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Bioenergy and Food Security Projects

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NAMIBIA

BEFS COUNTRY BRIEF

FAO FIAT PANIS

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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

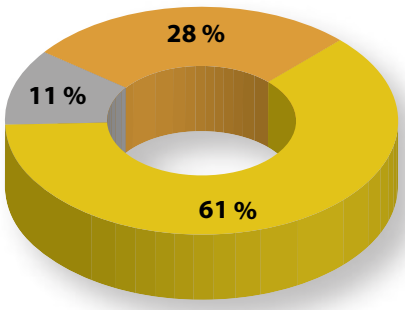
2.1 Quick facts

Namibia is a country located on the West coast of Africa and has a total area of 823,290 square kilometers[1]. It has an arid climate, with an average annual rainfall of 285 mm[2]. The population in 2010 was 2,283,289 and increasing by an average of 1.8 percent per annum[3]. Of this, approximately 62 percent is classified as rural, down from 68 percent in 1999[3].

2.2 Economy

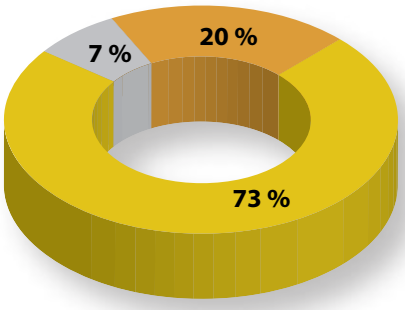
In 2009, Namibia's GDP decreased by 0.8 percent. Between 1999 and 2009, GDP per capita increased from $2,040 to $2,592 dollars (in constant US dollars)[3]. In 2010, trade equaled 76.7 percent of GDP, and foreign direct investments equaled 6.5 percent of the latter[3]. In the same year, consumer price inflation amounted to 4.5 percent[3]. Services are the main economic sector, with a 73 percent share of GDP in 2009, compared to 61 percent in 1999. Between 1999 and 2009, the share of the industrial sector decreased from 28 percent to 20 percent and the share of agriculture decreased from 11 percent to 7 percent (Figures 1,2).

Figure 1: Namibia GDP by Sector (1999)



Source: WDI (2010)

Figure 2: Namibia GDP by Sector (2009)



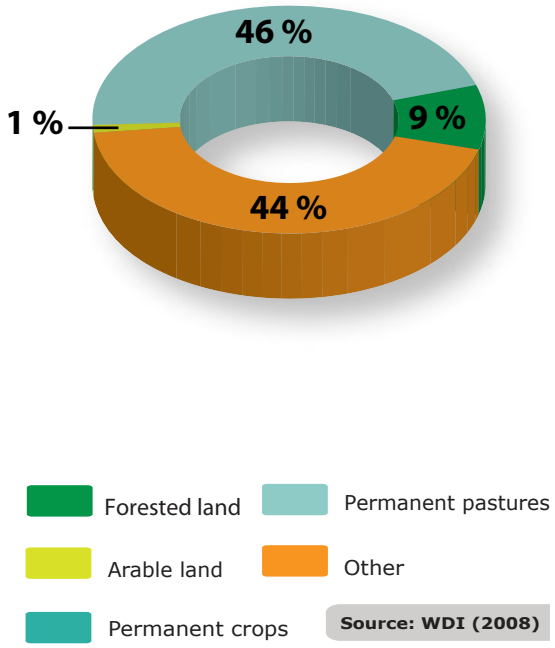
Source: WDI (2010)

3. Agriculture and Biomass

3.1 Land and water

Namibia has a total of 388,080 square kilometers of agricultural land, or 47 percent of the total land area **(Figure 3).** Of that, just one percent is classified as arable land. The country has over 17.7 billion cubic meters of renewable water resources available, of which 1.7 percent is withdrawn annually[4]. Of the total water withdrawn, around 71 percent is used in the agricultural sector[4].

Figure 3: Namibia Land Use (2008)



3.2 Agriculture and livestock

Agriculture employs approximately 41 percent of the labour force and accounts for 7.5 percent of total exports[2,3]. Subsistence farming, cattle ranching, as well as commercial farming can be found in Namibia.

