Assessment of policy instruments towards improving the water reservoirs' governance in Northern Iran

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A B S T R A C T

Man-made water reservoirs called *Ab-bandan* in Mazandaran province, Northern Iran are used to collect precipitation for irrigating rice fields. In spite of their importance, *Ab-bandans* face governance difficulties such as the lack of a specific law, the lack of long-term and strategic planning, and low recognition of these reservoirs at the national level. Therefore, water policy instruments are argued to be needed in order to overcome the barriers and improve water governance. This paper aims to identify and assess relevant policy instruments for the improvement of the governance of *Ab-bandans* by conducting an exploratory sequential research design. Based on interviews with 30 regional experts, 31 policy instruments are identified and grouped into three reinforcing dimensions of water governance; effectiveness, efficiency, and trust and engagement. Afterwards, these policy instruments are assessed by a larger sample of participants through snowball sampling (n = 169). Confirmatory Factor Analysis reveals that, in survey participants' opinion, 28 out of 31 policy instruments identified properly represent three reinforcing dimensions of water governance. The results indicate that the enhancement of collective action among farmers is the policy instrument which contributes more to the improvement of governance. Furthermore, the dimensions are positively related to one another. Therefore, the policy instruments are interdependent and should be addressed in a holistic way.

1. Introduction

Water is the main component required for most activities in human society. All societies need water for basic survival and economic development (Chenoweth, 2008). Thus, the water crisis is one of the key problems of global relevance in the 21 st century (Orr et al., 2009). The water crisis is not due to water shortage because sufficient water exists for all people, even in areas where there is a temporary shortage of water, but a crisis of governance e.g. fragmented institutional structures, and weak regulatory framework result in or exacerbate problems of water availability (OECD, 2011). Scholars in the water sector highlighted the fact that enhancing water governance is the solution to the water crisis (Akhmouch, 2012; Araral and Yu, 2013; Biswas and Tortajada, 2010; OECD, 2015; Rogers and Hall, 2003; Saleth and Dinar, 2005).

The government of Iran blames the current water crisis on the changing climate, frequent droughts, and international sanctions in order to hide the inefficient water management system in the country (Madani, 2014). Many Iranian experts claim that a failure of water governance is the more significant cause of water crisis (Foltz, 2002). Madani (2014) pointed out that the water crisis in Iran is rooted in managerial, political, and institutional determinants rather than engineering and technical issues. Although the climate has varied over the centuries, Iran has always been located in an arid and semi-arid region; therefore, it should not be assumed (as is often the case) that water is scarce in Iran (Yazdanpanah et al., 2013). The average annual precipitation of the country is approximately 417 billion cubic meters (bcm), of which 117 bcm of the precipitation is directly accessible, of which 92 bcm flows as surface water resources, and 25 bcm infiltrates into groundwater resources (Ardakanian, 2005).

In contrast to most provinces, the Mazandaran province located in Northern Iran, which is the most important region for rice production in

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the country, has a high annual average precipitation of 749.9 mm (Ministry of Agriculture Iran, 2015; Ministry of Energy Iran, 2015). A considerable amount of the precipitation in Mazandaran occurs during the non-growing seasons (autumn and winter) (Azmoodeh et al., 2009). In order to collect this precipitation to be used for irrigating rice fields during the growing seasons (spring and summer), there are man-made reservoirs called *Ab-bandan* (Abbasian et al., 2014). In spite of these reservoirs, a significant amount of precipitation runs off into the sea through rivers without being stored (Azmoodeh et al., 2009), sometimes even causing water-logging or flooding (Ministry of Agriculture Iran, 2016). This province has a potential of 4.9 billion m^3 as surface water resources, and of which around 2.2 billion m^3 is being stored and the remaining water flows into the sea (Ejlali et al., 2016). According to a number of regional experts, *Ab-bandans* are not well governed due to the lack of a specific law, the lack of long-term and strategic planning of administrative bodies, low recognition of *Ab-bandans* at the national level, financial problems for rehabilitation of *Ab-bandans*, lack of water user associations, little relevance of academic research on *Ab-bandans* to practice, and poor use of water technology (Mirzaei et al., 2017).

The Organization for Economic Co-operation and Development (OECD) states that practical water policy instruments for local and national governments are needed to overcome barriers (OECD, 2011). Policy instruments refer to the tools used by governments and public authorities to address related problems and achieve a public policy goal (Linder and Peters, 1989). In fact, water policy instruments are tools, strategies, and mechanisms for policy-makers to overcome governance obstacles in water policy; for instance, involving sub-national governments in designing water policy beyond their roles as implementers is a policy instrument to foster effective water management (OECD, 2011). The main purpose of water policy instruments is to enhance water conservation and efficient use of water resources, and a comprehensive evaluation of policy instruments is essential to achieve sustainable agricultural water management (Feike and Henseler, 2017). A lot can be said about different types of policy instruments in general, their respective effectiveness and efficiency, although they have to be adjusted to regional condition (Akhmouch, 2012; Akhmouch and Correia, 2016; Araral and Yu, 2013; OECD, 2015; Rogers and Hall, 2003). Since water governance is highly contextual, water policy instruments have to be appropriate for different places (OECD, 2015).

