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Designing Institutions for Watershed Management: A Case Study of the Urmia Lake Restoration National Committee

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ABSTRACT: One of the prescriptions of Integrated Water Resources Management (IWRM) is to organise water resources management on a watershed or basin scale, which usually involves the establishment of special-purpose organisations. This paper contributes to the discussion on the functioning of these organisations and, more specifically, on the relationship between their institutional design and their performance. An in-depth case study of the Urmia Lake Restoration National Committee (ULRNC) in Iran reveals that the committee has been successful in drafting ambitious plans and policies for restoring Urmia Lake. However, there is a serious risk of implementation failure due to contradictory national policy agendas of lake restoration and agricultural development, insufficient budget allocation for realising the restoration plan, lack of provincial accountability for the spending of resources made available for the implementation of restoration measures, and potential future political instability which may lead to less attention to the restoration process.

KEYWORDS: Watershed management, river basin organisation, institutional analysis, Urmia Lake, Iran

INTRODUCTION

Since the beginning of the 1980s, there has been a discursive shift in water management from the engineering paradigm or hydraulic mission towards Integrated Water Resources Management (IWRM). IWRM deals with technical as well as social, economic and institutional aspects of water management (Biswas, 2004). IWRM provides a holistic framework for ensuring that water resources are developed, managed and used in an equitable, sustainable and efficient manner (UN-Water, 2018). IWRM can be considered to be a response to several sources of fragmentation of water governance systems. Lubell and Edelenbos (2013) argue that this fragmentation cannot be completely 'solved', and that the main goal of IWRM is to facilitate coordination, cooperation, joint responsibility and integration within fragmented governance systems (Teisman and Edelenbos, 2011).

IWRM suggests that the watershed is the appropriate scale for organising water resource management. The concept of watersheds was developed as a technical tool – an area of land draining into a common body of water – but has been taken up as a policy framework (Cohen and Davidson, 2011). Watersheds are also "regions to which political jurisdictions almost never correspond, and watershed-

scale decision-making structures do not usually exist" (Schlager and Blomquist, 2008 : 1). Managing water at the watershed level helps to manage and control the conflicts between upstream and downstream water users and also encourages practitioners to develop a comprehensive approach to environmental problems instead of sticking to their local interests and traditional boundaries (Imperial, 2005). There is, however, no universal formula for organising watershed management (Biswas, 2004).

River basin organisations (RBOs) have emerged and are supposed to deal effectively with the challenge of managing water at the watershed level. The establishing or restructuring of RBOs is part of almost every contemporary water sector reform programme, and RBOs are incorporated into nearly all new water legislation that has been produced over the past ten years (Jaspers and Gupta, 2014). There are many different types of RBOs, and the current literature on water governance has produced various typologies of this kind of organisation (see, for example, Alaerts (1999), Hooper (2005), Molle et al., (2007) and Huitema and Meijerink (2014)).

In this paper, we want to learn from the institutional design and performance of one specific organisation for watershed management, the Urmia Lake Restoration National Committee (ULRNC), which was established in 2013 following the steady drying up of Urmia Lake and political changes in Iran after presidential elections (ULRP, 2015b). We will use the framework inspired by Ostrom and developed by Huitema and Meijerink (2014), to characterise the design of this committee, to discuss its performance, and to explore the relationship between its design and performance.

This paper uses a case study strategy. Case studies enable researchers to closely examine the data within a specific context, and to explore and understand complex issues such as the design and performance of RBOs (Zainal, 2007). For our in-depth case study, we have used four data sources and methods:

1. *Literature review and secondary analysis*: We analysed what others have written about institutions for water resources management in Iran and for Urmia Lake.
2. *Analysis of legislation and policy documents to identify specific rules that characterise the institutions*: We analysed official reports, policy documents, laws, acts and governmental websites.
3. *Participatory observations*: Through their positions, respectively, as former member of the expert groups during the ULRNC establishment, and member of the Monitoring and Evolution Council of the Urmia Lake Restoration Program (ULRP), two of the authors made observations during meetings in which the ULRP was discussed.
4. *Interviews with key actors*: We conducted interviews with the head of the ULRNC, with a staff member of the executive division of ULRP, with a member of the Monitoring and Evaluation Council of the ULRP, and with a staff member of the regional office of the Ministry of Energy.

In the following section, we first discuss the theoretical framework of the institutional design and performance of RBOs, after which we briefly sketch the history of the Urmia Lake Restoration National Committee and characterise its institutional design. Thereafter, we discuss the committee's performance and the relationship between its institutional design and its performance. Finally, we present the main findings and conclusions, and reflect on the theory of the relationship between institutional design and performance of RBOs.

THE INSTITUTIONAL DESIGN AND PERFORMANCE OF WATERSHED ORGANISATIONS

The term 'institution' refers to many different types of entities and, conceptually, to the frequently invisible elements of the policy environment (Verkerk et al., 2006). Institutions may be defined as "systems of rules, decision-making procedures, and programs that give rise to social practices, assign roles to the participants in these practices and, guide interactions among the occupants of the relevant

roles" (Gupta et al., 2010 : 460). North (1990) defines institutions as the "rules of the game in society". This includes rules, habits, and customs that define patterns of behaviour and shape human interaction. The rules and roles may be formally described in the form of a law, policy, or procedure; they may also emerge informally as norms, standard operating practices, or habits that may be visible or hidden (Huitema and Meijerink, 2017).

Ostrom has developed a framework for Institutional Analysis and Development (IAD). The IAD is a "multi-level conceptual map" which may be used to analyse the design and performance of institutions regulating interactions within an action arena (Polski and Ostrom, 1999). The IAD uses seven types of rules for analysing an action arena.

Huitema and Meijerink (2014) used Ostrom's framework in their study of the development, design, and performance of river basin organisations. They merged some of these rules and produced a list of five types: authority rules, aggregation rules, boundary rules, information rules and pay-off rules (Table 1).

Table 1. Rule types (Huitema and Meijerink, 2014).

Rule	Description
Authority rules	Rules specifying the set of positions, and defining the scope of each position's authority
Aggregation rules	Rules defining how decisions are made – weighing individual choices to calculate collective choices and decisions
Boundary rules	Rules defining who is eligible to enter a position and who is excluded, taking into consideration the geographical boundaries of the jurisdiction; this rule also affects the number of participants
Information rules	Rules affecting the amount and type of information available to participants, and establishing channels of information flow among the participants
Pay-off rules	Rules determining how costs and benefits are meted out, and assigning external rewards or sanctions to particular actions

They also used these rules to define four ideal types of RBOs: autonomous, agency, coordinating, and partnership (Table 2).

Table 2. RBO ideal types (Huitema and Meijerink, 2014: 38).

Typology	Description
Autonomous	Those having a constitutionally guaranteed independent position, and having their own mechanisms for democratic control
Agency	Those created by the state/government to perform a limited number of specialised tasks at arm's-length from the government; accountable only to (parts of) government
Coordinating	Those created to coordinate activities of different governmental organisations, and with accountability to these organisations
Partnership	Bottom-up initiated governance arrangements which are accountable to their participants, including civil society organisations

Huitema and Meijerink (2014) have studied the institutional designs of 11 different RBOs with this framework and found that most have properties of more than one ideal type, and that in some cases

there is more than one RBO within a river basin, often a combination of an agency and a coordinating type of RBO. Huitema and Meijerink (*ibid*) also evaluated the performance of each RBO. They questioned whether the RBO enhances 1) coordination across levels of government and policy sectors, and between public and private parties; 2) the accountability of water policies; 3) the legitimacy of water policies; and 4) the environmental effectiveness of policies. Finally, they have discussed the relationship between the institutional design and performance of each RBO. They found four common patterns that suggest connections between RBOs' design and performance: 1) institutional interplay, which refers to the coordination between the RBO and other organisations relevant to water resources management within a basin; 2) the ability to generate sufficient resources; 3) the tension between centralisation and decentralisation, which refers to advantages and disadvantages of (de)centralisation; and 4) the time which RBOs need in order to become effective and yield results (Huitema and Meijerink, 2014).

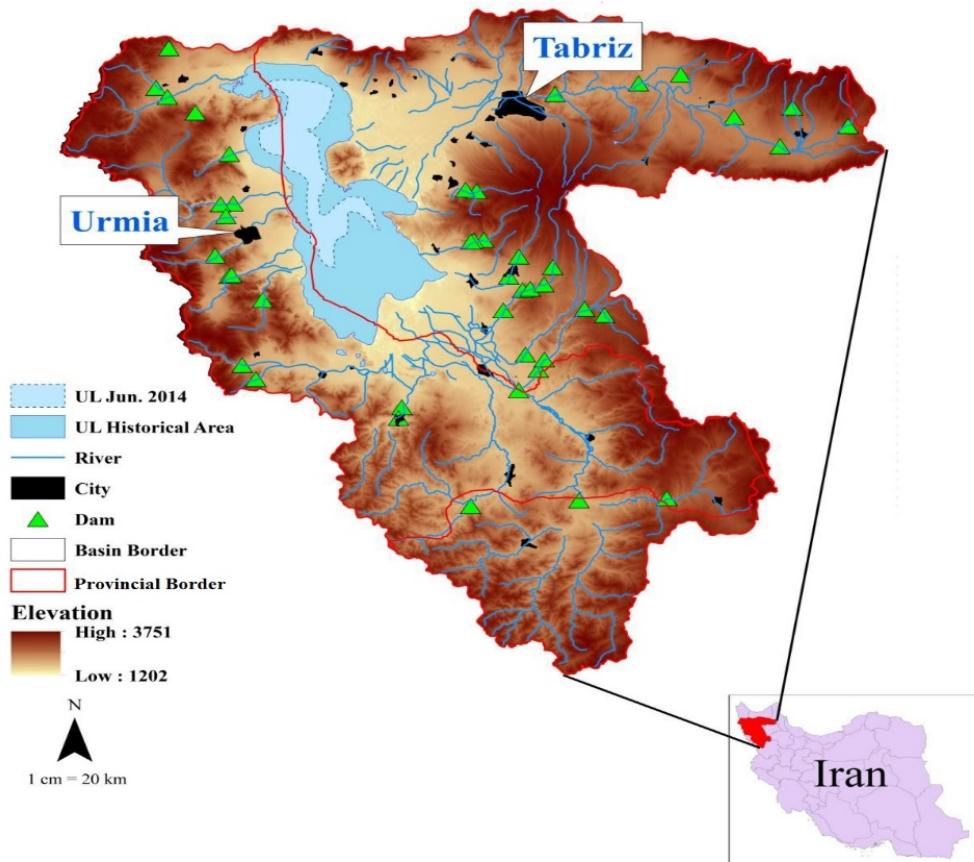
In this paper, we use this framework to study the design and performance of the Urmia Lake Restoration National Committee, and to explore whether the patterns found in other basins also apply to Urmia Lake.

