



Bioenergy and Food Security Projects
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SEYCHELLES

BEFS COUNTRY BRIEF



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1. BEFS

1.1 BIOENERGY AND FOOD SECURITY

Increasing costs of fossil fuels, the threat of climate change and the need to increase energy security and access have put alternative renewable energy sources, including bioenergy, high on the development agenda. Compared with other sources of energy, bioenergy potentially offers some developmental advantages. Bioenergy can target and stimulate the agriculture sector, a critical sector for development and poverty reduction, while improving energy access, creating a new market for producers, offering new employment opportunities, and potentially contributing to environmental objectives. Nevertheless, there are concerns regarding the actual viability of the sector and its environmental and socio-economic sustainability, also in terms of potential competition with food security.

1.2 THE BIOENERGY AND FOOD SECURITY APPROACH

To date, the rush to develop bioenergy as an alternative to fossil fuels has tended to occur in the absence of an understanding of the associated risks and benefits. In order to assist governments in gaining a proper understanding of the issues at stake, FAO has developed the Bioenergy and Food Security (BEFS) Approach.

FAO's **Bioenergy and Food Security (BEFS) Approach** aims to assist policy-makers in assessing the interplay between natural resource availability, bioenergy production potential, rural development and food security, and in strengthening their capacity to manage the trade-offs associated with bioenergy development.



1.3 THE BEFS COUNTRY BRIEF

Part of the first stage of the implementation of the BEFS Approach in a country, is to undertake a review of the agriculture, energy and food security situation at domestic level. This review provides the basis for the identification of potential bioenergy sources, and for a preliminary assessment of potential risks associated with the development of the sector.



The BEFS Approach consists of a **multidisciplinary** and integrated set of **tools and guidance** that can support countries throughout the following key steps of the bioenergy policy development and implementation process:

- **Identification of the key issues** surrounding **bioenergy and food security**, based on the conceptual foundation provided by the BEFS Analytical Framework, and through an **institutionalized dialogue** among relevant national stakeholders;
- **Assessment of the sustainable bioenergy potential**, based on an assessment of **land suitability** and **production costs**, and through an **analysis** of the **environmental** and **socio-economic** dimensions and implications of different bioenergy development pathways, with particular emphasis on food security;
- **Risk prevention and management**, through good environmental and socio-economic practices and related policy instruments;
- **Investment screening and appraisal** through an assessment of the viability and sustainability of proposed bioenergy investments/projects;
- **Impact monitoring, evaluation and response** at both national and project levels; and
- **Capacity building** both at **technical** and **policy** level through training on the above technical tools and guidance.

The BEFS Approach helps countries design and implement sustainable bioenergy policies and strategies, by ensuring that bioenergy development fosters both food and energy security, and that it contributes to both agricultural and rural development in a climate-smart way.

2. COUNTRY OVERVIEW

2.1 QUICK FACTS

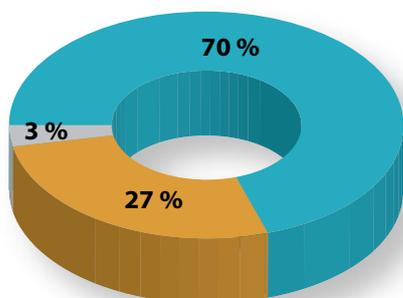
Seychelles is an island country comprising an archipelago of 115 islands in the Indian Ocean, around 1,500 kilometres off the East coast of Africa, and has a total area of 460 square kilometers¹. It has a tropical climate, with an average annual rainfall of 2,330 mm². The population in 2010 was 86,525, of which 44.7 was classified as rural (down from 49.2 percent in 1999)³.



