.3	124.5	70.1	94.8
Cabbage	10822.5	11663.3	8252.4	6279.6	6522.4	4766.2	4545.5	4429.8
Carrot	11461.0	12030.0	8649.7	5048.0	5841.1	3933.5	4315.1	4197.4
Cauliflower	2045.4	1845.7	1795.4	1662.0	2851.6	1901.0	1323.2	1631.1
Chillies (C)	165.2	288.7	267.0	214.1	280.8	171.2	207.5	219.9
Chillies (L)	609.4	677.3	500.3	759.7	942.6	889.0	1165.6	1072.9
Chillies (S)	129.7	65.3	58.1	81.5	98.4	100.6	138.3	132.6
Garlic	45.9	40.3	25.2	62.8	75.7	93.0	60.2	58.7
Ginger	498.1	867.8	473.0	369.0	790.6	1011.3	1014.8	1298.8
Groundnut	407.9	322.5	284.2	893.0	610.0	231.5	389.6	290.0
Maize	622.9	388.9	295.0	177.0	369.1	474.7	452.6	353.7
Onion	11485.2	10950.5	7117.1	4183.2	4682.0	5637.6	4548.5	5141.1
Potato	13843.3	16350.4	13339.0	12359.0	11246.5	12777.2	14522.6	14848.4
Tomato	10922.8	12395.8	11738.0	13246.7	14400.1	12839.9	14669.8	10156.4
Banana	8500.0	11000.0	7200.0	12090.0	12000.0	11580.0	10747.8	8511.0
Pineapple	3415.9	6015.8	1917.0	4561.3	4490.4	4883.8	5553.9	6398.2
Creepers	26525.0	28162.8	26493.7	27865.1	30381.0	22765.6	28579.7	23143.5
Other Crops	7822.2	7614.4	7797.6	7489.8	8674.7	6812.2	7362.3	5670.0
Starchy Crops	917.0	1046.4	971.0	805.0	1115.0	1118.0	841.9	1053.7
Total	116039	129120	103877	103454	111633	96728	106001	93809

**Foodcrop Annual Total Area (ha)**

Crop	2000	2001	2002	2003	2004	2005	2006	2007
Bean	351.1	375.9	393.8	400.8	397.7	371.7	333.2	299.8
Broccoli	5.4	16.3	18.9	16.3	12.5	9.2	5.6	7.1
Cabbage	422.0	459.4	330.4	267.3	286.8	223.7	236.0	225.7
Carrot	679.8	719.2	508.8	319.6	376.7	262.7	271.5	275.9
Cauliflower	101.6	90.1	84.9	88.0	114.7	81.6	69.3	81.6
Chillies (C)	24.2	41.7	43.1	33.7	37.6	27.9	35.7	30.1
Chillies (L)	144.6	153.1	142.4	145.4	156.2	161.9	223.4	205.9
Chillies (S)	33.6	17.9	24.5	25.0	25.7	33.7	45.8	46.6
Garlic	6.6	6.0	4.1	8.0	8.0	12.2	7.7	8.7
Ginger	31.7	51.7	31.1	29.6	37.7	53.9	52.1	80.9
Groundnut	122.6	123.1	115.7	255.5	211.8	137.2	183.1	139.7
Maize	70.1	54.0	37.7	26.6	56.6	63.5	58.1	47.0
Onion	336.4	332.6	237.6	158.1	180.9	252.6	169.9	208.3
Potato	622.2	778.8	605.6	587.5	606.7	599.1	588.4	590.6
Tomato	850.7	934.0	946.9	1044.2	953.2	918.5	934.8	703.8
Banana	489.0	540.0	600.0	544.0	527.5	520.7	480.2	436.3
Pineapple	79.0	165.1	83.0	125.9	137.2	134.5	175.9	204.1
Creepers	2029.2	1959.3	1950.3	2116.7	2284.5	2000.0	2177.6	1888.0
Other Crops	713.5	731.8	763.6	749.2	796.7	710.5	737.5	634.4
Starchy Crops	74.0	84.8	87.7	84.0	92.0	105.0	81.6	92.9
<b>Total</b>	<b>7447</b>	<b>7918</b>	<b>7260</b>	<b>7227</b>	<b>7553</b>	<b>6902</b>	<b>7142</b>	<b>6470</b>

