



High-Level Conference on:

Water for Agriculture and Energy in Africa: the Challenges of Climate Change

Sirte, Libyan Arab Jamahiriya, 15-17 December 2008

National Investment Brief

LESOTHO

EXECUTIVE SUMMARY:

Lesotho portrays a high level of undernourishment: in 2001 one out of four persons was undernourished. The situation has not changed significantly from 1990-92 to 1999-2001. Nonetheless, there is less undernourishment in Lesotho than in Southern Africa and in Sub-Saharan Africa.

Agriculture in Lesotho represented a value added in agriculture of 16.3 percent in 2006. Small farms (less than 1 ha) dominate the agricultural production and maize is by far the most popular crop accounting for some 60 percent of the cropped area. In 1999 there were 2 637 ha equipped for irrigation but only 2.54 percent were under operation. The irrigation potential is estimated to be between 1 000 and 13 000 ha.

Lesotho is located entirely within the Orange River basin which provides approximately 5.23 km³/yr of natural renewable water resources, by far exceeding water demand. Three major dams have been constructed during Phase I of Lesotho Highlands Water Project (LHWP): Katse Dam (1.95 km³), Mohale Dam (86 km³) and Muela Dam (6 million m³), acting as the tailpond of the Muela hydropower station. Phases II, III and IV of the project foresee the construction of the Mashai Dam (3.3 km³), Tsoelike Dam (2.22 km³) and Ntoahae Dam. In the electricity supply, Lesotho has relatively high potential for hydropower resources, estimates talk about 450MW, but only 76MW is currently being exploited (72 MW come from Muela hydropower station).

According to UNFCC, Lesotho is classified as a country highly vulnerable to climate change. Predictions expect that Lesotho will suffer water stress by year 2019 and will worsen by year 2062. Regarding agriculture, improved crop production in maize is predicted, that can only be met if the obstacles currently faced by agriculture are removed and policies and programmes that encourage the country to adapt to new agro-climatic conditions are adopted.

The goals of the *Agricultural Sector Strategy (ASeSt)* of Lesotho include Food security; Poverty reduction; Sustainable environmental management and conservation; Improved efficiency; Improved income distribution; and Increased share of agriculture in GDP. Irrigation plays an important role in achieving these goals, since the Government of Lesotho sees irrigation as a key avenue for increased agricultural production and household food security, as it would enable farmers to intensify and diversify their crop production base.

Currently, there are some of 7 project profiles recently implemented with a large water component that range from US\$2.5 million to US\$3.6. There are also two Bankable Investment Project Profiles with large water component; one for US\$65,074,800 and the other for US\$38,711,200. Finally, there is a total of some 5 recent and ongoing projects involving different donors ranging from about US\$ 65,549 to about US\$110 million.

1 CONTEXT

1.1 AGRICULTURE AND FOOD SECURITY

Agriculture

The national GDP of Lesotho was US\$1 600 million in 2007, with a value added in agriculture of 16.3 percent in 2006. The agricultural sector provided work for 276 000 people, which is 38 percent of the economically active population (2005). Of these agricultural workers, 58 percent were female.

Smallholder farmers whose farms are generally less than 1 ha in size dominate the agricultural production. Maize is by far the most popular crop accounting for some 60 percent of the cropped area, sorghum between 10 and 20 percent, wheat for about 10 percent and beans for a further 6 percent. In late summer, farmers plant wheat and peas on residual moisture, which remain dormant for most of the winter until the first rains in spring.

Irrigation and water control

The long-term irrigation potential in Lesotho is estimated at 13 000 ha. Other estimates of irrigation potential, considering only the available water resources and taking into account the reduced availability due to the Lesotho Highlands Water Project (LHWP), reckon that a minimum of 3 500 ha and up to 7 000 ha could be brought under irrigation if the Senqu River potential was fully exploited. However, others still, taking into account the high cost of irrigation development in the country, conclude that the irrigation potential is limited by the market for high value crops and set the potential for new irrigation at about 1000 ha.

The more successful irrigation projects in Lesotho, such as the small-scale irrigation and water harvesting projects, are based on an individual approach to communally owned irrigation schemes, where farmers control the on-field crop production activities. Private irrigation, consisting mainly of home gardens and small market gardens, is successful and is contributing to meeting household food security needs, as well as supplying rural markets.

