



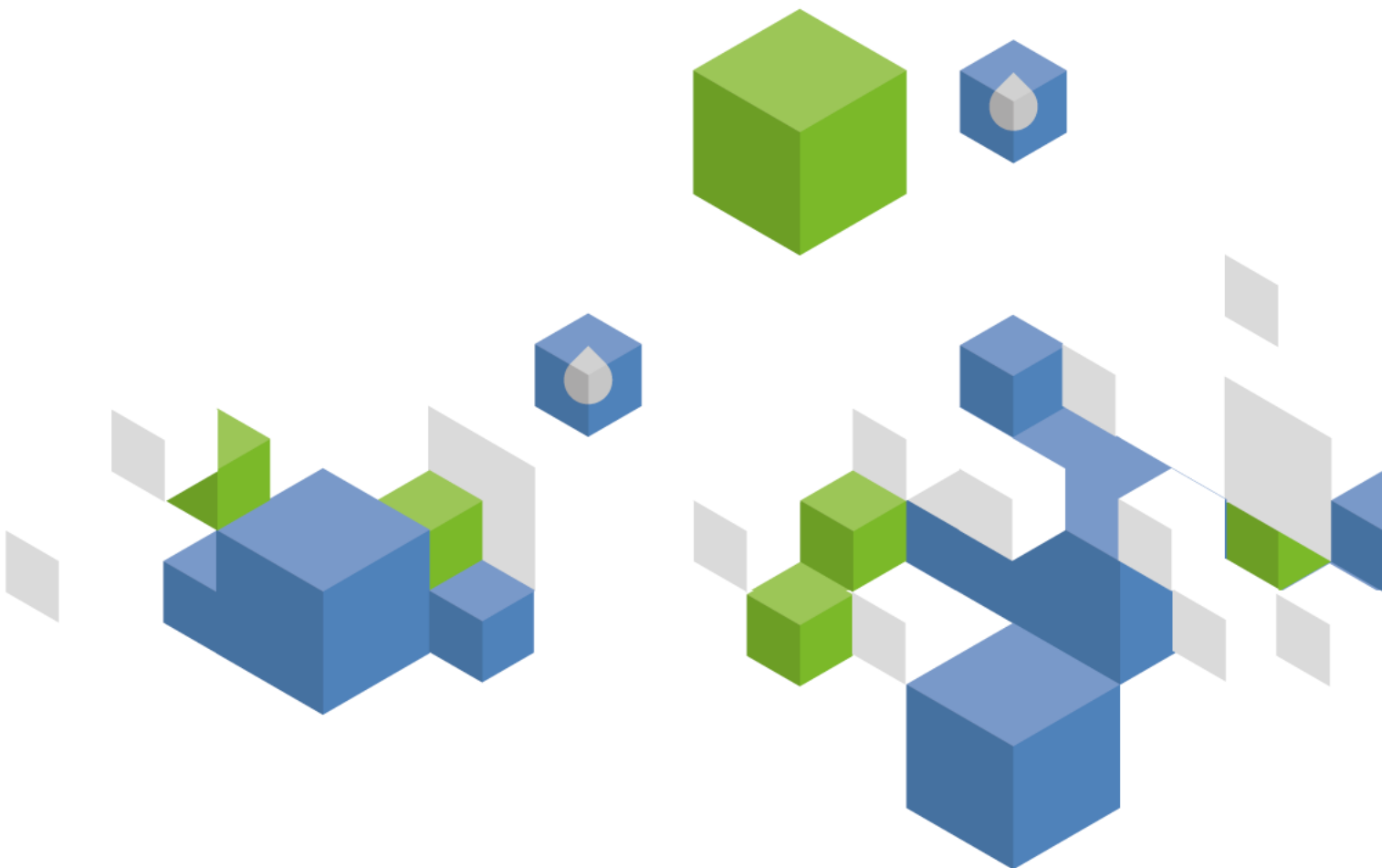
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# Country profile – Dominica

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# Dominica

## GEOGRAPHY, CLIMATE AND POPULATION

### Geography

Dominica is a Caribbean island that lies between the French islands of Guadeloupe and Marie-Galante to the north and Martinique to the south. It has been a member of the Commonwealth since independence in 1978. It is 47 km long and has a maximum width of 26 km. The total area is 750 km<sup>2</sup> and it's the largest island in the Windward and Leeward groups of the Eastern Caribbean.

