

Policy Brief

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Policy paths for the Restoration of the Iraqi Marshlands



Key Findings

Attempts at restoring the Iraqi Marshlands started in 2003 through re-flooding programmes; however, these efforts were initiated without systematic planning and management. While the situation improved, these efforts did not ensure that the overall wellbeing of the ecosystem was maximized as a function of the water quantity and quality made available for the marshes. Several national as well as international restoration plans have since been implemented. Yet, measuring the success of these plans has been hindered by the paucity of data. The key messages for decision makers include:

- ❖ Securing the quantity and quality of water to the marshlands to restore ecological function
- ❖ The implementation of field monitoring programmes, along with data management systems, models and finances
- ❖ Cooperative management of Euphrates-Tigris water resources
- ❖ Finally, improving the poor socio-economic conditions within the marshlands could play a critical role in the success of their restoration.

Policy Implications

There have been important efforts since 2003 to restore the environmentally critical Iraqi Marshlands. The hydrologic conditions in the Euphrates-Tigris Basin, declining water quality, and increased water requirements, have major impacts on the health of the marshlands and on restoration initiatives.

Recent trends in declining river flows and worsening water quality highlight the need for plans to further these restoration efforts with focus on the potential impacts of water quality deterioration and especially the increase in salinity. Restoration plans need to be closely linked to overall water allocation plans across the entire Euphrates-Tigris Basin (i.e. agricultural, industrial, and domestic water supply).

- Additional water made available from the Karun and Karkha rivers would play a significant role towards the restoration of the Hammar and Huwaiza marshes.
- Negotiations with the Iranian government will be needed to allow flows from these rivers to reach the marshlands and Shatt Al Arab.
- The current dependency of the Hammar on water flows from the Main Outfall Drain (MOD) should be reassessed in light of poor water quality.

To understand and manage salinity impacts sections of the marshes with differing salinity levels should be monitored to assess the effects on vegetation diversity and growth, species richness, and spread of alien species.

- This will require instrumentation and data collection over several years.
- These and other studies will be critical to forecasting and managing the future state of the marshlands.

POLICY PATHS FOR THE RESTORATION OF THE IRAQI MARSHLANDS

INTRODUCTION

This policy brief is based on insights gained from research carried out by the Marshlands Task Force (TF-M) within the Cooperative Programme Euphrates and Tigris project (CPET). The brief responds to the Center for the Restoration of the Iraqi Marshlands and Wetlands (CRIMW), Ministry of Water Resources, Iraq's agenda for creating a more strategic plan for the restoration of the Iraqi Marshlands, and increasing coordination between different influencing countries, initiatives and objectives. This policy brief summarizes the key points from the TF-M Response to the Restoration Initiative: Consultation Report submitted in December 2017.

The Iraqi Marshlands are the largest wetland in Southwest Asia. Historically, they extended over more than 20,000 km² of the area surrounding the confluence of the Euphrates and Tigris Rivers (Euphrates-Tigris) in southern Iraq and part of southwestern Iran. The Tigris and the Euphrates rivers are primarily fed from the Taurus Mountain Range in Turkey, with additional flow coming from the rivers' transboundary water basins that encompass Turkey, Iran, Syria, and Saudi Arabia.

Historically, the marshes functioned as flood retention basins for excess upstream water. They consist of several once interconnected wetland systems. The three main remaining marshes are 1) the **Huwaiza Marsh**; 2) the **Central Marsh**; and 3) the **Hammar Marsh**. These three Marshes, with their exceptional biodiversity and cultural richness, represent an ecosystem of fundamental historical, cultural, socio-economic, and environmental importance to both natural and human life in the region. They provide natural controls on the variations in climate, a central habitat for unique plant and animal species, and a settlement and migratory flyway point for many bird species. The marshes also act as a natural purifying system for the rivers, preventing the degradation of the Gulf.

Beyond their environmental importance, the Marshlands, also known as the "Garden of Eden", hold a central place in the world's cultural heritage. They have supported human settlements for more than 6,000 years, with the Marsh Arabs representing

an iconic embodiment of the intertwined connection between the marshes and the people of the area. The marshes also constitute an area of vital socio-economic significance for Iraqis.

It is estimated that between 1973-76 and 2000 around 86% of primary wetlands disappeared. The health of the marshland ecosystems is affected by many factors that include political, socio-economic, hydrological, and anthropogenic developments. The construction of upstream dams, diversions, and embankments by the Euphrates-Tigris riparian countries has significantly reduced flows to the marshlands and limited the seasonal floods. Another major stressor to the marshlands is drainage, whereby wetland and marshland areas have been converted into urban, industrial, agricultural, or oil & gas fields. Such developments, particularly the agricultural, have resulted in reduced water availability to the marshlands.