THE HISTORY AND INSTITUTIONAL DESIGN OF THE URMIA LAKE RESTORATION NATIONAL COMMITTEE

From the beginning of the 21st century, watershed management in Iran has undergone several changes (Nikravesh et al., 2009), mainly some fundamental organisational reforms in water management which provided fertile ground for the implementation of IWRM. Changes have occurred at policy levels as well as in strategies and structure. "Fundamental Policies of Iran" emphasised the need to implement integrated water resource management programmes that address the entire water cycle and are based on sustainable development principles at the basin scale (EDC, 2006). At the strategy level, "Long-Term Development Strategies for Iran's Water Resources", approved by the government in 2002 (IWRMC, 2002), became a guide for compiling short-term and mid-term plans, and also aimed to address the nexus between the water sector and other sectors, such as environment, agriculture and industry. At the organisational-structure level, water resource management has changed in order to create a more comprehensive management structure. In 2002, the government established the Iran Water Resources Management Company as an agency of the Ministry of Energy, and put it in charge of all regional water companies. This larger company was given the responsibility for both planning and implementing water programmes, and had a hierarchical structure with three main levels: 1) national, headed by the Ministry of Energy; 2) river basin, managed by three Tehran offices of the Iran Water Resources Management Company which helped the company to develop its plan at the basin scale; and 3) the provincial level, headed by the 30 regional (provincial) water companies which are part of the Holding Company of Iran Water Resource Management, and which implement the plans (Nikravesh et al., 2009). During the 2009 to 2013 administrative reforms, water management responsibilities were transferred to the provincial level, which caused conflicts between the provinces over transboundary water systems including the Urmia Basin (Madani, 2014). The central basin-scale management located in Tehran produces plans, but these have a poor chance of being implemented whenever collaboration and coordination at the basin scale are required, because of conflicts between the provinces.

Urmia Lake is the largest hypersaline lake in the Middle East (Alizadeh-Choobari et al., 2016; Nouri et al., 2017; Shadkam et al., 2016), and is located in the northwest of Iran between East and West Azerbaijan and Kurdistan provinces. The lake was designated as a UNESCO Biosphere Reserve site in 1976, with consideration for its unique ecological value (Eimanifar and Mohebbi, 2007). Urmia Lake is formed at the lowest point inside the closed Urmia Basin (Zarghami, 2011).

Figure 1. Urmia Lake Basin, existing dams and the lake's surface area (Zarghami and AmirRahmani, 2017).



There are 17 permanent rivers, 12 seasonal rivers, and 39 floodways in Urmia Basin. Most of the surface water is situated in the western part of the basin; Simineh-roud and Zarineh-roud alone provide 41.6 percent of total surface water inflow into the lake. The basin is one of the valuable centres of agricultural and livestock activity in Iran. According to statistical reports by the Ministry of Energy, the potential of renewable water resources in Urmia Lake Basin is 7024 Mm³. The total water consumption by different sectors is 4825 Mm³, which is equivalent to 70 percent of renewable water resources. Table 3 shows the status of water consumption in the basin; as can be seen, nearly 90 percent of water is used by the agricultural sector. Some 57 percent of the water consumed is surface water, and the rest is groundwater. There are about 74 dams and more than 88,000 wells in the basin which are using groundwater legally or illegally (ULRP, 2014a).

Table 3. Annual water consumption in the Urmia Basin (Mm³) (ULRP, 2014a).

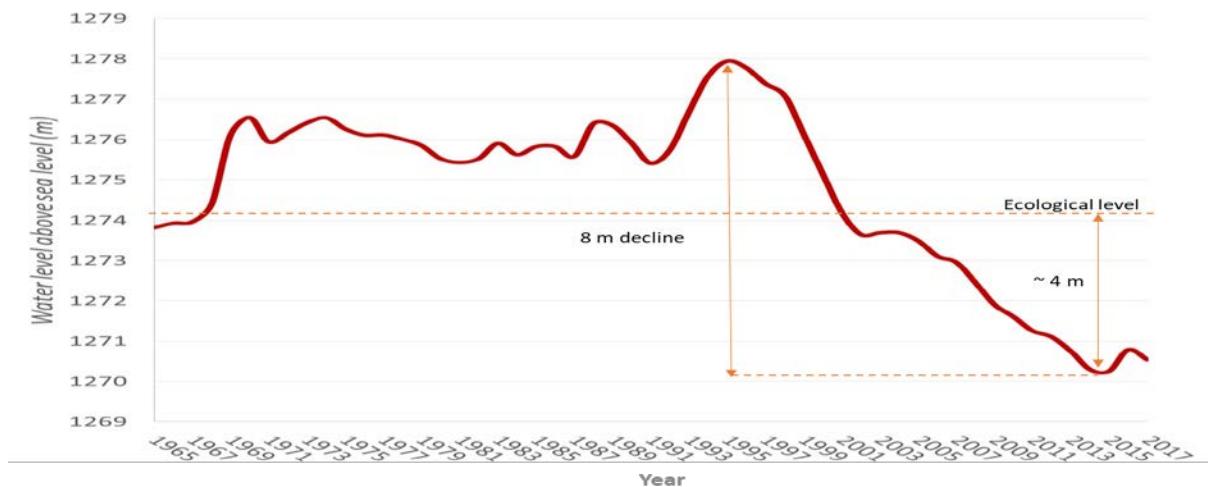
	Agriculture	Industry	Domestic	Total
Surface water	2424	33	276	2733
Groundwater	1867	35	190	2092
Total	4291	68	466	4825

Over the past few decades, Urmia Lake has experienced a rapid decline in water level. Figure 2 shows the water level of Urmia Lake from 1965 to 2017 (Salimi and Maknoon, 2018). Water level peaked at 1278.39 metres in 1995 (AghaKouchak et al., 2015), but since then there has been a marked decrease (reaching

four metres lower than the ecological level in 2015). The Department of Environment has determined 1274.1 m as the ecological level for the lake, and has proved that when water levels are lower than this threshold, salinity increases to an extent that ecological functions inside the lake are severely at risk (DOE, 2015).

Previous studies have shown that the situation in Urmia Lake is caused not only by natural factors (for instance an 18 percent reduction in precipitation and a 1.5-degree increase in temperature in the last two decades), but also by human activities and mismanagement, such as construction of dams, diversion of upstream rivers, extraction of groundwater, and agricultural development (ULRP, 2015e). Stakeholders blame each other for contributing to the shrinkage of the lake, with the most significant conflict being between the Ministry of Energy and the Ministry of Agriculture. According to the Ministry of Energy, about 90 percent of the basin's water is consumed by the agricultural sector. On the other hand, the Ministry of Agriculture blames the Ministry of Energy for its inability to calculate the water supplied to farmers, and argues that the lake shrinkage should primarily be attributed to the construction of dams (Rafiei, 2014).

Figure 2. Mean annual water level at Urmia Lake (Zarghami et al., 2017).



To stop the decline in water levels, Iran's ninth and tenth governments (2005-2013) took some actions, the most important being the drafting of the Urmia Lake Comprehensive Management Plan, which was prepared by the Iranian Department of the Environment in cooperation with different government agencies at the national level, and provincial authorities within the basin. The plan was signed on 18 October 2008 by the Vice President, the head of the Directorate of the Department of Environment, the Ministers of Energy and Agriculture, and the provincial governors of West and East Azerbaijan and Kurdistan. The plan took the form of an agreement consisting of six articles and six notes, and had a five-year validity. Eighteen months later, on 4 April 2010, it was ratified and approved by the Cabinet of Ministers. An executive committee was subsequently formed, and 24 projects were selected for implementation during the period of the five-year plan. Many of these projects had not been implemented by the end of the tenth government (2009-2013) due to insufficient budget allocation (ULRP, 2015c).

During these years Urmia Lake experienced a severe drought which caused serious environmental problems such as dust storms (Garousi et al., 2013), and led to public complaints. For instance, the 16 August 2011 Iranian parliament vote against allocating funds to the Lake Urmia Rescue Plan led to angry demonstrations in Tabriz and Urmia city on 27 August, and again on 3 September 2011. Large numbers of people came out to protest the official lack of attention to the drying up of Urmia Lake (France24,

2011). This may explain why, in their speeches during Iran's eleventh government election in 2013, many politicians stressed the importance of rescuing Urmia Lake. Building a government that takes the principles of environmental sustainability to heart was one of the most important points of Dr Rouhani's election platform, who then went on to be elected president. He constituted the Urmia Lake Rescue Task Force at the first meeting of his cabinet on 18 August 2013. The Ministry of Energy was given responsibility for setting up this task force and for organising meetings with experts from different fields of expertise.

During the task force meetings, it became apparent that experts had diverging views on the feasibility of Urmia Lake restoration. Some experts argued that restoration of the lake by increasing the water flow into it would be nearly impossible, as the lake's water is connected to the groundwater system and this groundwater is extracted for various economic purposes. These experts therefore suggested draining the lake and turning it into a natural park (Kardovani, 2012). Another group of experts felt that a partial – instead of a full – restoration should be pursued, as the full restoration would be impossible due to lack of water in the basin. They proposed restoring only the main part of the lake and some regional wetlands (Agh, 2014). A third group of experts believed that the lake could be sustainably and fully restored if interbasin water transfer systems were put in place to compensate for the basin's water shortage (ULRP, 2014b). Their proposal was to transfer water to Urmia Lake from the Caspian Sea and the Aras River. Finally, another group of experts believed that the lake could be sustainably and fully restored if dam construction was stopped, existing reservoirs better managed, and agricultural water use regulated. These measures would increase the lake's inflow, limit additional surface water and groundwater withdrawal, and mitigate salt blowouts and sand storms (ULRP, 2014b).

Despite these differences of opinion, the experts tried to reach a consensus on what needed to be done to save the lake. In the special meeting, "Thinking Together about the Urmia Lake Restoration Process", which was held at the University of Tehran on 26 September 2013, 26 projects were selected and given high priority. These projects were ratified at the Urmia Lake Rescue Task Force meeting on 8 October 2013, but conflicts arose among different stakeholders as some experts claimed that 'the system' (the Ministry of Energy) which had caused the crisis by constructing dams, should not be put in charge of resolving the problem. Because of this conflict, the Iranian government decided to accelerate the process of restoring Urmia Lake by establishing a new national committee under the chairmanship of the President or his special representative.

At the meeting of 22 January 2014, the Cabinet of Ministers approved the establishment of the ULRNC under the chairmanship of the First Vice President. Following this resolution, the ULRNC secretariat officially began its activities and started preparing the Urmia Lake Restoration Program, (ULRP, 2015c). Figure 3 shows the organisational chart of the ULRNC.

ULRP started its activities by establishing a Planning and Resource Mobilisation Unit (PRMU) at Sharif University of Technology, in collaboration with Tabriz University, Urmia University, and national and international experts. The ULRP set up six technical committees and 20 working groups, and conducted surveys on similar lakes around the world. They set up a vision and developed a Roadmap to return the Urmia Lake's water level to its ecological state of 1274.1 m by 2023.

The Roadmap consisted of three phases:

- *Stabilisation phase (2014-16)*: to stop the decline in the lake's water levels and to reduce the possible negative effects of a dried up Urmia Lake
- *Restoring phase (2017-22)*: to increase the water level by implementing solutions which bring water to the lake body
- *Final restoration phase (2023)*: to stabilise the restored water level

Figure 3. ULRNC's organisational chart (ULRP, 2015b).