Dominica is politically divided into 10 parishes: Saint Andrew, Saint David, Saint George, Saint John, Saint Joseph, Saint Luke, Saint Mark, Saint Patrick, Saint Paul, Saint Peter. The capital is Roseau.

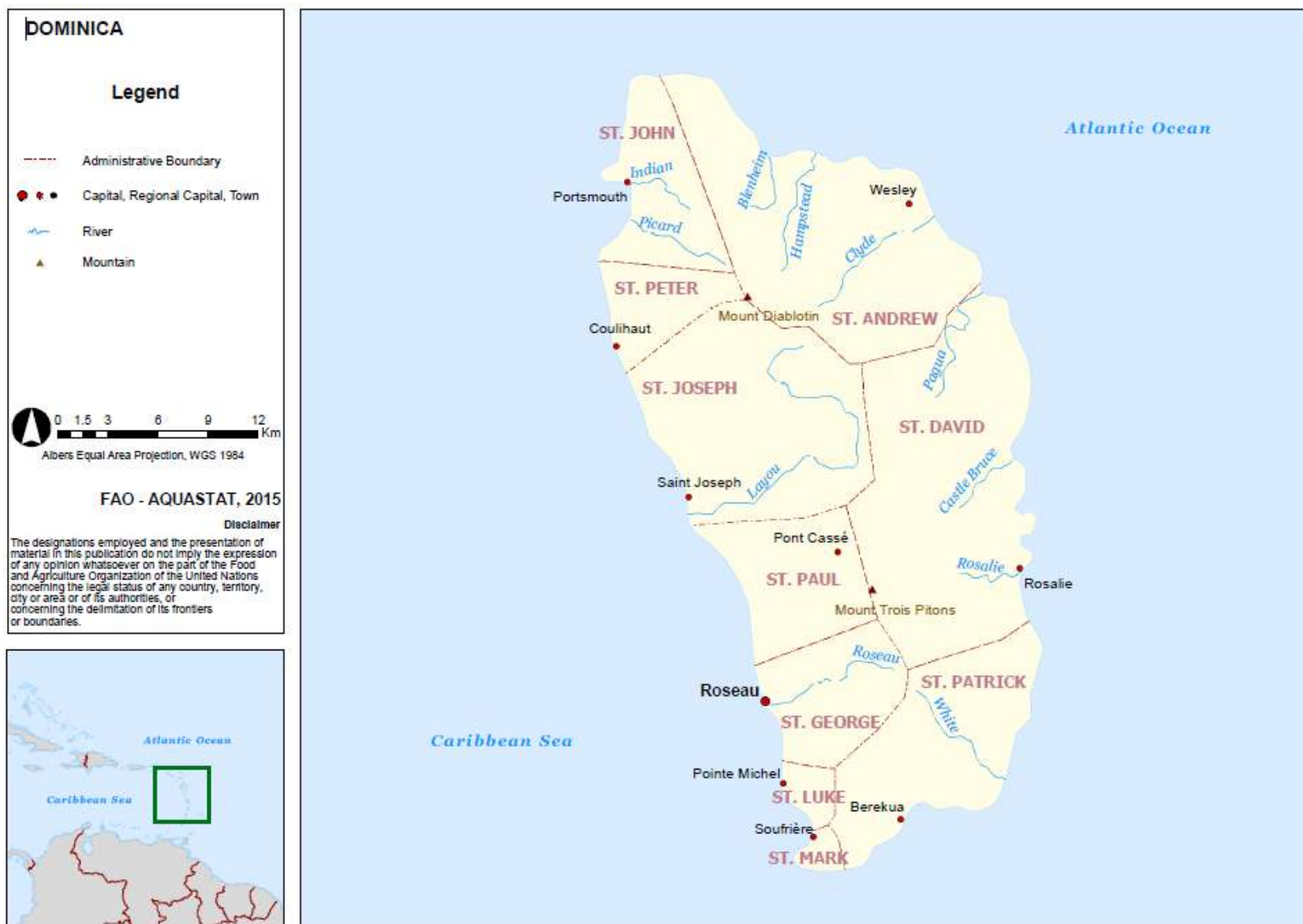
In 2012, the total physical cultivated area was estimated at 24 000 ha, of which 75 percent (18 000 ha) consisted of permanent crops and 25 percent (6 000 ha) of temporary crops (Table 1).

