

Control and Regulation of Groundwater through Pricing of Water in the Kerala Scenario

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Abstract: In India water consumption is increasing day by day. It has been estimated that there can be a shortage of about 450 cubic kilometres of water by the year 2050 A.D. Hence, an efficient use of ground water has to be insisted. In this paper, an attempt is made to explore the possibilities to conserve water through pricing of water. The paper touches upon various schemes introduced in Kerala for utilization of ground water for irrigation and drinking purposes. The global scenario and the Indian scenario regarding the pricing of water with special reference to Kerala have also been studied.

Introduction

The demand for good quality water is increasing all over the world and the efforts to meet the growing demand are becoming difficult. Ground water is relatively pure form of water after rain water and the large quantity withdrawal of ground water is a growing concern in many countries. People all over the world are aware about the quality of water needed. The concept of water market is already in existence in the United States of America.

Global Scenario

In order to meet the ever-increasing demand for good quality water, the introduction of new technologies has always been in priorities to augment the supply of water. At the same time, there has always been an attempt to explore the possibilities to allocate the existing water supplies and to conserve the water, through the pricing of water. The pricing of water can affect water use efficiently.

History of Water Rights

Water right is a legal concept that defines how water is distributed among various users within a river basin, state or country. In the United States there are two basic systems of water rights: the Riparian Doctrine and the Doctrine of Appropriation. Riparian Doctrine holds that, water rights should be allotted equally among all people who own land adjoining a river. The Appropriated rights are usually

allocated on a 'first in time, first in right' basis. The first people to take water out of a river obtain the primary right that supersedes the rights of everyone who later diverts water from the same stream.

Water Markets

A water market would provide a way for agricultural community to sell their water rights to urban customers who would be willing to pay more for the water than the farmer could earn by using it to grow crops. In essence, competing users would establish the price of water. The price of water would be negotiated between farming community and the metropolitan areas, thus creating a water market. The concept of water market will thus lead to the better pricing of water.

The Indian Scenario

In India, the water consumption is increasing day by day. Estimates showed that about 1050 cubic kilometres of water is required by the year 2025. But there will be a shortage of nearly 450 cubic kilometres as the available ground water and storage is limited to 600 cubic kilometres. In order to reduce the gap, an efficient use of water is recommended through the formulation of water policy, water law and water administration governing water supply, development, distribution and use.

Water charges in the form of land revenue were common before British rule in the kingdoms of Andhra Pradesh and Tamil Nadu. However India's current water charge system originated with the British colonial administration (Maloney and Raju, 1994). The British decided to charge for water on the basis of irrigated area.

India's independence brought radical changes to the water policy. Irrigation projects were viewed as employment generation projects, which augment income and food security. Policy makers lowered the internal rate of return and substituted the cost benefit rates for the selection of projects.

The Indian Constitution provides the states to have jurisdiction over water management and the responsibilities of fixing the water rates. Except the northeastern states, all other states charge for canal water either directly or indirectly. In Kerala the canal water is charged on the basis of irrigated area.

The Development and Utilization of Ground Water

In Kerala, the development of ground water is done through the construction of four types of wells viz, tube wells, bore wells, filter point wells and open wells. The tube wells and filter point wells are constructed in the sedimentary areas and the bore wells in the crystalline area and the open wells in the sedimentary and crystalline areas. The unconfined occurrence of groundwater is exploited by means of open wells and filter point wells, while the confined/semi-confined aquifers are extracted by means of tube wells and bore wells. The open wells are mainly used to meet the water requirement for domestic purposes while all the other three are used for either domestic or irrigation or for industrial purposes. Several attempts had been made to price the water either through direct pricing or through indirect methods.

Public Water Supply Scheme

During the rule of Maharaja of Travancore i.e., before the Kerala state was formed, the first tube well for public water supply was constructed at Alleppy district, then the only district in Kerala, which was

exclusively used for public water supply. The governments that ruled Kerala for the last 50 years never intended to get back the investment cost or the overhead expenses but priced the water at very low rates. The prices were not economical in the sense that the running costs are much more. The Kerala Water Authority is the government agency to supply water to the public. Public taps are very common in Kerala from where people can get water without paying anything. Thus the poor people are also given the facility of good drinking water. As the water is not priced the misuse of good drinking water is inevitable. In order to prevent this misuse, government campaigned to make the people aware about the precious drinking water.