Roots and tubers are the main crops produced in Namibia in terms of volume, followed by maize and millet. Grapes and cotton are the main export crops based on value. Between 1999 and 2009, maize production increased by 204 percent and production of roots and tubers increased by 13 percent, while millet production decreased by 21 percent **(Figure 4).**

Figure 4: Namibia Crop Production - tonnes (2009)

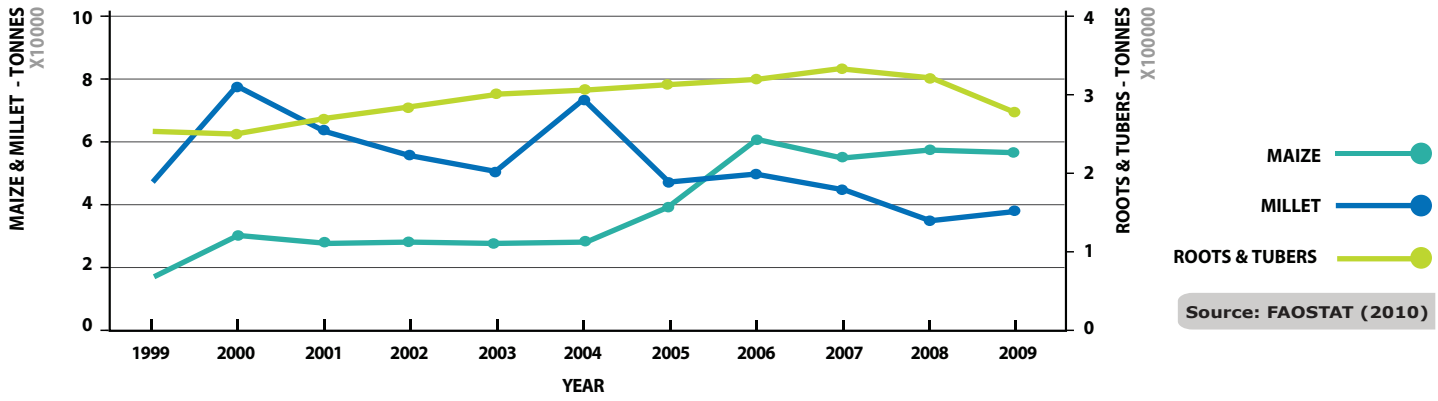
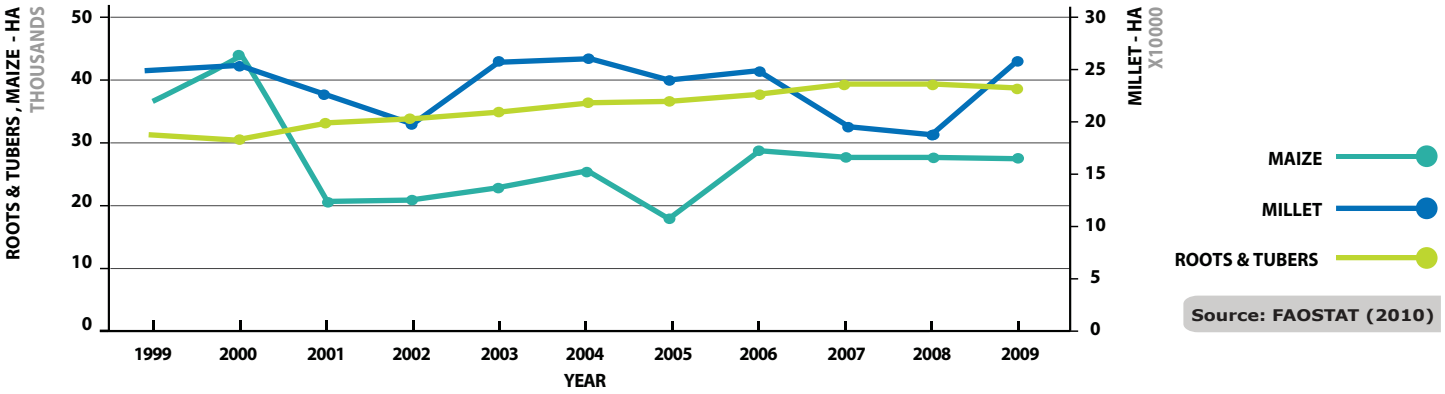
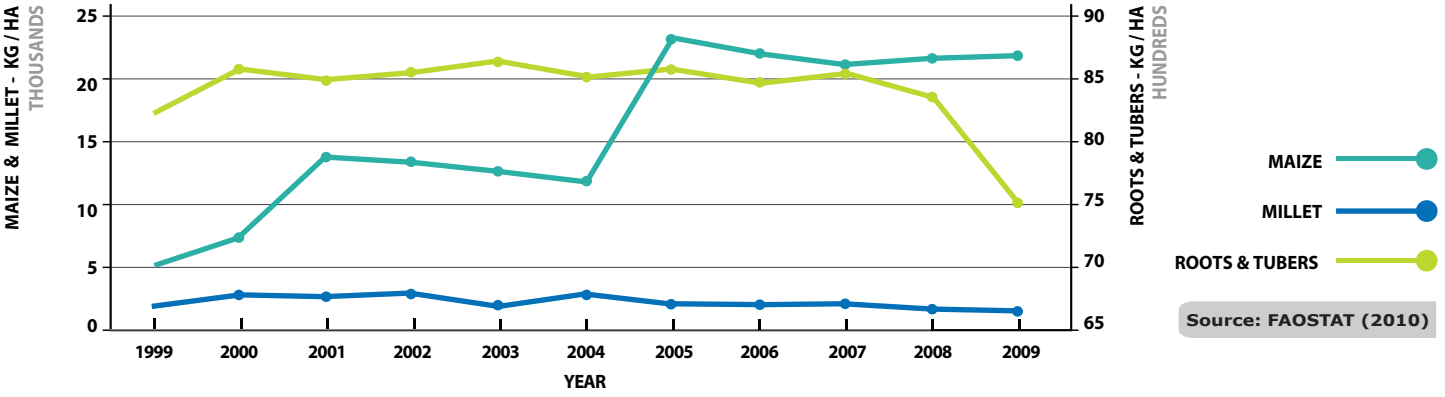


