



High-Level Conference on:

Water for Agriculture and Energy in Africa: the Challenges of Climate Change

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National Investment Brief

MAURITIUS

EXECUTIVE SUMMARY:

Mauritius portrays a mild level of undernourishment, being one out of 20 persons classified as undernourished. The situation has not changed significantly from 1990-92, benchmark period of the World Food Summit (WFS) and the Millennium Declaration (MD) to 1999-2001, the last period available.

Sugar constitutes the principal agricultural commodity in Mauritius and is also the main irrigated crop. The area equipped for full control irrigation was estimated to be 21 222 ha in 2002 which represents one fourth (25%) of cultivated area. It is estimated that there is a potential to irrigate an additional 33 000 ha.

Mauritius consists of 25 major river basins, most of them perennial, with a total dam capacity of 93 million m³. There are eight hydropower plants with a combined installed capacity of 59 MW. Hydropower potential is almost fully tapped in Mauritius and, considering the competition for the existing water resources, there is now little scope for any further development of hydropower in the country.

Agriculture is one of the most vulnerable sectors to climate change in Mauritius. It is expected that agricultural production will be directly affected by higher climate variability and extreme weather events and indirectly by reduced availability of water resources and changes in soil physical and chemical properties.

The priorities identified by the Government of Mauritius for the agricultural sector can be found in the *Sugar Sector Strategic Plan (SSSP) 2001-2005* and the *Non Sugar Sector Strategic Plan, NSSSP 2003-2007*. With regards to sugar production the aim is to ensure that the nation's export commitments are fulfilled and to reduce the cost of production. The specific interventions sought to achieve the aforementioned objectives include the provision of irrigation water for some 32 000 ha with water efficient systems by 2010. The main objective of the Non-sugar Sector Strategic Plan is to allow non sugar products to take on a more important role, also recognizing that irrigation is an essential component in successful agriculture.

Currently, there is a Bankable Investment Project Profile for approximately Rs141.2 million on small scale irrigation and water control. Eleven recent and ongoing projects with large water component (irrigation and dam construction) can be identified, ranging from about Rs8.2 million to about Rs50 million.

1. CONTEXT

1.1 AGRICULTURE AND FOOD SECURITY

Agriculture

Since achieving independence in 1968, Mauritius has had a practically continuous economic growth, reaching in 2007 a Gross Domestic Product (GDP) of US\$6363 million (current US\$). At the time of independence agriculture was also the largest sector in the economy and accounted for more than 25 percent of GDP, but since then the share of agriculture in the GDP has been declining, reaching 5.5 percent in 2006. The agriculture sector employs around 10% of the total working population, meaning about 56 000 people, of which 24 percent are women and 76 percent men.

About 93% of the farmed land is dedicated to sugarcane. Seventeen large millers and planters, who account for the bulk of total production, cultivate about half the total area planted with sugar. The other half is cropped by around 30 000 small planters who use traditional cultivation methods. A high proportion of these small planters, most of whom are part time farmers, owns around 0.5 ha or less. Many farmers with access to irrigation have diversified production, cropping, aside sugar cane, food crops and vegetables, due to the expanded demand from tourism.

Irrigation and water control

The area equipped for full control irrigation was estimated to be 21 222 ha in 2002, which represents one fourth (25%) of the cultivated area. It is estimated that there is a potential to irrigate an additional 33 000 ha.

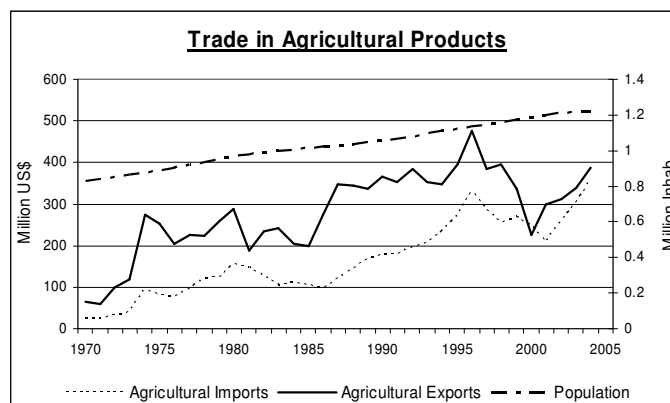
Most of the area equipped for irrigation is actually irrigated, i.e. 20 800 ha. Three categories of irrigation schemes can be distinguished: i) small-scale irrigation schemes (< 2 ha), amounting to 4 548 ha; ii) medium-scale irrigation schemes (2-40 ha), amounting to 328 ha; and iii) large-scale irrigation schemes (> 40 ha), amounting to 16 346 ha. The main irrigated crop is sugarcane.