2.2 ECONOMY

In 2009, the country's GDP decreased by 7.6 percent. Between 1999 and 2009, GDP per capita increased from \$7,335 to \$8,084 dollars (constant US dollars)³. In 2010, foreign direct investments equaled 17.8 percent of the GDP³. In the same year, average consumer prices decreased by 2.4 percent. Services are the main economic sector, with a 79 percent share of GDP in 2009 (up from 70 percent in 1999), followed by the industrial sector, with a 19 percent share in 2009 (down from 27 percent in 1999). In 2009, agriculture accounted for only 2 percent of the country's GDP, down from 3 percent in 1999 (**Figures 1,2**).

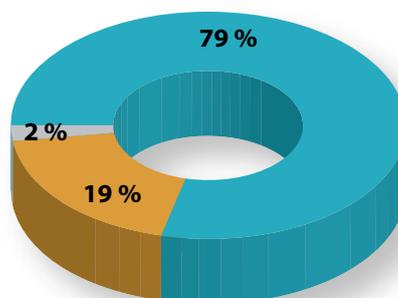
FIGURE 1: SEYCHELLES GDP BY SECTOR (1999)



Agriculture
 Industry
 Services

Source: WDI (2010)

FIGURE 2: SEYCHELLES GDP BY SECTOR (2009)



Agriculture
 Industry
 Services

Source: WDI (2010)

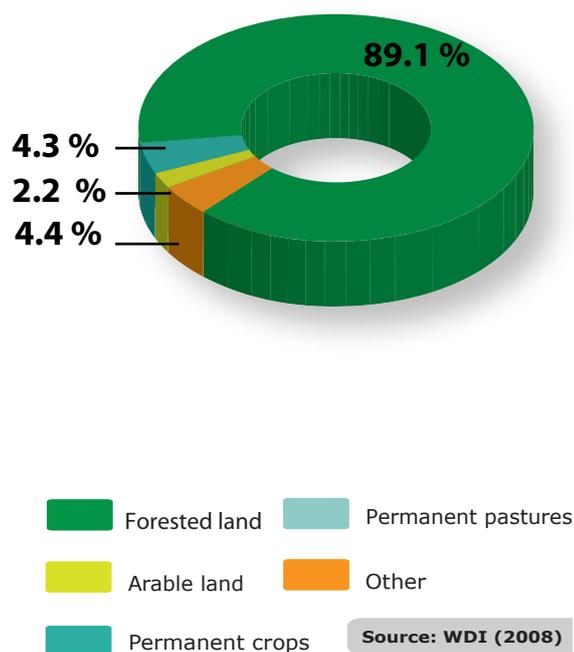
3. AGRICULTURE AND BIOMASS

3.1 LAND AND WATER

Seychelles has a total of 30 square kilometers of agricultural land, or 6.5 percent of the total land area (**Figure 3**). Of that, 2.2 percent is classified as arable land. Around 92 percent of the water used in the country comes from surface or groundwater sources, with the remaining 8 percent obtained from desalination⁴. The municipal sector accounts for 65 percent of total water use⁴.



FIGURE 3: SEYCHELLES LAND USE (2008)



3.2 AGRICULTURE AND LIVESTOCK

The agricultural sector employs around 8 percent of the total labour force and accounts for 0.9 of total exports^{2,3}. The main farming systems in the Seychelles are registered commercial farmers and household gardens. The sector is characterized by rain-fed production and relatively low levels of productivity. The fisheries sector has grown significantly over the last few decades particularly prominent within the country's agricultural sector⁵.

Coconuts, vegetables and bananas are the main crops produced in the country in terms of volume, while nuts and prepared fruit are the main export crops based on value. Between 1999 and 2009, coconut production decreased by 59 percent and banana production by 11 percent, while vegetable production increased by 26 percent (**Figure 4**).

