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An Analysis of Confronting the Groundwater Management Quality & Challenge in Maharashtra

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Abstract – GROUNDWATER EXTRACTION WITH more current advances and its utilization in Maharashtra are extremely later as contrasted with some other South Asian nations. The Agriculture Development Bank/ Maharashtra (ADB/M) has been personally included in groundwater improvement for as long as two decades. It is extremely reasonable to assume that, later on, the capacities of the Bank will be constrained just to loaning exercises without the specialized backing. Were it to be along these lines, the Bank will need to discover roads for filling in the recently made vacuum if watering system advancement is to be completely figured it out.

Thusly, this paper evaluates the institutional limit and the sufficiency of watering system help administrations to shallow tube wells (Stws) by the ADB/M by examining a few frameworks upheld by the Bank. The investment execution of the chose Stws is likewise introduced. Proposals are made for upgrading the Bank's institutional limit paying little respect to whether it holds specialized help as one of its capacities.

The dry spell inclined interior of Maharashtra State is particularly reliant on groundwater assets for both rural drinking water-supply and for subsistence and business watered agriculture. Notwithstanding for the most part exceptionally restricted potential these assets are seriously exploited, however such advancement has experienced noteworthy issues. This Case Profile abridges the advancement of, and the groundwater administration methodology created for, the MRWSSP (Maharashtra Rural Water-Supply & Sanitation Project –jalswarajya) and the MWSIP (Maharashtra Water Sector Improvement Project) – which separately are at the period of mid-term survey and fulfillment of 'standard characterization'. The feelings exhibited here are those of the creators alone, yet profited extraordinarily from in-profundity talk with the senior partners of the previously stated ventures : Mr V S Dumal (State Secretary – Department of Water-Supply & Sanitation), Dr Satish Umrikar (DWSS-MRWSSP Pilot Venture Coordinator), Dr S P Bagade & Mr Vikas Kharage (Directors of Groundwater Survey & Development Office), Mr Suresh Khandale (GSDA-Deputy Director) and Mr Shashank Deshpande (GSDA-MWSIP Pilot Aquifer Coordinator).

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INTRODUCTION

Groundwater, the invisible resource - our buried treasure-stored between sand grains and in rock fractures beneath the Earth's surface is vulnerable to pollution and over- exploitation. Most human activities at the land surface, including agriculture; industry and urban development, all ultimately degrade its quantity and quality. The extraction of excessive quantities of groundwater can result in the drying up of wells, damaged eco-systems, land subsidence, salt water intrusion and ultimately the loss of the resource.

Groundwater pollution often remains hidden for many years, becoming dispersed over wide areas, where it is difficult to clean up. In the long run, the most effective and economic means for assuring a predictable supply of clean groundwater is through the protection and careful management of this resource.

In dealing with issue of water, one may well face number of basic problems affecting different societies in different ways. The immediate concern may be un-portable water and human waste of a town/city, multiplying wastes in an industrial country, shortage of water impeding agricultural development in an arid land, watershed destruction and groundwater depletion in the entire region.

GROUNDWATER RESOURCE SITUATION

- Widespread and dynamic exhaustion of groundwater tables in Maharashtra has turned into a reason for significant concern in the course of recent years – in numerous areas this has happened pretty much year-on-year, with the exception of an incomplete (however impermanent) recuperation emulating years of incredibly overwhelming monsoon

rainfall. The developmental grouping for groundwater saw since the mid-1980s has been :

- drying-up of most dug wells ever prior in the dry (rabi) season – at first those at the edges of the primary groundwater bodies (where the weathering profundity was less) however therefore extending much all the more broadly extending of dug wells as dug-cum-borewells, additionally with consequent yield decreases penetrating of dynamically deeper bore wells, just about paying little heed to whether there was proof of the presence of groundwater stream at more excellent profundity.

- Groundwater asset exhaustion has as of recently had genuine effects (counting a conceivable connection with expanding levels of rancher suicides) and, in result, has accepted a considerable measure of media reputation and expanding political consideration. Anyway much of this has concentrated on just the accompanying two features of what is a more perplexing issue (deceiving for the reasons demonstrated) :

- **Procurement of exceedingly financed bump total electrical force for pumping** – while vitality subsidies ought to be eliminated as a result of their critical outcomes (when joined with falling water-tables) for state funds (and reinstated by some other type of help focused to the poorest ranchers), vitality utilization speaks to just a minor extent of aggregate harvest preparation costs and expanded vitality costs are improbable on their to demonstrate sufficient to control inordinate groundwater deliberation

- **Disappointment to moderate watersheds and empower groundwater renewal** – recharge improvement should not be viewed as a widespread panacea for asset awkwardness (on the grounds that the area zone over which recharge from monsoon precipitation could be monetarily improved is constantly constrained contrasted with the potential dry-season request from flooded agriculture) however might be suitable for supporting drinking-water sources (gave reflection to watering system in the area could be controlled).

