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Country profile – Saint Vincent and the Grenadines

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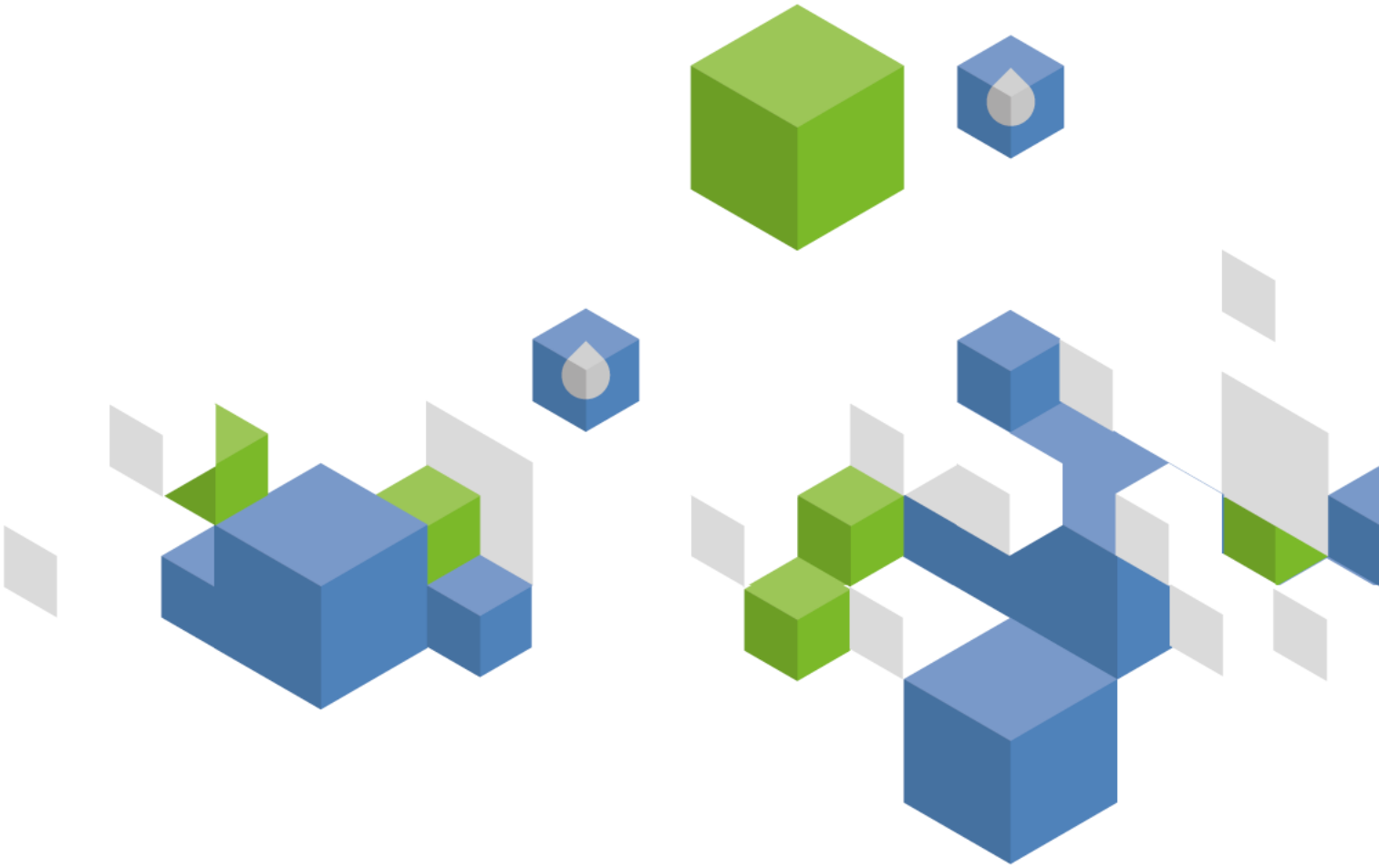

