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MINISTRY OF MINES, ENERGY AND WATER DEVELOPMENT

Water Resources Development Project

Environmental and Social Management Framework

FINAL DRAFT REPORT

Department of Water Affairs,
Sheki Sheki Road, LUSAKA

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PREPARED BY:

Jonathan Kampata – Principal Water Resources Engineer
Department of Water Affairs
Box 50288
LUSAKA
email: jkampata@yahoo.com ; jkampata@mewd.gov.zm

Albert Chomba – Acting Principal Water Engineer
Department of Water Affairs
Box 50288
LUSAKA
email: chomba08027@alumni.itc.nl

Abigail Bwanga – Water Planner
Department of Planning and Information
abwanga@mewd.gov.zm

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ACRONYMS

CBD	Convention on Biological Diversity
CITES	Convention on International Trade for Endangered Species
DPI	Department of Planning and Infrastructure
DWO	District Water Officer
DWA	Department of Water Affairs
EA	Environmental Assessment
ECZ	Environmental Council of Zambia
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EPB	Environmental Project Brief
EPPCA	Environmental Protection and Pollution Control Act
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
GIS	Geographical Information System
GRZ	Government of the Republic of Zambia
IBA	Important Bird Area
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for the Conservation of Nature (World Conservation Union)
MDG	Millennium Development Goals
M&E	Monitoring and Evaluation
MMEWD	Ministry of Mines Mineral Energy and Water Development
NCS	National Conservation Strategy
NGOs	Non-Governmental Organisations
NHCC	National Heritage Conservation Commission
NRDC	Natural Resources Development College
PMT	Project Management Team
PRA	Participatory Rural (Rapid) Appraisal
RPF	Resettlement Policy Framework
SNDP	Sixth National Development Plan
ToR	Terms of Reference
UNCCD	United Nations Convention to Combat Desertification
UNFCCC	United Nations Framework Convention on Climate Change
WB	World Bank
WHO	World Health Organisation
WWF	World Wildlife Fund
ZEMA	Zambia Environmental Management Agency
ZNFU	Zambia National Farmers Union
ZWRDP	Zambia Water Resources Development Project

EXECUTIVE SUMMARY

The Government of the Republic of Zambia has requested World Bank financing to support the National Water Resources Development Project (WRDP). This project corresponds with the central features of the Government's vision and strategy as described in its Vision 2030, the Integrated Water Resources Management and Water Efficiency Implementation Plan (2005-2030) and the Sixth National Development Plan (2011-15).

The Project Development Objective is to support the implementation of an integrated framework for development and management of water resources in Zambia.

The Water Resources Development Project (WRDP) will be implemented through the Ministry of Mines, Energy and Water Development (MMEWD), which will serve as the overall lead implementing and coordinating agency. The Department of Water Affairs (DWA) will provide day-to-day management.

The project consists of three components. Component A focuses on the strengthening the capacity of MMEWD and the DWA to manage Zambia's water resources. Component B addresses the infrastructure gap through development of small scale water resources projects in rural communities, which are to be identified and planned during the course of project implementation and through studies to support the identification of a proposed pipeline of future water resources investment projects. The small infrastructure works will be identified and planned in consultation with local communities, supported by project-financed management and extension teams, and then approved for funding through the Zambian government's water resources development and management approval systems. Component C seeks to strengthen and build the institutional capacity of MMEWD and the water resources management bodies.

The objectives of this Environmental and Social Management Framework (ESMF) are:

a. To establish clear procedures and methodologies for the environmental and social planning, review, approval and implementation of subprojects to be financed under the Project;
b. To specify appropriate roles and responsibilities, and outline the necessary reporting procedures, for managing and monitoring environmental and social concerns related to subprojects;
c. To identify any training, capacity building and technical assistance needed to successfully implement the provisions of the ESMF;
d. To establish the project funding required to implement the ESMF requirements;
e. To provide practical resources for implementing the ESMF.

These activities will be supported through the provision of: i) consultants services and technical assistance; ii) goods and equipment, including computers, vehicles and office equipment; iii) training and capacity building activities; and, iv) incremental operating costs to support the National Water Management Authority and departments within the Ministry associated with institutional transition.

Detailed environmental and social data, which will provide the environmental and social management process with key baseline information when identifying adverse impacts, is provided in this ESMF. The information contains data on bio-physical environmental features, such as (i) the physical environment (geology, topography, soils, Climate- climatic and hydrological variability, (ii) Ecosystem, land cover and protected areas (iii) Socio-economic environment (land-use, land tenure, and land titling and human settlements) and Economic impacts of Hydrological variability.

A thorough review of the National Environmental and Regulatory Framework including the World Bank Safeguards Operational/Bank Policies was undertaken. Out of the ten Operational Safeguards Policies, the following six are triggered by the ZWRDP: (i) Environmental Assessment OP/BP 4.01; (ii) Physical Cultural Resources (OP/BP4.11); (iii) Pest Management (OP 4.09);(iv) Involuntary Resettlement (OP/BP 4.12) (v) Safety of Dams OP/BP 4.37; and (vi) Projects on International Waterways OP/BP 7.50. This ESMF has incorporated both National and World Bank safeguard policy considerations with respect to the implementation of the subprojects to ensure that all policy concerns are taken into account. A process that will oversee the subproject identification, preparation, approval and implementation for the small water resources infrastructure development has been prepared. It provides a simple outline of the key steps and considerations that need to be undertaken to facilitate the development of the subprojects. The simple steps and considerations (outlined in flowchart (Chart 1) are further informed by relevant referenced Annexes in order to address ESMF requirements. The process is informed by the two primary laws, namely, the prevailing law governing Water Resources Management and the law governing Environmental Management (see Chapter 5 for further details).

The small water resources infrastructure development subprojects will cover two types of interventions. The first type is concerned with the establishment of water resources management systems aimed at improving the administration of water resources management in Zambia. These types of projects will involve the development of small infrastructure such as climate and hydrological data monitoring stations, weirs to measure stream discharge, and other measuring systems as necessary. The second type will be concerned with water resources development primarily for the benefit of rural communities as well as broader national economic benefits. Selection of the possible small infrastructure works to be supported by this project will be assessed through field investigation by extension staff with consultation of communities. .

The support for improving Zambia's ability to monitor and forecast climate, weather and water, the project's component A would finance purchase and installation of monitoring and observation equipment. The equipment is comparatively small in dimensions (from a river plate that is approximately 2 m high and 0.10m wide, to synoptic weather monitoring equipment of 1x2x2 m

dimension). As such, the civil works needed for the installation is minor. Installation of new equipment, could necessitate any needed (new or improved) short access roads. To address environmental and social issues as they may be encountered, the ESMF and RPF makes provision for compensation of any loss of land needed for the station or a new access road. Also, the ESMF's screening procedure, rules for contractors and monitoring would be adhered to in the planning and execution of the civil works. If an EMP would be required for hydro-met monitoring improvements, it would be prepared in accordance with World Bank guidelines and the Government of Mozambique's legal and regulatory framework. They will state the expected environmental and social impacts and provide good operational practice to control emissions (e.g. dust, noise), wastewater discharge, solid waste management on the construction site, and reduce impacts experienced by the surrounding population.

Guidance on how to monitor and address the environmental and social impacts and the recommended mitigation measures are provided. This covers timely information collection and monitoring and action to support project modifications. This process also determines whether the mitigation measures have been successful. The guidance entails the application of an environmental and social monitoring process or plan that provides: (i) Actions or mitigation measures to be undertaken; (ii) A description or list of parameters to be measured, including monitoring locations where appropriate; (iii) Indicators to measure and verify levels or the extent of implementation of the mitigation measures; (iv) Frequency of measuring and verifying the indicators; and (v) Institutions or persons responsible for carrying out the monitoring. This process is aligned to and embedded within the national regulatory systems, primarily through the administration of water rights and water allocation systems, but also within the broader context of the national legislative environment and the project implementation plan. Therefore the process will be linked to the monitoring framework, developed by MMEWD, within the context of national reporting systems to the Sector Advisory Group and the sub-groups on water resources infrastructure, water resources development, management and capacity building.

This report identifies the existence of a problem of inadequate capacity to successfully implement guidelines of this ESMF for the ZWRDP. Capacity needs to be strengthened at community and subproject operation levels and at the three Project Management Levels: District, including local Authority, Provincial / sub-catchment and National Levels. It is therefore necessary to provide for training and organizational arrangements to monitor and enforce the guidelines developed for successful implementation of the ESMF.

1 INTRODUCTION

1.1 Background

The Government of the Republic of Zambia has requested World Bank financing to support the National Water Resources Development Project (WRDP). This project corresponds with the central features of the Government's vision and strategy as described in its Vision 2030, the Integrated Water Resources Management and Water Efficiency Implementation Plan (2005-2030) and the Sixth National Development Plan (2011-15). The Project Development Objective is to support the implementation of an integrated framework for development and management of water resources in Zambia. The Project Beneficiaries are in part rural communities who will benefit from improved small scale water resources infrastructure. The project aims to support 1,000,000 direct and indirect beneficiaries through the construction of small water resources infrastructure over the next decade. The community-based water resources infrastructure will be identified and planned in consultation with local communities over the course of project implementation, supported by project-financed management and extension teams, and then approved for funding through the Zambian Government's water resources development and management approval systems. Other activities aimed at improving the water resources administrative systems will be identified and managed through the Water Resources Management Authority and the department responsible for water resources.

Therefore, this document provides an Environmental and Social Management Framework (ESMF) for the proposed Water Resources Development Project in Zambia, which is being financed by the World Bank. The Ministry of Mines, Energy and Water Development (MMEWD), is the agency responsible for implementing the Water Resources Development Project (WRDP) including the provisions of this ESMF. The project is national in scope and will be implemented over a five year period in all 10 provinces of Zambia. The project aims to enhance the livelihood of Zambians living in rural areas through rehabilitation, improvement and construction of small water resources infrastructure.

This Environmental and Social Management Framework (ESMF) is to be used by the Water Resources Development Project's (WRDP) executing agency (MMEWD) in order to ensure that all environmental and social safeguards are adequately addressed and that the relevant capacity building and training needs are established in order for the recommended measures to be implemented effectively.

1.2 Objectives

The objectives of this Environmental and Social Management Framework (ESMF) are:

a. To establish clear procedures and methodologies for the environmental and social planning, review, approval and implementation of subprojects to be financed under the Project;
b. To specify appropriate roles and responsibilities, and outline the necessary reporting procedures, for managing and monitoring environmental and social concerns related to subprojects;
c. To identify any training, capacity building and technical assistance needed to successfully implement the provisions of the ESMF;
d. To establish the project funding required to implement the ESMF requirements;
e. To provide practical resources for implementing the ESMF.

2 PROJECT DESCRIPTION

2.1 Project Development Objectives and Principles

The development objective of the Water Resources Development Project is to support the implementation of an integrated framework for the development and management of water resources in Zambia. The Project Beneficiaries are rural communities who will benefit from improved small scale water resources infrastructure. The project aims to support 1,000,000 direct and indirect beneficiaries through the construction of small water resources infrastructure over the next 5 years and provide a sustainable framework for long-term development of water resources in Zambia. The small infrastructure works will contribute to improved food security and reduced vulnerability to external shocks (climate change and rising food prices). In doing so, the project will directly contribute to the country's social and economic development objectives.

The project concept is based on two principles: 1) Demand will drive and guide the nature of investments in small water resources infrastructure. Organized communities should request for the project to assist them in the realization of the social/economic development ambitions and will have to commit themselves to share in the cost of the investments – mostly in kind. 2) Beneficiaries need to be able and willing to participate and pay for the operation and maintenance of the facilities. Therefore the project needs to trigger usability through the provision of irrigation and other facilities that makes water available for economic use.

2.2 Project Components

The Water Resources Development Project is a Sector Investment Loan (SIL) comprising an IDA Credit of US$50 million equivalent. The project objectives will be achieved through the implementation of three components and these are:

Component A: Water Resources Management: (IDA contribution $8m)

The objective of this component is to enhance capacity at the national and regional level to address the challenges of water resources management in Zambia. The component will provide support to: (a) building capacity to manage the hydro-meteorological and groundwater monitoring networks; (b) strengthening the hydro-meteorological and groundwater information management systems and functions ; (c) integrating spatial and remotely sensed data into decision making; (d) preparation of consolidated basin-level water resources development plans and strategic assessments, including groundwater; and, (e) implementing a series of comprehensive water allocation, licensing, revenue and compliance monitoring measures.

These activities will be supported through the provision of: i) consultants services and technical assistance; ii) goods and equipment, including hydro-climatic and water quality equipment, bulk meters, computers, vehicles and office equipment; iii) works to establish hydro-meteorological stations; and, iv) carrying out of training and capacity building activities to the sector.

Component B: Water Resources Development: (IDA contribution $30m)

The objective of this component is to address the infrastructure deficit through support to: (a) development and rehabilitation of small scale water resources infrastructure, such as small dams, weirs, gabions, and other small civil works intended to retain water, reduce erosion, enhance recharge and ensure productive application such as through fisheries and irrigation; (b) updating and climate screening the 1995 Dam Development Master Plan to identify a series of priority investments for further preparation; (c) preparation of studies in support of a proposed pipeline of possible future medium and large scale water resource investments; (d) supporting environmental and social assessments for future potential water resource investments; and, (e) measures approved under the groundwater development program.

This will be supported through the provision of: i) consulting services and technical assistance for the detailed design of water resources infrastructure, along with the preparation of environmental and social safeguards instruments; ii) works required for construction of small scale infrastructure; iii) goods needed to support implementation and, iv) operating expenses associated with workshops, training, community mobilisation and capacity enhancement initiatives.

The specific nature of the subprojects to be supported under this component will be determined during the course of project implementation in response to and in consultation with local communities and the government. A list of possible subprojects—as well as a negative list—that may be supported is provided in Annex 8 of this document. In general, these will be small scale water resources development projects which will either directly support local communities or will assist the government in managing water resources. For example, small dams and reservoirs will be one focus of investment but other associated projects such as small irrigation canals, fish ponds, and hydrometric stations may also be included. No large dams will be financed (i.e. dams over 10 meters).

Component C: Institutional Support: (IDA contribution $12m)

The objective of this component is to strengthen the institutional capacity for water resources management and development, including both surface and ground water. The component will provide support to: (a) operationalising the provisions of the Water Resources Management Act; (b) strengthening the institutional capacity to develop strategies and studies to ensure the sustainable and equitable development of water resources; (c) increasing the capacity for negotiations, monitoring and compliance with international waters instruments; (d) enhancing inter-agency coordination; and (e) overall project management, including fiduciary responsibilities, financial and technical audits, and safeguard management.

These activities will be supported through the provision of: i) consultants services and technical assistance; ii) goods and equipment, including computers, vehicles and office equipment; iii) training and capacity building activities; and, iv) incremental operating costs to support the National Water Management Authority and departments within the Ministry associated with institutional transition.

3 BASELINE ENVIRONMENTAL CONDITIONS

The project is a nation-wide initiative, whose approach is meant to serve as a basis upon which a series of investments in water resources to support productive development and sustainable management will be carried in Zambia. The project's central aim is in part meant to strengthen the existing systems for the provision of water resources infrastructure and to address the water deficit in rural communities in support of sustainable livelihoods. There is thus a focus on increasing the beneficial use of water in rural areas. However, as support for the development of small scale water resources infrastructure will be provided on a demand-driven basis, investments under this component may be in all regions of Zambia. It is therefore important to get a broad understanding of the different characteristics of the various areas across the country.

3.1 The Biophysical Environmental Features

3.1.1 Topography, Geology and Soils

The major topographic regions in the country are plateaus and valleys. The plateaus stand at altitudes of 1000 m to 1500 m above sea level (asl) with occasional high ground (1500 to 2000 m) in the northeast of the country consisting of mountains in Nyika and Mbala areas. The plateau is also covered by large expanses of floodplains in the north (Bangweulu Swamps), central parts (Kafue Flats) and west (Barotse Floodplain). The valleys (500 – 1000 m asl) occur along the Luangwa river and middle Zambezi (Figure 3.1) and are separated from the plateaus by escarpments. The Basement Complex is the oldest rock system in Zambia and occupies large parts of Eastern and Northern Provinces and some higher plateau areas of Southern Province. The main rock types of the Complex are gneisses, mica, hornblende, kyared, schists and micaceous quartzites. The upper part of the Complex is characterized by quartzites, schists and conglomerates. In some areas the Complex is overlain by sediments of the Katanga age, particularly in the southeast, east and north of the country. The rocks of the Katanga system occur extensively in Northern, Luapula, Copperbelt, North-western, Central and Lusaka Provinces. The younger rocks of Karroo system formed from the Upper Carboniferous to the Jurassic geological periods occur in the valleys of the Luangwa and middle Zambezi systems. The Karroo system consists of mudstones, grit and sandstones with an upper layer of basaltic lava around Livingstone. However, in the west this is covered by the Kalahari system which consists of poorly consolidated sandstones and unconsolidated windblown sands that cover extensive parts of Western Province and smaller areas of North-western, Central and Southern Provinces.

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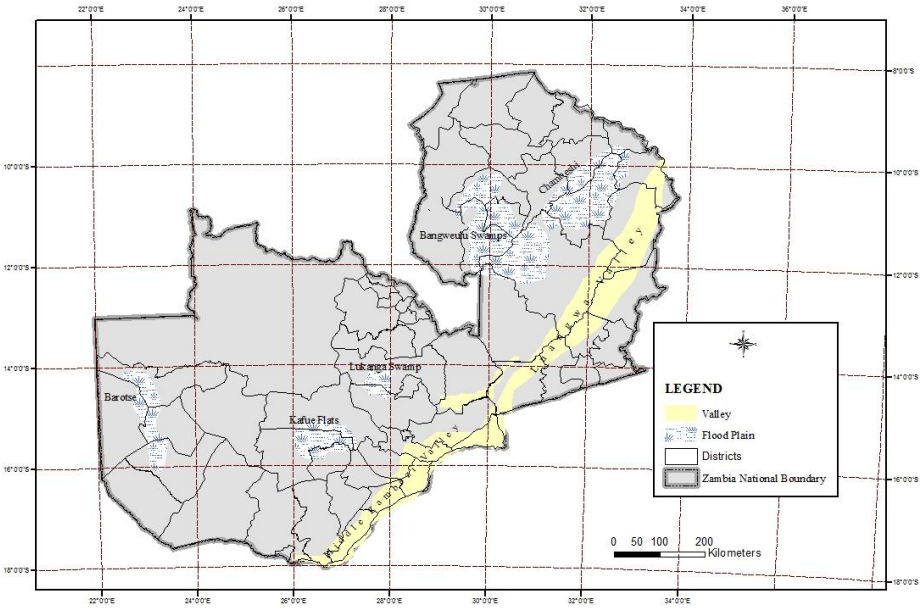
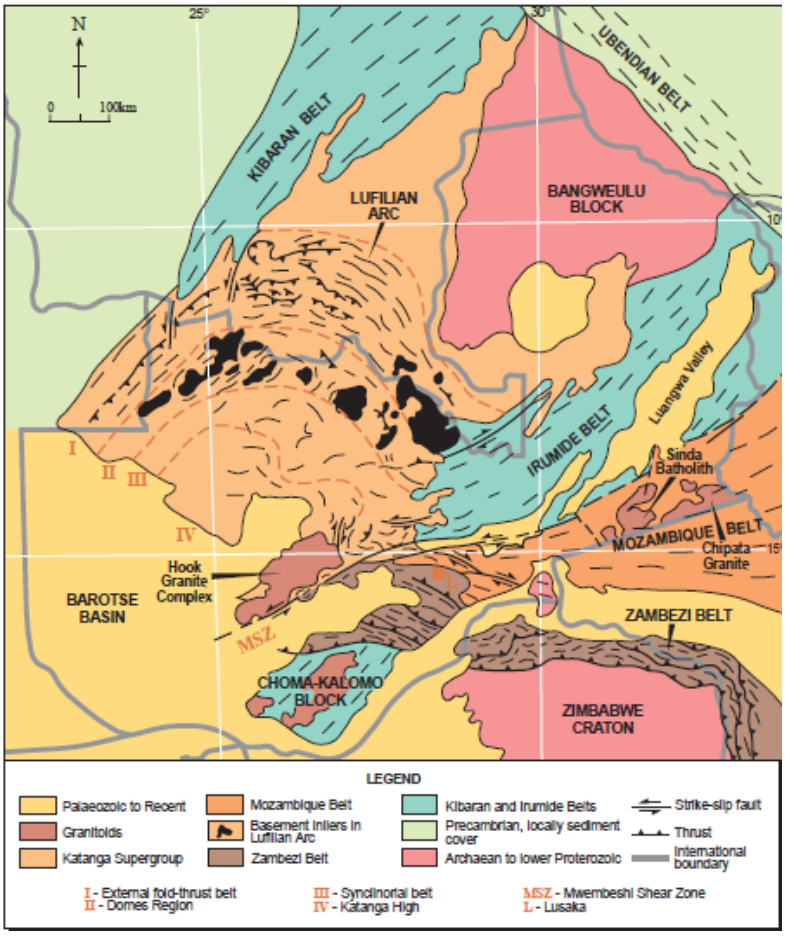


Figure 3.1 Major valleys and floodplains/swamps in Zambia.



Source: Ministry of Mines and Mineral Development (undated). Zambia Investment Opportunities in the Mining Industry.

Figure 3.2 Major Geology of Zambia

Based on the FAO/UNESCO classification the northern plateau soils in Northern and Copperbelt Provinces and northern parts of Central Province are orthic ferrasols that are strongly leached brownish clayey to loamy soils derived from acidic rocks with a pH of 4.0 – 4.5 while the plateau in the rest of Central Province, Eastern, Lusaka and Southern Provinces have ferrasols that are moderately leached with a pH of 4.5 – 6.0 . The Luangwa and Middle Zambezi valleys have vertisols, luvisols and fluvisols that are slightly acid to alkaline (pH 5.0 – 7.5) and these are separated from plateau soils by lithosols of the escarpment zone. The Kafue Flats in Central and Southern Provinces have clay vertisols that are slightly acid to alkaline (pH 5.0 – 7.5). In Western Province, the Kalahari sands with a pH of 4.0 – 4.5 cover most of the upland areas in the Province and some parts have strongly acid podzols and arenosols (pH 4.0 – 5.0) while the floodplain soils consist of dystric gleysols and arenosols that are also strongly to very strongly acid.