TABLE 1

### Basic statistics and population

<b>Physical areas:</b>			
Area of the country	2012	75 000	ha
Agricultural land (permanent meadows and pasture + cultivated land)	2012	26 000	ha
• As % of the total area of the country	2012	35	%
• Permanent meadows and pasture	2012	2 000	ha
• Cultivated area (arable land + area under permanent crops)	2012	24 000	ha
- As % of the total area of the country	2012	32	%
- Arable land (temp. crops + temp. fallow + temp. meadows)	2012	6 000	ha
- Area under permanent crops	2012	18 000	ha
<b>Population:</b>			
Total population	2013	72 000	inhabitants
- Of which rural	2013	32	%
Population density	2013	96	inhabitants/km <sup>2</sup>
Population economically active	2013	32 000	inhabitants
• As % of total population	2013	44	%
• Female	2013	41	%
• Male	2013	59	%
Population economically active in agriculture	2013	7 000	inhabitants
• As % of total economically active population	2013	22	%
• Female	2013	29	%
• Male	2013	71	%
<b>Economy and development:</b>			
Gross Domestic Product (GDP) (current US\$)	2013	505	million US\$/year
• Value added in agriculture (% of GDP)	2012	15	%
• GDP per capita	2013	7 011	US\$/year
Human Development Index (highest = 1)	2013	0.717	-
Gender Inequality Index (equality = 0, inequality = 1)	-	-	-
<b>Access to improved drinking water sources:</b>			
Total population	2007	94	%
Urban population	2012	96	%
Rural population	2007	92	%

FIGURE 1  
Map of Dominica



The island is of volcanic formation, with rich volcanic soils and with signs of activity including solfataras (volcanic vents) and hot springs. The terrain is very rugged and steep. A range of high, forest-clad mountains runs from north to south, broken in the centre by a plain drained by the Layou river, which flows to the west. The highest points are Mount Diablotin (1 447 m) and Mount Trois Pitons (1 424 m). The forest area is 45 000 ha. Since 1975, there is an extensive system of national protected areas covering approximately 20 percent of the national territory.

### Climate

The climate is characterized as tropical maritime with dominant influences being the Atlantic Ocean, the Caribbean Sea, and the north-easterly trade winds. Year-round daytime temperatures average 26-27°C in coastal areas and 19-21°C in mountainous areas, while night-time temperatures vary from 18-22°C on the coast to 10-12°C at higher elevations. The island possesses a number of micro-climates due to its mountainous terrain.

Dominica is the wettest island in the eastern Caribbean, with total annual rainfall exceeding 10 000 mm in some of the higher elevations. Average annual coastal rainfall varies from 1 500 to 3 700 mm. Average long-term annual rainfall at country-level is estimated at 2 083 mm. Rainfall is distributed between a dry season from December to May and a rainy season from June to November, the most likely period for hurricanes. The rugged topography results in a considerable amount of orographic rainfall making the island susceptible to landslides, particularly in mountainous areas. Relative humidity remains high throughout the year consistently averaging above 85 percent in the mountainous interior areas.

