



## 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

### ZIMBABWE

#### EXECUTIVE SUMMARY:

Zimbabwe portrays a high level of undernourishment; 39 percent of the population is undernourished. The number of undernourished people has increased from the 4.5 million for the 1990-92, benchmark period of the World Food Summit (WFS<sup>1</sup>) and the MD, to 4.9 million for the last period available of 1999-2001.

Agriculture is the mainstay of the Zimbabwean economy, contributing on average about 19% of GDP. About 80% of the country's agricultural production is rainfed; the remaining 20% is under irrigation. The agricultural sector is a source of food security; it provides livelihoods for 70% of the population in the rural areas and employment to about 25% of the labour force in the wage economy. The irrigation potential for the country is estimated at 365 624 ha, which takes into consideration only the available internal renewable water resources and not water from the Zambezi and Limpopo border rivers. Water is far a greater constraint than land as the overall area of soils classified as irrigable in Zimbabwe is estimated at 600 000 ha. In the last two decades, Zimbabwe has experienced a number of adverse climatic hazards and the most serious ones have been dry spells, seasonal droughts and intense rainfall. These climatic hazards, have since increased in frequency, intensity and magnitude over the same two decades, and have adversely impacted on food and water security, water quality, energy and sustainable livelihoods of the most rural communities.

Total internal renewable water resources have been estimated at 12.26 km<sup>3</sup>/year, of which 11.26 km<sup>3</sup>, based on 10% risk (resources in a dry year of a 10th year frequency) are surface water resources (excluding external surface water resources from such bordering international rivers like the Zambezi and Limpopo), 6.00 km<sup>3</sup> are groundwater resources. Total water withdrawal was estimated at 4.2 km<sup>3</sup> in 2002. Agriculture is the greatest water user in Zimbabwe accounting for 79 percent of total water use. The total hydropower potential is 12,750MW; with the hydropower potential on Zambezi River being about 7200MW. Of this potential 120 MW can be developed as mini-hydro power plants on existing dams and rivers.

The long-term policy objectives for the agricultural sector as a whole are set out in the Zimbabwe Agricultural Policy Framework (ZAPF) 1995-2020. Under this policy framework, agricultural development is based on the following principles: Land and agrarian reforms will be pursued to ensure productive use of land; Institutional development will focus on efficient delivery of services to farmers; Pursuance of that will lead to increased production and ensure household food security; and Development of a public sector investment programme to support agricultural development. Developments in the water sector are guided by the Water Act of 1998. ZINWA is responsible for the management of water resources countrywide on a commercial basis, allocation of water for agriculture and construction of dams. The department of Water Resources is responsible for the formulation and implementation of policies on the water resources development and management.

The investment envelope for the short, medium and long term is US\$2 946 million covering irrigation and energy projects. In total, it is estimated that the area to be developed under the investment envelope is 275 000ha with small scale water control investments covering 102 000 ha, rehabilitation of irrigation schemes would cover 73 000 ha, while large scale water projects covering 100 000 ha would include new investments in large scale irrigation.

# 1 CONTEXT

## 1.1 AGRICULTURE AND FOOD SECURITY

### Agriculture

Agriculture is the mainstay of the Zimbabwean economy, contributing on 19% to GDP in 2005. About 80% of the country's agricultural production is rainfed; the remaining 20% is under irrigation. The agricultural sector is a source of food security; it provides livelihoods for 70% of the population in the rural areas and employment to about 25% of the labour force in the wage economy. It is estimated that through several agro-industrial linkages, agriculture impacts on over 60 percent of the inputs and outputs of marketed products for the manufacturing sector and contributes about 40-50% of the country's merchandise exports.

Major factors that presently constrain agricultural production include constrained macro-economic environment; recurrent droughts and dry spells; shortages of appropriate agricultural technologies; inadequate supply of agro-inputs, lack of capital and poor access to credit by smallholder farmers, poor marketing and handling facilities; pests and diseases and inadequate power supplies. The *Land Reform and Resettlement Programme (LRRP)* under implementation since 2000 has resulted in the broadening of the potential agricultural production base through land redistribution and people have been resettled under both Models A1 and A2. A1 is for communal resettlement while A2 is for commercial resettlement holdings are meant to accommodate more households with smaller arable areas (up to 5 ha) while A2 holdings are larger units for large scale farming.

