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ADAPT FOR ENVIRONMENT AND CLIMATE RESILIENCE IN SUDAN (ADAPT!)

INTEGRATED WATER RESOURCES MANAGEMENT GOOD PRACTICES IN SUDAN

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The cover picture illustrates community participation in the construction of water harvesting infrastructure for agricultural production as part of the Wadi El Ku Catchment Management Project in North Darfur State.

Design and layout: Ahmad Reza Amiri

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ACRONYMS

ARC	Agriculture Research Centre
CBOs	Community-Based Organizations
DFID	Department for International Development
DWSU	Drinking Water and Sanitation Unit
FAO	Food and Agriculture Organization
GDP	Growth Domestic Product
GWP	Global Water Partnership
GWWD	Groundwater and Wadis Directorate
IDPs	Internally Displaced Persons
IOM	International Organization for Migration
IWRM	Integrated Water Resources Management
JICA	Japan International Cooperation Agency
LDC	Least Developed Countries
NAPA	National Adaptation Programme for Action
ND	North Darfur
NK	North Kordofan
NRM	Natural Resources Management
SWC	State Water Corporation
UNEP	United Nations Environment Programme
UNICEF	United Nations International Children's Emergency Fund
WEK	Wadi El Ku Catchment Management Project
ZOA	Dutch Non-Governmental Organisation

EXECUTIVE SUMMARY

The ADAPT! project aims to integrate environmental management, governance and climate-resilience best practices into a humanitarian and development programme to help the people of Sudan cope with environmental stress and climate change. IWRM is "a process that promotes coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems." The overall objective of the integrated water resources management (IWRM) theme in ADAPT! is to enhance management, control and use of water resources in a sustainable manner.

Six case studies have been selected and documented as good practices in IWRM to create a baseline that can be used to advocate upscaling of IWRM implementation and provide lessons for others to map out their own IWRM strategy. The case studies are based on the diagnostic criteria of: environmental, economic and social sustainability; gender sensitivity; technical feasibility; participation; scaling up; vertical and horizontal coordination; integration; replicability and adaptability; and reduction of disaster/crisis risks. There is no commonly agreed understanding on good practices. However, the keys to success are influenced by the local political, social, economic and cultural contexts of each country or community; there is no universal approach that can be replicated. Good practices in IWRM can be considered as activities and tools designed to minimize negative effects on the environment and water resources, promote efficient use of resources, improve safety for consumers and foster economic viability.

The selected case studies cover wide geographical locations, various ecological zones and a range of water uses:

1. The Wadi El Ku Catchment Management Project (North Darfur State) demonstrates an IWRM good practice, integrating water science, water planning and natural resources development.
2. The National Adaptation Programme for Action: Climate Change Adaptation Project aims at building the community adaptive capacity to climate change in four pilot areas in Sudan.
3. The Butana Integrated Rural Development Project (Gedaref State) aims to improve the livelihoods and resilience to drought of poor rural households. It particularly demonstrates IWRM good practices in empowering women.
4. The Khewei Water Supply Project (West Kordofan State) demonstrates good IWRM practices in providing safe water supply for domestic uses, reducing overgrazing and maintaining natural resources management. It also reflects the socioeconomic value of water.
5. The Hawata Wad-Elageili Water Supply Improvement Project (Gedaref State) demonstrates an IWRM good practice as it provides an example of a community-based system for sustainable water supply management.
6. The Rural Water for Sudan Project aimed at improved access to safe water, improved livelihood, sanitation and hygiene through establishment of catchment-level water resources management committees that represent key stakeholders and facilitate development of catchment-level water resources management plans through participatory planning processes.

INTRODUCTION

The ADAPT! project aims to increase understanding and ensure integration of environmental management, governance and climate-resilience best practices into humanitarian and development programme delivery. This document is designed to collate information around Integrated Water Resources Management (IWRM) best practices and Sudanese case studies (see Annex 1). It will form a baseline that can be used to inform project design and advocate for the upscaling of IWRM implementation in humanitarian and development programme delivery in Sudan. Although the IWRM concept has been used globally for several years and is accepted as a good practice, its implementation could be further improved, especially in developing countries such as Sudan.

Clarification of IWRM within the context of Sudan will be provided below and its practical implementation described. These will contribute towards changing perceptions from the traditional sectoral approach to the multisectoral integrated approach. Many traditional water projects have elements of an IWRM approach. Therefore, there is no single "best approach". Components of good practices are identified in the following, which also highlights missing management aspects that could enhance water plans, practice and policies.

