

**Integrated Water Resources Management (IWRM) Planning**  
**Development of a**  
**National Integrated Water Resources Management Policy**  
**for the Commonwealth of Dominica**

**TERMS OF REFERENCE**

**1. Background**

Caribbean countries occupy a region of the world in which providing adequate supplies of freshwater can present a substantial challenge to governments. In many countries, the annual per capita freshwater availability falls far below the 1,000 cubic meter commonly used to measure scarcity. In addition, the region has a poor track record of water resource management within the watershed and with respect to groundwater supplies. Due to the particular geography of Caribbean small island states, detrimental actions within the watershed areas immediately impacts the coastal zone areas and offshore waters.

Further, consequences of an unsatisfactory or inadequate management approach is having, and will continue to have, severe environmental impacts on key economic sectors such as agriculture and tourism. Poor water quality and/or inadequate supplies of water can have significant impacts on human health in terms of increasing the potential for incidence of water borne diseases and causing other negative impacts on health and sanitation. The future sustainability of the islands and the general health and well-being of the population are dependent on an integrated management approach to watersheds and coastal areas. This approach can produce benefits in other areas, particularly related to biodiversity conservation, climate change adaptation and land degradation abatement.

The United Nations Environment Programme (UNEP) and its national and international development partners are providing support to developing countries in attainment of their commitment under the Johannesburg Plan of Implementation to develop Integrated Water Resources Management (IWRM) and Efficiency Plans. Integrated water resources management is a systematic process for the sustainable development, allocation and monitoring of water resource use in the context of social, economic and environmental objectives.

Additionally, Dominica has ratified the Convention for the Protection and Development of the Marine Environment in the Wider Caribbean Region (Cartagena Convention). The Cartagena Convention is a comprehensive, umbrella agreement for the protection and development of the marine environment. In 1999, the Protocol Concerning Pollution from Land-Based Sources and Activities (LBS Protocol) to the Cartagena Convention was adopted and is currently being considered by many countries in the region for ratification, including Dominica. . The LBS Protocol is perhaps the most significant agreement of its kind with the inclusion of regional effluent limitations for domestic

wastewater (sewage) and requiring specific plans to address agricultural non-point sources. Specific schedules for implementation have also been included in the Protocol.

The Ministry of Agriculture, Fisheries and Forestry, with the support of the Global Environment Facility-funded Integrating Watershed and Coastal Areas Management (GEF-IWCAM) Project, the United Nations Environment Programme Caribbean Regional Coordinating Unit (UNEP/CAR-RCU), and the Pan-American Health Organisation (PAHO), and the Caribbean Health Institute (CEHI) held a Land Based Sources of Pollution Awareness and Promotion Workshop at the Garraway Hotel in Roseau, Dominica on 23-24 July 2009. At this workshop, it was recommended Dominica move forward with the ratification of the LBS Protocol, together with technical assistance from the GEF-IWCAM Project and UNEP/CAR-RCU.

As part of the national IWRM Plans development process and the process towards ratification of the LBS Protocol, the formulation of a national policy statement for the management of land and water resources is needed. The policy statement sets the backdrop that orients the IWRM Plan and LBS Protocol ratification process and the implementation of actions that are articulated in the IWRM Plan.

A national IWRM Plan aims to:

- heighten awareness and understanding of the value and benefits of integrated water resources management;
- identify and implement actions to address specific causes of negative impacts and threats on human health and the environment;
- mobilize resources and partners, including the private sector, for implementation of specific projects to address the negative impacts and threats on human health and the environment.

The IWRM planning process is a multi-staged undertaking that needs to include:

- Visioning on the needs and strategic directions for water resource management. This will take the form of an island-wide multi-stakeholder workshop for consensus-building;
- Data gathering and situational analysis to provide the necessary scientific, socio-economic data required in IWRM plan development;
- Strategy Formulation as shaped by the visioning exercise, research, focus group and technical stakeholder inputs;
- IWRM Plan validation and ratification through national stakeholder workshops and policy-level input followed by formal endorsement and adoption.