Figure 5: Namibia Area Harvested - hectares (2009)



The increase in the production of maize between 1999 and 2009 was due to a 300 percent increase in yields, with area harvested decreasing by 24 percent. On the other hand, the increase in the production of roots and tubers was the result of a 25 percent increase in the area harvested, while yields decreased by 10 percent. Millet production decreased due to yields falling by 24 percent, while the area harvested increased by 4 percent **(Figures 5,6).**

Figure 6: Namibia Crop Yield - kilogram/hectare (2009)



A share of agricultural output is wasted due to post-harvest losses **(Table 1).** Around 18 percent of the roots and tubers, 8 percent of the maize, and 5 percent of the millet consumed in Namibia was lost to waste.

Table 1: Namibia Crop Utilization (2009)

Commodity	Production	Domestic Consumption	Food Supply	Processing	Wastage	Feed	Seed	Other Utility
	Tonnes	Tonnes	Tonnes	Tonnes	Tonnes	Tonnes	Tonnes	Tonnes
Roots & Tubers	72 862	76 980	62 867	–	14 087	2 199 999	–	27
Maize	57 320	171 576	153 287	–	13 698	450 000	814	353
Millets	37 301	47 652	40 115	–	2 383	250 000	5 155	–

Source: FAOSTAT (2009)

With regard to livestock, permanent pastureland accounts for 46 percent of total available land according to 2010 data[3]. 4.9 million chickens, 2.7 million sheep, 2.5 million camels, 2 million cattle, and 140 thousand asses are raised in Namibia[2].

3.3 Policy

The National Agricultural Policy, which was adopted in 1995, aims to increase and sustain levels of agricultural productivity, real incomes, and food security while continuing to improve investment opportunities in the agricultural sector and expanding markets, both domestically and internationally [5].

4. FOOD SECURITY

4.1 NUTRITION

Nutrition is a concern for Namibia. Stunting was found in 29 percent of children under the age of five in 2010[6]. In Namibia, maize makes up 26.1 percent of the average daily calorie intake, followed by roots & tubers with 12.9 percent. Animal products account for 13.7 percent of the calorie intake **(Table 2).**

4.2 FOOD SECURITY AND FOOD PRICES

Currently, 38 percent of the population lives below the poverty line[3] and 18 percent is undernourished[6]. With a relatively high percentage of the country's population living in poverty, food security is a national concern. In 2009, domestic production and consumption of roots and tubers and other roots were roughly equivalent. With regard to maize, imports accounted for 49.1 percent of domestic consumption in the same year **(Table 3).** Potential increases in the price of maize on the international market can thus affect the trade balance, as well as the welfare of net consuming households.