### Population

In 2013, the total population was about 72 000 inhabitants, of which around 32 percent was rural (Table 1). Population density is 96 inhabitants/km<sup>2</sup>. The average annual population growth rate in the 2003-2013 period has been estimated at 0.2 percent

Topographic conditions have forced human settlements onto narrow coastal areas particularly in the south and west with approximately 44 000 persons, or 61 percent, living along the coast. Roseau, the capital, is the largest city with 15 000 persons representing almost 21 percent of the total population.

In 2012, 96 percent of the urban population had access to improved water sources. In 2007, 94 percent of the total population had access to improved water sources (96 and 92 percent in urban and rural areas respectively) and 81 percent of the total population had access to improved sanitation (80 and 84 percent in urban and rural areas respectively).

### ECONOMY, AGRICULTURE AND FOOD SECURITY

In 2013, the gross domestic product (GDP) was US\$ 505 million. In 2012 the agricultural sector accounted for 15 percent of GDP, while in 1992 it accounted for 22 percent. In 2013, total population economically active in agriculture is estimated at 7 000 inhabitants (22 percent of economically active population), of which 29 percent is female and 71 percent is male.

The economy reflects many of the traditional features of a small open economy. This includes a high level of dependence on external trade, dependence on single sector export products (in this case agriculture) and tourism revenue, high levels of under-employment and unemployment, and dependence on foreign capital (both public and private sector) for investment into productive sectors and for infrastructural development. The dependence of the economy on the constricting banana industry exposes its high economic vulnerability. Attempts to diversify are slow, however recent trends indicate that the island is making progress in its move towards tourism/ecotourism, as it markets its unique environment and culture.

The vulnerability of the agricultural sector – which together with tourism is the mainstay of the country's economy – is manifested in the risks presented by natural disasters and climate extremes, as well as in the sectors vulnerability to climate variability and external economic shocks. The World Bank points out that Dominica's real agricultural sector product and agriculture's share of GDP has fallen consistently with each major natural disaster with the sector failing to recover to previous levels of relative importance. Most of this decline is attributable to the crop sector and within that sector to the decline in banana production. There has been significant growth only within the small livestock sub-sector.

## WATER RESOURCES

### Surface water and groundwater resources

The island has an average annual precipitation of 2 083 mm, or 1 562 million m<sup>3</sup> and renewable water resources are estimated at about 200 million m<sup>3</sup>/year (Table 2).

TABLE 2  
Renewable water resources

Renewable freshwater resources:			
Precipitation (long-term average)	-	2 083	mm/year
	-	1 562	million m <sup>3</sup> /year
Internal renewable water resources (long-term average)	-	200	million m <sup>3</sup> /year
Total renewable water resources	-	200	million m <sup>3</sup> /year
Dependency ratio	-	0	%
Total renewable water resources per inhabitant	-	2 778	m <sup>3</sup> /year
Total dam capacity	-	-	million m <sup>3</sup>

Compared to other countries in the region, Dominica has abundance of rivers and water. There are about 365 rivers and streams emanating from 35 watershed areas into which the island is divided. The ten largest rivers are the Indian, Picard, Layou, Roseau, Blenheim, Hampstead, Clyde, Pagua, Castle Bruce and Rosalie rivers. Most rivers originate on the slopes of the central mountain ranges, while a few originate as outcrops of underground springs along low-lying valleys.

Other Caribbean countries consider Dominica as an alternative source of water supply in times of need. As a result, the government has positioned itself to be an exporter of bulk water (IWCAM, 2011).

There is a large sewerage system servicing the capital, Roseau, with a minimal treatment; and two small sewerage systems which service the areas of Cane Field and Jimmit, with no treatment. In most areas, the dominant method of wastewater disposal is by septic tank (IWCAM, 2011).

Intake tanks and very small dams have been constructed with a total capacity estimated at 2 008 m<sup>3</sup>. About 44 of such structures exist; the largest one has a capacity of 271 m<sup>3</sup>.