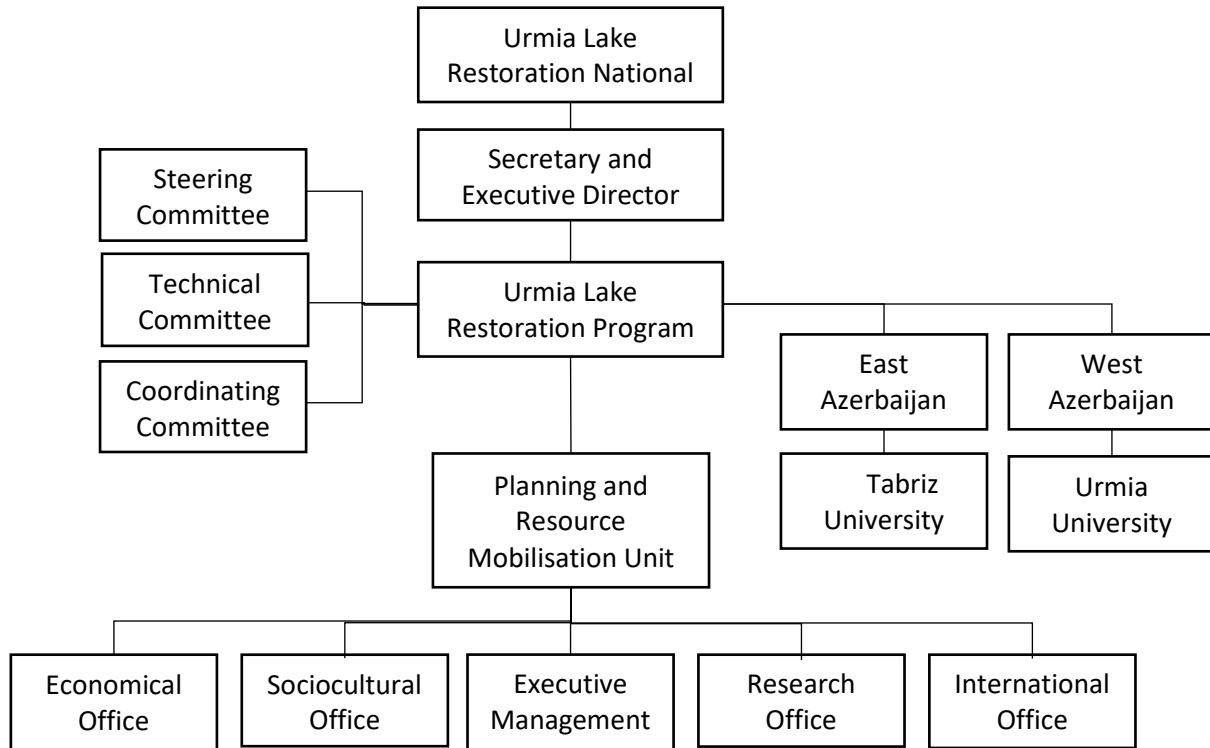
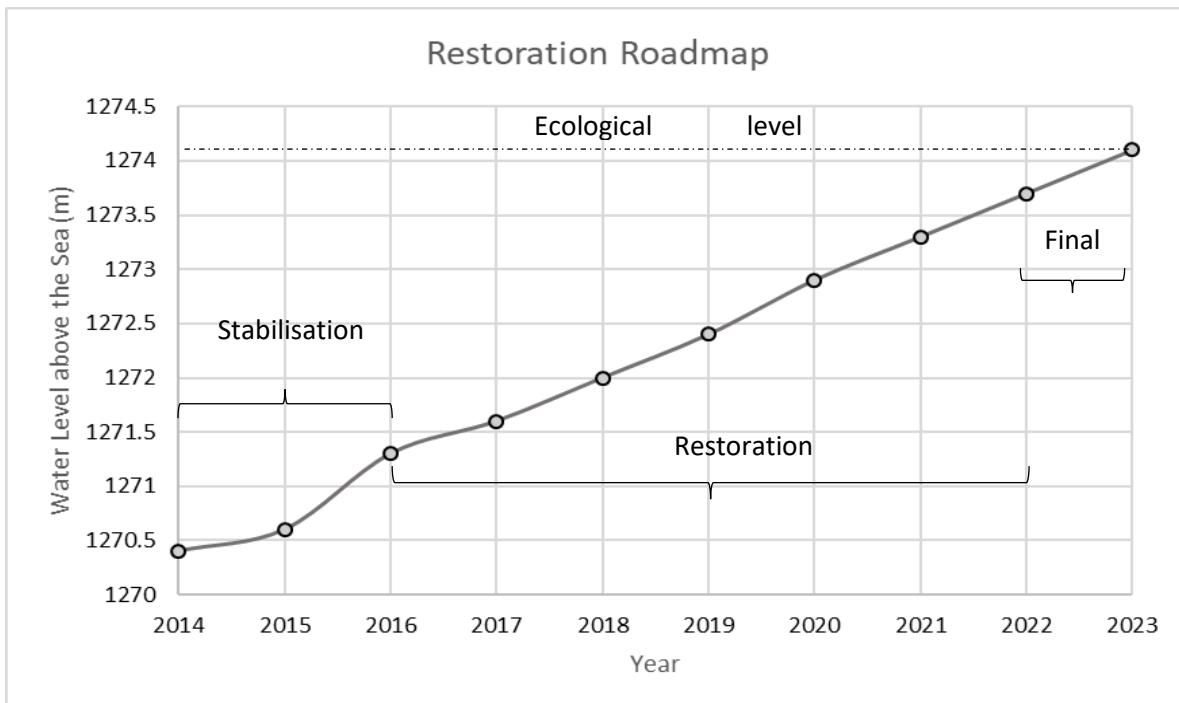


Figure 4. Restoration Roadmap (ULRP, 2014b).



These three phases include six packages of projects consisting of 26 main projects and nearly 90 sub-projects. The first package is "Forty Percent Reduction of Water Use in the Agricultural Sector". It seeks

to reduce water consumption in the agricultural sector by increasing water efficiency. Some of the measures of this package are: allocating funds to supply-required technologies; direct purchasing of water from farmers (*nakasht*); deficit irrigation for wheat and barley; replacing barley with alfalfa; applying sprinkler and drip irrigation; and using greenhouse cultivation for vegetables. While the ULRP expected this measure to add 1430 Mm³/y to the lake inflow, the actual quantitative impact is unclear (Shadkam, 2017).

The second package is "Water Supply From New Resources", which tries to increase the lake inflow by interbasin water transfer from Zab Basin and Silveh Dam, as well as from new sources like treated wastewater.

The third package includes "Studies and Software Measures", and aims at the development and implementation of a comprehensive training programme, capacity building, and public and local community participation, in order to raise awareness of the critical condition of the lake and the necessity of restoring it. This package is expected to play a vital role in the success of the two other packages.

The fourth package includes "Initiatives on Protection and Mitigation of Negative Impacts". It focuses on the identification of dust sources and ways to stabilise them, and on the reduction of the negative ecological impacts of the lake's shrinkage. One important project in this package is the development of alternative employment for farmers and livelihood improvement of local people.

The fifth package is the "Control and Reduction of the Withdrawal of Surface and Groundwater Resources in the Urmia Lake Basin". This package is aimed at preventing new projects and illegal water usage by forbidding new dam¹ construction, new irrigation and water supply networks, and new water allocations to the agricultural sector, and reinforcing protective laws.

The sixth and last package is "Facilitating and Increasing the Water Volume Entering the Lake Through Structural Measures". This package is aimed at increasing the amount of water that feeds the lake through dredging of rivers and waterways.

Figure 5. Six main objectives of the 26 solutions in the restoration plan.



The Roadmap was discussed and approved in two meetings of the ULRNC, of which the first meeting was chaired by the First Vice President, and the second (on 29 June 2014) by President Dr Rouhani. It was

¹ Except Cheraghveis and Shahid Madani dams.

expected that the main objective of restoring the natural water level in the lake could be achieved between 2014 and 2023.

Identifying the rules

In this section, we make an institutional analysis of the ULRNC using the five rule types and the typology of RBOs presented in Section Two.

Authority rules

After the Islamic Revolution, one of the vital national acts on water policy in Iran was the Law on the Equitable Distribution of Water.² According to this law, the government, and more specifically the Ministry of Energy, has the competencies to manage the supply and demand of water and wastewater services, to set the water price for all types of consumption, and to recover costs from all water users (Iran, 1982). The main authority in the management of water is therefore the Ministry of Energy.

The establishment of the ULRNC as a body that presides over the existing water management structure changed the authority rules in the Urmia Basin. The ULRNC follows the Urmia Lake Restoration Roadmap, and within the scope of this Roadmap it has the authority to manage other stakeholders. It was decided that the projects included in the Restoration Roadmap would be implemented by the related institutions and organisations, while the ULRNC would only carry out monitoring and evaluation (ULRP, 2015c). The ULRNC was hence established as an umbrella organisation to coordinate, facilitate, monitor and evaluate the Urmia Lake Restoration Program. The Ministry of Energy, as one of the members of the ULRNC, was tasked with following and implementing all plans approved by the committee. However, in reality, the Ministry of Energy mostly prioritises water supply for domestic, industrial and agricultural uses, over ecosystem restoration.

With the formation of the ULRNC, the roles and responsibilities of the stakeholders have changed in varying degrees. In a study conducted by the Social Committee of the ULRP, 80 stakeholders were identified and classified according to the restoration plans. The results showed that among the top 20 key stakeholders, only villagers and farmers were not governmental (ULRP, 2015a).

The study also considers eight key roles for stakeholders, including leadership and policymaking, implementing the projects, monitoring and evaluating the projects, participation in plans, empowerment and training of local people, increasing awareness, capacity building, and impact assessment. The Ministries of Energy and Agriculture, the Department of Environment, regional water companies, and provincial governors play the most important roles in the restoration plans. Non-governmental groups, local women's associations, water-user associations and social activists are considered to have less influence on restoration plans. To summarise, the authority remains in the hands of governmental actors, primarily the Ministry of Energy.

Aggregation rules

Despite this hierarchical structure, the ULRNC relies on consensus decision-making and planning. According to the framework defined by the committee, it has been decided that any decision must be prepared and discussed within groups of experts, and a final decision must be made by them rather than by individuals (ULRP, 2015b). To do so, three decision-making and professional committees – steering, technical, and coordinating – were established (Figure 3). To be more specific, there is an expert-based process for decision-making. First, subcommittees identify real challenges on the ground and hold meetings to analyse them and find possible solutions. In the next step, alternative solutions are reported

² This law was approved by parliament in 1982, and later some modifications were made. The law consists of five chapters, 52 articles, and 27 notes. This law regulates public and national ownership of water, groundwater resources, surface water resources, duties and authorities, and penalties.

to the planning and mobilisation committee unit which prioritises solutions. Lastly, the final decision is made by consensus in the ULRNC (ULRP, 2015b). NGOs and the private sector have a small role in planning and decision-making.

Although decisions are made in groups and are based on formal information and science, we learned from interviews that other factors, such as lobbies, political debates, and public complaints affect the decision-making process as well, and often decisions are interest based. For example, the livelihood problems of local farmers in turn cause social discontent and have become a national security issue (ISNA, 2018). This has been instrumental in justifying some actions taken by the Ministries of Energy and Agriculture, and has triggered members of parliament to put pressure on the ULRP. For instance, the Ministry of Energy refuses to release water from the dam reservoirs for lake restoration because they give priority to farmers' needs. The Ministry of Agriculture attributes the poor improvement of productivity and the inability to control the increase in cultivated land to the economic and livelihood problems of farmers, and considers the confrontation with local farmers to be a security issue. Members of parliament also put pressure on the ULRP to finance projects which may actually increase water consumption by farmers. These examples illustrate the severe tension between the ambition to restore Lake Urmia and policies to increase agricultural production.

Boundary rules

Boundary rules can be analysed from two different points of view. One describes the geographical delineation of the RBO and the other refers to the inclusiveness of the decision-making process.

Geographically, there is a clear definition of Iran's water basin boundaries which is accepted by experts and stakeholders. Iran has six main basins and 30 sub-basins (Nikravesh et al., 2009). There was no controversy over the definition of the boundary of Urmia Basin during the establishment of the ULRNC. Ghaheri et al. (1999), who reviewed the physical characteristics of the Urmia Basin, noted that the total basin area was about 51,440 km², that it contained 21 permanent and seasonal rivers and 39 episodic ones which flow into Urmia Lake, and that there are no surface outflows from the lake. As the lake is supplied by these rivers, the ULRNC chose the basin level for its territory.