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Saint Vincent and the Grenadines

GEOGRAPHY, CLIMATE AND POPULATION

Geography

Saint Vincent and the Grenadines is a multi-island state in the Windward Islands at the lower end of the chain of islands in the Caribbean. It is part of the Lesser Antilles, about 34 km southwest of Saint Lucia and 160 km west of Barbados. The islands are located at 13°15'N and 61°15'W. This archipelago of over 30 islands, islets and cays has a combined land area of 390 km^2. Mainland Saint Vincent, accounting for 89 percent of the total area, is about 29 km long and 18 km wide. Saint Vincent and the Grenadines is an independent republic within the Commonwealth and gained in 1979 its independence from the United Kingdom.

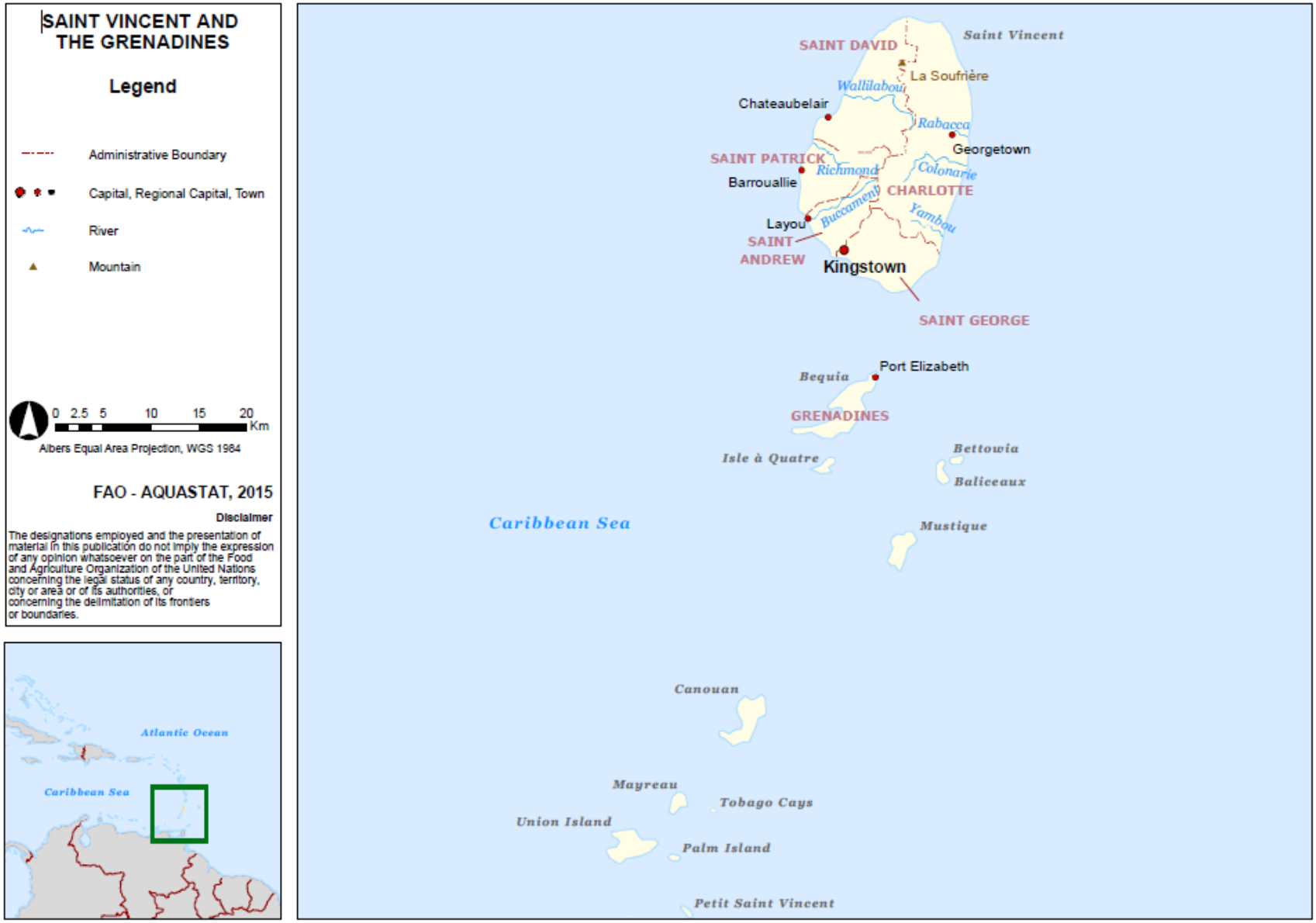
The country is divided into six parishes: Charlotte, Grenadines, Saint Andrew, Saint David, Saint George and Saint Patrick. The capital is Kingstown.