The major agricultural commodities grown in Zimbabwe can be classified into four categories namely: (i) food crops (maize, wheat, sorghum and millets); (ii) oilseed and industrial crops (soybeans, groundnuts, sunflower); (iii) export crops (tobacco, cotton, sugar cane, tea, coffee, paprika, floriculture, citrus, horticulture); and (iv) livestock products (beef and dairy cattle, poultry, goats, sheep and pigs). Production continues to be vulnerable to periodic droughts especially in the smallholder sector, which produces 70 percent of staple foods (maize, millets, and groundnuts) under rain-fed conditions.

### Irrigation and water control

The irrigation potential for the country is estimated at 365 624 ha, which takes into consideration only the available internal renewable water resources and not water from the Zambezi and Limpopo border rivers. Of this potential over 100 000 ha can be immediately developed using water from (i) existing under-utilised dams, (ii) newly constructed dams and (iii) dams currently under construction. The non-availability of funding and the high investment costs for irrigation have retarded development of new irrigation facilities. In general, water is far a greater constraint than land as the overall area of soils classified as irrigable in Zimbabwe is estimated at 600 000 ha. In 1999, it was estimated that the total equipped area under irrigation was 175 000 ha (Annex 2). These are full or partial control irrigated areas and referred to as formal irrigation<sup>1</sup>. Out of this area, approximately 102 000 ha are operational and 73 000 ha or 43 percent is equipped but not functional because the equipment was damaged during the current land redistribution exercise and require rehabilitation. Of the total irrigated area in Zimbabwe it was estimated in 1999 that approximately 114 000 ha was under sprinkler irrigation (including centre pivots), 47 000 ha under surface irrigation and 14 000 ha under localized irrigation (Annex 2). Because of its informal nature, microscale irrigation, including irrigation on dambos, is not usually included in official estimates of the total irrigation area. Estimates of this area vary from 20 000 to about 50 000 ha. This type is called informal irrigation.

There are four traditional formal irrigation systems in the country: Large-scale commercial schemes which are owned by private individuals or groups including estates and plantations; ARDA (Agricultural and Rural Development Authority) schemes which are parastatal operations responsible for running government-owned estates and farms, and for agricultural and rural development in rural

---

<sup>1</sup> Formal Irrigation are those schemes that are usually developed, controlled and operated by the government on behalf of smallholders or the government itself, or by owners such as commercial farmers and estates.

areas; Smallholder irrigation schemes which refer to a group of farmers irrigating together and sharing the same water source and supply line but with individual control of irrigation and farming activities by each farmer in his/her plot; and A1 and A2 irrigation schemes which are a new kind of irrigation scheme in the country.

The land reform undertaken by the government has increased the area under smallholder irrigation. The reform has split up commercial irrigation schemes and ushered in two new groups of farmers, namely A1 who irrigate small areas at times with shared infrastructure and A2 who are commercial irrigators. In some cases, the A2 farmers also share irrigation infrastructure. Average individual plot holdings range from 0.1 ha to 1.0 ha in the smallholder sector; up to 5 ha in Model A1 irrigation schemes and much larger areas in A2 model and large-scale the commercial subsector.

Most formal irrigation schemes in the country depend on water stored in small- and medium-sized dams. Other important water sources are boreholes/deep wells, direct river diversion, shallow wells/springs and sand abstraction systems (a technique for extracting water from sand layers in river beds through a network of perforated pipes buried in the river bed which collects water into a sump from which it is pumped). The irrigated crops are wheat, barley, maize, potatoes, sugar cane, citrus, coffee, tea, groundnuts, flowers and beans.

**Food security**

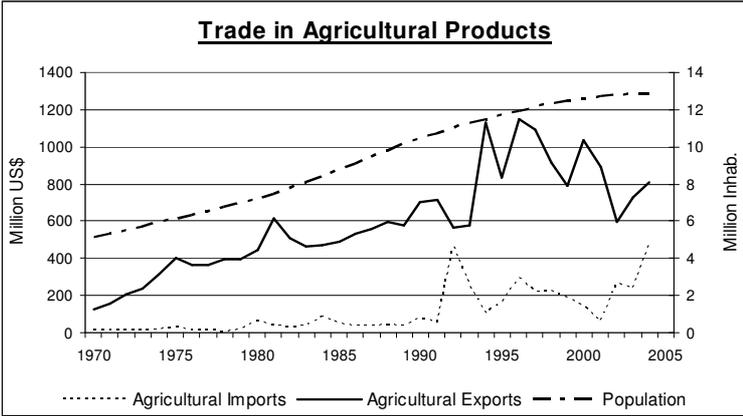
Achieving food security was identified as one of the priority national target areas in the *Zimbabwe Agricultural Policy Framework (ZAPF)* for the period 1995–2020. Traditionally, Zimbabwe has been food secure at national level and a net maize exporter in normal years. Food insecurity was only a household level concern among the poor or those without enough land to farm. However, food shortages at both national and household level have increased over the last five years and the country has had to rely on food aid and commercial grain imports to meet its requirements.

