

For Promotion of Groundwater Management

--- In order to continue to enjoy the multifaceted value of groundwater ---

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1. Introduction

The Basic Act on Water Cycle (the "Act") was enforced on July 1, 2014, and the Basic Plan on Water Cycle Policy, which is the basic plan under the same Act, was passed by the Cabinet on July 10, 2015. The Act provides that "water is a valuable common asset of the nation and a highly public resource," and requires the comprehensive promotion of the policy so that water is properly cycled and the people can enjoy the benefits of the cycle into the future. In response to this purpose, with regard to "groundwater," which is one of the important elements of water cycle, the Basic Plan provides that "local entities concerned, including local government, should take the initiative in management of groundwater in order to promote the sustainable conservation and use of groundwater." This paper discusses two points of research and development considered necessary in promoting groundwater management.

2. Strengthening of groundwater monitoring system

In order to prevent excessive pumping of groundwater, which is referred to as "Tragedy of the Commons" in economics, and resultant problems with groundwater intake and ground subsidence, it would be important first of all to "monitor the condition of the target and share the information." For groundwater, this means the grasp of groundwater level and the amount of groundwater withdrawal. For example, Ono-shi, Fukui, which is one of the municipalities advanced in groundwater management, set about 30 observation wells and requires the reporting of the amount of groundwater withdrawal for the wells with a diameter larger than a certain dimension. We intend to systematize groundwater monitoring technologies and advance the research and development to promote social implementation.

3. Further utilization of hydrological cycle analysis¹⁾

In accordance with the recent improvement in the capability of computers, technical development of "hydrological cycle analysis" to reproduce the movement of water is proceeding, centering on the movement of surface water and groundwater including rainfall, underground infiltration, surface runoff, river runoff, groundwater flow, and pumping. Figure below shows its concept. This hydrological cycle analysis can obtain the information that can be hardly obtained

from observation, such as water balance of the basin and the streamline chart of groundwater. This hydrological cycle analysis is also important since it can be used to determine measures. For example, with computer simulation of the condition when paddy field cultivation or control of pumping is implemented, etc., the effect of the measures can be evaluated by comparing the groundwater level computed with the actual groundwater level and the simulating data can be used as basic materials for selecting measures. In addition, further consideration is desired in the future about risk assessment using the hydrological cycle analysis. It is expected that specific and quantitative grasp of the risk of no groundwater management can serve as motivation to advance groundwater management.

On the other hand, it cannot be denied that no practical accuracy may be obtained from hydrological cycle analysis due to shortage of information on geological structure etc. Decision on practical accuracy should be made for individual sites since the condition is different according to basins but it is also important to take the approach of enhancing analysis accuracy by continual data acquisition. We intend to advance research and development for upgrading the utilization method of hydrological cycle analysis.

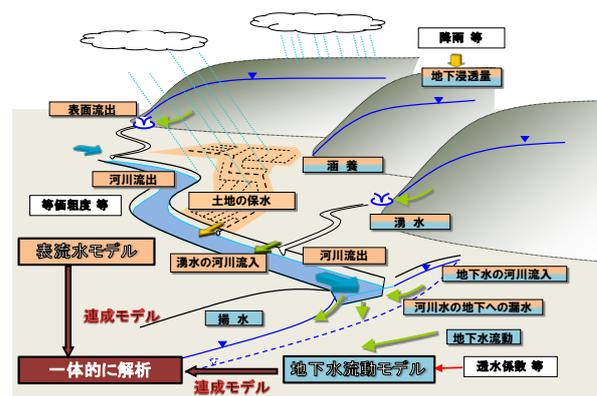


Figure: Concept of hydrological cycle analysis

[Reference]

☞ See the following for details.

1) Technical Note of NILIM, No.883 (March 2016)

<http://www.nilim.go.jp/lab/bcg/siryou/tnn/tnn0883.htm>