In 2012, the total physical cultivated area was estimated at 8 000 ha, of which 62.5 percent (5 000 ha) consisted of temporary crops and 37.5 percent (3 000 ha) of permanent crops (Table 1).

TABLE 1
Basic statistics and population

Physical areas:			
Area of the country	2012	39 000	ha
Agricultural land (permanent meadows and pasture + cultivated land)	2012	10 000	ha
• As % of the total area of the country	2012	26	%
• Permanent meadows and pasture	2012	2 000	ha
• Cultivated area (arable land + area under permanent crops)	2012	8 000	ha
- As % of the total area of the country	2012	21	%
- Arable land (temp. crops + temp. fallow + temp. meadows)	2012	5 000	ha
- Area under permanent crops	2012	3 000	ha
Population:			
Total population	2013	109 000	inhabitants
- Of which rural	2013	50	%
Population density	2013	279	inhabitants/km^2
Population economically active	2013	55 000	inhabitants
• As % of total population	2013	50	%
• Female	2013	42	%
• Male	2013	58	%
Population economically active in agriculture	2013	11 000	inhabitants
• As % of total economically active population	2013	20	%
• Female	2013	27	%
• Male	2013	73	%
Economy and development:			
Gross Domestic Product (GDP) (current US$)	2013	726	million US$/year
• Value added in agriculture (% of GDP)	2012	7	%
• GDP per capita	2013	6 656	US$/year
Human Development Index (highest = 1)	2013	0.719	-
Gender Inequality Index (equality = 0, inequality = 1)	-	-	-
Access to improved drinking water sources:			
Total population	2012	95	%
Urban population	2012	95	%
Rural population	2012	95	%

FIGURE 1
Map of Saint Vincent and the Grenadines



Saint Vincent, which is volcanic in origin, has a rugged and mountainous terrain with most of the slopes being greater than 5 percent. The highest point on the island is La Soufriere, an active volcano with a height of 1 234 m at the beginning of a central mountain range that divides the island (Simmons & Associates Inc., 2000). The volcanic ash has produced a fertile soil that has given rise to lush green vegetation. The Grenadines are primarily formed from coral (PAHO, 2002).

Climate

Saint Vincent and the Grenadines lie in the path of the northeast trade winds and has a tropical climate. Rainfall and temperature vary with altitude. Mean temperature is around 27°C, dropping by only a few degrees in the cooler months of December to February (UNDP, 2012). The islands have a recorded average annual precipitation of over 1 580 mm, which occurs year-round but is higher from July to September. Average annual rainfall ranges from 1 500 mm on the coast to 3 800 mm in the central mountains. There is a wet season from June to December and a dry season from January to May (Joyette, 2007). Monthly averages vary from 220 mm from July to September to 50 mm from February to April.

"El Niño" episodes bring warmer and drier than average conditions between June and August and "La Niña" episodes bring colder and wetter conditions during this period. Hurricanes occasionally hit the islands, which occur throughout August, September and October (UNDP, 2012).

Population

In 2013, the total population was about 109 000 inhabitants, of which 99.8 percent reside on the mainland. All islands of the Grenadines are inhabited with the exception of the Tobago Cays (Simmons & Associates Inc., 2000). Around 50 percent of total population is rural (Table 1). Population density is 279 inhabitants/km^2. The average annual population growth rate in the 2003-2013 period has been estimated at 0.05 percent.

