



High-Level Conference on:

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

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National Investment Brief

ETHIOPIA

EXECUTIVE SUMMARY:

The population of Ethiopia is estimated to be 77.4 million (2005). The country's GDP for the year 2007 valued at 19.39 billion US\$ with a per capita income of 245 US\$. In Ethiopia poverty traps prevail in different forms. A crucial mechanism, which has perpetuated poverty in the country, is the interaction of poverty population pressure with environmental degradation. High population pressures and decreasing plot size make some traditional farming practices land degrading, rendering an increasing number of households dependent on inadequately small number of households dependent on inadequately small and unproductive plots and subject to the vagaries of unpredictable rainfall. Several vicious circles by which land is progressively degraded can be identified. Households are too poor to leave fallow or invest in it, leading to a progressive deterioration of their asset base. As result of this declining asset base, soil nutrient depletion and environmental degradation appear to exceed the nutrient replacement by chemical fertilizers in recent years.

Ethiopia has twelve major river basins, including the Blue Nile. Its riparian systems, combined with its eleven major lakes, make Ethiopia the 'water tower' of Northeast Africa. Climate change is projected to cause a drying of wetlands. Although, Ethiopia has relatively abundant water, it has one of the lowest reservoir storage capacities in the world: 50 cubic metres per person compared with 4,700 in Australia (UNDP/HDR, 2007/08). Moreover, agro-pastoral and pastoral households, which are reliant on livestock for their livelihoods, suffer severe asset losses during droughts. As experience in Ethiopia has repeatedly shown, the consequences are likely to include adverse impacts for their terms of trade, with livestock prices falling sharply relative to cereal prices.

Irrespective of Ethiopia's endowment with potentially huge irrigable land, the area of land under irrigation so far is only about 10 percent of the gross irrigation potential showing that water resources have made little contribution towards the development of irrigated agriculture up to now. It can easily be realized, however that, in addition to the underdeveloped irrigation, the accelerated population growth and the disparity of rainfall distribution make production of sufficient food and food security almost impossible.

The main development objective of the Ethiopian Government is poverty eradication. Hence, the country's development policies and strategies are geared towards this end. This document describes the Plan for Accelerated and Sustained Development to End Poverty (PASDEP), Ethiopia's guiding strategic framework for the five-year period 2005/06-2009/10. In 2001, the Ministry of Water Resources formulated the comprehensive Ethiopian Water Sector Strategy which includes the Hydropower Development Strategy, the Water Supply and Sanitation Strategy, and the Irrigation Development Strategy. The principal objective of the Water Sector Strategy is to translate the national water resources management policy into action.

The financial envelope for the mid-term strategy by NEPAD/CAADP is about 683 million US. Currently, there are 11 project profiles already prepared with a large water component that range from 46 million US\$ for a crop production project to 2,637 million US\$ for the construction of a hydropower project. Finally, there are 10 ongoing medium- and large scale water projects involving different donors ranging from about 42 million US\$ to about 2,199 million US\$.

1. CONTEXT

1.1 AGRICULTURE AND FOOD SECURITY

Agriculture

The country's Gross Domestic Product or GDP (current US\$) was 19.39 billion US\$ in 2007 with per capita income of 245 US\$. In the same year, agriculture accounted for almost 47 percent of GDP and about 85 percent of exports. Ethiopia is the third largest populated country in Africa with a total population number of 77.4 million (2005), out of which 84% of the populations reside in the rural area. About 80 percent of the economically active population is engaged in agriculture. The cultivated area covered in 2005/06 was about 11.3 million ha, of which 10.5 million ha and 0.77 million ha covered with annual and permanent crops respectively.

The following five main agricultural production systems can be distinguished in the country:

- The *highland mixed farming system* is characterized by a very low level of specialization of production based on environmental and land suitability and is practised by about 80 percent of the country's population on about 45 percent of the total land mass in areas at more than 1 500 m above sea level. Livestock production is an integral part of the system. The highland mixed farming system includes the grain plough complex (predominantly *teff*) and the horticulture hoe complex.
- The *lowland mixed agricultural production system* is practised in low-lying plains, valleys and mountain foothills, with elevations of less than 1 500 m. These areas mainly produce drought-tolerant varieties of maize, sorghum, wheat and *teff*, along with some oil crops and lowland pulses. Off-farm activities such as sale of firewood and charcoal are widely practised.
- The *pastoral complex* supports the livelihood of only 10 percent of the total population living in the Afar and Somali regions and the Borena zone. Some lowland varieties of maize, sorghum and other cereals are also cultivated on flood plains or as rainfed crops.
- *Shifting cultivation* is practised in the southern and western part of the country. Fields are usually left idle after short periods of cultivation to re-vegetate (usually 1–2 years).
- *Commercial agriculture* is a farming system that has only emerged very recently. However, access to land and infrastructure-related problems as well as investment insecurity are major hindrances to the growth of this system of production.