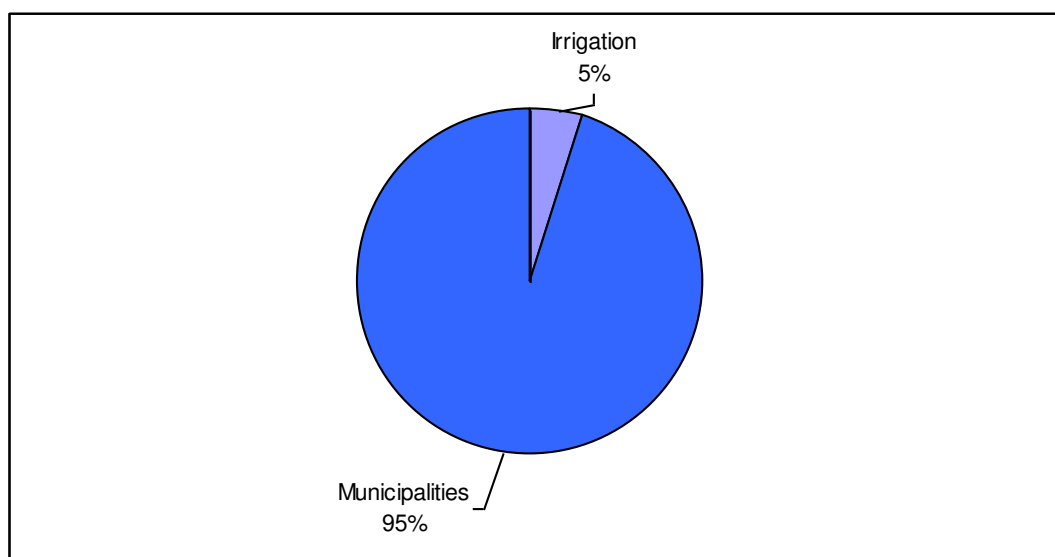
## WATER USE

In 2004, the total water withdrawal is estimated at 16.6 million m<sup>3</sup> and in 2010 at around 20 million m<sup>3</sup> (Table 3). Total municipal water withdrawal is estimated at around 19 million m<sup>3</sup> in 2010 (Figure 2). Most water withdrawn is surface water and the Dominica Water and Sewerage Company (DOWASCO) produces approximately 45 million l/day (16.4 million m<sup>3</sup>/year) of drinking water from about 47 independent river intakes. The largest of the water systems has a supply capacity of over 16.3 million l/day, for the capital Roseau and its environs. This system serves a population of about 25 000 people. Two other systems have a supply capacity of about 5.3 million l/day, whilst the other systems are much smaller serving communities with populations usually less than 1000. These supply systems are generally more than adequate to satisfy the demands of the communities. However, at some periods during the dry season, intermittent shortages can be experienced in a few of the systems.

TABLE 3  
Water use

Water withdrawal:			
Total water withdrawal	2010	20	million m <sup>3</sup> /year
- Agriculture (Irrigation + Livestock + Aquaculture)	-	1	million m <sup>3</sup> /year
- Municipalities	2010	19	million m <sup>3</sup> /year
- Industry	-	0	million m <sup>3</sup> /year
• Per inhabitant	2010	282	m <sup>3</sup> /year
Surface water and groundwater withdrawal (primary and secondary)	2010	20	million m <sup>3</sup> /year
• As % of total actual renewable water resources	2010	10	%
Non-conventional sources of water:			
Produced municipal wastewater	-	-	million m <sup>3</sup> /year
Treated municipal wastewater	-	-	million m <sup>3</sup> /year
Direct use of treated municipal wastewater	-	-	million m <sup>3</sup> /year
Direct use of agricultural drainage water	-	-	million m <sup>3</sup> /year
Desalinated water produced	-	-	million m <sup>3</sup> /year

FIGURE 2  
Water withdrawal by sector  
Total 20 million m<sup>3</sup> in 2010



DOWASCO currently serves 16 000 customer connections, which represents a population of about 50 000 or about 63 percent of the island population. In addition to these connections, 590 standpipes have been installed throughout the islands water networks extending water supply coverage to all major communities with population in excess of 200 people. The total DOWASCO coverage is estimated at over 90 percent of the total population.