As mentioned earlier, all major government bodies concerned, including provinces, are members of ULRNC under the chairmanship of the First Vice President (ULRP, 2015b). Although non-governmental actors are not formal members of the ULRNC, some universities, international collaborators, and experts from NGOs became involved in the ULRP through collaborations with governmental bodies. Interestingly, the private sector has a minimal role, local farmers have just two farmer-based associations, and the most prominent member is Farmers' House. Local people who live near cities and villages have no representatives except local governors and local ministerial bodies. The long distance between the Urmia Basin and the central management structures, which are headed by the ULRP office in Tehran, prevents local experts from fully participating in decision-making processes. Some local experts have expressed their dissatisfaction and suggested to transfer the central office of the ULRP to one of the provinces in the Urmia Basin. However, the ULRP believes that there is insufficient administrative capacity available in the region, and that there are more water experts residing in Tehran than in the provinces (Aghaei, 2018).

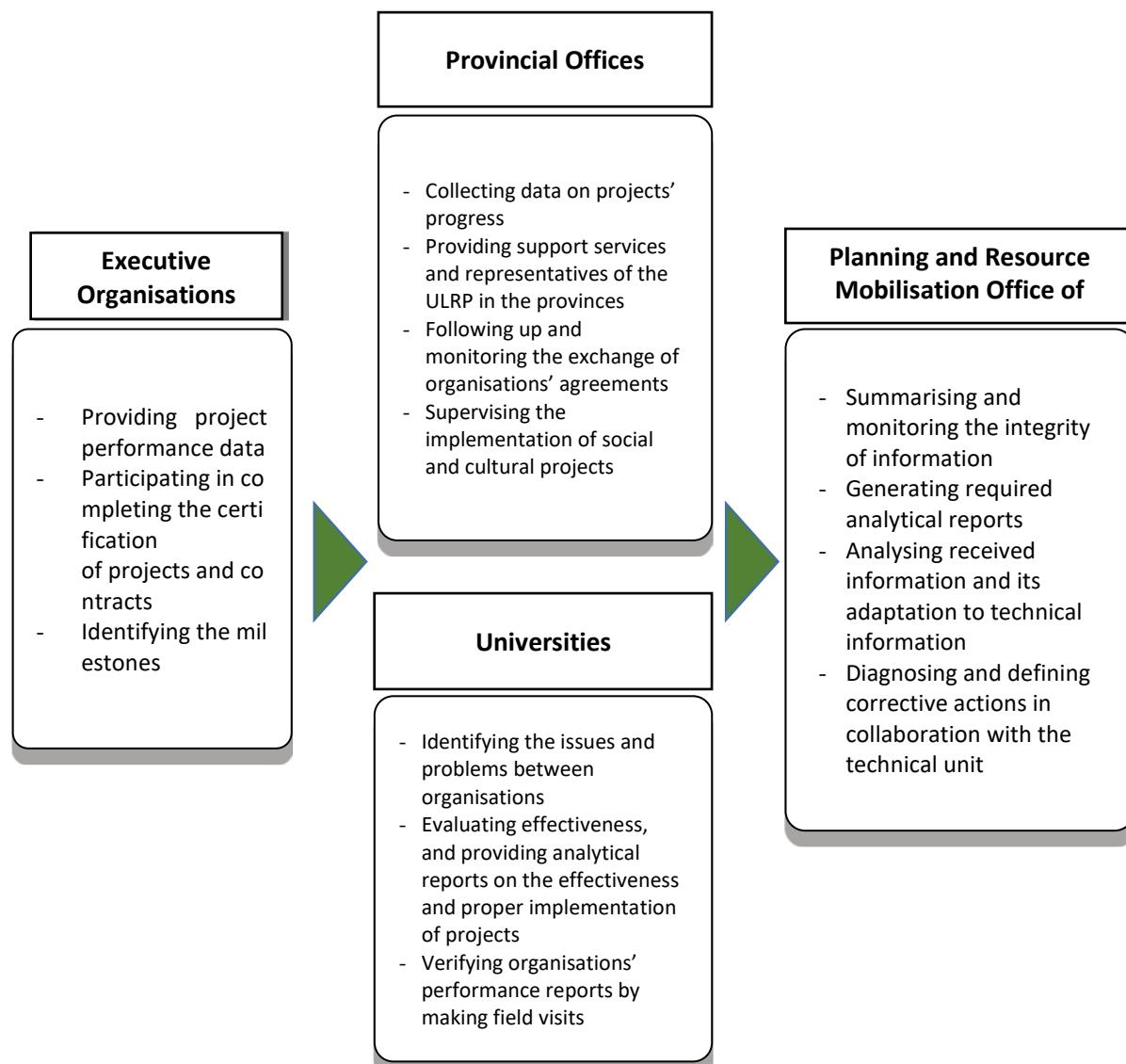
Information rules

The ULRNC is authorised to conduct the research and to collect the data which are needed to overcome the Urmia Lake shrinkage problem. During the period of the establishment of the ULRNC and the development of the Restoration Roadmap, several studies have been carried out to gather data for decision-making. Moreover, six main expert committees and 20 working groups have been established to analyse the data and to reach a consensus on major decisions. In these teams and committees, technical and engineering sciences like water and soil engineering and environmental sciences are very

well represented. There has been some social science input on how to raise awareness and organise participation by local communities (ULRP, 2015d), but economic expertise was limited to estimating the cost of plans.

The ULRNC also needs information to monitor and evaluate projects. To do so, the ULRP head office and two provincial sub-offices were established. The ULRP head office employs personnel from its provincial offices and regional universities for monitoring the projects. Provincial offices are responsible for collecting information on the projects' progress, surveying and monitoring the implementation of ULRP agreements with other organisations, and supervising the implementation of social projects. Universities are tasked with evaluating the effectiveness of projects, verifying performance reports by executive agencies (through field surveys), and identifying and analysing the sources of implementation problems. The evaluation results are summarised and integrated through the ULRP Planning and Resource Mobilisation Unit, and form the basis for prioritising the subsequent projects and resource allocations (see Figure 6).

Figure 6. ULRP monitoring process.



In practice, there are problems in the M&E process. Real and updated data is at the disposal of executive organisations, such as the Ministries of Energy and Agriculture, but they prevent online sharing of this data with the ULRP. For example, all data about water resources and water consumption is collected by the Ministry of Energy but is not made available online to the ULRP. Another problem is the absence of an independent reference for verification in case of conflict. As an example, when the ULRP reports poor performance of regional water companies to the Ministry of Energy, the Ministry asks its regional bodies to answer, and mostly they do not accept the ULRP's claims. The General Inspection Organization of Iran (GIO), which is linked to the Judiciary of Iran, is responsible for solving this kind of conflict, but governmental organisations such as the ULRP and the Ministry of Energy prefer not to report intra-government conflicts to the GIO.

The ULRP website publishes important data about the lake's current situation and also about the committee's activities and the status of projects. Minutes of steering committee meetings have been published, and project progress is reported online just as are the results of completed studies, however there is no real-time online database shared with the public.

Pay-off rules

The expenses of the ULRNC are fully covered by government through the annual national budget, the National Development Fund of Iran (NDFI), and disaster management funds (ULRP, 2015c). Every year during the country's annual budget approval, the ULRNC collects financial information from plan executors and then calculates the required budget to run the planned projects. After finalising the annual budget, the ULRNC sends a request to the Planning and Budget Organization and, after their analysis and if no changes are needed, the budget is sent to parliament to be approved as a budget law (ULRP, 2015c). According to the law, as the ULRNC is not an executive organisation it cannot be funded directly, so all payments are made through the Ministry of Energy. In this aspect of institutional design, the ULRNC is clearly an agency because it is funded by the government of Iran with no input from other stakeholders. Even though the ULRNC's projects have a high priority at the national level, the funding which is needed for the implementation of the restoration plan is far more than actual allocations. From 2014 to 2017, the government allocated only 30 percent of the required budget (Table 4).

Table 4. Urmia Lake restoration plans budgets and funding (Billion Rial).

Year	Planned budget	Actual allocation	Percentage
2014	7255	1840	25
2015	11,203	2896	26
2016	11,207	3000	27
2017	8207	3639	44
Total	37,872	11,375	30

Due to the lack of funding, President Rouhani recently ordered that foreign funds could be used in Urmia Lake restoration projects. The ULRP then began negotiations with foreign countries such as Japan, in order to raise US\$3 billion to fund acceleration of the lake's revival (IRNA, 2018), but these negotiations were stopped due to the recent imposition of sanctions. About 100 members of parliament wrote a letter to Iran's Supreme Leader asking for permission to use NDFI funds for the Urmia Lake Restoration Program (Tabnak, 2018).

Pay-off rules also define who benefits and who loses. The law establishing the ULRNC forbids new development of agricultural land and water usage in the region. In this legal framework, the organisations and people involved in water development (e.g. dam constructors, interbasin water transfer constructors, and irrigation network developers) stand to lose their budget or contracts, while more funding will be received by governmental bodies that protect surface water, groundwater or the

environment, and by organisations which aim to improve water efficiency. Farmers who already have authorised water-shares get state subsidies to modernise their irrigation technologies, while those who don't must stop using unauthorised water. Losers also include the farmers who can no longer get permission to expand their farms in the wake of the establishment of the ULRNC and the adoption of new restoration policies. Table 5 presents a summary of the rule types characterising the institutional design of the ULRNC.

Table 5. Rule types characterising the ULRNC.

Rule type	ULRNC rules
Authority rules	ULRNC has the authority to plan and monitor the condition of Urmia Lake with regard to particular water issues such as water quantity and quality, surface and groundwater usage, and spatial planning; the Ministry of Energy is required to follow and implement these plans.
Aggregation rules	According to the initial framework defined by the committee, decisions must be prepared by experts according to a consensus protocol, with the Vice President taking the final decision in case of a conflict.
Boundary rules	There was no controversy over the boundary of Urmia Basin during the establishment of the ULRNC. All governmental water-related stakeholders are members of the ULRNC and the ULRP, as are international collaborators, representatives from universities, and specialists from a number of NGOs.
Information rules	The committee bases its decisions on the technical and engineering expertise of water, soil and environmental professionals. A committee that is responsible for socio-economic studies also includes some social science experts.
Pay-off rules	Government pays for all ULRNC costs including approved projects. The activities of the committee benefit those who want to protect water resources, while those who want to use more water lose funding.

The ULRNC as agency and 'coordination' type of RBO

According to the RBO typology presented earlier, the ULRNC is an agency: it is created by the government to perform a limited number of specialised tasks, is totally dependent on external funding and inputs, and is accountable only to (parts of) government. The ULRNC also has some characteristics of a 'coordination' type of organisation as the committee was established primarily to improve the coordination between ministries and provinces.

PERFORMANCE OF THE URMIA LAKE RESTORATION NATIONAL COMMITTEE

In this section we evaluate the performance of the ULRNC. As only four years have passed since it was established, it is too early to draw final conclusions about its performance. Here we present a preliminary assessment and identify the main risks by using the evaluation criteria presented in Section Two.

