Groundwater Rights and Water Pricing Structure

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Abstract: In our country the rights of the land owner for groundwater withdrawals are not clearly defined. In the past such a measure was not necessary as there were few users and groundwater potential was adequate for them. For the last few decades rich farmers, influential industrialists, large multinational companies and big builders have withdrawn increasing volumes of ground water using powerful pumps and deeper wells. This has caused substantial lowering of the water table and consequently failure of neighbouring shallow tube wells. Some economically weaker users cannot afford relocation or deepening of their tube wells and are the worst sufferers of this phenomenon. Therefore the paper addresses the necessity of formulating administrative and legislative measures to protect the interest and groundwater rights of small farmers. Paper also focuses on the pricing structure of water which is intimately linked with ground water. Industrial organizations, big builders and rich farmers have the capacity to pay actual costs of water which may even allow generating some profits. A pricing structure should allow minimum supply of water to all users at a very reasonable cost. This is possible if slab system pricing structure is adopted where people from economically weaker section of society and small farmers who are normally using much smaller quantities of water can be charged at a subsidised rate; whereas for the big users with the increase in demand, the water price increases substantially. This also puts a desirable pressure on its less planned and poorly managed use, particularly by the affluent farmers. The paper suggests that the collective administrative and pricing measures may be a step in the right direction to ensure equitable distribution of water and fulfillment of the minimum requirement of all users.

NEED FOR GROUNDWATER RIGHTS: A GENERAL PERSPECTIVE

With rapid economic growth in India, accompanied by expansion of multinational companies, large construction houses and growth of rich farmers, heavy groundwater withdrawals have been reported in many parts of the country. Accompanying lower water tables have caused undue suffering to small farmers in villages and ordinary citizen in cities who normally have a shallow well or tube well to meet their limited water demands. In some instances heavy withdrawals have caused severe problems to important drinking water programmes in India. Bajpai (2000) reported that due to rise of irrigation tube wells in almost all cultivated areas of Madhya Pradesh accompanied by heavy withdrawals by affluent farmers caused water levels to go down as much as 80 to 90 metres below ground level in districts of Mandsour, Khargone, Rajgarh, Dewas, Indore, Chindwara etc. Consequently India-Mark II hand pump designed in 1970 for drinking water programmes failed in 1990 since these pumps were developed to lift water from a depth of 45 m. Nobody in 1970 foresaw that water level will go down

almost by 100%. He also reported that about 20,000-30,000 shallow tube wells have stopped delivering any ground water during summer. Situation is not very different in many other states of the country and it is, therefore, extremely important to meet the minimum water demands of economically weaker section of society in the long run for the overall peace and prosperity of our country.

SUGGESTED MEASURES

Although Department of Irrigation was changed to Ministry of Water Resources in 1985 by the Government of India for laying down policies and programmes for development and regulations of country's water resources, it could not look into smaller details and focused itself on planning, coordination, policy guidelines and technical examination of water resources projects. It had a number of organisations under its wings including Central Ground Water Board (CGWB). Since primary responsibility of water lies with the State Government, these details were to be worked out by the states.

It is difficult to make laws and a public policy for ground water in confined and unconfined aquifers because the exact nature of the movement of ground water and its quantification may not be defined perfectly. Therefore to administer a set of legal rules in respect of ground water may involve severe practical difficulties. Irrigation return flow, canal seepage losses, recharge from reservoirs, rivers and lakes significantly contribute to ground water. However if not used near the recharge regions, groundwater may move to other areas over a period of time which are far away from recharging bodies. Thus origin of ground water and its occurrence in various formations lacks a definite answer that may be acceptable to all the scientific and engineering community involved in the studies of groundwater resources of a particular region.

Since land has an owner, so water underneath the land should also belong to the owner to certain degree. It should be the property of the owner of the overlying land in perpetuity. Therefore the owner should have the right to use it forever. However, as explained above, the groundwater underneath an owner's land is coming from the adjoining areas and is not the only ground water held underlying his land in possession. For this reason an owner cannot be given full rights to withdraw all the ground water that he can. Since it is established that groundwater mining may result in severe harmful repercussions for the entire groundwater basin in the long run, such a right cannot be granted to an owner under any circumstances. One possible solution could be to allow limited withdrawals to the owner such that it should not cause any harmful effect to the users of near vicinity. In this context Piper (1960) cited a decision by US court that "As between two neighbours, the rights to withdraw percolating ground water restricts each to a reasonable exercise of his own right, a reasonable use of his own property in view of similar rights of others".