In 2012, 95 percent of the total population had access to improved water sources (95 percent in urban and rural areas as well). In 2007, 76 percent of the total population had access to improved sanitation (76 percent in urban and rural areas as well).

ECONOMY, AGRICULTURE AND FOOD SECURITY

In 2013, the gross domestic product (GDP) was US$ 726 million. In 2012, agriculture accounted for 7 percent of GDP, while in 1992 it accounted for 19 percent. In 2013, total population economically active in agriculture is estimated at 11 000 inhabitants (20 percent of economically active population), of which 27 percent is female and 73 percent is male.

Saint Vincent needs to import the majority of its food. In 2013, the country imported US$ 78 million of food products (Statistical Office, 2014b). Agricultural exports in 2013 totaled US$ 8 million (Statistical Office, 2014c).

WATER RESOURCES

Surface water and groundwater resources

The country has an average annual precipitation of 1 583 mm, or 617 million m^3 and renewable water resources are estimated at about 100 million m^3/year (Table 2).

The island of Saint Vincent has thickly wooded volcanic mountains running north to south and producing many short, swift streams. The streams are numerous but small and the island is divided into 16 watersheds: Soufriere-Leeward, Soufriere-Windward, Rabacca, Wallilabou, Georgetown, Richmond, Chateaubelair, Cumberland, Colonarie, Peter's Hope, Buccament Watershed, San Souci, Biabou, Union, Montreal, Kingstown.

TABLE 2
Renewable water resources

Renewable freshwater resources:			
Precipitation (long-term average)	-	1 583	mm/year
	-	617	million m^3/year
Internal renewable water resources (long-term average)	-	100	million m^3/year
Total renewable water resources	-	100	million m^3/year
Dependency ratio	-	0	%
Total renewable water resources per inhabitant	-	917	m^3/year
Total dam capacity	-	-	million m^3

Surface water is the main source of freshwater on Saint Vincent, where the abundance of rivers and streams allows for more water being available than is required to meet the average national demand. Rainwater harvesting is informally practiced by only a small fraction of the residents on Saint Vincent, while on the drier islands of the Grenadine rainwater harvesting is the main source of freshwater due to the absence of springs and perennial streams (NEAB/MHE, 2000) (Table 2).

The country presently does not experience water shortage, although there is physical evidence that suggests a reduction in river stream flows and river water quality. This stream flow reduction is predicted to be a possible future problem as the demand for water increases (NWRS/CWSA, 2009).

The Grenadine islands of Bequia, Mustique and Canouan have desalination plants. The plants produced a total of 600 000 m^3 of water in 2013.

Lakes and dams

There are no dams, but the Central Water and Sewerage Authority uses a series of water intakes and storage tanks around the island. The total storage capacity on mainland Saint Vincent is 19 836 m^3. This consists of a total of 47 reinforced concrete tanks which vary in size from 9 m^3 to 2 839 m^3 (MoHWE/PAHO, 2013).

There are no natural lakes of importance in the country.