By 1999, out of the 2 637 ha equipped for irrigation only 67 ha were still under operation, and this still relied heavily on government/donor support, although the latter has declined in recent years. Of the total equipped area, 175 ha were small schemes (< 100 ha) and 2 462 ha were large schemes (> 100 ha). In small schemes mostly vegetables are grown and surface and sprinkler systems are used. Large schemes were equipped for sprinkler irrigation, but as the schemes never managed to make a profit (due to its inappropriateness for operation and the high running costs), they are no longer irrigated.

Food security

Lesotho portrays a high level of undernourishment: in 2001 one out of four persons was undernourished. The situation has not changed significantly from 1990-92, benchmark period of the World Food Summit (WFS) and the Millennium Declaration (MD) to 1999-2001, the last period available. Nonetheless, there is less undernourishment in Lesotho than in Southern Africa and in Sub-Saharan Africa.

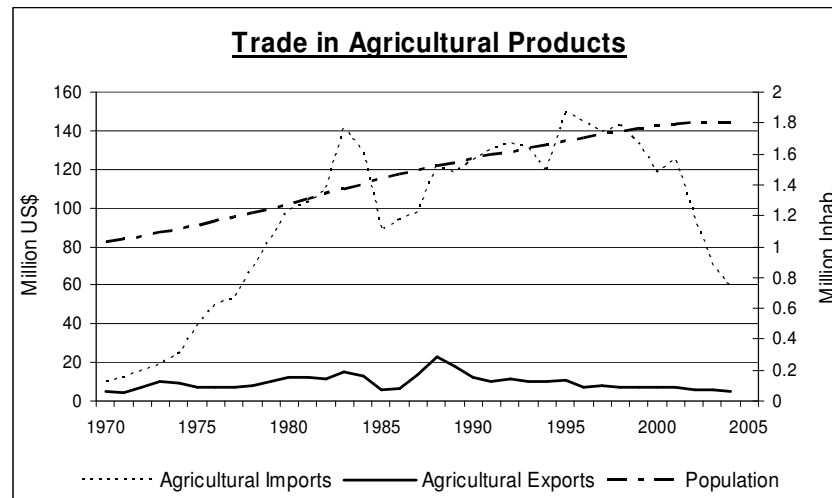
Government sees irrigation as a key avenue for increased agricultural production and household food security, as it would enable farmers to intensify and diversify their crop production base. Crops identified for diversification include vegetables and fruits such as paprika, asparagus and apples. Nonetheless, the scope for increasing food production through area expansion or through higher productivity is extremely limited.

Food and agriculture trade and import balance

The country is a persistent net food importer, externally sourcing up to 65 percent of its annual maize requirements and 80 percent of its annual wheat requirements. The food commercial bill in Lesotho shows a steady increase from 1970 to the mid nineties, when it stabilized at values which average US\$95 million. Since 2002, the total commercial food bill declined and in 2003 reached a value of US\$34 million, close to the values assumed at the end of the Seventies.

In face of a food export value stable around an average of US\$9.4 million, the food imports steadily increased until the mid-nineties, reaching a peak in 1995 (US\$149 million). Afterwards, imports recorded a sharp decline, driven by the sharp decline in the amount of cereals, particularly coarse

grains, imported. In fact, while in 1995 cereals were contributing to 47% of the import bill, in 2003 they represented only 21% of food imports. Instead, most of the expenditures concentrated on meat and fruits and vegetables.



1.2 WATER RESOURCES AND HYDROPOWER

Lesotho is located entirely within the Orange River basin shared with Botswana, Namibia, and South Africa. The major sub-basin river systems in Lesotho are the Senqu, where four large dams will be constructed under the Lesotho Highlands Water Project (LHWP), the Makhaleng and the Mohokare (or Caladon) which marks the border with South Africa.

Lesotho's natural renewable water resources are estimated at 5.23 km³/yr, by far exceeding its water demand. Due to Lesotho's commitments in the framework of the LHWP, its actual water resources will decrease to 3.03 km³/yr by 2020. Groundwater resources are estimated at 0.5 km³/yr. Except for the area around Maputsoe (aquifer yield 50 l/s), the potential for irrigation with groundwater in Lesotho is low. Although Lesotho's main natural resource is water, drought chronically affects the country, illustrating the vulnerability of the agricultural sector.

Major dams have been constructed in the framework of Phase I of LHWP:

- Katse Dam in the Central Maluti Mountains was completed in May 1997 with 710 m crest length and a storage capacity of 1.95 km³.
- Mohale Dam, with 540 m crest length has a storage capacity of 0.86 km³.
- Muela Dam, 6 million m³ capacity, dam acts as the tailpond of the Muela hydropower station.