3.2 Climate- climatic and Hydrological Variability

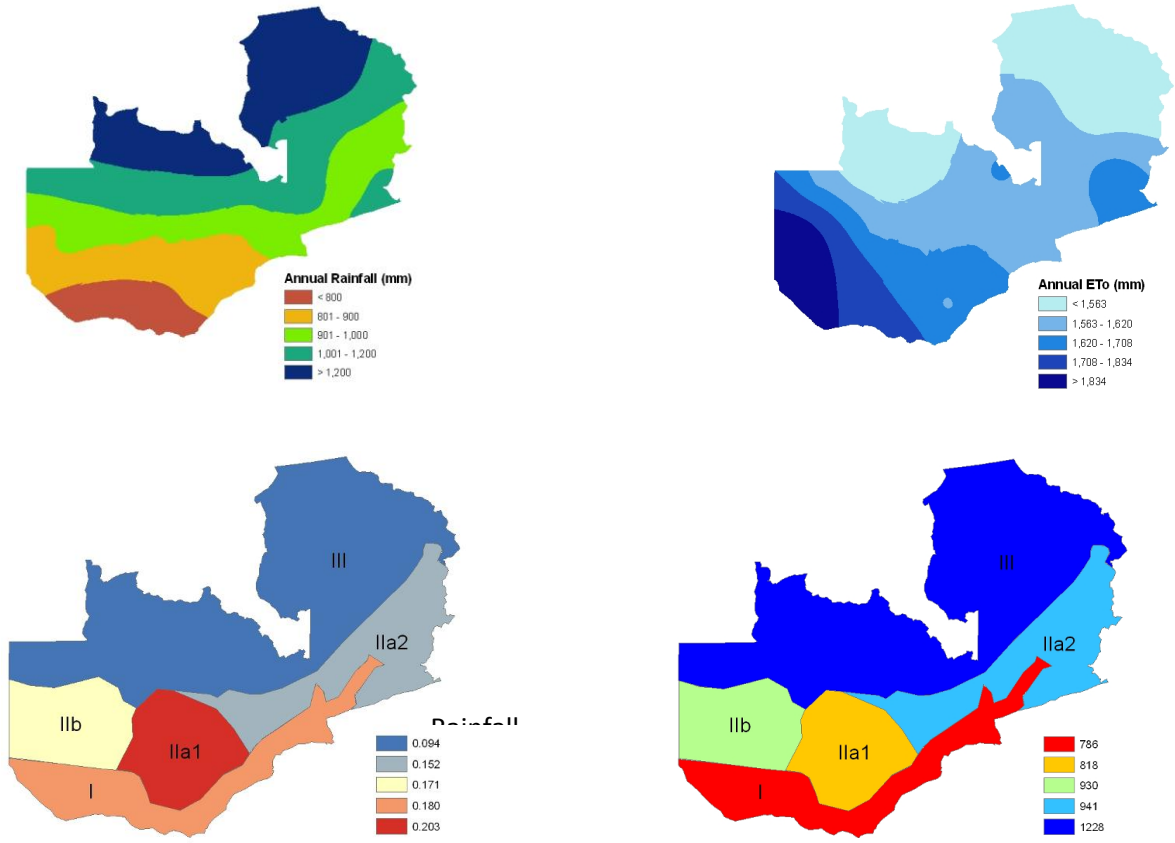
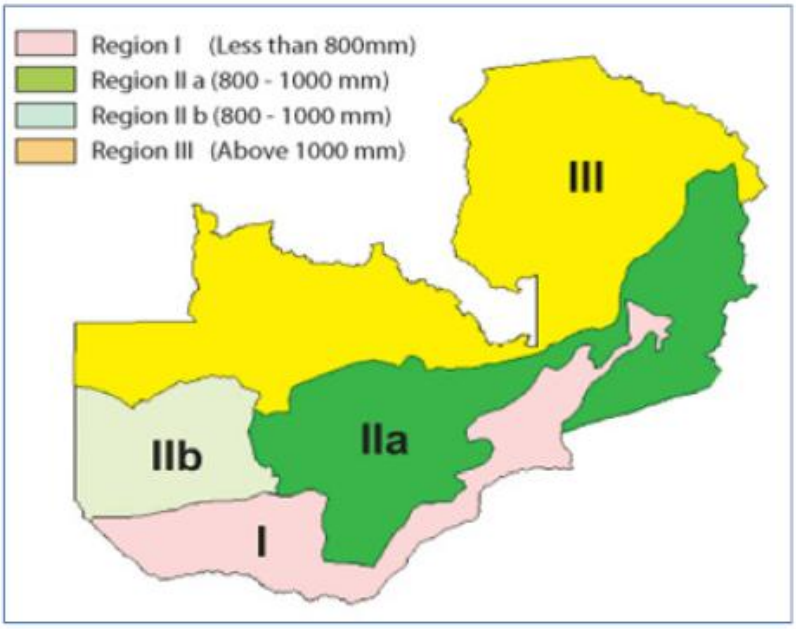


Figure 3.3: Average annual rainfall and average annual reference evapotranspiration in Zambia for 1976-2007 (generated from 1km pixel averaged annual rainfall and averaged annual ETo interpolated from 30 weather stations with data available in the same period).

Zambia lies in the tropics with a moderate climate, summer temperature rarely exceeding 35°C, and receives moderate rainfall averaging 1000 mm annually. The climate in Zambia is characterized by alternating wet (rainy) and dry seasons. The rainy season lasts from November to March or April. Rainfall in Zambia is influenced by the southward movement of the equatorial low pressure belt in the summer months that is linked to the migration of the overhead sun and the Inter-Tropical Convergence Zone (ITCZ) which is a zone in which the Congo air and southeast and northeast trade winds converge (Davies, 1971). The mean annual rainfall distribution in Zambia is characterized by a decrease from north to south (Figure 3.3) that may be attributed to the shorter time the south is influenced by the ITCZ. There is considerable spatial and temporal variability (Figure 3.3). There is a strong national gradient, with the southern part of the country experiencing less rainfall (<800 mm) and higher evapotranspiration (>1800 mm), while the central and northern parts of the country receive higher annual rainfall (>1200 mm) and experience lower annual evapotranspiration (see Figure 3.3). The coefficient of variation (CV) of annual precipitation currently ranges from 10 – 20% in Copperbelt and Northern Provinces and the northern districts of Kalabo and Lukulu in Western Province to 20 – 30% in Central, Eastern, Lusaka and Southern Provinces and the rest of Western Province.

Zambia has historically been divided into three agro-ecological zones, representing the south, central, northern parts of the country characterized by rainfall distribution and soil type. Of the three agro-ecological regions of Zambia Region I has the lowest rainfall (of less than 800 mm), followed by Region II and III. According to the National Adaptation Programme of Action (NAPA) (Ministry of Tourism, Environment and Natural Resources, 2007), Region I is considered to be the most vulnerable region in Zambia as it consistently has had the most droughts and water This makes rain-fed agriculture very vulnerable to droughts.



Source: Republic of Zambia. 2011. Zambia Strategic Programme for Climate Resilience (SPCR)

Figure 3.4: Agro ecological Regions of Zambia

The main source of renewable water in Zambia is rainfall. Most of this rainfall falls during the wet season between the months of October and April. Seasonal variations in river flow, following rainfall distribution, peak between March and April with low flow periods between October and November. Extreme inter-annual variations are observed and there is a high probability that at least one agro-ecological zone will experience abnormal weather events in any given year. The central and southern regions of the country (i.e., Zones I, IIa1 and IIb) are particularly prone to both droughts and floods. The dry Zones I and IIa1 have the highest inter-annual climate variability, with coefficient of variation values of 0.180 and 0.203 respectively (Figure 3.3). By contrast, the remaining agro-ecological zones have fairly stable weather conditions, and no severe droughts have been recorded over the last three decades. These zones have coefficients of variation that are inversely proportional to their annual rainfall amounts, indicating that rainfall is both higher and less variable in these zones. Annual runoff can be as high as 130 Km^3 per year in a high rainfall hydrological year, in contrast to severe drought years where average runoff has been recorded as low as 68 Km^3. Global Circulation Models of climate change predict that over the next 20 to 30 years, Zambia will experience increasing temperatures, with longer dry periods, more intense rainfall and increased storm events. The frequency of flood and drought events taking place simultaneously across agro-ecological zones

shows that during the last 32 years the country experienced four severe droughts that affected several agro-ecological zones (Table 3.1). More frequent, moderate droughts were recorded for seven seasons for at least one of the agro-ecological zones, indicating a recurrence interval of 4.5 years and typically affecting larger areas. "Normal" weather patterns (i.e. with a Palmer Z index between -0.5 and 0.5) were are not experienced simultaneously in more than three of the five agro-ecological zones during the 32-year study period, indicating that at least one part of the country experiences extreme weather events every year.

Table 3.1. Occurrence of climatic events across agro-ecological zones, 1976-2007

Number of zones simultaneously affected	Severe drought ($Z^a \leq -1.5$)	Moderate drought ($-1.5 < Z \leq -0.5$)	Normal ($-0.5 < Z \leq 0.5$)	Moderately wet ($0.5 < Z \leq 1.5$)	Very wet ($Z > 1.5$)
5	0	1 (1994)	0	0	0
4	0	4	0	4	1 (1978: I, IIa1, IIa2, IIb)
3	1 (1992: I, IIa1, IIb)	4	6	5	0
2	2 (1995: I, IIa1; 2005: I, IIa1)	4	11	2	1 (1981: I, IIb)
1	1 (1987: IIa1)	7	10	9	4 (1979: III; 1989: IIa1; 1997: IIa1; 2004: 2b)

Note: Based on averaged monthly Palmer Z Index in maize growing period from November to March. The monthly Palmer Z index shows how monthly moisture conditions depart from normal, reflecting short-term drought and wetness (Zambia CWRAS background study: WB / IFPRI, 2008).

3.2 Climate Change

Climate change is expressed as deviations from a regional climatology determined by analysis of long-term measurements, usually over a period of at least 30 years, or the normally experienced climate conditions and a different, but recurrent, set of climate conditions over a given region of the world (IPCC, 1998). Climate change may also refer to a shift in climate, occurring as a result of human activities (Wigley, 1999). In climate modeling and assessment of impacts of climate change on biodiversity the deviations or anomalies from normals are based on the climatology for the period 1961 to 1990 calculated from observed instrument records (New et al., 1999). Although IPCC scenarios project that sub-Saharan Africa will experience a declining trend in rainfall during the 21st century, there has been little change in annual rainfall in Zambia during 1970 to 2010; however, variability in annual rainfall remains high and this is likely to continue during most of this century while the pattern in the frequency of floods and droughts is also expected to continue. The analysis of climate change based on the Hadley Center Coupled Models (HadCM3 B1-low and A2-high) climate change scenarios (IPCC, 2007), indicate that average temperature anomalies (i.e., departures from the 1961 – 1990 mean values) in Zambia will increase by 1.3 to 2.0^{o}C by 2020 and 2.25 to 3.00^{o}C by 2050.

3.3 Ecosystems and Land Cover

Based on the vegetation of Zambia, there are 16 main ecosystems in the country. These ecosystems are dynamic due to the influence of climate and geomorphological processes. Over the last million years, there have been drastic changes in the extent of these ecosystems which have been triggered by changes in climate. In recent times, biotic factors, such as cultivation, fire and herbivory, have played a significant role in altering the structure and functioning of these ecosystems. These are important considerations in biodiversity management. Ecosystems with the highest species biodiversity are Acacia savanna (munga) and Brachystegia-Julbenardia (miombo) woodlands followed by Colosphospermum (mopane) woodland and floodplain/swamp grassland. Termitary is a transition ecosystem between wetland grassland and upland woodland that is characterized by wooded termite mounds (termitary) surrounded by grassland and is important for grazing. Montane forest, although of limited extent in the country, has the highest number of endemic woody plants. The diversity of ferns and orchids is correlated to ecosystem diversity. The diversity of some invertebrates (Arachnids and butterflies) and ferns shows a south-north increase while that of other invertebrates (Hemiptera and Hymenoptera) shows the opposite trend. These diversity gradients are related to rainfall/moisture gradient.

3.4 Protected Areas

The Convention on Biological Diversity (CBD) defines a protected area as a geographically defined area which is designated or regulated and managed to achieve specific conservation objectives. Similarly, in-situ conservation refers to the conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings and, in the case of domesticated or cultivated species, in the surroundings where they have developed their distinctive properties.

The protected area system in Zambia consists of national parks (IUCN protected area category II), bird sanctuaries (IUCN protected area category IV), game management areas (GMAs, IUCN protected area category VIII), important bird areas (IBAs, IUCN protected area category IV), forest and botanical reserves (IUCN protected area categories IV and VIII) and national heritage sites (IUCN protected area categories III and X). National parks were established by government primarily for the conservation of biodiversity. There are 19 national parks in Zambia and these cover a total area of 6.358 million hectares (ha). Sustainable use of wildlife and its habitats in national parks is promoted through eco-tourism while settlements and hunting are prohibited.

Bird sanctuaries have the same status as national parks but are usually smaller in size. There are two bird sanctuaries in the country. Important Bird Areas (IBAs) are identified based on internationally agreed criteria and are established for the long term viability of naturally occurring bird populations across the range of those species for which a site-based conservation approach is appropriate. There are 42 IBAs in Zambia and some of these are in national parks and these also include the two Ramsar sites (Bangweulu Swamps and Kafue Flats) in the country.

Game management areas (GMAs) were established by government to control the hunting of game and protected animals through a licensing and monitoring system. There are 34 GMAs in Zambia which cover a total of 16.57 million ha. Because other forms of land use, such as settlements and agriculture are allowed, GMAs are not strictly protected areas.

Forest reserves were established by government to conserve forest resources for sustainable use by local people in the case of local forests and to protect major catchment areas, headwaters and biodiversity in the case of national forests. There are 432 forest reserves in Zambia which cover a total of 7.4 million ha. Settlements and cultivation are normally not permitted in forest reserves while removal of any plant is only permissible under license as is livestock grazing. Other forest reserves are managed as botanical reserves that serve three objectives: (i) preservation of relic vegetation types and/or plant species, (ii) genetic banks for multiplication and breeding programs, (ii) reference sites in determining human impacts on forest ecosystems outside reserves. There are 59 botanical reserves in Zambia which cover a total area of 148,000 ha but form part of the country's forest reserve system.

3.5 Relevant Social Economic and Environment Considerations

Between 1980 and 2010, Zambia's life expectancy at birth decreased by almost 5 years, although mean years of schooling increased by over 3 years the expected years of schooling decreased by less than 1 year and the GNI per capita decreased by 11%. In spite of this, Zambia's HDI had risen by 14.5% in 2010 from the level in 2000, the country is ranked at 150 out of 160 countries. In general, the social vulnerability of Zambia is partially due to the rural nature of livelihoods of which 60% and 40% of the population is respectively rural and urban. Other reasons are due to low levels of production, knowledge and skills among the county's population.

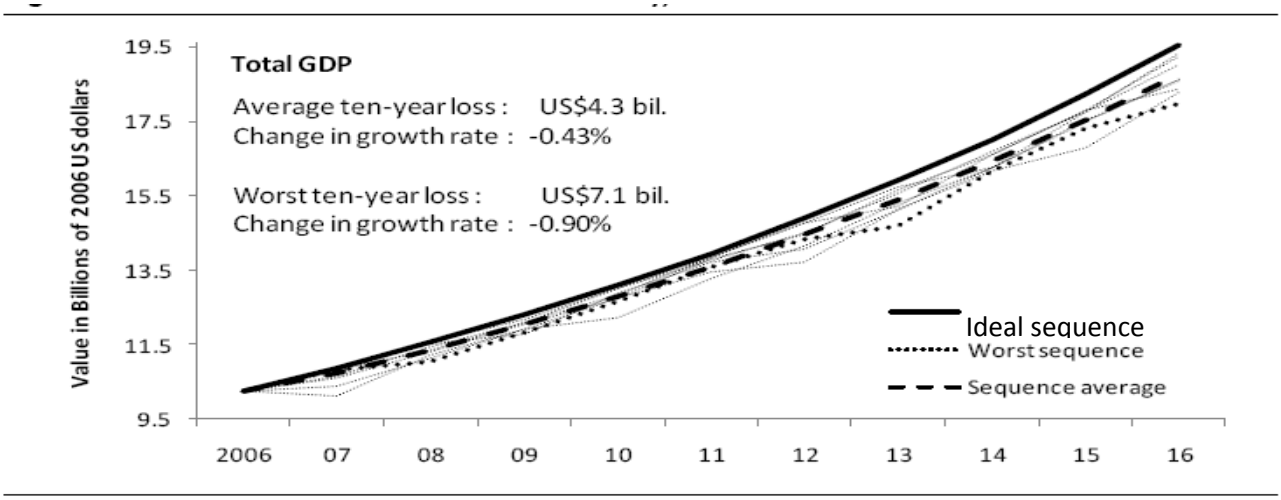
There are vast disparities in living conditions between Zambia's rural and urban populations. For example, 64% of the urban population has access to safe water compared to 27% of the rural population. Moreover, 46% of the urban population lives below the poverty line compared to 88% of the rural population. In more general terms, the disparity of wealth between Zambia's rich and poor is also considerable. The poorest 60 percent of the population share 25% of the nation's wealth, whereas the wealthiest 10% benefit from 39% of the wealth; the remaining 36% of the wealth is shared by 30% of the population. Incomes have not grown as fast as inflation which, in combination with the introduction of user fees for health and education services, means that a majority of Zambians cannot afford to provide themselves with even basic social services.

The pattern of household expenditures prevailing in the country is characteristic of a poor society because the bulk of expenditures, 52% on average and 64% among the poor is spent on food items. Other essential expenditures, fuels, health and education account for 22% of average household expenditures, as opposed to a developed country situation where at least 51% of household expenditures are on other items other than food, clothing, fuel, health, education and transport.

3.6 Economic Impacts of Hydrological Variability

According the Country Water Resources Strategy prepared by the World Bank, Zambia faces significant water resources management challenges related to climatic variability, recurring droughts and floods, and chronic underinvestment in water infrastructure. Frequent water shocks such as droughts and floods have a significant impact on the country's economic performance. Rainfall is also the most crucial climatic element whose abundance or deficiency strongly impacts the national agricultural output.

Figure 3.5 Loss in Total GDP due to rainfall variability Under the *"ideal sequence",* without rainfall variability in this scenario, Zambia's GDP grows at 6.7 percent per year between 2007 and 2016, with national GDP rising from US$10.2 billion in 2006 to $US19.6 billion by 2016. (Zambia CWRAS background study: WB / IFPRI, 2008).



Source: Results from the Zambian economywide model.
Note: Ten-year losses are the cumulative losses for the whole 2007-2016 period.

An assessment of economic impacts of hydrological variability in Zambia using a hydro-economic model that combines the dynamic CGE model and hydro-crop model was carried out to simulate potential impacts of future rainfall variation on economic growth and poverty in the next 10 years. A range of possible rainfall patterns has been simulated using historical data. The model was applied to assess economic impacts of the following three rainfall scenarios:

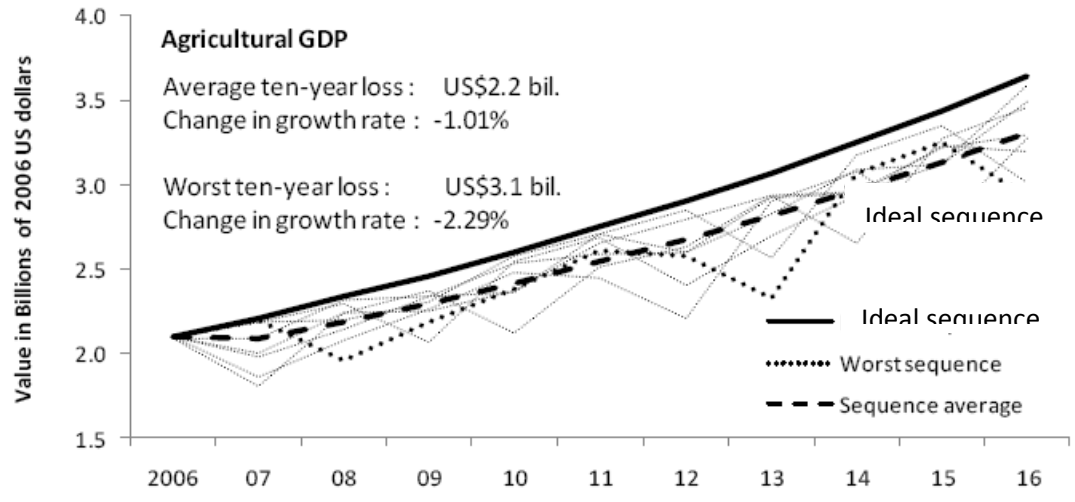
- "Ideal" rainfall sequence – a rainfall pattern without considerable rainfall variability over the ten year period that allows crop yields to be stable. Moreover, the level of yields and the allocation of land are assumed to grow steadily according to estimated yield potentials drawn from field trials and historical trends in land expansion;
- "Average rainfall sequence" – a rainfall pattern that assumes 1976-2007 average rainfall in all years of the 10 year period;

"Worst rainfall sequence" - the worst 10 –year rainfall sequence that has the highest value of annual precipitation coefficient of variation (CV) and the number of severe weather events. This scenario reflects in the historical rainfall patterns of the period 1986-1995 when three severe drought events occurred

Rainfall variability has a significant effect on economic growth in Zambia, and the losses associated with some of the worst rainfall sequences in Zambia's history are substantial. This is illustrated by the results of economy-wide model simulations of GDP losses for the three scenarios (Figure3.5). Under the average pattern of rainfall (sequence average scenario), rainfall variability may reduce Zambia's economy would therefore be four percent smaller by 2016 than it would have been in the same year without rainfall variability. The accumulated GDP losses due to the rainfall variability over the ten-year period would be US$4.3 billion. This simply means that Rainfall Variability Will Cost Zambia US$4.3 Billion in foregone GDP over Ten Years. This is equivalent to lowering Zambia's annual GDP growth by 0.4 percentage points each year between 2007 and 2016.