Although the droughts have played a big role in this scenario, the general contraction in the economy, the slow pace at which new resettled farmers have commenced agricultural activities and the onset of the HIV/AIDS pandemic have also been significant contributory factors. Food supply has improved but not enough during the 90's. Zimbabwe portrays a high level of undernourishment. The number of undernourished people has increased from the 4.5 million for the 1990-92, benchmark period of the World Food Summit (WFS<sup>2</sup>) and the MD, to 4.9 million for the last period available of 1999-2001, which is 39 percent of the population.

**Food and agriculture trade and import balance**

The food import bill in the country has rapidly increased since 1990, after a period of relative stability and low agricultural imports. In 2004 the import bill trespassed the threshold of 400 million US\$ (see figure aside). Until 2005, the country was a net food exporter with exports reaching values double the imports of 2004.

The main commodities exported are cash crops such as cotton and tobacco, which account for, respectively, 237 and 439 million US\$ in 2004. Cereals, instead, are contributing to the largest share of the import bill, and in 2004 the



<sup>2</sup> World Food Summit goal: halve, between 1990–92 and 2015, the number of undernourished people. The World Food Summit in 1996 established the target of halving the number of undernourished people by no later than 2015. FAO uses the average of the period 1990–92 as the baseline for monitoring progress towards this target.

Government of Zimbabwe imported 319, 974 metric tonnes (MT) of maize followed by 205,214 metric tonnes of wheat, and 12, 912 MT of rice.

## **1.2 WATER RESOURCES AND HYDROPOWER**

Total internal renewable water resources have been estimated at 12.26 km<sup>3</sup>/year, of which 11.26 km<sup>3</sup> are surface water resources and 6.00 km<sup>3</sup> are groundwater resources, while the overlap between surface water and groundwater resources is estimated to be 5.00 km<sup>3</sup>/year. Total water withdrawal was estimated at 4.2 km<sup>3</sup> in 2002. Agriculture is the greatest water user in Zimbabwe accounting for 79 percent of total water use (Annex 2). Agricultural water uses are for irrigation, fish farming and livestock watering with irrigated agriculture dominating the water use.

The overall groundwater resource is small when compared to estimates of surface water resources, mainly because the greater part of Zimbabwe consists of ancient igneous rock formations where groundwater potential is comparatively low. The estimated groundwater potential is between 1 and 2 km<sup>3</sup>/year.

The country consists of the following major river systems, which form the basis of the seven river catchments the country has been divided into: Save, Runde, Mzingwane, Gwayi, Sanyati, Manyame and Mazowe. Zimbabwe is cooperating with other members of the Southern Africa Development Community (SADC) on the shared management of the region's river systems. The country is a signatory to the recent Shared Water Course Systems Protocol, which provides the basis for the management of international rivers in SADC. The country is actively participating in the formation of the Limpopo and Zambezi basin commissions which will oversee joint management of these international rivers.

Dams are the core of significant progress towards the full development of the country's water resources. The government has embarked on a large and medium-size dam construction programme both for irrigation and other purposes. Total capacity is about 103 km<sup>3</sup>, but this includes 50 percent of the total capacity of 188 km<sup>3</sup> of Lake Kariba on the Zambezi River which is shared between Zambia and Zimbabwe and thus accounts for 94 km<sup>3</sup> of this capacity.

