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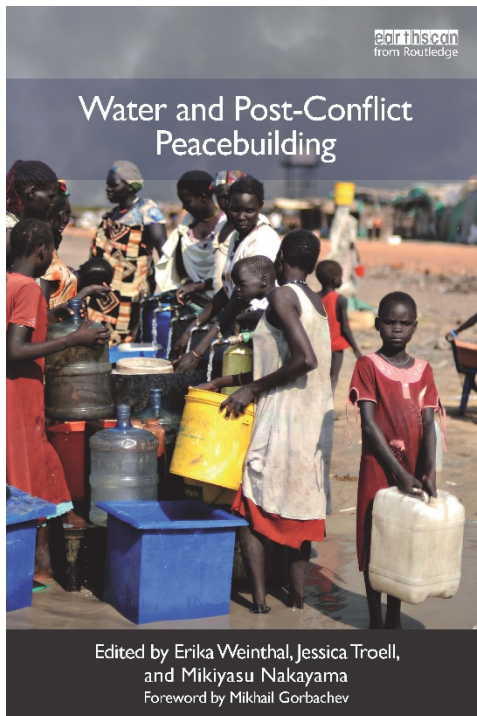
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Environmental management of the Iraqi marshlands in the post-conflict period

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Environmental management of the Iraqi marshlands in the post-conflict period

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As part of United Nations assistance for the reconstruction of Iraq, the United Nations Environment Programme (UNEP) implemented a large-scale initiative—the Iraqi Marshlands Project—in the Iraqi marshlands to address critical environmental degradation that hampered the stability and livelihoods of the marshland communities. The project demonstrated environmentally sound technologies (ESTs) and management practices for rehabilitating wetlands and maintaining water quality, supplied safe drinking water to residents in selected rural communities, and provided pilot-scale sanitation services.

This chapter summarizes two types of natural resource management activities undertaken within the project: drinking-water provision and wetland rehabilitation. The period examined is from the inception of the UNEP project in mid-2004 to 2008, during the reconstruction phase after the fall of the Saddam Hussein regime. It covers a period in which significant changes occurred in the institutional landscape, from the transfer of sovereignty to the establishment of a permanent government.

THE IRAQI MARSHLANDS

The Iraqi marshlands, the largest wetland ecosystem in the Middle East, have environmental, historical, and sociocultural significance. Located in the areas surrounding the confluence of the Euphrates and Tigris rivers in the governorates of Basra, Maysan, and Dhiqar in southern Iraq, the Iraqi marshlands consist of

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the interconnected wetland systems of the Central Marsh, Hammar Marsh, and Hwaizeh Marsh (see figure 1).

In 2001, UNEP alerted the world about the marshlands' destruction when it released satellite images showing that 90 percent of the marshlands had already been lost (UNEP 2007b). By the time the regime of Saddam Hussein collapsed in 2003, these marshlands were almost entirely destroyed. Numerous engineering structures, including more than thirty large dams, had been built along the Tigris and Euphrates rivers over the previous hundred years to control water flow and for irrigation, public water supply, and hydroelectric power generation (MOE, MWR, and MMPW 2006). During the 1990s, extensive drainage structures were built for the primary purpose of drying out the marshes. For example, initiatives were carried out to divert water for irrigation, to build railways and other transportation infrastructure by filling wetland areas, and to build canals and dikes to control water flow, limiting the number of water release points to the wetland system and reducing the overall flow.

The destruction of the area is also attributed in large part to deliberate acts by the regime of Saddam Hussein, who was retaliating against political factions in the area that opposed his regime. In order to tighten security and control, the regime sought to destroy natural landscapes that provided hiding places and to force migration away from the marshlands. A significant number of Iraqis suffered oppression and persecution, and the regime's actions led to systematic

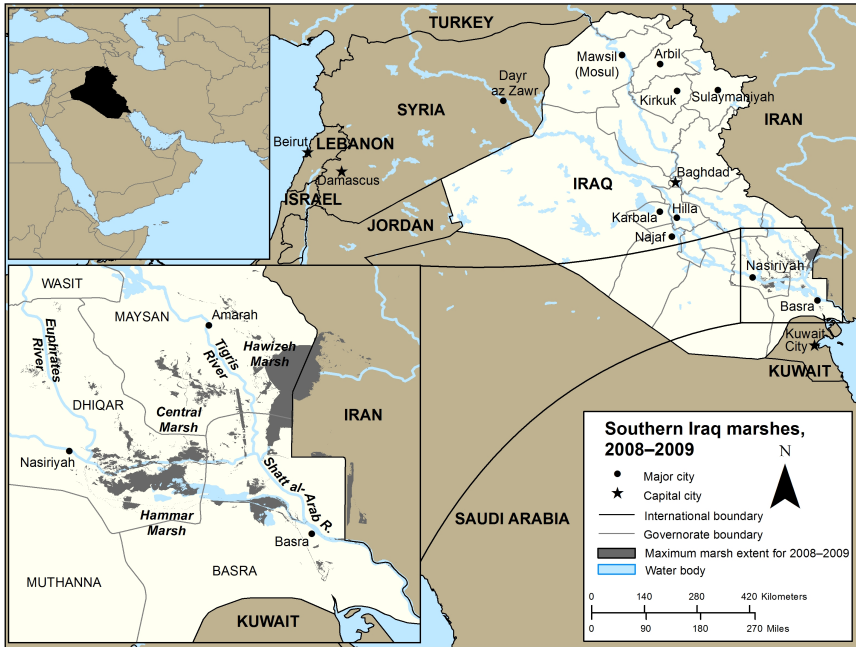


Figure 1. Location of the southern Iraq marshes, 2008–2009

Source: CIMI (2010).

shrinkage of the marshlands’ area and to associated damage to the ecosystem and to the livelihoods of the local residents.