The IWRM Plan development process as specified in a **Roadmap** generally considers 9 key Action Areas (GWP, 2005), although this needs to be weighed in the context of the country circumstance and how advanced it is in its IWRM Plan development stage. These Action Areas include:

1. Process initiation;
2. Steering Committee (SC) establishment;
3. Process management team (PMT) establishment;
4. Stakeholder involvement plan development and implementation;
5. Communications plan development and implementation;
6. Situational Analysis and IWRM Plan Framework;
7. Vision Statement and Goals Articulation (considered under the National Policy Statement);
8. Evaluate IWRM Plan options;
9. IWRM Plan promotion, adoption and implementation.

The Integrated Watershed and Coastal Area Management (IWCAM) concept and approach provides a framework for countries to better address environmental management challenges that they face. To this end, the United Nations Environment Programme (UNEP) and the United Nations Development Programme (UNDP) are co-implementing the GEF-IWCAM Project. The GEF-IWCAM Project is also being co-executed by the Caribbean Environmental Health Institute (CEHI) and UNEP's Caribbean Regional Coordinating Unit (UNEP/CAR-RCU). Under Component 3 of the GEF-IWCAM Project, which focuses on Policy, Legislation and Institutional Reforms, support is provided for national IWRM Plan development in all 13 GEF-IWCAM participating countries. This work has already begun in Grenada, St. Lucia, Union Island (Saint Vincent and the Grenadines), Barbados and Antigua and Barbuda. For more information on the GEF-IWCAM Project please consult the website at [www.iwcam.org](http://www.iwcam.org)

## **2. Objectives of the Consultancy**

The objective of the consultancy is:

*To prepare a **National Integrated Water Resources Management Policy** statement for the Commonwealth of Dominica. This Policy is intended for ratification at the highest political level and will set the overall guidance for management of the country's coastal and fresh water resources and advocate for **ratification of the LBS Protocol**.*

*This Policy development process must draw on, and build on the previous policy work conducted under a 2005 EU-financed water resources management planning initiative for Dominica (Annex 1).*

### 3. Responsibilities of the Consultant

The Consultant will be required to (*inter-alia*):

1. Closely review the recommendations of the 2005 Dominica water resources assessment and policy statement prepared by Dr. Remy L. de Jong, and the 2008 Dominica Water & Sewerage Company Institutional Review Study by NIRAS Consulting Engineers and Planners as primary references in the formulation of national water resources policy directions, and proceedings from the July 2009 aforementioned LBS Awareness Workshop.
2. Acquire pertinent data to inform a situational analysis in respect of the status of water resources management in Dominica that should form the backdrop to the policy statement. This will take the form of literature search and interviews with relevant stakeholders in Dominica. The IWRM Data Capture Instrument (listed as Annexes to the Roadmaps prepared for other Caribbean countries by CEHI) should be used as a guideline as appropriate. The following are key areas for focus:
  - a. Identify stakeholders, assess their interests, their potential contributions to the IWRM policy development process and LBS ratification and their relative influence and importance;
  - b. Examine the existing water resources management framework in terms of the IWRM principles and the goals of sustainable management and development;
  - c. Assess socio-economic aspects in terms of impacts of the present water resources management framework;
  - d. Assess the current status of the critical watersheds<sup>1</sup> in Dominica in terms of land and water quality management issues and make general recommendations for each of these watersheds that will result in improved water resources management (these recommendations should consider *inter-alia*, enactment/enforcement of specific legislative instruments and regulations, voluntary compliance mechanisms, enhancements to land tenure, establishment of conservation buffer zones, etc);
  - e. Provide a policy approach for future groundwater exploitation within aquifers in Dominica;
3. Participate in an **IWRM policy visioning workshop** and make a presentation on the IWRM policy development process to date in Dominica. Identify through stakeholder feedback, any gaps that need to be addressed, particularly with respect to the linkages to coastal water resources management. Document the outcomes of the workshop;

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<sup>1</sup> Determine in consultation with DOWASCO and the Forestry Department. Please note that the GEF-IWCAM project is also providing support to the development of a watershed management planning initiative for the Roseau Watershed. Outputs from that initiative should be integrated within this project as relevant.

