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Choosing a Framework for Analyzing Water Management and Agricultural Systems

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Abstract

A rapidly growing population and need for agricultural production, urbanisation and industrialisation are increasing the demand for limited fresh water resources all around the world. This often takes place in parallel with declining water availability due to climatic variabilities and extraction of non-renewable water resources. Consequently, water scarcity has approached critical levels in many areas around the world, constraining sustainable development. Water for irrigation of agricultural crops consumes about 70 percent of freshwater in the world (up to 94 percent in developing countries). Management of agricultural water demand plays a critical role to align water consumption to water resources capacity. For designing agricultural water demand measures, it is necessary to first have an explicit understanding of the respective action situations in which water use decision are made. Choosing an appropriate analytical framework is a decisive step for better understanding problems and interdependences in the actions situations to be studied. An analytical framework offers the basis and concepts to build causal explanations on a specific phenomenon from the lens of a theory. The aim of this article is to assess analytical frameworks for the study and explanation of action situations in agricultural water system, as well as, sustainable management of agricultural water demand. For comparison of different frameworks, a literature review was done. In order to identify appropriate frameworks, some criteria are discussed according to the purpose and orientation of study, conceptualisation of social and ecological systems and their interactions. As a result, Social Ecological Technical Systems Framework is found as an appropriate framework for explaining the complexity of water management and agricultural systems. However, there is no single framework that would completely support all objectives of research and be appropriate for any types of cases studies (Binder et al 2013). Therefore, bonding and bridging frameworks seem to be expedient approaches. Moreover, the challenges of its application also are discussed.

Keywords: Action Situations, Agricultural Water Systems, Analytical Framework, Social Ecological Systems, sustainable Management

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