TOWARDS A SOLUTION FOR IRAN'S DRYING WETLANDS

An International Technical Round Table
16-18 March 2014, Tehran

CONCLUSIONS AND RECOMMENDATIONS

Department of Environment
Islamic Republic of Iran

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FOREWORD

As is increasingly coming to be recognized, wetlands have played a crucial role in the evolution of human civilisation. Despite the huge sense of mastery we may believe we have exerted over the natural environment, our sustainable development still depends to a significant degree on these remarkable ecosystems.

We see this through the recent combined impact of droughts, climate change and the consequences of the unsustainable management of water resources which has brought two of Iran's most precious wetlands – Lake Urmia and the Hamouns – to the brink of ecological catastrophe.

Once these environmental assets were of immense value to the country and the local communities they supported. Now these two ecosystems have become sources of dust and salt storms – of poverty – and of severe health problems. Their biodiversity has all but disappeared.

Nor are these our only wetland problems in Iran. Some other wetlands have already completely disappeared. Others are under immense threat.

Therefore we must act. And this action must be urgent – particularly as climatic trends point to a hotter, drier future in Iran – and even as population pressure increases the demand for our declining water resources.

But the situation can be reversed.

This Brief report is one effort to contribute to this reversal. It summarises the conclusions and recommendations of a 3-day technical round table, jointly hosted by the Department of Environment (DOE) and UNDP which brought together eminent Iranian and international experts to develop solutions for consideration by the Government. In this report you will find a range of practical and in-country solutions specifically for the Hamoun wetlands and Lake Urmia, as well as for Iran's wetlands in general. Some build upon measures that the Government has already put in place in the last few years. Some are new.

Department of environment and the United Nations commit to implementing these recommendations – to the extent that our resources allow – in order to resolve the problems of Iran's drying wetlands. In addition, we urge all relevant national partners (governmental and non-governmental), as well as the international community and global specialists to join us in this endeavour.

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EXECUTIVE SUMMARY OF ACTIONS NOW REQUIRED

For the HAMOUNS

Urgent Actions (to be implemented within 1-2 years)

A1: Better share and gather information

A2: Clarify, simplify and rationalize Hamoun institutional management arrangements

A3: Share water in a way that will maintain essential ecosystem services

A4: Reduce evaporative losses from the Chahnimeh reservoirs

A5: Create awareness and provide education

Recommended medium-term actions

A6: Improve trans-boundary cooperation

A7: Adopt an Integrated Wetland Basin Management approach

A8: Increase the efficiency of water use to conserve water

For LAKE URMIA

Urgent Actions (to be implemented within 1-2 years)

B1: Strengthen the institutional structure

B2: Update the Integrated Management Plan

B3: Establish a Lake Urmia Sustainability Fund

B4: Reduce agricultural water use

B5: Mobilize a public campaign to conserve water

B6: Ecological restoration of (part of) the lake – "embayments"

B7: Implement health-protection measures (especially related to salt/dust storms)

B8: Develop a monitoring system on the condition of the basin and the lake

Recommended medium-term actions

B9: Prepare a long-term development vision for the Basin

B10: Continue with water conservation measures

B11: Do not prioritize certain supply-side measures

B12: Optimize the water allocation system

For IRAN's wetlands in general

Urgent Actions (to be implemented within 1-2 years)

C1: Implement a national awareness campaign and programme to conserve water

C2: Reform agriculture to conserve water

C3: Build capacity for ecosystem-based management of wetlands

Recommended medium-term actions

C4: Introduce water pricing

C5: Review and adjust land and water use planning and strategies

C6: Review the national dam construction programme

C7: Make better use of Strategic Environmental Assessments

C8: De-centralise water governance

C9: Develop information and early warning systems

C10: Restore dried wetlands

C11: Pursue international best practice approaches to manage trans-boundary basins and wetlands

I INTRODUCTION

Background

The international technical round table *"Towards a solution for Iran's drying wetlands"* was held at the joint invitation of the Department of Environment, Islamic Republic of Iran and UNDP Iran from 16-18 March 2014. The round table focused on two wetland-related ecosystems of international importance, Lake Urmia and the Hamoun wetlands, recognizing the current and critical threats to the continued survival of these sites, and their strategic importance to the economy, livelihoods and biodiversity of Iran.

The round table was attended by 33 national technical experts who had particular experience on Lake Urmia or the Hamouns, and 11 international technical experts with relevant experiences from other countries. The 3 day meeting was divided into plenary and breakout sessions, as well as a one day field visit. For the breakout sessions and the field visit, the experts were divided into groups for Lake Urmia and the Hamoun wetlands, respectively.

Objectives

1. To review the drivers causing the drying of Lake Urmia and the Hamoun wetlands, and the actions that have so far been undertaken to address them.
2. To share experience and international best practice approaches for the restoration of drying wetlands.
3. To recommend a series of steps to the Government – taking into account known logistical, institutional and budgetary limitations – which can then be shaped for quick implementation.

The challenge

In many arid and semi-arid regions of the world, environmental water flows are declining due to the over-allocation of water for human use, particularly for agriculture; these trends may be compounded by droughts and longer-term climatic changes. As a result, flows in many rivers (eg. Murray (Australia), Colorado (United States), Nile (Africa)) and water volumes reaching downstream lakes and wetlands (eg. Aral Sea, Great Salt Lake, Lake Urmia, Hamoun Wetlands) are greatly reduced, resulting in severe environmental, social and economic impacts.

As shown in Figure 1, salt- and dust-laden winds and degradation of lands are among the present consequences arising from the drying of both Lake Urmia and the Hamouns, which are causing serious social, economic and health problems for the inhabitants of the two basins.

The main challenge behind these problems is the **over-allocation and mismanagement of water.** Water issues are typically considered in terms of whether there is sufficient water available to satisfy human requirements without adequate regard to environmental needs or climatic variability. However,

- Water allocations to the environment are crucial to maintaining critically important environmental services such as ground and surface water supply, sediment transfer, nutrient recycling, diluting pollutants, moderation of micro-climate, support to ecosystems, crucial habitat structure and biodiversity.
- Declining allocations of water to the environment can therefore lead to wider environmental problems such as salinisation, dust storms, spread of microbial diseases, desertification, disappearance of wetlands and loss of biodiversity. Less water in the environment can

therefore impose substantial economic losses on water-dependent activities such as agriculture, fisheries and tourism, with severe social and health-related costs for rural populations.