4. Prepare a **National IWRM Policy Statement** for the Commonwealth of Dominica using appropriate models from Caribbean countries (e.g. St. Lucia, Grenada, Jamaica) and other SIDS incorporating the elements from Item 2 above. This Policy statement must include the coastal water resources management dimension with emphasis on pollution control (linkage to the LBS Protocol). The National Water Policy Statement must make reference to and build on the 2005 Dominica water resources assessment and policy statement prepared by Dr. Remy L. de Jong, and the 2008 Dominica Water & Sewerage Company Institutional Review Study by NIRAS Consulting Engineers and Planners. Note that the key findings of the situational analysis must be included as background within the policy;
5. Present in a National Workshop setting the IWRM Policy to key stakeholders in Dominica, incorporating their feedback into the final version of the document (note that the key stakeholders must be identified in consultation with DOWASCO and the Forestry Division.
6. Prepare a **IWRM Policy Brief** for public dissemination;
7. Prepare an **LBS Policy Brief** for public dissemination;
8. Prepare the **IWRM Cabinet dossier/documentation** for presentation of the policy to the Cabinet of Ministers for ratification;
9. Prepare an **LBS Protocol Cabinet Brief** for presentation of the Protocol to the Cabinet of Ministers for ratification;
10. Prepare a **Lessons Learnt Paper** (max 10 pages) that documents the policy development process.

There are many institutional partners at the regional and international level that have been making contributions to the IWRM development process and LBS Protocol ratification in the Caribbean region. These stakeholders should be consulted for inputs into the process. Relevant agencies include:

- Caribbean Community Climate Change Centre (CCCCC)
- Caribbean Institute of Meteorology and Hydrology (CIMH)
- Caribbean Water and Wastewater Association (CWWA)
- Caribbean WaterNet
- Food and Agriculture Organization (FAO)
- GEF-Integrating Watershed and Coastal Areas Management Project (GEF-IWCAM)
- Global Water Partnership-Caribbean (GWP-C)
- Institute of Marine Affairs, Trinidad and Tobago (IMA)
- Inter American Institute for Cooperation on Agriculture (IICA)

- Pan American Health Organization (PAHO)
- UNEP Caribbean Regional Coordinating Unit (UNEP CAR-RCU)
- United Nations Education and Scientific and Cultural Organization – International Hydrological Programme (UNESCO-IHP)
- University of the West Indies (UWI)

#### 4. Deliverables

The Consultant must provide to the Executive Director at CEHI the following deliverables within the stated time frames:

1. **Inception Report** that lists the actions and indicative timeframes over the course of the contract within one (1) week of contract signature;
2. **Draft National Integrated Water Resources Management Policy** within twenty (20) weeks of contract signature;
3. **Draft LBS Policy Brief** within twenty (20) weeks of contract signature.
4. **Final National Integrated Water Resources Management Policy** incorporating stakeholder feedback within twenty-four (24) weeks of contract signature;
5. **Draft IWRM Policy Brief** within twenty-four (24) weeks of contract signature;
6. **Final LBS Policy Brief**, incorporating stakeholder feedback within twenty-six (26) weeks of contract signature;
7. **Final IWRM Policy Brief**, incorporating stakeholder feedback within twenty-six (26) weeks of contract signature;
8. **IWRM Cabinet Dossier** within twenty-eight (28) weeks of contract signature;
9. **LBS Cabinet Dossier** within twenty-eight (28) weeks of contract signature;
10. **Lessons Learnt Paper** at thirty (30) weeks or at the end of contract period.
11. **Monthly progress briefs** that summarise key tasks achieved and challenges encountered.

#### 5. Consultant Profile

The following are the principle assets sought in the consultant:

- A professional with research, writing, analytical and computing skills;
- A graduate degree in water resources management, environmental studies, or a related field;

- Significant experience and understanding of the IWRM process, the LBS Protocol and the national water sector will be an asset.

## 6. Duration

The period of execution of this contract is eight (8) months beginning on the date of signature of the contract execution documents. **Please note that the input in terms of mandays is expected to range between 25 and 35.**

## 7. Submission Requirements

Proposal submissions are to include:

1. A technical proposal
2. A cost proposal (budget)

Technical proposals must not exceed 10 pages in length, including CVs. Other material deemed to be relevant to the proposal may be attached as annexes.