Figure 3.5 also demonstrates that if the rainfall patterns over Zambia's next ten years were to replicate this worst rainfall sequence, then the accumulated total losses in GDP due to the more frequent severe droughts would be US$7.1 billion over the ten-year period. This is equivalent to reducing Zambia's annual GDP growth by 0.9 percentage points each year. By applying the model results to the period of 1977-2007, on average, Zambia lost 0.4 percent of growth annually between 1977 and 2007 due to rainfall variability, at an accumulated cost for this period of US$13.8 billion (in 2006 prices)[1]. Thus, while Zambia has undergone several decades of unsuccessful policies and suffered a number of large external shocks, all resulting in huge economic cost to growth, rainfall variability has still contributed significantly to the country's poor economic performance and lowered economic growth, even over the last decade when development has proven more successful.

[1] That is to say, if rainfall variability had not caused GDP growth to fall by 0.4 percentage point annually in 1977-2007, then Zambia's economy, measured by GDP, would have been US$1.5 billion higher now (i.e., in 2006 and in 2006 prices) than it was actually was. This is equivalent to 12.8 percent more than was actually observed in 2006.



Source: Results from the Zambian economywide model.
Note: Ten-year losses are cumulative for the whole 2006-2016 period, and not just the loss in the final year.

Figure 3.6. Losses in Agricultural GDP due to Rainfall variability (Zambia CWRAS background study: WB / IFPRI, 2008).

Rainfall variability lowers Zambia's agricultural Growth by one Percentage Point Each Year.

According to the model simulation and as expected, rainfall variability has a much larger negative impact on agricultural performance than on overall economic growth (Figure 3.6). Under the 'normal rainfall' scenario, agricultural GDP rises from US$2.1 billion in 2006 to US$3.6 billion by 2016 with 5.7 percent of annual growth rate. Because agricultural GDP growth is below total GDP growth (i.e., 5.8 percent) agriculture's share of GDP falls from 20.4 to 18.6 percent during 2006-16 under the normal rainfall scenario.

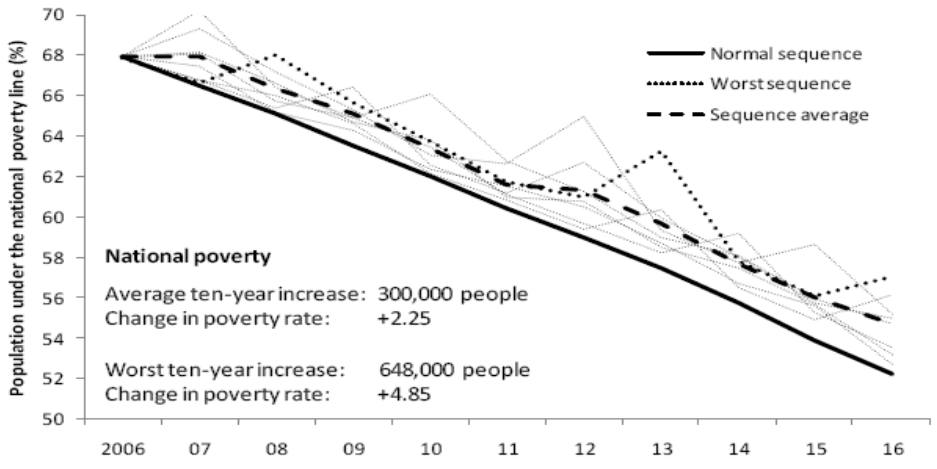
On average, rainfall variability causes a total loss in agricultural GDP of US$2.2 billion over a ten-year period. This is equivalent to a reduction in agriculture's growth rate of one percentage point annually. With a lowered annual growth rate, the level of agricultural GDP by 2016 will be US$300 million below what it have been under the "normal" rainfall scenario. Thus, rainfall variability greatly reduces Zambia's chances of achieving its national agricultural growth target of six percent per year, as set by the Comprehensive African Agricultural Development Program (CAADP).

Agricultural losses are especially severe under the worst rainfall sequence, which replicates the rainfall patterns of the ten-year period between 1985/86 and 1994/95. Under this rainfall sequence accumulated agricultural GDP losses would amount to US$3.1 billion. This means that, during the worst sequence, agricultural GDP is 10.2 percent lower due to rainfall variability than what it would have been during an ideal sequence. Agriculture's average annual GDP growth rate during 2007-2016 would be 2.3 percentage points lower than under the ideal rainfall scenario. Such a large decline in agricultural production would severely undermine the country's development efforts.

The model results also indicate that rainfall variability reduces maize production by at least 30 kg per capita and jeopardizes food security. The model results indicate that rainfall variability lowers maize production, causing per capita availability to rise to only 145 kg per person by 2016 (only 20 kg more than the 2006 level). Moreover, if the rainfall patterns in the next 10 years are similar as those described under the worst rainfall sequence, per capita maize availability supplied by domestic production by 2016 declines to a level below that in 2006. Rainfall variability therefore greatly reduces food availability in Zambia, thus necessitating food imports and aid during periods of severe drought

Rainfall variability will also keep 300,000 more Zambians in poverty over the next decade. Apart from its adverse effects on basic food security, rainfall variability has large impacts on household incomes and poverty. This can be seen in Figure 3.7, which shows the national poverty headcount rate over the next years resulting from model simulations. The poverty rate is the share of the population whose per capita expenditure falls beneath the national poverty line[2]. The modelling results demonstrate that rainfall variability will slow poverty reduction over the next ten years. As shown in Figure3.7, the national poverty rate for the average scenario is above the line representing the national poverty rate under the normal rainfall scenario. On average, rainfall variability increases national poverty by 2.3 percentage points by the end of the ten-year period. There will thus be 300,000 more people predicted to be living under the poverty line in 2016 than there would have been without rainfall variability. Under the worst rainfall sequence, the national poverty rate is higher by 4.9 percentage points by 2016. Thus, if Zambia were to experience a ten-year rainfall pattern similar to that of 1984/85 to 1994/95, then most of the country's potential reductions in

Figure 3.7. Increase in the national poverty headcount rate due rainfall variability (Zambia CWRAS background study: WB / IFPRI, 2008)



Source: Results from the Zambian economywide model

poverty over the next ten years would be lost, and the number of poor people in Zambia would rise from its current 7.4 million to 7.6 million by 2016.

[2] The national poverty line in 2004/05 was US$300 per person per year or US$0.8 per day. Converted to 2006 current prices, the poverty line is US$496 per person per year or US$1.36 per day.

Severe droughts and floods dramatically lower growth and increase poverty in the drought/flood years.

Severe droughts and floods also have large impacts on household incomes in those particular years. The impacts of severe water shocks on growth and poverty headcount are shown in Table 1 in the particular year for each of the three climate shock scenarios examined.

As illustrated in the simulation, the national poverty rate rises dramatically by 7.5 percentage points in a year under the severe drought scenario. Were this severe drought to take place in 2007, then this would imply an increase in the number of poor people by 836,000 from the level in the same year

Table 3.2: Climate Variability on Economic Growth

	Ten-year climate sequences		One-year drought and flood events		
	Average over 30 sequences	Worst sequence	With severe drought	With modest drought	With severe flood
Change in GDP growth rates (%-point)					
Total GDP	-0.43	-0.90	-6.6	-4.0	-2.3
Agricultural GDP	-1.01	-2.29	-22.7	-15.7	-9.4
Cumulative or total loss in GDP, 2006-16 (US$ billion)					
Total GDP	4.3	7.1	2.6	1.6	0.9
Agricultural GDP	2.2	3.1	1.8	1.2	0.7
Change in national poverty (%-point)					
	2.2	4.9	7.5	3.9	2.4
Increase in absolute poor (1000s)					
	300	648	836	435	273

Source: Results from the Zambian economywide model.
Note: Ten-year losses are cumulative for the whole 2006-2016 period measured in 2006 prices; one-year total losses are for the year in which the extreme climate event takes place (also measured in 2006 prices); 'severe drought' replicates the 1991/92 drought; 'modest drought' replicates the 1994/95 drought; and 'severe flood' replicates the 2006/07 flood.

without drought. Poverty also rises significantly in years with modest drought, with an increase of 3.9 percentage points and a rise in the absolute number of poor people of 435,000 a year. Finally, the national poverty rate rises by 2.4 percentage points in years which experience severe flooding, pushing 273,000 more people below the poverty line in such years.

Table3.2 summarizes the findings from the analysis of the impacts of climate variability on economic growth and poverty. While the country has performed well since the late 1990s, with positive economic growth and poverty reduction, growth in agriculture remains volatile despite improvements in the policy environment. This can, at least in part, be attributed to high rainfall variability in the country. Indeed some of the more substantial declines in economic growth over the last three decades have occurred during major drought years. Rainfall variability is especially important for the agricultural sector, which is heavily dependent on rainfall due to the country's limited irrigation capacity. Rainfall variability may also undermine attempts to reduce poverty, since most of Zambia's poor population live in rural areas and are heavily dependent on rain fed agricultural incomes. Overcoming rainfall variability therefore poses a significant challenge to maintaining agricultural growth, significantly reducing poverty, and achieving the Millennium Development Goals. It also heightens concern over potentially negative impacts from climate

change. Together rainfall variability and climate change places considerable pressure on Zambia's government to invest in water infrastructure and improve productivity

3.7 Land Tenure and Titling System

Land tenure is the way in which rights in land are held and in Zambia tenure is categorized into two tenure systems namely, statutory tenure and customary. Statutory land tenure refers to state Land which is administered by the Lands Commissioner through local authorities on behalf of the President since all land in the country is vested in the Republican President on behalf of the people. The president of Zambia holds the country's land in perpetuity on behalf of the Zambian people. The president has delegated his powers to make and execute grants and disposition of land to the Commissioner of Lands. The Commissioner has agents who plan the land into plots and thereafter select and recommend suitable candidates to the Commissioner of Lands for issuance of certificate of title. The Commissioner's agents in this regard, are the District, Municipal, and City Councils. These agents use the Town and Country Planning Act to plan the land in their areas in their capacities as planning authorities under the Act.

Customary land tenure system applies in areas under the jurisdiction of traditional authorities (chiefs/chieftainesses). The traditional system of tenure is the most prevalent among the majority Zambians who live in rural areas. Approximately 94% of the country is officially designated as customary area. It is occupied by 73 tribes, headed by 240 chiefs, 8 senior chiefs and 4 paramount chiefs (Chileshe, 2005). Usually, tenure under customary lands does not allow for exclusive rights in land. No single person can claim to own land as the whole land belongs to the community. Land is deemed as belonging to members of the community for their own use (Republic of Zambia,1995). It is a valuable heritage for the whole community. Communal lands in most of the African countries including Zambia have sprung from a concept of ancestral trust committed to the living for their own interest and for the interest of the unborn.

3.8 Livelihood Zones

A representation of Zambia's livelihoods is given by the Zambia Livelihood Map Rezoning and Baseline Profiling (2004) prepared by the Zambia Vulnerability Assessment Committee. The zones are profiled against agro-climatic peculiarities and a total of 16 are given. Livelihoods are defined as the means by which households obtain and maintain access to essential resources to ensure their immediate and long term survival. In Marxian terms, livelihoods are defined as the way society generates social values; in product and labour forms.

The Zambia Livelihood and Profiling system employs a household economy approach, organised around the concept of Disaster Risk Reduction framework. Accordingly, risk is understood as being dependent on an array of hazards and vulnerabilities that households face, underpinned by their coping strategies. Hazards are derived from information related to either natural or social and economic factors. Thus, hazards range from climatic elements, such as rainfall; floods or droughts, production and market (failure) factors; policy and institutional factors and access to information and services. Risk therefore is the combination of the information related to these factors, revealing the likelihood of gaps in food or income at household levels. Using information available from the

Central Statistical Office (CSO) on household sources of food and income for each zone, it is possible to assess vulnerability to particular events (i.e., which stresses will impact which populations and how).

Table 3.3: Population of Zambia by Livelihood Zones

Zone	Code	Zone name	Population	Percent
4A	Central	Maize-Cotton	332952	0.03
4B	Chama-Lundazi	Rice	413905	3.17
12A	Chiawa-Zambezi	Lowlands	138404	1.06
7B	Chongwe-Nyimba	Plateau	117513	0.90
2A	Copperbelt	Mining	2173983	16.66
5B	Eastern province	Cash crop	1053696	8.08
11A	Gwembe	Valley	362983	2.78
16B	Kaputa	Rice	39171	0.30
7A	Kazungula-Mwandi	Plains	257222	1.97
11B	Lake Kariba	Fishing	16974	0.13
5A	Line of rail	Commercial Farming	3137586	24.05
15C	Luangwa-Mfuwe	Valley	117513	0.90
7C	Luano	Valley	244165	1.87
15B	Luapula	Valley	322507	2.47
16A	Luapula	Northern wetlands	212828	1.63
12B	Mambwe-Petauke	Valley	154072	1.18
13	Mkushi	Commercial Farming block	90093	0.69
3B	Muchinga	Escarpment	82259	0.63
3A	Mufumbwe	Kasempa	385180	2.95
9	Mulobezi	Woodlands	23503	0.18
2B	Northern province	Plateau	1278276	9.80
1A	Northwest	High rainfall	262445	2.01
6	Sioma	Plain	488330	3.74
1B	Tuta-Luapula	Corridor	778194	5.96
10B	Zambezi	East	129264	0.99
14	Zambezi	Floodplain	91399	0.70
10A	Zambezi	West bank	342092	2.62
Total	Total population	0	13046508	100.00

Based on Zambia Livelihood Map Rezoning and Baseline Profiling (2004. Population estimates by Study team (2011)

4 INSTITUTIONAL FRAMEWORK

The new institutional framework for Water Resources Management in Zambia was formalised on 1st October, 2012 signalling the commencement date for the Water Resources Management Act, No. 21 of 2011, of the Laws of Zambia. The Water Resources Management Authority will be established. The Board of the Authority[3] will through the Director General, Secretary of the Authority, Catchment Managers and other staff ensure the WRMA is responsible for controlling the abstraction and use of all surface water and groundwater resources by considering and granting water permits. Although the WARMA shall be entitled to receiving grants from the Government, its operations including the decision making process shall be autonomous. However, the Annual Reports on the operations of the WARMA will be submitted to Parliament through the Ministry. The link of WARMA with the Ministry will be through the Department of Water Resources, which will focus on shared waters and; policy development and analysis.

The Water Resources Management Authority shall be a regulatory body with a lean structure than DWA, whose function will be to regulate the water resources development and management sub-sectors in order to foster financial and technical efficiency in the water sector. All water resources development and management activities, both public and private will be governed by regulations developed by the WARMA, which will, among others, set standards for service delivery, health, safety and technical norms. Furthermore, it will also be responsible for functions of Water Resources Management and Development in the water sector with regard to the provision of sufficient and reliable data on water resources availability and demand in the country to allow for effective utilisation and management of the water resource in accordance with the functions outlined in the Water Resources Management Act, No. 21 of 2011. The WRMA shall have directorates and sections at headquarters under the Director General; and shall establish sections. Upon the establishment of the WARMA, the Act provides for the management of water resources by establishing the six (6) catchments and the constitution of the respective catchment Councils by the Minister responsible for water. A Catchment Manager and other staff will be employed by the Authority for the day-to-day management of the catchments and sub-catchment and for the effective performance of the functions of the catchment council, sub-catchment council and water user associations. Figures 4.1, 4.2, 4.3 and 4.4 represent the proposed organisational arrangements of the new institutional setup.

[3] The Water Resources Management Act of 2011, under section 11 provides for the constitution of the Board for the WARMA, comprising 14 members. All the WARMA Board members are to be appointed by the Minister responsible for water resources, including the appointment of the Chairperson of the Board from among the members. The WARMA and the Board shall be put in place on the 1st October 2012 the commencement date for the Act. The Board is to perform the following among other things:- Policy matters; the granting, varying, cancellation and renewal of permits and licences; the establishment and issue of guidelines and standards; and making of recommendations to the Minister for the amendments to the Water Resources Management Act No. 21 of 2011 or the issue of rules or regulations under the same Act.

Figure 4.1

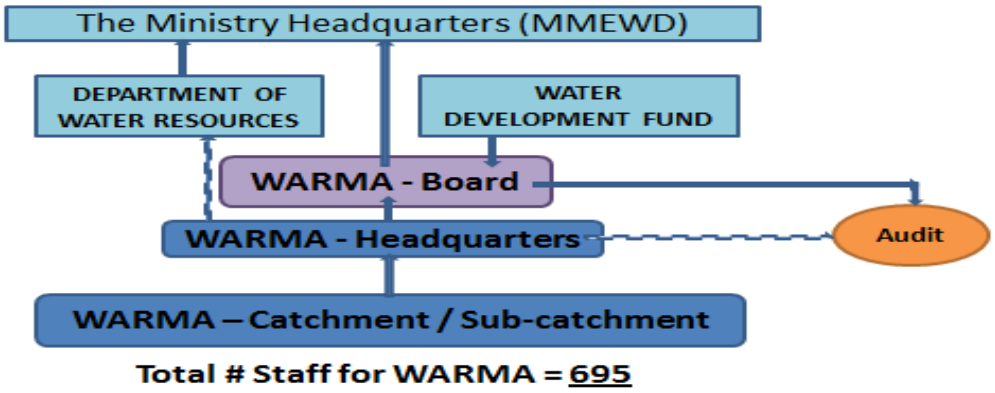


Figure 4.2

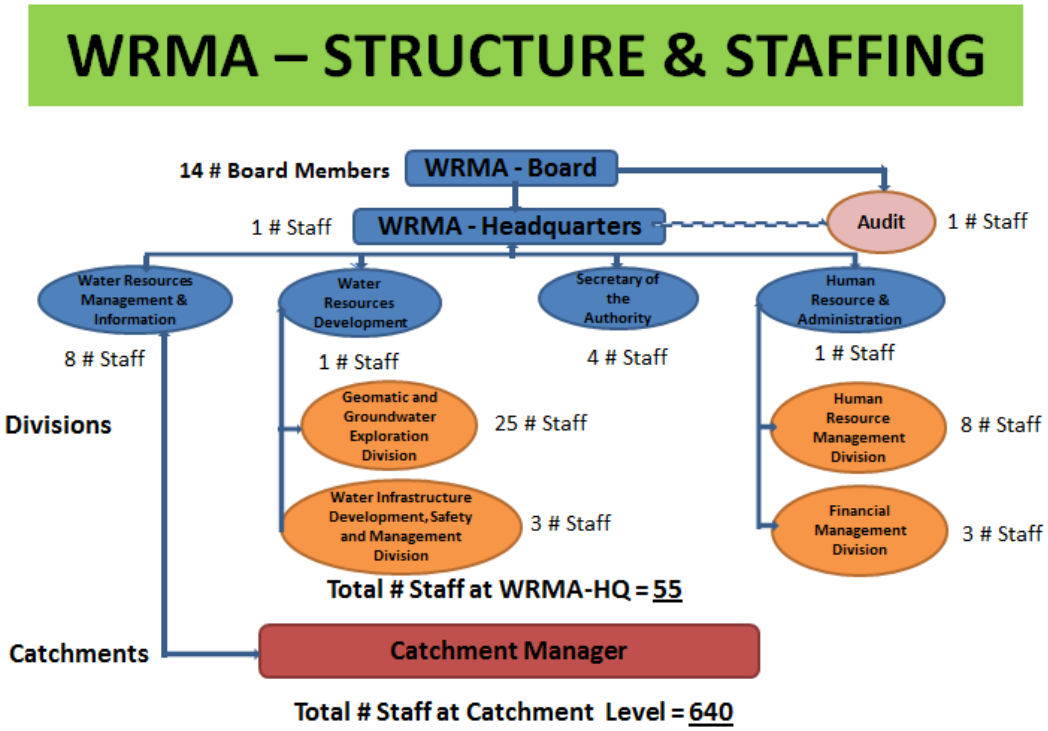


Figure 4.3

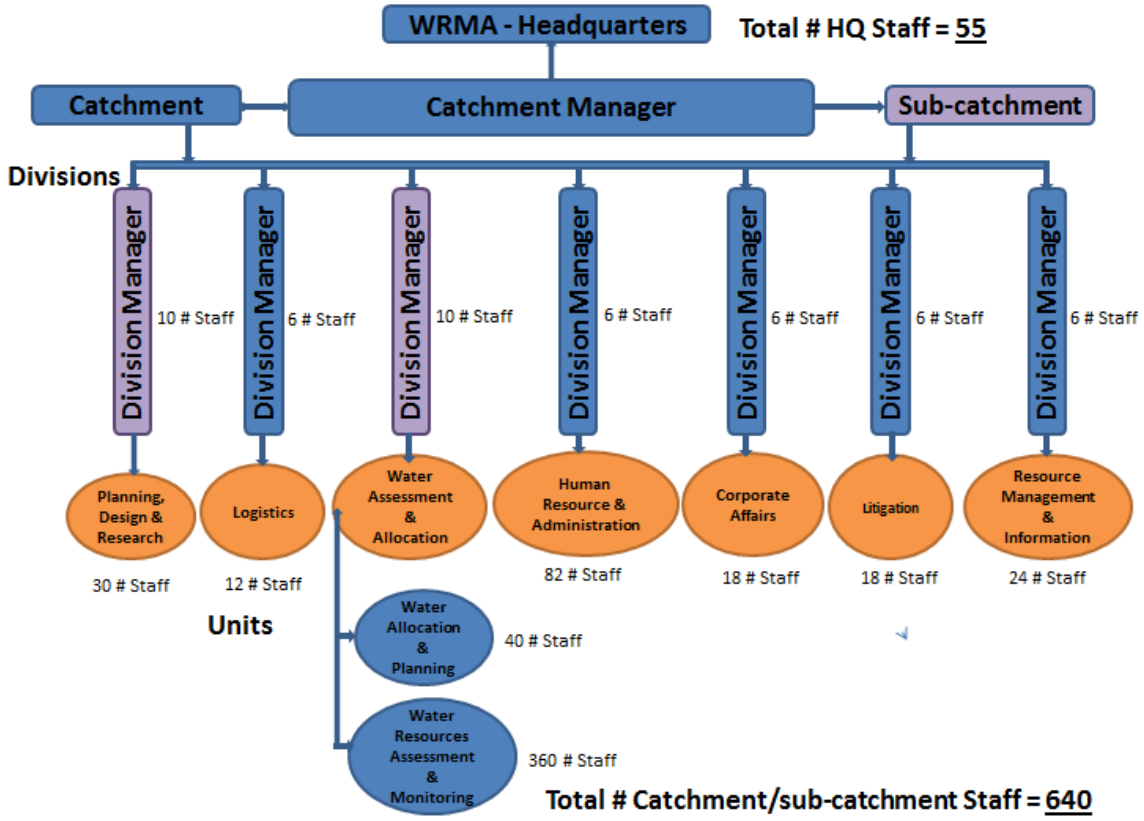
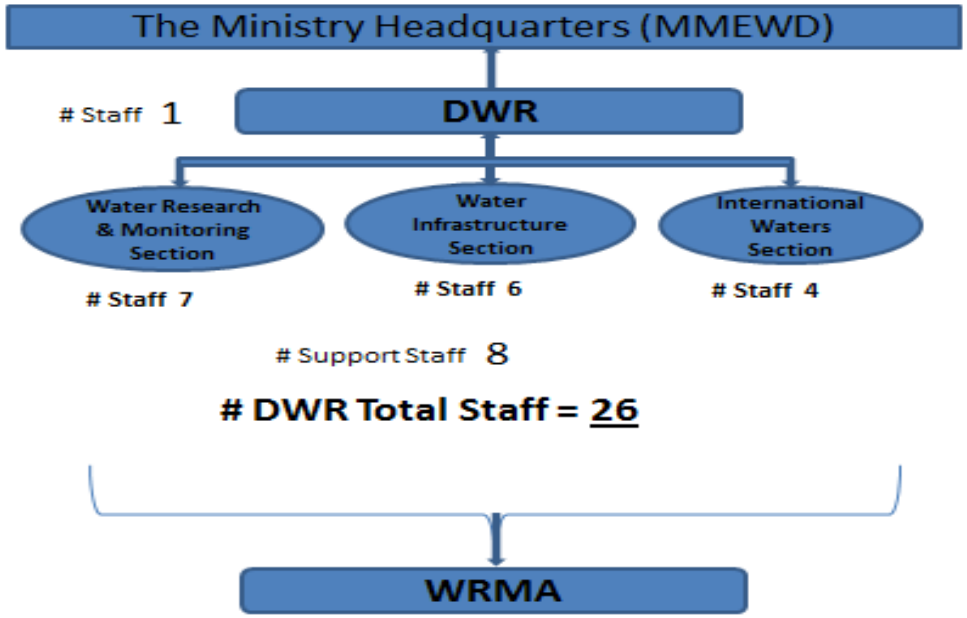


Figure 4.4



There are several institutions that have a role in water resources management. Some of these are: Local Authorities (responsible for town and country planning and service provision of domestic water supply and sanitation, community managed approach in rural and peri-urban areas); Commercial utilities (CUs) (responsible for water and sanitation provision in urban areas), National Water Supply and Sanitation Council (responsible for regulation of urban water supply and sanitation service delivery), Zambia Environmental Management Agency (responsible coordinating environmental management, E.I.A, water pollution control); Ministry of Lands (responsible for land administration and use planning); Ministry of Agriculture and Cooperatives (responsible for irrigation and land husbandry); Mine Safety Department under the Ministry of Mines (responsible for regulation of groundwater standards in mining operations); Forestry Department (responsible for protection of watersheds); Department of Maritime and Inland Waterways (responsible for management of waterways); Zambezi River Authority (responsible for the management of the Kariba Dam and the Zambezi river along the common Zambia – Zimbabwe boarder); National Heritage Commission (management and conservation of historic and scenic areas such as water falls).