- So what are the essential drivers of groundwater asset exhaustion? Without a doubt the aggregate accessible capacity of groundwater bodies in hard-shake aquifers, (for example, the Deccan Traps Basalt) is strictly constrained by their weathering attributes and water-bearing properties. Besides, this stockpiling diminishes quickly as the water-table falls through discriminating skylines in the weathering zone (more often than not underneath the highest 2-6m of broke bedrock which is regularly arranged at 5-25m bgl). It can in this manner be quickly exhausted by substantial deliberation, and the concentrated uncontrolled borewell penetrating for watering system of rabi and jawaad (dry season) crops (which has happened generally in the course of the last 10-15 years) is irrefutably answerable for the watched hydrological imbalance.

FACTORS AFFECTING GROUNDWATER QUALITY

The quality of water is affected by natural processes as well as human activities. Natural factors that affect water quality include:

a. chemistry of precipitation;

b. dissolution of organic and mineral substances from vegetation, soil and rocks as water infiltrates through earth material; and

c. duration of contact with soil and rocks.

Man's activities cause changes in water quality. These activities include over withdrawal of water from the groundwater regime or dumping of chemicals and contaminants directly into the aquifers. Contaminants are discharged to the groundwater system primarily through waste discharges from agricultural, industrial and urban sources. The sources of wastes and associated types of contaminants most likely to affect groundwater quality of an area are listed in Table.

Natural Factors	
Natural Sources	Types of Contaminants
Precipitation	Dissolved gases, dust and emission particles
Infiltration through vegetation, swamps or soil and rocks (above water table)	Biochemical products, organic minerals, colour and minerals.
Aquifer rocks	Mineral matter (increases with the time of contact)
Inter-aquifer mixing of cold water and thermal water.	Minerals and gases.
Human Factor	
Sources of Wastes	Type of Contaminants
Aquifer activities	Fertilizers, perticides and herbicides
Mining operation (ore processing plants)	Metallic traces elements and their compounds
Nuclear process	Radiochemicals, heat and radio isotopes
Urban activities (Storm and sanitary sewers solids sewage disposal plants, septic tanks and sanitary landfills)	Organic matter, dissolved solids, suspended detergents, bacteria, phosphates, njitrates,

Table: Natural and Human Factors Affecting Groundwater Quality

NEARBY GROUNDWATER RESOURCE MANAGEMENT PARTNERSHIPS

- Only those regions widely underlain by a consistent groundwater body loan themselves to group aquifer (groundwater asset) administration through an AWMA or AMOR. Furthermore here, on the grounds that groundwater is a 'very decentralized asset' and one that has been chiefly created through private activity (by huge amounts of unique clients), its administration and security must be compelling through proactive social cooperation.

- However, a mindful neighborhood government office will frequently need to make the 'first move' by :

- characterizing 'groundwater bodies' that are fit for being overseen as a 'water repository', and their real and potential allotment clashes

- building a 'groundwater clients profile' for every groundwater body to encourage engagement with the group and accordingly understanding the socioeconomic criticalness of the asset and surveying the danger of 'non-activity'

- selecting 'pilot zones' to go for participatory groundwater asset administration and quality insurance the limits of such zones (and ensuing aquifer administration territories) being characterized on the groundwork of groundwater bodies with particular administration needs.

- A 'nature' for nearby group cooperation (at groundwater body or micro-watershed level) will frequently need to be encouraged and managed, which will include uniting subsistence agriculturists, business irrigators (where present), town panchayat pioneers (speaking to drinking water engages and any mechanical clients), neighborhood organization (locale examiners, revenue officers, and so forth) and state government offices. In this setting the advancement of group groundwater client (or aquifer administration) associations will be a critical venture to create an organized dialog and coordinated effort with those either owning or working water wells, and to guarantee satisfactory reconnaissance of groundwater asset status and practicality.

NEED FOR GROUNDWATER RIGHTS AND PRICING

- A little extent of groundwater bodies in Maharashtra State, basically for the most part (or solely) those of the alluvial aquifer connected with Tapi Gurnia 'tectonic graben', have substantial enough groundwater assets to help substantial scale business inundated agriculture – moreover some of these groundwater bodies are defenseless to irreversible salinization if their groundwater deliberation is not adequately controlled. As being what is indicated they oblige a to some degree diverse administration approach in which proactive group investment is supplemented by a formalized administrative methodology. Specifically if groundwater use for rural water-supply and little subsistence irrigators is to be ensured in such aquifers, an inexorable suggestion is that bigger groundwater deliberation for business scale watered agriculture (furthermore mechanical utilization if present) must be controlled.

- Here the capable neighborhood government org will need to evaluate the degree for administrative measures such as singular groundwater utilization rights (reflection grants/privileges with deliberation estimation furthermore charging) for real business and modern abstractors (and common groundwater use rights at total town level for town water-supply and subsistence agriculture), But the issue of how to address heterogeneity in the groundwater 'clients profile' will must be tended to guarantee group backing and enforceability.

