

## Mainstreaming of Environmental Flows into Integrated Water Resources Management in the WIO Region: A Workshop for Managers and Policymakers

### Concept Note

#### 1.0 Introduction

Water is essential to all kinds of human development and livelihood support systems and sustains both aquatic and terrestrial ecosystems. However, water resources are now under pressure due to the increase in competing demands and global warming, which have led to complex water management challenges. In recent decades, it has been widely recognised that the impact of human society on the environment is beginning to threaten the basic foundation upon which humans depend for food, shelter and well-being. Increasing demands for water and other natural resources resulting from increased population—compounded by the inappropriate use and poor management of land and water resources—have increased negative effects on economic growth, social welfare and on the coastal and marine environment. Poor management of river basins has resulted in degradation of water catchments, consequently affecting river flows in both quantity and quality with devastating impacts on the downstream, including coastal and marine ecosystems. Such ecosystems suffer from increased inflow of nutrients carried by rivers to the seas and sediment deposits on the sea bottom and variation of flow regimes. The drivers for the change, namely deforestation, overgrazing, and extensive land based rural activities in the upstream catchment areas, play a significant role on the coastal and marine ecology by altering flow regimes and sediment deposition.

Notably, most governments are currently striving to promote effective management of water and catchments in order to meet anticipated requirements in the near and distant futures. Traditionally, the focus has been on providing enough water for human needs, with little attention to the environment. However, it has been recently recognised that provision of water for the environment is one component of an intersectoral water allocation process in which the right to the use of water is distributed amongst various users. Therefore, Environmental Flow Assessments (EFAs) have in recent years gained attention and become a scientifically accepted method for determining the quantity, quality, and timing of flows needed to sustain ecosystems and ecosystem services (King *et al.*, 2008). In this case, provision for environmental flows is currently becoming a central issue in the debate of integrated water resources management in river basins.

Plans for the further development of water resources are being formulated in the framework of Integrated Water Resources Management (IWRM), which seeks to develop and manage water in a manner that maximizes economic and social benefits for multiple water users without degrading ecosystems (GWP, 2000). In essence, IWRM *is a process that promotes the coordinated development and management of water, land and related resources in order to maximise the resultant economic and social welfare in an equitable manner, without compromising the sustainability of vital ecosystems.* It is considered a basic principle in sustainable development and in the search for ways to reconcile multiple and competing water uses with environmental protection.

Integrated Water Resources Management (IWRM) approach which some of the countries in the WIO Region have adopted through reforms in their water sectors, adopts a holistic approach to the management of water resources. However, capacity for IWRM implementation in most of the participating countries has been limited by lack of appropriate decision-making tools for allocating water to various users including water allocation (environmental flows) for sustaining ecological systems that includes coastal and marine ecosystems. To remedy deficiencies in the management of river basins, the SAP proposes to focus on building capacity for Environmental Flow Assessment (EFA) and implementation in the region. EFA is an important decision support tool for the management of river flows because it provides a scientific process of allocating water for various purposes. EFA has certain fundamental benefits in that it allows for informed allocation of river water resources while at the same time allowing adequate volume of river flow to reach the downstream areas where it is required to maintain aquatic and terrestrial ecosystems. The application of EFA is still underdeveloped in most countries in the WIO Region. In this regard, awareness on the value of EFA needs to be created and capacity for EFA implementation developed.

## **2.0 Understanding Environmental Flows and its contribution to IWRM**

Environmental flow (EF) is the water that is left in river ecosystem, or released into it, for the specific purpose of managing the condition of that ecosystem. According to Dyson *et al.*, (2003); Tharme and King, (1998), EF is regarded as the water regime provided within a river, wetland or coastal zone to maintain ecosystems and their benefits. The oft-used definition in the Brisbane Declaration (2007) describes environmental flows as "*the quantity, timing, and quality of water flows required to sustain freshwater and estuarine ecosystems and the human livelihoods and well-being that depend on these ecosystems.*" Different names such as instream flow, environment water requirement, minimum flow requirements, ecological flow, ecological reserve, environmental reserve and riparian flow have been used in the literature. The failure to maintain such flows has led to a decline in the health of many of the world's water dependent ecosystems, largely as a result of increasing pressure from water and catchment developments.