Although there is literature related to water management in Iran, research which specifically addresses policy instruments for the improvement of the governance of *Ab-bandans* is not existent. Therefore, this paper adds additional value to the scientific and empirical evidence by identifying relevant water policy instruments and assessing the suitability of these multiple instruments in an integrated way towards good governance of *Ab-bandans* in the Mazandaran province of Northern Iran. This paper aims 1) to identify policy instruments for the improvement of the governance of *Ab-bandans*; 2) to cluster these instruments on three OECD reinforcing dimensions of water governance; 3) to assess how and to what extent the instruments grouped in each dimension contribute to the improvement of the governance of *Ab-bandans*. In this paper following the introduction, Section 2 details the theoretical background, explaining the OECD dimensions and principles on water governance; Section 3 introduces the study area; Section 4 describes the sequential exploratory method for collecting and analyzing data; Section 5 presents findings and is followed by a discussion and conclusion of the research findings in Sections 6 and 7, respectively.

2. Theoretical background

Water governance is a broader concept than water management (Moench et al., 2003). It encompasses the political, social, economic, and administrative systems involved in making decisions for management of water resources, as well as water service delivery at different levels of society (Global Water Partnership, 2003). Rogers and Hall

(2003: 16) noted that the governance for water is "the ability to design public policies and institutional frameworks that are socially accepted and mobilize social resources in support of them".

OECD (2015a: 5) defines water governance as "the range of political, institutional and administrative rules, practices, and processes (formal and informal) through which decisions are taken and implemented, stakeholders can articulate their interests and have their concerns considered, and decision-makers are held accountable for water management". As public authorities are in charge of water resources management in Iran (Ardakanian, 2005), it is crucial to understand their role with regard to the governance of *Ab-bandans* through the effective design and implementation of water policies. This paper focuses on public authorities' roles for water governance and their involvement in political, institutional and administrative issues; therefore, it takes a close look at water policy instruments which can be applied by public authorities for solving challenges of the governance of *Ab-bandans*.

Governance is considered as 'good governance' when it is able to solve challenges for achieving results in a fair and comprehensive manner. Good governance in the water sector leads to sustainable water management for ensuring water security which is consistent with the goals legitimately established by a society (Akhmouch and Correia, 2016). OECD (2015a) clarified water governance as good governance, if a combination of bottom-up and top-down processes is applied to tackle water challenges and resolve conflictive issues related to water resources, while fostering constructive state-society relations. Good or effective governance systems provide processes and structures to facilitate actions for all actors involved in water management and do not create development obstacles (Rogers and Hall, 2003).

Good water governance cannot be achieved with the use of blueprints from outside of the given regions or countries and it has to be aligned with territorial specificities (Batchelor, 2007). However, OECD (2015a) has formulated a menu of principles based on three mutually reinforcing and complementary dimensions of water governance. The OECD principles consider different policy instruments which can be applied by governments at all levels to strengthen water governance to fit for current and future water challenges. The principles were developed by the OECD Water Governance Initiative, a multi-stakeholder platform of over 100 delegates from public, private, and non-profit sectors to scale up governance responses to water challenges. A preliminary step to developing the principles consisted in preparing an inventory of tools, guidelines, and principles on water governance to take stock of what already exists. This document comprises 108 governance tools among which 55 are specific to the water sector. These principles were grouped into three dimensions (i.e. effectiveness, efficiency, trust and engagement) and approved by the OECD Regional Development Policy Committee through a written procedure on 11 May 2015. Each of the dimensions and related principles are explained as follows:

1) The dimension of effectiveness refers to a clear definition of water-related goals and targets at all government levels, so that the goals are well implemented and the expected targets are obtained. The dimension of effectiveness consists of the following four principles:

Principle 1: Clear allocation of roles and responsibilities across levels of government for policy making, policy implementation, operational management, and regulation and enforcement, at the same time fostering effective co-ordination across levels of government.

Principle 2: Managing water at the appropriate scale(s) to reflect local conditions, therefore ensuring an appropriate hydrological management and promoting strategies based on national policies and local conditions.

Principle 3: Encouraging policy coherence through effective cross-sectoral co-ordination mechanisms and recognition and mitigation of conflicts among authorities involved.