If the groundwater system can sustain heavy withdrawals in an aquifer without causing any alarming situation, then, full rights may be granted. However this is likely only in some thick, coarse, unconsolidated and heavily recharged unconfined aquifers. Situation becomes more complex when, both, big and small users of the water are involved and, particularly, in periods of poor rainfall and river recharge. For such regions some fixed withdrawal rights could be granted to each owner. For exceeding these limits a license may be required by the owner to withdraw additional volumes, which can be approved by the appropriate authority only after ascertaining that such additional well discharges will not cause any harm to other well owners and also to groundwater basin in general. This requires a careful monitoring by the groundwater authority. For example Walton (1970) reported that in New Jersey the government had allowed restricted groundwater withdrawals of 100,000 gpd ($\approx$ 4000 m^3/d)

to any person, corporation or agency, but beyond this limit a permit was required to obtain, which was to be issued only by the division of water policy and supply if estimated annual recharge was more than the net annual withdrawals. For these reasons it is necessary to consider that irrespective of the land right, all surface and ground water belongs to state and needs prior approval of the state for its use.

ADMINISTRATIVE MEASURES

Before permitting the heavy withdrawals of water, groundwater department through their state officer/ hydrogeologist and scientists should check that no protests are filed for such a withdrawal from the adjoining areas. If some resistance from the neighbours is registered, he may conduct a technical enquiry before granting or denying the permit. This exercise is required in addition to looking at other technical considerations from a long-term point of view. It is required that groundwater department of every state should have some officers assigned to settle these types of problems. Besides it may be required that all the water well contractors must be licensed. Tube well installation, deepening, must be reported on a prescribed form. Drillers must submit geologic logs for all new and deepened wells. Governments of Maharashtra, Gujarat, Tamil Nadu, Andhra Pradesh, Karnataka and Pondicherry have some degree of such legislation for groundwater management. These measures prohibit deeper wells and restrict the groundwater withdrawal rates, thus helping the cause of shallow tube well owners.

According to Kelkar et al. (2000) the control being exercised at present in India for regulating groundwater development is in the form of indirect administrative measures adopted by financial agencies for schemes proposed for bank financing. The financial institutions require technical clearance from authorized groundwater development board or department. Karanth (1987) stated that this clearance took into consideration the stage of groundwater development in a region which was defined as ratio of net estimated extraction to the net estimated recoverable recharge. On this basis Agriculture Refinance and Development Corporation (1979) divided the various regions in white area (60% development), grey area (> 60 to < 80% and dark area (> 85%). No bank facilities were given for loans to drill tube wells in dark areas. Secondly administrative measures deny power connection to pump in areas with serious state of groundwater exploitation (where annual withdrawal is more than 85% replenishment). However over the years more than 120 blocks across the country have reached a stage of over-exploitation and these measures could not prevent affluent farmers, builders and industrialists to construct well in critical areas. This requires the introduction of monitoring by the private bodies who can be hired to disclose such heavy withdrawals for suitable remedial measures.

OTHER MEASURES

Nobody can be given the right to pollute the confined and unconfined aquifers in anyway. In some places companies find it difficult to treat water for discharging it to the nearby surface water bodies. So they prefer to inject it quietly into the aquifer. If discovered heavy penalty should be imposed on such polluters. Such companies should also be asked to clean up the ground water by several available techniques of aquifer remediation. A definite deterrent punishment is necessary to stop this evil practice completely. On the other hand many canal command areas have caused water logging due to canal seepage losses and inadequate planned drainage in adjoining irrigated areas. Water rights also demand that government must take measures to ensure adequate horizontal and vertical drainage of

ground water in canal command areas to avoid the creation of water logged areas, which are very difficult, expensive and time taking to reclaim. Farmers have lost considerable irrigable land due to water logging in many canal command areas of the country.