Recognising their importance, there have been various restoration efforts of Iraqi marshlands-wetlands since the year 2003. The main objective of the Marshlands Task Force was to examine the management and restoration plans developed, with an emphasis on the Huwaiza, Central, and Hammar marshes. The status of the marshlands with regards to their inundation areas and vegetation cover was also assessed using Landsat-based remote sensing. The analysis quantifies the spatiotemporal changes that have occurred in these marshlands over the past 30 years, tracking changes in water coverage, wetness extent, and vegetation indices. Water quality and quantity of the main sources feeding the marshes were also examined to establish the correlations between marshland coverage and anthropogenic alterations. The task force's work plan was subdivided into two main activities:

- Delineating the extent of the existing marshland areas and tracking their historic evolution and conditions regarding anthropogenic disturbances and the restoration attempts implemented
- Assessing the current health of the marshes using remote sensing, water quality and quantity data, and available literature

This policy brief attempts to outline key steps towards the development of a strategic plan for the restoration of the marshes.

STUDY FINDINGS

The health of the marshlands is a function of the water quality and quantity flowing to them. While the marshes are resilient to natural seasonal and annual fluctuations in both water quality and quantity, increased anthropogenic stressors in the Euphrates-Tigris basins have pushed the systems beyond their buffering capacities. This study analysed the current water condition in terms of quality and quantity of water required for re-flooding the marshes. Accordingly, links were established between water requirements for re-flooding the marshes and water availability in the Euphrates-Tigris. At the present time, irrigation consumes most of the water that could be used for reflooding. The total agricultural water needs were found to be significantly higher than the actual available water from the Euphrates-Tigris. Therefore, when agricultural water demands are met, little if any water is left for the restoration of the marshlands. Monitoring programmes have been developed by CRIMW to track the quality of the water reaching the marshlands.

The Euphrates-Tigris basin, like many other large river systems, experienced major changes in its land cover and land use over-time. This is a result of anthropogenic interventions within their contributing areas. Many of these changes focused on controlling and altering the natural hydrology of these two rivers, utilizing the water, and ultimately modifying the flooding regimes. These changes have impacted the marshlands negatively both with regards to water availability and water quality. In an effort to capture the impact of these changes on the marshlands, the use of remotely sensed data collected through the Landsat programme has been critical. Remotely sensed data effectively covers the large spatial extent of the Iraqi marshlands and overcomes issues related to the limited accessibility to parts of the marshlands. Data collected from Landsat 4, 5, 7, and 8 were used in this study to reconstruct the temporal changes in marshland coverage as well as health. The Landsat image record shows a significant change in the spatial extent of the healthy vegetative cover over time in the three marshes.

While in the late 1980s, most of the Huwaiza Marshland was healthy, the southern section was adversely affected post 2000. In 1991, the marsh appears to have been adversely affected by the drought of 1990, which was one of the driest years on record. The southern section of the Huwaiza was

the most affected - a consequence of the Karkheh diversion and the construction of embankments, levees, and dykes on both the Iranian and Iraqi sides. While some of the southern sections started to recover, as witnessed in 2011 and 2015, the lack of flow from the Karkheh into the marshlands has constrained recovery in its southern portions. Moreover, the discharge of polluted and highly saline water from the Iranian side into the marsh is expected to have also played a role in the demise of the south-eastern section of the Huwaiza.

In the case of both the Hammar and Central Marshlands, drainage efforts in the late 1990s and early 2000s almost completely wiped out these marshes, converting lush vegetative cover into a wasteland. Restoration efforts in the Hammar have focused on reflooding the marsh using the MOD drainage water combined with water from the Euphrates. These efforts reversed some of the losses with the western part of the marshland seemingly revegetated by 2011. In 2015, however, the extent of recovered vegetation appears to have declined due to both the dry conditions and the increase in the salinity of the water being delivered by the MOD. Future plans envision measures for regulation to better control water flows and salinities. The current reliance on the high salinity MOD water is a major source of concern to the full recovery of the marsh, especially the western section. The eastern section suffers from the migration of the salt-wedge upstream in the Shatt Al Arab due to low flow from the Euphrates-Tigris and the Iranian diversions of water away from the river.

Drainage initiatives in the late 1990s and early 2000s almost completely drained the marsh and converted its lush vegetative cover into a wasteland. Restoration efforts in the Central Marshland have focused on reflooding the marsh using water from both the Euphrates and Tigris rivers. However, its restoration lagged behind the progress made in the Hammar and Huwaiza; the Central Marshland still had little vegetative cover in 2012. Restoration efforts do appear to have accelerated post 2012 with a visible improvement. Currently, the core area of the marsh still appears to have large unhealthy sections, particularly in the east. The planned increase in water diversion from the Tigris to the Central Marshland should help alleviate some of these shortcomings.