TABLE 2: NAMIBIA FOOD CROP CALORIC INTAKE (2009)

Ranking	Commodity	Calorie Share (%)
1	Maize	26.1
2	Roots & Tubers	12.9
3	Roots, Other	11.7
4	Sugar	9.2
5	Wheat	8.2
6	Millet	7.1
Subtotal Food Crop share		75.2
Animal Products Share		13.7
Total Calories (kcal/capita/day)		2 151

Source: FAOSTAT (2009)

TABLE 3: NAMIBIA NET FOOD CROP TRADE (2009)

Commodity	Production	Import	Export	Stock Variation	Domestic Consumption	Import Share of Consumption
	Tonnes	Tonnes	Tonnes	Tonnes	Tonnes	%
Maize	57 320	84 301	45	30 000	171 576	49.1
Roots & Tubers	72 862	4 199	81	0	76 980	5.4
Roots, Other	281 740	0	0	–	281 740	0

Source: FAOSTAT (2009)

4.3 POLICY

The *Food Security and Nutrition Policy*, which was adopted in 1995, has the overall goal of improving food security and the nutritional status of the population. In order to pursue this goal, this policy outlines three specific objectives: improving access to resources required to grow or purchase food commodities; improving the knowledge, education, and understanding necessary to utilize those resources efficiently; and improving access to appropriate services[5].

5. Energy and Bioenergy

5.1 Energy supply and demand

Approximately 34 percent of the country has access to electricity [3]. The majority of electrified households (70 percent) live in urban areas, with around 15 percent of rural households having access to electricity [7].

Oil products account for 72 percent of total primary energy supply and for over 84 percent of final energy consumption, while biomass and more precisely primary solid biofuels account for around 13 percent of supply and 16 percent of consumption[8] **(Figures 7,8).** Other potential renewable energy options include modern bioenergy, solar energy, wind energy, and further development of hydropower [7].

Figure 7: Namibia Total Primary Energy Supply (2009)

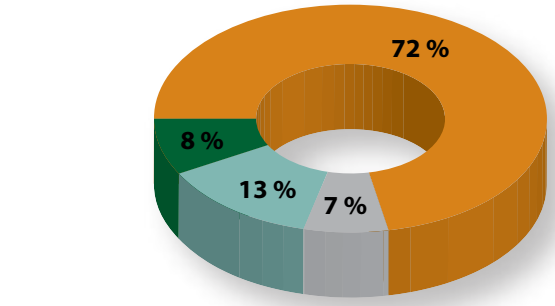
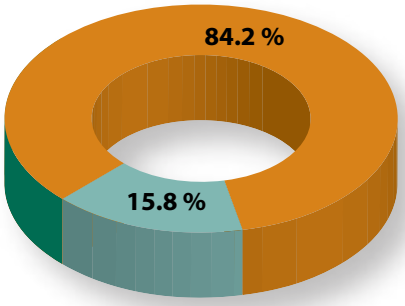


Figure 8: Namibia Total Final Energy Consumption (2009)

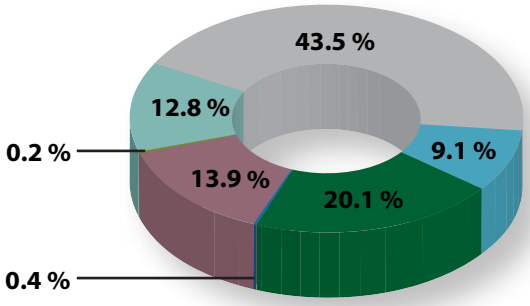


Source: IEA (2009)

Coal & Peat | Oil Products | Nuclear | Solar , etc.
Crude Oil | Natural Gas | Hydro | Biomass & Waste

The main consumer of energy in Namibia is the transport sector, accounting for 43.5 percent of energy use[8], while agriculture accounts for nearly 14 percent **(Figure 9).**

Figure 9: Namibia Energy Use by Sector (2009)



Source: IEA (2009)

Industry | Transport | Residential | Commercial
Agricuture | Non-energy use | Non-specified

5.2 Modern bioenergy

As of May 2010, there were two projects for the production of biodiesel from jatropha in the planning stages[9].

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

5.3 Policy

Namibia's *White Paper on Energy Policy* of 1998 recognizes the importance of renewable energy in fostering sustainable socio-economic development and the security of supply[10]. The Paper outlines six specific goals for the energy sector: effective governance; security of supply; social development and growth; investment and growth; economic competition and efficiency; and sustainability[10].