- Rising water demands and climate changes threaten further declines in environmental flows, and risk leading to even more severe and widespread environmental, economic, and social problems.

Ensuring adequate water to meet environmental as well as direct human needs is therefore essential to maintaining the health of the wider environment and human security.

Transboundary river basins and wetlands pose an additional challenge because unilateral decisions on water use can have serious impacts on these ecosystems and human security in neighbouring countries.

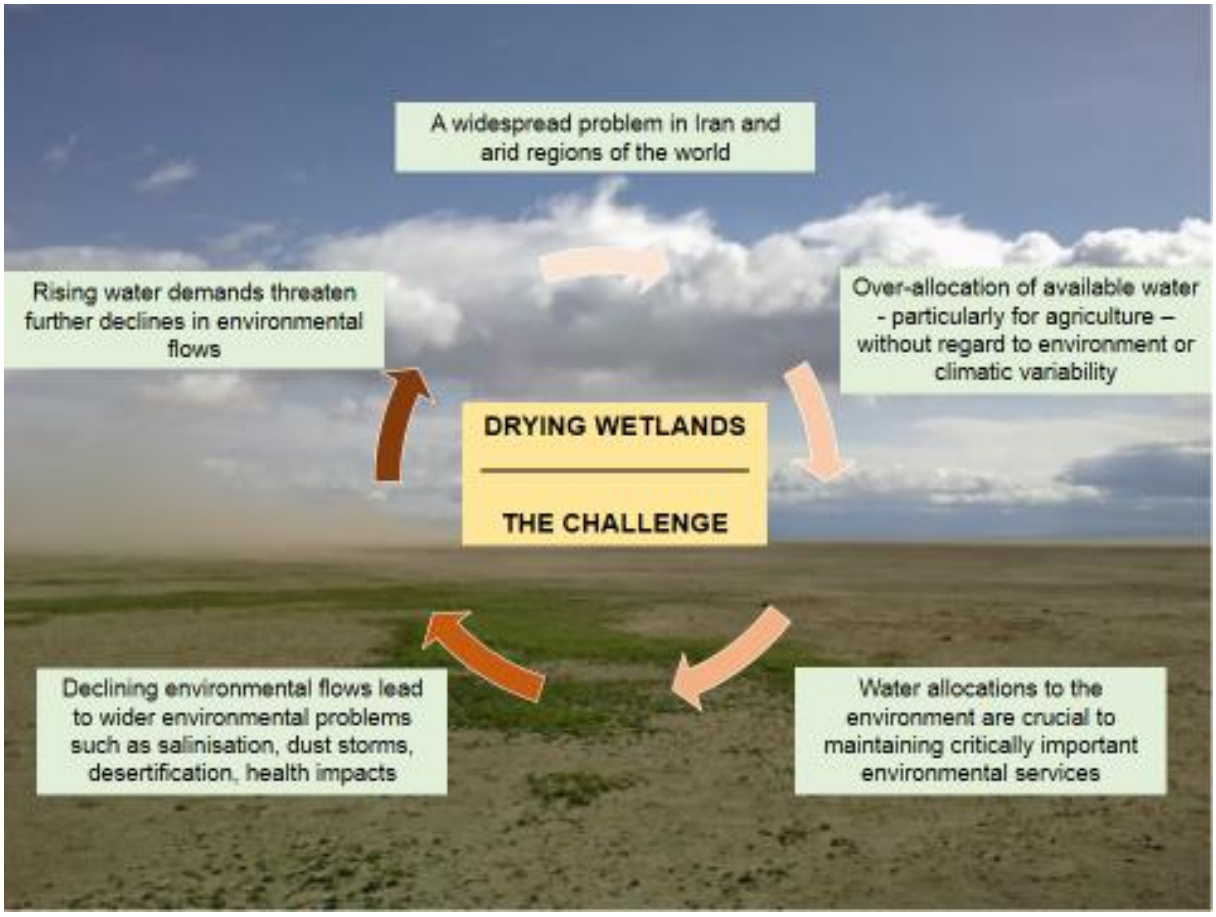


Figure 1. A summary of the challenge concerning drying wetlands

What has been done so far to address the challenge in Iran?

Since hosting the pivotal 1971 conference in the town of Ramsar on the Caspian coast of Iran, which established the Ramsar Convention on Wetlands, Iran has continued to implement measures for the management of wetlands. This has included establishing a large network of wetland protected areas, of which 24 covering almost 1.5 million hectares have been included on the list of wetlands of international importance.

During the last decade, considerable efforts have been made to improve the management of wetlands across the country, recognizing that significant pressures arising from human activities were degrading wetland resources. Of particular importance has been the Conservation of Iranian Wetlands Project (CIWP), which was launched in 2005 with support of UNDP and the Global Environment Facility. As a result of the progress made under this project, a 2 year up-scaling phase was launched in 2013. The main achievements of this initiative have been as follows:

- Building capacity, a management system and tools for participatory and integrated ecosystem-based approaches to manage wetlands in a basin context
- Finalising the draft of a Parliament Act on "Conservation, Restoration and Sustainable use of wetlands based on the Ecosystem Approach", incorporating the requirement for a National Wetland Conservation Strategy and Action Plan
- Demonstrating integrated, participatory management for 3 internationally important wetlands Lake Urmia, Lake Parishan and Shadegan wetland), with appropriate governance arrangements – and launching the roll-out of this approach nationwide
- Developing a Drought Risk Management Plan for Lake Urmia to address climate change and water shortages
- Establishing governance mechanisms for wetlands at national, provincial and local levels
- Raising public awareness of wetlands, and engaging NGOs in their conservation
- Practical demonstration of alternative livelihood approaches including (piloting) of field-level sustainable agricultural techniques to conserve water and promote local ecotourism.
- Developing a toolkit and several guidelines for wetland basin management including a guideline for assessing the water requirements of wetlands

Specific activities that have been undertaken for the Hamouns and Lake Urmia are summarised in the following chapters.

These achievements show that Iran is making serious commitments to address the problems facing wetlands (including water shortages). However, implementation of many of the above achievements has been inadequate. Progress is already too late for some wetlands, and urgent and concerted actions are required to prevent further degradations arising in other basins. Furthermore, special measures are needed for trans-boundary wetlands/basins.