Irrigation and water control

According to Ministry of Water Resources Irrigation Development Programme document prepared for the year 2002-2016, the gross and net irrigation potentials of Ethiopia have been estimated to be 3.73 and 2.23 million hectares respectively. The total area irrigated till 1991 was 176,015 ha, and this figure had increased to 197,250 ha in 1998. According to data recently compiled by MOWR (2004/5) from different master plan studies and regions the area under irrigation in the country has increased to about 289,530 ha in 2001. This is due to rapid increment of the area under traditional irrigation. The maximum irrigation area quoted to be currently under irrigation is about 10 percent of the gross irrigation potential. This means that the irrigation sub-sector, despite its huge potential, is grossly under-developed-accounting for merely 3 percent of the country's total food production.

Approximately 62 percent of the area under irrigation is located in the Rift Valley, while 29 percent of the area under irrigation is located in the Nile basin. The remaining 9 percent is located in the Shebelli-Juba basin. Nearly 100 percent of the irrigated land is supplied from surface water, while groundwater use has just been started on a pilot scale in East Amhara. Sprinkler irrigation is practised on about 2 percent of the irrigated area for sugar cane production by government enterprises, while localized irrigation has recently started in the Tigray and Amhara regions. Spate irrigation and flood recession cropping are practised in the lowland areas of the country. Some references indicate that the traditional practice of spate irrigation exceeds 100 000 ha. Four types of irrigation are practiced: traditional (38 percent), modern communal (20 percent), modern private (4 percent), and public (38 percent).

Food security

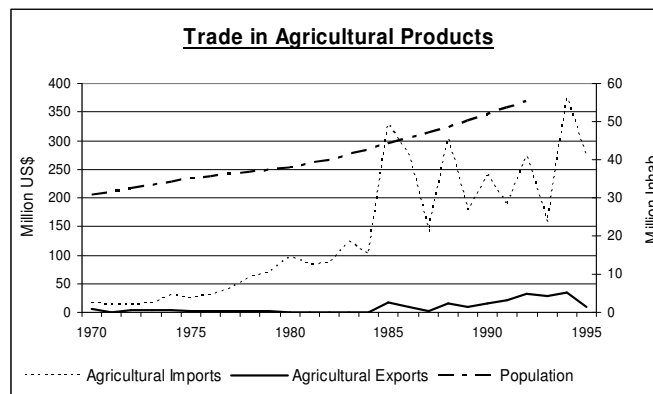
Food insecurity, as a result of persistent drought among other reasons, has been the order of the day for a very long period in Ethiopia. Despite Ethiopia's considerable agricultural resources potentials, the country has been facing chronic food shortages since the early 70s as a result of recurrent drought and high population growth. Even in years of adequate rainfall, the survival of some 4–6 million people depends on international food assistance. In 2001/2002, one of the worst droughts in recent memory, 14 million people required food aid amounting to 1.45 million tons.

Ethiopia portrays a very high level of undernourishment; 42 percent of the population is undernourished. Both the number and the proportion of undernourished people have decreased from 32.2% of the population in 1993-95 to 26.5% in 1999-2001. There is more undernourishment in Ethiopia than in East Africa and in Sub-Saharan Africa.

Food and agriculture trade and import balance

Ethiopia can be considered a net food importer, being the agricultural imports constantly higher than the exports. In 2006, the value of imports and exports comprise 16 percent and 42 percent of the GDP respectively. Cereals are contributing to the largest share of the import bill, consisting of 34%, and, in particular, wheat alone accounts 18% of the total. Coffee is the largest export commodity for Ethiopia, drawing in about 60 percent of foreign exchange earnings.