A socioeconomic survey that UNEP conducted with Thi-Qar University in 2007 assessed specific negative effects that the marshland villages faced during the Saddam Hussein regime (UNEP 2007a). More than half of the 199 villages surveyed experienced intentional negative effects, including destruction, bombing, and burning. Eighty-two percent of the villages experienced displacement, 37 percent experienced destruction, and 12 percent were bombed (see table 1). More than a third of the marshland villages were affected by multiple negative effects,

Table 1. Types of negative effects on surveyed Iraqi marshland villages during the Saddam Hussein regime

Governorate	Number of villages affected			
	Destruction	Bombing	Burning	Displacement
Dhiqar	19	3	3	37
Maysan	24	16	4	64
Basra	30	4	1	62
Total	73	23	8	163
Percentage	37%	12%	4%	82%

Source: UNEP (2007a).

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with nearly two-thirds of the surveyed villages in Dhiqar affected by multiple negative effects.

UNEP'S IRAQI MARSHLANDS PROJECT

Natural resource management concerns in the marshlands area, particularly marshland degradation and the lack of safe water and sanitation, along with the displacement of a large percentage of the indigenous population, were identified as critical problems in a joint needs assessment conducted by the United Nations and the World Bank (UN and World Bank 2003) and were considered priority reconstruction needs (UN 2003; USAID 2004). The Iraqi authorities requested help from UNEP, identifying management of the marshlands, provision of water and sanitation, and capacity building as priorities for reconstruction.

With this background and motivation, the United Nations Development Group's Iraq Trust Fund endorsed UNEP's Iraqi Marshlands Project in July 2004. The United Nations and the World Bank had established the Iraq Trust Fund under the International Reconstruction Fund Facility for Iraq (IRFFI), in 2004, in response to international requests for coordination of donor support for reconstruction and development in Iraq, and in close consultation with Iraqi authorities and donors. The IRFFI emphasized supporting projects that addressed Iraqi priorities, including those identified in the 2003 joint needs assessment.

The development goal of the first phase of the UNEP project was

to support the sustainable management and restoration of the Iraqi marshlands, with the following immediate objectives:

1. To monitor and assess baseline characteristics of the marshland conditions, to provide objective and up-to-date information and to disseminate tools needed for assessment and management
2. To build capacity of Iraqi decision-makers and community representatives on aspects of marshland management including: policy and institutional aspects; technical subjects; and analytical tools
3. To identify . . . EST options suitable for immediate provision of drinking water and sanitation as well as wetland management, and to implement them on a pilot basis
4. To identify needs for additional strategy formulation and coordination for the development of a longer-term marshland management plan based on pilot results and cross-sectoral dialogue (UNEP 2009b, 15).

Although the primary focus of the project was on environmental management and basic service provision, the project also played an important role in socio-economic reconstruction for the local population because traditional livelihood activities in the area—such as agriculture, fishing, livestock rearing, and handicraft production—rely significantly on the marshlands.

Iraq's Ministry of Environment took the lead on the project, and cooperation was established with the Ministry of Water Resources and the Ministry of

Municipalities and Public Works. The Ministry of Environment had been established for the first time in 2003 under the Iraqi Governing Council. Previously, environmental management had been assigned to the Environmental Protection and Improvement Directorate within the Ministry of Health. The new ministry was staffed by personnel from the directorate and additional personnel who had been reassigned from various other ministries. Due to the newness of the environmental field in Iraq and limited access to outside educational opportunities during the sanctions, human and institutional capacity were in need of robust support.¹ Other main actors for the project included governorate councils from Basra, Maysan, and Dhiqar, local groups such as the Marsh Arab Forum, local universities, and nongovernmental organizations.

Provision of drinking water

Access to safe drinking water was the top priority for residents of small rural communities in the marshlands. Many rural residents depend on traditional activities such as agriculture, fishing, animal rearing, reed harvesting, or making of reed products for their livelihoods. These activities are small in scale, and residents tend to live in small tribal clusters along the fringe of the marshlands.

Lack of access to safe drinking water resulted from the presence of brackish water in some areas of the reflooded marshlands and the absence of infrastructure for water provision there.² Safe water was available only in nearby town centers, and treated water had to be transported by trucks if it was to reach the marshland villages. The supplies that reached the villages in this mode tended to be of inadequate quantity and unreliable quality due to the debilitation of the infrastructure for water treatment and transport. In addition, these supplies were too costly for many residents.