FIGURE 4: SEYCHELLES CROP PRODUCTION - TONNES (2009)

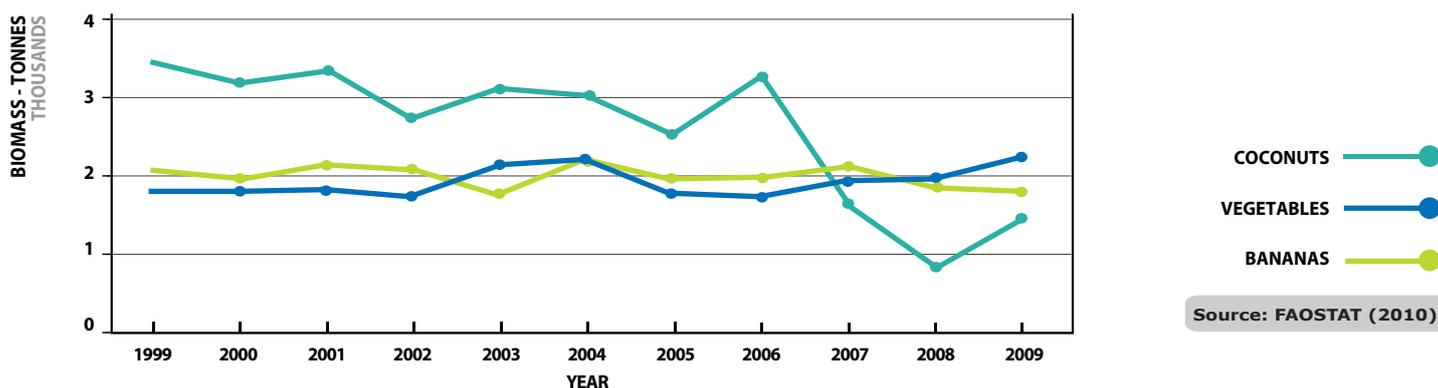
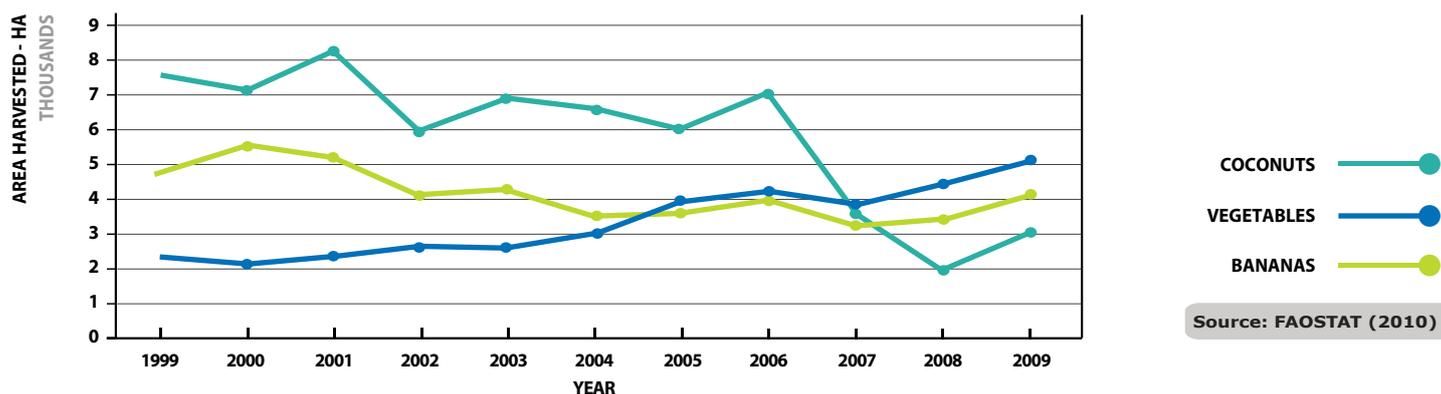
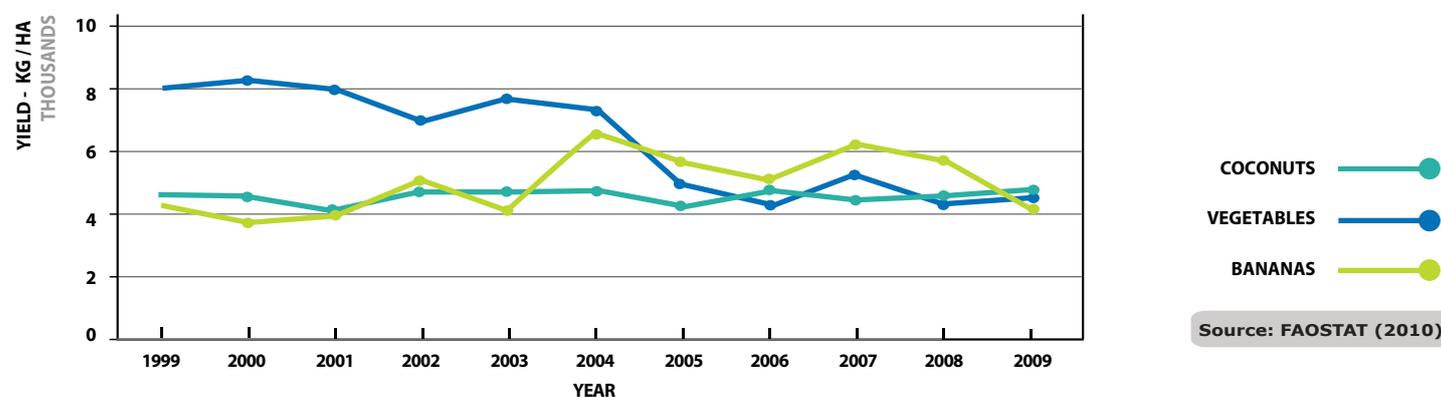