Approximately 47% of the population has access to electricity in Zimbabwe. The Zimbabwe Electricity Supply Authority (ZESA) has been responsible for the generation, transmission and distribution of electricity in Zimbabwe and it has five major power stations, with a total capacity of 1,961 MW. These facilities do not meet the country's electricity demand and the country imports 41 per cent of its electricity from neighbouring countries. Electricity generation in Zimbabwe is mainly from coal and hydro plants. The total hydropower potential on Zambezi River for Zimbabwe and Zambia is 7 200MW. Of this 750 MW each has already developed at Lake Kariba. A further 4 200 MW that can be developed jointly with Zambia on Kariba Extension (at least 1 500MW), Batoka Gorge, Mupata Gorge and Devils Gorge. There is a potential to generate 120 MW from small and mini-hydropower resources (20 MW from existing dams, 60 MW from proposed dams and 43 MW from run-of-river sites). Other potential sources of energy include biofuels, biomass, solar and wind energy, all of which can be impacted by climate change. In addition to these sources, Zimbabwe has great potential for power generation using its large reserves of coal bed methane.

## **1.3 CLIMATE CHANGE**

Agriculture is not only a fundamental human activity at risk from climate change, it is a major driver of environmental and climate change itself. It has the largest human impact on land and water resources. Developing countries, many in Africa, are seen as being most vulnerable to climate variability and change and like many other developing countries, Zimbabwe has not been spared from the severe impacts of climate change. In the last two decades, Zimbabwe has experienced a number of adverse climatic hazards and the most serious ones have been dry spells, seasonal droughts and intense rainfall and floods. These climatic hazards, have since increased in frequency, intensity and magnitude over the same two decades, and have adversely impacted on food and water security, water quality, energy and sustainable livelihoods of the most rural communities. Erratic rains have resulted in acute crop failure, which in turn have resulted in food insecurity and malnutrition,

especially among vulnerable rural communities. Planning for adaptation to climate change has just started and improved attention to regional river basin management has begun. The 2008/9 targeted farmer programme for agricultural production bears testimony to this.

## **2 NATIONAL STRATEGIES FOR WATER, AGRICULTURE AND ENERGY**

### **2.1 POLICY CONTEXT**

The long-term policy objectives for the agricultural sector as a whole are set out in the *Zimbabwe Agricultural Policy Framework (ZAPF) 1995–2020*. Under this policy framework, agricultural development is based on the following principles: Land and agrarian reforms will be pursued to ensure productive use of land; Institutional development will focus on efficient delivery of services to farmers; Pursuance of that will lead to increased production and ensure household food security; and Development of a public sector investment programme to support agricultural development.

The *Land Reform and Resettlement Programme (LRRP)* under implementation since 2000 is part of the above framework and has, so far, resulted in the broadening of the potential agricultural production base through land redistribution to more people. Under the programme, government has acquired approximately 11 million hectares of land bringing to 14.4 million hectares in total of the land redistributed since independence. The target of the LRRP is to settle a total of 350,000 indigenous families under both Models A1 and A2. The process gave more prominence to A1 settlement model in order to de-congest the marginal communal areas. It has also been complemented by the *Agricultural Mechanisation Programme* that has seen agricultural equipment (such as tractors, ploughs, harvesters) being distributed to benefit farmers across all farming sectors. The LRRP has the potential to significantly change the agrarian structure and development of the indigenous farming community and hence calls for the development of an appropriate agricultural policy and conducive legal framework that will guide the agricultural sector, especially the provision of services to the new farmers and to create an enabling environment for the agricultural sector to grow and to flourish. In this regard Government is in the process of revising the *Agricultural Policy Framework (1995–2020)* to develop a new policy.

Faced with dwindling donor support, the Government of Zimbabwe launched, the *National Economic Recovery Programme (NERP)* in 2003. NERP is a multi-sectoral macro framework which forms the basis for several strategic framework documents under which different government programmes were to be implemented. In the agricultural sector, NERP drew heavily from the ZAPF. It notes the severe socio-economic challenges facing the country and focuses on the following measures for agriculture and rural development: Security of land tenure; Promotion of effective land utilization; Review of minimum farm sizes; Provision of farm input support; Proper producer pricing policies; Encouragement of contract farming; Promotion of dairy farming; Promotion of livestock development; Establishment of farmer associations; Promotion of irrigation development; Establishment of a land bank; Improvement of marketing of agricultural commodities internally and externally; Assurance of food security through productivity growth and least cost import programmes.