Surface water and tanker trucks are classified as unimproved drinking-water sources. Replacing them with improved drinking-water sources is necessary for movement toward meeting target 10 of the Millennium Development Goals (MDGs), which calls for cutting in half the proportion of the world's population without sustainable access to safe drinking water and basic sanitation by 2015 (WHO and UNICEF 2006). One of the main challenges addressed by the UNEP project was to provide access to a safe and improved drinking-water supply in an environmentally sound manner. Pilot projects on drinking-water provision were implemented through the UNEP project to address this challenge.

¹ The United Nations Security Council imposed economic sanctions against Iraq in response to Saddam Hussein's invasion of Kuwait. The sanctions were in place from August 1990 until Saddam Hussein was removed from power in May 2003.

² Significant efforts have been undertaken by various institutions to assess the water quality in different parts of the marshlands since the project commenced. For instance, water quality and other parameters in four marshes were monitored from 2003 to 2005 with support from the U.S. Agency for International Development (Richardson and Hussain 2006).

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To identify intervention areas that could be covered by the resources available, project personnel began by adopting a process by which stakeholders could participate in the selection of communities for intervention. First, they solicited proposals from the Iraqi ministries of Environment, Water Resources, and Municipalities and Public Works, and from community groups from the three governorates, such as the Marsh Arab Forums, which consist of nominated representatives of tribes in each area. Next they applied technical selection criteria developed by UNEP, including community size, physical stability of sites, road access, and existence of similar facilities. The project leaders also consulted external data on service availability and lists of communities receiving support, and considered geographical distribution over the three southern governorates. Finally, the project personnel and stakeholder representatives reached a consensus on site selection on the basis of discussions.

The selections were finalized at the Technical Meeting on Pilot Project Implementation held with Iraqi stakeholders in Amman, Jordan, in February 2005. The selection procedure and criteria were communicated clearly to the Iraqi stakeholders, and no issues arose with the process or the representation. Iraqi institutions assumed the responsibility of collecting documentation and presenting the candidate sites.

Six communities for pilot implementation were selected from the eighteen candidates proposed: Kirmashiya, Badir Rumaidh, Masahab, Jeweber, Hadam, and Sewelmat. The community representatives from the Marsh Arab Forums in the three governorates pledged to facilitate access to the sites and provide security for the facilities. Such active participation of local communities was one of the key factors in the successful implementation of the pilot project.

The provision of clean drinking water commenced in early 2006. Distribution pipelines and common taps were installed in the six villages to improve access. The facilities, worth US\$4.7 million, have the capacity to serve up to 22,000 residents (UNEP 2007b), making a tangible contribution toward target 10 of the MDGs. The project provided operator training, as well as support for operation and maintenance for a one-year period following installation. In June 2007 the completed facilities were officially handed over to the Ministry of Municipalities and Public Works, which is responsible for public water service provision and management in Iraq. To prepare for the handover and ensure sustainability of operations, technical dossiers were created to enable the ministry's water directorate to continue operation and maintenance of the facilities. The plant manufacturer also organized technology and management training for ministry officials. Finally, UNEP handed over a warehouse with spare parts and chemicals necessary for maintenance.

In response to a request for further support from Iraqi stakeholders, UNEP implemented drinking-water provision in a seventh community, the village of Ghreej in Dhiqar Governorate. This facility, which utilizes diesel-powered generators and photovoltaic panels to meet its energy needs, serves approximately 3,000 people and was transferred to the Ministry of Municipalities and Public

Works in 2009 (UNEP 2009b). The water treatment technologies are the same as for the six facilities in the first phase of the project; this allows for ease of continued operation and maintenance by the Ministry of Municipalities and Public Works.

Wetland rehabilitation

When displaced residents returned to the marshlands following the collapse of Saddam Hussein's regime, some people breached dikes to reintroduce water into dried areas. Such reflooding of the marshlands took place in a haphazard manner, until the Ministry of Water Resources assumed control of the reflooding process. Although the reflooding brought back life in some areas in 2003 and 2004, the extensive decade-long drying had resulted in accumulation of salts and other substances, causing degradation of the wetlands in many areas. Human settlements without adequate sanitation facilities also caused contamination of reflooded areas. Furthermore, upstream hydrological infrastructure reduced water flow, and there were seasonal variations in the amount of water available for flooding the marshlands.³

As the reflooding continued and the residents resettled, the need to study optimal hydrological options for reflooding with the available quantity of water emerged. Such an analysis was carried out by Iraqi authorities with international support from Italy and the United States. The New Eden Project, supported by the Italian Ministry for the Environment, Land and Sea beginning in 2003, evaluated the state of the marshlands, developed water allocation strategies, and identified actions, priorities, and costs related to development of the region. The Italian-developed New Eden Master Plan for Integrated Water Resources Management in the Marshlands Area was presented in 2006 to assist Iraqi policy makers by providing sound data analysis and analytical tools to make choices regarding water resource allocation and environmental management (MOE, MWR, and MMPW 2006). Also, a U.S. Agency for International Development initiative developed a hydrological model of the Tigris and Euphrates river basins to simulate water allocation and flood control, and it supported development and monitoring of an integrated marsh management plan (USAID 2005).

With this background, the UNEP project investigated the feasibility of ESTs to rehabilitate the degraded wetlands, improving water and wetland quality, while other donors pursued activities related to hydrology and water quantity. A donor coordination mechanism facilitated periodic assessment of gaps and sharing of experiences and data between Iraqi and international institutions. Recognizing the need to coordinate initiatives, several donors had begun meeting in 2003; at the third such meeting, organized by the government of Italy and held in October 2004, UNEP was nominated as a liaison for donor coordination. UNEP then

³ For more information on the varying extent of the Iraqi marshlands and on efforts to restore the marshlands, see Lonergan (2012).