Phases II, III and IV of the project foresee the construction of Mashai Dam (3.3 km³), Tsoelike Dam (2.22 km³) and Ntoahae Dam. After completion of all phases by 2020 the project will convey 2.2 km³/yr (66 m³/s) of water to South Africa.

The energy supply of the country is met through the following resources: biomass, petroleum, coal, electricity and liquefied-petroleum gas (LPG). With a poor energy resource base and severe deforestation, the country has, until recently been totally dependent on imports for her commercial energy requirements. However, in the electricity supply, Lesotho has relatively high potential for hydropower resources. The country is believed to have a potential of 450MW, but only 76MW is currently being exploited. The generation plants are: Muela (72MW), Mantsonyane (2MW), Mokhotlong (0.67MW), Tsoelike (0.4MW) and Semonkong (0.18MW). Since the completion of Muela, Lesotho has been largely self-sufficient in its domestic electricity requirements except during the peak periods.

1.3 CLIMATE CHANGE

The vulnerability assessment undertaken in 2000 by the Ministry of National Resources has revealed Lesotho as country prone to natural disasters, liable to drought and desertification. The fragile soil/terrain characteristics, erratic climatological conditions, difficulties of realising the full potential of agro-ecological conditions, the growing level of poverty which is currently estimated at more than

50% of the households, and the relative deprivation of the inaccessible mountain region which makes up more than 60% of the country, ranks Lesotho as one of the most highly vulnerable developing countries.

Global Circulation Models (GCM) simulations of future scenarios show a reduced surface and sub-surface runoff under climate change as a result of the predicted lower precipitations. Given the current population growth rate and climate, it is estimated that the country will enter a water stress period by year 2019 which will worsen by year 2062.

From the GCM simulations emerges that the projected climate change conditions are likely to have a slightly positive impact on maize production during normal and wet years. However, their impact on sorghum and dry bean production during these years can not be clearly determined, with dry bean production likely to fall below baseline levels during normal years. Lesotho will only realize the potential of improved crop production that is predicted by these GCM climate change scenarios if the obstacles that is currently facing are removed and policies and programmes that encourage the country to adapt to new agro-climatic conditions are embraced. This may require the adaptation of new production technologies that could include land reform and irrigation.

2. NATIONAL STRATEGIES FOR WATER, AGRICULTURE AND ENERGY

2.1 POLICY CONTEXT

The Ministry of Agriculture and Food Security (MAFS) of Lesotho has developed two strategies: *the District Economic Strategies (DES)* and the *Agricultural Sector Strategy (ASeSt)*.

There are 10 DESs which offer desired investments by rural people and they also benefit from other national pre-investment strategies namely, the *Agricultural Sector Investment Programme (ASIP)* and *Agricultural Policy and Capacity Building Programme (APCBP)* which have been funded by donors to build capacity in the MAFS.

The ASeSt has six goals which are:

- Food security;
- Poverty reduction;
- Sustainable environmental management and conservation;
- Improved efficiency (adopting a productivity culture);
- Improved income distribution;
- Increase share of agriculture in GDP;
- Increased awareness and prevention of HIV/AIDS and inter-institutional coordination.

Through the **Irrigation Policy**, formulated in 2002, efficient use of water is also given priority because of droughts in the previous three years. The Government of Lesotho also sees irrigation as a key avenue for increased agricultural production and household food security, as it would enable farmers to intensify and diversify their crop production base. Currently the National Irrigation Policy of the Government is in disarray, as the Government and its donors recognize that previous policies have failed, but so far no comprehensive alternative has been developed.

The **National Environmental Policy** of Lesotho recognized that the sustainable development of small-scale irrigation schemes, based on surface water resources via the construction of small dams and diversion of rivers, is totally dependent on the improvement and stabilization of soil conservation and afforestation measures in the catchment areas serving these schemes and adopted this as a guiding principle for water resources management.

A process of **land reform** is on-going in the Ministry of Local Government. Two Land Commissions were set up in 1987 and 2000 respectively, to review the Land Act 1979. The Ministry has prepared a land policy and the Land Bill 2003 that provides for the Land Market, Land Board, equal rights of women in land ownership and abolishes discrimination in land leases.

The **Agricultural Sector Investment Programme (ASIP)** intends to improve the viability and sustainability of existing public irrigation schemes by making them more responsive to demand, and, subject to demand, to expand irrigation for fruit and vegetable import substitution, employment creation and enhanced food security.