5 NATIONAL LEGISLATIVE AND REGULATORY ENVIRONMENTAL REQUIREMENTS

5.1 Introduction

Environmental issues cut across a wide variety of sectors and there are a number of government institutions and agencies outside of the Zambia Environmental Management Agency (ZEMA), which are involved in aspects of environmental management. The primary pieces of legislation having a fundamental bearing on the ZWRDP are the Water Resources Act Cap 21 2011 and Environmental Management Act Cap 12 of 2011. These are described in more detail below. Other institutions/laws and their legislative responsibilities that have a bearing on the project are summarized in Annex 1- Relevant National Legislation. Depending on the nature of the subprojects designed under this Project, representatives of these institutions may provide technical assistance at District level in the preparation and implementation of subprojects and Environmental Management Plans (EMPs) where required. More substantial details addressing environmental and social management processes and concerns are further elaborated and linked to the subproject preparation and approvals process outlined later in Chapter 7 of this report.

5.2 The Water Resources Management Act

The Act Water Resources Magement Act was enacted to:

a. Establish the Water Resources Management Authority and define its functions and powers;
b. Provide for the management, development, conservation, protection and preservation of the water resource and its ecosystems;
c. Provide for the equitable, reasonable and sustainable utilisation of the water resource; ensure the right to draw or take water for domestic and non-commercial purposes, and that the poor and vulnerable members of the society have an adequate and sustainable source of water free from any charges;
d. Create an enabling environment for adaptation to climate change;
e. Provide for the constitution, functions and composition of catchment councils, sub-catchment councils and water users associations;
f. Provide for international and regional cooperation in, and equitable and sustainable utilisation of, shared water resources;
g. Provide for the domestication and implementation of the basic principles and rules of international law relating to the environment and shared water resources as specified in the treaties, conventions and agreements to which Zambia is a State Party; and
h. Repeal and replace the Water Act, 1949;

Of primary importance to this project is the new National Water Allocation Framework currently under development in the Ministry of Energy and Water development. Activities under this project will be guided by this framework once its developed and operationalised. In the meantime, the provisions and processes under the Water Act cap 198 will apply during the transition stage of transformation. Under the new law a revised approach will be adopted for the Water Allocation

system for Zambia which will involve three key levels. The first level which occurs at national level, will be the development and establishment of a national allocation plan that takes into account a) overall current water use and availability; b) International Water Allocations and any allocation required for national level priority uses such as hydropower; and c) the criteria of water allocation as per the water resources management Act. The second level will be the development of sub-catchment allocation plans, at catchment level, collated into Catchment Management Plans. Catchment categories will be established in order to align the level of allocation planning with catchment conditions. Stressed catchments will receive the greatest attention. The third level will involve actual authorization of water use as guided by established catchment categories. Three categories have been envisioned, with the first category being the one requiring the least attention. The second category will require more attention than that first with respect to the increased allocations. The third category will be the stressed category that will involve the task of reducing allocations to sustainable levels. The Ministry of Mines Energy and Water Development and the Department of Water Resources will be responsible for level one activity. The interventions at the second level and third levels will be the responsibility of Catchment Management Authorities. The Water Resources Management Act details an expanded organisational structure of Water Management allocation and authorization as illustrated in Figure 5.1. Figure 5.1 represents who will perform the various roles and functions in regard to water allocation. Figure 5.2 represents the proposed improved water allocation planning and authorization process for the new Water Resources Management Act.

Figure 5.1: Roles and responsibilities for water allocation under the new WRM Act

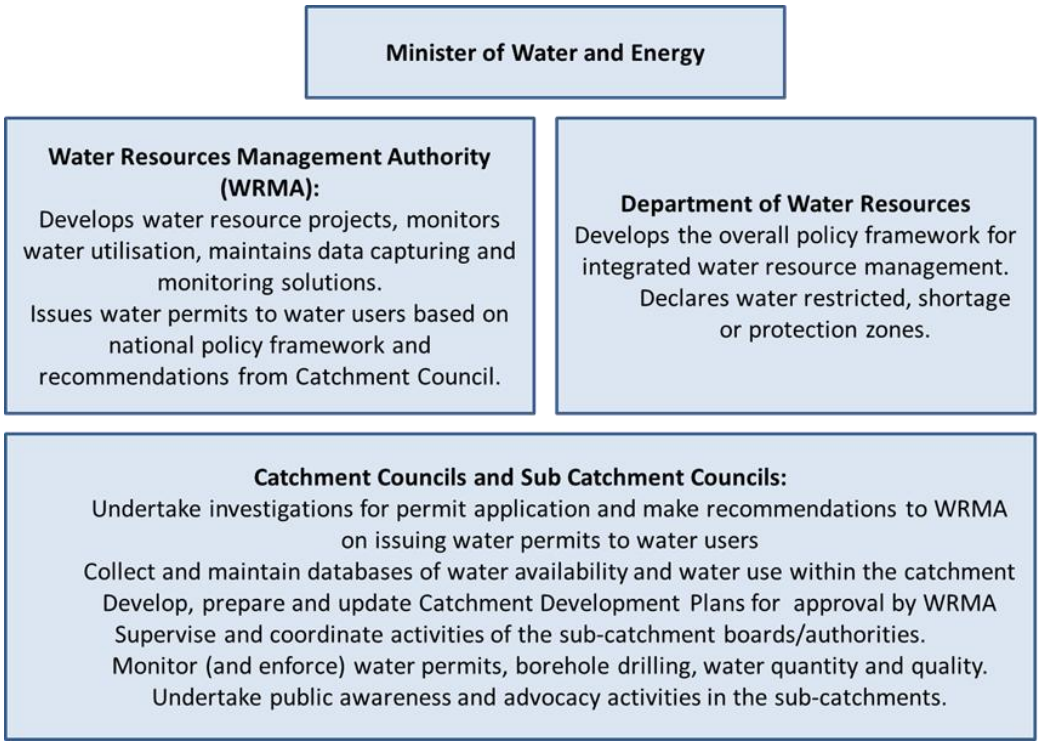
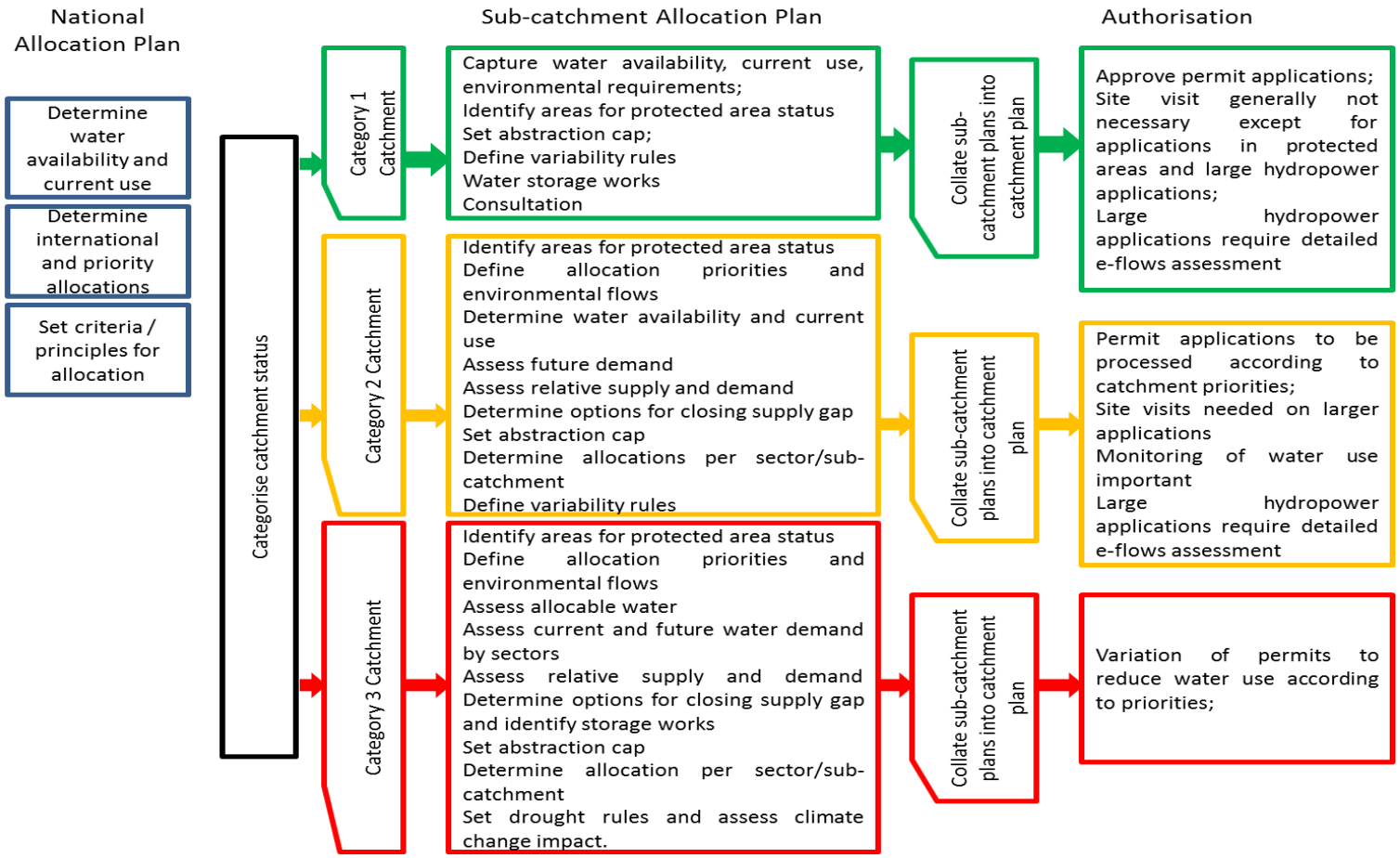


Figure 5.2: Outline of the allocation planning and authorisation process



5.3 The Zambia Environmental Management Act

The Zambia Environmental Management Act was enacted to:

a. Transform the Environmental Council of Zambia in the Environmental management agency and to redefine its actions;
b. Provide for integrated environmental management and the protection and conservation of the environment and the sustainable management and use of natural resources;
c. provide for the preparation of the State of the Environment Report, environmental management strategies and other plans for, environmental management and sustainable development;
d. Provide for the conduct of strategic environmental assessments of proposed policies, plans and programmes likely to have an impact on environmental management;
e. Provide for the prevention and control of pollution and environmental degradation;
f. Provide for public participation in environmental decision-making and access to environmental information;
g. Establish the Environment Fund; provide for environmental audit and monitoring;
h. Facilitate the implementation of international environmental agreements and conventions to which Zambia is a party;
i. Repeal and replace the Environmental Protection and Pollution Control Act, 1990;

Several environmental management procedures are outlined by the Zambia Environment Management Agency (ZEMA), and include the Environmental Project Brief (EPB), the Environmental Impact Statement (EIS) and the Environmental Impact Assessment (EIA). Before commencement of projects, projects are required to submit an EPB or EIS to ZEMA. The ZEMA details the circumstances under which each of the instruments is to be applied. These are outlined in Annex 2. Similar to the Environmental Assessment (EA) discussed under the WB's safeguards policies in Chapter 6, the EPB, EIS or EIA aim at enhancing the environmental acceptability of a proposed project by ensuring that all adverse and good benefits are catalogued. Alternative implementation options are examined in order to choose options that minimize adverse effects.

The Environmental Management Act (EMA), 2011, No. 12 of 2011, having replaced the Environmental Protection and Pollution Control Act (EPPCA) of 1990, Cap 204, of the Laws of Zambia, is the supreme environmental law in Zambia. The EMA identifies projects, plans and policies for which an EIA is necessary. Through the EIA Regulations No. 28 of 1997, the ZEMA is responsible for facilitating the EIA process and for quality control of environmental assessment statements. Under the WRDP the project managers will consult ZEMA on the review and approval of EPBs and ZEMA where appropriate may also be involved in monitoring the implementation of mitigation measures, especially for category B subprojects.

5.4 International Conventions

Zambia is a party to many international agreements, including the following that are relevant to the ZWRDP.

a. Convention Concerning the Protection of the World Cultural and Natural Heritage which is concerned with the conservation of ancient, cultural and natural heritage, relics and other objects of aesthetic, historical, pre-historical, archaeological or scientific interest.
b. Convention on Biological Diversity (CBD) which requires the country to conserve genetic, species and ecosystem diversity.
c. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) which is concerned with the regulation of trade in endangered species.
d. United Nations Convention to Combat Desertification (UNCCD) which is concerned with the conservation of the productivity of land and the control of land degradation, such as soil erosion.
e. Lusaka Agreement on Co-operative Enforcement Operations Directed at illegal Trade in Wild Fauna and Flora that is concerned with the control of illegal trade in animals and plants.
f. United Nations Framework Convention on Climate Change (UNFCCC) which is concerned with the reduction in emissions of greenhouse gases into the atmosphere.
g. Ramsar Convention which is concerned with the conservation and management of wetlands Zambia presently has 8 sites (Bangweulu Swamps, Busanga Swamps, Kafue Flats, Luangwa Flood Plains, Lukanga Swamps, Mweru wa Ntipa, Tanganyika Zambezi Floodplains designated as Wetlands of International Importance, with a surface area of 4,030,500 hectares.
h. SADC Protocol on shared Water Resources which is concerned with basin wide cooperation in the development and use of water resources derived from shared water courses and the application of principles of equitable and reasonable utilization.
i. Zambezi River Commission agreement which is concerned with cooperation in the Development and use of water in the Zambezi River Basin

6 WORLD BANK SAFEGUARD POLICIES

The World Bank operates with ten (10) environmental, social and legal safeguard policies that ensure potential environmental risks and benefits associated with Bank lending operations are taken into account. According to Operational Policy (OP) 4.01 Environmental Assessment, the World Bank classifies proposed projects into one of four categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts. These being:

Category A: if it is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. For a Category A project, the borrower is responsible for preparing a report, normally an environmental assessment (EA) or a suitably comprehensive regional or sectoral EA.

Category B: if it's potential adverse environmental impacts on human populations or environmentally important areas (including wetlands, forests, grasslands, and other natural habitats) are less adverse than those of Category A projects. These impacts are site-specific; few, if any of them are irreversible; and in most cases mitigatory measures can be readily designed.

Category C: if it is likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required for a Category C project.

Furthermore, if projects provide funds to a bank, credit institution, or other financial institution for on-lending this will be done at the Financial Intermediary's (FI's) own risk.

The safeguards policies are designed to identify, avoid, mitigate, or minimise potential adverse environmental and social impacts and enhance positive impacts that may be generated by projects supported by the Bank. The ZWRDP has to comply to World Bank Safeguard Policies since it is Bank financed. The following (Table 6.1) is a summary of the Policies that will be triggered by the ZWRDP.

Table 6.1: World Bank Safeguard Policies Triggered by the Project

Safeguard Policies	Triggered?	Explanation (Optional)
Environmental Assessment OP/BP 4.01	Yes	The policy is triggered because of potential negative environmental impacts from the rehabilitation of existing infrastructure, construction of new of small scale water infrastructure, such as irrigation canals, boreholes, water points, irrigation equipment, hydrological or meteorological monitoring stations, weirs, small fish farms, and unpaved tertiary access roads or footpaths. Such impacts would include: (i) Vegetation clearing; (ii) Health and safety risks for workers;(iii) Air pollution from dust during excavations; (iv) Noise from heavy machinery; (v) Pollution from waste water and solid waste from construction site and materials; (vi) Reduced downstream water flow; (vii) Soil erosion; (viii) Sedimentation of reservoir and loss of storage capacity. The project has been classified environmental assessment (EA) Category B and an Environmental and Social Management Framework (ESMF) has been prepared to establish clear procedures and methodologies for environmental and social assessment, review, approval and implementation of investments to be financed under the WRDP. These documents have been submitted to the Infoshop for disclosure, disclosed in Zambia through the MMEWD website and incorporate feedback from civil society resulting from the consultations to date. During the course of project implementation as specific investment sites are identified, site-specific environmental and social impact assessments (ESIAs) will be prepared for each investment based on the outcome of the initial identification and screening process required in the ESMF and detailed management plans will be developed as necessary.
Natural Habitats OP/BP 4.04	No	This Policy is not triggered because all investments will be screened and this ESMF includes a negative list precluding infrastructure investments in designated protected areas and those affecting critical natural habitats.
Forests OP/BP 4.36	No	All investments financed under the project would be carefully screened in accordance with the procedures included in the environmental and social management framework to avoid adverse impacts on primary forests. Small scale investments to combat environmental degradation, reduce soil

Safeguard Policies	Triggered?	Explanation (Optional)
		erosion and sedimentation to enhance the quality of natural forests will be supported and promoted to enhance the positive environmental benefits of the project.
Pest Management OP 4.09	Yes	The project will not procure any pesticides or agro-chemicals. However it is possible that the Government and/or communities might use pesticides within their existing production systems. To ensure compliance with the policy, the project will promote use of integrated pest management approaches and the safe use, storage, and disposal of agro-chemicals as appropriate. A Pest Management Plan (PMP) has been prepared for the project to meet the requirements of the policy.
Physical Cultural Resources OP/BP 4.11	Yes	Provisions have been included in the environmental and social management framework to ensure the requirements of the Policy are met and that chance find procedures are adhered to in the event that archaeological relics, fossils, or other physical cultural resources are discovered during any construction.
Indigenous Peoples OP/BP 4.10	No	No Indigenous Peoples are associated with project area or activities.
Involuntary Resettlement OP/BP 4.12	Yes	Land acquisition may be required to implement some of the small scale water resources infrastructure. The Project's Resettlement Policy Framework provides the provisions and guidance to address any involuntary resettlement, land acquisition, loss of assets or access to assets.
Safety of Dams OP/BP 4.37	Yes	The project will not finance construction of large dams (dams over 10 meters). Small water resources infrastructure financed to increase income generating activities for local beneficiaries will be subject to the application of generic dam safety measures contained in existing operational procedures.
Projects on International Waterways OP/BP 7.50	Yes	Notification has been made to all riparian States (January 07, 2013) and will be updated to inform on specific investments in accordance with the Bank's OP and the Revised SADC Protocol on Shared Watercourses.
Projects in Disputed Areas OP/BP 7.60	No	There will be no investments or project activities in disputed areas.

Implementation of the ZRWDP triggers OP 4.12 on Involuntary Resettlement because some of the land will be inundated by reservoirs or otherwise acquired for construction of small infrastructure works. The affected persons will need to be compensated for loss of land, housing or homes, loss of livelihood or revenues from business, etc. The Resettlement Policy Framework outlines the core considerations that the government will implement in the event that resettlement occurs.

The Resettlement Policy Framework (RPF) has been prepared as a separate document by the Ministry of Mines, Energy and Water Development. The RPF will be used by the ZWRDP to ensure that core considerations of OP 4.12 are addressed adequately.

Note that the PMP is also separate document – this was also in the previous comments.