Coordination

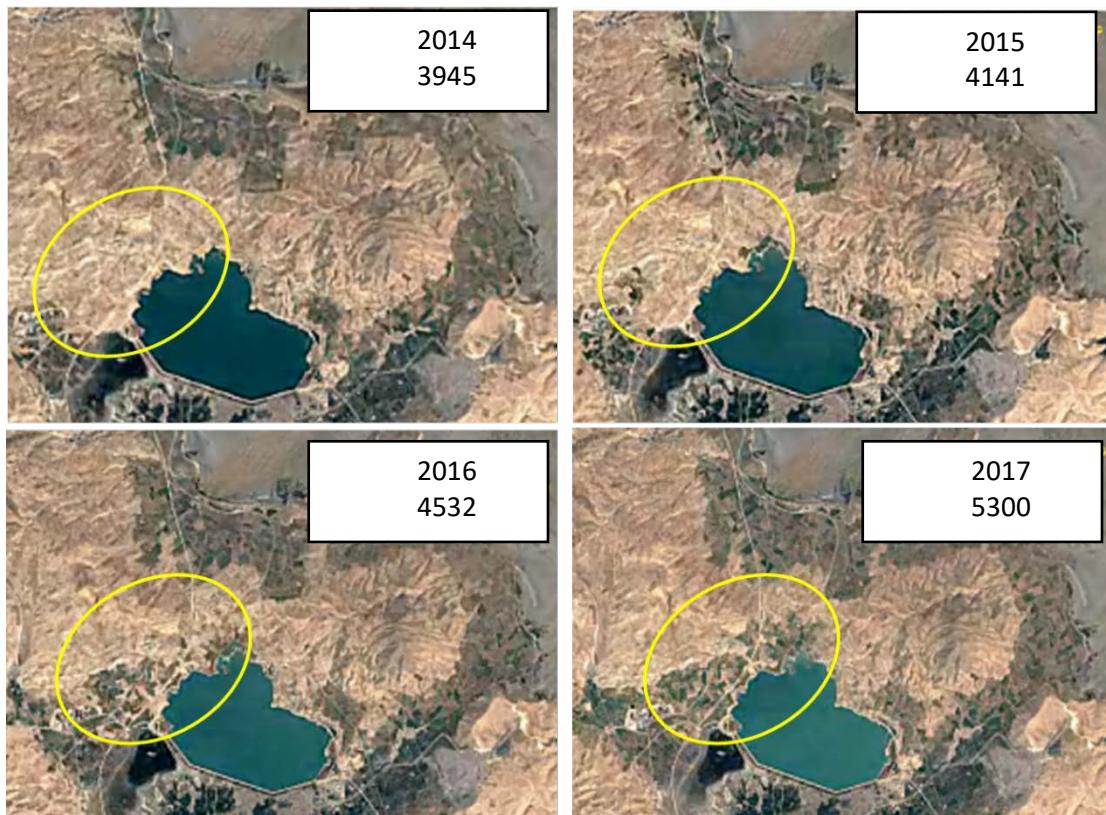
Urmia Lake was shrinking mainly because of a collective action problem. All stakeholders had been trying to maximise their short-term benefits without taking into account the long-term impacts of their behaviour. The ULRNC and the ULRP were established to respond to this serious problem by bringing all stakeholders together, arriving at collective decisions, and improving coordination.

In order to assess the degree of coordination achieved by the ULRNC, we distinguish between the development and the actual implementation of policies and plans.

The ULRNC has made serious efforts to bring different experts and stakeholders together and to develop a common vision and long-term strategy to save Urmia Lake. At first glance, it seems that policy coordination has improved because all relevant governmental actors are involved in the development of joint visions and plans, and because the committee has managed to develop a strategy for restoration of the lake. However, a more detailed look into the decision-making process and contents of the plans reveals that coordination is still poor and problematic. Some of the main problems can be categorised as:

- **The existence of contradictory development policies and lack of proper land use plans:** As the ULRNC does not play a main role in Iran's economic development planning, some contradictory plans for the Urmia Basin have been approved which frustrate the restoration process. The ULRP tries to monitor these problems and to solve them by organising meetings and reporting on the observed problems to ministers, however this does not seem to be effective. For example, the development of agricultural land from 480,000 ha in 2012 to 560,000 ha in 2016 clearly contradicted the main objective of the Urmia Lake Restoration Program (ULRP, 2018b). Figure 6 shows agriculture development upstream of the Hasanlu Dam in the Urmia Basin between 2014 and 2017. This expansion of agricultural land is largely due to the construction of infrastructure by the Ministries of Energy and Agriculture and the allocation of water to farmers. In fact, these ministries continued with the Hasanlu Dam construction even after the establishment of the ULRNC and the adoption of the plan to restore Urmia Lake.

Figure 7. Agriculture development upstream from the Hasanlu Dam in the Urmia Basin (ULRP, 2018b).



This development can be explained by the contradiction between the tasks and objectives of the Ministry of Agriculture which come from Five-Year Development Plans, and the tasks and objectives which are

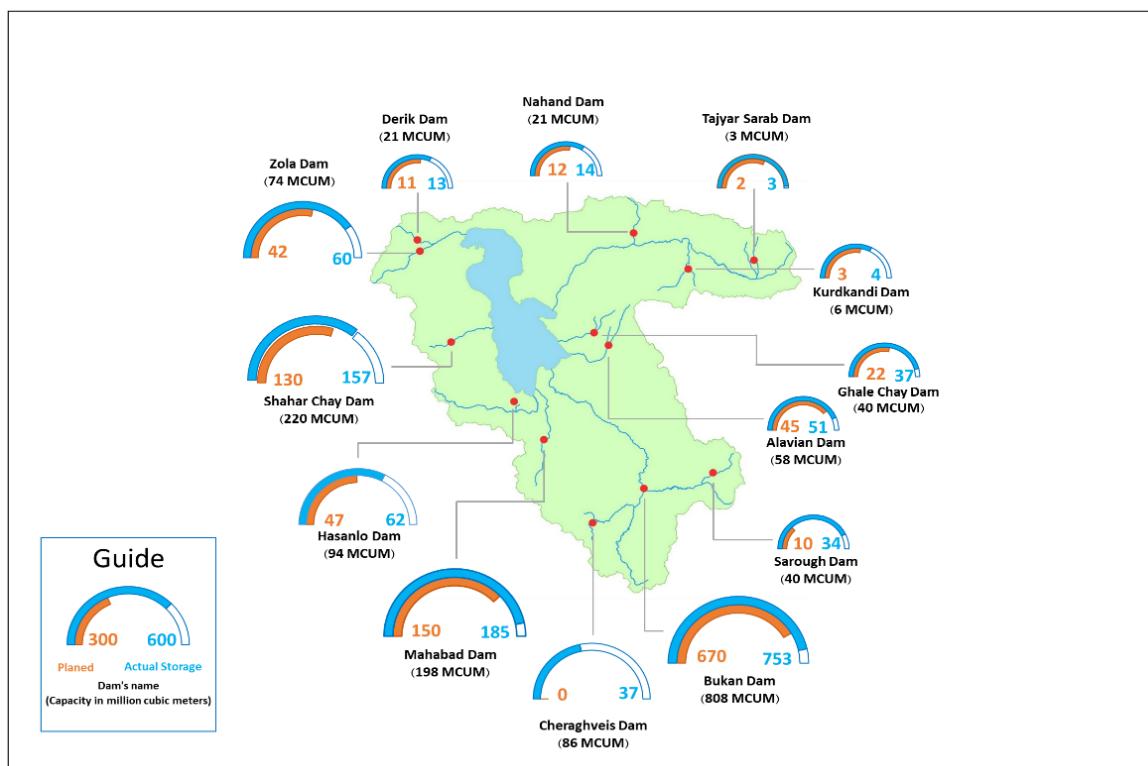
part of the new restoration plans. In the former, the Ministry of Agriculture is responsible for ensuring food security in the country, one of the indices of which is the Ministry's performance with regard to annual agricultural production. This Ministry of Agriculture programme is in conflict with the goal of preventing agricultural development and reducing water consumption in the Urmia Basin. The Ministry of Agriculture's provincial subordinates, in an effort to meet the objectives of national development plans, continue to develop agriculture by implementing cultivation plans, turning dryland farming to irrigated farming, and turning natural into agricultural land. Although these contradictory policies still exist, the restoration plan has decreased the pace of cultivating new lands.

- **Weakness in integrating the plans:** For developing the Restoration Roadmap, different technical working groups at different levels did preparatory work, until finally all proposed measures and projects were compiled. Due to time constraints, only redundancies were addressed and no integration of policies took place.

Executives of the restoration plans are mostly within the regional branches of ministries. Each has its own goals and plans which are not well integrated with the ULRP's programme, nor are regional offices aware of each other's plans, making it hard to coordinate and align them.

Another problem is that the Roadmap is rigid, with no flexibility for dealing with future uncertainties and no alternative scenarios. For example, the ULRNC planned to release a specific amount of water from the dams every winter. Although the Ministry of Energy is responsible for releasing this amount of water, in reality it adjusts releases to actual water availability resulting from differences in yearly rainfall, and takes into account stakeholders' (including farmers') interests, which is not in line with ULRP policies. Figure 8 shows the status of the dam reservoirs in the Urmia Basin. As can be seen, the reservoirs of all dams contain more water than the amount specified in the ULRP's plans, meaning that some water which should have been released to restore the lake is stored in order to be distributed to farmers.

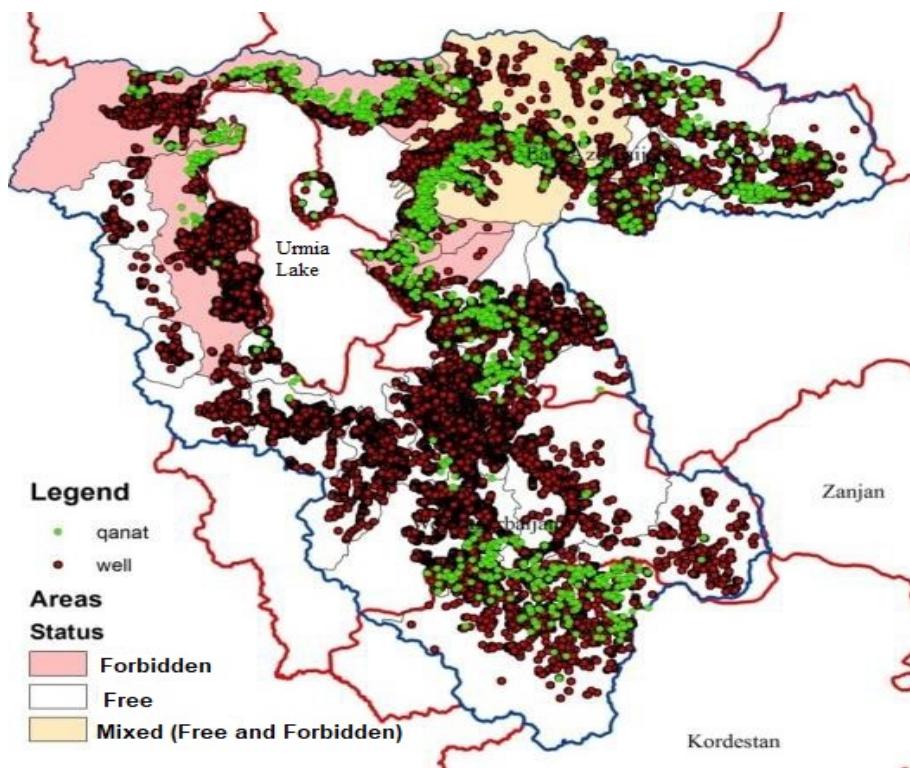
Figure 8. The status of dam reserves in Urmia Basin (21 May 2018) (Tajrishi, 2018).