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organized a ministerial donor coordination meeting in November 2005 in Paris and participated in subsequent meetings held in 2006 and 2007.

The pilot project for marshland management and wetland restoration was implemented under an agreement with the Center for Restoration of the Iraqi Marshlands (CRIM) of the Iraqi Ministry of Water Resources. The project conducted field surveys and assessments at the six pilot drinking-water facility sites, analyzing water quality, water flow and volume, vegetation, soil quality, and erosion conditions. For each site, CRIM identified key work required for rehabilitation, including restoration of marshland interconnections, flow regulation through channel connection and irrigation management, application of phytotechnology for replanting and water-quality improvement, separation of domestic wastewater, and dredging and cleaning of canals to manage water flow and quantity. On the basis of discussions with experts, the project identified two sites for in-depth investigation, developed detailed designs of pilot work, and held discussions with local residents to solicit their views on wetland rehabilitation. CRIM then selected one community for the pilot project site.

The selected site, Jeweber, had been dewatered, with 80 percent of the original marsh area remaining dry. Options for marshland rehabilitation included regulating the flow of water through an existing outlet from a nearby marsh, constructing dikes, and replanting the area with *Phragmites australis*. Although most local residents and community leaders extended positive support and cooperation, a small faction threatened the CRIM staff near the end of the project in 2006. It is unclear whether this security incident was related to the specifics of the project. Such security problems temporarily halted the project's implementation, but by the time project management was handed over to CRIM, the project was functioning well, though at less than the intended design capacity. The Iraqi implementing partners continued dialogue with local stakeholders for longer-term management. This illustrated the importance of stakeholder engagement in the selection of suitable locations for intervention.

A second pilot project commenced in early 2008 with the purposes of identifying and demonstrating options to minimize further damage to the wetlands, and of assessing the feasibility of increasing the availability of water for longer-term marshland restoration using constructed-wetland technology. The pilot project targeted the Main Drain, which drains wastewater from Baghdad and upstream areas and has diverted water that used to flow into the marshlands. Pilot project activities included monitoring Main Drain water quality at several locations.

On the basis of preliminary surveys of potential sites, Auda Marsh in Dhiqar Governorate, which was being reflooded with Main Drain water, was selected as a pilot site. The Ministry of Environment took the lead in implementing the pilot work of using constructed-wetland technology for water-quality and wetland improvement. The project also provided targeted capacity building to support project implementation.

The results of the Main Drain water-sampling surveys showed that the quality of Main Drain water would need to be improved before its flow could

be used as a source for marshland reflooding. Pilot activities in water-quality and wetland improvement showed a reduction in concentrations of some pollutants, such as nitrates, phosphates, and suspended solids. The study concluded that longer-term monitoring and control of operating conditions would be needed before researchers could reach definitive conclusions. Also, such wetland improvement activities would need longer-term, sustained availability of water flow, with the cooperation of and coordination with the Ministry of Water Resources. The Ministry of Environment requested such cooperation.

PROJECT IMPACTS

Overall, the interventions generated the impacts originally intended, and in some areas surpassed expectations. As operating conditions worsened during the conflict and media coverage of Iraq focused more on violence, the project was seen as a rare case of good news. The project impacts summarized here have also been articulated in UNEP reports (UNEP 2009a, 2009b).

The project improved living conditions in local communities by providing drinking water to up to 25,000 rural residents, and through demonstration of sanitation and wetland management practices for replication. Tangible contributions to target 10 of the MDGs were made. The terminal project evaluation found that the drinking-water facilities were functioning after the handover, with Iraqi financing of operations and maintenance. The project pioneered the use of modular reverse osmosis container units for water purification in rural areas, and the number of such units funded by the Iraqi government and donors in the marshlands increased significantly. On the other hand, the two-year drought in 2008 and 2009 exacerbated water flow problems and worsened marshland conditions, negatively affecting the sanitation and wetland management pilot projects (UNEP 2011).

The project also generated data on marshland conditions. Water-quality and biodiversity monitoring established baseline data and made possible limited trend analysis of marshland conditions. UNEP's 2007 socioeconomic survey collected previously unavailable data that government ministries used to inform policy making and intervention planning. The relevant ministries were directly engaged in developing the data-collection and analysis methods, and in preparing the survey report.

Because the project contributed to the redevelopment of local communities, anxiety about rebuilding life in the marshlands was reduced, according to third-party monitors. Community-level initiatives that were planned and implemented with local residents and organizations involved over 2,000 participants and enhanced the level of community engagement in marshland management.

Capacity-building activities increased the expertise of Iraqi personnel and institutions, and the project encouraged trained personnel to develop and use their new skills by taking part in pilot projects, data management, and policy assessments. Also, university personnel who participated in training planned and

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executed secondary training courses in Iraq. This linkage between capacity building and project implementation generated various employment opportunities. Altogether, the project held fourteen international training sessions with 314 participants, ten in-country training sessions with 141 participants, and two study tours with twenty-two participants.