7 ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN

7.1 Environmental and Social Impact Identification and Mitigation

During the implementation of the ZWRDP, different types of sub-projects will be prepared and delivered for communities in various Provinces throughout the country. These sub-projects will have different types of negative environmental and social impacts associated with them. In this regard, the environmental and social issues have been identified and the proposed mitigation measures are presented below in Table 7.1.

Table 7.1: Identified Environmental and Social Impacts and Associated Mitigation Measures

Phase	Issue/Impact	Mitigating Measure	Responsibility
Small Dams and Reservoirs			
Design	• Loss of land due to inundation from reservoir	• Resettlement of people and compensation • Relocation of access roads • Siting of dam so as to avoid/ minimize losses	Water Resources Management Authority, Water User committees and Catchment Councils
	• Loss of natural areas, important habitats (biodiversity)	• Avoid Protected natural areas and areas with critical habitats or with significant biodiversity (e.g. wetlands)	Water Resources Management Authority, Water User Committees, Catchment Councils
Construction	• Vegetation clearing	• Careful location of quarries and borrow pits	Dam Contractors, Water Resources Management Authority
	• Damage valuable historic, religious, cultural, and archaeological resources	Avoid areas of cultural, historical, or religious significance • Apply chance find procedures in construction clauses	Road Development Agency, ZEMA, Traditional Authorities, NHCC
	• Health and safety risks for workers (e.g. Increases in HIV and accidents)	• Education of construction workers and local people	Dam Contractor, Local level NGOs, District Health Officers
	• Excavation of borrow pits	• Monitor excavation and enforce relevant Zambian regulations	Water Resources Management Authority, Water User Committees, Contractors

Phase	Issue/Impact	Mitigating Measure	Responsibility
	• Air pollution from dust during excavations	• Spray water on excavation areas	Dam Contractor
	• Noise form heavy machinery	• Ensure machinery is well maintained including the silencers	Dam Contractor, Water Resources Management Authority
	• Pollution from waste water and solid waste from construction site and materials	• Careful location of disposal sites and control waste water discharge	WRMA
	• Deterioration of water quality in reservoir	• Clearance of woody vegetation from reservoir area prior to flooding	Catchment councils and Water User Committees
Operation	• Reduce downstream water flow	• Management of environmental flows	• WRMA, • Water User Committee
	• Increases in water-related diseases such as malaria, *schistosomiasis* (bilharzia)	• Take corrective measures such education, provision of health services and vector control as needed	• Local Authority, • Ministry of Health, • NGOs
	• Sedimentation of reservoir and loss of storage capacity	• Control of land use in catchment by good forest, land, water management and soil conservation	• WRMA, • Ministry of Agriculture, • Forestry Department, • Local Authorities, • Traditional Authorities, • NGOs
	• Conflicts in water use	• Management of dam with involvement of local community members and undertaking equitable allocation of water	• WRMA, • Ministry of Agriculture, • Water User Committee, • Traditional

Phase	Issue/Impact	Mitigating Measure	Responsibility
			Authorities,
Decommissioning	Degraded water quality due to release of toxins and high sediment load which would damage sensitive downstream habitat and poses significant health risks.	• Thorough sediment analysis and prior assessment of the foreseeable effects of releasing sediment • Gradual, incremental drawdowns to transport sediment	WRMA, ZEMA, Local Authority
	Flooding of downstream areas	Timed and gradual draw down of reservoir	WRMA, ZEMA, Local Authority
	Pollution from debris /waste from dam structures	• Disposal of debris /waste materials to scrape yards and authorised waste dumps	WRMA, ZEMA, Local Authority
Small scale irrigation			
Design	Loss of vegetative cover and decrease in soil fertility	Avoid siting irrigation areas on protected areas, critical habitats or areas with significant biodiversity (e.g. wetlands)	Ministry of Agriculture, Catchment Council, Water Committee
	Erosion	• Design and layout of furrows and fields appropriately • Avoid unsuitable gradients	Ministry of Agriculture, Contractor, Consulting Engineers, WRMA
	Upsetting existing social and economic community management relationships, land tenure systems, security of livelihoods, and gender division labour	Avoid sites that require: • Resettlement • Displacement of other important land uses • Encroachment on historical, cultural, or traditional use areas	WRMA , Water User Committee, Local Authority
Construction	• Vegetation clearing	• Careful location of quarries and borrow pits	Contractor, Local Authority

Phase	Issue/Impact	Mitigating Measure	Responsibility
	• Health and safety risks for workers (e.g. Increases in HIV and accidents)	• Education of construction workers and local people	Local Authority, Ministry of Health, NGOs
	• Air pollution from dust during excavations	• Spray water on excavation areas	Contactor
	• Noise form heavy machinery	• Ensure machinery is well maintained including the silencers	Contactor
	• Pollution from waste water and solid waste from construction site and materials	• Careful location of disposal sites and control waste water discharge	Contractor, Local Authority, ZEMA, WRMA
Operation	Fertilizer runoff leading to degradation of aquatic environments in nearby ponds, streams and other water bodies	• Use manure to help fertilize crops and build soil quality • Do not apply agro-chemicals too close to streams, ponds and drinking water sources • Do no wash fertilizer bags in streams or ponds	Ministry of Agriculture, Catchment Council, Water Committee
	Conflicting demands on water supplies	• Ensure effective community organization for equitable distribution of water	Catchment Council, Water Committee
	Waterlogging	• Apply water efficiently. Consider drip or dawn/evening sprinkler irrigation. • Install and maintain adequate surface and subsurface drainage • Use lined canals or pipes to prevent seepage	Ministry of Agriculture, Water Committee
	Salinization	• Avoid waterlogging (above) • Mulch exposed soil surfaces to reduce evaporation • Flush irrigated land	Ministry of Agriculture, Water Committee

Phase	Issue/Impact	Mitigating Measure	Responsibility
		regularly • Cultivate crops having high tolerance to salinity	
	Health effects and water pollution from improper storage, handling, use or disposal of agro-chemicals (pesticides and herbicides)	• Provide education and training for farmers and other community members on: - Irrigation health risks, - Efficient use of irrigation water, - Maintenance of irrigation and drainage works, - Proper storage, handling, use and disposal of agro-chemicals, - Integrated pest management	Ministry of Agriculture, Water Committee, NRDC, NGOs
Decommissioning	Pollution from debris /waste from dam structures	• Disposal of debris /waste materials to scrape yards and authorised waste dumps	WRMA, ZEMA, Local Authority
	Erosion from bare land	• Planting of trees	• WRMA, • Ministry of Agriculture, • Forestry Department, • Local Authorities, • Traditional Authorities, • NGOs
Hydrological and Meteorological Monitoring equipment			
Design	• Loss of land for installation of equipment (from 1sq meter to 5 sq meter)	• To the extent possible, avoidance of human settlement or farmland. • Compensation associated with losses incurred due to installation of monitoring equipment.	Water Resources Management Authority, Water User committees and Catchment Councils

Phase	Issue/Impact	Mitigating Measure	Responsibility
	• Loss of land for any path or access road (with gravel top) needed for installation of equipment	• See provisions for access roads.	Water Resources Management Authority, Water User Committees, Catchment Councils
Rural access roads: Works will mainly be on rehabilitating existing gravel roads within the existing Right of Way (ROW).			
Design	Negative social and economic effects on local people and communities, such as: • Unplanned commercial development • Demand for local public infrastructure and services increases beyond existing capacities • Disruption of traditional lifestyles Induced population movements and natural resource exploitation activities, due to improved access (e.g. conversion of forest to pasture, or of sustainable land use to unsustainable, short-cycle cropping; illegal or unsustainable hunting)	• Work with affected communities to anticipate and plan for enhanced access to and demand on local public infrastructure and services • Provide project funds to strengthen local public infrastructure and services (e.g. health clinics, markets, schools) Avoid creating congested and unsafe road conditions at intersections, and in villages and towns	Local government/ Road Development Agency
	Displacement of housing or farms or involuntary resettlement	• Purchase of replacement land and resettlement of affected people Monetary compensation	Road Development Agency / Provincial Resettlement Department

Phase	Issue/Impact	Mitigating Measure	Responsibility
	Loss of natural areas, important habitats, biodiversity	Avoid infringing on: • Critical habitats or areas with significant biodiversity (e.g. wetlands) Protected natural sites and wilderness areas	Road Development Agency, ZEMA, ZAWA
	Increased soil erosion leading to sediment in runoff and, possibly, gully formation from: • Construction activities such as grading, excavations, and borrowing/quarrying Inadequate design of culverts and drainage controls	• Design: ○ Use surface drainage controls and mulch on vulnerable surfaces and slopes ○ Line receiving surfaces with stones or concrete ○ Locate and design borrow/quarry sites for erosion control during road construction and future maintenance operations ○ Identify the most environmentally sound source of materials within budget	Road Development Agency
Construction	Social disruption during construction (e.g. enhanced transmission of STDs and TB)	• Comprehensive community participation in construction planning and management • Education on avoiding communicable diseases/hygiene • Use regional labour where possible	Road Development Agency / Ministry of Health

Phase	Issue/Impact	Mitigating Measure	Responsibility
	Creation of stagnant water in construction borrow pits and quarries, and on road sides, that breed disease carriers	Assess ecology of disease carriers in road corridor, and employ suitable mitigation measures (e.g. proper drainage of construction areas and road sides, effective road maintenance)	Local government/ Road Development Agency
	Impact of road noise on settlements	Plant 30 meter tree buffer strips between road and settlements	Road Development Agency, Local Authority
	Dust	• Stabilize the road surface with gravel and other rocky surfacing materials and spray with water	Road Development Agency
Operation	Contaminate surface water and generate waste due to lack of solid waste management	• Provide temporary sanitation (e.g. latrines) and provide a disposal site for solid waste • Collect all solid waste from all site areas and dispose of either in local landfill or well-screened waste pits	Road Development Agency, Local Government
	Increased soil erosion leading to sediment in runoff and, possibly, gully formation from • Construction activities such as grading, excavations, and borrowing/quarrying • Inadequate design of culverts and drainage controls	• Limit earth movement and soil exposure to the dry season • Balance cut and fill for minimum deposition of earth • Provide sedimentation basins • Resurface and re-vegetate exposed surfaces	Road Development Agency

Phase	Issue/Impact	Mitigating Measure	Responsibility
	Landslides, slumps and slips	• Stabilize slopes by planting vegetation • Install drainage ditches to divert water away from road	Road Development Agency, Local Authority
	Accidents and safety risks	Provide basic speed humps and employ traffic signs where possible	Road Development Agency, Local Authority
	Increased soil erosion leading to sediment in runoff and, possibly, gully formation from inadequate maintenance of road surface, ditches, borrow/quarry sites, and drainage and erosion control measures	• Ensure proper and timely maintenance of erosion control and drainage measures along the road and at borrow/quarry sites • Clean out culverts and side channels/runout when they begin to fill with sediment • Fill mud holes and pot holes with quality gravel • Use water from settling basins and retention ponds for road maintenance	Road Development Agency, Local Authority
	Quarry used for construction may become a health hazard	• Discuss with local community the usefulness of using pits as water collection pits for cattle, irrigation • Highlight issues of disease transmission and the need to prohibit its use for drinking, bathing, and clothes washing	Road Development Agency, Local Authority

Phase	Issue/Impact	Mitigating Measure	Responsibility
	Impact of road noise on settlements	Plant 30 meter tree buffer strips between road and village	Road Development Agency, Local Authority
Decommissioning			
Small scale fish farming			
Design	• Land use conflicts	• Avoid project sites that require: – Resettlement – Displacement of other important land uses (e.g seasonal grazing), – Encroachment on historical, cultural, or traditional use areas • Encourage use of existing depressions, hollows and ditches • Limit areas converted to ponds	
	• Water supply conflicts: – Social and economic disruptions to existing community water management practices and relationships – Conflicting demands on surface or groundwater supplies	• Good pond design, construction and maintenance to avoid premature abandonment and digging of new ponds • Ensure adequate community participation in the planning and operation of the project • Site ponds to avoid disrupting existing/traditional uses of water (e.g. drinking, washing, animal watering)	

Phase	Issue/Impact	Mitigating Measure	Responsibility
		• Develop ponds with other activities to combine water uses (e.g. pond water used for irrigation of crops) • Develop supply sources: – Where water quantities are adequate and the project will not conflict with existing human, livestock, wildlife or aquatic water uses, especially during dry seasons So that withdrawals do not exceed "safe yield" from groundwater resources	
	• Loss of wetlands	• Site project well away from wetlands • Design project features to prevent disturbing water flows to and from wetlands (e.g. flow regulating works, access road crossings on trestles or pilings)	
Construction	• Loss of ground cover and erosion at project site	• Restrict area cleared for ponds • Construct ponds during dry season • Stabilize exposed soil with grasses and other ground cover • Ensure good drainage and erosion control around ponds	
	Increased soil erosion leading to sediment in runoff and, possibly, gully formation from • Construction	• Limit earth movement and soil exposure to the dry season • Balance cut and fill	

Phase	Issue/Impact	Mitigating Measure	Responsibility
	activities such as grading, excavations, and borrowing/quarrying	for minimum deposition of earth • Provide sedimentation basins • Resurface and re-vegetate exposed surfaces	
Operation	Depletion of local fuel wood to dry fish	• Promote community management of woodlots/ local forests to ensure sustainable source of fuel wood	
	• Pollution of surface waters with aquaculture wastes	• Keep fish densities at moderate levels to reduce disease risk and need for antibiotics • Pump air through the water to speed up decomposition • Release pond water into water body with adequate dilution and dispersal capability • Dilute pond water prior to release • Time releases with period of high water levels or flows • Use shorter retention time of water in ponds – i.e. more frequent exchange and flushing of pond water • Consider using pond bottom sludge as agricultural fertilizer if properly decomposed and non-toxic	
	Loss of wetlands	• Enhance or protect other nearby wetlands to offset losses at project site	

Phase	Issue/Impact	Mitigating Measure	Responsibility
	Accidental or deliberate release of aquaculture stock (esp. exotic sp.) leads to decline in wild species important for local food supply or restocking and improvement of domestic stock	• Use local, wild species rather than introduced species as seed stock • Ensure aquaculture stock is kept healthy	
Decommissioning	Degraded water quality due to release of poor water quality and high sediment load which would damage sensitive downstream habitat and poses significant health risks.	• Thorough water and sediment analysis and prior assessment of the foreseeable effects of releasing the water/sediment • Gradual, incremental drainage of ponds • Drying of sediment and use as manure	Ministry of Agriculture, Local Authority
	Erosion from bare land	Burying the ponds and planting of appropriate vegetation cover	• Ministry of Agriculture, • Forestry Department, • Local Authorities, • Traditional Authorities, • NGOs

7.2 Environmental and Social Monitoring Plan (ESMP)

Implementation of environmental and social mitigation measures will be guided by the guidelines provided in this monitoring plan. The objectives of these guidelines are to:

(a) Alert the project developer and controlling authorities through the provision of timely information about the success or otherwise of the subproject implementation process as outlined in the ESMP. This monitoring will ensure full compliance in the implementation of the sub-projects;

(b) Determine whether the mitigation measures designed for the subprojects have been successfully implemented; and

(c) Ensure that the operation and maintenance activities are being carried out in a manner that protects the environmental and social conditions, as well as the health and social wellbeing of the workers and the general public.

Table 7.2 Environmental and Social Monitoring Plan for ZWRDP subprojects

Phase	What parameter is to be monitored?	Where is the parameter to be monitored?	How is parameter to be monitored/ type of monitoring equipment?	When is parameter to be monitored/ frequency of measurement or continuous?	Responsibility
Small Dams and Reservoirs					
Construction	Area of vegetation cleared	Reservoir area and downstream environs	Survey area where vegetation is cleared due to construction	Before commencement of construction and after	Contractor, WRMA, Forest Dept.
	Findings of valuable historic, religious, cultural, and archaeological resources and traditional graves; preparation of chance finds management plan for each site	Reservoir area and downstream environs	Monitoring each site for physical cultural resources chance finds and recording each case, and monitoring compliance with the chance find management plan.	For each sub-project/site, during the construction phase – for chance finds	Contractor, WRMA, NHCC
	Number of illnesses, accidents and injuries	Construction site	Record of cases reported and treated	Daily	Contractor, Ministry of Health
	Air quality	Construction site and Settlements close to construction	Number of times working areas are watered	During use of heavy machinery, monthly	Contractor,WRMA

		site			
	Noise levels	Construction site and Settlements close to construction site	Use of a noise measuring meter	During use of heavy machinery, monthly	Contractor,WRMA
	Water Quality (including ph, conductivity, DO, temperature, FC, sediment load, and nitrates)	Upstream and downstream of construction site and reservoir area	Water quality sampling using field kits, portable meters, or other necessary methods	Baseline before construction, monthly, after construction, and after the reservoir has filled	WRMA, ZEMA
Operation	Stream flow (River discharge)	Upstream and downstream of dam	Water Levels using gauge plates and Discharge measurements using current meter	Water levels daily and Discharge measurements	Water User Committee, District Water Officer
	Incidences of diseases such as malaria, schistosomiasis (bilharzia)	Catchment area	Record of cases reported and treated	Quarterly	Ministry of Health,WRMA
	Storage capacity of reservoir	Reservoir	Bathometric Survey	5 year interval	District Water Officer
	Complaints against water use	Catchment area	Complaints received	Monthly	Water User Committees, District Water Officer
Decommission	Water Quality (including ph, conductivity, DO, temperature, FC, sediment load, and nitrates)	Down stream	Water quality sampling using field kits, portable meters, or other necessary methods	When water is released from dam	WRMA, ZEMA

	Amount of debris /waste from dam structures	Dam site	Amount of debris /waste cleared and taken to dump sites/ scrap yards	After demolition of dam structures	Contractor,WRMA

Small scale irrigation					
Construction	Area of vegetation cleared	where irrigation schemes are sited	Survey area where vegetation is cleared due to construction for the purpose of securing natural habitats to avoid degradation of natural habitats and ensure compliance with the policy(OP 4.04)	Before commencement of construction and after	Contractor
	Number of illnesses, accidents and injuries	Construction site	Record of cases reported and treated	Daily	Ministry of Health, WRMA
	Water Quality (ph, conductivity, DO, temperature, FC)	Upstream and downstream of construction site	Water quality sampling using field kits, portable meters, or other necessary methods	Before construction, monthly, and after construction	WRMA, ZEMA
Operation	Fertilizer usage on the irrigation schemes	At irrigation schemes	Number of farmers trained in sustainable farming practices and water quality measures as per below.	Yearly	Ministry of Agriculture and Livestock, Conservation Farming Unit, WRMA
	Complaints against water use	Catchment area	Complaints received	Monthly	Water User Committees, District Water Officer

	Ground water levels	At irrigation schemes and environs	Water level readings from tube wells	Monthly	Water User Committees, WRMA
	Soil Salinity	Irrigated lands	Field probes to measure Soil Salinity by measurements of Electrical Conductivity	Yearly	Ministry of Agriculture and Livestock, WRMA
	Water Quality (including ph, conductivity, DO, temperature, FC, sediment load, and nitrates)	Drainage canals, downstream of Irrigation scheme	Water quality sampling using field kits, portable meters, or other necessary methods	Monthly	WRMA, Water User Committee, ZEMA
Decommission	Amount of debris /waste from irrigation scheme structures	Irrigation scheme site	Amount of debris /waste cleared and taken to dump sites/ scrap yards	After demolition of Irrigation scheme structures	Contractor,WRMA
	Area with Vegetation cover	Irrigated lands	Area planted with fodder species	Yearly	WRMA, Water User Committee, Forestry Dept.

Rural access roads					
Construction	Number of illnesses, accidents and injuries	Construction site environs and road route	Record of cases reported and treated	Monthly	Ministry of Health, WRMA
	Noise levels	Construction site and Settlements close to construction site	Use of a noise measuring meter	During use of heavy machinery, monthly	Contractor, Local Authority, WRMA
	Air quality	Construction site and Settlements close to construction site	Daily recording of ambient air quality	During use of heavy machinery, weekly	Contractor, Local Authority, WRMA

	Approved waste disposal sites	Construction site environs and along road route	Number of appropriate waste disposal facilities	Every six months	Contractor, Local Authority
	Water Quality (including ph, conductivity, DO, temperature, FC, sediment load, and nitrates)	Rivers crossing/ around the roads	Water quality sampling using field kits, portable meters, or other necessary methods	Monthly	WRMA, ZEMA
Operation	Number of Landslides, slumps and slips occurring	Along the road route	Recorded incidents	Continuously	Road Development Agency, Local Authority
	Number of illnesses, accidents and injuries	Along the road route	Record of cases reported and treated	Monthly	Ministry of Health. Police, Local Authority
	Water Quality (including ph, conductivity, DO, temperature, FC, sediment load, and nitrates)	Rivers crossing/ around the roads	Water quality sampling using field kits, portable meters, or other necessary methods	Monthly	WRMA, ZEMA
	Number of Quarries developed	Construction site environs and road route	Recorded beneficial use of abandoned quarries	Yearly	Road Development Agency, Local Authority, WRMA
	Level of road noise on settlements	Along the road route	Number of buffer trees planted	Yearly	Road Development Agency, Local Authority, ZEMA
Decommission	Amount of galleys formed	Along the road route	Side drains in place	Yearly	Road Development Agency, Local Authority, WRMA
Small scale fish farming					

Construction	Area planted with fodder species around cleared areas	Area where fish ponds are sited	Survey area where vegetation was cleared due to construction	Yearly	Water Uses Committee, Local Authority, WRMA
	Water Quality (including ph, conductivity, DO, temperature, FC, sediment load, and nitrates)	Rivers crossing/ around the roads	Water quality sampling using field kits, portable meters, or other necessary methods	Monthly	WRMA, ZEMA
Operation	Area of community woodlots	Community settlements/ farms	Survey area of Area of community woodlots	Yearly	Water Uses Committee, Local Authority, Department of Forestry, WRMA
	Water quality (Sediment load, DO, temp, PH)	Discharge from ponds and downstream	Water quality sampling using field kits and portable meters	Monthly	WRMA, ZEMA
	Loss of wetlands				
	Number of farmers trained to stock local species	Fish pond sites	Reports of training sessions held	Yearly	Ministry of Agriculture
Decommission	Water Quality (including ph, conductivity, DO, temperature, FC, sediment load, and nitrates)	Down stream	Water quality sampling using field kits, portable meters, or other necessary methods	When water is drained from ponds	WRMA, ZEMA
	Area with Vegetation cover	Sites with ponds	Area planted with fodder species	Yearly	WRMA, Water User Committee, Forestry Dept.