Proposals must be submitted via e-mail to Natalie Boodram ([nboodram@cehi.org.lc](mailto:nboodram@cehi.org.lc)) by **December 11<sup>th</sup> 2009**. The subject of the e-mail should be RFP – Dominica Integrated Water Resources Management Policy and then the name of the company or consulting group submitting the proposal, or, if submitted by an individual, your last name (e.g. *RFP – Dominica Integrated Water Resources Management Policy – Smith* or *RFP – Dominica Integrated Water Resources Management Policy – Smith and Jones Associates*)

Caribbean Environmental Health Institute  
November 19, 2009

## Annex 1      **Some key water resources policy strategic directions for Dominica**

**Extracted from:** Dominica Water & Sewerage Company Institutional Review Study by NIRAS Consulting Engineers and Planners (2008) with reference to the Dominica water resources assessment and policy statement prepared by Dr. Remy L. de Jong (2005);

### **Integrated Water Resources Management (IWRM) approaches**

**Economic and Institutional Framework:** Environmental management works within a complex of natural, technical and social systems and has to involve a wide variety of different relationships between organisations. There are no unique models for successful environmental management and many different forms are seen to work more or less effectively in different countries at different times. That is, the success of environmental management is conditional on a wide array of factors for which there is no standard recipe. The divergence between formal procedures and informal behaviour for the budgetary process is also apparent in environmental management for similar reasons.

The main questions to be addressed when addressing the support needed for effective environmental management concerns where and how to intervene, - bearing in mind the different interest groups involved, their different political agendas, and power bases. Different groups at different levels of government may, in following what they perceive to be in their best interests, work counter to the needs of others. This is a common feature of all systems of governance where the principles and practices of subsidiarity are not fully established. The problem may be understood from the perspective of 'interest-group intermediation':

*'policy networks (of interest-groups) are characterised by interdependence between organisations; continued interaction between network members to exchange resources and negotiate shared purposes; game-like interactions rooted in trust and regulated by the rules of the game negotiated and agreed by network partners; and a significant degree of autonomy from formal state procedures<sup>2</sup>'.*

Getting interest-groups to work together to address critical environmental management needs is difficult because, outside the management framework of a single organisation, the levers that control behaviour and performance are missing and the only way to implement improvements or establish accountability is through trusted relationships on a reciprocal basis. This situation is present even in strong and functional administrative hierarchies.

Promoting the active participation by as many actors as possible within the sector is therefore necessary not only on the grounds of enhanced accountability but also on the grounds that this is necessary to achieve some workable consensus on how to implement environmental reforms. This is especially true for the environmental sector where many of the stakeholders have quite different ideas on what constitutes the public interest.

**IWRM Approaches:** The National Water Policy would incorporate IWRM Approaches. Integrated Water Resources Management (IWRM) systems and procedures integrate hydrology, engineering, social and economic best practices (i.e. a *holistic* approach), and integrate the goals, needs, interest, beliefs and knowledge of all water users (i.e. a *participatory* approach).

IWRM approaches include all the water users' groups and also the users being affected by the water use of others. In this participative approach polluting water users (e.g. farmers) should be assisted to make their own impact assessment and their own plans for taking remedial actions. In this way better water use practices become established as social practice and the need for costly (and problematic) regulation is

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<sup>2</sup> Rhodes.R (1997) *Understanding Governance, Policy Networks, Reflexivity and Accountability*. OUP, Oxford

avoided. However, there must also be a regulatory framework based on law to establish compliance with sustainable water resource management practices.

IWRM draws its inspiration from the Dublin Principles (see annex I.3). It considers not only the interdependencies within natural systems, but also the way that economic and social systems affect the demands placed on the resource base. It establishes the need for enhanced stakeholder involvement in water development and management, including recognition of the vital role played by women as decision makers and water users.

Finally, it considers water as an economic good which cannot continue to be freely available for all competing users and uses. Demands will inevitably outstrip the capacity of the resource base to deliver services unless mechanisms exist to make users aware of the provision costs (including the environmental costs) involved.

**Challenges for Policy Makers:** IWRM approaches represent a major challenge for policy makers. It requires a break from tradition, from the sectoral to integrated management, from top-down to stakeholder and demand responsive approaches, from supply fix to demand management, from command and control to more co-operative or distributive forms of governance, from closed expert driven management organisations to more open, transparent and communicative bodies.

Meaningful IWRM is ultimately about changing the nature of water governance, which is defined as 'the range of political, social, economic and administrative systems that are in place to develop and manage water resources, and the delivery of water services, at different levels of society'

**Concepts of water scarcity:** IWRM is also closely linked to managing water scarcity. It is obvious that a lack of water resources will encourage the implementation of IWRM initiatives – whereas surplus of water (as is the case in Dominica until now) tends to discourage any serious efforts to implement IWRM approaches.