IWRM good practices cannot simply be copied. Modification according to the local context is needed, as is focusing on IWRM as a process that involves learning, innovating and adapting. It is therefore necessary to document good practices and identify the tools that brought about these practices and disseminate them for possible use.

The perception of IWRM good practices differs greatly, as there is no commonly agreed understanding. The keys to success in IWRM processes are influenced by the political, social, economic and cultural conditions of communities.

Identification of good practices can involve judgment, which requires prior analysis using a set of criteria. This entails deep evaluation or assessment using an agreed set of indicators to avoid confrontation with practitioners. Therefore, in this study, IWRM diagnostics are used instead, and project assessment or evaluation are not considered.

This report focuses on Non-Nile Water. Due to the nature of the study and its limited duration, primary investigation with extensive fieldwork was not possible. Scattered information and data on water resources make it difficult to produce an exhaustive inventory of all good IWRM practices in Sudan. To cover as much variety in terms of water use, geographic spread and elements of IWRM principles, a list of intended filters or diagnostics has been used. Some of the case studies described have been identified based on participation in the IWRM conference "Integrated and Sustainable Management of Non-Nile Water Resources in Sudan, Corinthia Hotel, Khartoum" held in November 2017 and some ongoing projects such as Rural Water for Sudan implemented by a consortium led by ZOA .

The report of the IWRM collated good practices was represented in a national consultative workshop on 28th March 2018 at Paradise Hotel Khartoum and attended by 37 IWRM practitioners and the report further peer reviewed by nine organizations and government institutions (see Annex 2).

IMPORTANCE OF NON-NILE WATER RESOURCES

Non-Nile water resources are vital for Sudan. They are the main source of water for much of the economy. It is estimated about 70 per cent of the population in Sudan depends on Non-Nile Water for domestic uses. They comprise rainfall, seasonal streams, wadis and groundwater.

Sudan receives about 420 billion m^3 of rainfall every year (Salih, 2017). Decline and/or variability in annual rainfall were detected as early as the 1990s, leading to high sediment deposits in irrigation canals and reservoirs and crops failure (Awimbo et al., 2004).

Approximately 300 seasonal streams and wadis yield 2-8 billion m^3 of water per year, influenced by the variable rainfall. These sources are unreliable and their use for irrigation purposes is very limited. However, they are harvested for domestic and livestock uses in rural areas.

Water-bearing geological formations are common and include the Nubian Sandstone and Umrwaba Formations as well as alluvium basins. Information on the extent of groundwater is limited, but some studies (Salih, 1982; Salih and Kheir, 1994; Ali, 1998) estimate total annual recharge at 4 billion m^3. Groundwater is tapped for domestic use and rarely utilized for irrigation because reservoirs and associated aquifers in most parts of the country occur at very great depths (exceeding 100 m). The reserved groundwater is estimated to be about 16 billion m^3. Groundwater covers about 70 per cent of rural areas and 60 per cent of urban areas water supply.

Forest and woodland cover used to be approximately 25 per cent of the total area of the country before the separation of South Sudan and yielded 16 million m^3 of wood and timber for fuel, construction and various industrial purposes. There is great demand for these products, and their exploitation is associated with many detrimental effects on the environment.

Gum arabic is a valuable non-timber forest product harvested by rural communities. It contributes significantly to the gross domestic product (GDP) increase within the agriculture sector. Sudan provides more than 8 per cent of the total global production of gum arabic. All the forest areas depend on rainwater and rainfall in the rain-fed sector, and gum arabic contributes 3.3 per cent of GDP based on the value of its exports.

The agriculture sector accounts for almost 40 per cent of GDP and supports approximately 80 per cent of the population. Almost 97 per cent of exports from Sudan comprise primary agricultural commodities. There are three distinct subsectors of agriculture in Sudan: modern irrigated farming, mechanized rain-fed farming and traditional rain-fed farming. Rain-fed agriculture covers 90 per cent of the cultivated area in Sudan and about 70 per cent of the population depends on it (Awimbo et al., 2004; Ali, 2017). However, productivity in the agricultural sector is declining. This is attributed to land degradation due to inappropriate agricultural expansion, inappropriate policies and planning, overgrazing and the continuous removal of vegetation cover.