The food commercial bill in the country shows an exponential increase from 1970 to 1995. A remarkable increase in the food bill can be noticed from 1984; in that year the bill measured at US\$84 million and in ten years it more than quadruplicated, reaching in 1994 values close to US\$359 million. After 1984 the increasing trend appeared to be less smooth than before, mirroring the recurrent droughts occurred in the country. In particular, a peak is noticed in the period immediately subsequent to the severe draught of 1984-85. Cereals are contributing to the largest share of the bill, accounting for 75.7%, and, in particular, wheat alone accounts for more 59.8% of the total commercial bill.



1.2 WATER RESOURCES AND HYDROPOWER

The country is endowed with vast riches of water resources, including 12 major river basins and 12 natural and artificial lakes. The total annual surface runoff, regardless of its distribution, is estimated to be about 122BCM³, of which 75% drains to neighbouring countries. There is also an estimated 2.50 BCM³ of usable ground water that is not yet exploited much with the exception of rural and urban water supply.

The country possesses four major drainage systems: (1) The Nile basin covers 33 percent of the country and drains the northern and central parts westwards; (2) The Rift Valley covers 28 percent of the country; (3) The Shebelli-Juba basin covers 33 percent of the country and drains the south-eastern mountains towards Somalia and the Indian Ocean; and (4) The North-East Coast. Most of the rivers of Ethiopia

originate within the country and flow across the borders to neighbouring countries, thus becoming transboundary rivers. Sharing the water resources of these transboundary rivers is very challenging, particularly the Nile tributaries (Abbay, Tekeze and Baro-Akobo) with the downstream riparian countries Sudan and Egypt.

Ethiopia has many small, medium and large reservoir dams constructed for hydropower generation, irrigation and drinking water supply. Small dams are less than 15 m high with a capacity of less than 3 million m³ and are constructed for irrigation supply (concentrated in the Amhara and Tigray regional states). The height of the medium and large dams in Ethiopia is 15–50 m with a capacity ranging from 4 to 1 900 million m³. In total, there are nine medium and large dams with a total capacity of almost 3.5 km³. Two large dams are used for hydropower generation only, one dam is used both for hydropower generation and irrigation supply, two dams are used for irrigation supply only and the remaining four for water supply to the city of Addis Ababa and the town of Gondar.

Ethiopia has an immense renewable energy potential in the forms of hydropower, solar, and wind, as well as significant untapped geothermal resources. However, the per capita electricity consumption is among the lowest in the world. According to the Government of Ethiopia, only 15 percent of the population has access to electricity, and the bulk of consumption (82 percent) is in the household sector. Ethiopia has a significant hydropower potential. According to recent studies, the hydropower potential is estimated to be 160,000 GWh/year, estimated to be 100 times more than current production. In 2005/06 the energy production of the country was about 2895 GWh, of which hydropower comprised 98.5 percent. Industries and households account for 77% of the national hydroelectricity consumption. Although the low levels of demand for electricity results largely from the low level of development of consumer sectors, recent analysis indicates that demand has outstripped the supply capacity of the hydropower sector. Ethiopia has made ready grand plans to develop its hydropower potential to meet the soaring power demand and played a leading role in a planned regional grid.

Deforestation in watersheds has contributed to high rates of siltation in the country's reservoirs, which limits the useful life of hydropower structures which further increases the cost of modern energy, e.g. the Bati and Kombolcha reservoirs in Wello, Amhara, have completely silted up. This loss of reservoir capacity has caused reduced hydropower generation, reduced water availability for irrigation, and reduced capacity to regulate the river. Hydropower electrical systems are especially prone to disruption by drought. During the 2003 drought, for example, power disruptions (caused by load shedding) were common. Energy-intensive and water-intensive farms were among the hardest hit. This vulnerability can be mitigated by expanding generation and the grid so that temporal and spatial variations in hydrology can be balanced.

1.3 CLIMATE CHANGE

While the country is highly dependent on the agricultural sector for the income, foreign currency, and food security, the sector is dominated by small-scale farmers who employ largely rain-fed and traditional practices- a state which renders Ethiopia highly vulnerable to climate variability (as seen during past persistent drought), and thus to climate change which is projected to reduce yields of the wheat staple crop by 33 % (NAPA).