It is estimated that 8% of the world's populations live in areas that are classified as water stressed areas. With respect to water availability the world-wide definition considers that a potentially serious constraint on socio-economic development occurs when there is less than 1,000 m<sup>3</sup>/capita/annum.

In Dominica the amount of renewable water/capita is estimated to be around 20,000 m<sup>3</sup>/capita/annum. However the exact amount is difficult to determine as there are no hydrometric stations on Dominica and this data is not available (see annex I.5 for further discussion and guidance on hydrometric equipment needed to measure river flows).

Dominica therefore cannot be described as 'water stressed' but as demand rises there will be increasing need for higher levels of capital investment into new schemes in specific areas and a search for new sources especially during the dry season

## **IWCAM Project Recommendations for the Caribbean**

**Caribbean-wide Approach:** The "*Integrated Watershed and Coastal Areas Management Project*"<sup>3</sup> was formulated in response to Caribbean concerns on watershed and coastal areas management issues. Because coastal and marine areas cannot be defined in narrow sectoral terms, neither can the projects that seek to manage them be limited to sector initiatives. The Project proposed that an overall objective be agreed that ...'recognized the impacts of activities in terrestrial areas to overall coastal water quality. As Caribbean countries continue to cite the absence of a unifying policy on the issue of marine pollution as a fundamental weakness in addressing coastal and marine issues, the project promotes the demonstration of effective, comprehensive, *integrated watershed and coastal area management systems*, based on an intersectional management approach, in the participating Caribbean islands'.

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<sup>3</sup> IWCAM Report (August 2007) *Review of Policy, Legislation & Institutional Structures related to IWCAM in countries participating in the IWCAM Project*. Coordinated by CEHI and UNEP-CAR/RCU

**Key Issues to be addressed:** The legal, institutional and policy framework for “integrating watershed and coastal area management” is considered to be an integral building block to achieve the transition from a fragmented, inconsistent and sometimes conflicting approach to a comprehensive watershed and coastal areas management system. A summary of issues is given in Annex I.2 and is summarised as follows:

- **Institutional Options:** The numerous pieces of legislation that deal with a various aspects of IWCAM in separate instruments establish different policy, implementation and enforcement strategies. As a result proper oversight over either remedial or regulatory measures is inconsistent. These actions need to be coordinated by an institutional framework that can ensure consistency in implementation and enforcement policy.
- **Amendment of sectoral legislation:** IWCAM–related legislation is scattered in several pieces of legislation that are outdated and do not in a precise manner or adequately address the key IWCAM issues in a management context.
- **Policy Harmonization:** Overlapping responsibilities between the many different agencies can lead to conflicts in the implementation and enforcement of the different legislative and policy schemes. While some are more focused than others there is a tremendous degree of overlap between several of them. Several policies contain slight differences in terms of actions to be taken there under, leading to potential conflicts. There is thus a need for greater rationalization of these competing and conflicting policies to arrive at one comprehensive policy balancing all these competing interests
- **Human resource capacity:** A major area of weakness to IWCAM is the inadequate human resource capacity – specifically, the lack of adequately trained manpower to carry out the functions needed for integrated watershed and coastal areas management, and a lack of structured training programmes.
- **Enforcement regime:** The issue of comprehensive enforcement of legislation remains a crucial issue. Lack of enforcement stems from several factors including limited human resources and lack of buy-in to the underlying principles of the enactment by the enforcement person

## **Institutional & Organisation of an IWRM Framework**

**Water Policy Study (EC 2005):** An EC Report on Water Policy in Dominica (2005)<sup>4</sup> concluded that there was a need to develop a *Comprehensive Water Policy* and a *Legislative Framework for Water Resources Management* for all the water sectors in Dominica - policies and laws being the tools to implement the objectives of Government on a national scale. The Report presented a 2-3 page draft *Water Resource Management Policy* consisting of 12 key water principles with explanatory notes.

As of today there is no structured institutional set up to efficiently manage water resources on Dominica. Three three models or scenarios of that could remedy this shortcoming:

- i) An established *National Water Resources Council* with participation from 4-6 ministries with interest in water resources and its allocation to provide policy direction and guidance.
- ii) The establishment of the same *Council* as above but with an *Executive Water Resource Management Unit* to implement directives and decisions made by the Commission/Council.
- iii) A new *Ministry for Water Resources and Environmental Protection*. Recognizing the importance and economical value of water resources and in addition alleviate the present confusion on exactly who manage and monitor Dominica’s water resources.