Food security

Mauritius portrays a mild level of undernourishment, being one out of 20 persons classified as undernourished. The situation has not changed significantly from 1990-92, benchmark period of the World Food Summit (WFS) and the Millennium Declaration (MD) to 1999-2001, the last period available. Food supply has improved during the 90's and there is less undernourishment in Mauritius than in Southern Africa and in Sub-Saharan Africa.

Food and agriculture trade and import balance

The food import bill in the country has increased since 1970 (see figure aside). In 2004, the value of the agricultural imports reached US\$359 million, approximately fourteen times the value of the bill in 1970. Mauritius imports all its basic staples namely rice, wheat and oil and has been classified as a Net Food Importing Developing Country (NFIDC) by the WTO. Nonetheless and as shown in the chart aside, the agricultural exports appeared to be always above imports, due to the considerable production of sugar cane, almost fully (99%) oriented to foreign markets, specifically the EU and the USA. The agricultural exports, moreover, increased from the 1970s up to US\$339.5 million in 2003, reaching a peak of US\$476.7 in 1996. The country is self-sufficient in fresh vegetables except in times of unfavourable climatic conditions (cyclones, drought and heavy rains).



1.2 WATER RESOURCES AND HYDROPOWER

Mauritius consists of 25 major river basins; the largest are the Grand River South East and the Grand River North West. Most rivers are perennial, originating from the central plateau. Mauritius has five main aquifers. There are five main storage reservoirs (Mare aux Vacoas, La Ferme, Mare Longue, La Nicoliere, Piton du Milieu) and one impounding rockfill dam (Midlands Dam). Minor reservoirs for hydropower are Tamarin, Eau Bleue and Diamamouve and there are two in-field minor storage reservoirs at Valetta and Dagotièrre, which regulate water for irrigation. The total dam capacity is 93 million m³.

Hydropower in Mauritius represented in 2000, together with wind energy, 1.9% of the total primary energy supply. There are eight hydropower plants with a combined installed capacity of 59 MW. However, because of seasonal rain conditions and limited storage capacity, only two of these plants can generate power all year round. The other six plants generate as and when water is available, particularly during the period of January to March. Hydropower potential is almost fully tapped in Mauritius and, considering the competition for the existing water resources, there is now little scope for any further development of hydropower in the country.

1.3 CLIMATE CHANGE

The vulnerability of key socio-economic sectors to climate change was assessed by the government of Mauritius in 1999 using the General Circulation Model outputs (GCM) and available meteorological data. The two most vulnerable areas are the coastal zone (due to sea level rise) and the agricultural sector. It is expected that the agricultural production will be affected by the higher climate variability and extreme weather events with changes in crop development, increased competition from weeds, higher incidence of pests and diseases and, indirectly, from availability of water resources and changes in soil physical and chemical properties. Coastal agriculture could be affected by land degradation. The risk of intrusion of salt water in coastal aquifers exists.

2. NATIONAL STRATEGIES FOR WATER, AGRICULTURE AND ENERGY

2.1 POLICY CONTEXT

The priorities identified by the Government of Mauritius for the agricultural sector are summarised in four strategic documents: the *Sugar Sector Strategic Plan*, the *Non-Sugar Strategic Plan*, the *Fisheries Development Plan* and the *Forest Policy*.

The *Sugar Sector Strategic Plan (SSSP)*, developed in consultation with the private sector, covers the time frame of 2001–2005 and aims at ensuring that the nation's export commitments are fulfilled and at the reduction of the cost of sugar production. The reform process implies increased centralisation, cost reduction, enhanced productivity, optimization in the use of sugarcane resources, and diversification of activities. The specific interventions undertaken to achieve the above objectives include the provision of irrigation water for some 32 000 ha with water efficient systems by 2010. The

government is currently working on the preparation of the *Accelerated Reform for the Sugar Sector/Sugar Action Plan 2005–2015* as a response to the threat of a reduction in the guaranteed export price of sugar. However, it is expected that the accelerated reforms would leave more or less unchanged the proposed orientation for the sugar industry, including the intensive derocking/ irrigation/ mechanisation programme.