Next steps

The remainder of this report presents the conclusions and recommendations of the Round Table discussions, as submitted to the Government and UNDP. It is recommended that with the support of UNDP, the Government prepares a “Response and Action Plan”, detailing the recommendations it intends to adopt, which organization will lead implementation, by when and with what budget. UNDP should assist Government to convene further meetings of donors and specialists to help implement the recommendations.

An independent review of implementation should be conducted in mid-2015.

II CONCLUSIONS FROM INTERNATIONAL CASE STUDIES

Five international case studies[1] were presented to the Round Table, as follows:

- Case study of La Mancha Húmeda and Tablas de Daimiel National Park (Spain): story of the degradation and restoration of wetlands over 50 years (Jesús Casas Grande).
- Managing over-allocation of water in Australia – the failure of the market model (Brian Chatterton).
- Role of rural development and alternative livelihoods in wetlands conservation (Anthony Fitzherbert).
- Trans-boundary water resources management in the Nile basin (Eelco van Beek).
- French – Geneva trans-boundary collaboration (Sepideh Nayemi).

A number of additional documents were also circulated including the following abstracts and executive summaries:

- Climate change impacts on the Zarqa River Basin (Jordan), and adaptation (Mufleh Al Alaween).
- A satellite-based wetland monitoring system for the Hamoun wetlands (Hassan Partow and Asif Zaidi).
- Learning from Western Mistakes (David Laylin).
- Lake Urmia crisis and roadmap for ecological restoration of Lake Urmia (three papers submitted by Brad Marden, Philip Micklin and Wayne Wurtsbaugh).

Based on these inputs and their own experiences, the participants drew the following "headline" conclusions:

1. "Prevention is better than cure" – restoration of highly degraded wetlands can be very expensive and complex. It is important to address sustainable management of water resources and wetlands, before such problems arise. This requires integrated working by the different governmental sectors, and the strong participation of stakeholders, particularly NGOs and local communities.

2. Recognise that water resources are finite, that efforts to increase supply (e.g., through water diversions) often cause problems elsewhere, and that the main solution lies in demand-side management – reducing water use to sustainable levels within the capacity of each basin.

3. Avoid using "drought" or "climate change" as an excuse for poor water management (as occurred in the Murray-Darling basin (Australia) and many other countries). Instead, develop water resources management skills and participatory approaches to build resilience to cope with the reality of water scarcity.

4. Reform of agriculture to conserve water (particularly from inefficient intensive irrigation practices) is the priority; successful approaches have included:

[1] All the mentioned presentations and documents are available on http://www.ir.undp.org/content/iran/en/home/presscenter/articles/2014/04/21/experts-search-for-answers-to-help-save-iran-s-drying-wetlands/

a. Using a mix of incentives, disincentives and regulation, including gradual introduction of "a progressive scale of water charges" linked to good/bad practices. Water will not be conserved or used efficiently if it continues to be treated as a free good.
b. Providing farmers with grants and soft loans to implement more water efficient practices, such as use of less water intensive crops and diversification of farming, e.g., to support productivity improvements in the rain-fed farming sector.
c. Engaging best practice farmers as extension agents to help roll-out sustainable agriculture approaches.
d. Supporting alternative livelihoods to reduce pressures on water through rural development.
e. Forming Water User Associations that are capable of providing management and supervisory functions for local irrigation facilities.

5. Take great care to ensure that water savings made through improvements in water use efficiency do not lead to additional water demand (e.g.,. extending the area under irrigation), but provide more water for maintaining public benefits (e.g., maintaining wetlands to support fisheries and grazing, reduce dust storms etc).

6. Emphasise the links between wetlands and local people, and engage communities to help conserve water and save wetlands. Water belongs to the community, and needs to be managed to deliver maximum public benefits.

7. For already seriously degraded wetlands, do not give up hope. Recovery or partial recovery is possible, but requires determination and a long-term approach. Do not expect quick-fixes to be successful. Every wetland is different, and will require a clear vision, strong leadership, good science, specific financing, and public engagement.

8. There are no cost-free solutions to restoring degraded wetlands, and hard decisions will need to be taken with regard to existing and future water resources management projects. However, the costs of restoration are likely to be much cheaper than the costs arising from the loss of the environmental services naturally provided by wetlands.

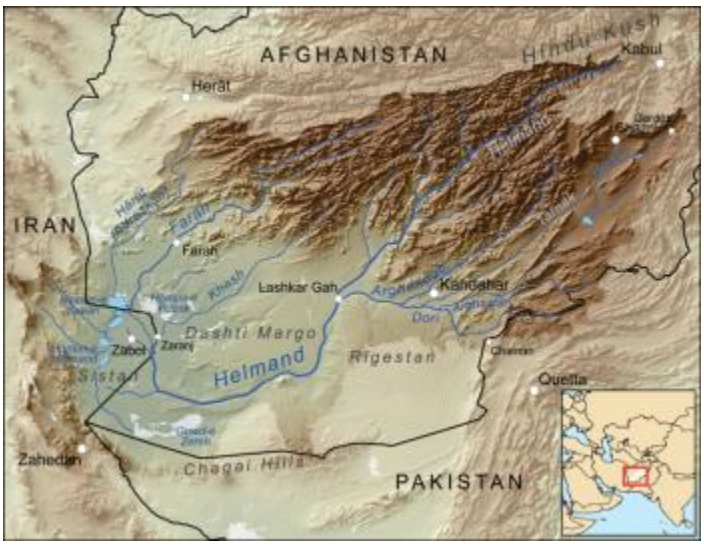
9. Restoration should be undertaken in a phased manner (pilots, followed by up-scaling), using best practice techniques supported by careful monitoring, open reporting and adaptive management. The important point is to TAKE ACTION – and then to adapt the measures in response to how successful they have been. Wherever possible, rely on natural processes and light (scale-appropriate) interventions - and avoid massive engineering "Frankenstein" solutions.

10. Effective management of water resources and wetlands in trans-boundary basins requires holistic approaches at a basin scale, formal coordination and fair water-sharing agreements between the concerned countries and/or provinces. Such agreements must be anchored in proactive water diplomacy – predicated on robust bi-lateral/multi-lateral evidence-based mechanisms. Communication and shared "win-win" actions on the ground are key, not just between governments, but particularly between trans-border communities.