After signing the United Nations Framework Convention on Climate Change (UNFCCC) in 1992, and ratifying the same in 1995, Lesotho initiated a project Enabling Activities for the Implementation of UNFCCC. The main objectives of this project are to assist Lesotho to meet her obligations under the UNFCCC, and to lay down a framework for the formulation and implementation of a **national programme of action on climate change** (NAPCC). The development of NAPCC has been done in stages that involve multi-disciplinary inputs and are marked by the following clearly identifiable activities: public awareness campaigns, compilation of inventories of GHG emissions, vulnerability assessments, and the assessment of policies and mitigation and adaptation measures.

It is recognised that most of the country’s vulnerability to climate change emanate from the wide prevalence of poverty, hence poverty alleviation has become an important national objective which is incorporated into national plans. A lot of programmes have been designed for poverty alleviation in recent years. These include social funds, special employment schemes, and restoration and resettlement schemes for households that are affected by development activities. Moreover, several mitigation policies have been undertaken: promotion of renewable sources of energy for the residential and commercial sectors, the encouragement of energy switching to cleaner sources such as electricity, reforestation of indigenous forests, rehabilitation of wetlands. Adaptation policies concern in particular the agriculture and water sectors, and include a series of measures such as introducing new and more drought resistant crop varieties, crop diversification to high value crops, irrigation development, etc.

2.2 INVESTMENT ENVELOPE

The investment envelope for the short, medium and long term is presented in the Table below and expressed in million US \$ (based on CAADP investment projections).

Time scale	Type of investment (million US\$)			
	Small scale water control	Rehabilitation of irrigation infrastructure	Large scale projects	Total
Short-term	19	2	0	21
Medium-term	12	6	1	18
Long-term	6	1	2	9

2.3 PROJECT PORTFOLIO

Section 3 presents recently achieved, active and pipeline projects related to the above investment envelope. Currently, there are some of 7 project profiles already prepared with a large water component that range from US\$2.5 million for a crop production effort to US\$3.6 million for the Sustainable Agricultural Development Programme for the Mountain Areas. There are also two Bankable Investment Project Profiles with large water component; one for US\$65,074,800 and the other for US\$38,711,200. Finally, there is a total of some 5 recent and ongoing projects involving different donors ranging from about US\$ 65,549 to about US\$110 million.

3. PROJECT PROFILES (ON-GOING AND PROJECTED)

Project title	Funding Partners	Lifeline	Total Budget	Description
I. PROJECTS RECENTLY IMPLEMENTED				
Highland Water 1B Project	World Bank	04/06/1998-31/12/2006	Commitment amount: 45 US\$million	The components include: (a) main project works including the construction of a concrete face rockfill dam at Mohale, a concrete line tunnel from Mohale to Katse, concrete weir at Matsoku and associated infrastructure; (b) engineering supervision; (c) implementation of a full environmental action plan including resettlements and compensations and (d) administration and capacity building.
Lesotho Highlands Water Project - Phase 1A	World Bank	23/07/1991-31/03/1999	Commitment amount: 110 US\$million	The project is the phase 1A of a 30-year scheme to export water from Lesotho to the industrial heartland of the Republic of South Africa (RSA). It includes facilities to permit water transfer and install 72 MW capacity of hydropower.
Soil and Water Conservation and Agroforestry Programme	IFAD, Government	1989-1997	8.5 US\$million	The programme assisted farmers in building and repairing erosion control structures such as terraces and waterways and water harvesting structures for supplementary irrigation. The programme promoted controlled livestock grazing, simple biological methods of soil conservation, and traditional sharing arrangements so that women and landless people could have access to land.
II. ON-GOING PROJECTS				
Lesotho Water Sector Improvement Project	World Bank	26/10/2004-31/12/2009	Commitment amount: 14.1 US\$ million plus GoL US\$ 1.5 million	Water supply and support adequate sanitation services for consumers living in the Lowlands areas. Component: 1) It will provide support for policy analysis and capacity building. 2) will include selected civil works to augment water treatment and extensions to the distribution system. 3) pilot component to provide an opportunity for the stakeholders involved to test different service options and delivery mechanisms for the delivery of water to six peri-urban communities.
Special Programme for Food Security (SPFS)	Responsible institutions: MAFS and FAO		M700,000; US\$140,000. USD1=Maloti7	The objective is to Increase crop and livestock production.
South-South cooperation	Responsible institutions: MAFS and Indian Team		India: M951,000 FAO: M1,505,000 GoL: M900,000	The main goal of the programme is to enable delivery of Technical Assistance from advanced developing countries to specific countries participating in SPFS.
TCP/LES/3102	TCP Facility	2007-2007	US\$ 88,141	
TCP/LES/3201	TCP Facility	2008-2009	US\$ 65,549	
National Programme for Food Security	EC, UK	2007-2017	US\$435 million	The main objective is to improve the adequacy and stability of access to food at household level. Further objectives are to improve the utilisation of food at household level; and to improve adequacy and stability of food supplies at national level.
Sustainable Agriculture and Natural Resource Management Programme	IFAD, Government, Beneficiaries	2005-2011	12.0 US\$ million	The programme comprises three components, namely: (i) agricultural diversification and intensification; (ii) land and water management; and (iii) local capacity-building. Through the land and water management component, the programme will promote the construction of small earth dams to