Regarding non-sugar products, the sector is governed by the *Non Sugar Sector Strategic Plan, NSSSP 2003–2007*. The objective of the Plan is to provide the basis for restructuring the non-sugar sector to allow it to take on a more important role vis-à-vis the increasingly challenged sugar sector. The main objective of the NSSSP is to modernize agriculture to make it economically viable and sustainable. The Plan recognizes that irrigation is an essential component in successful agriculture. A great emphasis is given by the plan to a series of measures aimed at ensuring a judicious utilisation of water resources in agriculture and the setting up of institutions.

Mauritius has no known oil, natural gas or coal reserves, and is therefore heavily dependent on imported energy carriers. The imported petroleum products and coal accounted for 75.4 percent of the primary energy requirements in 2000. Therefore, the Government’s policy on energy is to encourage a greater use of sources other than oil for the generation of electricity, through the optimization of the use of local and renewable energy sources. The government is currently undertaking an *Energy reform Policy 2007-2025*, supported jointly in the initial stage by the European Commission (EC) and the UNDP. The key objectives of the Energy Policy are to limit the vulnerability of Mauritius to imported fossil fuel and its volatile prices; promote economic growth and job creation; democratize energy supply; secure affordable energy to the consumers; and ensure financial sustainability.

With regards to Climate Change and according to the Government of Mauritius, adaptation within the agricultural sector will come through changes in management and infrastructure rather than changes in land use. Adaptation measures for water resources rely on better management and the use of "gray" water. In 1991 The National Climate Committee (NCC) was formally established under the chairmanship of the Prime Minister's Office with the objectives to monitor progresses made on the science of climate change and to evaluate the possible impacts of climate change on key sectors of the economy. Some studies regarding climate change have been conducted such as the Inventory of Greenhouse Gas Emissions for the year 1990, the assessment of coastal vulnerability to sea level rise, and the evaluation of impacts of climate change on local agriculture.

2.2 INVESTMENT ENVELOPE

The investment envelope for the short, medium and long term is presented in the Table below and expressed in million US \$ (based on CAADP investment projections).

Time scale	Type of investment (million US\$)			
	Small scale water control	Rehabilitation of irrigation	Large scale hydraulic projects	Total
Short-term	2	4	1	7
Medium-term	1	10	7	18
Long-term	1	2	14	16
Total	4	16	21	42