7.3 Monitoring Indicators

Monitoring indicators are a very important part of the monitoring plan. The indicators should be:

(i) Specific to avoid ambiguity of items being measured;
(ii) Measurable to facilitate quantification; and
(iii) Quantifiable to be easily translated into units of measurement and to facilitate verification.

Indicators should be related to issues raised in the subproject preparation and approval process outlined above and can be measured in units of, for example, time (duration), frequency (how often), area or volume (size of land cleared), length (length of stream affected. In some cases indicators may be qualitative. For example, when comparing the state of the environment before and after subproject using the following:

(a) state of natural resources (worse or same or better;
(b) state of grazing (less or same or more)
(c) state of wildlife (fewer or same or more abundant)
(d) state of stream water (bad or same or better)

Some of the main socioeconomic indicators, by which to evaluate the successful implementation of the EMPs are:

(a) Affected individuals, households, and communities able to maintain their pre-subproject standard of living, and even improve on it; and
(b) Number of farmers and community groups that have remained supportive of the subproject.

In order to be able to assess the effectiveness of the proposed mitigation measures for the impacts that will arise from the potential ZWRDP sub-projects, the following will be used as indicators for monitoring the programmes implementation:

- Number of small dams rehabilitated/ constructed.
- Area of land brought under irrigation.
- Amount of fish harvested
- Quality of water in the catchment.
- Number of people trained in sustainable land and water management practices
- Number of employment opportunities created for locals

8 SUBPROJECT PREPARATION, SCREENING, APPROVAL, AND IMPLEMENTATION

8.1 Subproject Preparation and Approval

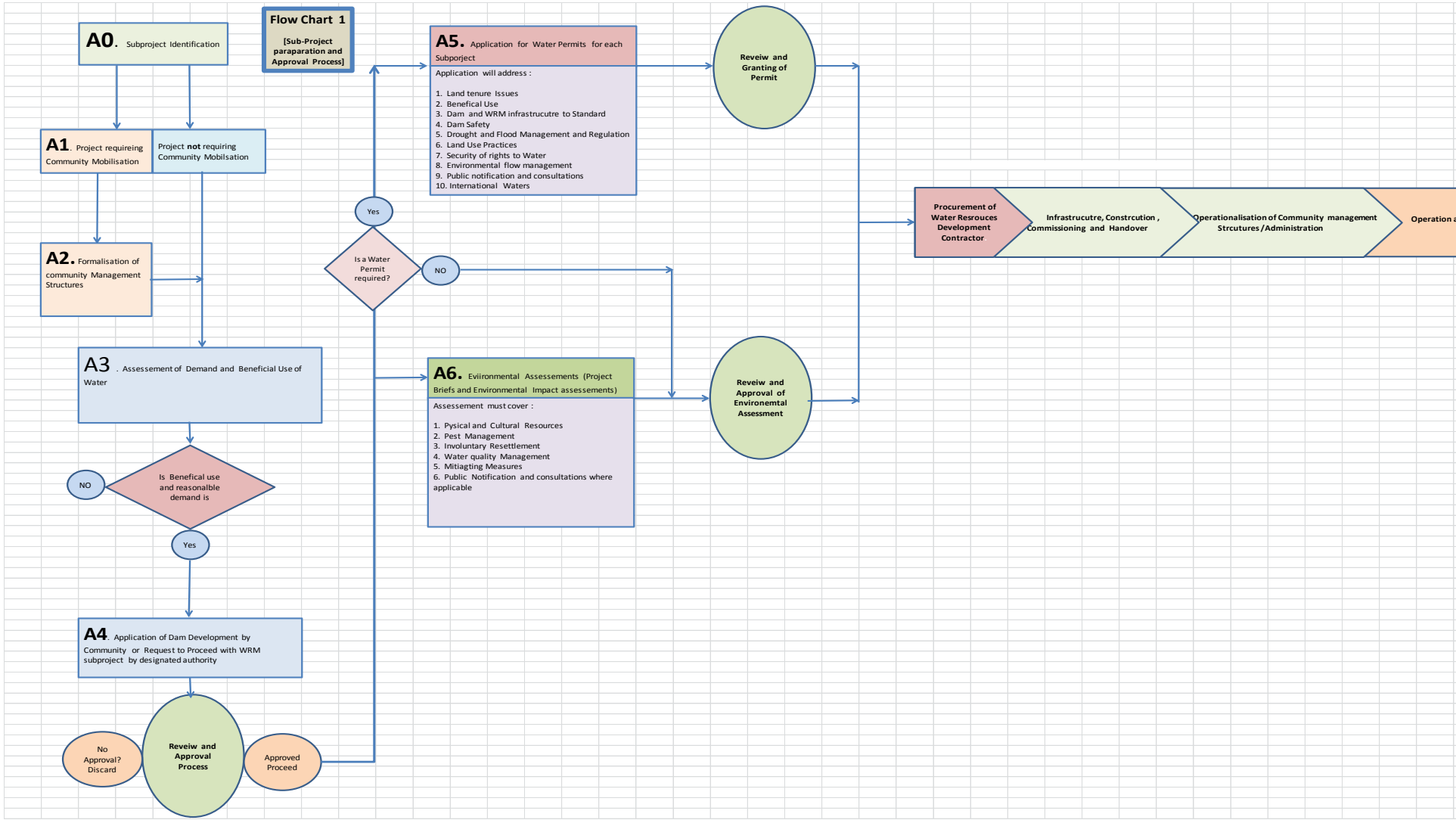
The preparation of sub-projects under the ZWRDP will be participatory and shall be facilitated by the Provincial/ sub-catchment Centre Technical Teams, outreach and district extension staff, and/or subcontracted external facilitators. Technical guidance and input into preparation of subproject proposals is crucial to ensure that all environmental and social concerns are thoroughly considered from the start of the identification and planning process.

The following is an outline of the process that will be undertaken to oversee the subproject identification, preparation, screening, approval and implementation process for the small water resources infrastructure development process as well as other sub-projects. It provides a simple outline of the key steps and considerations that need to be undertaken to facilitate the development of the subprojects. The simple steps and considerations are further outlined in flowchart (Chart 1) in order to address ESMF requirements. As mentioned earlier the ZWRDP will be guided by two primary laws of Zambia and World Bank safeguard policies in order to address environmental and social management considerations under the project. That is, the prevailing law governing Water Resources Management, the law governing Environmental Management and the triggered safeguard policies. The ZWRDP has been screened and assigned to WB Category B.

Under the Zambia's Environmental Management Act (EMA) the subprojects will require screening and scoping to determine whether they require the preparation of an Environmental Project Brief (EPB) or an Environmental Impact Statement (EIS). In addition, each subproject will require a water allocation permit that will be determined under the Water Act Cap 198 or the Water Resources Management Act which ever law is prevailing at the time of the application for the permit. For the small dams sub-project, the water permit will need to be accompanied by Dam Designs approved under the Act. The Design and construction of dams will be based on the Dam Design and Construction Manual developed by the FAO. The legal requirements contained in the body of the two primary laws address relevant environmental and social considerations to some extent. These are further complimented by the Banks' safeguard policies within sub project and planning processes.

The relationship between the steps and considerations are presented in a flowchart (Chart 1). The steps are outlined below.

Chart 1: Flowchart for subproject identification, preparation, approval and implementation process



8.2 Subproject Identification

The water resources infrastructure development subprojects will cover two types of interventions. The first type is concerned with the establishment of water resources management systems aimed at improving the administration of water resources management in Zambia. These types of projects will involve the development of infrastructure to support things such as climate and hydrometric data monitoring platforms, water allocation monitoring weirs and measuring systems etc. The first type of project will be informed by the technical planning processes with the organisations responsible for water resource management and will not be required to undertake any of key steps concerned with community mobilisation but will involve sensitisation of the communities on the importance of the infrastructure being installed. The second type will be concerned with water resources development primarily for the benefit of rural communities as well as broader national economic benefits. Subproject identification will be managed through the project management team for all types of subprojects. The Second type of project should pass through the community mobilisation processes and will also be informed by beneficiary communities and institutions such as the Ministry of Agriculture and Livestock and the Zambia Environment Management Agency (for matter related to natural conservation planning).

The demand for dam development should emerge from the beneficiary community, though they may not really understand the kind of intervention required to solve their problem. Care should be taken during the consideration of the application so that the request is not over or under rated.

In general, it is expected that the district extension teams will work with communities in preparing their subproject applications to avoid or minimize adverse environmental and social impacts. Among their other responsibilities, extension teams will assist communities in planning their subprojects, and preparing their applications, to avoid or minimize adverse environmental and social impacts. This work involves carrying out adequate environmental analysis which will involve the use of EA tools provided in this ESMF.

8.3 Environmental and Social Screening

This section outlines the stages of the environmental and social screening process (the screening process) leading towards the review and environmental approval of any sub-project that will be undertaken in the ZWRDP.

To facilitate environmental and social screening, the ESMF has provided a checklist for subproject screening that will assist stakeholders, proponents and project staff with the identification of environmental and social issues relating to the subproject location and the surrounding environment based on available knowledge and field investigations. Once a subproject/subcomponent is specified for a particular location, the proponent with assistance from the DFP will complete the environmental and social checklist at the community level, and in consultation with the relevant local communities and authorities as well as potentially affected persons. In some instances, a field appraisal may be required depending on the information in the environmental and social checklist. The criteria for determining the need for and the purpose of a field appraisal are summarized in Table 6.2.

8.3.1 Desk Appraisal

(i) Environmental Screening.

Prior to going to the sites, a **desk appraisal** of the planned activities plans, including designs, will be carried out by the Provincial Centre/ sub-catchment level technical team comprising experts from i) WRMA/ sub-catchment/ Provincial and District Water Office, ii) Ministry of Agriculture and Livestock- Extension Officers iii) Districts Planning Officers, iv) Department of Forestry, and v) Ministry of Local Government and Housing, vi)Traditional Authorities, vii) local NGOs to ensure that all pertinent environmental issues are identified.

This initial screening will be carried out through the use of the *Environmental and Social Screening Form (*Annex 3*)*. This form will be completed by the District Water Officer (Head of Water Resources Management in the area), with assistance from the Provincial Centre level technical team.

Completion of this screening form will facilitate the identification of potential environmental and social impacts, determination of their significance, assignment of the appropriate environmental category, proposal of appropriate environmental mitigation measures, and conduct any further environmental work, if necessary.

Suitably qualified officials will conduct the screening process and if none are available, training will be provided.

(ii) Assigning the Environmental Categories

The assignment of the appropriate environmental category to a particular agricultural activity will be based on the information provided in the environmental and social screening form (Annex 3). The Provincial/ sub-catchment Centre level technical team of experts, will be responsible for categorizing an agricultural activity either as A, B, or C.

The assignment of the appropriate environmental category will be based on provisions in Operational Policy (OP) 4.01 Environmental Assessment. Consistent with this operational policy, most of the activities of the ZWRDP are likely to be categorized as B, meaning that their potential adverse environmental impacts on human populations or environmentally important areas – including wetlands, forests, grasslands, and other natural habitats – are site-specific, few if any of the impacts are irreversible, and they can be mitigated readily.

Some infrastructure activities such as establishment of hydrological monitoring stations might be categorized as “C” if the environmental and social screening results indicate that such activities will have no significant environmental and social impacts and therefore do not require additional environmental work. Thus, if the screening form has only “No” entries, the proposed activity will not require further environmental work. In addition, these activities are not specified in the Zambian Regulations. The Zambian EIA guide however states that any project which is not specified in the First Schedule, but for which the ZEMA determines, a project brief should be prepared. Thus ZEMA will be consulted if these activities require any Project Brief or EIS. Most likely they will not and once cleared the technical team of experts will recommend approval of this proposal and implementation can proceed immediately.

The environmental category “A” (significant, irreversible impacts) will not be funded by the project.

8.3.2 Review of Recommendations and Field Appraisal

All the screening information is then submitted to the District Water Officer (DWO) for review. The DWO will review the recommendations in the screening form, review the proposed mitigation measures, and conduct public consultations. The DWO will further determine, whether (a) the application of simple mitigation measures outlined in the Environmental and Social screening form (Annex 3) will suffice; or whether further Environmental work needs to be done.

If the desk appraisal indicates that the proposed sub-project may have environmental or social concerns that are not adequately addressed in the current documentation, or if the application meets certain criteria (see Table 8.1), the DWO will require a field appraisal before the sub-project application can be considered further. An example of a format for a field appraisal report is provided in (Annex 4).

Table 8.1 Criteria for Requiring a Field Appraisal

Criteria	Field Appraisal
1. Land must be acquired for a sub-project, an individual or community's access to land or available resources is restricted or lost, or an individual or family is displaced	**Determines the scale and level of impact. A Resettlement Action Plan (RAP) may then be required according to procedures detailed in RPF Document.**
2. A sub-project may-affect a protected area or a natural habitat	**Determines if the sub-project will adequately avoid adverse effects on the protected area or natural habitat, as provided for in Chapter 7 of this ESMF**
3. A subproject may have an impact on ecologically sensitive ecosystems e.g., wetlands or river mouths or areas of high biodiversity/endemism or habitat for endangered species)	**A field appraisal determines the scale and level of impact. The application may need to be revised to describe how the sub-project will avoid or minimize adverse impacts to ecologically sensitive areas. This may require a distinct Environmental and Social Management Plan (ESMP) as outlined in Chapter 7 of this ESMF**
4. A sub-project will involve or introduce the use of pesticides	**A field appraisal determines the scale and level of the concerns. If needed, a Pest Management Plan is prepared according to the requirements of Chapter 7 of this ESMF.**

5. A sub-project may involve, or result in: • **Diversion or use of surface waters;** • **Production of waste water (e.g. irrigation runoff);** • **New or rebuilt irrigation or drainage** • **Reclamation of degraded land or soil erosion control** • **Small dams, weirs, reservoirs**	**A field appraisal determines the scale and level of potential adverse effects. The application may need to be revised to avoid or minimize potential adverse effects, and may include an Environmental Management Plan.**

Note: these criteria should be updated based on field experience in implementing sub-projects.

The DWO will supervise the further environmental work which may include the preparation of an ESMP or PMP as the situation may require. Once all the requisite documentation has been compiled the DWO will make recommendations to **National Level** for approval.

8.3.3 Appraisal and Approval of Environmental Work

The completed screening form along with any additional planning reports (e.g. ESMP, RAP or PMP) is forwarded together with the overall sub-project application to the review authority – MMEWD (National Level).

The first step in the approval process is to determine if all the relevant information has been provided, and is adequate. MMEWD (National Level) will also check if the beneficiaries and technical team have thoroughly considered all environmental and social issues with regards to the identification of potential adverse effects arising from the sub-project as well as mitigating measures to adequately address negative impacts.

If, based on the desk appraisal and if needed, the field appraisal, national legislation requires further review, MMEWD (National Level) will refer the application to the approval authority – the **Zambia Environmental Management Agency** - with recommendations for approval conditions and implementation supervision (e.g. erosion control, waste management, human safety).

8.3.4 Annual Monitoring and Reviews

Environmental monitoring needs to be carried out during the implementation of the Sub-projects. Monitoring of the compliance of sub-project implementation with the mitigation measures set out in the sub-project's ESMP, PMP and/or RAP will be carried out jointly by farmers, extension teams and the PMT. District Water Offices should supervise the monitoring activities and are required to report annually on sub-project activities during the preceding year. The information to be included in these annual reports is shown in Annex 5. An annual monitoring report must be submitted to the WB by the MMEWD.

Compliance monitoring comprises on-site inspection of activities to verify that measures identified in the ESMP, PMP and/or RAP are being implemented. This type of monitoring is similar to the normal tasks of a supervising engineer whose task is to ensure that the Contractor is achieving the required standards and quality of work. An appointed environmental consultant will have the responsibility of conducting the

environmental inspections. An annual inspection report must be submitted (together with the monitoring report) to WB for review and approval.

Annual reviews may be carried out by an independent local consultant, NGO or other service provider that is not otherwise involved with ZWRDP. Annual reviews should evaluate the annual monitoring report from district Water Offices and the annual inspection report from MMEWD. The purpose of the reviews is two-fold:

1. To assess compliance with ESMF procedures, learn lessons, and improve future ESMF performance;
2. To assess the occurrence of, and potential for, cumulative impacts due to project-funded and other development activities.

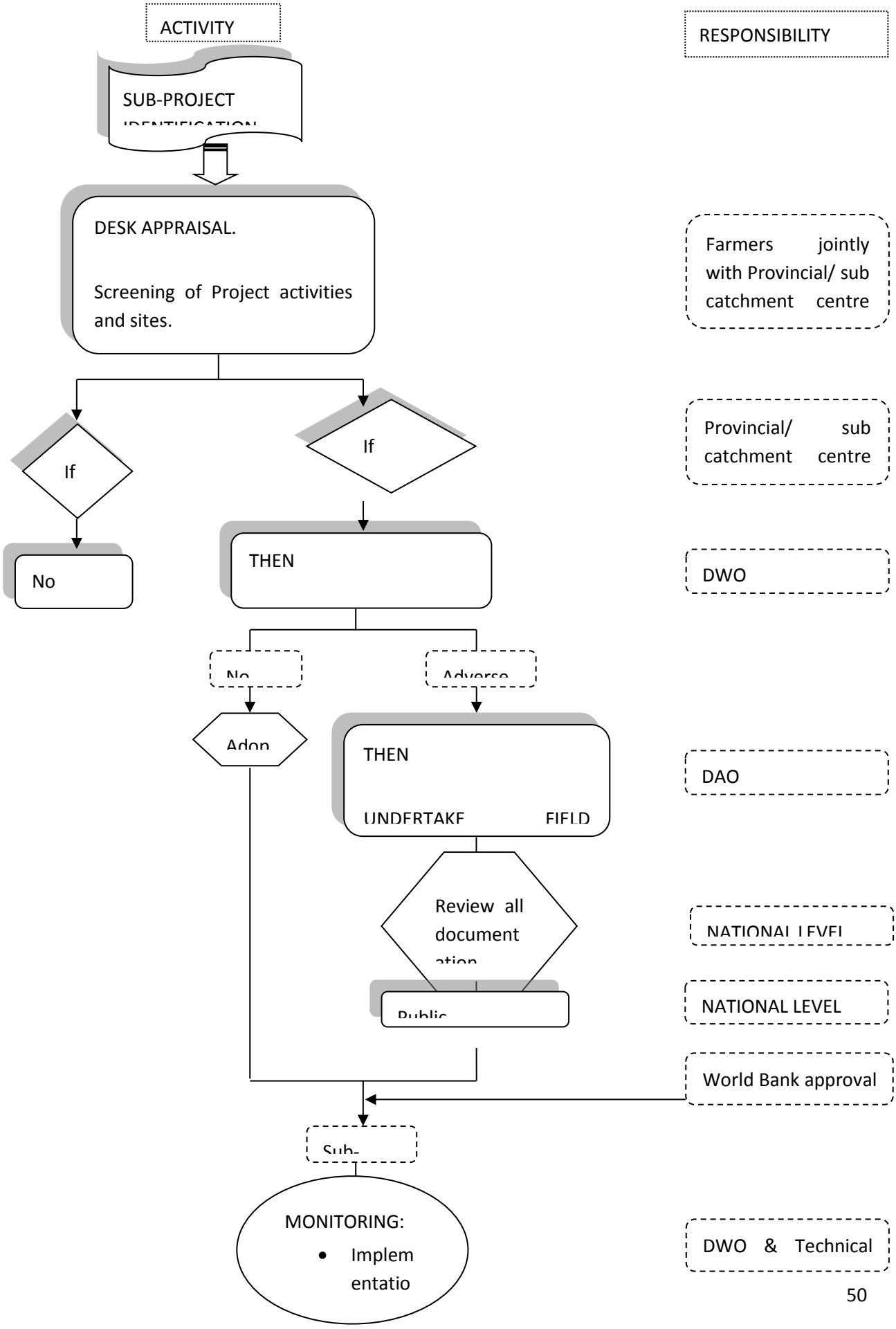
The annual reviews will be a principal source of information to the PMT for improving performance, and to Bank supervision missions. Thus, they should be undertaken after the annual report on monitoring has been prepared and before Bank supervision of the project. Guidance on undertaking annual reviews is provided Annex 6 of this ESMF.

(i)

8.3.5 Summary of the Screening Process

Each sub-project funded by the World Bank will have to undergo the Environmental and Social screening process.

Figure 10.1 below is an outline of the screening process.


ACTIVITY
RESPONSIBILITY
SUB-PROJECT
DESK APPRAISAL.
Screening of Project activities and sites.
Farmers jointly with Provincial/ sub catchment centre
If
If
Provincial/ sub catchment centre
No
THEN
DWO
No
Adverse
Adop
THEN
DAO
Review all document
NATIONAL LEVEL
NATIONAL LEVEL
World Bank approval
MONITORING:
Implem entatio
DWO & Technical

9 TRAINING AND INSTITUTIONAL CAPACITY BUILDING

9.1 Introduction

The MMEWD will be responsible for overseeing the implementation of the ESMF under the ZWRP. The Ministry and other arms of government such as the Ministry of Agriculture have structures at national, provincial, district levels.. In instances of new staff joining the project, on the job training will be provided as well as regular training for government officials involved in the project. The timeline for training will consist of a concentrated effort within the first year of project implementation with ongoing support as needed. Trainings addressing specific capacity gaps necessary for implementation will be implemented on a timely basis to meet the need.

9.2 Specific Training and Awareness Requirements

The successful implementation of the ZWRDP will in part depend on how well the various groups involved in the project implementation process understand and implement this ESMF. Such an understanding can be enhanced through training and awareness (sensitisation) in the various aspects of the ESMF.

The objective of the training under this ESMF is to:

- Support representatives and leaders of community groups and associations to prioritize their needs, and to identify, prepare, implement and manage the environmental and social aspects of their sub-projects;
- Ensure that provincial and district government officials are able to appraise, approve and supervise the implementation of sub-projects; and
- Strengthen local NGOs and extension teams to provide technical support [including basic ESMPs,] to communities in preparing their sub-projects.