**Domestic Food Consumption estimates**

	2000	2001	2002	2003	2004	2005	2006	2007
<b>Quantity ('000 t)</b>	585	660	713	660	703	723	743	739
<b>Value (M Rs)</b>	7039	8494	11531	10230	11424	13315	15997	22049

**Imports - Quantity ('000 tonnes)**

	2000	2001	2002	2003	2004	2005	2006
<b>Cereals</b>	229.1	217	225	213	209.4	219.9	203.8
<b>Pulses</b>	10.3	10.8	10.4	10.4	10.9	11.3	11.3
<b>Fruits</b>	24.3	23.4	26	25.8	26.3	23.4	23.7
<b>Meat</b>	19.8	17.6	16.9	18.1	17.1	16.1	15.1
<b>Dairy</b>	21.5	22.6	24.9	23.6	23.9	22.4	21.7

**Livestock Production ('000)**

	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
<b>Milk</b>	4600	4400	4000	4000	4000	4000	4000	4200
<b>Eggs</b>	12000	12000	12500	12500	12900	12200	12570	12600
<b>Poultry Meat</b>	25600	27200	29305	30000	33000	33000	36000	37000
<b>Beef</b>	240	375	207	202	137	72.5	99.5	100
<b>Goat &amp; Sheep</b>	94	58	31	37	27	27	32	35
<b>Pork</b>	891	882	800	830	780	750	720	511
<b>Game Meat</b>	500	600	600	600	600	613	620	620
<b>Rabbit</b>	25	25	25	25	25	25	25	25

## Production Targets

Sno	Commodity	Production (2007)	Target Production (2015)	Units
1	Aloe vera (leaves)	N.A	300	t
2	Anthurium	5000000	10000000 (to confirm)	blooms
3	Aromatic herbs	Negligible	22.5	t
4	Banana	8500	26000	t
5	Beef meat	100	1000	t
6	Bromeliads	work out	300000	blooms
7	Carrots	4200	8000	t
8	Chicken meat	37500	45000	t
9	Chillies	1200	3000	t
10	Crucifers	6000	7400	t
11	Cucurbits	27500	33500	t
12	Duck meat	250	600	t
13	Eggs	125	165	million units
14	Garlic	60	500	t
15	Gerberas	work out	6000000	stalks
16	Ginger	1300	2500	t
17	Goat meat	35	90	t
18	Litchi	750 to 1300	4000	t
19	Maize	negligible	19000	t
20	Milk	3.2 million	20 million litres	t
21	Onions	5000	20000	t
22	Orchids	work out	2000000	stalks
23	Organic (beans)	N.A	1000	t
24	Other fruits species	NA	3000	t
25	Palm shoot (Peijibye)	850000 (check)	400000	
26	Pineapple	6400	15000	t
27	Pitaya	NA	??	
28	Pork meat	511	1500	t
29	Potato	14000	30000	t
30	Pulses	negligible	5500	t
31	Rose	work out	7000000	stalks
32	Soyabean	N.A	Pilot study	
33	Tomato	10150	28000	t
34	Tropical flowers	work out	600000	blooms
35	Venison meat	500	750	t