Implementation of plans is also slow and problematic. Some of the problems in coordination can be categorised as follows:

- **Weak administrative systems, big bureaucratic government:** The existence of time-consuming bureaucracy and redundant rules makes the implementation process slow and coordination difficult.
- **Inconsistency in implementing plans:** One of the restoration plans related to water consumption reduction in the agricultural sector was '*Nakasht*' (not planting). According to this plan, 50,000 ha of agricultural land in the Zarrineh-roud area had to be leased by the government, which would then have to compensate the farmers (TabnakNews, 2014). The plan faced widespread opposition in the region and was ultimately stopped after pressure by members of parliament. The opponent's argument was that there is no alternative income for farmers and so their livelihood is at risk (Khabaronline, 2017).
- **Lack of coordination between ministries and their regional agencies:** Even if ministries have reached an agreement on policy and planning, conflicts may arise during implementation as regional agencies of the ministries defend their interests. As an example, there are more than 40,000 illegal wells in the region (see Figure 9), and the Ministry of Energy was responsible for destroying these wells by 2017.

Figure 9. All wells located in Urmia, the forbidden area (pink) and some in yellow are illegal (Shadkam, 2017).



The Ministry of Energy set a plan to reach this goal but the local implementation agencies were able to block less than 8 percent of the illegal wells. Table 7 shows the performance of regional water companies in the Urmia basin after 2013 in the line of objective No4 of the Lake restoration. They were able to save 33.75 Mm³ but there is a big gap with between plans and implementation, and much public resistance.

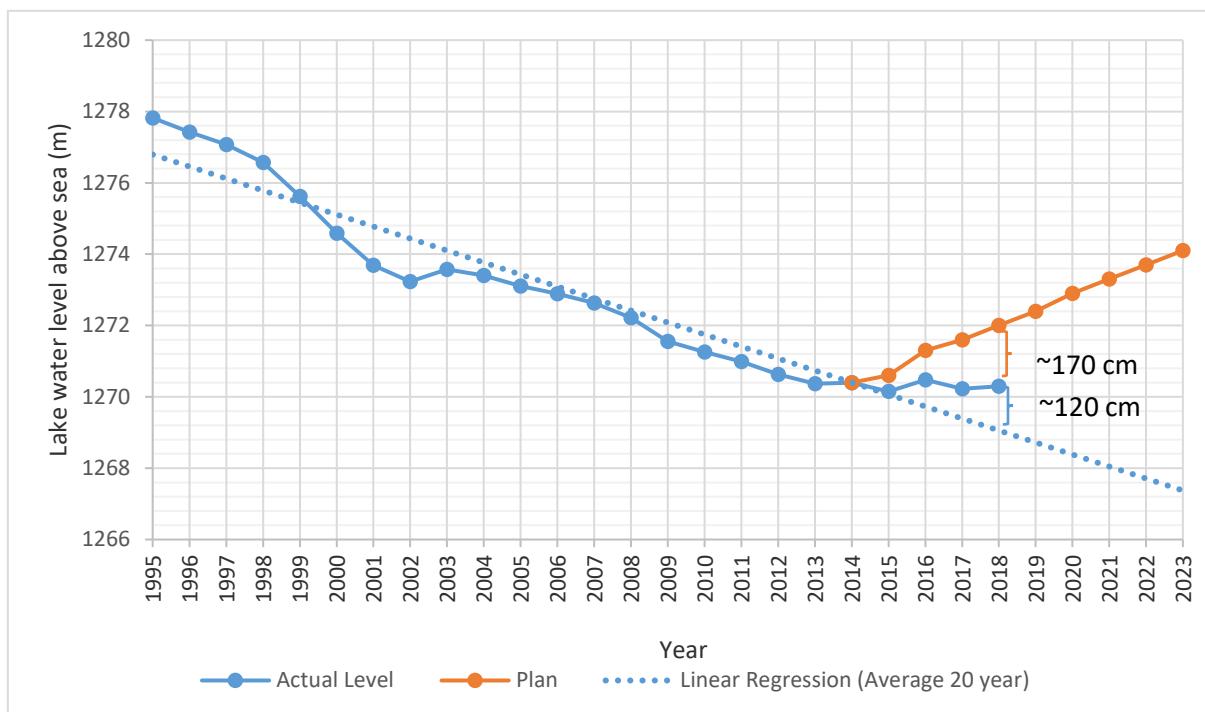
Table 6. Performance of regional water companies in controlling illegal water usage in the Urmia Basin between 2013 and 2018 (ULRP, 2018a)

Action	Unit	Performance
Stopping new illegal well construction	number	1051
Preventing unauthorised drilling; seizing drilling machines	number	491
Blocking illegal wells	number	3219
Total water savings	Mm ³	33.75

Environmental effectiveness

After the implementation of the ULRNC's plan, the decline in water level of the lake has stopped (see Figure 10).

Figure 10. The trend of Urmia Lake's water level (ULRP, 2018c).



Although some experts believe that the rising water level can be explained by heavy precipitation in 2015-2016 (Soudi et al., 2017), Table 7 shows that the effect of the ULRP plans is undeniable when comparing the volume of water in the lake in the 2014-2015 water year with that of 2015-2016. Improvement of the lake's water level has resulted from release of water from dams, reduction of water usage in the agriculture sector, dredging of rivers, and the construction of a canal connecting two of the main feeding rivers, leading to the conclusion that the projects that were part of the stabilisation phase of the ULRP have been rather successful (ULRP, 2018b).

Table 7. Comparison of the 2014-2015 and 2015-2016 water years.

Water year	2014-2015	2015-2016	ULRP Actions
Precipitation	317 mm	326 mm	
The runoff recorded in hydrometric stations	701 Mm ³	2990 Mm ³	1) Release of 440 Mm ³ from dams 2) 16 percent reduction in dam water use by agriculture 3) Closing of streams in non-farming seasons
'Fatalities' ¹³	36%	15%	1) Dredging of 120 km of the rivers that feed into the lake 2) Building of a 25 km channel connecting the Zarrineh-roud and the Simineh-roud Rivers
Net inflow to Urmia Lake	480 Mm ³	1900 Mm ³	

Although the decline in water level was stopped, the goals of the restoration plan have not yet been reached (see Figure 10). The report of the 58th meeting of the Monitoring and Evaluation Council examines the most important failures in the implementation of the plan. The report estimates that if there had been no agricultural development, an additional 210 Mm³ of water could have entered Urmia Lake in water year 2016-2017. Also, due to the failure of the planned water consumption reduction that was to follow from the agreement between the ULRP and the Ministry of Agriculture, about 420 Mm³ of water failed to be supplied to the lake.

Furthermore, regarding the duties of the Ministry of Energy, about 178 Mm³ of surface water has been illegally taken; about 95 Mm³ of water has not reached the lake due to the non-realisation of the water transfer from the Silveh Dam through the Jeldian channel; and about 340 Mm³ has been distributed to farmland. Although outside the growing season the irrigation networks should be closed and the water should flow to the lake, in reality farmers continue to divert water to their land by opening or damaging the gates. The Ministry of Energy also has not operated the reservoirs according to the planned release of water from the dams.

Following the stabilisation phase, some projects to reduce the negative environmental effects of lake shrinkage were implemented. These included actions for dust control, the planting of a halophyte such as *Salicornia* in semi-saline lands, waste water management, grazing management, and protection of animals and biodiversity. Figure 11 shows the progress between 2014 and 2016 in the reduction of land area with the potential for dust generation.

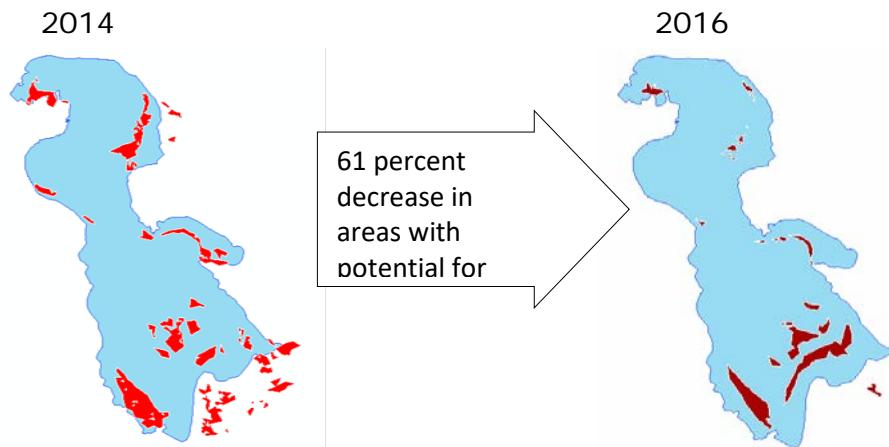
In sum, there is evidence that some of the projects which have been implemented during the stabilisation phase have had positive effects, as have those which aimed to reduce the negative environmental effects of the lake's shrinkage. Still, many environmental issues have not yet been solved.

Accountability

This section discusses accountability on three interrelated levels, including the ULRNC, the ULRP and the executive governmental bodies:

¹³ 'Fatalities' refers to the water which does not reach the lake due to evaporation or infiltration into the soil.

Figure 11. The reduction of land areas that have the potential for dust generation in Urmia Basin (ULRP, 2018c).



- The ULRNC, which is under the supervision of the Vice President and whose members are selected by the President,⁴ is indirectly accountable to the Iranian parliament. While the parliament does not have the right to ask a question directly to the ULRNC, the ministers involved or the President himself can be asked about their roles in ULRNC duties. There is also a legal framework in place for people's representatives to ask questions in parliament about implementation of the ULRP. If 25 percent of the members of parliament support a specific question, this question may be put to the President.⁵ This may explain why, in practice, the ULRNC is only held accountable to the President, and not to the Iranian parliament.
- The ULRP, as a governmental body, must submit its financial statement to the General Inspection Office, which is linked to the judiciary system of Iran. The ULRP must also report on its performance to the Monitoring and Evaluation Council, which evaluates the performance of the ULRP and reports the results to the ULRNC.
- The governmental implementation agencies, which are responsible for the implementation of restoration plans, should be accountable to the ULRNC and ULRP. However, in practice, the ULRNC does not have the (legal) means to hold them accountable. The only thing the ULRNC can do is report implementation gaps to the responsible minister or to the First Vice President, though this has so far not been very effective.

Legitimacy

According to Scharpf (1999), legitimacy is defined as a two-dimensional concept, referring simultaneously to the inputs and the outputs of a political system. Input legitimacy revolves around the process by which members are selected, how decisions are made and power exercised, and so on. Output legitimacy focuses primarily on the public assessment of the relevance and quality of the institution's performance.

According to the authority and aggregation rules, citizens, NGOs, and the private sector have a small role in the process of decision-making by the ULRNC, but there are some projects to increase public participation, for example the Convention on Wetlands' (Ramsar Convention) programme on Communication, Education, Participation And Awareness (CEPA). To raise social awareness about the

⁴ There is no legal need for parliament to approve the ULRNC members.

⁵ According to Iran's constitution, whenever at least one-fourth of the members of parliament pose a question to the President or any member of the assembly poses a question to a minister on a subject relating to their duties, the President or the minister is obliged to attend the assembly and answer the question.

negative effects of the lake's shrinkage, the ULRNC has used social media, national and local TV shows and radio programmes, newspapers, and websites. In addition, many meetings and conferences have been organised with, for instance, local teachers, local experts, and agricultural organisations. Educational programmes for raising awareness have been set-up, such as those for educating women, students, farmers, and water-user associations (Abbaran cooperatives). Some NGOs have supported the creation of local institutions for seeking community rights. It should be noted that there are fewer than ten active environmental NGOs in Iran, of which two have focused on Urmia Lake.