The concept of environmental flows is adaptive and essential to the wider IWRM approach. It is closely linked to the concept of ecosystem services. In real terms, an environmental flow expresses the quantity, quality and timing of water flows required to sustain freshwater and estuarine ecosystems and the human livelihoods and well-being that depend on these ecosystems. A useful way of understanding environmental flows is thinking of 'ecological water demand' in just the same way as there is agricultural or industrial water demand. Environmental flows are effectively a balance between water resources development and the need to protect freshwater-dependent ecosystems. When thinking about environmental flows, it is important to consider all aspects of the river and drainage system. The basin must be viewed from its headwater to the estuarine and coastal environments.

Environmental flows improve water management by ensuring a sustainable water supply meets the needs of people, agriculture, energy, industry and the environment within the limits of availability. The application of environmental flows supports the health of aquatic ecosystems and the well-being of people who depend on them. By providing a system for equitable allocation of water, based on available supply, the application of environmental flows can support development and poverty alleviation. Environmental flow assessments provide the tools and the data necessary to help support decision-making processes, which focus on poverty reduction

contributing to wider national development activities. The beneficiaries of environmental flow protection are numerous, arguably extending to the whole of society. Environmental flow requirements should be viewed not as a use or allocation of water, but as a necessary and desirable outcome of sustainable water management.

Water management planners and other natural resource planners use EFAs to make informed decisions about water management that protect the environment and sustain social and economic development. An important measure for mitigating the potential negative impacts to river ecology caused by changes in the natural river flow is the planned releases of environmental flows downstream from dams, or limits on the amount of water that can be abstracted from a channel.

The actual estimation of environmental flows is complicated by the lack of both understanding and quantitative data on relationships between river flows and the multiple components of river ecology. However, the major criteria for determining environmental flows should include the maintenance of flow variability, which affects the structural and functional diversity of rivers and their floodplains, and which in turn influences the diversity of aquatic species.

### **3.0 Environmental Flows for sustainable rivers flows management in the WIO Region**

Environmental flow is a core component of Integrated Water Resources Management. It improves water management by ensuring a sustainable water supply to meet the needs of people, agriculture, energy, industry and the environment. The loss of natural flow regimes disrupts the productivity of freshwater and estuarine fisheries and of flood-recession agriculture. Communities downstream face increasing conflict over water access and lose the resilience needed to cope with water scarcity and climate change. Environmental flows provide tools to coordinate upstream-downstream water allocations in order to maintain healthy ecosystems and vital services.

The mainstreaming of environmental flow into IWRM is now a reality to some of the WIO Region countries, as provided in their policies and legislations. South Africa and Tanzania have been in the forefront within the WIO Region. Tanzania in particular has recently implemented environmental flows in preparations of integrated water resources management and development plans (IWRMDP) for its hydrological basins using varied approaches, varying from simple hydrology-based look-up tables to complex holistic methods. The lessons from EFA for IWRMDP culminated in the development of harmonized guidelines (URT, 2016) to aid the Environment Water Requirement (EWR) assessment. The guidelines have been developed from experiences gained during environmental water assessments in five basins, namely the Wami-Ruvu (Wami and Ruvu Rivers), Rufiji (upper Great Ruaha and Kilombero River Catchments), Lake Victoria (Mara River), Pangani, and Lake Rukwa (Katuma and Songwe Rivers). The guidelines provide guides for carrying out EWA for different types of water bodies in Tanzania and a set of rules related to how the EWA process shall be conducted.