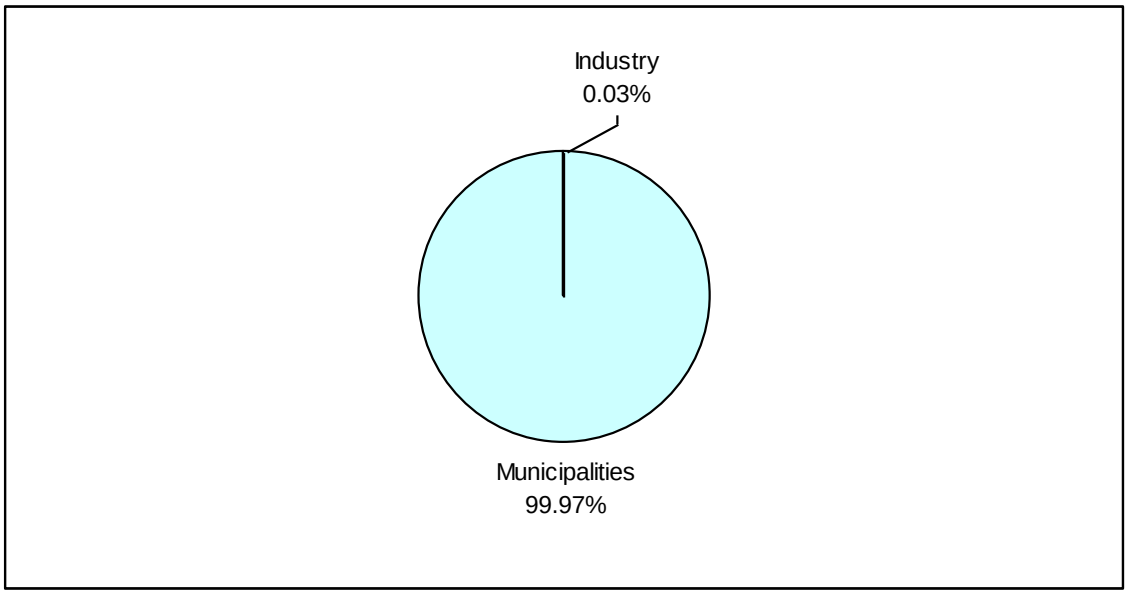
WATER USE

In 2013, total water withdrawal accounted for 8.502 million m^3, of which 8.5 million m^3 for municipal uses (CWSA, 2013) (Table 3 and Figure 2). Of the total municipal withdrawal, government institutions are estimated to use 1.3 million m^3, commercial uses 0.7 million m^3, domestic uses 5.4 million m^3, and leakages 1.1 million m^3. The total water withdrawal for industrial use is 0.002 million m^3. At present equipped areas for irrigation have been abandoned, thus there are no records for withdrawal for irrigation.

TABLE 3
Water use

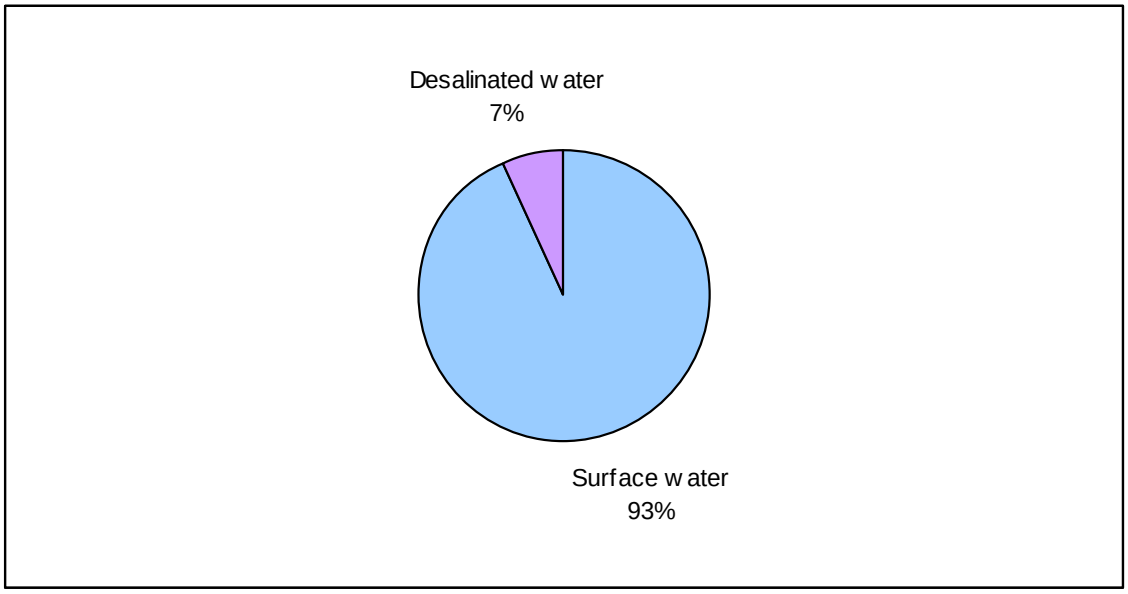
Water withdrawal:			
Total water withdrawal	2013	8.502	million m^3/year
- Agriculture (Irrigation + Livestock + Aquaculture)	2013	0	million m^3/year
- Municipalities	2013	8.5	million m^3/year
- Industry	2013	0.002	million m^3/year
• Per inhabitant	2013	78	m^3/year
Surface water and groundwater withdrawal (primary and secondary)	2013	7.902	million m^3/year
• As % of total renewable water resources	2013	8	%
Non-conventional sources of water:			
Produced municipal wastewater	-	-	million m^3/year
Treated municipal wastewater	-	-	million m^3/year
Direct use of treated municipal wastewater	-	-	million m^3/year
Direct use of agricultural drainage water	-	-	million m^3/year
Desalinated water produced	2013	0.6	million m^3/year