The NERP document also singles out irrigation as the most important and necessary cornerstone for agricultural development, hence the key to agriculture-led economic recovery, given the country's vulnerability to drought and the high risks associated with rainfed agriculture. The broad strategy and policy objectives of GoZ for the irrigation subsector aim to: contribute to poverty alleviation by targeting resource-poor smallholder farmers, with an aim to increasing farm incomes; increase agricultural production and enhance food security at the household level by ensuring some crop production during droughts and dry seasons; extend cropping opportunities and provide a wider variety of crops in both wet and dry seasons (year-round cropping) so as to improve nutritional status; create an enabling environment for irrigated agriculture by facilitating and encouraging the private sector to invest in irrigation development; enhance human capacity for irrigated agriculture in the public, parastatal and private sector; and create a spirit of business culture in the smallholder

sector by promoting and providing competitive financing of irrigation projects and improving the produce–marketing system at national and international levels.

The *Small and Medium Enterprise (SME) Policy and Strategy Framework* launched in 2002 reinforces the importance of the agricultural sector in relation to small enterprise development and employment creation. It emphasizes the potential for generating maximum employment gains in the agricultural sector, especially the renewed focus of small-scale agriculture in areas where it has comparative advantage. According to the Framework, this sector has the potential to generate more jobs than any other, given its links to other sectors of the economy.

Zimbabwe’s target for electricity coverage is 85% by 2020. The Zimbabwe Electricity Supply Authority (ZESA) has been responsible for the generation, transmission and distribution of electricity in Zimbabwe. The Government has sought to increase energy access to previously disadvantaged people through both grid extension and offgrid electrification. The national energy policy has five main objectives: a) Ensuring accelerated economic development; b) ensuring accessibility, availability and reliability of electricity to the populace and facilitating rural development; c) Promoting small-medium scale enterprises; d) Ensuring environmentally friendly energy development; and e) Ensuring efficient utilisation of energy resources. In 1992, the Performance Improvement Programme (PIP) was implemented with the assistance of Electricité de France (EdF). The programme consisted of a set of simple maintainable targets that were tied to the new management’s contracts covering finance, customer services and management, distribution system, generation plants and system, transmission system, other technical services, and human resources management.

In 1999, the Government instituted other reforms in the power sector which included programmes of unbundling of the electricity sector, establishing a regulator, privatisation, and establishing a Rural Electrification Fund based on 1 per cent of all electricity bills collected. The Rural Electrification Fund helped in the extension of grid electricity to rural households by contributing towards initial capital investments. However the implementation of the fund has been slow and the failure to achieve the target was due to the narrow contractor base used for the rural electrification programme rather than to lack of funds. In November 2001 the Zimbabwe cabinet approved a Rural Electrification Fund Bill that was to pave way for establishing the Rural Electrification Fund/Agency to spearhead the Rural Electrification Programme and also the commercialization of ZESA by adopting the Electricity White Paper which provided for power sector reforms. In January 2002, a new Electricity Act and a Rural Electrification Act were passed whereby the power sector now has a Regulatory Commission (Zimbabwe Electricity Regulatory Commission, ZERC) and a Rural Electrification Agency (REA). The Act also paved way for the entry of independent power producers into the energy sector.

## 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 \$. In total, it is estimated that the area to be developed under the investment envelope is 275 000ha. Small scale water control investments (including small scale irrigation, soil and water conservation, etc.) would cover soil and water conservation on 102 000 ha, rehabilitation of irrigation schemes would cover 73 000 ha, while large scale water projects would cover 100 000 ha including new investments in large scale irrigation to use under-utilised water in existing dams, accompanying institutional strengthening investments. It will cost Zimbabwe US\$ 2 946 million to implement these projects.

Time scale	Type of investment (million US\$)				Total
	Small scale water control	Rehabilitation of irrigation	Utilization of water in existing dams	Hydraulic projects	
Short-term	87	220	300	36.3	643.3
Medium-term	55	70.7	400	300	825.7
Long-term	27		200	1250	1477

Total	169	290.7	900	1586.3	<b>2946</b>
<b>Area</b>	<b>102 000</b>	<b>73 000</b>	<b>100 000</b>		<b>275 000</b>

### **2.3 PROJECT PORTFOLIO**

The table below presents recently achieved, active and pipeline projects that are related to the above investment envelope. Currently, there are thirteen project profiles already prepared that range from US\$60 million for a crop production project to US\$200 million for the irrigation recovery programme. There are also two Bankable Investment Project Profiles: one for US\$67 million (out of the required US\$ 900 million) and the other for US\$90.7 million.