Table 9.1 sets out the general training and sensitisation requirements of each of the groups and Table 9.2 presents details of the training to be carried out and the chronological order of training. For each training session, consideration should be given to involving the participation of other stakeholders, such as those from District authorities, NGOs and the local private sector. Since the management of water resources cuts across provincial and district boundaries a training intervention targeting a specific catchment will attract stakeholders from across Provincial and District boundaries. Training program proposed under Table 9.1 would be conducted very early on during sub-project /site identification in order to sensitize decision makers on environmental and social issues and compliance with the environmental safeguards issues.

Table 9.1 General Training and sensitization requirements of various groups

Type of Training	**National level Management**	**Provincial level Management**	**District level management**	**Extension workers/NGOS/ private sector**	**Water user Associations, Farmer organizations**
			(working at catchment level)		
Integrating environmental management (including water resources management) in development planning	T	T	T	S	A
Linkage between environmental and water management and use with poverty reduction and rural livelihoods	T	T	T	T	T
Environmental Assessment legislation and relevant environmental policies and water management legislation (national and international)	A	A	A	A	A

Legend: T =Technical training, S =Sensitization, A = Awareness-raising

Table 9.2 Summary of Capacity Building Requirements and Cost Estimates.

No.	TRAINING ACTIVITY	TARGET GROUP / TRAINER	MEANS OF VERIFICATION	COST ESTIMATES	TIMELINE
1.	• Environmental and Social Impact Assessment of the projects: - Screening process. - Use of checklists - Preparation of terms of reference. - Identification of Impacts - EIA report preparation and processing - Strategic action planning for Environmental Management - Policies and laws in Zambia - World Bank safeguard policies - Monitoring	• District Water Office Team • District Agricultural Office Team • District Planning Units • Extension workers in project impact areas. TRAINER: Zambia Environmental Management Agency OR PRIVATE CONSULTANT	• 10 members of District Water Office Team are trained. • 10 members of District Agricultural Office Team are trained. • 10 District Planning Units members are trained. • 10 Extension workers in project impact areas trained.	K 70,000,000 (Two sessions during the entire project period) **Length**: 5 days each	Before implementation of subprojects
2.	• Water Management - Integrated water resources management - When to irrigate - Water conservation and water use efficiency - Water rights • Watershed Management - Soil	• District Extension workers, NGOs and Farmers	• 10 Extension Workers • 30 Farmers • 5 NGO team members	K100,000,000 (One session during the entire project period) Venue: Location in catchment such as at a Farm training center Length:	Before implementation of subprojects

No.	TRAINING ACTIVITY	TARGET GROUP / TRAINER	MEANS OF VERIFICATION	COST ESTIMATES 5days	TIMELINE
	conservation - Head water protection - Sustainable forest management • Irrigated Crop and Fish farming Management - Sustainable Agriculture practices - Integrated farming practices - Crop harvesting & storage - Linkage to Markets	TRAINER: PRIVATE CONSULTANT, UNZA OR MAL, Dept. of Forestry and MMEWD			
2.	• Pest and Pesticide Management - Types of pests - Identification of pests - Biological control of pests - Physical control of pests - Chemical (pesticide) control/ management (Use, storage, record management, disposal) - Environmental control	• Scheme Farmers • Scheme Management Committee TRAINER: MINISTRY OF AGRICULTURE	• 10 members of scheme management committee • 10 Extension Workers • 30 Farmers	K55,000,000 (One session during the entire project period) **Venue**: Farm **Length**: 5 days	Before implementation of subprojects

No.	TRAINING ACTIVITY	TARGET GROUP / TRAINER	MEANS OF VERIFICATION	COST ESTIMATES	TIMELINE
3.	• Facilitate HIV/AIDS awareness. - Impacts of HIV/AIDS on social wellbeing, livelihood and projects - Mitigation measures - Care of victims	• Extension workers in project impact areas • Scheme farmers. TRAINER: NAC,NGOs	• 10 Extension workers in project impact areas trained. • 30 Scheme Framers from various schemes trained	K60,000,000 (Two sessions during entire project period) Venue: **Length**: 4 days	On-going/as needed
6.	• Maintenance of the water infrastructure (small dams, irrigation schemes, access roads, fish ponds) - Detecting the damaged structures - Maintenance schedule, roles and responsibilities - Materials needed to maintain the damaged structures - User fees	• District Extension workers, Local Private Sector artisans/ contractors and Farmers TRAINER: PRIVATE CONSULTANT OR UNZA	• 10 Extension Workers • 30 Farmers • 10 Local Private Sector artisans/ contractors	K85,000,000 (One session during the entire project period) **Venue:** At dam sites Length: 5 days	In parallel to implementation of subprojects and as necessary following completion

No.	TRAINING ACTIVITY	TARGET GROUP / TRAINER	MEANS OF VERIFICATION	COST ESTIMATES	TIMELINE
	- Community management institutional setup				

10 PUBLIC CONSULTATIONS

The ESMF has been developed through an iterative, consultative process working with key stakeholders within the Ministry of Mines, Energy and Water Development. These consultative working sessions included senior officials from the provinces, culminating in disclosure of the safeguard instruments on the website of the MMEWD and public consultations facilitated by MMEWD on February 01, 2013 in Lusaka, Zambia. Senior officials from the implementing agency and the coordinating agencies (MMEWD, DWA, DPI, and ZEMA) and senior officials from civil society (WWF) participated in the consultation. The outcome of the meeting was endorsement of the safeguards instruments following minor revisions to several indicators and the addition of one indicator to the ESMF. These revisions and the addition are described below.

Consultations began with a brief presentation of the project and its components. Participants were already familiar with the details of the specific activities to be undertaken and were well prepared to comment on the safeguards instruments. Specific topics of discussion included:

Water quality. Participants engaged in an extended discussion over the appropriate water quality parameters which the project should monitor surrounding the small infrastructure subprojects, the sampling methods, and the equipment necessary. One specific concern was whether the government has the capacity to implement water quality monitoring at a more sophisticated level than in-situ monitoring. The DWA confirmed that it has a national water quality testing lab and that this would be fully available to support project monitoring. Ultimately, the framework was revised slightly so as not to limit the parameters that the government could monitor or the methods they could employ. These revisions have been incorporated into the ESMF.

Monitoring of borrow pits. Borrow pits are created when construction requires additional fill not present on the construction site. Contractors often engage in the practice of digging “borrow pits” off site and transporting the fill to the construction site. Meeting participants were concerned that the framework should monitor any such borrow pits and ensure their successful reclamation. The meeting also confirmed that Zambian law regulates the practice of digging borrow pits. A new indicator to monitor borrow pit management has been incorporated into the ESMF.

Natural habitats. The meeting clarified that no works shall be undertaken in protected or critical natural habitats.

Involuntary resettlement. The meeting clarified that no project funds are to be used for cash compensation resulting from involuntary resettlement or land acquisition. All cash compensation and financing required for involuntary resettlement land acquisition will be made available by the Government and that in the case of any resettlement activity under the Project no physical

displacement or restriction of access shall occur before necessary resettlement measures consistent with the Resettlement Policy Framework are in place. This includes full payment of compensation, from non-IDA funds, and any other assistance prior to displacement.

Environmental flows. There was extended discussion over the need to properly handle environmental flows. The consensus of the consultation was that the need to implement environmental flows should be responsive to the formal decision making process as manifested through Zambian law and responsive to local needs. These concerns have been integrated into the ESMF.

11 SAFEGUARDS BUDGET

The estimated figure for ESMF preparation and implementation is US$ 4,574,000 and has been made available under the project Component B (US$ 30 million). This is approximately 15 percent of the total budget allocation under this component and will be used to fully finance any safeguard requirements associated with the small infrastructure projects. It should be noted that this is an estimated figure, based on a budgetary framework for the categories of costs identified below, and will be revised during implementation as the details of specific projects become known. The government will finance any cash compensation for land acquisition or resettlement, as explained in the RPF. The budget for the RPF is described separately in the RPF. Detailed budgets for any site specific impacts will be developed as part of the environmental and social impact assessment on a case by case basis. At a minimum, the following allocations have been made:

Table 11.1 ESMF Cost Estimates.

No.	ESMF ACTIVITY	COST ESTIMATES (US$)
1.	Environmental and Social Impact Assessment of the projects:	1,000,000
2.	Water Resource assessments for sub- project infrastructure development	1,000,000
3	Community Mobilization and management/ operation of Water Users Committee	2,000,000
4.	Training and Capacity Building	74,000
5.	Monitoring of subprojects	500,000
	Total	US 4,574,000

Notes :

1. *ESIA and WRM assessments each at US$ 10,000 per sub project*
2. *Community Mobilisation at US$ 20,000 per sub project*
3. *Training as determined by the DWA*
4. *Monitoring at US$ 5,000 per sub project*

12. ANNEXES

ANNEX 1: RELEVANT NATIONAL LEGISLATIVE, ACTS, AND REGULATIONS		
National Parks and Wildlife Act, Chapter 201	The National Parks and Wildlife Act provides for the establishment, control and management of National Parks and Game Management Areas. Under this Act is a schedule of Protected animal species.	Some subprojects may require the development of water conservations structures for purposes of improving natural resources conservation and improving the water flow regime. These will improve water supplies for flora and fauna. The development of natural resource conservations structures will be carried out with the participation of wildlife authorities in the target areas and will be subject to the preparation of an environmental project brief and the securing of water rights.
Town and Country Planning Act, Chapter 283	The Town and Country Planning Act, came into force in 1962 and provides for the control, use and change of land use zones and reservations for various purposes, eg. siting of work sites. It also provides for the compensation of those affected by planning decisions and regulated development subdivisions.	The ZWRDP project will be undertaken in accordance with the approved land use plans as provided for under the Town and Country Planning Act. Responsible planning authorities such as ZEMA; Local Authorities and regional planning Authorities will undertake to include and have gazetted any water resources developments that should fall as part of Zambia's natural resources statutory plans.
Factories Act, Chapter 441	The Factories Act provides a framework for the setting of regulations to ensure the safety, health and welfare of persons employed on construction work sites and in factories. The Act is applicable during road rehabilitation.	The project will ensure that the safety, health and welfare measures and facilities of workers during water resources infrastructure development initiatives will be in accordance with the provisions of the Factories Act.

Forest Act, Chapter 199	The Forest Act, passed in 1974, provides for the establishment and management of National and Local forests, conservation and protection of forest and trees, and licensing and sale of forest products. The Act prohibits the felling, collecting or injuring of forest products in protected forest areas or forest reserves, unless a license has been obtained to do so. It also prohibits excavation, construction, and operation of machinery within the forest reserves or protected areas. Forest reserves currently cover approximately 10% of the country and are intended for the conservation and development of forest resources, as well as providing protection to watersheds. The Act also provides for the protection of 6 tree species nationally whether in a protected area or outside it. These are as follows: • Entandrophragma caudatum Mountain Mahogany • Khaya nyasica Red Mahogany • Pterocarpus angolensis African Teak • Afzelia quanzensis Pod Mahogany • Faurea saligna Beechwood • Baikiaea plurijuga Teak	During the development of ZWRDP subprojects these species will be investigated and addressed in accordance with the measures to be outlined and guided by the Environmental impact brief and those considerations contained within the body of this report as part of subproject development process.
Water Act, Chapter 198	The Water Act provides for the control, ownership and use of public and private water excluding that of Zambezi, Luapula and Luangwa Rivers which border with other countries. Public water use is controlled by the Water Board through the allocation of water rights which are granted following investigation, advertisement	The project will comply with the provisions of the Act by ensuring necessary water permits are secures for the specified purposes. Though this Act has been repealed, it shall continue to apply until the substantive water resources management Act comes into full force. ESMA linked with the provisions of this Act are

	and, where necessary, permission from the chief. The Act also establishes the pollution of public water as an offence, although the Water Pollution Control Regulations are established by the EPPCA.	further elaborated in the ESMF document. Refer to the sub project preparation process
National Heritage Conservation Commission Act	The National Heritage and Conservation Act established the National Heritage Conservation Commission (NHCC), which is responsible for the conservation of ancient, cultural and natural heritage, relics and objects of aesthetic, historical, prehistoric, archaeological or scientific interest by preservation, restoration, rehabilitation, reconstruction, adaptive use and good management. The Commission also provides regulations for archaeological excavation and export of relics. If a development is unable to proceed without affecting an item of heritage, permission must be sought from the NHCC as outlined in Sections 35 and 36 of the National Heritage Conservation Commission Act.	During the subproject development process detailed investigations will be carried out through EIS or EIA processes and will be addressed in accordance with the mitigation measures provided in this report.
The Land Act of 1995	The Land Act of 1995 was enacted to guarantee peoples' right to land while enhancing development. The Act recognises the holding of land under customary tenure and the Chief's role has been legally recognised, such that land cannot be converted or alienated without approval of the chief.	The ZWRDP will work closely with the local community through formal government structures at grass root level and obtain consent from Chiefs on land possession issues for the development of selected sites. No water permits will be granted in traditional areas unless the chief confirms issues of assignment of land under customary law and the consent indicated in the application forms for Water Rights.

The Lands Acquisition Act No. 2 of 1970	Land acquisition is governed by the Lands Acquisition Act No. 2 of 1970. The Act sets out regulations for compulsory acquisition of land and property and compensation for such acquisition. The president (his designated and authorized person) may acquire any property in the interest of the Republic. Notice shall be given in person not less than two months in advance and shall be gazetted. Compensation for acquired property, losses and damages shall be paid as may be agreed or, finally determined by the National Assembly in case agreement on compensation is not reached within six weeks after publication in the Gazette. Any disputes except for disputes related to the amount of compensation may be instituted for court proceedings. The Act also opens for compensation to be granted by allocation of new land to the property owner. The Act instituted a Compensation Advisory Board to advise the Minister of Lands in assessment of compensation payable under the Act. The functions of the Board have been delegated to various committees. Various forms to be used in proceedings of property acquisition are prescribed in the statutory Instrument No. 60 of 1970.	The ZWRDP will avoid any incidences requiring land compulsory land acquisition based on this Act of Parliament.
Roads and Traffic Control Act, Chapter 464	The Roads and Traffic Control Act, provides for the control of traffic, and for the regulation of storm water disposal structures.	In this ZWRDP the requirements for storm water disposal structures along the access road as provided for under this Act will be part of the overall designs for development of necessary feeder roads to development sites.

Local Government Act, Chapter 281	The Local Government Act allows the Council to implement environmental protection and natural resources management functions which include prevention of pollution of water supplies, undertaking of mining operations and natural resources conservation.	Location and siting of camps and development sites will be undertaken with consultations and consent from the local community and approval from relevant Government Departments. The Subproject development process gives details addressing the approach to community participation and consultations.
Public Health Act, Chapter 295	The Public Health Act empowers a Council to prevent diseases and pollution dangerous to human health and to any water supply for domestic use.	The project will ensure that measures to prevent diseases and pollution dangerous to human health and to any water supply are taken into account. It is in part the objective of this project to provide for safe drinking water through the development of water resources infrastructure.
Fisheries Act of 2011	Provides for the development of commercial fishing and the registration of fishermen and their boats and the protection of endangered species.	Applicable to subprojects that might provide for fish farming under ZWRDP. The project will relay on the use of extension officers for the design and management of fish farming interventions taking into issues of environmental health.

ANNEX 2. PROCESS AND CATEGORIES OF ENVIRONMENTAL IMPACT ASSESSMENTS (EIA) IN ZAMBIA.

The EIA process in Zambia is outlined in the EIA Regulations, S.I. No.28 of 1997. The EIA regulations provide schedules in which projects are classified in categories. All development projects listed under the First and Second Schedules of the EIA regulations of 1997 are required to undertake an EIA. However, for projects not specified in these schedules, ECZ determines whether an EIA should be carried out. Projects which existed prior to the EIA regulations are also required to develop and put in place Environmental Management Plans (EMP).

All developers are required under the EIA regulations to submit an EIA Study Report to ECZ for review before commencement of a proposed project.

EIA in Zambia fall in two classes depending on the nature of the project.

1) First Schedule - Environmental Project Brief; and
2) Second Schedule - Environmental Impact Statement (EIS).

The nature of the project determines whether the developer should prepare an EPB or EIS. Projects likely to have significant negative impacts on the environment tend to fall under the EIS category.

ENVIRONMENTAL PROJECT BRIEF (EPB)

This is an EIA report prepared in respect of projects with very low negative impacts on the environment. Under the EIA Regulations, the law states that a developer shall not implement a project for which a project brief is required, unless the project brief has been concluded in accordance with the said Regulations and ECZ has issued a decision letter. A decision letter on a project is issued within forty working (40) days of receiving the EPB from the developer.

The requirement for a project brief applies to:-

a) A developer of any project set out in the First Schedule, whether or not the developer is part of a previously approved project;
b) Any alterations or extensions of any existing project which is set out in the First Schedule, or;
c) Any project which is not specified in the First Schedule, but for which the ECZ determines a project brief should be prepared.

What is contained in a Project Brief?

A project brief outlines the following:

a) The site description of the environment;
b) The objectives and nature of the project and reasonable alternatives;

c) The main activities that will be undertaken during site preparation, and construction and after the development is operational; c. The main activities that will be undertaken during site preparation, and construction and after the development is operational;
d) The raw and other materials that the project shall use;
e) The products and by-products, including solid, liquid and gaseous waste generation;
f) The noise level, heat and radioactive emissions, from normal and emergency operations;
g) The expected socio-economic impacts of the project and the number of people that the project will resettle or employ, directly, during construction and operation etc;
h) The expected environmental impact of the project, taking into account the provisions of paragraphs (c) to (g);
i) The expected effects on bio-diversity, natural lands and geographical resources and the area of land and water that may be affected through time and space; and
j) A description of adverse impact mitigation measures and any monitoring programmes to be implemented.

Projects which require Project Briefs

1. Projects

a) Urban area rehabilitation
b) Water transport
c) Flood control schemes
d) Exploration for and production of hydrocarbons including refining and transport
e) Timber harvesting and processing in forestry
f) Land consolidation schemes
g) Mining and mineral processing, reduction of ores, minerals, cement and lime kilns
h) Smelting and refining of ores and minerals
i) Foundries
j) Brick and earthen manufacture
k) Glass works
l) Brewing and malting plants
m) Plants for manufacture of coal briquettes
n) Pumped storage schemes
o) Bulk grain processing plants
p) Hydro power schemes and electrification
q) Chemical processing and manufacturing
r) Resettlement schemes
s) Storage of hydrocarbons
t) Hospitals, clinics and health centres
u) Cemetery designation
v) Touring and recreational development in national parks or similar reserves

w) Projects located in or near environmental sensitive areas such as indigenous forests, wetlands, zones of high biological diversity, areas supporting populations of rare and endangered species; and others.

ENVIRONMENTAL IMPACT STATEMENT (EIS)

This is an EIA report prepared in respect of projects likely to have significant negative impacts on the environment. The period within which ECZ is required to make a decision on a proposed project requiring an EIS is within sixty five (65) working days of receiving the EIS from the Developer.

What is contained in an EIS?

An EIS is an extensive evaluation of the effects likely to arise from a project significantly affecting the national and man-made environment. Consultation and participation are integrated to this evaluation. The study is undertaken by a group of experts approved by ECZ in accordance with ToR preferred by the Developer in consultation with ECZ.

An EIS contains an executive summary, stating the main findings and recommendations and is signed by every individual person involved in its preparation.

The EIS includes:

a) A description of the project, reasonable alternatives, which may begin or increase operations to provide materials or services to the proposed project;
b) A description of the proposed site and reasons for rejecting alternative sites;
c) A brief description of the site and the surrounding environment including specifying any information necessary to identify and assess the environmental effects of the project;
d) A description of the raw material inputs into the project and their potential environmental effects;
e) A description of the technology and processes that shall be used;
f) A description of the products and by-products of the project;
g) The environmental effects of the project, and reasonable alternatives, including the direct, indirect cumulative, short-term and long-term effects;
h) The socio-economic impacts of the project such as resettlement of the affected people.
i) An impact management plan containing a description of measures proposed for preventing, minimising or compensating for any adverse impact, and enhancing beneficial effects, and measures to monitor effluent streams or important environmental features which may be affected by the project; and
j) An indication of whether the environment of any neighbouring state is likely to be affected.

Stages in conducting a full EIA

Stage 1: Preliminary Actions

The project is screened to determine that project falls in Second Schedule

• The developer with the help of ECZ develops Terms of Reference

• The description of the project which is done in the project brief submitted to the ECZ.

• The developer appoints a Study Team Leader for the environmental impact study. The qualification of the Team Leader depends on the nature of the project.

• The developer submits the names and qualifications of all persons to carry out the study to ECZ for approval. Preference should be given to experts with specific knowledge of local or similar conditions. The team shall include at least one person resident in the potentially affected area.

- The Team Leader allocates work to the team members for the purpose of carrying out the scoping exercise.
- The team reviews and determines the applicable laws, regulations and standards.
- The developer, the Team Leader and the team identify the various alternatives for the development of the project (sites, technology, design etc).

Stage 2: Scoping (Or Identification of Potential Impacts)

• The team under the guidance of the co-ordinator identifies all the possible environmental impacts of the project.

• The co-ordinator, the team, the Council and the potentially affected and interested parties determine which of the impacts shall be the subject of the study based on the following criteria:

a) **Magnitude:** to what extent environmental resources are going to be affected;
b) **Extent:** how much area will adversely or positively be affected by the project;
c) **Significance:** what value in terms of costs and benefits does society place on the resources and the different impacts affecting the resource (s); and
d) **Special sensitivity:** which impacts are significant in the specific local economic, social and ecological setting.

Stage 3: Baseline Study

The team undertakes a detailed description of the existing environment including the social and economic activities of the population resident in the potentially affected area.

Stage 4: Impact Evaluation

The team predicts and evaluates the various predicted impacts and ranks them in order of importance on the basis of two criteria:

• Quantitative change where change can be quantified.

• Qualitative change where change cannot be quantified, but instead the impact of the project depends on the social acceptability of the project.

Stage 5: Public Participation in Environmental Impact Study

• The team seeks the view of the community which are likely to be affected by the project.

• The views sought are considered in the development of mitigation measures.

Stage 6: Identification of Mitigation Measures

The team identifies measures for elimination (where possible), or reduction, of environmental impacts for various alternatives identified in the study such as:

a) Engineering works in noise reduction, prior treatment of effluent, air pollution reduction measures and solid waste minimisation through reclamation, recycling and any other appropriate measures;
b) Management measures especially in areas of natural resources, reforestation, control of soil erosion, desalinisation, desilting.