III CONCLUSIONS AND RECOMMENDATIONS: THE HAMOUNS

The current situation

The Hamoun wetland is made up of a series of three marshes in the Sistan Basin that straddles the border between Iran and Afghanistan.



Freshwater input into the wetland is mainly from the Helmand River that originates in the Hindu Kush mountains in north-eastern Afghanistan. At its largest extent, the wetland once covered some 2,000 to 4,000km^2 depending on the spring floods but the region is periodically affected by drought and since 1999, the marshes have been suffering their longest period of drought; satellite images show an increase in the area of agricultural lands in Helmand Basin during the last 10 years.

The wetland has become completely dried[2] leading to severe impacts on the health and livelihood of the local people, as well as on the environment. Evidence presented to the round table suggested that the drying of the Hamouns has been caused by a combination of: (i) reduced average flows in the Helmand/Hirmand and related river basins since the late 1990s due to changing patterns of precipitation and run-off in the mountains of Central Afghanistan; and (ii) the poor management of the water entering the Sistan basin itself.

Historically, the seasonal Sistan wind would cause some 120 days of sand and dust storms each year, but due to the drying condition the frequency of these storms is now reported to have increased to some 220 days. As a result, the frequency and severity of some respiratory and optic illness has increased amongst the residents, as well as those related to the heart, intestine and even cancer. These problems are not only affecting the people of Iran but also Afghanistan, and indeed because of the prevailing winds also the Pakistan province of Balochistan. The socio-economy of the local people has also been severely impacted. The loss of their daily source of freshwater and of their livelihood, such as from fishing, has caused the migration of hundreds of thousands of people to other provinces in Iran. For the people who have remained, there are increasing local conflicts for water, and poverty levels are increasing.

The drying out of the Hamoun wetland has also affected the biodiversity value of the site which used to be internationally important for wintering waterbirds, supporting up to 300,000 individuals including a number of globally threatened species. The three marshes (1. Hamoun-e-Puzak - south

[2] Satellite images taken on 10 and 26 March 2014 (over the period of the round table) show the first significant water flows for several years arriving into the Hamoun wetland.

end; 2. Hamun-e-Saberi & 3. Hamun-e-Helmand) were designated as a Wetland of International Importance ('Ramsar Site') in 1975 and in 1990 these wetlands were added to the Ramsar Montreux Record of wetlands in danger.

Iran registered the Hamoun wetlands as protected areas in 1968 and promoted the level of protection to Wildlife refuge in 2004. Bird Life International has recognised these wetlands as Important Bird Area (IBA).

Actions taken so far

The whole Sistan basin and its wetlands are an integrated system which can only be managed effectively through a collaborative approach between the two countries. The dependence of the Sistan area to water from the Helmand River was recognized many decades ago and as a result, the Hirmand (Helmand) Water Treaty was signed in 1973 to agree on the amount of water from the Helmand River that Afghanistan would provide to Iran annually. The treaty was not ratified until 1977 and then, due to increasing political and social instability in Afghanistan, the treaty has largely become dormant until the early 2000s.

After 7 years of major droughts, and formation of the new government in Afghanistan (after Taliban), Iran once again pursued implementation of the 1973 Hirmand (Helmand) Water Treaty. During the last 10 years, 15 joint meetings have been held about the treaty, alternately in Iran and Afghanistan.

In the mid-2000s the discussion between Iran and Afghanistan on the challenges facing the Hamoun wetlands focused on the need to establish a "*Joint Committee on the Sistan Basin Wetlands*" but which ultimately was not formally approved. Three meetings were held between 2005 and 2007 under the auspices of UNEP assisted by UNDP, to develop the TOR for the Committee. A UNDP/GEF funding proposal was also developed in 2008 entitled '*Sustainable Management of the Sistan Basin'* to support the establishment of the Joint Committee. Although the GEF proposal has been formally supported by Iran, the Afghanistan Government did not endorse the project document.

From the early 2000s, a number of important projects have been implemented to better understand the status of the Hamoun wetland and the Sistan Basin, as well as to address the threats that the site faces from drought. These include:

- 2004-2006 joint Iran-Netherlands project to promote IWRM for the Sistan Plain;
- 2006: Release of the report '*History of Environmental Change in the Sistan Basin: Based on Satellite Image Analysis 1976 – 2006'* by the UNEP Post-Conflict Branch, Geneva;
- Various national projects on: i) stabilization of sand flowing in Sistan plain and Hamoun lakes; ii), water resources and consumptions in Sistan plain; iii) changing agriculture and irrigation patterns; iv) creation and management of Chahnimeh reservoirs for supplying potable waters;
- 2013 (in progress): '*Participatory GIS Mapping on Agricultural Land in Hamoun Basin*' by the Ministry of Jihad Agriculture;
- 2014 (in preparation) '*Integrated management Plan for the Hamoun Wetlands*' with support of the UNDP/GEF '*Conservation of Iranian Wetlands Project*' and participation of DoE and other main stakeholders.

Recommended urgent actions (to be implemented within 1-2 years)

Recommendation A1: Better share and gather information

- Due to the political instability in Afghanistan since the late 1970s, the country's network of hydrological monitoring stations is for the most part no longer operational. As a result, it is not possible to accurately calculate the discharge of the Helmand River and water flows in the Sistan Basin. This lack and discrepancy in information is one of the main reasons for misunderstanding and mistrust between Iran and Afghanistan. Nevertheless, it should be noted that over the past several years Afghanistan has been rebuilding its river monitoring network, but progress has been slow due to the difficult security situation.
- There is thus a need to identify the gaps in the monitoring of flow, to recommend a new methodology and for dissemination of the results that can be agreed by both sides.
- While this work is being done, UNEP has stated that if requested by both countries, they would be willing to establish a satellite based environmental monitoring system for the Hamoun ecosystem by updating their work from 2006 and then setting-up a web-based information portal where the information collected can be shared. Training on the wetland monitoring methodology could be provided to experts from both countries, and the system can subsequently be handed over to them to maintain.

Responsibility: Governments of Iran and Afghanistan, UNEP

Recommendation A2: Clarify, simplify and rationalize Hamoun institutional management arrangements

- Presently, there are a number of organisations/institutions, e.g., committees, ministries and departments at the national and provincial level, with responsibility for the management of the Hamoun wetlands.
- These mechanisms are operating at different levels of effectiveness and with some degree of overlap of responsibility between them.
- There is thus a need to clarify, simplify and activate these mechanisms so as to achieve improved effectiveness in decision making and implementation.