Desertification brought on by human pressure and recurrent drought has consumed significant land area and continues to threaten arable land. Ethiopia has experienced at least five major national droughts since 1980, along with literally dozens of local droughts. Cycles of droughts create poverty gaps for many households, constantly thwarting efforts to build up assets and increase income. Survey data show that between 1999 and 2004 more than half of all households in the country experienced at least one major or drought shock. These shocks are a major cause for transient poverty: had households been able to smooth consumption then poverty in 2004 would have been at least 14% lower a figure that translates into 11 million fewer people below the poverty line (see figure below).

Figure: The impact of drought shocks in Ethiopia	
	People in poverty (%)
Observed poverty	47.3
Predicted poverty with no drought shocks	33.1
Predicted poverty with no shocks of any kind	28.4

Source: UNDP, Human Development Report 2007/2008: Fighting climate change

Climate change is projected to greatly affect water resources: the runoff to Nile tributaries is projected to be reduced by up to one third and climate change is projected to cause a drying of wetlands. Structural measures for addressing problems of disasters related to drought and flooding have been in use in many occasions thus water shortage for irrigation has been overcome by releasing water from reservoirs and crop losses have been avoided. Since last seven years micro-dams, diversion schemes, and water harvesting schemes are being implemented throughout the country, particularly in areas that are characterized by recurrent drought. Regarding structures for flood control, there is a long tradition of using structures such as dykes and gabions as flood control measures for protection against flood. Reservoirs are rarely operated for flood control purposes other than their primary objectives of power generation and irrigation.

Also hydropower generation has increasingly been influenced by the effects of climate change. Soil erosion, in fact, has directly affected the total volumes of many of the reservoirs in the country, as exemplified by the case of the Koka dam, which has a negative impact on the annual energy generation from the plant and on the benefits obtained from irrigated agriculture. A secondary impact, although important in the case of Koka, are the reduction in the reservoir's capacity to attenuate flood peaks.

2. NATIONAL STRATEGIES FOR WATER, AGRICULTURE AND ENERGY

2.1 POLICY CONTEXT

The main development objective of the Ethiopian Government is poverty eradication. Hence, the country's development policies and strategies are geared towards this end. **PASDEP** is Ethiopia's guiding strategic framework for the five-year period 2005/06-2009/10. The PASDEP represents the second phase of the Poverty Reduction Strategy Program (PRSP) process, which has begun under the Sustainable Development and Poverty Reduction Program (SDPRP) in the period 2002/03-2004/05. The PASDEP carries forward important strategic directions pursued under the **Sustainable Development and Poverty Reduction Program** (SDPRP) - not only related to infrastructure, human development, rural development, food security, and capacity-building- but it also embodies some bold new directions focusing on growth in the coming five-year period with a particular emphasis on greater commercialization of agriculture and enhancing private sector development, industry, urban development and a scaling-up of efforts to achieve the Millennium Development Goals (MDGs).

The overarching objective of the government's poverty reduction strategy is to reduce poverty through maintaining macroeconomic stability. According to HICE 1999/2000, poverty head count ratio is projected to decline by about 10 % (about 4 percentage points) by the end of the poverty reduction strategy program period (2004/05) from the level of 44 percent in 1999/00. Real GDP is targeted to grow by at least 7 percent on average during the program period.

There are indications that excepting conditions of drought, even the present extension program could have sufficed to bring about a satisfactory level of national food security. Irrigation development would have to be expanded significantly if sustainable food security at the national level is to be attained. However, food insecurity at the household level could still persist despite growth of food and cash crop production at national level. The salient features of the ongoing **food security strategy** are outlined in a

way that the medium-to long-term target is to reduce the absolute size of the food insecure rural population substantially and enable them exit from food aid. In the short-run, the objective is to rely on fiscal transfer of resources to support a relatively small number of food-deficit households.

Agriculture Development-Led Industrialization (ADLI) is seen as a long-term strategy to achieve faster growth and economic development by making use of labor intensive technologies. During the first stage of ADLI, agriculture is to play a leading role in the growth of the economy. For agriculture to continue serving as an engine of growth in the coming years, through the domestic economy and international trade, there has to be progress in terms of commercialization, with more intensive farming, increasing proportion of marketable output. Extension of credit to the small farmer will gain importance with commercialization of agriculture, and give impetus to the establishment of rural banks.