FIGURE 5: SEYCHELLES AREA HARVESTED- HECTARES (2009)



The decrease in coconut and banana production between 1999 and 2009 was due to a decrease in the area harvested, by 59 percent and 11 percent respectively. Yields also decreased marginally for both coconuts and bananas. On the other hand, vegetable production increased because there was an increase in the area harvested of 126 percent, with yields decreasing 44 percent (Figures 5,6).

FIGURE 6: SEYCHELLES CROP YIELD- KILOGRAM/HECTARE (2009)



A small share of agricultural output is wasted due to post-harvest losses (Table 1). In 2007, around 5 percent of domestic banana consumption was lost to waste.

TABLE 1: SEYCHELLES CROP UTILIZATION (2009)

Commodity	Production	Domestic Consumption	Food Supply	Processing	Wastage	Feed	Seed	Other Utility
	Tonnes	Tonnes	Tonnes	Tonnes	Tonnes	Tonnes	Tonnes	Tonnes
Coconuts	2 100	2 100	1 960	140	–	–	–	–
Vegetables	2 211	4 423	4 181	–	–	–	–	242
Bananas	1 733	1 734	1 474	–	87	–	–	173

Source: FAOSTAT (2009)

Livestock plays a very minor role in the Seychelles's agricultural sector, given the lack of permanent pastureland. Around 370,000 chickens, 5,200 goats, 5,175 pigs, and 350 cattle are raised in the country².

3.3 POLICY

The *Agricultural Development Strategy of 2007-2011* aims aimed to provide an enabling environment for agricultural production and shift the production responsibilities to entrepreneurs and farmers; and to achieve self-sufficiency through increased agricultural production³.

4. FOOD SECURITY

4.1 NUTRITION

Nutritional intake in the Seychelles mainly comes from animal products and imported crops. Wheat, rice, maize and sugar make up 54.5 percent of the average daily calorie intake, while animal products provide an additional 16.6 percent² (**Table 2**).

4.2 FOOD SECURITY AND FOOD PRICES

Currently, only 1.8 percent of the population lives below the poverty line³ and a negligible share is undernourished⁶. In 2009, 100 percent of the wheat, rice, and maize consumed domestically was imported (**Table 3**). Potential increases in the price of these crops on the international market could thus affect the trade balance, as well as the welfare of net consuming households.