Validation of results and impacts

Third parties commissioned by UNEP carried out independent monitoring of the pilot projects. The monitoring and evaluation report for six drinking-water plants was released in September 2006. It concluded that the project, which was successfully implemented under very difficult circumstances, had made “a tremendous impact in confidence building within the communities” (Prodev 2006, 13). The report authors wrote that “the contribution and support given to the returning families of the Iraqi Marshlands through this project is deeply appreciated by the beneficiaries and has to a great extent alleviated suffering and covered the basic humanitarian need for sustaining life” (Prodev 2006, 2). The report also found that the project had encouraged many households to return to their home villages and to reestablish their livelihoods. The number of livestock increased, as did the production of dairy products and of reed-related crafts that could be sold in the urban market centers, “adding to the income generation, employment and generally, the prosperity of the community” (Prodev 2006, 12).

The project team was awarded a 2007 UN21 Award from the UN Secretary-General.⁴ The project was also honored as “a model of international environmental cooperation” by the Iraqi Minister of Environment in 2008.⁵ Community groups indicated in official correspondence that “UNEP is one of the few organizations that has made a real effort at engaging the local communities.”⁶

An assessment of pilot components on sanitation provision and wetland restoration was released in January 2008, with positive evaluations overall (Stars Orbit Consultants 2007). The evaluators concluded that the concepts and technology selected for the project were appropriate and that similar projects might be implemented in other parts of Iraq. The short-term benefits identified included the enhancement of water quality and the marshland environment, and reduction of water-related diseases and infections. The long-term benefits included return of original marshland residents, increased biodiversity, rehabilitation of the agricultural sector, an economic boost, creation of job opportunities, enhancement of the marshland environment, and restoration of the original wetlands.

⁴ The UN21 Award recognizes UN staff members for innovation, efficiency, and excellence in the delivery of programs and services.

⁵ Minister of Environment, official correspondence to United Nations Environment Programme, 2008.

⁶ Personal communication from community groups to United Nations Environment Programme.

To assess the project results and impacts, UNEP organized several project evaluation meetings with stakeholders and donors. In particular, a meeting was held in Kyoto, Japan, in September 2008 to review the outcomes and results achieved in all project phases, and to formulate recommendations for future work to be undertaken by the Iraqi government and the international community to mainstream environmental issues in a sustainable development agenda for Iraq. Other participants in the meeting included high-level officials from the Ministry of Environment and the Ministry of Municipalities and Public Works, and the ambassador of the Republic of Iraq to Japan. The workshop was also attended by representatives from the government of Japan, the government of Italy, the United Nations Educational, Scientific and Cultural Organization (UNESCO), and other institutions. The Iraqi Minister of Environment indicated satisfaction with the project outcomes and benefits, especially concerning the development of ESTs in the marshland ecosystem and capacity building for ministry staff.

Finally, the terminal evaluation of the project, conducted in 2010 and 2011, found that all project activities appear to have been fully implemented with almost no shortcomings. Across the project phases, all of the project components were assessed as “highly satisfactory” except one, which was assessed as “satisfactory” (UNEP 2011).

Factors supporting and preventing positive outcomes

The UNEP project team has concluded that the factors contributing to the positive outcomes are primarily associated with project design, the addressing of immediate needs, involvement of local stakeholders in project decision making, and political will.

The project included multiple activity components, including support for strategy development and coordination, data collection and baseline analysis, capacity building, pilot implementation, and awareness raising and follow-up. Drinking-water provision addressed the immediate needs of the local communities, helping to generate their support and trust. Such support and trust facilitated the implementation of other field-based activities, including the data collection and monitoring that are necessary for effective natural resource management. Capacity building, awareness raising, and other initiatives addressed both immediate and medium-term needs.

The project discussed community needs extensively with stakeholders to incorporate them into project decisions. For example, during an early technical meeting to discuss EST pilot project implementation, stakeholders expressed the overwhelming need for drinking-water provision, and they reiterated this concern during follow-up discussions. As a result, the project allocated a larger share of resources than originally planned to the provision of drinking water to seven communities.

The project prioritized activities that were visible to and had direct benefits for local residents. Resentment was growing during the post-conflict period as

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residents continued to suffer and as their leaders expressed concern that there was insufficient help from international organizations and domestic sources. Therefore, expedited action was fundamental in mobilizing and maintaining local support for the project.

Finally, the government of Iraq demonstrated political will when it recognized the project as a national environmental and humanitarian priority for reconstruction and redevelopment. The Ministry of Environment demonstrated political will when it facilitated the allocation of human and technical resources within the ministry to support the project and took the lead in key activities, such as water-quality and biodiversity monitoring and pilot project implementation. Also, the Ministry of Environment took charge of interministerial and local coordination for the project and presented the project phases to the Iraqi Strategic Review Board, which has the final approval authority on recommendations from the Ministry of Planning and Development Coordination for allocation of international assistance to Iraq.

On the other hand, a number of factors negatively affected the project outcome. They include security concerns; limited availability of human, financial, technical, and other resources; and infrastructure and governance constraints.