The Community Irrigation Scheme

The community irrigation scheme introduced during 1992 mainly focused on the groundwater utilization for irrigation purposes. Rather than a commercial venture, it is focused on the development of agriculture thereby increasing the income and also the employment potential. A filter point well is usually constructed for irrigating an area of five acres of land, a bore well is for 10-15 acres of land and a tube well is for irrigating 25-40 acres of land. A minimum of seven families is required for registering as a society. The location of the tube well/filter point well/bore well was decided based on hydrogeological survey. After the construction of the well the distribution line mainly of PVC pipes, is laid in such a way that each family gets a tap on his plot, with a valve. At one time, one or two persons can irrigate their plot, and the electrical and repair charges are to be borne by the society. In a way, this can be regarded as a first step in pricing the water since the electrical and maintenance charge and the operational costs if any are to be shared by the members of the society. The scheme failed to bring the desired results since the land holdings of the members varied from 5 cents to 50 cents. The income generation from agriculture was virtually nil or minimal.

The Kerala Samuhya Jalasechana Samithi

Utilization of the ground water for drinking and irrigation purposes was the aim of this The Netherlands aided Project which was almost similar to the Community Irrigation Scheme. The main difference was that there were community organizers for motivating the people and they guided the people to form the society. In this case, it was guided by organized sector. The project was implemented in Thrissur district, and the scheme was run by constructing bore wells at different places. The operational and maintenance costs are borne by the members of the society. The main difference between Community Irrigation Scheme and The Kerala Samuhya Jalasechana Samithi schemes was that in the Kerala Samuhya Jalasechana Samithi schemes, drinking water was also provided to the members and thus it became sustainable.

The Jalanidhi

Jalanidhi a World Bank aided project, aimed to provide drinking water to a group of people of an area and the source of water is ground water. The operational and maintenance costs are to be shared by the members of the group and the main difference between other schemes and the Jalanidhi is that, the Jalanidhi does not provide free public taps in an area. In a way we can say that the drinking water is priced as the overhead expenses are borne by the group. In Kerala, many panchayaths had adopted the Jalanidhi schemes.

The Kerala Ground Water Control and Regulation Act, 2002

The government of Kerala initiated certain steps to control and regulate the use of ground water in Kerala and introduced the bill in the Assembly. The bill was passed and an act named Kerala Ground Water Control and Regulation Act 2002 is now in force. As per this rule the government can notify an area and in the notified area, permission from the Ground Water Authority is required to construct an open well/filter point/bore well/tube well. Also, all users of ground water in Kerala, who pump out water from open wells using above 1.5 HP pumps and those who pump out water from a bore well using above 3 HP have to register with the Kerala Ground Water Authority.

The Ground Water Balance Studies based on GEC-2002

The study conducted jointly by Central Ground Water Board and State Ground Water Department revealed that there are over-exploited and critical blocks as per the norms of GEC (1997). The trends in groundwater levels nearly in last three decades (1997-2006) as shown in Fig. 1 were taken into consideration along with the stage of groundwater development, before categorizing the blocks.