An element of the restoration programme which innovatively increases the input legitimacy of the ULRP (relative to other water plans in Iran), is the engagement of universities in planning, and the involvement of international experts. The ULRP, as the main executive body of restoration planning, is located at the Sharif University of Technology, and the two regional universities have been given responsibility for monitoring projects. The ULRP has also engaged in collaborations with more than 12 countries and 20 international research institutes and universities. This approach has also to some extent enhanced the output legitimacy of restoration plans.

Assessing output legitimacy is quite difficult because there is little data available for such assessments. We have learned from our interviews that ULRNC programmes typically have low output legitimacy because local farmers do not support the plans and policies drafted by the committee. The committee has been able to inform people about the threats and negative effects of lake shrinkage, but unable to mobilise changes in water use behaviour because farmers did not feel they would benefit from this. They were not informed on economically and financially feasible alternatives, and do not believe that the Urmia Lake Restoration Program offers such alternatives (Paknia and Karamjavan, 2017). Farmers' livelihood problems, in turn, cause social discontent and this has become a national security issue (ISNA, 2018). This argument has also been used to justify the decisions of the Ministries of Energy and Agriculture, and has been used by MPs to put pressure on the ULRP. As mentioned earlier, the Ministry of Energy refused to release water to the lake to the detriment of farmers' needs. The Ministry of Agriculture also attributed its poor performance in improving productivity and its inability to control the increase in cultivated land to the economic and livelihood problems of farmers, and considers the confrontation with local farmers to be a security issue.

Performance analysis conclusion

ULRNC is an agency which is trying to protect and restore Urmia Lake through coordinating existing institutions. It is a governmental body that is accountable directly to the President and some intergovernmental bodies, and indirectly accountable to the parliament. It has managed to slightly improve the coordination between different stakeholders at the planning and policy level, and has tried to facilitate implementation of the plans. ULRNC has acted in an environmentally effective manner through building a common vision to stop the drying up of the lake and related possible negative effects. However – and despite all efforts made by the ULRNC – there are still many implementation problems including contradictory development plans and improper budget allocation.

THE RELATIONSHIP BETWEEN INSTITUTIONAL DESIGN AND PERFORMANCE

Having discussed both the institutional design and the performance of the ULRNC, this section will discuss the relationship between the institutional design of the committee and its performance. As Huitema and Meijerink (2014) point out, this is a difficult question because there are many factors (not only institutional) influencing the performance of the committee. Nevertheless, some of the general patterns which they found across 11 watershed management organisations seem to be relevant here as well.

The problem of institutional interplay: The ULRNC was established in addition to, and on top of, the current organisations working on water resources management in the basin. The ULRNC has managed to bring various governmental actors together and develop a more integrative and holistic perspective on

the lake's problems. Although the establishment of the ULRNC as a basin committee created a good fit between the institution and the bioregion (the Urmia Basin), this spatial fit does not guarantee good performance. The committee's performance largely depends on effective coordination with other organisations, such as the general governors of provinces, regional executive agencies of ministries, and the people living in the region. The main problem which the committee faces in its efforts to restore the lake is that these organisations usually defend vested interests. For example, regional water companies' income depends on selling water and so a decrease in water consumption is detrimental to them. As explained above, the performance of the regional implementation agency of the Ministry of Agriculture depends on agricultural production, which is not favoured by a decrease in water consumption. Finally, the significantly cheaper prices of water have not provided local farmers incentives to increase production efficiency. Despite the committee's efforts, 'old' water policies, characterised by a top-down style and a focus on the realisation of infrastructure works and agricultural development, are still highly influential (Nabavi, 2018).

Resources: In most cases, Huitema and Meijerink (2014) found that the watershed committee has a small amount of resources for a secretariat and for joint planning activities, but lacks sufficient resources for the implementation of its plans. In the case of ULRNC, due to the high political commitment a large budget was allocated on paper for the implementation of the plans. The actual budget allocation, however, was only 30 percent of the ULRNC's budgeted amount. This may be explained by the following factors:

- In the last decades, Iran has had an unstable economy under serious international sanctions. Generally, economic insecurity and high inflation rates encourage an attitude of maximising short-term benefits and non-cooperative behaviour in water management (Madani and Dinar, 2012), and Iran has not been an exception. Due to sanctions and the global reduction in oil prices, the national economy faces financial problems. As all activities of the ULRNC are funded by the government, the country's economic problems have affected the actual budget allocation for implementation of the restoration programme and have caused delays of some projects.
- The regional implementation agencies of ministries are not held sufficiently accountable by their ministers with regard to spending, which may explain why funds have been diverted to projects other than lake restoration. In practice, therefore, even less than 30 percent of the amount allocated for the lake's restoration is actually spent for that purpose.

Dilemma of (de)centralisation: The Iranian government has a top-down central planning and policymaking structure which is located in Tehran. The advantage of such a centralised approach, within which the ULRNC functions, is that the water system can be dealt with holistically and policies can be developed at the basin scale. This centralised system, however, sometimes has insufficient knowledge of the local context in which programmes need to be implemented. Local actors – without a full understanding of national plans and policies – interpret the plans and then adjust them to local circumstances, which risks completely changing the objectives of the national policies. For example, in order to reduce water consumption in the agricultural sector, the ULRP has asked the regional implementation agency of the Ministry of Agriculture to change the pattern of sugar beet production from spawn (growing from seed) to planting (transplanting seedlings) in the Urmia Basin, especially in West Azerbaijan province. Accordingly, the regional implementation agencies of the Ministry of Agriculture received funds from the ULRP to produce and distribute sugar beet seedlings among West Azerbaijan farmers who for various reasons did not buy them, while the farmers in other provinces such as Kurdistan and East Azerbaijan were eager to do so. The agency thus distributed the seedlings among the latter, and some farmers began to plant sugar beets for the first time. Contrary to the objective of reducing water use, the implementation of the plan in the end resulted in an increase in sugar beet production and thus increased water usage.

Time and institutional stability: Huitema and Meijerink (2014) also observed that watershed organisations are not always given sufficient time to prove their effectiveness. In many countries, changes in political leadership often result in reform of water management organisations – a phenomenon also observed throughout the history of Iranian water resources management (Madani, 2014). One aspect of this is the transfer and shifting of local managers, which slows implementation of programmes. Urmia Lake restoration is a race against time, and in Iran there is a risk that a newly elected government may deprioritise restoration work and decide to abolish the committee – a potential postponement of action that may result in the irreversible ecological death of the lake.

In addition to the four factors identified by Huitema and Meijerink (2014), we identified some important contextual factors which affect the committee's performance.

Lobbies: Due to the existence of some strong lobbies in Iranian water governance, disbursement of government funds does not occur according to plan, and funds are diverted to other purposes which are often contradictory to the intentions of the restoration plan. As an example, 31 percent of the funds paid out for the construction of irrigation and drainage sub-networks has been spent on the development of agricultural areas (ULRP, 2018b). A strong lobby also presses for interbasin water transfer projects, even though experts advise against them. As an example, the transfer of water from the Caspian Sea to Urmia Lake was a project which was opposed by most experts for a number of reasons, including high cost, risk of transmitting invasive biological species, its violation of international conventions, risk to the Caspian Sea, risk of bringing oil pollution and heavy metals from the Caspian Sea to Urmia Lake, and the destruction that would occur along a route that would pass through forests, pastures and fields (ULRP, 2014b). Despite these concerns, a feasibility study for this transfer was approved.

Gap in public awareness: According to the respondents, most people living in the Urmia Basin are not aware of the negative impacts of their behaviour and do not understand the causes of the water crisis. Perhaps due to poor economic conditions they lack a long-term perspective.

Short-term thinking of politicians: Because of the existing political instability and insecurity within the system, politicians and decision makers are more interested in populist development actions which produce immediate economic results, rather than long-term planning for the restoration of ecosystems. For example, a dam construction project can get funded through pressure on the water authorities by a regional parliamentary representative – a process which boosts the regional economy and popularises the representative, increasing his/her chances of re-election. Short-term economic benefits and political popularity take precedence over long-term environmental issues and ecosystem preservation (Madani, 2014).

DISCUSSION AND CONCLUSIONS

Iranian water managers started to implement IWRM in 2007, and have faced problems similar to those of other countries. Deterioration of water management in Iran has put the country at serious risk of water scarcity. Urmia Lake is an important example of this unfolding water crisis.

Since 2013, the Iranian government has recognised the critical nature of Urmia Lake's situation, and has made serious attempts at restoration, including the establishment of a national committee which organises at the basin level, and which has developed plans to restore Urmia Lake to its ecological level. Due to political commitment and the involvement of all relevant policy sectors at the beginning, the committee was able to slightly improve coordination of policy and planning. By the end of the stabilisation phase, the committee was also able to reduce the negative effects of the lake's shrinkage.

Although the committee has developed a restoration plan, its implementation is highly problematic. Regional implementation agencies are slow, bureaucratic and inefficient. Contrary to the intention of restoration plans, further agricultural development has taken place, thus increasing water demand, and no effective actions have been taken to change cultivation patterns. The committee has also proven itself

to be unable to control upstream water usage and water releases from dams. Local communities, which are crucial to reducing water consumption, are still weak. No plans have been developed yet for creating alternative jobs and employment in non-agricultural sectors.

National policy objectives have proven to be incompatible with actual trends and problems, such as increased agricultural production, improper budget allocation, institutional instability, lack of accountability of governmental bodies and executive agencies, malicious lobbies, and lack of water awareness.

Considering these factors, the authors make the following recommendations:

- Pay more attention to the institutional interplay among organisations involved in the implementation of restorations plans, including ministerial implementation agencies in the provinces;
- Make sure that provinces are accountable to either the committee or central ministries;
- Build and enhance the capacity of rural communities and institutions;
- Use local capabilities and NGOs' power to improve monitoring of project implementation;
- Search for new sources of funding for plan implementation, such as international environment funds or private sector support;
- Pay more attention to soft solutions such as social projects than to hard solutions such as construction projects;
- Build capacity among local farmers and focus more on the creation of alternative livelihoods;
- Pay more attention to demand management, and develop more flexible supply management strategies (Shadkam, 2017).

In sum, with the establishment of the ULRNC a new player has emerged. The committee is considered to be a pilot for reform of Iranian water management, directed specifically at the restoration of Urmia Lake – a critical situation which has been neglected in previous national water policies. The ULRNC is trying to build a new form of water governance by engaging old players in more sustainable management. Policy support was initially present, but in the longer run the committee does not have sufficient political support to achieve its objectives, as evidenced by the fact that the government is not able, or not willing, to control agricultural expansion. Due to the incompatibility of lake restoration and agricultural development at a policy level, and the inability of the committee to hold ministerial implementation agencies and provincial agencies accountable, the implementation of the newly developed restorations plans is problematic. If Urmia Lake is to be saved, the local communities need to make lifestyle and water use changes. The real challenge, therefore, is to put in place economically feasible alternatives to high water use agriculture – alternatives which, despite the ULRNC's efforts, have yet to be developed.