In 2001, the Ministry of Water Resources formulated the comprehensive **Ethiopian Water Sector Strategy** which includes the Hydropower Development Strategy, the Water Supply and Sanitation Strategy, and the Irrigation Development Strategy. The principal objective of the Water Sector Strategy is to translate the national water resources management policy into action.

The principal objective of the **irrigation development strategy** is to exploit the agricultural production potential of the country to achieve food self sufficiency at the national level, including export earnings, and to satisfy the raw material demand of local industries, but without degrading the fertility and productivity of country's land and water resources base. More specific objectives of the strategy are to:

- Expand irrigated agriculture and rehabilitate the existing schemes suffering from deferred O&M.
- Improve irrigation water-use efficiency and thus the agricultural production efficiency, maximizing returns to water by allocating the water to its highest value use; and promoting the use of alternative irrigation options such as sprinkler and drip irrigation.
- Establish water allocation and priority setting criteria, as well as fair and transparent management systems.
- Consider development of groundwater resources.
- Develop irrigation systems that are technically and financially sustainable.
- Give emphasis to water harvesting methods and expand small scale irrigation schemes.
- Create conditions conducive to the construction of medium and large scale irrigation schemes.
- Address waterlogging problems in irrigated areas.

The objective of the **hydropower development strategy** is to guide the development of potential hydropower to meet the present and future domestic demand and, if possible, to generate additional hydropower to cater for the demand of neighbouring external markets. The Strategy includes the following actions:

- Promote and adapt hydropower development technologies that encourage local level manufacturing of hydro mechanical equipment and spare parts, create employment opportunities, and ensure technological self-reliance on sustainable basis.
- Establish hydrological, topographical (surveying and mapping), socio-economic, environmental databases for each of the candidate sites to facilitate feasibility studies and analyses.
- Negotiate with the neighbouring countries arrangements for exporting electricity and for the possibility of using imported power--if cheaper as compared to the locally produced electricity.
- Monitor electrification levels, needs and means in demand centres in the various regions.
- Prepare inventories of the complete hydropower potential of the country.
- Implement appropriate watershed management measures to ensure long life of hydro dams by minimising siltation of water ways and reservoirs.

Under the umbrella of the hydropower development strategy the Ministry of Water Resources has three projects currently under construction (Tekeze and Gilgel Gibe II), five more in development, and an additional seven under study. While these developments will further increase the dependency of the system on hydropower, future energy developments are anticipated to be an alternating mix of thermal and hydropower (EEPCCO, 2003).

2.2 INVESTMENT ENVELOPE

The investment envelope for the short, medium and long term is presented in the Table below. The total investment required for the three categories of water structures rehabilitation and development activities amounts to 2013 million US\$ in the short-, medium-, and long- term time scale. These figures are based on NEPAD/CAADP investment projections. In total, it is estimated that small scale water control investments, rehabilitation of irrigation schemes, and large scale water projects would cover 1,662,000 ha, 44,000 ha, and 62,000 ha respectively.

Time scale	Type of investment (million US\$)			Total
	Small scale water control	Rehabilitation of irrigation	Large scale hydraulic projects	
Short-term	648	35	32	715
Medium-term	409	82	192	683
Long-term	205	16	395	615
Total	1262	132	619	2013

2.3 PROJECT PORTFOLIO

The subsequent section presents active and pipeline projects related to the above investment envelope. Currently, there are 11 project profiles already prepared with a large water component that range from US\$46 million for a crop production project to US\$2,637 million for the construction of a hydropower project. Finally, there are 10 ongoing irrigation and hydropower projects involving different donors ranging from about US\$ 42 million to about US\$2,199 million.