Continued terrorism and worsening security at the local level presented unprecedented security and accountability challenges for all actors, including UNEP. For example, UN staff could not enter the country or directly oversee activities on the ground. Ensuring the safety of Iraqi personnel became an overwhelming priority. Moreover, continuing violence during the case study period necessitated prolonged humanitarian relief activities, slowing the move toward development activities in the transition phase. Many interventions related to basic services, such as water treatment, electricity generation, and construction, were halted due to security concerns, and in some cases they were destroyed by terrorism.

Human, financial, and technical resources were limited; this was in part due to the decade-long sanctions against Iraq, which eroded the capacity of Iraqi experts and institutions by restricting their exposure to international practices. In addition, threats, kidnappings, assassinations, and bombings within ministry premises preceded or resulted in the deaths of key partners, drove some to leave their government positions, and compelled others to flee the country altogether. The security risks also limited the number of available and willing contractors, and restricted the availability of goods and services for procurement. Personnel and procurement expenses increased significantly during the project period. Border closings and curfews complicated personnel movement and the transport and installation of equipment, and they caused negative financial impacts associated with stowage fees, contract extensions, and reluctance of vendors in subsequent procurements.

The project implementation period coincided with a period during which the Iraqi governance and institutional landscapes changed significantly. Although the reestablishment of democracy and participatory governance is a welcomed

necessity, the emergence of or changes in multiple institutions and their sometimes competing mandates made it difficult at times for the project to learn which institution was responsible for what.

When Iraq's military and intelligence services were dissolved in May 2003, de-Baathification removed senior officials from government posts. The insurgency and criticism of uneven implementation of the de-Baathification policy led to the gradual partial return of vetted ex-Baathists to government and security positions beginning in 2004. Escalating violence also targeted government workers and public buildings, undermining stabilization. The sustenance of institutional knowledge about the project was hampered by frequent changes in personnel, including elected officials and senior-level managers. Because the worsening security situation restricted personnel movement, the project relied increasingly on mobile telecommunications and the internet, which quickly became available in the post-conflict period. However, the fragility of the telecommunications infrastructure and limitations on electricity supply caused communication difficulties at times (UNEP 2009a, 2009b).

Finally, although the new government had various regulations in place concerning pollutant release, water quality, and environmental impacts of new construction, the level of enforcement appeared to be low, possibly because of security concerns, competing priorities, difficulty accessing laboratories, and staffing limitations.

LINKS TO PEACEBUILDING

The Iraqi Marshlands Project made primary contributions to the socioeconomic dimension of peacebuilding by providing relief and basic social services and by aiding the return of displaced populations. Moreover, the project addressed two vulnerability concerns. The first was the fear that the decimated ecosystem would no longer support the culture and lifestyle of the local residents. The second was that the insufficiency of basic services and natural resources would make the return of displaced persons to the area more difficult.

Access to safe drinking water has been the critical priority of the marshland residents as they reestablish their livelihoods. The project's drinking-water interventions, undertaken in the face of many major challenges, helped this rural area to accommodate the projected number of returning displaced persons.

The rationale for wetland rehabilitation was to revive life in the marshlands and to prevent further deterioration of the socioeconomic conditions of the people, as well as to improve the security and stability of the region. The wetlands are the backbone for sustaining both human and other life in the area, and reflooding was necessary for restoration. The project interventions focused on two specific aspects of wetland rehabilitation. In the first phase, the focus was on ESTs for restoring degraded areas of the wetlands; in the subsequent phase, the emphasis was on ESTs to improve the quantity and quality of water available for reflooding.

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Whereas the interventions for drinking water are of immense immediate value to the local communities, the impacts of wetland rehabilitation are realized only over the long term and therefore are not immediately visible to the local communities. Nevertheless, UNEP's rehabilitative interventions were generally welcomed and appreciated by Iraqi stakeholders and led to the leveraging of additional resources to continue the establishment of long-term sustainable management practices.

In addition to providing drinking water and rehabilitating the wetlands, the project's interventions contributed to peacebuilding by helping to address residents' frustration and desperation and by increasing trust and partnership between public authorities and local communities. Without the interventions, the basic need for the access to safe drinking water could not have been met in the pilot communities, and this lack would have worsened the suffering of the marshland residents and resulted in increased resentment and mistrust of public authorities. Instead, because local communities and public authorities worked together on the project from inception to completion, the interventions helped to increase the trust.

The success of the first phase of intervention in the six communities helped to strengthen cooperation and consultation between public authorities and community stakeholders in subsequent phases of the project. Community-level initiatives supported by the project also helped to foster partnerships. For example, project-funded environmental awareness campaigns in Basra for the Marsh Arab Forums stimulated the establishment of partnerships to engage the community from different angles, such as religious, scientific, and political perspectives. The common goal of conveying a coherent message that the Iraqi marshlands are an invaluable environmental resource was present throughout the campaign. The series of public meetings, followed by further discussions, provided the indirect benefit of making community members aware of the wide range of organizations with which they could work in the future. In Dhiqar, short training courses were given to tribal chiefs and religious leaders to help explain to local fisherfolk and their families the adverse effects of fishing with poison. The rationale behind the campaign was to begin to create an atmosphere in which using poison for fishing would become unacceptable within marshlands societies so that eventually this practice would be eliminated.

