

## **D INTEGRATED RESOURCE MANAGEMENT USING GIS**

### **D.1 Overreaching Goal for Geographic Information System**

The GIS technology is a tool which can be used for cross-sectoral analysis, giving a quick grasp of existing situation, so that planning and timely decision-support may be synchronised in Rodrigues, through a good balance of transparency and data confidentiality. The data exchange and integration, however, require a set of preconditions like interoperability of the systems, and data exchange protocol.

The satellite GIS represented by the major departments of Rodrigues, when integrated, enable the overview of Rodrigues development status, the progress achieved, the delays, and the driving factors. Removal of the unnecessary red tapes for digital information exchange among departments is expected to create the necessary synergy for co-ordination and resource optimisation. The ultimate goal of all information systems is to create the necessary knowledge and disseminate it as quickly as possible to all stakeholders, so as to dynamise the targeted development and sustain the economic growth. Given the limited land and water resources, better resources allocation to support the socio-economic development, to create jobs, and to improve the quality of life for the inhabitants are desired. At the same time, this should not be detrimental to the environment; as such equilibrium is really fragile for a small island economy.

- **Goal 1:** Proper spatial entity for selected data themes;
- **Goal 2:** Geodatabase as a corporate asset;
- **Goal 3:** Culture of data security and quality control;
- **Goal 4:** Knowledge build-up and dissemination to the community;
- **Goal 5:** Strengthen processes and procedures as well as organisation of operations.

#### **D.1.1 Proposed logical framework**

**INFORMATION SYSTEM DEVELOPMENT OF RODRIGUES**

**D.1.1.1 Goal 1: Proper spatial entity for selected data themes**

NARRATIVE SUMMARY (ACTIVITY DESCRIPTION)	INDICATORS OF ACHIEVEMENT (OVIS)	M & E (MoV)	RISKS & ASSUMPTIONS
<b>OVERREACHING GOAL: An integrated resource based GIS which enables an overview of the status of development across all sectors, their driving or impeding factors on the progress achieved</b>			
<b>Goal 1: Proper spatial entity for selected data themes</b>			
<p><b>Project Development Objective</b></p> <p>Objective 1. The Cadastre Land Information System has become sustainable as a service-provider.</p> <p>Activities:</p> <ol style="list-style-type: none"> <li>1. All land parcels are mapped, and can be linked to the Deeds' registry database</li> <li>2. Rehabilitation of abandoned lands, and squatters regulated</li> </ol> <p>7 Digital maps update is included in the license and lease payment routine complement the GIS</p>	<p><b>Output/outcome</b></p> <ol style="list-style-type: none"> <li>1.1. All land parcels (leased state land as well as privately owned) are mapped with the accuracy required for legal standards by the end of 2008.</li> <li>1.2. Real-time visualisation of land parcel, and data query on deeds details is possible at the Registry's desk by 2009.</li> <li>2.1. Abandoned lands are identified through on-line property revenue collection, and are redeployed for leasing.</li> <li>2.2. All squatters are regulated for lease payment by year 2010.</li> <li>3.1. Any amendment to existing land parcel use, new building construction or modifications to</li> </ol>	<ol style="list-style-type: none"> <li>1. Lease payment is up to date.</li> <li>2. New lease application and/or land use permit can be issued within one week.</li> <li>3. Members of RRA through its library node follow real-time land use change, and development by 2009.</li> <li>4. No squatters by 2010.</li> <li>5. Yearly land use statistics is published.</li> </ol>	<ol style="list-style-type: none"> <li>1. The cadastre office is modernised, strengthened with trained personnel, and equipped for commercial digital/hard copy map production.</li> <li>2. A proper legal and institutional framework is set up by the RRA to support the Cadastral Land Information System</li> </ol>