TABLE 2: SEYCHELLES FOOD CROP CALORIC INTAKE (2009)

Ranking	Commodity	Calorie Share (%)
1	Wheat	17.7
2	Rice	14.6
3	Maize	11.4
4	Sugar	10.8
5	Coconuts	3.8
6	Roots & Tubers	3.1
Subtotal Food Crop share		61.4
Animal Products Share		16.6
Total Calories (kcal/capita/day)		2 426

Source: FAOSTAT (2009)

TABLE 3: SEYCHELLES NET FOOD CROP TRADE (2009)

Commodity	Production	Import	Export	Stock Variation	Domestic Consumption	Import Share of Consumption
	Tonnes	Tonnes	Tonnes	Tonnes	Tonnes	%
Wheat	–	7 268	19	0	7 249	100
Rice	–	7 852	4	0	7 847	100
Maize	–	5 935	–	0	5 935	100

Source: FAOSTAT (2009)

4.3 POLICY

The *Food Security Strategy* of 2008-2011, which was formulated in response to rapidly increasing food commodity prices, identified five key areas for improvement: agricultural land use; agricultural inputs and supplies; agricultural infrastructure; agricultural policy and institutional support; and human resource development and training⁵. In addition, under the Strategy, the “every home a garden” campaign was promoted⁵.

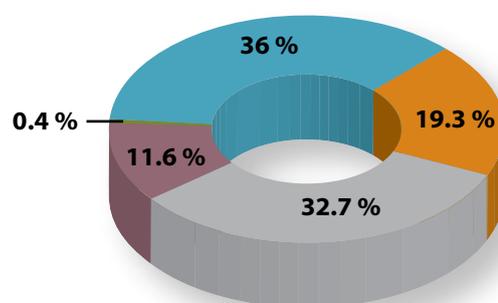
5. ENERGY AND BIOENERGY

5.1 ENERGY SUPPLY AND DEMAND

The energy sector in the Seychelles is well developed, with approximately 96 percent of the country having access to electricity³.

The Seychelles is heavily reliant on imported fossil fuels, with almost 100 percent of imported oils used for electricity production⁷. The main consumer of electrical energy in the Seychelles is the residential sector, accounting for over 32 percent of energy use. Industry is the second biggest consumer of electricity with 36 percent total energy usage (**Figure 7**). Potential renewable energy options include modern bioenergy, solar energy and wind energy⁷.

FIGURE 7: SEYCHELLES ELECTRICITY DEMAND BY SECTOR (2009)



Source: REEGLE (2011)

■ Domestic (Residential) ■ Government ■ Industry ■ Export ■ Lighting

5.2 MODERN BIOENERGY

As of May 2010, there was no modern bioenergy production in the Seychelles⁸. Recently, research has been carried out on the potential for electricity generation from biomass gasification in rural communities, with promising preliminary results⁷.

Further assessment is needed in order to adequately understand the potential role of bioenergy within the country's energy mix. potential role of bioenergy within Namibia's energy mix.

5.3 POLICY

The Second National Energy Policy (2010-2030) outlines the following objectives: enhance the internal energy supply; decrease reliance on imported supplies; focus on sustainable energy efficiency; and increase diversification through the deployment of renewable energy sources, such as energy from waste⁷.