Responsibility: Government of IR Iran

Recommendation A3: Share water in a way that will maintain essential ecosystem services

- During periods of low water flows (which seem likely to continue to be the norm) it is essential to make most effective use of the available water, to deliver maximum public benefits.
- The Hamoun wetland provides a range of essential ecosystem services (benefits) for people and the environment. These include providing water for local livelihood, irrigation and maintaining the health of the people as well as of the environment.
- The amount of water needed to restore and maintain each of these services needs to be carefully reviewed and calculated. This will then help to determine the total amount of water required by the Hamoun wetland in order to ensure a healthy ecosystem.

- In future, water should be proportioned between each of the relevant users (including the environment) at the optimal time and quantity, based on their needs and the total amount available. Measures to avoid poor water management and wasteful practices should be implemented urgently.
- Consideration could be given to using the grey water from Zabol's water treatment plants for agricultural purposes.

Responsibility: Ministry of Energy, Department of Environment. Ministry of Jihad-e-Agriculture

Recommendation A4: Reduce evaporative losses from the Chahnimeh reservoirs

- The four Chahnimeh reservoirs came into operation between 1983 and 2008 in order to provide water for domestic and industrial use in the city of Zabol, its surrounding areas and for Zahedan. During dry years some water for irrigation is released to neighbouring farmland. The reservoirs were built in a natural depression and have a total area of >50 km2 and a "live storage" capacity of some 950 MCM.
- During discussion on the need to make the most efficient use of the finite amount of water available to the Hamoun wetland, concerns were raised about the evaporative loss from the Chahnimeh reservoirs since in other countries, evaporative loss from reservoirs has been found to be significant.
- Concerns were also raised about the timing and effectiveness of the releases to farmers.
- As a result, it was recommended that a study be conducted to investigate the amount of loss from the Chahnimeh reservoirs, and the effectiveness of the management of the water.

Responsibility: Ministry of Energy, Department of Environment.

Recommendation A5: Create awareness and provide education

- Round table participants felt that there was still a low level of awareness of the importance of wetlands as natural infrastructure for storing and delivering water, as well as for the many other important ecosystem services they provide.
- Participants also commented on there still being a sectoral approach to the management of wetlands and water, instead of a much more effective cooperative and integrated approach.
- Greater effort must therefore be taken to raise awareness of these issues across all the relevant stakeholders at the highest decision-making level, to the national ministerial level, and to the provincial and local levels using all means (training, education, NGOs, religious leaders etc)
- These actions should be incorporated into, and addressed through, the integrated management plan that is being prepared for the Hamoun wetland.

Responsibility: Department of Environment and Ramsar Convention Secretariat.

Recommended medium-term actions

Recommendation A6: Improve trans-boundary cooperation

- Due to the lack of communication between Iran and Afghanistan over the Hamoun wetland since the mid-2000s, mutual misunderstanding has built up between both sides. This key problem will need to be overcome before any progress can be made on the conservation of the wetland.
- In order to rebuild trust and cooperation between both sides, small practical confidence-building steps should be taken. This could include the sharing of existing information on the Hamoun wetlands though organizing joint study visits and exchanges, technical workshops etc.
- International organizations including UN agencies could be requested to help support the dialogue between both sides through joint meetings, projects and management structures.
- When approaching the Afghanistan side in any future dialogue, a 'win-win' approach should be taken, stressing how the impacts of the drying of the Hamoun wetlands affects people in both Iran and Afghanistan, and that it is in the common interest for both sides to cooperate and restore the wetland for the livelihood of their people.

Responsibility: Ministry of Foreign Affairs, Department of Environment etc, UNEP and UNDP.

Recommendation A7: Adopt an Integrated Wetland Basin Management approach

- As the Hamoun wetland is part of the Sistan Basin and is also at the end of the larger Helmand River Basin, the long-term conservation of the Hamoun wetland is dependent on there being open cooperation for the management of the Helmand River using an ecosystem approach (integrated wetland basin management).
- This approach should take into account the range of present and future demands for the water resources from the Helmand River under a range of development scenarios on both the Iranian and Afghanistan side of the wetland.

Responsibility: Department of Environment and Ministry of Energy.

Recommendation A8: Increase the efficiency of water use to conserve water

- All the sectors in Iran that depend on water from the Helmand River and the Hamoun wetland need to recognize that the quantity of water available is finite and there is therefore a priority to ensure that the water which is available is used in the most efficient and effective way.
- The main user of the water in the region is presently the agriculture sector and so they should investigate means to improve the efficiency of irrigation as well as whether the types of crops grown are most suited to the drying conditions of the Hamoun.
- Further detail on possible measures to conserve water, and to ensure that the saved water leads to greater public benefits are given in the generic recommendations C2, C4 and C5.

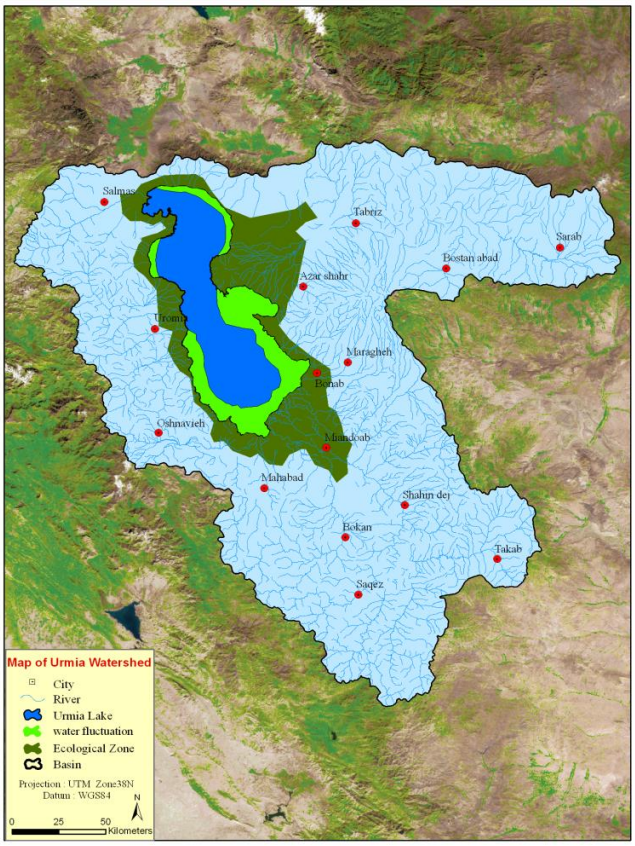
- In addition, the Chahnimeh reservoirs were built specifically to provide water for domestic and industrial use in both Zabol, its surrounding areas as well as for Zahedan. It is therefore important also to ensure that the water delivery and use in the cities are efficient as possible.