REFERENCES

- Agh, N. 2014. Urmia Lake should be restored in different phases; The need to change cultivation pattern in the region. <https://mehrnews.com/news/2248694> (accessed 12-18-2018)
- Aghaei, M. 2018. The devolution of Urmia Lake restoration authority to West Azerbaijan Provinces/Government does not trust local managers. <https://tn.ai/1845217> (accessed 1-13-2019)
- Aghakouchak, A.; Norouzi, H.; Madani, K.; Mirchi, A.; Azarderakhsh, M.; Nazemi, A.; Nasrollahi, N.; Farahmand, A.; Mehran, A. and Hasanzadeh, E. 2015. Aral Sea syndrome desiccates Lake Urmia: Call for action. *Journal of Great Lakes Research* 41(1): 307-311.

- Alaerts, G.J. 1999. Institutions for river basin management. The role of external support agencies (international donors) in developing cooperative arrangements. Paper read at International Workshop on River Basin Management – Best Management Practices.
- Alizadeh-Choobari, O.; Ahmadi-Givi, F.; Mirzaei, N. and Owlad, E. 2016. Climate change and anthropogenic impacts on the rapid shrinkage of Lake Urmia. *International Journal of Climatology* 36(13): 4276-4286.
- Biswas, A.K. 2004. Integrated water resources management: A reassessment: a water forum contribution. *Water international* 29(2): 248-256.
- Cohen, A. and Davidson, S. 2011. The watershed approach: Challenges, antecedents, and the transition from technical tool to governance unit. *Water Alternatives* 4(1): 1-14.
- DOE. 2015. Urmia Lake. Challenges, actions, and the way forward. Tehran: Department of Environment. <http://ulrp.sharif.ir/en/news/news-1420-library-urmia-lake-challenges-actions-and-way-forward>
- EDC. 2006. Fundamental policies of Iran. Edition Council, E.D. Tehran: Expediency Discernment Council.
- Eimanifar, A. and Mohebbi, F. 2007. Urmia Lake (northwest Iran): A brief review. *Saline systems* 3(1): 5-13.
- France24. 2011. Iranian police clash with protesters... fighting for a lake. <https://observers.france24.com/en/20110830-iran-protests-police-clash-protesters-fighting-lake-urmia> (accessed 12-20-2018)
- Garousi, V.; Najafi, A.; Samadi, A.; Rasouli, K. and Khanaliloo, B. 2013. Environmental crisis in Lake Urmia, Iran: A systematic review of causes, negative consequences and possible solutions. Proceedings of the 6th International Perspective on Water Resources & the Environment (IPWE) Izmir, Turkey.
- Ghaheri, M.; Baghal-Vayjooee, M. and Naziri, J. 1999. Lake Urmia, Iran: A summary review. *International Journal of Salt Lake Research* 8(1): 19-22.
- Gupta, J.; Termeer, C.; Klostermann, J.; Meijerink, S.; van den Brink, M.; Jong, P.; Nooteboom, S. and Bergsma, E. 2010. The adaptive capacity wheel: A method to assess the inherent characteristics of institutions to enable the adaptive capacity of society. *Environmental Science & Policy* 13(6): 459-471.
- Hooper, B. 2005. *Integrated river basin governance*. IWA publishing.
- Huitema, D. and Meijerink, S. 2014. The politics of river basin organisations: Institutional design choices, coalitions and consequences. Edward Elgar Publishing.
- Huitema, D. and Meijerink, S. 2017. The politics of river basin organizations: Institutional design choices, coalitions, and consequences. *Ecology and Society* 22(2): 42-59.
- Imperial, M.T. 2005. Using collaboration as a governance strategy: Lessons from six watershed management programs. *Administration & Society* 37(3): 281-320.
- Iran, I.P.O. 1982. Equitable Distribution of Water Law. Iran, I.P.O. Tehran: Islamic Parliament of Iran.
- IRNA. 2018. Foreign Fund Talks Over Urmia Lake Restoration. <https://financialtribune.com/node/80853> (accessed 05-01-2019)
- ISNA. 2018. Investigating the agricultural development in Urmia Basin in the Supreme National Security Council. <https://www.isna.ir/news/97070402325/> (accessed 11-30-2018)
- IWRMC, I.W.R.M.C. 2002. Long – term development strategies for Iran's water resources. <http://portal.wrm.ir/tabid/86/Default.aspx> (accessed 10-08-2018)
- Jaspers, F. and Gupta, J. 2014. Global water governance and river basin organisations. In Huitema, D. and Meijerink, S. (Eds), *The politics of river basin organisations: Coalitions, institutional design choices and consequences*, pp. 38-66. United Kingdom: Edward Elgar Publishing.
- Kardovani, P. 2012. Dry Urmia Lake. www.hamshahrionline.ir/news/190458/ (accessed 07-25-2018)
- Khabaronline. 2017. Nakhasht project stopped under pressure of some members of Parliament. www.air.ir/51d (accessed 11-30-2018)
- Lubell, M. and Edelenbos, J. 2013. Integrated Water Resources Management. *International Journal of Water Governance* 1(3-4): 177-196.
- Madani, K. 2014. Water management in Iran: What is causing the looming crisis? *Journal of Environmental Studies and Sciences* 4(4): 315-328.

- Madani, K. and Dinar, A. 2012. Cooperative institutions for sustainable common pool resource management: Application to groundwater. *Water Resources Research* 48(9): 1-15.
- Molle, F.; Wester, P.; Hirsch, P.; Jensen, J.R.; Murray-Rust, H.; Paranjpye, V.; Pollard, S. and van der Zaag, P. 2007. In Molden, D. (Ed), *Water for food, water for life: A Comprehensive Assessment of Water Management in Agriculture*, pp. 585-624, Chapter 16. London: EarthScan.
- Nabavi, E. 2018. Failed policies, falling aquifers: Unpacking groundwater overabstraction in Iran. *Water Alternatives* 11(3): 699-724.
- Nikravesh, M.; Ardakanian, R. and Alemohammad, S. 2009. Institutional capacity development of water resources management in Iran. In Blokland, M.; Alaerts, G.; Kaspersma, J. and Hare, M. (Eds), *Capacity development for improved water management*, pp. 159. CRC Press.
- North, D.C. 1990. Institutions and a transaction-cost theory of exchange. In Alt, J.E. (Ed), *Perspectives on positive political economy*, pp. 182-191. Cambridge: Cambridge University Press.
- Nouri, H.; Mason, R.J. and Moradi, N. 2017. Land suitability evaluation for changing spatial organization in Urmia County towards conservation of Urmia Lake. *Applied Geography* 81: 1-12.
- Paknia, F. and Karamjavan, J.M. 2017. Components analysis of social capital and the tendency of farmers to participate in solving the crisis of the Lake Urmia. In 3rd. International Conference of Sustainable Development, Strategies & Challenges. Tabriz, Iran: civilica.
- Polski, M.M. and Ostrom, E. 1999. *An institutional framework for policy analysis and design*. Paper on Workshop in Political Theory and Policy Analysis Department of Political Science, Indiana University. <http://mason.gmu.edu/~mpolski/documents/PolskiOstromIAD.pdf>.
- Rafiei, M.A. 2014. Who is responsible for Urmia Lake shrinkage? <http://yon.ir/Hdag3> (accessed 10-20-2018)
- Salimi, J. and Maknoon, R. 2018. Evaluation of adaptive capacity of Urmia Lake Restoration National Committee. *Iran Water Resources Research* 14(4): 45-58.
- Scharpf, F.W. 1999. *Governing in Europe: Effective and democratic?* Oxford, UK: Oxford University Press.
- Schlager, E. and Blomquist, W.A. 2008. *Embracing watershed politics*. Boulder, Colorado: University Press of Colorado.
- Shadkam, S. 2017. Preserving Urmia Lake in a changing world: Reconciling anthropogenic and climate drivers by hydrological modelling and policy assessment. Wageningen University, Netherlands.
- Shadkam, S.; Ludwig, F.; van Vliet, M.T.; Pastor, A. and Kabat, P. 2016. Preserving the world second largest hypersaline lake under future irrigation and climate change. *Science of the Total Environment* 559: 317-325.
- Soudi, M.; Ahmadi, H.; Yasi, M. and Hamidi, S. 2017. Sustainable restoration of the Urmia Lake: History, threats, opportunities and challenges. *European Water* 60(1): 341-347.
- Tabnak. 2018. The letter of Parliament members to Iran leader about Urmia Lake restoration. <http://yon.ir/iGcQL> (accessed 01-06-2019).
- TabnakNews. 2014. "Nakasht Plan" will implement in Urmia. www.air.ir/P8t (accessed 10-15-2018)
- Tajrishi, M. 2018. The Ministry of Energy does not give the ecological water need of Urmia Lake. <https://www.isna.ir/news/97031707396/> (accessed 07-09-2018)
- Teisman, G.R. and Edelenbos, J. 2011. Towards a perspective of system synchronization in water governance: A synthesis of empirical lessons and complexity theories. *International Review of Administrative Sciences* 77(1): 101-118.
- ULRP. 2014a. Study and analysis of water resources and consumption in Urmia basin. Tehran. OC07RN9306018. <http://ulrp.sharif.ir/sites/default/files/field/files/Final%20Band%201--18-5-96.pdf>
- ULRP. 2014b. Visioning for Urmia Lake Restoration Program. Tehran. <http://ulrp.sharif.ir/sites/default/files/field/files/Final%20matne%20asli.pdf>
- ULRP. 2015a. Stakeholder Identification, categorization and analysis. Tehran.
- ULRP. 2015b. ULRNC Foundation. <http://ulrp.sharif.ir/en/page/foundation> (accessed 11-05-2017).
- ULRP. 2015c. The Urmia Lake Restoration Plan, A look at status and progress of approved projects. Tehran. <http://ulrp.sharif.ir/page/%DA%AF%D8%B2%D8%A7%D8%B1%D8%B4-%D8%B9%D9%85%D9%84%DA%A9%D8%B1%D8%AF>

- ULRP. 2015d. Urmia Lake Restoration Program; Brief Report and Projects Outline. Tehran.
- ULRP. 2015e. The Urmia Lake shrinkage, causes and effects. Tehran: Social and Cultural Committee 1.
<http://ulrp.sharif.ir/sites/default/files/field/files/01%20Urmia%20Lake%20Issues%20-%201394.08.11.pdf>
- ULRP. 2018a. The performance of regional water companies at Urmia basin Tehran.
- ULRP. 2018b. Reviewing the main policy issues of Planning and resource mobilization unit. In Fifty-eighth meeting of the Monitoring and evaluation council Tehran.
- ULRP. 2018c. The Status of Restoration Plan presented to President Dr. Rohani. Tehran.
- UN-Water. 2018. Sustainable Development Goal 6: Synthesis Report on Water and Sanitation. New York: United Nations. https://sustainabledevelopment.un.org/content/documents/19901SDG6_SR2018_web_3.pdf
- Verkerk, M.P.; Hoekstra, A.Y. and Gerbens-Leenes, P.W. 2006. Global water governance: Conceptual design of global institutional arrangements. Unesco-IHE Institute for Water Education, *Value of Water Research Report Series No. 26*.
- Zainal, Z. 2007. Case study as a research method. *Jurnal Kemanusiaan* 9.
- Zarghami, M. 2011. Effective watershed management; Case study of Urmia Lake, Iran. *Lake and Reservoir Management* 27(1): 87-94.
- Zarghami, M. and Amir Rahmani, M. 2017. A system dynamics approach to simulate the restoration plans for Urmia Lake, Iran. In Matsumoto, A. (Ed) , *Optimization and dynamics with their applications*, pp. 309-326. Singapore: Springer.
- Zarghami, M.; Torabi Haghghi, A. and Zafaranchi, S. 2017. Second discussion panel on Urmia Lake: Finland experiences for environmental stewardship. University of Tabriz.
<https://www.researchgate.net/publication/319183789>

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