### 3 PROJECT PROFILES (ON-GOING AND PROJECTED)

Project title	Funding Partners	Lifeline	Total Budget	Description
<b>I. PROJECTS RECENTLY IMPLEMENTED</b>				
Smallholder Irrigation Support Programme	IFAD/ DANIDA	1998 -2003	US\$19.33million	Programme to upgrade existing smallholder irrigation schemes and support the development of new schemes ensure that farmers are able to manage, operate and maintain the irrigation schemes in a fully operational and productive manner
<b>II. ON-GOING PROJECTS</b>				
Agricultural input assistance to vulnerable smallholder farmers in Zimbabwe and the Co-ordination and monitoring of Agricultural Emergency Interventions	FAO	2008 - 2009	US\$5.98million	
Smallholder Micro-Irrigation Support Programme	EU	2008-2012	Euro 7 million	Rehabilitate and develop 500 ha in smallholder irrigation sector.
Mini-hydro-projects (Osborne, Manyuchi)	JVC Zim/Russia/ Private Partnership	2007-2009	US\$ 3.4 million	Development of mini-hydropower for community (including school, health centre) and industrial use (for timber, pulp and paper production).
<b>III. PIPELINE PROJECTS</b>				
Increased Crop Production and Diversification		2009- 2014	US\$ 60 million	The overall objective of the project is to increase crop production and productivity on a sustainable basis and to diversify the range of crops grown by smallholder farmers ,A1 and A2 farmers. Project will also involve resuscitating multiplication and promotion of drought-tolerant crop varieties
Irrigation recovery programme		2010 – 2013	US\$200 million	The project aims at restoration of all the irrigation infrastructure.
Irrigation Development and utilization of existing under-utilised water resources	(FAO/NEPAD) IFAD/JICA /EU	2010 – 2015	US\$ 900 million	The <i>overall objective</i> of the project is to improve food security and incomes among rural communities through the rapid increase of agricultural production and productivity by reducing the high risks associated with over-dependency on rainfed agriculture by developing smallholder irrigation schemes for which water is currently available in existing dams.
Rehabilitation of Irrigation schemes	FAO/NEPAD - IFAD/JICA /EU	2010-2015	US\$ 90.7million	The <i>overall objective</i> of the project is to increase agricultural production and productivity and incomes, particularly of smallholder farmers, through the rehabilitation of irrigation schemes.
Kariba South Bank (Extension) Hydropower Project	ZESA/Private Partner	Up to 2012	US\$ 300 million	To augment national power capacity through the development of 2* 150 MW plant.
Batoka Hydropower Project (Regional Projects: Zimbabwe and Zambia)	(SAPP)	2009 - 2015	US\$ 1250 million	Project entails the construction of a run off the river hydro power plant on the Zambezi River, 54km down stream of the Victoria Falls. Project lead-time is 6

				years. 4 x 200 MW units on either side of the dam (Total 1600 MW) with capacity shared equally between Zimbabwe and Zambia. To target regional market. Regional project awaiting funding.
Mini-hydro plants combined with irrigation (Mutirikwi, Siya, Duru, Tsanga, Gairezi, Esatern Highlands)-details in Annex 3		2009-2011	US\$ 32.9 million	Objective is to generate power for augment national grid and for community Use. Water use to generate power will be used for irrigation downstream.
Rehabilitation /upgrading of 20 000 watering points		2009-2015	US\$ 40 million	To improve access of water for livestock and nutrition gardens and productive use of water in smallholder communal areas
Dam rehabilitation/development, catchment management and promotion of soil and water conservation		2009-2015	US\$ 150 million	To preserve catchments and maximize sustained productive use of water