3. PROJECT PROFILES

Project title	Funding Partners	Lifeline	Total Budget	Description
I. PROJECTS RECENTLY IMPLEMENTED				
Community-based Integrated Natural Resource Management Project	IFAD, Government, Beneficiaires	2009-2016	US\$30.0 million (provisional)	The project is expected to have three components, which will be further developed during project design: (i) Community-based integrated watershed management; (ii) Institutional, legal and policy reform; (iii) Project coordination and management
II. ON-GOING PROJECTS				
National Programme for Food Security	Belgium; Italy, Spain, UNDP, Administ. Trust Fund		Funds committed: US\$11.7 million	
Participatory Small-scale Irrigation Development Programme	IFAD, Government, Beneficiaries	7 Years	57.7 US\$ million	The programme aims at reforming small-scale irrigation development approaches and practices in Ethiopia. The irrigation schemes developed under the programme will provide a model to be scaled up and replicated across the country. Other objectives are to improve access roads in areas where there are irrigation systems, and to boost agricultural productivity by improving farming practices, supporting the establishment of home vegetable gardens and strengthening agricultural support services.
Energy Access Project	IBRD/IDA	2002-2009	US\$ 199.12 million	The Project will establish a sustainable program for expanding the population's access to electricity and improving the quality and adequacy of electricity supply, reduce environmental degradation and improve energy end-use efficiency; reduce the barriers to the wide spread adoption of renewable energy technologies, and provide technical support for institutional and capacity building of key sector agencies. Hydropower accounts for the 5% of the total cost of the project.
Tekeze HEPP	Eth. Gov.	-2009	US\$ 413 million	Hydropower project. Located in Tekeze river basin. It will have an installed capacity of 300 MW
Gelgel Gibe 2 HEPP	Italian Gov., European Investment Bank, Ethiopian Gov.	2004 - 2009	Euro 373.5 million	Hydropower project. It is located in Omo-Gibe river basin and will have the capacity of generating 420 MW
Beles HEPP	Eth. Gov.	-2009	US\$ 720 million	Hydropower project. It is found in Abay river basin and will have an installed capacity of 460 MW
Halele Warabesa HEPP	Eth.Gov.	-2013	US\$ 606 million	Hydropower project. It is in Omo-Gibe river basin and will generate 96 MW
Amerty Neshe HEPP	China Gov.	-2012	US\$ 210 million	Hydropower project. It will have the capacity of generating 97 MW
Chemoga Yada I & II HEPP	China Gov.	-2012	US\$ 601 million	Hydropower project. It is located in Abay river basin with the capacity of generating 118 MW(I) and -----MW(II) respectively
Gibe III HEPP	JP Morgan	-2013	US\$ 2119 million	Hydropower project. It will have an installed capacity of 1870 MW
Tendaho-kesem IP	Eth.Govt.	2004-2011	US\$ 338 million	It will command a total irrigable land of 80,000 ha- It is found in the Awash river basin

Koga IP	Eth.Govt.	2003-2008	US\$ 42 million	It irrigates 7,200 ha of land, and it is found in Abay river basin.
III. PIPELINE PROJECTS				
Geba I HEPP		2009-2013	US\$ 377 million	Hydropower project. Feasibility study- it is located Baro-Akobo river basin
Geba II HEPP		2009-2013	US\$ 158 million	Hydropower project. Feasibility study- it is found in Baro-Akobo river basin.
Genale Dawa III HEPP	AHMET AYDENEZ	2009-2014	US\$ 340 million	Hydropower project. Feasibility study, MoU signed - will generate 254 MW and it is found in Genale-Dawa basin.
Gibe IV		2009-2014	US\$ 2214 million	Hydropower project. Feasibility study- it is located in Omo-Gibe
Mendaya HEPP		2012-2017	US\$ 2637 million	Hydropower project. Feasibility study- will generate 2000 MW. It is found in Abay river basin.
Tana-zuria				Feasibility study- will irrigate 51,077 ha. It is located in Abay river basin.
Humera			US\$ 100 million	Feasibility study- will irrigate 60,000 ha. It is found in Tekeze river basin
Welkayet				Feasibility study- it is located in Tekeze basin and will irrigate 40,000 ha
Arjo-dedesa			US\$ 46 million	Feasibility study- Abay river basin. It will irrigate 16,800 ha.
Wabishebele				Feasibility study- Wabishebelle river basin. It will irrigate 52,920 ha.
Zeway				Feasibility study. Rift valley river basin. It will develop 15,000 ha.
SSI development: Study & design and Rehabilitation	Eth. Gov/ NGOs/ multilaterals/ bilateral s			Pre-feasibility level: 75 projects. Feasibility level: 16. Design level: 2. Rehabilitation: Feasibility: 71. Design: 19
Water Harvesting and Small-Scale Irrigation	NEPAD-CAADP	5 years	US\$1,491.0 million	Components: (i) Small-Scale Irrigation; (ii) Water Harvesting; (iii) Crop Development and Marketing; (iv) Capacity Building and Institutional Development ; (v) Programme Coordination and Management.