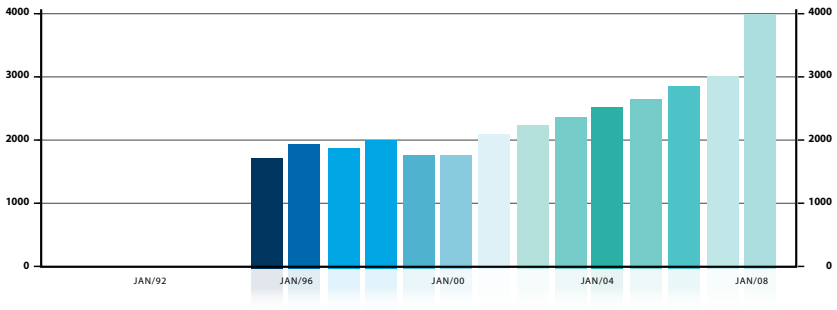
6. Environmental Concerns

6.1 Climate change

Climate change has already started to impact Namibia. Rainfall patterns are shifting, flooding has increased, and prolonged droughts have become more common[11]. These trends are predicted to continue over the coming decades, with a projected increase in the annual average temperature of 1.7 degrees Celsius and a 2.5-7.5 percent decrease in average annual rainfall[11].

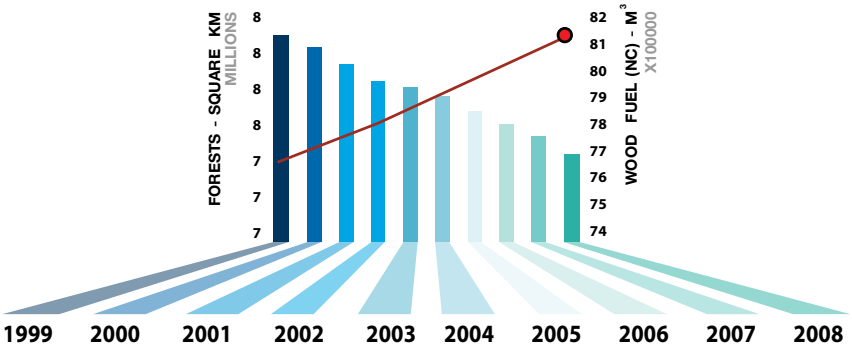
CO_2 emissions have more than doubled during the last decade **(Figure 10).** In 2008, liquid fuel consumption accounted for 72.4 percent of total emissions in Namibia[3].

Figure 10: Namibia CO_2 Emissions - KT (2008)



Source: WDI (2010)

Figure 11: Namibia Forest Area vs. Wood Fuel Production (1999-2008)



Source: FAOSTAT (2010)

Land-use change and especially deforestation and forest degradation are major sources of GHG emissions in Namibia. As noted previously, forests and forest products are heavily utilized as energy sources, with 48 percent of energy produced coming from biomass and almost 16 percent of energy consumption coming from the same source[8]. Forested areas are rapidly shrinking to meet domestic demand for wood fuel and export demand for wood products **(Figure 11).** In addition to GHG emissions, unregulated harvesting of wood fuel wood is causing other environmental problems as well, especially in terms of biodiversity loss.

6.2 Policy

Namibia's *Environmental Impact Assessment* Policy of 1994 aims to: better inform decision-makers and promote accountability; promote public participation; assess environmental costs and benefits and cumulative environmental impacts; incorporate international standards; promote sustainable development; and adapt to new information and technologies[12].

Summary

- Namibia's agricultural sector employs around 41 percent of its total labour force and accounts for 7 percent of the country's GDP.
- Out of Namibia's total land area, 47 percent is used for agricultural purposes, with one percent of this area classified as arable land. Around 1.7 percent of the country's renewable water resources is withdrawn annually.
- Maize, roots and tubers, and other roots make up 50.7 percent of the average daily calorie intake. Animal products account for 13.7 percent of the average daily calorie intake.
- In 2009, domestic production and consumption of roots and tubers and of other roots were roughly equivalent, while 49.1 percent of the maize consumed domestically was imported. Potential increases in the price of maize on the international market can thus affect the trade balance, as well as the welfare of net consuming households.
- Around 34 percent of households have access to electricity. Imported oil products account for over 84 percent of final energy consumption. There are currently two projects for the production of biodiesel from jatropha in the planning stages. Further assessment is needed in order to adequately understand the potential role of bioenergy within Namibia's energy mix.
- Namibia's forest area is declining as the demand for forest products for domestic consumption and the export market increases.
- Over the last ten years, Namibia 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 Namibia.

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