**ANNEX 1: MAP OF WATER CONTROL IN ZIMBABWE:**



## ANNEX 2: COUNTRY STATISTICS

<b>Country and population</b>			
Area of the country	2005	39076	1000 ha
Cultivated area as % of the total area of the country	2005	8.6	%
Total population	2005	13010	1000 inhab
• of which rural	2005	64	%
Population economically active in agriculture	2005	6180	1000 inhab
• as % of total economically active population	2005	48	%
• female	2005	45	%
• male	2005	55	%
<b>Economy and Development</b>			
Gross Domestic Product (GDP) (current US\$)	2007	3418	million US\$/yr
• value added in agriculture (% of GDP)	2005	19.13	%
• GDP per capita	2007	255	US\$/yr
<b>Access to improved drinking water sources</b>			
Total population	2006	81	%
Urban population	2006	98	%
Rural population	2006	72	%
<b>Water Resources and management</b>			
Average precipitation	2007	270.5	10 <sup>9</sup> m <sup>3</sup> /yr
Total actual renewable water resources	2007	20	10 <sup>9</sup> m <sup>3</sup> /yr
Dependency ratio (transboundary rivers)	2007	38.7	%
Total actual renewable water resources per inhabitant	2007	1537	m <sup>3</sup> /yr
Total dam capacity	2003	103	10 <sup>9</sup> m <sup>3</sup>
Total water withdrawal	2002	4.205	10 <sup>9</sup> m <sup>3</sup> /yr
• as % of total actual renewable water resources	2002	21.03	%
<b>IRRIGATION AND DRAINAGE</b>			
Irrigation potential	2007	366	1000 ha
<b>Water Management</b>			
Area equipped for irrigation: full control - total	1999	173.513	
Equipped lowlands	1999	-	
<b>Total area equipped for irrigation</b>	1999	173.513	1000 ha
• Area equipped for irrigation as % of cultivated area	1999	5.18	%
• Annual increase rate		6.9	%
• Power irrigated area as % of total area equipped for irrigation	1999	-	%
• Area actually irrigated as % of area equipped for irrigation	1999	71	%
Non-equipped cultivated lowlands and flood recession	1999	20.000	1000 ha
<b>Total agricultural water managed area</b>	1999	193.513	1000 ha
• Agricultural water managed area as % of cultivated area	1999	5.8	%
• drained cultivated area as % of total cultivated area	1999	-	%
<b>Typology of irrigation schemes</b>			
Small-scale schemes	2002	81.58	1000 ha
Medium-scale schemes			1000 ha
Large-scale schemes	2002	91.938	1000 ha
<b>Irrigated crops</b>			
Wheat	1999	49.100	1000 ha
Barley	1999	5.700	1000 ha
Maize	1999	18.000	1000 ha
Sorghum	1999	0.500	1000 ha
Potatoes	1999	2.100	1000 ha
Sugar cane	1999	33.700	1000 ha
Pulses	1999	3.100	1000 ha
Vegetables	1999	3.700	1000 ha
Citrus	1998	5.000	1000 ha
Coffee	1999	5.200	1000 ha
Tea	1999	3.500	1000 ha
Tobacco	1999	12.150	1000 ha
Cotton	1999	27.300	1000 ha
Fodder	1999	8.600	1000 ha
Soybeans	1999	19.400	1000 ha
Groundnuts	1999	4.200	1000 ha
Sunflower	1999	0.400	1000 ha
Flowers	1999	0.800	1000 ha
Other annual crops	1989	44.794	1000 ha
Other perennial crops	1999	4.980	1000 ha
<b>ENERGY INDICATORS</b>			
Energy Production	2005	8.86	Mtoe
Net Imports	2005	0.86	Mtoe
TPES	2005	9.72	Mtoe
- TPES/Pop	2005	0.75	toe/capita
- TPES/GDP	2005	1.77	toe/thousand 2000 US\$
- TPES/GDO (PPP)	2005	0.41	toe/thousand 2000 US\$ PPP
Electricity Consumption	2005	12.50	TWh

- EC/Pop		2005		961		kWh/capita		
<b>ENERGY SUPPLY AND CONSUMPTION</b>								
	Coal	Gas	Crude oil	Petroleum products	Hydro	Other Renewable & Waste	Others	TOTAL
Production	2335	0	0	0	502	6023	0	8860
Imports	34	0	0	694	0	0	259	987
Exports	-119	0	0	0	0	0	-3	-122
International Bunkers	0	0	0	0	0	0	0	0
Stock Changes	-1	0	0	0	0	0	0	-1
<b>Total Primary Energy Supply (TPFS)</b>	<b>2248</b>	<b>0</b>	<b>0</b>	<b>694</b>	<b>502</b>	<b>6023</b>	<b>256</b>	<b>9723</b>