				retain runoff for small-scale irrigation and livestock, header tanks to provide microscale irrigation for homestead gardens and rain storage tanks utilizing roof catchments.
III. PIPELINE PROJECTS				
Crop Production: Small-scale Irrigation Development Project (BIPP)	FAO-NEPAD		US\$ 65,074,800	The specific objective of the project is to improve overall agricultural land productivity through harnessing of run-off and application of rainwater in the form of irrigation and through holistic soil moisture management by trained and capable farmers supported by equally empowered extension staff. The project covers all ten districts of the country but it focuses on the central District of Maseru as well as the four northern Districts of Berea, Leribe and Butha Buthe.
Conservation and Land Improvement Project	FAO-NEPAD		US\$ 38,711,200	The project aims at improving the productivity of cropland and rangeland through rehabilitation and protection from further erosion using physical and biological means as part of the normal farming practice. Moreover, it concentrates on the sustainable production and harvesting of wood for fuel, poles and other uses as well as other forest resources, as well as on the development of fruit trees in accordance with the agro-ecological zones.
Irrigated Crop Production	Responsible institutions: Farmers, MOA		Canada: M200,000. GoL: M1.1m. India: M2m	The main objectives of the project are: to make the estimated 9 percent (300,000ha) of land that is suitable for cropping as efficiently productive as possible to enhance household food security; and to expand irrigated crop production in order to counteract frequent drought import and facilitate year round production.
Water Control of SPFS-I	Responsible institutions: MOA/FAO Farmers		US\$ 236,342	The project aims at demonstrating how vulnerability to drought can be minimize using 255 ha through water resources harnessing.
Soil Fertility Improvement in Lesotho	Responsible institutions: MOA, Farmers		M2.6m	The main objective of the project is to raise productivity in crop production by improving the soil fertility of crop land.
Metolong dam and Water Supply Programme	Kuwait Fund, Saudi Fund, OPEC Fund, BADEA, MCC, World Bank, EC.	2007 to 2013	USD 157.16 million	To augment Maseru water supply and en-route areas.
Lesotho Lowlands Water Supply Scheme.	Being solicited	2009 to 2020	USD 430 million	To address chronic water shortage in the lowlands areas.
Lesotho Highlands Water Project Phase II.	Bi-Lateral cooperation between Lesotho and South Africa	2009 to 2020	USD 1 billion	To augment water transfer to the Republic of South Africa and generate hydropower for Lesotho.

ANNEX 1: MAP OF LESOTHO



Source: AQUASTAT 2005.

