



Extended Abstract

A Conceptual Model of Integrated Water Resource Management for National Water Security

R. Zargarpour^{1} and A. Nourzad²*

Introduction

The remarkable quantity/quality of growth in agricultural productions and urban development has caused the use of underground water resources to go beyond safe capacity measures. Financial problems for new projects together with scarce resources of fresh water call for practical and proper water resources management practices.

In the past three decades, the approach has changed to a new concept called Integrated Water Resources Management (IWRM) requesting all countries to establish five year programs based on this approach. This has presently been established in about twenty countries. The Islamic Republic of Iran is planning to launch this in a little while.

Objectives

The main objective of this paper is to present comprehensive knowledge of Integrated Water Resources Management based on previous studies and experiences.

An attempt has been made to investigate/explore the correlation among the proposed criteria. The effects of IWRM on water security are then discussed. Finally a model of IWRM emphasizing water security is presented.

Methodology

Based on the available manuscripts and lessons learned, two questionnaires are prepared and distributed among managers, scientific staff, and experts in the field of

water resources management. The obtained data are analyzed using Fuzzy Decision Making for multi lateral decisions. Then the criteria are prioritized in order to reach a conceptual understanding of IWRM and water security. Based on the approved documents with governmental water authorities, more than one hundred strategies related to IWRM have been chosen. Using the new software MDSS4 for multi lateral decision making the 70 strategies are prioritized in a water catchment to accomplish an IWRM model.

Results and Discussion

Based on the literature and the present study the following arguments can be summarized in IWRM practices and Water security;

1. An IWRM approach promoted the coordinated development and management of water, land, and related resources in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.
2. Water security is defined as a reliable access to the acceptable quantity of water with the desirable quality, in order to produce life and health with an acceptable risk which has unanticipated effects related to water in the society.
3. By using the literature review, the present governmental documents, and also the multi lateral decision making model in the fuzzy area the four criteria of IWRM and seven criteria of water security have been achieved as follows;

1- Ph.D., National Defense University, Email: zargar@moe.org.ir

2- Professor, Power and Water University of Technology (PWUT), Email: ageonek@yahoo.comail

*- Corresponding Author

Water security criteria	IWRM criteria
1- To provide the fundamental requirements of the human being 2- To reduce the qualitative and quantitative vulnerability of the water resources 3- Assured access to water 4- Cooperation of all stakeholders 5- Water governance 6- Environmental protection of the ecology related to water 7- Justice in access to water for all people	1- Establishment of water governance 2- Joint water management and environmental management 3- Band management of water and soil 4- Justice in water allocation 5- Participation of all stakeholders 6- Joint management of surface and underground water 7- Attention to social aspects 8- Providing safe water for all people 9- Having a systematic viewpoint 10- Having cooperative policies in governmental issues 11- Attention to the catchment area as the most important management feature 12- Suitable management structure 13- Capacitate human resources 14- Access to base information

The hypothesis of this research, "the criteria governing water security and integrated water management are associated" was approved through ninety five (95) percent correlation with higher degree of confidence.

4. The proposed integrated water management model is the major outcome of this research. This model is in a multi lateral decision making format using MDSS4

software. Seventy strategies of integrated water management are extracted from one hundred and forty strategies which are established and endorsed in the national water management sector. In this model the TOPSIS methodology are designed for ranking the criteria and the value function methodology is used for normalizing the rankings. The conceptual model is illustrated in figure 1.

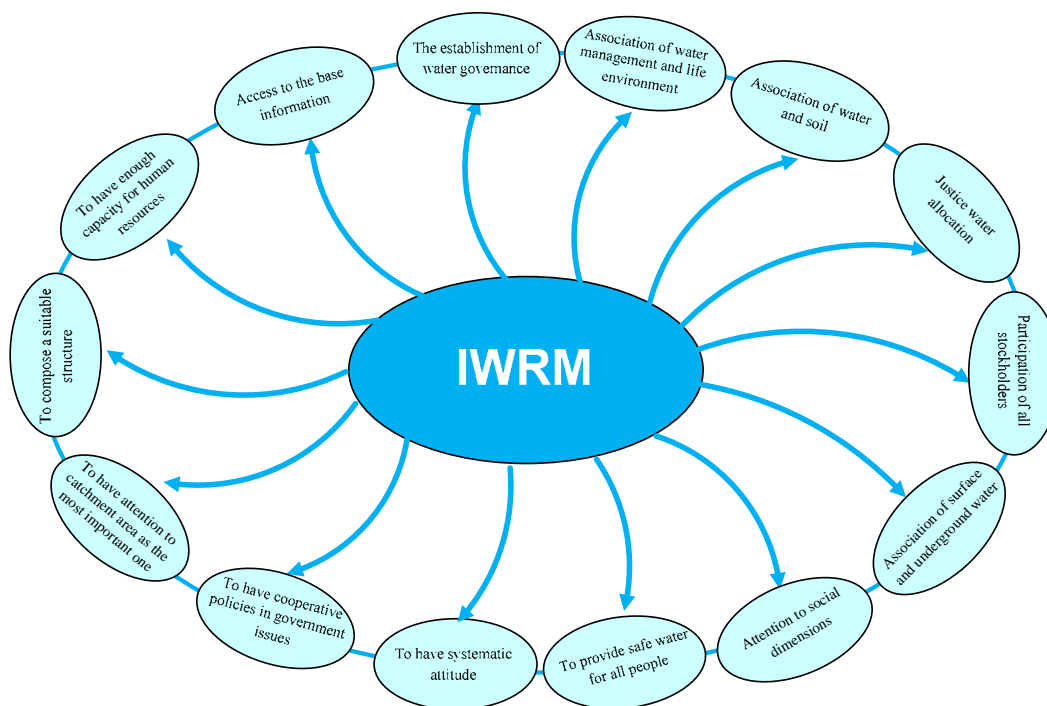


Figure 1- Conceptual model of integrated water management

Keywords: Integrated Water Resources Management (IWRM), Water security, Index, Water Governance, Making Decision Support System.

References

Integrated Water Resources Management, (2000) Global water partnership, Technical Advisory Committee (TAC), GWP, Stockholm.

IWRM, Planning, Training Manual and Operation Guide VNDP, (2006) Cap Net,

IWRM for Sustainable Use for Water, 50 Years of International Experience with the Concept of IWRM, (2004) Ministry of Agriculture Nether Lands.

MULINO, (2008) Siak, Giupponi, Fasio, Silsoe Research Institute, Venice, Multi sector integrated and operation, decision support for use of water resources at catchments.

The 2nd World Water Forum, (2000) Available at www.worldwaterforume.com, The Hague.

The 3 rd World Water Forum,(2003) Available at www.worldwaterforum, Kyoto.

World Water Assessment Program, (2001) WWAP.

Zargar, R. and Noorzad, A. (2009). A conceptual model of integrated water resources management, Azad Journal of technology, Vol. No.4, pp.23-32.