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

## REFERENCES

- AQUASTAT – FAO’s Information System on Water and Agriculture – Country Profiles  
<http://www.fao.org/nr/water/aquastat/countries/index.stm>
- NEPAD Comprehensive Africa Agriculture Development Programme  
<http://www.fao.org/docrep/005/Y6831E/Y6831E00.htm>
- NEPAD National Medium-Term Investment Programmes (NMTIPs and BIPPs)  
[http://www.fao.org/tc/tca/nepad/nmtip\\_en.asp](http://www.fao.org/tc/tca/nepad/nmtip_en.asp)
- The World Bank. Country information  
<http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/0,,pagePK:180619~theSitePK:136917,00.html>
- World Bank and AfDB Climate Change Consultations.  
<http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/AFRICAEXT/0,,contentMDK:21772010~pagePK:146736~piPK:146830~theSitePK:258644,00.html>
- African Development Bank Country information  
[http://www.afdb.org/portal/page?\\_pageid=473,30722152&\\_dad=portal&\\_schema=PORTAL](http://www.afdb.org/portal/page?_pageid=473,30722152&_dad=portal&_schema=PORTAL)
- UNCCD – National Communications  
[http://unfccc.int/national\\_reports/non-annex\\_i\\_natcom/items/2979.php](http://unfccc.int/national_reports/non-annex_i_natcom/items/2979.php)
- World Bank- Country Water Resources Assistance Strategy  
<http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTWAT/0,,contentMDK:21749170~menuPK:4948286~pagePK:148956~piPK:216618~theSitePK:4602123,00.html>
- Human Development Report 2006 – Background Papers  
<http://hdr.undp.org/en/reports/global/hdr2007-2008/papers/>
- Trends in Hunger Reduction for the Monitoring of the WFS and MDG targets, FAO Statistics  
[http://www.fao.org/ES/ess/mdg\\_kit/cy\\_level.asp#07](http://www.fao.org/ES/ess/mdg_kit/cy_level.asp#07)
- World Bank – Project Database.  
<http://web.worldbank.org/WBSITE/EXTERNAL/PROJECTS/0,,menuPK:115635~pagePK:64020917~piPK:64021009~theSitePK:40941,00.html>
- FAO, 2003. Technical Cooperation Department. Field Programme Activities. Country Project Database.  
<http://www.fao.org/countryprofiles/default.asp?lang=en>
- African Development Bank – Project Database  
[http://www.afdb.org/portal/page?\\_pageid=473,970916&\\_dad=portal&\\_schema=PORTAL&p\\_start\\_date=&p\\_end\\_date=&p\\_country=2&p\\_sector=&p\\_text=](http://www.afdb.org/portal/page?_pageid=473,970916&_dad=portal&_schema=PORTAL&p_start_date=&p_end_date=&p_country=2&p_sector=&p_text=)
- IFAD Operations by Country.  
<http://www.ifad.org/operations/projects/regions/country.htm>
- NEPAD, FAO., 2004. National Medium Term Investment Programme.  
<ftp://ftp.fao.org/docrep/fao/007/ae582e/ae582e00.pdf>
- SAPP statistical report 2005:  
<http://www.sapp.co.zw/documents/R7-Statistics-Report-2005.pdf>
- NEPAD, FAO. 2004. National Medium Term Investment Programme.  
<ftp://ftp.fao.org/docrep/fao/007/ae415e/ae415e00.pdf>
- The world Factbook: Zimbabwe  
<https://www.cia.gov/library/publications/the-world-factbook/print/zi.html>
- SAPP Annual Report 2007  
<http://www.sapp.co.zw/viewinfo.cfm?id=71&linkid=2&siteid=1>
- Electricity Access Southern Africa Sub-regional Study: South Africa and Zimbabwe

[http://www.gnesd.org/Downloadables/Energy\\_Access\\_I/Technical\\_report\\_ERC\\_ver\\_16\\_April\\_2004.pdf](http://www.gnesd.org/Downloadables/Energy_Access_I/Technical_report_ERC_ver_16_April_2004.pdf)

- ZESA Holdings (PVT) Limited Presentation ON 'POWER GENERATION OPTIONS'  
<http://www.sapp.co.zw/documents/Gokwe%20North%20Coal%20Fired%20Station%20in%20Zimbabwe.pdf>
- Special Report: FAO/WFP Crop and Food supply assessment mission to Zimbabwe, Food and Agriculture Organisation of the United Nations, Rome  
<http://www.ftp.fao.org/docrep/fao/010/ai469e/ai469e00.pdf>
- Climate change and the future of smallholder agriculture  
<http://www.ifad.org/events/gc/31/roundtable/climate.pdf/>  
<http://www.ifad.org/events/gc/31/roundtable/index.htm#1>
- OSRO/RAF/403/SAF: Training of Zimbabwe Irrigation Officers in Planning, Design, Implementation and Management of Smallholder Irrigation Schemes with Farmer Participation – report prepared by E. Berejena (for the list of irrigation projects)