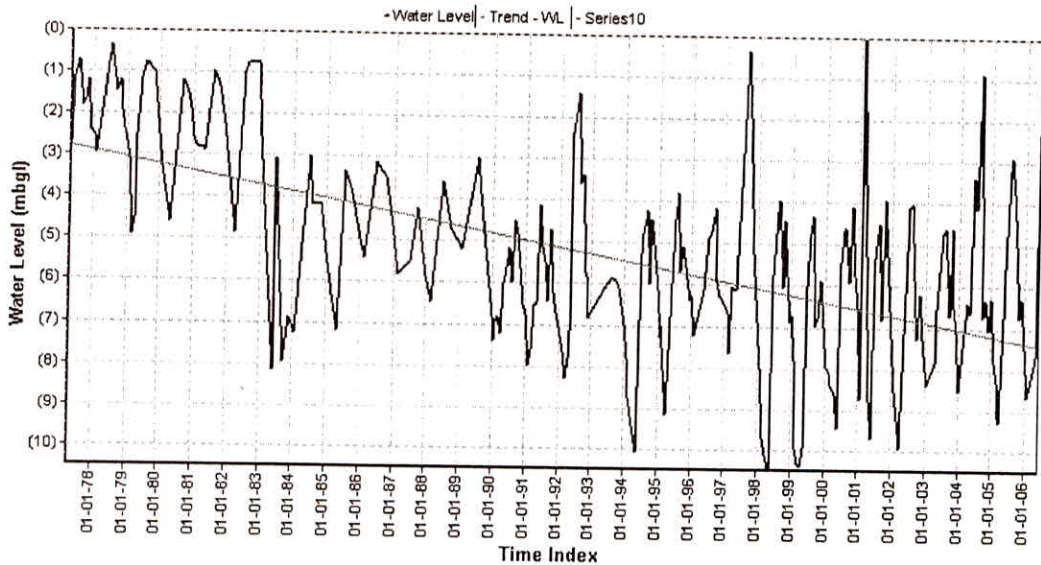


Fig. 1. Hydrograph showing falling trend of water level in an open well in Neriyanangalam, Ernakulam district, Kerala.

It is observed that there has been a considerable groundwater development during the last decade (Fig. 2). All blocks were in the safe category in year 1992. The situation changed during the year 1999 computation where three blocks were categorized as over-exploited, six critical and six semi-critical. During year 2004, the number of over-exploited blocks increased to five from three in year 1999 and number of critical blocks increased to 15 from six and in the semi-critical category the number

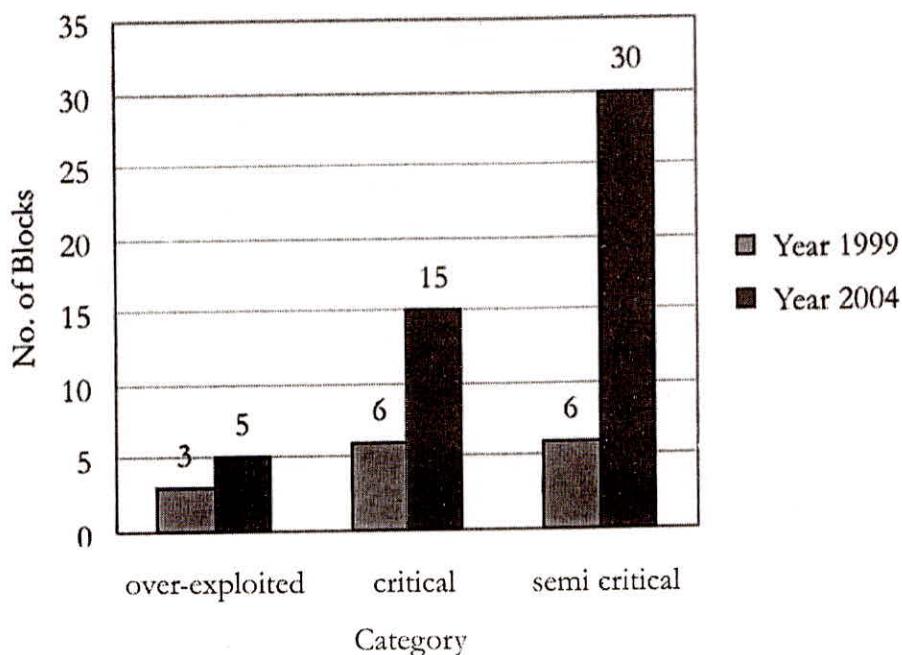


Fig. 2. Chart showing the number of over-exploited, critical and semi-critical blocks in Kerala state.

increased to 30 from six. These indicate that the groundwater extraction in the state has an increasing trend, and eventually warrant for a systematic and effective groundwater regulation.

Water Tariff in Kerala state

The present water tariff in Kerala state fixed by the Kerala Water Authority is shown in Table 1.