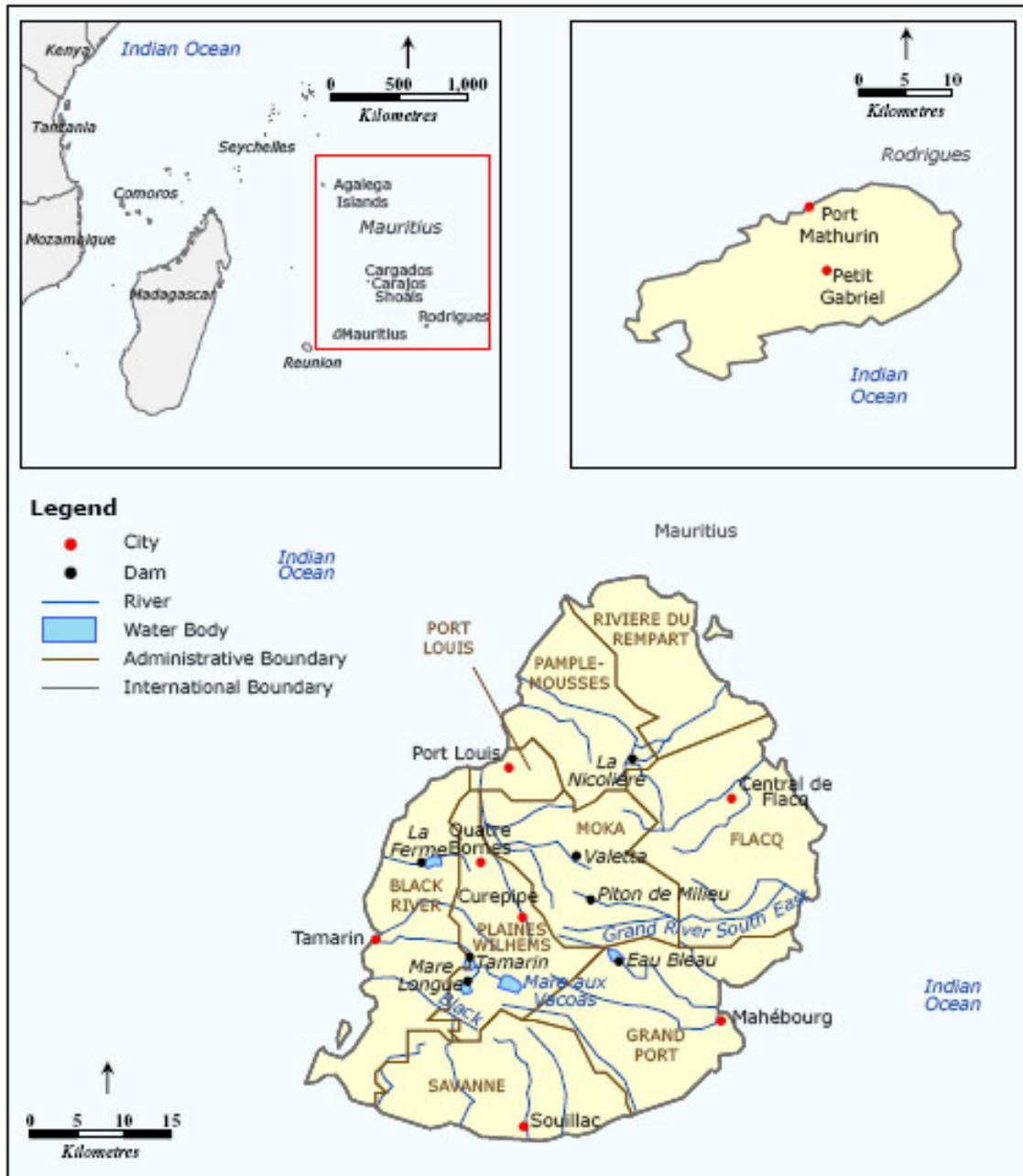
2.3 PROJECT PORTFOLIO

Section 3 presents recently achieved, active and pipeline projects related to the above investment envelope. Currently, there is a Bankable Investment Project Profile for approximately Rs141.2 million on small scale irrigation and water control. Eleven recent and ongoing projects with large water component (irrigation and dam construction) can be identified, ranging from about Rs8.2 million for a Center Pivot irrigation project to about Rs50 million for a drip irrigation project.

3. PROJECT PROFILES (ON-GOING AND PROJECTED)

Project title	Funding Partners	Lifeline	Total Budget	Description
I. PROJECTS RECENTLY IMPLEMENTED				
Solitude II Irrigation Project	Irrigation Authority	Operation in 2000	RS 26million	Drip irrigation covering 70 ha of sugarcane and vegetables that would benefit 117 planters
Western Coast Turnkey Drip Project	Irrigation Authority	Operation in 2000	RS 50million	Drip irrigation covering 230 ha of sugarcane and vegetables that would benefit 46 planters
Pointe aux Piments Irrigation Project	Irrigation Authority	Operation in 2001	RS 8.2million	Centre Pivot irrigation covering 42 ha of sugarcane, vegetables and foodcrops that would benefit 90 planters
Small-scale Agricultural Development Project	IFAD, International Bank for reconstruction and development, Government, Beneficiaries	1983-1991	US\$ 8.3 million	The project helped 2,000 small-scale farmers initiate new farm enterprises implemented through cooperatives or farmers' groups. It financed the construction of rural health centres in villages where they were badly needed. It introduced activities such as small-scale rice farming, litchi production and planting mulberry trees for silk production, and it introduced new farming ventures, such as rearing goats, and small-scale irrigation for vegetable production. The
Midlands Dam	BADEA, KFAED	April 2000 - End of 2002		Water supply for domestic and irrigation purposes
II. ON-GOING PROJECTS				
Development of Irrigated Agriculture in the Northern Plains Irrigation Project - Phase II	ADB, BDEAGOM	January 2005 - December 2009	US\$ 15.24 million	The project is focused on: Derocking and Land Preparation on 1,377 hectares; Technical Assistance; Installation of Irrigation Infrastructure (Centre-Pivot and solid set systems; Institutional support of the Irrigation Authority (IA) and the Agricultural Research and Extension Unit (AREU).
CWA Reduction of Non Revenue Water Enhancing 6 water supply networks on the island	EIB	Approved 17/12/01	€20,000,000	
Northern Plains Drip Irrigation Project	Gov. of France		Rs25m (†)	
Water Project	BADEA, KFAED			
Rural Diversification Programme	IFAD, Government of Mauritius	2000-2008	Total cost: US\$16.6 million IFAD loan: US\$11.1 million	The programme's goal is to help stimulate livelihood opportunities for disadvantaged households in Mauritius by developing microenterprises and diversifying food production. The area of operations includes the islands of Mauritius and Rodrigues, with special emphasis on the poorer northern and eastern parts of Mauritius Island. A key programme activity develops new irrigation schemes, rehabilitating existing schemes and establishing water users' associations to own and manage them. Irrigation schemes contribute to a rise in the productivity of land cultivated by small-scale farmers.
III. PIPELINE PROJECTS				
Bankable Investment Project Profile (BIPP): - Sustainable Land and Water Management	FAO-NEPAD		Rs141,200,000	The main objective of the project is to increase the area under sustainable small-scale irrigation and water control in Mauritius, through infrastructure development, human capacity building and catchments protection.