Responsibility: Ministry of Energy; Ministry of Jihad-e-Agriculture.

IV CONCLUSIONS AND RECOMMENDATIONS: LAKE URMIA

The current situation

Lake Urmia is in the worst condition ever recorded. Last year (2013) witnessed the smallest surface area in recorded history, with only 20% of the normal surface area remaining at the end of the dry season, and 30% during the wet season.



Water supply in the basin has shown a clear decrease in recent years, while at the same time the consumption of water has increased.

The Lake has almost entirely lost its ecological functions, while the ecological condition of many satellite wetlands is also in great danger.

The low lake level has resulted in major socio-economic impacts for people that depend on the lake and the wetlands. Sand storms and salty haze from the dry and salty lake bed causes serious and large-scale problems for people's health and for agriculture. These health problems are being aggravated by salt mining activities close to villages.

Despite nation-wide recognition of the problems, the institutional arrangements that have been in place since 2010 have not yet delivered significant action on the ground, and communities are not yet engaged in the solution.

Actions taken so far

1. Major progress on institutional, awareness and capacity-building measures has been made over the last five years.
2. The problems of Lake Urmia are widely acknowledged and appropriate institutional arrangements have been put in place at both the national level (the National Committee for Saving Lake Urmia) as well as at the regional level (Regional Council).
3. Agreement has been reached between the main stakeholders (the three provinces and the central government) about the environmental water demand of the lake, the share of each province of the available water and the need to stop new water consuming developments around the lake.
4. Other important steps include the government-approval of the 2010 Integrated Management Plan for the Lake and its basin as well as the Drought Risk Management Plan.

The recent establishment of the Commission, led by Dr Kalantari, to advise the Government on the restoration of the Lake, as well as the funding of a number of emergency actions, provide further evidence of the Government's commitment.

These institutional arrangements, agreements and plans are important boundary conditions for saving Lake Urmia. However, translating this into real action is lagging behind. In particular the Regional Council has so far been non-functional, and the capacities of the local technical working groups are not being used effectively. Moreover, despite the decision that no new water consuming activities are allowed (dams, irrigation areas, ground water pumps, etc.), it seems that new development projects continue to be implemented. Additionally, there is evidence of pastures being converted to dry land farming in the basin.

On the positive side, the pilot projects undertaken for the Conservation of Iranian Wetlands Project (CIWP) have demonstrated that significant water savings are possible by applying sustainable agricultural techniques. These pilots will be up-scaled but this alone will not solve the lake problem! It is also very positive that the capacity of stakeholders has been raised to better address the issue and the public awareness has been raised. These efforts should be continued with more practical implementation details and mobilization into action.

So overall, the real actions continue to be inadequate and management implementation measures have not yet shown results. The situation of Lake Urmia is still deteriorating instead of improving.

Short and long term objectives

The first objective of all actions should be to avoid further deterioration of the condition of the Lake. The second is to initiate recovery. The implementation of all actions must start as soon as possible, taking into account their impact on the basin, the Lake and its people. This can be done based on what has been learned through the CIWP studies and pilot projects during the last five years (e.g., Drought Risk Management Plan, the studies that are now being done by the Lake Urmia Rescue Working Group, and making use of success stories and lessons learned elsewhere in the world, customized to the Lake Urmia situation). The actions should have the longer-term objective of promoting sustainable development across the Urmia basin to support the socio-economic situation of the people (jobs, income, etc.), through better environmental management.

Recommended urgent actions (to be implemented within 1-2 years)

Recommendation B1: Strengthen the institutional structure

- The present institutional structure should be extended to empower people in a local (community) based setting.
- In order to actually implement measures it will be necessary to strengthen the operational mechanisms. For this to be achieved it is necessary to clarify at what level (national, regional, local or community) the decisions are made, who will implement them and who will be accountable.
- Where appropriate the mandate for implementation should be decentralized to regional, local and community level (subsidiarity principle).
- This will require that sufficient staff and sufficient budget will be made available at that level.

- The institutional structure should also provide transparency on their decisions and actions and provide information (Lake bulletin) to the public on the condition of the water resources system (monitoring) and the implementation of the agreed upon actions.

Responsibility: Government of IR Iran.

Recommendation B2: Update the Integrated Management Plan

- The already approved Integrated Management Plan should be updated within 2-3 months in light of recent government decisions, incorporating the Drought Risk Management Plan and recommendations arising from this technical round table discussion and the Kalantari Commission. There should only be one over-arching plan for the Lake.
- This updating should be done in a participatory way.

Responsibility: Department of Environment.

Recommendation B3: Establish a Lake Urmia Sustainability Fund

- A Sustainability (or Lake Urmia Restoration) Fund should be established to incentivize farmers and local communities to implement the recommended measures, and also to address specific health and social impacts of the current situation.
- Insurance companies should be involved in this regard for developing the methods with less reliance on the government.

Responsibility: Government of IR Iran.

Recommendation B4: Reduce agricultural water use

- All new agricultural developments (either under study or under construction) should immediately be stopped, including expansion of the irrigation area and transfer of areas from rain-fed to irrigated land.
- The allocating of natural resources and land to people should also be stopped immediately (i.e., transfer of pasture to rain-fed area).
- Reduction of the agricultural water use should be realized by:
    - Up-scaling of water-saving techniques (up to 25% saving) from the IPCM pilots to 20% of all farm-lands in the basin (within 2 years). This will include changes of crop patterns.
    - Incentivize farmers to change their cropping patterns to those that are less water consuming.
    - Reduce the area of irrigated land by taking out low-yielding, high water consuming irrigated areas. Farmers should to be compensated for loss of income from the Sustainability Fund, with incentives to diversify to less damaging activities.
    - Implement a project in one sub-basin to evaluate the impact of water pricing on water consumption based on international experience (see Generic Recommendation C4).
    - Allocate part of the spring run-off and the stored water behind the dams exclusively for the lake. The timing of water releases should be agreed by the local working groups.

