

## Human-water resources interface in agriculture sector of Iran: A historical-theoretical understanding

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### ABSTRACT

Human-water resources interface is a fundamental core to form the socio-economic structures and conceptual understanding of its evolution is important to investigate the causes of current challenges of water resources. Therefore, identifying and analyzing the human-water resources interface in agriculture sector of Iran by using a theoretical-historical approach was the purpose of this research. Also a descriptive-analytical method was employed to perform and write this paper. This study attempted to combine different theories such as “Asiatic Mode of Production (AMP)”, “social institutions”, “social changes (Ibn Khaldun theory and Marx theory)” in order to represent the formulation and evolution of human-water resources interface. In addition, the secondary data and literature were applied to describe the water resources change over time. Due to limitation of water resources, the Asiatic Mode of Production (autocratic central government and group work organization) was formulated and its major institutional features (despotism, ethnicity, and patriarchy) were reproduced in a repeatable cycle during the history. Human-water resources interface has been changed by two mutation steps (i.e. the constitutional movement and the land reform), and it was trying to transition from the traditional institutions (despotism, ethnicity, and patriarchy) to modern institutions (rights-based legislation and law-based administration). But it is seen that coexistence (sometimes peaceful coexistence and sometimes violent coexistence) was found between the traditional and modern institutions. Also, due to attempts to institutionalize and rearrange of human-water resources interface mechanisms an organized chaos has established that it has been considered as the major reason of water crisis in Iran.

**Keywords:** Water Crisis, Asiatic Mode of Production (AMP), Social Changes, Despotism, agriculture sector

### Objectives

Change is the only constant thing of the world and the all dynamic systems such as Social-Ecological Systems (SESs) have been exposing the unpredictable drivers over time. The interface of human-water resources in agriculture sector, as an important sub-system of SESs, has faced the various drivers such as climate change (drought and flood) and social change (population growth). While a SES has been exposing to these drivers, the different sub-system must be apply the adaptation behaviors to survive the whole system. Due to the acceptance of appropriate behaviors for adaptability of a system rely on the knowledge and information surrounding the system and its sub-system, there have been developed a lot of studies using different approaches in different disciplines to understand the SESs and the human-water resources interface. Some studies were focused on developing and applying the frameworks to describe the complexity of human-water resources interface in a multidisciplinary context and some others were investigated the transformation of water governance to meet modernity. Despite there have been valuable studies regarding the human-water resources interface that providing significant knowledge for adapting the challenges, a historical-theoretical understanding is lacking of knowledge in the literature.

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Therefore, this study is an attempt to fill the research gap by merging different theories of social changes and water institutions.

### Methods

A descriptive-interpretive approach was employed in order to achieve a long-time analysis of human-water resources interface. For implementing this approach, the *Annals School* was selected that is an influential agenda for historiography, especially regarding the use of social scientific methods by historians, emphasizing social and economic. Using theories of Asiatic Mode of Production (AMP), Social Institutions and Social Change (*Ibn Khaldun* and *Karl Marx*), the formulation and evolution of human-water resources interface were described and interpreted within a historical theme. The theory of the Asiatic mode of production (AMP) was raised by Karl Marx. This theory has been described that Asiatic societies were maintained in thrall by despotic ruling governance and directly expropriating farmers' communities. Social institutions are mechanisms and patterns of social order focused on meeting social needs, such as government, economy, education, and so on. Also, social institutions govern the behavior of a set of individuals into a given community and throughout time and the water institutions are considered in this study. The social change theories of *Ibn Khaldun* and *Karl Marx* were the basic foundations of understanding the transformation of human-water resources interface during the past centuries. Theory of *Ibn Khaldun* has been classified as cyclic theory of social changes that has been shown the rise and fall of civilizations is closely dependent on the social-economic features of communities during the time. Other social change theory that known as the materialist conception of history was raised by *Karl Marx* that show the trajectory of historical development. In this theory, history is classified into several linear steps; primitive communism, slave society, feudalism, and capitalism. In addition the secondary data is used to describe the trend of changes in parameters related to water resources.

### Results

The results showed that the formulation and emergence of human-water resources interface in Iran as an arid and semi-arid area were described. Water scarcity has caused to form an autocratic central government and group work organization, because this scarcity has been known as an environmental constraint to emergence and evolution of social-economic structures in term of a collective action. Despite the environment limited the initial communities to survive in a difficult situation, the traditional institutions such as despotism, ethnicity, and patriarchy were developed in order to adapt and adjust the collective actions in response to the environmental constraints. The *Qanat* technology was invented in ancient communities of Iran and the *boneh* structure organized in rural society for adjusting human-water resources interface to meet the water use constraints. Next, the transformation of human-water interface was studied throughout the time. The history of Iran was classified in three periods (before the constitutional movement (1907), between this movement and the land reform (1963), and after land reform), and then the different aspects of human-water resources were described and interpreted. The result showed that major institutional features of human-water resources interface (despotism, ethnicity, and patriarchy) were reproduced in a repeatable cycle during the first period of history (before 1907). Human-water resources interface has been changed by the first mutation (i.e. the constitutional movement) and attempts to transition from the traditional institutions (despotism, ethnicity, and patriarchy) to modern institutions (rights-based legislation and law-based administration) have started. But there have been not sufficient coevolution for different aspects of human-water resources interface. If there had prevailed the Asiatic mode of production before 1907 in governing the human-water resources interface, a lord and peasant structure would be formed during the second period (1907-1963), and eventually, after land reform (1963), smallholder farmers would develop that all of them have prevented the formation and development of private property. Also, the diffusion of new technologies such as dams and water well drilling after 1963 has led to the development of surface and groundwater utilization and finally human-water resources interface has faced the wicked challenges.

**Discussion**

Human-water resources interface have met the fundamental changes, but it seems that traditional institutions of water and social order have not completely become alternative institutions (rights-based legislation and law-based administration). Overall, there are two pathways in response to the disorder of human-water resources interface; the first, the governance system enable to rearrange of rule-in-use of water and try to establish the alternative institutions in practices, and the second, using various attempts to find and apply the ways and strategies which combine the traditional and alternative institutions. It seems that the second pathway is much more suitable due to the traditional institutions have formulated during centuries and have acted as behavioral bases of collective actions in a society, then each change lacking the enough knowledge and wisdom might go the SESs to unsolved problems. Finally, applying the participatory approach in different steps of change in human-water resources interface is recommended as a significant consideration.