The need for Pricing

As everyone knows, the bore well/tube well/filter point well/open well are used to draw water from an aquifer and the aquifer boundary cannot be defined or limited. Therefore, if a man owns a plot and a bore well, although the land may belong to him but not the water he draws out. A groundwater boundary cannot be defined or demarcated in such cases. Therefore how much water can be pumped out for his personal use of drinking and irrigation purposes is to be defined. In case of an industry, it should be regulated through pricing. Therefore the following suggestions are made.

1. **For Agriculture:** The use of groundwater for irrigation should be regulated by pricing. But that should not prevent one's right to extract water for drinking and minimal irrigation purposes. Therefore ground water for drinking purposes and for irrigating an area up to 50 cents (local unit for measurement of land area) of land may be extracted without any restriction. The consumption of ground water for irrigation above 50 cents should be measured as detailed in the concluding paragraph and appropriately priced.

Table 1. Water tariff fixed by Kerala Water Authority in Kerala state (KL : Kilolitre)

Category	Monthly consumption (KL)	Price (1/10/91 to 31/5/93)	Price (1/6/93 to 31/5/94)	Price (1/6/94 to 31/3/99)	Price (1/4/1999 onwards)
Domestic	0 - 10	Re. 1/KL (minimum of Rs. 10/month)	Rs. 1.5/KL (minimum of Rs. 15/month)	Rs. 1.7/KL (minimum of Rs. 17/month +Rs. 2 as MIC)	Rs. 2/KL (minimum of Rs. 20/month +Rs. 2 as MIC)
	10 - 30	Rs. 10 + @ Rs. 1.5/KL for above 10 KL	Rs. 15 + @ Rs. 2/KL for above 10 KL	Rs. 19 + @ Rs. 2.3/KL for above 10 KL	Rs. 22 + @ Rs. 3/KL for above 10 KL
	30 - 50	Rs. 40 + @ Rs. 2/KL for above 30 KL	Rs. 55 + @ Rs. 3/KL for above 30 KL	Rs. 65 + @ Rs. 3.45/KL for above 30 KL	Rs. 82 + @ Rs. 5/KL for above 30 KL
	Above 50	Rs. 80 + @ Rs. 3/KL for above 50 KL	Rs. 115 + @ Rs. 4/KL for above 50 KL	Rs. 134 + @ Rs. 4.60/KL for above 50 KL	Rs. 182 + @ Rs. 7.35/KL for above 50 KL
Non-Domestic	0 - 50	Rs. 3/KL (minimum of Rs. 25/month + Rs. 1 as SC)	Rs. 4/KL (minimum of Rs. 50/month + Rs. 2 as SC)	Rs. 4.60/KL (minimum of Rs. 60/month + Rs. 2 as MIC)	Rs. 7.35/KL (minimum of Rs. 100.00/month + Rs. 2 as MIC)
	Above 50	Rs. 150 + @ Rs. 4/KL for above 50 KL	Rs. 200 + @ Rs. 6/KL for above 50 KL	Rs. 232 + @ Rs. 6.90/KL for above 50 KL	Rs. 370 + Rs. 10.60/KL for above 50 KL
Industrial	For the whole monthly consumption	Rs. 5/KL (minimum of Rs. 100/month)	Rs. 6/KL (minimum of Rs. 100/month)	Rs. 6.90/KL (minimum of Rs. 100/month)	Rs. 10.60/KL (minimum of Rs. 200/month) + Rs. 2 as MIC)

2. **For Industries:** The extraction of ground water for industrial purposes should be charged. An allocation may be made for the use of workers of the industry and for canteen purposes. The requirement for industrial purposes is to be measured, after allocating for the above and should be appropriately charged. Artificial recharging through rainwater harvesting is to be insisted.

3. **For public water supply:** There should be enough public taps to provide drinking water to the people. For household connections the present charges are to be continued.

Measurement of quantity: In order to measure the quantity of groundwater used for irrigation/ industrial purposes, the bore wells/tube wells are to be fitted with pump sets of known HP and separate electric connection is to be provided. By noting the consumption of electricity, we can arrive at the quantity consumed by the user i.e., if a 3 HP pump is used, the approximate quantity of discharge for pump per hour is around 17,000 lph and for running the pump for one hour the current consumption can be noted. Such a calculation will give almost accurate usage of ground water and this should be appropriately charged. In this way the groundwater usage can be controlled and regulated through pricing of water.

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