Responsibility: Ministry of Jihad-e-Agriculture and Ministry of Energy.

Recommendation B5: Mobilize a public campaign to conserve water

- In order to create momentum for water conservation measures, the Government should work with NGOs and communities to launch a major campaign to conserve water.
- This should address all users: domestic, industrial and agricultural.
- Further guidance for such a campaign is provided in Recommendation C1.

Responsibility: Government of IR Iran.

Recommendation B6: Ecological restoration of (part of) the lake – "embayments"

- Simultaneous to the measures to conserve water (above), some of the ecology of Lake Urmia can be (partly) restored by reducing the size of the Lake until more water is available.
- This could be done by preventing the flooding of shallow parts of the Lake (constructing dikes and drainage canals) and/or by establishing "embayments" in the lake next to inflowing rivers.
- These would allow for better management of the available water.
- A rapid but comprehensive feasibility study should be carried out on possible options, including a rigorous Environmental Impact Assessment (EIA) taking into account international best practice and advice.
- Measures should be undertaken in a phased way, and rigorously evaluated.

Responsibility: Department of Environment.

Recommendation B7: Implement health-protection measures (especially related to salt/dust storms)

- Studies of practical measures should be carried out on how to protect local people against the negative impacts of the drying lake, in particular the sand/salt storms and the salty haze.
- This could include wind control and soil stabilization measures.
- Special attention should be given to villages close to salt mining areas.
- Moreover, the salt companies should obey strict standards to prevent exposure of salt by wind.

Responsibility: Ministry of Health and Department of Environment.

Recommendation B8: Develop a monitoring system on the condition of the basin and the lake

- A good monitoring system is needed to:
    - create awareness of all people on the condition of the lake (e.g. by website and a kind of electronic billboard (as for atmospheric pollution)), the causes of that condition and the ecological and socio-economic impacts;
    - determine when additional actions are needed to prevent further deterioration of the lake as part of the Drought Risk Management Plan;
    - ensure that all stakeholders keep their promises with respect to land- and water use (and delivery of water to the Lake).
- This monitoring system should cover the hydrology (surface water and groundwater), water quality and ecology of the Lake, land use, storage in reservoirs, health, etc.

Responsibility: Department of Environment.

Recommended medium-term actions

Recommendation B9: Prepare a long-term development vision for the Basin

- The population and socio-economic activities in the basin will continue to grow. This growth should take place within the carrying capacity of the natural resources (land and water) of the basin.
- This will require that land use or water use planning should be improved, building on the practical experience of the pilot projects and including an ecological assessment (in general but also in particular for the Lake) and a socio-economic assessment. Successful pilot projects should be up-scaled without waiting for planning reports to be completed.
- All future development plans and programs should include a Strategic Environmental Assessment (SEA). See also recommendation C5.

Responsibility: Government of IR Iran.

Recommendation B10: Continue with water conservation measures

- The most effective measure to restore Lake Urmia is to reduce the water losses upstream and maximize the flow of river water into the lake.
- Recommendation B3 proposes the first steps to reduce agricultural water use.
- The water-saving techniques should be extended and applied to all agricultural areas in the basin, taking into account the lessons from the short-term measures.

Responsibility: Ministry of Jihad-e-Agriculture and Ministry of Energy.

Recommendation B11: Do not prioritize certain supply-side measures

- External supply of water to the lake (by means of inter-basin water transfer) has potential negative impacts on the ecology of the lake, and environmental impacts on the basin from which water is transferred which might lead to potential future conflicts.
- The effectiveness of cloud seeding as another measure to increase the water supply is considered to be doubtful based on international experiences.
- For that reason it is recommended to give these measures a low priority.

Responsibility: Government of IR Iran.

Recommendation B12: Optimize the water allocation system

- The water system in the Lake Urmia basin has been extensively developed with many dams, irrigation systems and groundwater pumping schemes etc.
- This full development is one of the main causes of the present condition of the lake. It is recommended to carry out a cumulative impact assessment of all these developments to identify the sources of the most negative impacts.
- Based on that assessment, measures can be taken to manage and mitigate the most negative impacts.

Responsibility: Ministry of Energy.

V GENERIC RECOMMENDATIONS FOR WETLANDS IN IRAN

The following Recommendations are made in response the question: "What steps should be taken to avoid more Iranian wetlands drying up in the future?"

RECOMMENDED URGENT ACTIONS (to be implemented within 1-2 years)

Recommendation C1: Implement a national awareness campaign and programme to conserve water

- Increasing demand for water, combined with predicted declines in available water due to climate change, will create enormous future challenges for managing Iran's finite water resources to meet both direct human and environmental needs.
- A multi-year awareness campaign and programme (with measurable targets) for water conservation is therefore urgently needed at both national and local levels.
- This campaign should aim to reduce water consumption in all sectors (domestic, industrial and agricultural), so that the saved water can be used to secure public/environmental benefits. The campaign should also build awareness of the costs of unsustainable water management, as is currently experienced around Lake Urmia and the Hamouns.
- The campaign should be led from high political levels, with champions appointed in all relevant Ministries and all provinces/local authorities. NGOs, religious leaders, the media, educators and politicians should all be engaged to spread the message.

Responsibility: Government of IR Iran.

Recommendation C2: Reform agriculture to conserve water

- Agriculture is by far the largest consumer of water in Iran (about 90% of total water use). It therefore offers the greatest potential sector for water savings.
- A major programme of reform of irrigated agriculture should therefore be launched to conserve water, with savings secured to ensure maximum public/environmental benefit.
- A range of mechanisms should be implemented simultaneously, with priority given to improving existing irrigation systems (increasing productivity while reducing water consumption) over the development of new irrigation systems, as follows:
    a. Major roll-out of the successful CIWP pilot projects (Integrated Pest and Crop Management (IPCM)) for sustainable agricultural and irrigation practices, using farmers and NGOs as extension agents. The pilots on demonstration areas have shown that a reduction of 50% in water use, and a 44% reduction in chemical use are possible. These reduced inputs also produced an 18% increase in profitability.
    b. Upgrade irrigation practices and infrastructure to conserve water (provide grants and soft loans).
    c. Change to more sustainable (less water-demanding) crop types.
    d. Introduce water pricing (see Recommendation C4 for further details).
    e. Make better use of dry-land farming (restoration of pastures to improve productivity) and incentivise livelihood diversification options for farmers away from dependence on irrigation.
    f. Improve waste-water treatment in dry areas and use that for agriculture.

g. Forming Water User Associations that are capable of providing management and supervisory functions for local irrigation facilities.
h. Support for formal "sustainable farming groups" of 10-100 farmers (including women representatives) for collective action and rapid transfer of best practices.