In remote areas, rainwater harvesting is practiced by individual households and institutions. Some small communities with less than 200 persons that are not served by DOWASCO are serviced through small water supply systems built by non-governmental organizations (IWCAM, 2011).

Agriculture uses surface water abstracted directly from rivers. Based on area equipped for irrigation, it is estimated at around 1 million m<sup>3</sup> in 2010.



## IRRIGATION AND DRAINAGE

### Evolution of irrigation development

There is a considerable potential for irrigated agriculture in Dominica, but the country has practically no irrigation. In fact, there are only small systems where farmers grow vegetables such as watermelons, carrots, tomatoes, cabbages.

These systems are usually fed by surface water abstracted directly from rivers. According to IWCAM (2011), area equipped for irrigation accounts for less than 1 percent of the estimated area of farmland. It is therefore estimated at maximum 200 ha (Table 4).

TABLE 4  
Irrigation and drainage

<b>Irrigation potential</b>	-	-	ha
<b>Irrigation:</b>			
1. Full control irrigation: equipped area	2010	200	ha
- Surface irrigation	-	-	ha
- Sprinkler irrigation	-	-	ha
- Localized irrigation	-	-	ha
• Area equipped for full control irrigation actually irrigated	-	-	ha
- As % of area equipped for full control irrigation	-	-	%
2. Equipped lowlands (wetland, ivb, flood plains, mangroves)	-	-	ha
3. Spate irrigation	-	-	ha
<b>Total area equipped for irrigation (1+2+3)</b>	<b>2010</b>	<b>200</b>	<b>ha</b>
• As % of cultivated area	2010	1	%
• % of area irrigated from surface water	2010	100	%
• % of area irrigated from groundwater	2010	0	%
• % of area irrigated from mixed surface water and groundwater	2010	0	%
• % of area irrigated from non-conventional sources of water	2010	0	%
• Area equipped for irrigation actually irrigated	-	-	ha
- As % of total area equipped for irrigation	-	-	%
• Average increase per year	-	-	%
• Power irrigated area as % of total area equipped for irrigation	-	-	%
4. Non-equipped cultivated wetlands and inland valley bottoms	-	-	ha
5. Non-equipped flood recession cropping area	-	-	ha
<b>Total water managed area (1+2+3+4+5)</b>	<b>2010</b>	<b>200</b>	<b>ha</b>
• As % of cultivated area	2010	1	%
<b>Size of full control irrigation schemes: Criteria:</b>			
Small schemes	< - ha	-	ha
Medium schemes	> - ha and < - ha	-	ha
large schemes	> - ha	-	ha
Total number of households in irrigation	-	-	
<b>Irrigated crops in full control irrigation schemes:</b>			
Total irrigated grain production	-	-	metric tons
• As % of total grain production	-	-	%
<b>Harvested crops:</b>			
Total harvested irrigated cropped area	-	-	ha
• Temporary crops: total	-	-	ha
• Permanent crops: total	-	-	ha
Irrigated cropping intensity (on full control area actually irrigated)	-	-	%
<b>Drainage - Environment:</b>			
Total cultivated area drained	-	-	ha
• Non-irrigated cultivated area drained	-	-	ha
• Area equipped for irrigation drained	-	-	ha
- As % of total area equipped for irrigation	-	-	%
Area salinized by irrigation	-	-	ha
Area waterlogged by irrigation	-	-	ha

## Role of irrigation in agricultural production, economy and society

The Dominica Banana Growers Association (DBMC) is the central authority which manages banana production and marketing in the island and provides essential services to the farmers including export. Although there has been much talk of growing bananas under irrigation, no concrete efforts have been made to do so. Indications are that average yield could be significantly improved if irrigation were practiced. Areas like Calabishi and Marigot, which are considered prime banana areas because of the soil type, tend to suffer from drought and could benefit significantly from irrigation. Banana is the major crop in the island in terms of area.