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<sup>4</sup> As given in Study ToR...”*A Report of a consultancy on Water Legislation funded by the European Commission in 2005 with objectives of (i) Development of a comprehensive water policy, (ii) Clarification of the legislative and institutional framework as it relates to water resources management. (iii) Institutional recommendations for the implementation of proposed irrigation and drainage projects and the management and maintenance of related infrastructure must be considered in this study”.*

**Establish a Water Resources Council (WRC):** These institutional models are examined in detail in Annex I.4 which concludes that a *Water Resources Council* with representatives from ministries with an interest in the water sector should be established. This would be an executive branch of water management that will push WRM policy issues forward when established. The WRC would be a body with periodic meetings and no permanent presence or office

For DOWASCO – this implies that the management of national water resources, which is set out in the Water and Sewerage Act 1989, will be out of their hands.

**Establish a Water Management Unit (WMU):** Annex I.4 also suggests that a new body called a *Water Management Unit* should be created with 3-5 permanent professional staff members to implement the Council's directives, guidelines and policy decisions. It would put in place regulations for water use permits and wastewater disposal permits, some tasks already described in Parts VI and VII of the Water and Sewerage Act 1989.

The functions of such a Unit would be initially set up by DOWASCO who may then transfer to the WMU – and thereby provide the link and information of water availability, quality etc. when needed by DOWASCO

**Water Resources Data:** In addition, assuming that the basic data situation would allow this, those bodies would in due course also develop a long-term water management plans. The Unit could also take over the technical function with little controversy such as installation of a certain number of hydrometric stations and monitoring the catchments for both the critical dry weather flows, especially in the NW region where internal settlement and tourism are expected to grow, and annual discharges.

The latter would include some computer hardware and software as well as the installation of a basic network of hydrological data stations for permanent surface water records (see annex I.5 for equipment recommendations). Hydrologists should be involved to convert those historical data into meaningful projections of water resources availability in the future, which in turn can serve as a foundation for national water resources development plans.

## Findings and Recommendations on Water Resource Policy

### Development of a National Water Policy

There is a consensus that Dominica needs a National Water Policy that should provide the means to move away from single sector water planning to multi-objective planning and integrated planning of land and water resources. The Policy would recognise the wider social economic and development goals and make sure that cross-sectoral coordination is established between the involved Ministries.

Recommendation: *the Water Policy should be prepared and contain three main sections:*

- *Overview of Dominica's water sector comprising the state of water resources and management institutions, development priorities and broad principles leading to policy formulation.*
- *Key policy issues related to the basic principles and challenges confronting water resources management development and use in sub-sectors – and the corresponding measures and/or actions.*
- *Proposals and guidelines for implementing the policy including institutional roles and responsibilities, standards, regulations, definitions and references.*

### Institutional set-up for water resource management

The management of the river catchments and basins remain an area of serious concern to DOWASCO and other key stakeholders. Catchment areas comprise large portions of privately owned land used in part for agricultural production. The use of pesticides and fertilizers on private farms is a risk and this is sporadically

monitored by the Environmental Health unit. Under the Water Act (1989) water management authorities for the country have been granted to DOWASCO which includes water conservation and the preservation and protection of catchment areas. However, there are overlapping responsibilities primarily between the ministries of agriculture, health and public works and public utilities.

*Recommendation: establish Water Resources Council (WRC) with representatives from Ministries with an interest in the water sector. In addition, a Water Management Unit (WMU) should be created with 3-5 permanent professional staff member that should coordinate and implement the Council's directives, guidelines and policy decisions. The guidelines/draft ToR for a consultancy to develop a WMU is given in Annex I.4.*

### **Establishing hydrometric stations**

As of today, there is no exact data on the discharge of the 365 rivers on Dominica. Starting with the collection of hydrological (as well as physiographic, demographic and socio-economic) data would also be a first step toward implementing some kind of appropriate integrated water resources management practices on Dominica.

*Recommendation: setting up hydrometric station on main rivers/catchment areas. It is recommended to utilize radar sensor equipment to measure water levels – as it contains no mechanical part – and is not in contact directly with the river water – and to utilize traditional current meter (with propellers) to measure flows – see annex I.5 for details on equipment, cost and contacts.*