Responsibility: Ministry of Jihad-e-Agriculture.

Recommendation C3: Build capacity for ecosystem-based management of wetlands

- The long-term solution for resolving the problem of drying wetlands is to build capacity for integrated, participatory and sustainable management of wetlands and water resources in a basin context.
- It is therefore crucial to continue the urgent roll out of capacity-building for ecosystem-based approaches for integrated management developed under the Conservation of Iranian Wetlands Project to help solve water management conflicts between stakeholders, giving priority to the most vulnerable basins and wetlands.

Responsibility: Department of Environment.

RECOMMENDED MEDIUM TERM ACTIONS

Recommendation C4: Introduce water pricing

- There are limited charges in Iran for taking water for agricultural use, and there is therefore no incentive for farmers to conserve water, despite the heavy economic costs both of providing that water, and from environmental degradation as a result of unsustainable water use.
- A system of water pricing should therefore be introduced at the national level to give value to water.
- Such a system should be introduced in a phased way, building on the pilot that is proposed for the Urmia Basin.
- The adopted system should take account of lessons learned internationally, and might be based around a 3-tier progressive scale of water charges linked to good (including traditional e.g., *qanat* and water-efficient systems) and bad (high use, low productivity) practices:
    1. Green Zone: a Moderate charge for reasonable consumption of water in relation to crop needs;
    2. Orange Zone: a Medium charge (perhaps 100% of the Green Zone charge) for water used above the Green Zone consumption;
    3. (iii) Red Zone: a High charge to be applied for water consumption above the Orange zone levels, with the threat of cutting water supply completely if consumption is not reduced.
- Systems for metering the water consumption, and accounting for water use to farmers will be required.

Responsibility: Ministry of Energy.

Recommendation C5: Review and adjust land and water use planning and strategies

- Land and water use planning has contributed significantly to the unsustainable pressures on Iran's wetlands and water resources, because:
    1. It has not adequately addressed the limits/capacity of land and water resources within each basin.
    2. It has tended to over-estimate the water resources that are available.
    3. It has not addressed adequately the need to maintain environmental flows.
    4. It does not take account of droughts and potential longer term climate change impacts.
- Land- and water-use planning and strategies should therefore be reviewed at national, province and basin level to support more sustainable use of natural resources and livelihood options (e.g., improvement of the rangelands and dryland farming areas (such as changing from cereals to legumes), particularly around the most vulnerable wetlands.
- As shorter-term measures, environmentally-friendly clauses should be incorporated into the revised Water Law and the national IWRM plan, to rectify imbalances.

Responsibility: Ministry of Energy and Ministry of Jihad-e-Agriculture.

Recommendation C6: Review the national dam construction programme

- The construction of dams has been a major contributor to the provision of water and energy in Iran, but has also had important environmental impacts, particularly on the condition of downstream wetlands.
- An independent, comprehensive and participatory assessment of the national dam construction programme (past, present and future) is needed.
- This would aim to identify both the positive and negative impacts – economic, social and environmental – and draw lessons learned from both national and international experiences. It would identify outstanding issues and provide recommendations for improving the planning and operation of dams for more sustainable use of Iran's water resources.

Responsibility: Ministry of Energy.

Recommendation C7: Make better use of Strategic Environmental Assessments

- Greater use of Strategic Environmental Assessments (SEAs) should be made to evaluate development options including impacts on wetlands, at various geographic scales.
- This should include national policies, national and provincial development plans, sectoral plans and basin-level planning.

Responsibility: Department of Environment.

Recommendation C8: De-centralise water governance

- In order to give greater responsibility for the management of water to those who depend on its wise management, strong consideration should be given to greater de-centralisation of water governance. This could be achieved both:

i. Through the establishment of water basin commissions to have better monitoring and management of water resources (building on best practices from Europe and elsewhere), and;
ii. By empowering local authorities, villages and informal institutions to be responsible for the sustainable management of their water resources.

- Appropriate measures, including the necessary supervision of performance, should be incorporated into legislation.

Responsibility: Ministry of Energy.

Recommendation C9: Develop information and early warning systems

- Real-time and enhanced information on the state of water resources and wetlands should be made publicly available to assist stakeholders to develop informed solutions (e.g., through the implementation of drought risk management plans).
- Such early warning systems could use remote sensing (snow pack, wetland condition, river discharge etc), vulnerability assessments, and dynamic monitoring mechanisms (citizen science via social media).

Responsibility: Ministry of Energy and Department of Environment.

Recommendation C10: Restore dried wetlands

- All efforts should be made to avoid the drying of wetlands as a result of unsustainable human practices[3], since restoration measures are often complex and expensive.
- However, restoration (or partial restoration) is usually possible.
- Restoration measures should seek to work with natural processes rather than engineering solutions, use the best management approaches for the enhancement of wetland functions and for the promotion of the integrity of the broader ecosystem, and should be implemented in a phased way according to an agreed plan, with careful monitoring and evaluation of results.
- The solutions being piloted and proposed for Lake Urmia can be considered as pilots for other wetlands.
- However, all wetlands are different, and Lake Urmia is particularly challenging due to the vast size of its basin.

Responsibility: Department of Environment

Recommendation C11: Pursue international best practice approaches to manage trans-boundary basins and wetlands

- The management of water resources and wetlands in trans-boundary basins poses a particular challenge for planning, management and monitoring.
- Because of competing demands to maximize the use of the available water, this poses a particular challenge to drying wetlands.

[3] Note that many wetlands do dry naturally, either on a seasonal basis or as a result of natural droughts.

- Best practice approaches should therefore be pursued to improve the trans-boundary management of water resources and wetlands, based on internationally-accepted principles such as the Ramsar Convention guidelines, with a goal to achieve formal coordinated trans-boundary management agreements being in place within 5 years for all shared basins.
- The agreements should be supported by actions; strong cross-border communications at all levels will be a key success factor.

Responsibility: Ministry of Foreign Affairs.

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