### **4.0 Some lessons for successful EFA implementation**

Adoption and implementation requires that environmental flows be incorporated into water policies and national legislation. These must include mechanisms for negotiated consensus on flow allocation among all stakeholders. And realizing the full benefit requires coordination of stakeholders at the different levels, including the grassroots level. It requires a paradigm shift

from traditional systems based on command and control to an incentive-based system with major drivers on maintaining environmental flows, stakeholder participation, and the use of modern and emerging technologies in water and catchment management.

Implementing environmental flows requires adaptive management, based on a 'learning by doing' approach. Flexibility is required to effectively negotiate the objectives and outcomes of environmental flows. Effective implementation of environmental flows can help to achieve the wise use of catchments and natural resources and contribute to all SDGs, particularly SDG 6, 14 and 15.

Finally, **"The success or failure to mainstream environmental flows in water management will depend on whether it has a place in national legislation (IUCN, *Managing Water Allocation and Trade-Offs*)"**.

## 5.0 The WIO EFlows Guidelines

The Guidelines on EFlows Assessments for the Western Indian Ocean (WIO) region supported by the WIOSAP 2019 project were launched during the regional inter-governmental meeting of the 3rd Project Steering Committee of the WIOSAP Project on the 26th of June 2019 in Durban.

The Guidelines provide support on EFlows Assessments for rivers and estuaries with a view to enabling a harmonized approach to such assessments across the region in order to enhance protection of the WIO, in particular the near-shore ecosystems. The document is intended for use by government agencies responsible for river basin management, national research institutions, regional organizations and civil society organizations playing a role in the management of water resources.

The Guidelines focus on EFlows Assessments, including EFlows Assessment methods and the information provided by different methods; undertaking EFlows Assessments and managing data limitations. They also provide guidance on mainstreaming EFlows, in particular building technical capacity in EFlows Assessments.

## 6.0 Objectives

The Contracting Parties to the Nairobi Convention have received funding from the Global Environment Facility (GEF) to implement a Programme entitled 'Implementation of the Strategic Action Programme for the protection of the Western Indian Ocean from land-based sources and activities' (WIOSAP). The Project is intended 'to reduce impacts from land-based sources and activities and sustainably manage critical coastal and marine ecosystems through the implementation of the agreed WIO-SAP priorities with the support of partnerships at national and regional levels'. **Component C: Sustainable management of river flows** aims at promoting wise management of river basins in the region through implementation of a suite of activities aimed at building the capacity for environmental flows assessment and application in river basins of the region.

The overall objective of the workshop is to share experiences, discuss and appreciate the relevance and mainstreaming of E-Flows in Integrated Water Resource Management (IWRM) in the region. Specific objectives will include enhanced understanding on the:

1. Ecosystem goods and services provided by river basins
2. Link between upstream river basin related processes on the coastal and marine environment downstream
3. Contemporary drivers of change facing river basins in the region
4. Necessary policy/legal/institutional frameworks for river flows management in the region
5. Participatory negotiation of objectives for river and estuarine ecosystem management
6. Development of managerial and technical capacity in E-Flows

The main expected outputs of the Workshop include:

1. Appreciation of the socio-economic and ecological value of river basins and challenges in their management
2. Understanding of the supporting policy and institutional frameworks for river flow management
3. Enhanced capacity in the negotiation of objectives for river and estuarine ecosystem management
4. Identification of capacity for E-Flows adoption and application at the national level.

The workshop will include a broad introduction to the guidelines but will focus on the value and application of EFlows in IWRM, and related frameworks, such as SDGs and Aichi Targets. Accordingly, it will include presentations and practical sessions on:

- the nature and functioning of river systems, and the impacts of water-resource developments;
- policy frameworks with reference to EFlows in selected WIO countries;
- negotiating objectives for river and estuarine ecosystem status;
- managing an EFlows Assessment: Tools and guidance
- building managerial and technical capacity in EFlows;
- EFlows information systems;
- EFlows in practice:
  - participants share their experiences on the adoption and application of EFlows in IWRM.
  - case studies.

The workshop will focus on river basin managers and policy makers in the WIO region as the main audience and will be delivered through plenary presentations and targeted group activities.