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<p>8 Trainings in land management and administration</p> <p><b>Objective 2. Land evaluation</b></p> <p>Activity 1. Stockstaking of remaining lands (excluding settlement), according to their suitability for other development as proposed by the land suitability map</p>	<p>existing building is handed in as hard and digital copy for permit application according to law.</p> <p>3.2. Hard and digital copies of land parcel maps including site plan are provided at a minimal fee by 2008.</p> <p>1.1. Areas feasible for land improvement projects like irrigation, terracing, and drains provision are earmarked to accommodate big agricultural/business projects</p> <p>1.2. Siting of various cluster types: agribusiness, PME, or handicraft village are done through the spelling out of specific criteria, and their identification on map layers.</p> <p>1.3. The technical committee assesses project profitability and sustainability through simulation scenarios in GIS.</p> <p>1.4. Holistic Land evaluation is possible as from 2008 with map overlays from different departments.</p> <p>2.1. Physical infrastructure like road network and facilities mapping like water supply, electricity, and telephone network can be</p>	<p>6. By 2009, individual business license issued same day; whereas business clusters' permit issued within 48 hrs on normal working days.</p> <p>1. Map documents and spatial statistics are produced for decision-support.</p> <p>2. Monitoring of the phased development, and implementation can be done through database query, and map documents produced.</p> <p>3. Propositions are submitted with relevant information to funding agencies.</p> <p>4. Taxes are charged according to facilities' access, and the development potential of the area.</p> <p>5. Monthly progress is</p>	<p>1. Memorandum of understanding is signed among departments to share costly resource map, and their derived information.</p> <p>2. All map layers are geo-referenced, and have same map projection</p> <p>High speed computer connection is accessible at reasonably cheap price</p>

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<p>Activity 2. Yearly data update calendar is established for each department</p> <p><b>Objective 3.</b> Assessment of catchment's capacity</p>	<p>uploaded for property assessment, and development by the beginning of 2010.</p> <p>2.2. Consensus is reached for a list of priority development areas to be catered for in the next financial year:</p> <ul style="list-style-type: none"> <li>a) Inadequate facilities</li> <li>b) Missing physical and social infrastructure which impede development, and/or to decrease opportunities for new development,</li> <li>c) Missing critical information for decision-making</li> </ul> <p>1. The following base maps for Rodrigues are published:</p> <ul style="list-style-type: none"> <li>• Mean annual rainfall map or Isohyet.</li> <li>• Mean annual evaporation map,</li> <li>• Mean annual solar radiation map</li> <li>• Summer/Winter temperature map</li> </ul>	<p>monitored by the inter-sectoral committee; and any delay is treated promptly.</p> <p>1 Daily weather bulletin is broadcasted to the local community.</p> <p>2 Catchment microclimate maps available to all stakeholders.</p>	<p>1. Funds obtained for equipment purchase.</p> <p>2. Delays in equipment installation and commissioning as rely on the availability of Mauritian staff.</p> <p>3. Catchment boundary is established and</p>

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<p><b>Activities:</b></p> <p>3.1. Automatic weather stations are installed in major river catchments for daily rainfall, temperature, wind measurement. Evaporation and solar radiation are also recorded</p> <p>1.2. Flow gauges are installed, and calibrated for automatic daily recording.</p> <p>3.3. Routine water sampling from boreholes and rivers for lab analysis.</p> <p><b>Objective 3.</b> Assessment of catchment's capacity</p> <p><b>Activities:</b></p> <p>3.1. Automatic weather stations are installed in major river catchments for daily rainfall, temperature, wind measurement. Evaporation and solar radiation are also recorded</p> <p>3.2 Flow gauges are installed, and calibrated for</p>	<ul style="list-style-type: none"> <li>• Summer/Winter rainfall map</li> </ul> <ol style="list-style-type: none"> <li>2. Water balance is established for each river catchment by 2010.</li> <li>3. Water tariff is set according to water quality, and use.</li> <li>4. Catchment health is diagnosed: Possible salination of fertile valleys, and Non-Point Source pollution of river catchments are under control.</li> <li>5. Fertilizer applied according to the site's fertility status, with the necessary soil amendments wherever applicable.</li> <li>6. Erosion prone sites are identified, and mapped. The local community are informed. Corrective measures undertaken according to established calendar Lagoon silting attenuated.</li> <li>7. Lagoon silting is under control.</li> </ol>	<ol style="list-style-type: none"> <li>3 Daily river flow data for major valleys is published in Water Resources Yearbook.</li> <li>4 Monthly bulletin on water extraction from boreholes and rivers is published together with water quality data.</li> <li>5 Water bills paid, and water rights respected.</li> <li>6 Environmental flow ensured: Favourable report on biodiversity of both aquatic and riparian ecosystems.</li> <li>7 Soil fertility, and nutrient(s) deficiencies mapped</li> <li>8 Selective</li> </ol>	<p>agreed.</p> <ol style="list-style-type: none"> <li>4. Interpolation of point data collected in catchment is done with the help of GIS</li> <li>5. Local staff is trained for validation of meteo and water flow data, and minor equipment maintenance in the short term.</li> <li>6. Water analysis lab and Soil analysis lab have been set up in Rodrigues.</li> <li>7. High-resolution satellite image is programmed and purchased every 3 years to serve as a common base map for all departments to monitor land use, environmental</li> </ol>