ANNEX 1: MAP OF WATER CONTROL



ANNEX 2: COUNTRY STATISTICS

Country and population			
Area of the country	2005	110430	1000 ha
Cultivated area as % of the total area of the country	2005	12.6	%
Total population	2005	77431	1000 inhab
• of which rural	2005	84	%
Population economically active in agriculture	2005	27528	1000 inhab
• as % of total economically active population	2005	80	%
• female	2005	40	%
• male	2005	60	%
Economy and Development			
Gross Domestic Product (GDP) (current US\$)	2007	19395	million US\$/yr
• value added in agriculture (% of GDP)	2006	47.32	%
• GDP per capita	2007	245	US\$/yr
Access to improved drinking water sources			
Total population	2006	42	%
Urban population	2006	96	%
Rural population	2006	31	%
Water Resources and management			
Average precipitation	2007	936.0	10 ⁹ m ³ /yr
Total actual renewable water resources	2007	122	10 ⁹ m ³ /yr
Dependency ratio (transboundary rivers)	2007	0.0	%
Total actual renewable water resources per inhabitant	2007	1576	m ³ /yr
Total dam capacity	2002	3.458	10 ⁹ m ³
Total water withdrawal	2002	5.558	10 ⁹ m ³ /yr
• as % of total actual renewable water resources	2002	4.56	%
IRRIGATION AND DRAINAGE			
Irrigation potential	2007	2700	1000 ha
Water Management			
Area equipped for irrigation: full control - total	2001	289.53	1000 ha
Equipped lowlands	2001	0.00	1000 ha
Total area equipped for irrigation	2001	289.53	1000 ha
• Area equipped for irrigation as % of cultivated area	2001	2.7	%
• Annual increase rate		6.2	%
• Power irrigated area as % of area equipped for irrigation		-	%
• Area actually irrigated as % of area equipped for irrigation		-	%
Non-equipped cultivated lowlands and flood recession	2001	0.00	1000 ha
Total agricultural water managed area	2001	289.53	1000 ha
• Agricultural water managed area: as % of cultivated area	2001	2.5	%
• Drained cultivated area as % of total cultivated area		-	%
Typology of irrigation schemes			
Small-scale schemes (<200 ha)	2001	191.83	1000 ha
Medium-scale schemes			1000 ha
Large-scale schemes (>200 ha)	2001	97.703	1000 ha
Irrigated crops			
Wheat	2002	23.162	1000 ha
Barley	2002	5.791	1000 ha
Maize	2002	86.859	1000 ha
Sorghum	2002	17.372	1000 ha
Other cereals	2002	2.895	1000 ha
Potatoes	2002	37.639	1000 ha
Sweet potatoes	2002	11.697	1000 ha
Other roots and tubers	2002	2.895	1000 ha
Sugar cane	2002	27.197	1000 ha
Pulses	2002	8.686	1000 ha
Vegetables	2002	107.126	1000 ha
Bananas	2002	5.828	1000 ha
Citrus	2002	5.828	1000 ha
Tobacco	1998	4.000	1000 ha
Cotton	2002	57.906	1000 ha
Soybeans	1998	4.000	1000 ha
Groundnuts	2002	5.791	1000 ha
Other perennial crops	2002	3.885	1000 ha
ENERGY INDICATORS			
Energy Production	2005	19.86	Mtoe
Net Imports	2005	1.56	Mtoe

TPES	2005	21.63	Mtoe
- TPES/Pop	2005	0.30	toe/capita
- TPES/GDP	2005	2.16	toe/thousand 2000 US\$
- TPES/GDO (PPP)	2005	0.32	toe/thousand 2000 US\$ PPP
Electricity Consumption	2005	2.59	TWh
- EC/Pop	2005	36	kWh/capita

ENERGY SUPPLY AND CONSUMPTION (2005)*								
	Coal	Gas	Crude oil	Petroleum products	Hydro	Other Renewable & Waste	Others	TOTAL
Production	0	0	0	0	245	19610	0	19855
Imports	0	0	0	1563	0	0	0	1563
Exports	0	0	0	0	0	0	0	0
International Marine Bunkers	0	0	0	0	0	0	0	0
Stock Changes	0	0	0	215	0	0	0	215
Total Primary Energy Supply (TPES)	0	0	0	1778	245	19610	0	21633

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

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