An additional benefit of irrigation is that the national banana production target could be realized from a more reduced area. As a consequence, steep hillside areas which are currently planted to rainfed bananas could be released from arable land and put under tree crops or agro-forestry, uses that area more consistent with good conservation practice. The DBMC is also interested in promoting crop diversification among its banana farmers.

## WATER MANAGEMENT, POLICIES AND LEGISLATION RELATED TO WATER USE IN AGRICULTURE

### Institutions

The Dominica Water and Sewerage Company (DOWASCO) is the sole organization responsible for the management of the water resources. It is a private company, incorporated by an Act of Parliament. It has an exclusive license, granted by the Minister of Communication and Works, to abstract and utilize the water resources of the country. It is charged with the development of the resource and for any research, data collection, projection and maintenance and development of new sources. This license was granted in 1989 for 25 years. Anyone else wishing to distribute water must therefore get a sub-license from DOWASCO. This organization has no obligation to develop or provide water for agriculture.

The Dominica Electricity Services (DOMLEC) is in charge of the hydropower generation.

Other institutions related to water resources management are the Ministry of Environment, Natural Resources, Physical Planning and Fisheries, and the Ministry of Agriculture and Forestry.

### Water management

Though Dominica is well known as ‘the land of many rivers’ and it is perceived that the country has an abundant source of water to meet all its needs, the reality is that this resource is finite and impacted by development, human activities and climate variability.

There is a lack of water resources governance in a holistic manner as no water resources management policy, strategy, plans or legislative framework are in place. With the growing demand for water, the inadequate institutional structure, ineffective land-use management, limited public understanding of integrated water resources management (IWRM), a lack of data and information to support decisions and legislation that needs updating, appropriate actions should be undertaken. The government, in its commitment to ensure sustainable national development, recognizes the contribution of effective management of water resources to its continued social and economic growth (IWCAM, 2011).

### Finances

A license is needed to abstract water and to sell water, and royalties and fees must be paid based on the type of use for which the water is required. A tariff system also exists for drinking water supply. The tariff structure for water supply and sewerage was designed more as a function of affordability to pay than to reflect the economic value. In addition, public standpipes and public facilities are provided in communities for persons to access drinking water. There is no direct charge for the water obtained from standpipes, but the government pays DOWASCO on a monthly basis for this service (IWCAM, 2011).

## Policies and legislation

The Water and Sewerage Act (1991) of the revised laws states the government's water policy. The Act generally speaks about the orderly and coordinated development, use and conservation of Dominica's water resources. It also makes the DOWASCO responsible for the supply of water to all residents of the country.

There are several other laws related to water resources management, such as the Physical Planning Act (2002), the Development and Planning Corporation Act (1972), the Agricultural Small Tenancies Ordinance (1953), the Pesticides Control Act and Regulations, the Crown Lands Ordinance, the Forestry Act, the Health Act and the National Development Corporation Act (1988). They however are usually not considered within the formal management framework, because there is no coordination among related institutions (IWCAM, 2011).

## ENVIRONMENT AND HEALTH

The effects of chemical fertilizer and pesticides on water quality are not yet a threat to human health through the water supply. However, this problem can be expected to increase as activities incompatible with maintaining an uncontaminated water supply increase in the quest for economic development. DOWASCO has recommended that all the island's catchment areas be declared "Water Quality Control Areas" (IWCAM, 2011).

## PROSPECTS FOR AGRICULTURAL WATER MANAGEMENT

Dominica – as a country with the risk of climate related extreme events such as droughts, floods and hurricanes – must plan to minimize the negative impacts and prepare to protect and maximize the water resources available for water supply under these conditions (IWCAM, 2011).

## MAIN SOURCES OF INFORMATION

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