FIGURE 2
Water withdrawal by sector
Total 8.5 million m^3 in 2013



Surface water accounts for 93 percent of total withdrawals and desalinated water accounts for 7 percent, or 0.6 million m^3 (Figure 3).

FIGURE 3
Water withdrawal by source
Total 8.5 million m^3 in 2013



IRRIGATION AND DRAINAGE

Evolution of irrigation development

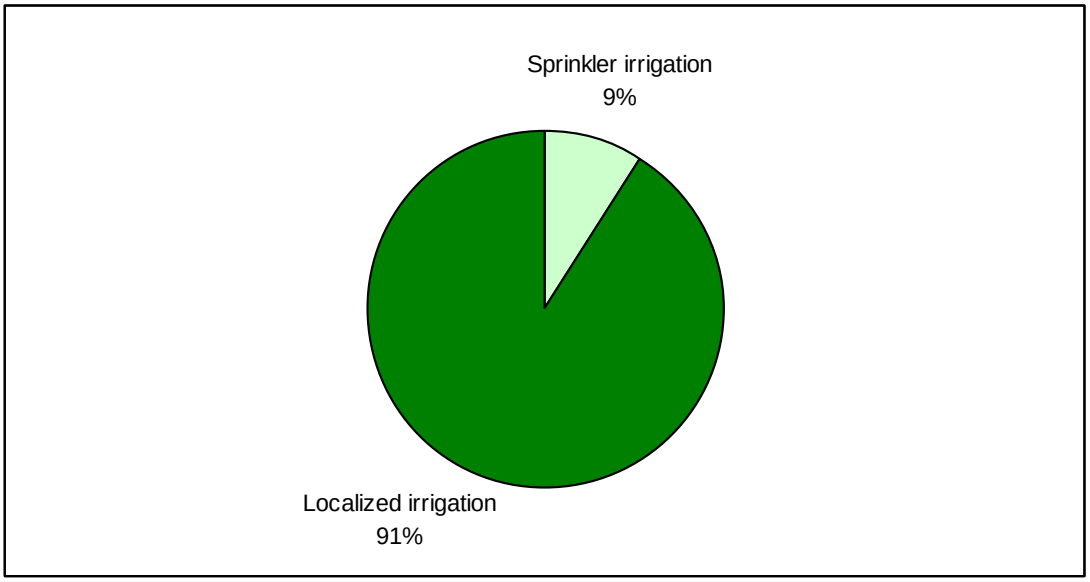
Irrigation potential in the country is estimated at 655 ha (Table 4). Irrigation systems were installed during the period 1998-2002 under the National Irrigation Programme with funding from the European Union. The systems were installed in selected areas between San Souci and Rabacca in the North Eastern section of Mainland Saint Vincent and was managed through the Irrigation unit in the Ministry of Agriculture, Industry, Forestry, Fisheries and Rural Transformation. There were two types of irrigation systems implemented, micro sprinklers and the drip (Figure 4). Water was piped directly from the Caratal, Colonaire, San Souci, Perseverance, Langley Park and Rabacca rivers. In 2003 the area equipped for irrigation was estimated at 478 ha. Unfortunately, during the troughs (meteorological event bringing clouds, showers and wind shifts) that took place in 2011 and in 2014 the irrigation systems were damaged substantial and they are no longer in use.