	Action Plan	Programme Manager	Starting Period	Ending Period	Annual Budgetary Allocation (Rs)	Project Value
<b>Sub-programme 1 - Strategic crops for food sovereignty and nutritional security</b>						
P1	Review of supply regime	FARC	Jul 2008	Oct 2008	300,000	
P2	Credit facilities	MoF	Jul 2008			
P3	Rapid multiplication of planting materials	FARC/AREU /MSIRI	Jun 2008			
3.1	Potato (Belle Isle)	MSIRI	Jun 2008		5,000,000	
3.2	Onion (Bellarose & Francia)	AREU	Jun 2008		3,000,000	
3.3	Grain Maize	MSIRI/Private	Jul 2008		1,000,000	
P4	Facilities for land preparation	MSA	Jul 2008		25,000,000	75,000,000
P5	Extension of boost-up scheme	AMB	Jul 2008		5,000,000	15,000,000
P6	Improved Crop Insurance Scheme	SPWF	Jul 2008		5,000,000	15,000,000
P7	Fiscal incentives & tax rebates	MoF	Jul 2008			
P8	Sub-contract seed production	FARC/AREU	Jul 2008		5,000,000	15,000,000
P9	Incentive for strategic crops under CBI	MoF	Jul 2008			
P10						

<b>Sub-programme 2: -Vegetable Production for enhanced self-sufficiency</b>						
SC1	Improving Yield					
1.1	Improved planting materials and introduction of QDS	AREU	Jul 2008	4,000,000	12,000,000	Quantity of seeds produced
1.2	Land preparation/irrigation	AREU		8,000,000	24,000,000	Area developed
1.3	Technology/Skills/R&D support	AREU		24,000,000	72,000,000	No of technologies developed
SC2	Soil and Plant analysis and recommendation	AS		1,000,000	3,000,000	No of analytical reports with recommendations
	Diagnostic Services	AREU/AS		2,000,000	6,000,000	
SC3	Pesticide Residues analysis	AS		2,000,000	6,000,000	No of analytical reports with recommendations
SC4	Fruit fly control	AS				No of services offered
	Voucher for purchase of Hydrolysate Bait	AREU		1,000,000	3,000,000	Quantity supplied
	IPM (Import of Biological Control Agents)	AS		500,000	1,500,000	Number introduced and multiplied
	Training of Farmers	AREU		500,000	1,500,000	Number of farmers trained
SC5	Certification Global GAP	AREU		2,000,000	6,000,000	Number of producers certified
SC6	Post Harvest Handling & Storage Incentives	MoF		1,000,000	3,000,000	
SC7	Identifying Tomato	AREU		300,000	900,000	Number of

	Varieties with prolonged shelf life					varieties assessed and released
SC8	Identifying high yielding Chilli varieties with higher flesh content	AREU		300,000	900,000	Number of varieties assessed and released
SC9	Identify cauliflower and broccoli varieties for off season production	AREU		300,000	900,000	Number of varieties assessed and released
SC10	Land preparation and mechanisation for carrot cultivation	MSA		5,000,000	15,000,000	Area of land prepared
SC11	Enhancement of quality of carrots through GAP	AREU		500,000	1,500,000	New varieties released
SC12	Promote Post harvest & micro-storage system for carrots	AREU		500,000	1,500,000	Number of adopters
SC13	Production of baby carrots	AREU		300,000	900,000	Number of promoters and quantity produced
SC14	Production of baby squash, baby zucchini and melon	AREU		300,000	900,000	Number of promoters and quantity produced
SC15	Cleaning existing planting materials of ginger through tissue culture	FARC/AREU		250,000	750,000	
SC16	Multiplication of selected accession of garlic	AS/FARC		250,000	750,000	Quantity of setts produced and released
SC17	Cleaning existing planting materials of Garlic through tissue culture	AREU/FARC		250,000	750,000	Number of clones Cleaned and selected
SC18	Hydroponic and protected cultivation	AREU/FARC		7,000,000	21,000,000	Number of new promoters and quantity produced
<b>Subprogramme 3 – Fruits</b>						
F1	Increasing planting materials for Litchi	AREU		1,000,000	3,000,000	Quantity produced and released
F2	Global GAP Certification for Litchi & Pineapple	AREU		3,000,000	9,000,000	Number of promoters accredited
F3	Introduction of improved fruit planting materials	AREU/AS		1,000,000	3,000,000	Number of varieties and planting materials released
F4	Village frutier	AREU		2,000,000	6,000,000	Number of villages covered and plants grown
<b>Subprogramme 4 – Ornamentals</b>						
O1	Technical audit review of plant import procedures for ornamentals	AS		300,000	900,000	Consultancy report and implementation of recommendations