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<p>automatic daily recording.</p> <p>3.3. Routine water sampling from boreholes and rivers for lab analysis.</p> <p>3.4. Soil fertility assessed through systematic soil analysis prior to crop cultivation, and strategic sampling.</p> <p>3.5. Determination of soil erosion rate at selected sites</p> <p>3.6. Determination of agricultural productivity, economic performance, and life quality in the villages of the catchments</p>	<p>8. Agricultural production is mapped and can be queried on-line.</p> <p>9. GDP, life quality, etc. are mapped for comparison on village or on catchment basis.</p>	<p>consolidation of riverbanks; and storm water drains are constructed on steep slopes.</p> <p>9 Comparative production, life quality, etc. is published on RRA website.</p>	<p>changes including the territorial seas.</p> <p>8. Village limits are proclaimed. Aggregation of villages to enumeration areas of CSO is straightforward.</p>

**D.1.1.2 Goal 2: Geodatabase as a corporate asset**

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<b>Goal 2: Geodatabase as a corporate asset</b>			
<p><b>Objective 1: Organise present data collection and systematic compilation.</b></p> <p><b>Activity 1.</b> Each department prepares a list of</p>	<p>1.1 Template for data collection, and the calendar for such data collection are set.</p> <p>1.2. Regular inflow of data for database</p>	<p>1. Statistics or summary are published by each department at regular</p>	<p>1. System analysis performed in each</p>

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<p>critical data, and map documents required in their work. (Field workers, report preparation and strategy development).</p> <p><b>Objective 2: Identification of critical data gaps.</b></p> <p><b>Activity 1.</b> Incomplete data and missing data are flagged</p> <p><b>Activity 2:</b> Action plan is formulated for project funding, and the levels of technical assistance required.</p>	<p>maintenance in each department, as defined by the calendar of data compilation.</p> <p>1.3 Database is up to date for use.</p> <p>1.4. All GIS satellite sectors (cadastre, agriculture, forestry, central administration, and PID) hand in yearly updated datasets to central administration in month x of each year to maintain the integrated resource database.</p> <p>2.1. Additional resources required for such data tracking are evaluated, and priorities set.</p> <p>2.2 Scholars research on selected data gaps; and scholarship offered to young graduates for specific topic's research</p> <p>2.3 Tailor-made courses or attachment are offered to officers for skill acquisition in data exploration, and instrumentation.</p> <p>2.4.Short-, medium-, long-term action plan of the department is published.</p>	<p>interval; and are accessible through RRA website</p> <p>2. Monthly progress reported by the technical committee</p> <p>1. Constraints (financial, staffing, equipment) list submitted to technical committee for action</p> <p>2. Collaboration of NGOs, Universities, and community is visible.</p> <p>Staff movement is checked as career path is visible in the department</p>	<p>department, and advice of Statistician sought in the template prepared for data collection and entry.</p> <p>2. Dedicated staff for data maintenance.</p> <p>3. Delays in field data collection due to unforeseen circumstances.</p> <p>4. Inter-sectoral committee is set up for resource pooling, viz., data conversion, and equipment replacement</p> <p>RRA has a co-ordinated action plan to empower each department in database maintenance</p>