For very heavy withdrawals, the user should be asked to recharge certain volumes of (treated) water elsewhere. Design and development of recharge sites can be decided in consultation with groundwater authority. Additionally, the cultivators must be asked for adopting more economical ways of irrigation, such as sprinkler system and drip irrigation which reduce water consumption almost by 50% compared to conventional flooding irrigation system followed for the last several centuries in our country. In all big cities and municipal corporations there should be provision for supply of two qualities of water. Type I for drinking and cooking purpose which should be of high quality and reduced standards can be followed for Type II which can be used for all other purpose including bath, washing, cleaning and gardening. This is truer for industries which consume large quantities of water. For example building industry needs water for concrete mixing and curing operations. It does not have to be of drinking water quality. But in all metropolitan cities builders can be seen using drinking quality water for these activities. Similarly for agriculture, cattle and for washing and cooling operations of industry also, we do not necessarily require potable quality water.

Such measures may create some additional drinking water for small user as it is expensive to produce one cubic metre of water with drinking quality due to costs involved in water purification. Therefore if alternative water supply can be arranged, then legislation may state certain areas of operation where drinking quality water will not be made available. Legislation should suggest gradual switch over to this system of dual quality water supply over a fixed period of time so that necessary pipe line system can be installed. Compulsory use of CNG in Delhi in the transport sector on the order of Supreme Court is a fine example to emulate in water sector, which has reduced the noise and pollution from vehicles considerably.

WATER PRICING MEASURES

Water right also requires that an administrative and legislative plan should be kept ready to meet the future (say, next ten years) requirement of water in a region. Cost towards construction, operation and maintenance, water supply, waste water collection and treatment should be considered and an appropriate price structure is suggested to recover these costs. This will make the entire exercise of effective water delivery self sustaining. Big industrialists, rich farmers, powerful builders and multinational companies make considerable profits. Since these sectors cannot survive without water, water supplied to them should not only recover the full annual cost of operation and maintenance but also generate a reasonable profit on the water supplied. This water price can be suitably paid from the profits of the company, which will be a meagre percentage of their total profit and will be used for providing water service elsewhere in (or adjoining) economically weaker regions. Thus the rich sectors can (and should) contribute to a social cause, since they draw their manpower and other resources from the society. In many countries of the world rich multinational companies help towards the social causes in various ways which gives them publicity and goodwill of the people.

These days bottled water (which is largely ground water from deeper wells) is sold at rates ranging from rupees 10 to 15 per litre of water across the country, which is many times the cost of procuring and bottling this water. Government must have some legislation on this pricing so that their profits cannot be more than 50% of their total costs, since water is not a commodity on which enormous profits should be earned. It can be argued that bottled water supply is normally consumed by upper

middle strata of society who can afford it. In that case the excess profits generated above a certain limit must be used for making the minimum supply of water available to the economically weaker section of society.

Financially rich sectors should be supplied water at a cost that generates reasonable profits to the municipal body. However if they do not accept the water with higher tariff from the municipal body and prefer to install their own tube wells, then, they should be charged considerably enhanced license fee to withdraw water. This fee should rise with the increase in volume of water withdrawn as should be clearly indicated in the permit from the groundwater authority. Middle class can be given water supply at a marginally subsidised rate whereas people below poverty line should be provided the water at a very subsidized rate (say 50% of the actual annual cost). For water supplies in big cities sufficient funds should be collected from the public on slab system basis to recover annual costs of operation, maintenance and administration. Metering of the entire supply system helps in effective monitoring and makes the consumer conscious of the quantities used.

CONCLUSIONS

A strong regulatory body is necessary to protect user's interest in the long run from the abuse of power by the operating organisation which always goes in favour of the rich and the powerful. Regulator has to ensure that public is assured drinking water at minimum price and that the water is delivered effectively to the user. It is important that tariff structures eventually should aim at recovering all cost of water services, which should be reviewed annually to make suitable modification to account for any changes in public policy for the water user. A comprehensive plan of waste water collection and treatment, delivery of reclaimed water for agricultural purpose is also required for fixing a price structure. There needs to be effective programmes to control groundwater quality deterioration through adequate legislation; supported by regulatory standards that specify the quality of water for specific purpose. Private sector participation should be encouraged by law for the exploration, withdrawal, planning, development and management of groundwater resources. For this certain pricing norms can be fixed by the government which should aim at encouraging efforts towards research activities to come out with more efficient and economic methods of water delivery systems. Outsourcing to qualified private companies needs to be encouraged in monitoring and maintaining groundwater systems. It will be better if CGWB works along with state groundwater boards to have well defined guidelines that are acceptable to all states across the country. Additional financial resources will be required to ensure groundwater rights in the country.

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