Stage 7: Assessment (Or Comparison of Alternatives)

• The team compares all the alternatives on the basis of economic, socio-cultural and environmental gains and costs.

• The team ranks and recommends all alternatives to the developer on the basis of sound environmental and economic analysis.

Stage 8: Decision making by the Developer

The developer makes a decision choosing one alternative and giving reasons for the rejection of other alternatives.

Stage 9: Submission of the report to ECZ

• The Developer submits a draft copy of the EIS for comments to ECZ
• ECZ comments on the draft EIS
• The developer incorporates comments into the final EIS report
• The developer submits the report ECZ.

Stage 10: Decision Making by ECZ

• Upon submission of the EIS ECZ reviews the project,
• ECZ either approves or rejects the project.
• If ECZ approves the EIS, the developer may implement the project
• If ECZ rejects the project the Developer can appeal to the Minister, Ministry of Tourism, Environment and Natural Resources within ten working days of receipt of such rejection letter. The Minister must respond to this letter within 14 working days.
• If unsatisfied with the Minister's Decision, the Developer may appeal to the High Court.

Projects which require EIS

1. Urban Development

a) Designing of new townships which are more than 5Ha or more or sites covering 700 dwellings and above
b) Establishment of industrial estates
c) Establishment or expansion of recreational areas such as golf course, which would attract 200 or more vehicles
d) Shopping centres and complexes - 10, 000 m2 and above, floor area

2. Transportation

a) All major roads outside urban areas, the construction of new roads and major improvements over 10 Km in length or over 1 Km in length if the road passes through a National Park or Game Management Area
b) Railway lines 10 Km away from built up area
c) Airport and airfields whose runway is 1, 800 m or more
d) Pipelines: for water, diameter 0.5 m and above and length 10 Km outside built up area; for oil, 15 Km or more of which 5 Km or more of their length will be situated in a protected area, a seriously polluted or a water abstraction area
e) Establishment of or expansion of harbours or pontoon areas

3. Dams, Rivers and Water Resources

a) Dams and barrages covering a total of 25 Ha or more
b) Exploration for, and use of, ground water resources including production of geothermal energy: water to be extracted to be more than 2 million cumecs (m3/s)
c) Water supply - reservoir surface area 50 m2 or more

4. Mining: Including Quarrying and Open Cast Extraction

a) Copper mining, coal site
b) Limestone, sand, dolomite, phosphate and clay extraction's of 2Ha or more
c) Precious metals (silver, zinc, cobalt, nickel)
d) Industrial metals
e) Gemstones
f) Radioactive metals

5. Forestry Related Activities

a) Clearance of forestry in sensitive areas such as watershed areas or for industrial use 50Ha or more
b) Reforestation and a forestation
c) Wood processing plants - 1, 000 tonnes or more

6. Agriculture

a) Land clearance for large scale agriculture

b) Introduction and use of agrochemicals new to Zambia
c) Introduction of new crops and animals especially exotic ones new to Zambia
d) Irrigation schemes covering an area of 50 Ha or more
e) Fish farms of which production is 100 tonnes or more a year
f) Aerial and ground spraying - industrial scale

7. Processing and Manufacturing Industry

a) Cement works and lime processing - 1, 000 tonnes or more a year
b) Fertilizer manufacturing or processing - 1, 000 tonnes or more a year
c) Tanning and dressing of hides and skins - 1, 000 skins a week
d) Abattoirs and meat processing plants - 20, 000 carcasses and above a month
e) Fish processing plant - more than 100 tons a year
f) f. Pulp and paper mills - daily out put 50 air dried tonnes and above a day
g) g. Food processing plants - 400 tonnes or more output a year

8. Electrical Infrastructure

a) Electricity generation station
b) Electrical transmission lines - 220 kV and more than 1 Km long
c) Surface roads for electrical and transmission lines for more than 1 Km long

9. Waste Disposal

a) Sites for solid disposal: construction of permanent disposal site with 1, 000 tonnes and above a day
b) Sites for hazardous disposal of 100 tonnes or more a year
c) Sewage disposal works - with a capacity of 15, 000 litres or more a day

10. Nature Conservation Areas

a) Creation of national parks, game management areas and buffer zones
b) Commercial exploitation of natural fauna and flora
c) Introduction of alien species of flora and fauna to local ecosystems

ANNEX 3. CHECKLIST FOR ENVIRONMENTAL AND SOCIAL SCREENING OF ZWRDP

CHECKLIST FOR ENVIRONMENTAL AND SOCIAL SCREENING OF ZWRDP SUBPROJECTS

Name of the Project:

Sub-projects Name:

Sub-projects Location:

Community Representative and Address:

District Team Representative and Address:

Site Selection:

When considering the location of a sub-project, rate the sensitivity of the proposed site in the following table according to the given criteria. Higher ratings do not necessarily mean that a site is unsuitable. They do indicate a real risk of causing undesirable adverse environmental and social effects, and that more substantial environmental and/or social planning may be required to adequately avoid, mitigate or manage potential effects.

Issues	Site Sensitivity			Rating
	Low	Medium	High	
Natural habitats	No natural habitats present of any kind	No critical natural habitats; other natural habitats occur	Critical natural habitats present	
Water quality and water resource availability and use	Water flows exceed any existing demand; low intensity of water use; potential water use conflicts expected to be low; no potential water quality issues	Medium intensity of water use; multiple water users; water quality issues are important	Intensive water use; multiple water users; potential for conflicts is high; water quality issues are important	
Natural hazards vulnerability, floods, soil stability/ erosion	Flat terrain; no potential stability/erosion problems; no known volcanic/seismic/ flood risks	Medium slopes; some erosion potential; medium risks from volcanic/seismic/ flood/ hurricanes	Mountainous terrain; steep slopes; unstable soils; high erosion potential; volcanic, seismic or flood risks	

Issues	Site Sensitivity			Rating
	Low	Medium	High	
Cultural property	No known or suspected cultural heritage sites	Suspected cultural heritage sites; known heritage sites in broader area of influence	Known heritage sites in project area	
Involuntary resettlement	Low population density; dispersed population; legal tenure is well-defined; well-defined water rights	Medium population density; mixed ownership and land tenure; well-defined water rights	High population density; major towns and villages; low-income families and/or illegal ownership of land; communal properties; unclear water rights	

Completeness of Sub-projects Application:

Does the sub-project application document contain, as appropriate, the following information?

	Yes	No	N/A
Description of the proposed project and where it is located			
Reasons for proposing the project			
The estimated cost of construction and operation			
Information about how the site was chosen, and what alternatives were considered			
A map or drawing showing the location and boundary of the project including any land required temporarily during construction			
The plan for any physical works (e.g. layout, buildings, other structures, construction materials)			
Any new access arrangements or changes to existing road layouts			
Any land that needs to be acquired, as well as who owns it, lives on it or has rights to use it			
A work program for construction, operation and decommissioning the physical works, as well as any site restoration needed afterwards			
Construction methods			
Resources used in construction and operation (e.g. materials, water, energy)			

Information about measures included in the sub-projects plan to avoid or minimize adverse environmental and social impacts			
Details of any permits required for the project			

Environmental and Social Checklist

		Yes	No	ESMF Guidance
A	Type of activity – Will the sub-projects :			
1	Involve food processing?			Section 2
2	Build or rehabilitate any structures or buildings?			Section 2
3	Support agricultural activities?			Section 2
4	Be located in or near an area where there is an important historical, archaeological or cultural heritage site?			RPF
5	Support installation of hydrology or meteorological stations / equipment			Section 2
6	Be located within or adjacent to any areas that are or may be protected by government (e.g. national park, forest reserve, world or national heritage site) or local tradition, or that might be a natural habitat?			Section 4
	If the answer to any of questions 1-5 is “Yes”, please use the indicated Resource Sheets or sections(s) of the ESMF for guidance on how to avoid or minimize typical impacts and risks			
B	Environment – Will the sub-projects :			
6	Risk causing the contamination of drinking water?			Section 7
7	Cause poor water drainage and increase the risk of water-related diseases such as malaria or bilharzia?			Section 7
8	Harvest or exploit a significant amount of natural resources such as trees, soil or water?			
9	Be located within or nearby environmentally sensitive areas (e.g. intact natural forests, mangroves, wetlands) or threatened species?			Section 4
10	Create a risk of increased soil degradation or erosion?			Section 7
11	Produce, or increase the production of, solid or liquid wastes (e.g. water, medical, domestic or construction wastes)?			Section 7
12	Affect the quantity or quality of surface waters (e.g. rivers, streams, wetlands), or groundwater (e.g. wells)?			Section 7
13	Result in the production of solid or liquid waste, or result in an increase in waste production, during construction or operation?			Section 7

		Yes	No	ESMF Guidance
	If the answer to any of questions 6-13 is "Yes", please include an Environmental and Social Management Plan (ESMP) with the sub-projects application.			Indicate Annex
C	Land acquisition and access to resources – Will the sub-projects :			
14	Require that land (public or private) be acquired (temporarily or permanently) for its development?			RPF
15	Use land that is currently occupied or regularly used for productive purposes (e.g. gardening, farming, pasture, fishing locations, forests)			RPF
16	Displace individuals, families or businesses?			RPF
17	Result in the temporary or permanent loss of crops, fruit trees or household infrastructure such as granaries, outside toilets and kitchens?			RPF
18	Result in the involuntary restriction of access by people to legally designated parks and protected areas?			
	It the answer to any of the questions 14-18 is "Yes", please consult the ESMF and, if needed, prepare an Resettlement Action Plan (RAP)			RPF
D	Pesticides and agricultural chemicals – Will the sub-projects :			
19	Involve the use of pesticides or other agricultural chemicals, or increase existing use?			Section 7 & PMP
	If the answer to question 19 is "Yes", please consult the ESMF and PMP.			PMP

CERTIFICATION

We certify that we have thoroughly examined all the potential adverse effects of this sub-projects . To the best of our knowledge, the sub-projects plan as described in the application and associated planning reports (e.g. ESMP, RAP, PMP), if any, will be adequate to avoid or minimize all adverse environmental and social impacts.

Community representative (signature): ……

Extension team representative (signature): ……

Date: ……

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Desk Appraisal by Review Authority:

☐ **The sub-project can be considered for approval.** The application is complete, all significant environmental and social issues are resolved, and no further sub-project planning is required.

☐ A field appraisal is required.

Note: A field appraisal must be carried out if the sub-project:

- Needs to acquire land, or an individual or community's access to land or available resources is restricted or lost, or any individual or family is displaced
- May restrict the use of resources in a park or protected area by people living inside or outside of it
- May affect a protected area or a critical natural habitat
- May encroach onto an important natural habitat, or have an impact on ecologically sensitive ecosystems (e.g. rivers, streams, wetlands)
- Involves or introduces the use of pesticides
- Involves, or results in: a) diversion or use of surface waters; b) construction or rehabilitation of latrines, septic or sewage systems; c) production of waste (e.g. slaughterhouse waste, medical waste); d) new or rebuilt drainage systems; or e) water points.

The following issues need to be clarified at the sub-project site:

……
……

A Field Appraisal report will be completed and added to the sub-project file.

Name of desk appraisal officer (print): ……..

Signature: ……

Date: ……

ANNEX 4. ENVIRONMENTAL AND SOCIAL FIELD APPRAISAL FORM

NAME OF PROJECT Application Number:

(Zambia Water Resources Development Project)

PART 1: IDENTIFICATION

1. Project Name:

2. Project Location:

3. Reason for Field Appraisal: Summarize the issues from the ESMF Checklist that determine the need for a Field Appraisal.

4. Date(s) of Field Appraisal:

5. Field Appraisal Officer and Address:

6. Extension Team Representative and Address:

7. Community Representative and Address:

PART 2: DESCRIPTION OF THE PROJECT

8. Project Details: Provide details that are not adequately presented in the sub-project application. If needed to clarify sub-project details, attach sketches of the sub-project component(s) in relation to the community and to existing facilities.

PART 3: ENVIRONMENTAL AND SOCIAL ISSUES

9. Will the project: Yes No

* Need to acquire land?
* Affect an individual or the community's access to land or available resources?
* Displace or result in the involuntary resettlement of an individual or family?

If "Yes", tick one of the following boxes:

- ☐ The Resettlement Action Plan (RAP/ARAP) included in the sub-project application is adequate. No further action required.
- ☐ The RAP/ARAP included in the sub-project application must be improved before the application can be considered further.
- ☐ An RAP/ARAP must be prepared and approved before the application can be considered further.

10. Will the project: Yes No

* Encroach onto an important natural habitat?

* Negatively affect ecologically sensitive ecosystems?

If "Yes", tick one of the following boxes:

- ☐ The Environmental and Social Management Plan (ESMP) included in the sub-project application is adequate. No further action required.
- ☐ The EMP included in the sub-project application must be improved before the application can be considered further.
- ☐ An EMP must be prepared and approved before the application can be considered further.

11. Will this project involve or introduce pesticides? Yes No

If "Yes", tick one of the following boxes:

- ☐ The Pest Management Plan (PMP) included in the sub-project application is adequate. No further action is required.
- ☐ The PMP included in the sub-project application must be improved before the application can be considered further.
- ☐ A PMP must be prepared and approved before the application can be considered further.

12. Will this project involve or result in: Yes No

* Diversion or use of surface waters?

* Production of waste (e.g. slaughterhouse waste)?

* New or rebuilt irrigation or drainage systems?

If "Yes", tick one of the following boxes:

- ☐ The application describes suitable measures for managing the potential adverse environmental effects of these activities. No further action required.
- ☐ The application does not describe suitable measures for managing the potential adverse environmental effects of these activities. An ESMP must be prepared and approved before the application is considered further.

13. Will this project require the construction of a small dam or weir? Yes No

If "Yes", tick one of the following boxes:

- ☐ The application demonstrates that the structure(s) will be designed by qualified engineers, and will be built by qualified and adequately supervised contractors. No further action is required.
- ☐ The application does not demonstrate that the structure(s) will be designed by qualified engineers, and will be built by qualified and adequately supervised contractors. The application needs to be amended before it can be considered further.

14. Will this project rely on water supplied from an existing dam or weir? Yes No

If "Yes", tick one of the following boxes:

- ☐ The application demonstrates that a dam safety report has been prepared, the dam is safe, and no remedial work is required. No further action is required.
- ☐ The application does not demonstrate that a dam safety report has been prepared, the dam is safe, and no remedial work is required. A dam safety report must be prepared and approved before the application is considered further.

15. Are there any other environmental or social issues that have not been adequately addressed?

Yes No

If "Yes", summarize them:

and tick one of the following boxes:

- ☐ Before it is considered further, the application needs to be amended to include suitable measures for addressing these environmental or social issues.
- ☐ An ESMP needs to be prepared and approved before the application is considered further.

PART 4: FIELD APPRAISAL DECISION

- **The sub-project can be considered for approval.** Based on a site visit and consultations with both interested and affected parties, the field appraisal determined that the community and its proposed project adequately address environmental and/or social issues as required by the ESMF.

- **Further sub-project preparation work is required before the application can be considered further.** The field appraisal has identified environmental and/or social issues that have not been adequately addressed. The following work needs to be undertaken before further consideration of the application:

All required documentation such as an amended application, ESMP, RAP/ARAP, or PMP will be added to the sub-projects file before the sub-projects is considered further.

Name of field appraisal officer (print): .....

Signature: .....**Date:** ……

ANNEX 5. GUIDELINES FOR ANNUAL REPORT

Name of the Project: Application Number:
(Zambia Water Resources Development Project)

1. Name of District or Local Government:

2. Name and Position of Review Authority Completing the Annual Report:

3. Reporting Year:

4. Date of Report:

5. Small Water Infrastructure Sub-project (s):

Please enter the numbers of sub-projects in the following table.

Types of Activities	Approved this year	Application included an ESMF checklist	Field Appraisal	EMP	PMP	RAP/ARAP	Specific TA
Small Dams and Reservoirs							
Earth dam Construction							
Earth dam rehabilitation							
Community reservoirs							
Water harvesting facility							
Gravity water schemes							
Small scale irrigation							
Survey of Irrigation Scheme							
Construction of canals and off takes							
Field preparation							

Types of Activities	Approved this year	Application included an ESMF checklist	Field Appraisal	EMP	PMP	RAP/ARAP	Specific TA
Demonstration / market gardens							
Rural access roads							
Surveying							
Grading							
Installation of drifts and culverts							
Small scale fish farming							
Fish pond development							
Demonstration of integrated fish farming							

6. Were there any **unforeseen environmental or social problems** associated with any sub-project approved and implemented this year? If so, please identify the sub-project (s) and summarize the problem (s) and what was or will be done to solve the problem (s). Use a summary table like the one below.

Sub-project	Problem(s)	Actions taken	Actions to be taken

7. Have any **other environmental or social analyses** been carried out by other public or private agencies in your district/province? If so, please describe them briefly.

……

…….

8. Have you noticed any particular **problems with implementing the ESMF** in the past year (e.g. administrative, communications, forms, capacity)? If so, please describe them briefly.

……
……

9. **Training:** Please summarize the training received in your district/province in the past year, as well as key areas of further training you think is needed.

Group	Training Received	Training Needed
Review Authority		
Approval Authority		
Extension Teams		
IOs/Associations		

ANNEX 6. GUIDELINES FOR ANNUAL REVIEWS

Objectives: The objectives of annual reviews of ESMF implementation are two-fold:

a) To assess Project performance in complying with ESMF procedures, learn lessons, and improve future performance; and

b) To assess the occurrence of, and potential for, cumulative impacts due to ZWRDP-funded and other development activities.

The annual reviews are intended to be used by ZWRDP management (PMT) to improve procedures and capacity for integrating natural resources and environmental/social management into project operations. They will also be a principal source of information to Bank supervision missions.

Scope of Work: ESMF Performance Assessment

The overall scope of the performance assessment work is to:

a) Assess the adequacy of the sub-project approval process and procedures based on interviews with project participants, project records, and the environmental and social performance of a sample of approved sub-projects;
b) Assess the adequacy of ESMF roles and responsibilities, procedures, forms, information resource materials, etc.;
c) Assess the needs for further training and capacity building;
d) Identify key risks to the environmental and social sustainability of sub-projects; and
e) Recommend appropriate measures for improving ESMF performance.

The following tasks will be typical:

a) Review provincial and district records of sub-projects preparation and approval (e.g. applications; screening checklists; ESMPs, RAP/ARAPs and PMPs appraisal forms; approval documents), monitoring reports as well as related studies or reports on wider issues of natural resources and environmental management in the country;
b) On the basis of this review, conduct field visits of a sample of approved sub-projects to assess the completeness of planning and implementation work, the adequacy of environmental/social design, and compliance with proposed mitigation measures. The sample should be large enough to be representative and include a substantial proportion of sub-projects that had (or should have had) a field appraisal according to established ESMF criteria (see Section 8.33 Appraisal

and Approval). Sub-projects in sensitive natural or social environments should especially be included.

c) Interview project and district officials responsible for sub-projects appraisal and approval to determine their experience with ESMF implementation, their views on the strengths and weaknesses of the ESMF process, and what should be done to improve performance. Improvements may concern, for example, the process itself, the available tools (e.g. guidelines, forms, and information sheets), the extent and kind of training available, and the amount of financial resources available.
d) Develop recommendations for improving ESMF performance.

Cumulative Impacts Assessment

This part of the annual review assesses the actual or potential cumulative impacts of sub-projects with other sub-projects or development initiatives on the environment, natural resources and community groups. Cumulative impacts result from a number of individual small-scale activities that, on their own, have minimal impacts, but over time and in combination generate a significant impact. For example:

* Decline in groundwater levels or quality due to the construction of numerous wells and the introduction of numerous small-scale irrigation works;

* Overwhelmed or illegal waste and dumping sites due to the inappropriate disposal of increasing amounts of waste materials;

* Illegal poaching of wildlife due to expansion of land under cultivation or increased proximity and access to protected areas through construction of small access roads; and

* Attraction of large migrant populations to communities that have successfully introduced improve social infrastructure (such as schools, health centers or water sources) resulting in overcrowding, depletion of resources (e.g. space, supplies, water), etc.

The function of this assessment is primarily as an "early warning" system for potential cumulative impacts that might otherwise go undetected and unattended to. It will be largely based on the observations of people interviewed during the field work, and trends that may be noticed by district or regional officials. Where cumulative impacts are detected or suspected, recommendations will be made to address the issue, perhaps through more detailed study to clarify matters and what should or can be done about them.

Qualifications for Undertaking Annual Reviews:

The reviews should be undertaken by an individual or small team with training and experience relevant to the likely issues to be encountered (e.g. environmental and natural resources management and land acquisition and resettlement). They should also be familiar with the methods and practices of effective community consultation, and with typical methods and processes for preparing, appraising, approving and implementing small-scale community development projects.

Timing:

Annual reviews should be undertaken after the annual monitoring report has been prepared and before Bank supervision of the project, at the closing of each year of the project. It is expected that each review would require 3-4 weeks of field work (interviews, examination of sub-projects), and that the review report would be completed within 2 weeks of completing the field work.

Outputs:

The principal output is an **annual review report** that documents the review methodology, summarizes the results, and provides practical recommendations. Distinct sections should address: a) ESMF performance and b) cumulative impacts. Annexes should provide the detailed results of the field work, and summarize the number of approved sub-projects by district and their characteristics according to the annual report format (see Annex V). Copies of the annual review report should be delivered to the ZWRDP Steering Committee, to each district/provincial office responsible for appraisal, approval and implementation of sub-projects, and to the World Bank. The Provincial/ Sub-catchment Review Panel may also want to host national or district workshops to review and discuss the review findings and recommendations.

ANNEX 7. SCOPE OF PROJECT ACTIVITIES

The project will finance small-scale infrastructure projects associated with the development of water resources.

The list of possible subprojects to be implemented may include but is not limited to:

Small dams less than 15 meters high
Irrigation canals
Boreholes
Water points
Irrigation equipment
Hydrological or meteorological monitoring stations
Weirs
Small fish farms
Unpaved tertiary access roads or footpaths

The project will *not* finance (negative list):

Large dams (dams over 10 meters or reservoir volume greater than 1 million cubic meters)
Tarred or sealed roads
Projects in protected or critical natural habitats
Projects in disputed areas
Projects in primary forests
Category A subprojects

REFERENCES

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