The dynamics between local groups and the government changed drastically after the fall of Saddam Hussein's regime. Between mid-2004 and 2008, the period examined in this chapter, the people of the marshlands were given the power to choose their local government representatives in democratic elections. Consequently, relations between local groups and the government improved significantly compared with the period under the former regime, when decisions were taken from the top without consultation with local groups. The central government now provides special allocations to the governorates, which are given the authority to decide on the priorities of reconstruction projects and other relevant matters. In addition, the trials of figures suspected of persecuting local

residents during the Saddam Hussein regime may have helped to bring some sense of justice among the residents, according to the project's national coordinator.

Occasional disputes did arise, but they were largely resolved amicably during the implementation of the interventions. Many disputes stemmed from competition to benefit from project activities and resources, such as employment opportunities and water access. These disputes did not contest the interventions or the rationale for natural resource management. Maintaining dialogue with local communities and building trust through local presence from the inception of the project helped in the resolution of these disputes.

LESSONS LEARNED

On the basis of its experiences managing water and wetlands in southern Iraq in the post-conflict period, the project team learned a number of lessons that are generally applicable to other post-conflict situations.

The limited availability of reliable data hampered decision making for many institutions working in Iraq. This limitation compelled some to spend significant resources and time on assessment activities. Also the difficult security situation may have steered some institutions to favor safe activities, such as training and desk studies. Various community leaders complained of "assessment fatigue," voicing their frustration about having facilitated numerous studies and assessments that did not yield any form of improved local conditions.

Communities cannot prioritize saving the ecosystem when they face acute hardships from a lack of basic services. In a post-conflict situation where the population suffers from the disruption of basic services such as the provision of drinking water, interventions to address immediate basic needs should be given priority and carried out as soon as feasible and in an environmentally sound manner. Such interventions, when successful, have additional benefits, such as the building of a solid foundation for the trust and partnership that will be necessary for work toward long-term ecosystem management. These interventions also help practitioners to learn what works and does not work in a particular setting, especially in an ecologically sensitive area such as the Iraqi marshlands. On the other hand, if the immediate basic needs of a community are not adequately addressed first, other well-intentioned interventions that need longer-term commitments may fail to garner community support.

Natural resource management has many elements, participants, areas of intervention, and supporting measures. For the UNEP project, having a clear focus on EST implementation and the multifaceted measures necessary to support such implementation was beneficial because this approach enabled the project team and its partners to better understand linkages and consequences among actions and participants. For example, the data collection to identify and monitor pilot project sites was facilitated by community groups and used ministry and local personnel who had undergone project training. As pilot projects were implemented,

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the analyzed data informed national ministries' subsequent policy decisions on wetland management and were made available through the project information system to national and international partners. Such comprehensive and integrated programming, which encompassed data collection, training, implementation, and policy coordination was effective and had synergistic impacts among the participants and activities.

Projects should include targeted and coordinated measures to address the specific needs and roles of various people. Donor coordination is beneficial for identifying gaps in international cooperation, facilitating communication and cooperation, and preventing overlaps. Donor coordination initiatives under UNEP's leadership provided a forum for discussing the contributions and status of various Iraqi-led and donor-supported initiatives. This supported and facilitated policy coordination and the establishment of a longer-term marshlands management structure.

National-level initiatives are needed for policy establishment and implementation, coordination among relevant ministries, monitoring, and enforcement. Increasingly, governorate councils are entrusted to make decisions on resource allocation. Close cooperation and coordination are necessary to ensure that initiatives complement rather than undermine natural resource management efforts.

Local citizens and communities face the direct consequences of environmental degradation and of efforts to address the degradation. The necessity of their participation and support for the success of natural resource management initiatives cannot be overstated. Establishment of a local presence and management structure for the project implementation period and beyond is thus essential. Because of the severe security restrictions placed on UN personnel, the project relied significantly on national coordination and local implementation support by Iraqi partners, with overall coordination carried out by UNEP from outside. The national coordinator's presence in Iraq throughout the project period was a key factor in the successful maintenance of communications and project implementation modalities.

Major consultative meetings with stakeholders were primarily organized outside Iraq and were supplemented with regular dialogue and community visits by the national coordinator inside Iraq. While this setup had the obvious limitations and challenges of remote operations for UNEP, it had the positive effect of enhancing local management and responsibility taking, which translated into a greater sense of national and local ownership. To ensure representation in the stakeholder engagement process, representatives of local communities, governorates, and academic and civic institutions from the three governorates were engaged in the consultative process from the project kickoff in September 2004, with UNEP support. Notification and engagement of Iraqi stakeholders followed a transparent and systematic process to alleviate concerns over fairness and equity.

Donors and countries should recognize the need for long-term financial and programmatic support for ecosystem rehabilitation and management. Initiation

of such efforts in the early phases of peacebuilding is absolutely necessary to prevent further damage, and sustained support should be provided over the long term, with realistic goals.

Natural resource management takes a long time to establish, and it has significant financial costs even in stable, developed countries where people are not competing for resources for survival and where adequate environmental laws and regulations are in place, enforced, and understood by communities. For example, the management plan for the Florida Everglades in the United States took approximately sixty years to develop, and it entails action for the next twenty years, with a budget of US\$8 billion for implementation (CERP 2004). The master plan development for Lake Biwa, the largest lake in Japan, took over ten years to reach consensus among various stakeholders. For that plan, coordination and government engagement alone costs approximately US\$1 million per year, not including expenses for lake management measures (Shiga Prefecture 2000). Countries emerging from post-conflict situations are unlikely to be able to mobilize such resources on their own; therefore, they need sustained international support for such programming and implementation over a long period of time.