ANNEX 2: COUNTRY STATISTICS

Country and population								
Area of the country	2005	3035	1000 ha					
Cultivated area as % of the total area of the country	2005	11.0	%					
Total population	2005	1795	1000 inhab					
• of which rural	2005	82	%					
Population economically active in agriculture	2005	276	1000 inhab					
• as % of total economically active population	2005	38	%					
• female	2005	58	%					
• male	2005	42	%					
Economy and Development								
Gross Domestic Product (GDP) (current US\$)	2007	1600	million US\$/yr					
• value added in agriculture (% of GDP)	2006	16.30	%					
• GDP per capita	2007	798	US\$/yr					
Access to improved drinking water sources								
Total population	2006	78	%					
Urban population	2006	93	%					
Rural population	2006	74	%					
Water Resources and management								
Average precipitation	2007	23.9	10 ⁹ m ³ /yr					
Total actual renewable water resources	2007	3.022	10 ⁹ m ³ /yr					
Dependency ratio (transboundary rivers)	2007	0.0	%					
Total actual renewable water resources per inhabitant	2007	1684	m ³ /yr					
Total dam capacity	2005	2.82	10 ⁹ m ³					
Total water withdrawal	2000	0.05	10 ⁹ m ³ /yr					
• as % of total actual renewable water resources	2000	1.65	%					
IRRIGATION AND DRAINAGE								
Irrigation potential	2007	13	1000 ha					
Water Management								
Area equipped for irrigation: full control - total	1999	2.637	1000 ha					
Equipped lowlands	1999	0.000	1000 ha					
Total area equipped for irrigation	1999	2.637	1000 ha					
• Area equipped for irrigation as % of cultivated area	1999	0.8	%					
• Annual increase rate		-	%					
• Power irrigated area as % of area equipped for irrigation		-	%					
• Area actually irrigated as % of area equipped for irrigation	1999	2.5	%					
Non-equipped cultivated lowlands and flood recession	1999	0.000	1000 ha					
Total agricultural water managed area	1999	2.637	1000 ha					
• Agricultural water managed area: as % of cultivated area	1999	0.8	%					
• Drained cultivated area as % of total cultivated area		-	%					
Typology of irrigation schemes								
Small-scale schemes (<100 ha)	1999	0.18	1000 ha					
Medium-scale schemes (- ha)		-	1000 ha					
Large-scale schemes (>100 ha)	1999	2.462	1000 ha					
Irrigated crops								
Vegetables	1995	0.203	1000 ha					
ENERGY INDICATORS								
Energy Production			Mtoe					
Net Imports			Mtoe					
TPES			Mtoe					
- TPES/Pop			toe/capita					
- TPES/GDP			toe/thousand 2000 US\$					
- TPES/GDO (PPP)			toe/thousand 2000 US\$ PPP					
Electricity Consumption			TWh					
- EC/Pop			kWh/capita					
ENERGY SUPPLY AND CONSUMPTION								
	Coal	Gas	Crude oil	Petroleum products	Hydro	Other Renewable & Waste	Others	TOTAL
Production								
Imports								
Exports								
International Marine								
Bunkers								
Stock Changes								
Total Primary Energy Supply (TPES)								

* in thousand tonnes of oil equivalent (ktoe) on a net calorific value basis.

REFERENCES

- AQUASTAT - FAO's Information System on Water and Agriculture
<http://www.fao.org/nr/water/aquastat/countries/lesotho/index.stm>
- Government of the Kingdom of Lesotho, 2005. LESOTHO SCIENCE & TECHNOLOGY POLICY (2006-2011).
http://www.lesotho.gov.ls/documents/Policy/S_T_Policy_LESOTHO.pdf
- International Energy Agency.
<http://www.iea.org/>
- FAO, 2003. Technical Cooperation Department. Field Programme Activities. Operationally Active projects for all Organizational Units in Lesotho
<https://extranet.fao.org/fpmis/FPMISReportServlet.jsp?APD=&countryId=LS&div=&fundG=&type=countryprofileopen&lng=EN&qfrs=&UF=N&typeUF=&colorder=2345&pwb=&sorttype=1>
- FAOSTAT, 2004. The commercial import / Trade and Food Security (TFS) database.
<http://faostat.fao.org/site/342/default.aspx>
- FAO Statistics, 2003. Trends in hunger reduction for the monitoring of the WFS and MDG targets.,
http://www.fao.org/ES/ess/mdg_kit/cy_level.asp#07
- Ministry of Natural resources, 2000. Lesotho First National Communication to the Conference of the Parties to the United Nations Framework Convention on Climate.
<http://unfccc.int/resource/docs/natc/lesnc1.pdf>
- NEPAD, FAO, 2005. National Medium Term Investment Programme.
<http://www.fao.org/docrep/008/ae900e/ae900e00.htm>
- NEPAD, FAO, 2005. Support to NEPAD-CAADP implementation, TCP/LES/2905(I). Bankable Investment Profile - Crop Production: Small-scale Irrigation Development Project
<http://www.fao.org/docrep/008/ae901e/ae901e00.htm>
- NEPAD, FAO, 2005. Support to NEPAD-CAADP implementation, TCP/LES/2905(I). Bankable Investment Profile - Conservation and Land Improvement Project
<http://www.fao.org/docrep/008/ae902e/ae902e00.htm>
- THE WORLD BANK. Projects and Operations.
<http://web.worldbank.org/external/projects/main?pagePK=217672&piPK=95916&theSitePK=40941&menuPK=223661&category=regcountries®ioncode=1&countrycode=LS&pagenumber=1&pagesize=50&sortby=COMMITMENTAMT&sortorder=ASC>