TABLE 4
Irrigation and drainage

Irrigation potential		-	655	ha
Irrigation:				
1. Full control irrigation: equipped area		2003	478 *	ha
- Surface irrigation		-	-	ha
- Sprinkler irrigation		2003	44	ha
- Localized irrigation		2003	434	ha
• Area equipped for full control irrigation actually irrigated		2014	0	ha
- As % of area equipped for full control irrigation		-	-	%
2. Equipped lowlands (wetland, ivb, flood plains, mangroves)		-	0	ha
3. Spate irrigation		-	0	ha
Total area equipped for irrigation (1+2+3)		**2003**	**478**	**ha**
• As % of cultivated area		2003	6	%
• % of area irrigated from surface water		2003	100	%
• % of area irrigated from groundwater		-	-	%
• % of area irrigated from mixed surface water and groundwater		-	-	%
• % of area irrigated from non-conventional sources of water		-	-	%
• Area equipped for irrigation actually irrigated		2014	0	ha
- As % of total area equipped for irrigation		-	-	%
• Average increase per year				%
• Power irrigated area as % of total area equipped for irrigation		2003	100	%
4. Non-equipped cultivated wetlands and inland valley bottoms		-	0	ha
5. Non-equipped flood recession cropping area		-	0	ha
Total agricultural water managed area (1+2+3+4+5)		**2003**	**478**	**ha**
• As % of cultivated area		2003	6	%
Size of full control irrigation schemes:	**Criteria**:			
Small schemes	< - ha	-	-	ha
Medium schemes	> - ha and < - ha	-	-	ha
large schemes	> - ha	-	-	ha
Total number of households in irrigation		-	-	
Irrigated crops in full control irrigation schemes:				
Total irrigated grain production		-	-	metric tons
• As % of total grain production		-	-	%
Harvested crops:				
Total harvested irrigated cropped area		-	-	ha
• Temporary crops: total		-	-	ha
• Permanent crops: total		-	-	ha
Irrigated cropping intensity (on full control area actually irrigated)		-	-	%
Drainage - Environment:				
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

* *At the time of this survey, this irrigation area has been abandoned, after having been damaged substantially during the 2011 and 2014 troughs.*

FIGURE 4
Irrigation techniques on area equipped for full control irrigation
Total 478 ha in 2003*



- At the time of this survey, this irrigation area has been abandoned, after having been damaged substantially during the 2011 and 2014 troughs

Role of irrigation in agricultural production, economy and society

In 2003, the main crops that were irrigated were bananas, plantain and dasheen.

The area equipped for irrigation having been abandoned, all crops grown locally are rainfed and account for 22 percent of the total food exports (Statistical Unit, 2014).

Women and irrigation

Women are mainly involved in field crop maintenance, production for home consumption, post-harvesting and marketing of cash crops. Women have comparatively little or no involvement in the policy development of agricultural organizations. Some women own their own land with their husband, but it is quite rare for an unmarried woman to own her own land (IWRAW, 2016).

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

Institutions

The Central Water and Sewerage Authority (CWSA), statutory body under the Ministry of Health, Wellness and the Environment, is empowered by Act No. 17 of 1991 to "investigate the water resources of Saint Vincent and the Grenadines and advise the Minister relating to the improvement, preservation, conservation, utilization and apportionment of those resources". The act also indicates that the Authority will control the use of the resource for all other applications, including for irrigation, agriculture, industrial and commercial purposes. The CWSA is responsible for the production and distribution of piped water on Saint Vincent and presently supplies 95 percent of its population (CEHI, 2006).