O2	R&D support	AREU			7,000,000	21,000,000	Number of new varieties and technologies
O3	Technology and up skills of farmers				8,000,000	24,000,000	Training sessions and beneficiaries
O4	Analytical and Diagnostic Services				1,000,000	3,000,000	Number of analytical reports and recommendations
<b>Subprogramme 5: Agro processing</b>							
AP1	Selection of appropriate vegetable varieties for processing	AREU			300,000	900,000	Number of new varieties assessed and released
AP2	Develop protocols, norms and standards for minimal processing and preservation	AREU			500,000	1,500,000	Number of new protocols developed
AP3	Setting up the Agri-business Incubation Centre	AREU			3,000,000	9,000,000	Operationalisation date and programme
<b>Subprogramme 6: - Promising Crops and Sustainable Agriculture</b>							
PC1	Pilot study for Soyabean and value-added products	AREU			7,000,000	21,000,000	Quantity of soyabean and products
PC2	Increasing supply of planting materials for Pejibaye	AS/MSIRI			1,000,000	3,000,000	Seed quantity distributed
PC3	Pilot study for commercial production of Pitaya	MSIRI/AREU			1,000,000	3,000,000	Production level of pitaya
PC4	Pilot study on commercial production and processing of Aloe vera	AREU			7,000,000	21,000,000	Production level of aloe vera and products
PC5	Pilot plant for composting and bio-fertiliser production	AREU			10,000,000	30,000,000	Number and quantity produced and used
PC6	Pilot study on prospects of organic agriculture	AREU/AS			6,000,000	18,000,000	Number of organic enterprises and production
PC7	Biotechnology and other emerging technologies	FARC			5,000,000	15,000,000	Number of technologies developed and adopters
<b>Livestock development programme</b>							
L1	Village laitier						
	Technical support	AREU/FARC			10,000,000	30,000,000	Training and recommendations made
	Fodder development	Forestry Services/AREU			10,000,000	30,000,000	Area and production of fodder
	Feed development	AREU			5,000,000	15,000,000	Amount made available
L2	Upskilling of farmers on animal husbandry	AREU			5,000,000	15,000,000	Number of sessions and

						beneficiaries
L3	Veterinary Services to be ISO certified	AS		500,000	1,500,000	
L4	Implementation of veterinary voucher system	AS		2,000,000		Number of beneficiaries
L5	Importation and insurance scheme for breeding stock	AS/SPWF		25,000,000	75,000,000	Number imported
L6	Provision of 5% of total bagasse and molasses to the dairy sector	MSA				
L7	Implementation of a voucher system for breeders to access feed from private companies	AS		3,500,000	10,500,000	Number of beneficiaries
L8	Slaughter, Quarantine and modernisation of Central Abattoir	MMA/AS		10,000,000	30,000,000	Operationalisation and number of beneficiaries
L9	Pest Control	DVS		3,500,000	10,500,000	Percentage reduction in pest population
L10	Veterinary services	DVS		6,400,000	19,200,000	Number of beneficiaries
L11	Technology transfer and R&D (Meat)	AREU		5,000,000	15,000,000	Number of technologies developed and adopters
L12	Technology/Skills/R&D support (poultry & pork)	AREU		5,000,000	15,000,000	Number of technologies developed and adopters
L13	Animal Production/Livestock Breeding (poultry & pork)	AREU		5,000,000	15,000,000	Number of new breeds introduced
L14	Training (poultry & pork)	AREU		3,000,000	9,000,000	Number of sessions and beneficiaries
<b>Marketing and Information</b>						
MI1	Setting up of a National Auction Market	AMB/AREU		35,000,000	105,000,000	Operationalisation date and programme
MI2	National market management information system	AREU/AMB		8,000,000	24,000,000	Operationalisation date and programme
IL1	Networking & Institutional linkages	FARC		12,000,000	36,000,000	Number of networks and collaborative projects developed