WATER SAMPLING AND QUALITY MONITORING

i) In order to study the status of groundwater quality in- Chemical industry surroundings (GokulShirgaon village premises, Kolhapur North) monitoring wells selected were: Bore wells 3 + open wells 6 = 9,

ii) Distillary Industry surroundings(Kupwad village premises, Kolhapur South), i.e., monitoring wells selected were: Bore wells 8 + open wells 2=10, groundwater samples were collected during pre-monsoon, monsoon and post monsoon seasons in the years 2010, 2011 and 2012 around GokulShirgaon village surroundings.

Similarly groundwater samples were collected during pre-monsoon, monsoon and post monsoon season in the years 2010, 2011 and 2012 around Kupwad village surroundings. Nineteen (9+10) wells were inventorised for falling groundwater table and water quality - physical and chemical tests. In all, 7 sets of field water samples were taken during three meteorological period and subjected to physical and chemical analyses and the results of analyses are presented in Tables.

The tests carried out were:

A. Physical Tests

a) pH value

b) Salinity

i) Electrical Conductivity (EC)

ii) Total dissolved solids (TDS)

B. Chemical Tests

a) Estimation of cations - Na0+, Ca++, Mg'

b) Estimation of anions - Cl HCo3" , So4, No3-

Determination of total hardness.

CONCLUSION

● Only those micro-watersheds broadly underlain by a persistent groundwater body give themselves to group aquifer (groundwater asset) administration through an AWMA or AMOR – those with restricted zones of persistent groundwater body just oblige this methodology in a share of the microwatershed also in the 'spillover zone' (specifically) group interest can helpfully be limited to the activity of Vwscs in admiration of source change, operation and insurance.

● There is a pressing need for Maharashtra State Government to guarantee (through GSDA) the fruitful conclusions of the current pilot ventures as far as :

• social valuation for (and first steps in) coordinated group groundwater administration in the Deccan Traps Basalt groundwater 'stockpiling zones'

• enhanced water-supply sources in the Deccan Traps Basalt 'recharge and overflow zones' for each of the current pilot ventures. In this setting GSDA will need to fortify its capacity to work with group Ngos (Sos) and to create some in-house limit in socioeconomics and horticultural water-utilization. They will require additionally to further the following of groundwater deliberation, building-up a more full profile of utilization and clients which will require not just run overview and stock of watering system wells at the same time likewise their utilization for watering system by :

• group enlistment toward oneself with some checking and extra overview work

• satellite symbolism translated regarding developed zones, harvest sorts and water utilization.

● in light of a legitimate concern for long haul manageability and replicability of the groundwater administration pilots, it is further proposed that GSDA assume the 'beacon capacity' for state government by creating a gathering committed to checking (and giving a 'reference point' for) the advancement of group based groundwater asset administration and along these lines guarantee that they don't fall flat as a result of absence of help and control (in light of the fact that it will take a few years for the group to end up pioneers of an ecologically reasonable improvement process).

REFERENCE

• Ahuja, L.R., Timlin, D.J. and Heathman G.C. (1991). Modelling soluble chemical transfer from soil to overland low and its transport through macropores to groundwater. IAHS Pub. No. 202 Proc. of the XX General Assembly of IUGG at Vienna, 11-24 Aug., pp. 3-11.

• Allison G.B., (2001). A review of some of the physical and chemical and isotopic techniques available for estimating groundwater recharge, Intl. Simmers (edt.), Estimation of Natural Groundwater Recharge, 49.

• Bear J and Verruijt A (2003). Modelling Groundwater Flow and Pollution, Rudel Publishing, Dordred.

• Bear, J. (2003). Hydraulics of Groundwater, McGraw Hill, New York.

• Demetriou C., Volker R.E., and Johnson A.J., (2004). Contaminant movement in groundwater under the inluence of recharge and density surplus, Hydrology & Water Resources Symposium, Christchurch, New Zealand, 23-30, Nov., pp. 356-360.

• Freeze, R.A. and Cherry J.A.(2004) : Groundwater. Prantice - Hall, Inc. New Jersey, USA.

• Fried J.J., (2005). Groundwater pollution mathematical modelling: Improvement or Stagnation, Quality of Groundwater, Proceedings of the International Symposium, The Netherlands, 23-27 Mar, pp 807-822.

• Jacob, C.E. (2006). Flow of Groundwater, Engineering Hydraulics - Edt. Hunter Rouse, John Wiley and Sons, Inc., New York, Chapter V, pp. 321-386.

• Karanth, K.R. (1987). Groundwater Assessment, Development and Management. Tata McGraw Hill Publishing Co. Ltd., New Delhi.

• Todd D.K (2001). Groundwater Hydrology, Publ: John Wiley & Sons., New York.

• Ujfaludi L and J Magineez, (2002). Determination of dispersion coefficient in soils using their pore size distribution, Contaminant transport in groundwater, Kobus and Kinzelbach, Balkema, Rotterdam ISBN 9661918790.

• Wheatland A.B. and Borne B.J., (2004). Some changes in polluted water during percolation through soil. The Water and Waste Treatment Journal, May/June, pp. 30-335.