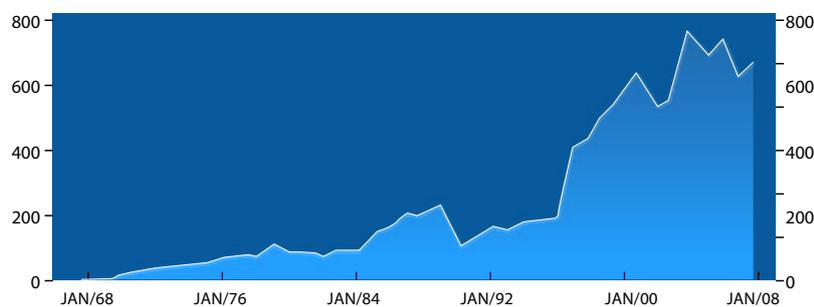


6. ENVIRONMENTAL CONCERNS

6.1 CLIMATE CHANGE

Climate change has already started impacting the Seychelles. The average temperature is increasing by an average of .33 to .82 degrees Celsius from 1972 to 2006, sea levels are rising at the global rate of 1.8mm per year from 1961 to 2003, and flooding and periods of drought are becoming more severe⁹. CO2 emissions have increased considerably since the mid 1990s (**Figure 8**). In 2008, liquid fuel consumption accounted for 100 percent of CO2 emissions³.

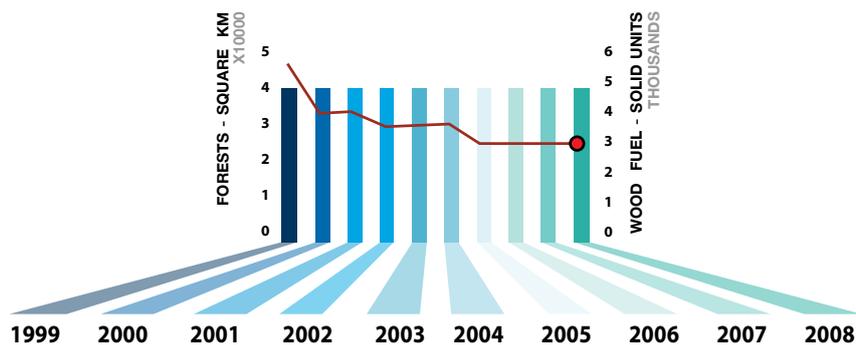
FIGURE 8: SEYCHELLES CO₂ EMISSIONS - KT (2008)



Source: WDI (2010)

Over 89 percent of the total land area is covered by forests³. The amount of forested land has remained stable during the last decade, thanks also to a decrease in the demand for wood fuel wood¹⁰ (**Figure 9**).

FIGURE 9: SEYCHELLES FOREST AREA VS. WOOD FUEL PRODUCTION (1999-2008)



Source: FAOSTAT (2010)

6.2 POLICY

The *Environmental Management Plan of Seychelles (2000-2011)* has the overall goal of upgrading professionalism in the agricultural sector and promoting sustainable agricultural practices for food security with minimum impact on the environment⁵. This development plan supports the main objective of the *Seychelles Strategy 2017*, which is to ensure food security through the most economically and environmentally effective means possible⁵.



SUMMARY

- The Seychelles' agricultural sector employs 8 percent of its total labour force and accounts for 2 percent of the country's GDP.
- Out of the country's total land area, 6.5 percent is used for agricultural purposes, with 2.2 percent of this area classified as arable land. Around 92 percent of the water used in the country comes from surface or groundwater sources, with the remaining 8 percent obtained from desalination.
- Wheat, rice, maize and sugar make up 54.5 percent of the average daily calorie intake, while animal products provide an additional 16.6 percent. In 2009, 100 percent of the wheat, rice, and maize consumed domestically was imported.
- Around 96 percent of households have access to electricity. The Seychelles' main energy consumer is the residential sector. Utilization of other forms of renewable energy such as modern bioenergy, solar and wind could increase energy access and diversify the Seychelles's energy profile.
- At present, there is no modern bioenergy production in the Seychelles⁸. Recently, research has been carried out on the potential for electricity generation from biomass gasification in rural communities, with promising preliminary results⁷. Further assessment is needed in order to adequately understand the potential role of bioenergy within the country's energy mix.
- Over the last ten years, the Seychelles has implemented a range of policies affecting the agricultural, energy, and environmental sectors. The development of better data on the topics covered in this brief will strengthen the government's ability to assess the effectiveness of these policy interventions and improve future decisions regarding food security and energy sector development in the Seychelles.

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