For the Iraqi Ministry of Environment, the Iraqi Marshlands Project was one of the first and largest environmental management initiatives implemented with UN support after the ministry was established. The project therefore served as a platform for on-the-job training in environmental management, international cooperation, and domestic coordination for the ministry and its staff. It also provided a practical context for establishing cooperative working relations with the governorates, local groups, universities, and other ministries, as well as with nongovernmental organizations and international organizations.

The positive impacts of the project extended to the development of new water policy and law at the national level. For instance, efforts by the Ministry of Environment to establish and revise water quality-analysis standards have been informed by the UNEP project's experiences in water-quality management and have been supported by personnel and institutions that built relevant expertise through the project. Furthermore, the project's findings and recommendations, particularly those related to Main Drain water-quality management, have been shared through the interministerial meetings to facilitate consultations and policy making.

The project helped the Iraqi people and institutions to better recognize the global value of the Iraqi marshlands and the Iraqi environment in general, beyond local and national concerns. The project also influenced the Ministry of Environment's concentrated efforts for Iraqi accession to multilateral environmental agreements, such as the Convention on Biological Diversity; the Convention on Wetlands of International Importance, commonly known as the Ramsar Convention; and the United Nations Framework Convention on Climate Change. Such effective use of international cooperation initiatives is a universal lesson for countries emerging from conflicts (UNEP 2009a, 2009b).

CONCLUSIONS AND NEXT STEPS

Although the specific initiatives described in this chapter were completed by 2009, there is a need to continue the process of bringing the Iraqi marshlands back to life. Ecosystem rehabilitation and redevelopment is a long-term process, and sustainable development in this area needs to be prioritized in the national development process.

Recognizing the need to transition from short-term post-conflict interventions in the marshlands toward longer-term sustainable redevelopment initiatives with potential for rural employment and income generation, UNEP and UNESCO launched a new initiative in 2009 to preserve and manage the cultural and natural heritage of the area (UNEP n.d.). Using the World Heritage site inscription process, the new project will identify and implement key sustainable production and consumption practices that use local materials and heritage. It will operate on a pilot basis and will build capacity and raise awareness among local institutions to ensure their participation in site preservation and ecosystem management.

The government of Iraq has added the marshlands area to a national tentative list of World Heritage sites because of its mixed natural and cultural heritage. This tentative listing of the marshlands marks the first recognition for the World Heritage program of natural heritage importance in Iraq. Recognizing the need to build experiences and capacity for natural resource and environmental management related to the World Heritage program, the Iraqi Ministry of Environment has endorsed this project as a priority.

Despite the emergence of promising longer-term initiatives, additional environmental threats could undermine the improvements in natural resource management that have been achieved to date. The marshlands area experienced a severe drought in 2008 and 2009, which significantly reduced water flow and vegetative cover in the wetlands and the availability of water nationwide. The drought and resulting desertification, attributed to climate change, are having a negative impact on economic development and the quality of life of Iraqi citizens.

A common country assessment conducted in 2009 stated that Iraq's environmental problems are defined by "declining quality and quantity of natural resources, exacerbated by unsustainable resource use" by a population which lacks awareness of environmental issues (UN 2009, 54). The assessment articulated additional factors contributing to environmental problems, including the drought, desertification and elevated soil salinity, increasing carbon emissions, loss of biodiversity, and an unsuitable rural water supply for agriculture, livestock raising, and drinking purposes. Although Iraq has only recently transitioned to the post-conflict and redevelopment phase, the country now experiences issues that are more common in middle-income and industrializing countries, such as urbanization-related air, noise, and water pollution; a lack of housing; limitations in industrial waste management and accident response; and chemical and other waste-related pollution. The assessment also highlighted the need to diversify

Iraq's economy and to use the wealth arising from resources toward sustainable development.

In response, the United Nations Development Assistance Framework (UNDAF) for Iraq for 2011–2014 gives priority attention to water resource management, particularly where transboundary issues are involved, and the Iraqi marshlands. In addition, UN programming will address climate change by strengthening institutions and institutional frameworks, assessing Iraq's vulnerability to climate change, and identifying opportunities for climate change mitigation measures that will have economic, social, and environmental benefits, including potential for the development of green jobs (UN 2010). Iraq has also become a member of the Global Environment Facility and has been eligible for its financing in the field of climate change and biodiversity since 2010.

The government of Iraq has requested urgent assistance from the international community and cooperation from neighboring countries. Included in the July 2009 United Nations Economic and Social Council Substantive Session was a special agenda item on the Iraqi marshlands. And UNEP is committed to continue its work beyond 2011. It will be part of the United Nations Country Team for Iraq, which will implement interventions under the UNDAF process to address emerging environmental priorities, with targeted ecosystem management initiatives for the Iraqi marshlands.

Through the provision of basic services and support for the return of displaced populations, the Iraqi Marshlands Project made significant contributions toward peacebuilding. Working with Iraqi institutions and citizens to help bring the area back to life has been an act of peace.

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