Apart from the CWSA, the other institutions that play a role in water resources management are the National Irrigation Authority (NIA), the Ministry of Agriculture, Industry, Forestry Fisheries and Rural Transformation and the Ministry of Health, Wellness and the Environment (MoHWE) (CEHI, 2001).

Water management

Presently the Ministry of Agriculture, Industry, Forestry, Fisheries and Rural Transformation is working with consultants to develop a rehabilitation project for the irrigation systems that got damaged by the troughs.

Policies and legislation

The monitoring, measurement or protection of water resources is mentioned or implied by a number of Acts of the Assembly of the Government of Saint Vincent and the Grenadines:

1. The Central Water and Sewerage Authority, Act 1991: includes in the functions of CWSA to investigate the water resources of Saint Vincent and the Grenadines, and to advise and make recommendations to the Minister relating to the improvement, preservation, conservation, utilization, and apportionment of those resources.
2. The National Irrigation Authority Act, 2004: mandates NIA, in collaboration with the CWSA, to investigate the water resources of Saint Vincent and the Grenadines and advise the Minister on matters relating to improving or expanding existing irrigation schemes and creating new irrigation schemes.
3. The Forest Resource Conservation Act, 1992: charges the Director of Forestry with the protection and preservation of water resources in forest reserves, cooperative forests, conservation areas and along streams and rivers in cooperation with the CWSA and Saint Vincent Electricity Services.
4. The Public Health Act, 1977: defines the functions of the Public Health Department, which include "to promote the public health and the prevention, limitation and suppression of communicable or preventable diseases within Saint Vincent".
5. The Environmental Health Services Act, 1991: further emphasizes pollution control. It is the responsibility of the Minister to regulate, monitor and control the actual and likely contamination or pollution of the environment from any source.
6. The National Parks Act, 2002: established the National Parks, Beaches and Rivers Authority. The Authority shall have power and control over all rivers, streams, springs, swamps, waterfalls, waterpools and beaches in the State.

ENVIRONMENT AND HEALTH

The most challenging issue on Saint Vincent is the turbidity of the water. Turbidity can range between 10 and 75NTUs but can exceed 100NTUs during and after heavy rainfall events. The CWSA has implemented a strict maintenance programme at the water intakes (MoHWE/PAHO, 2013).

There are three laboratories that conduct water quality testing locally. The laboratory at the CWSA carries out weekly sampling at the larger treatment plants and bi-weekly sampling of water from the sources, smaller treatment facilities and areas along the distribution network. Tests are conducted to investigate chemical and microbial parameters (MoHWE/PAHO, 2013). The CWSA adheres to the WHO Guidelines for drinking water quality (WHO, 2011).

The Public Health Department of the MoHWE conducts routine spot checks at various sites around the island, mainly public stand pipes, clinics and schools. Analysis is conducted for residual chlorine, turbidity and pH.

The Saint Vincent and the Grenadines Bureau of Standards conducts water quality testing mainly on the bottled water for commercial use and export. Routine testing on the public water distribution system is not done unless it is requested by the Public Health Department in the event of abnormal results in their routine spot check.

In 2012, there were 880 people in the country affected by water-related diseases which include water-borne, water-based and water-based insect vector diseases. The majority of these reported cases were seen in the gastro intestinal infections (MoHWE, 2013).

PROSPECTS FOR AGRICULTURAL WATER MANAGEMENT

In order establish the planned National Water Resources Management Agency, it is planned to enact a Water Resources Act. There would be a Management Board comprising representatives from water abstractors, industry, water-related organizations and local residents. The activities of the Agency would be overseen by a Government Minister, who would approve proposed standards and adjudicate in cases of appeal against agency decisions. Some current functions of the CWSA, such investigating the water resources of St Vincent and the Grenadines, advising and making recommendations to the Minister relating to the improvement, preservation, conservation, utilization, and apportionment of those resources, will be carried out by the Water Resources Management Agency (NWRS/CWSA, 2009).

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