ANNEX 1: MAP OF WATER CONTROL IN MAURITIUS:



ANNEX 2: COUNTRY STATISTICS

Country and population								
Area of the country	2005	204	1000 ha					
Cultivated area as % of the total area of the country	2005	52	%					
Total population	2005	1245	1000 inhab					
• of which rural	2005	56	%					
Population economically active in agriculture	2005	54	1000 inhab					
• as % of total economically active population	2005	10	%					
• female	2005	24	%					
• male	2005	76	%					
Economy and Development								
Gross Domestic Product (GDP) (current US\$)	2007	6363	million US\$/yr					
• value added in agriculture (% of GDP)	2006	5.56	%					
• GDP per capita	2007	5038	US\$/yr					
Access to improved drinking water sources								
Total population	2006	100	%					
Urban population	2006	100	%					
Rural population	2006	100	%					
Water Resources and management								
Average precipitation	2007	4.2	10 ⁹ m ³ /yr					
Total actual renewable water resources	2007	2.751	10 ⁹ m ³ /yr					
Dependency ratio (transboundary rivers)	2007	0.0	%					
Total actual renewable water resources per inhabitant	2007	2210	m ³ /yr					
Total dam capacity	2003	0.093	10 ⁹ m ³					
Total water withdrawal	2003	0.725	10 ⁹ m ³ /yr					
• as % of total actual renewable water resources	2003	26.35	%					
IRRIGATION AND DRAINAGE								
Irrigation potential	2007	33	1000 ha					
Water Management								
Area equipped for irrigation: full control - total	2002	21.222	1000 ha					
Equipped lowlands	2002	0.000	1000 ha					
Total area equipped for irrigation	2002	21.222	1000 ha					
• Area equipped for irrigation as % of cultivated area	2002	20.0	%					
• Annual increase rate		2.8	%					
• Power irrigated area as % of area equipped for irrigation	2002	61.5	%					
• Area actually irrigated as % of area equipped for irrigation	2002	98.0	%					
Non-equipped cultivated lowlands and flood recession	2002	0.000	1000 ha					
Total agricultural water managed area	2002	21.222	1000 ha					
• Agricultural water managed area: as % of cultivated area	2002	20.0	%					
• Drained cultivated area as % of total cultivated area		-	%					
Typology of irrigation schemes								
Small-scale schemes (< 2 ha)	2002	4.55	1000 ha					
Medium-scale schemes (2 - 40 ha)	2002	0.328	1000 ha					
Large-scale schemes (> 40 ha)	2002	16.346	1000 ha					
Irrigated crops								
Maize	2002	0.038	1000 ha					
Sugar cane	2002	19.490	1000 ha					
Vegetables	2002	0.758	1000 ha					
Citrus	2002	0.042	1000 ha					
Tobacco	2002	0.340	1000 ha					
Groundnuts	2002	0.116	1000 ha					
Flowers	2002	0.135	1000 ha					
ENERGY INDICATORS								
Energy Production			Mtoe					
Net Imports			Mtoe					
TPES			Mtoe					
- TPES/Pop			toe/capita					
- TPES/GDP			toe/thousand 2000 US\$					
- TPES/GDO (PPP)			toe/thousand 2000 US\$ PPP					
Electricity Consumption			TWh					
- EC/Pop			kWh/capita					
ENERGY SUPPLY AND CONSUMPTION								
	Coal	Gas	Crude oil	Petroleum products	Hydro	Other Renewable & Waste	Others	TOTAL
Production								
Imports								
Exports								
International Marine Bunkers								
Stock Changes								
Total Primary Energy Supply (TPES)								

* in thousand tonnes of oil equivalent (ktoe) on a net calorific value basis.

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