CONCLUDING REMARKS AND RECOMMENDATIONS

Several challenges were identified during this study. These include:

1. Scarcity, pollution & overuse of upstream water resources
2. Lack of awareness of the social and ecological importance of wetlands
3. Lack of information on the economic value and financial revenues derived from the marshlands
4. Interference of tasks and intersection between state institutions
5. The National Commission for the Marshlands and Wetlands of Iraq is not legislated
6. The security situation in some governorates remains a concern
7. The dire conditions of the Marsh Arabs and especially the women and children. This is catalyzing an exodus from the marshlands
8. Lack of execution of laws and the implementation of legislation that serve to protect the wetlands
9. Lack of accurate digital elevation models needed to better model the hydrodynamics for the marshlands
10. Difficulty of access to the marshlands for field visits

Prospective management plans for the marshlands should target the following areas:

1. Increase the distribution of monitoring equipment within the marshlands. Equip CRIMW with an environmental data management solution to better assess the spatiotemporal trends in collected data. Provide training in the use and maintenance of both equipment and software.
2. Assessing marshland biodiversity as a function of salinity is of high importance and requires the setting up field experimental stations across all three marshlands. Drones could be used to geospatially monitor the marshlands in the areas that are currently hard to reach. Alternatively, a low-maintenance cost fixed-wing aircrafts or helicopters equipped with imaging equipment could be used by CRIMW
3. Priority provision of software licensing and training for CRIMW employees for the hydrodynamic software and remote sensing programmes (ArcGIS and ERDAS) that are currently used by the Iraqi delegation.
4. Instrument the marshlands to better estimate the temporal variation of evapotranspiration as a function of vegetation cover and inundation area. This to inform inundation schedules and restoration efforts.
5. Expand the existing hydrological and water quality modelling work in order to assess options to limit and ultimately stop the reliance on the polluted waters delivered through the Main Outfall Drain to the Al-Hammar. The work should also explore the economic and technological constraints associated with treating the Main Outfall Drain water to levels suitable for marshland use.
6. Ensure that the planned increase in water diversion from the Tigris to the Central Marsh is

implemented. Take care that this diversion should not have an impact on the water available for the Huwaiza Marsh.

7. Update the monthly analysis of the New Eden project with actual monthly measurements that account for the temporal variability in flows, irrigation requirements, water diversions, and losses (e.g. evapotranspiration).
8. Establish linkages between the hydrodynamic models developed for the marshlands and the calibrated HYPE hydrological model developed for the rivers, while accounting for water extractions due to consumptive uses. This will allow for a holistic understanding of the direct and indirect effects of flow variations from the rivers.
9. Explore the implementation of a pilot project to reuse treated wastewater effluent to feed the marshlands (e.g. the Huwaiza Marsh from the treated effluent of Al-Ammara). Discharge limits for wastewater quality must be determined and defined. This will require the development of a field experimental programme that tracks the behaviour of the marshlands as a function of the water quality.
10. Plan for a site visit of the CPET taskforce to the marshlands to better understand the situation at hand.
11. Plan and administer surveys targeting gender mainstreaming in the marshlands and the surrounding areas. These surveys would update knowledge on the involvement and role of women in decision making with regard to marshland restoration and rehabilitation.
12. Grow gender awareness, reduce inequalities, and increase the involvement of women in decision-making.
13. Elaborate on the planning and management scenarios that were deemed by the taskforce as important for the survival of the marshlands.

Planning and management scenarios

Scenario 1: Impact of Karkheh River on Huwaiza Marsh. The focus is on researching the change in Huwaiza water quality and quantity when relying on the Karkheh for reflooding processes. Planned agriculture would be taken into account - focusing on the type of crops, time of the year, irrigation schedule and rates. Several restoration targets and reflooding rates would be considered.

Scenario 2: Impact of the Karun River on the marshlands. The main focus would be to examine the change in reflooding rates and the annual water requirements for different flooded areas relying on Karun River water availability.

Scenario 3: Impact of the Main Outfall Drain on Hammar This targets water quantity and quality of the MOD and its effect on the Hammar Marsh restoration. Salinity levels and various water flows from Al Khamissiya channel would be considered for various re-flooding rates and flooded areas.

Scenario 4: Impacts of anthropogenic activities on the Marshlands. Anthropogenic activities cause significant pressures on water availability, resulting in water scarcity and dryness across the area. Water requirements of the overall area of the marshland would be generated along with annual water requirement for the different re-flooding levels.