

Efficacy of Groundwater as 'Commons': An Enquiry into the Implementation of Groundwater (Control and Regulation) Bill of 1992 in selected States in India

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Abstract

Though in India water has been perceived as a common pool resource (CPR) for centuries, in the current scenario, water as 'commons' exists more in theory than in reality. The case of groundwater is even more complex considering the present state of the prescription under the Indian law where the ownership of land carries the ownership of the groundwater under it. This has resulted in the excessive, indiscriminate use of groundwater leading to over exploitation. The pressure on ground water resources has increased many folds in the recent past with the shifts in the agricultural patterns, urban growth and rising demands from various sectors of the economy. Central Ground Water Board paints a gloomy picture of the status the groundwater resources across the country with an increasing number of 'critical' and 'over exploited' blocks. This critical state of ground water resources has led to the demand for groundwater regulation in India. The Model Groundwater (Control and Regulation) Bill of 1992 was formulated and circulated by the Central Government for the consideration of the states, and eventually been adopted in many states across the country. This paper examines the effectiveness of the Model Bill with the analysis of the provisions of the Bill in the various states in India. The paper also addresses the larger debate on the issue of groundwater as commons.

Keywords: groundwater, commons, regulation, over exploitation, India

1. INTRODUCTION

Though in India water has been perceived as a common pool resource (CPR) for centuries, however in the current scenario, water as 'commons' exists more in theory than in reality. To add to the complexity, there is a continuum existing in case of water resources where public, private and common property regimes are present simultaneously (Iyer 2001). In case of groundwater, the situation is even grimmer under Indian law; where the ownership of land carries with it the ownership of the groundwater (Singh 1991; Saleth 2004). This has resulted in the excessive, indiscriminate use of groundwater leading to over exploitation. The pressure on ground water resources has

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increased many folds in the recent past with the shifts in the agricultural patterns, urban growth and rising demands from various sectors of the economy. Central Ground Water Board paints a gloomy picture of the status of the groundwater resources across the country with an increasing number of '*critical*' and '*over exploited*' blocks. This critical state of ground water resources has led to the demand for groundwater regulation in India. The Model Groundwater (Control and Regulation) Bill of 1992 was formulated and circulated by the central government for the consideration of the states, and eventually been adopted in many states across the country.

Groundwater was perceived to be abundant. However, given the intensity of use, the situation is becoming increasingly critical in many parts of the world. In the Indian scenario over-extraction of groundwater pose crucial questions on the livelihoods of millions of farmers across the country. The recent boom in agriculture facilitated by the use of groundwater has undoubtedly benefitted the farming sector but has also led to declining water tables in various regions of the country. Under such an alarming situation, Groundwater Governance needs to be tackled with efficient interventions at various levels. The government Model Groundwater Bill, 1992 was introduced. However, this Bill has not been implemented by all the states and also has not achieved the desired results till date. Also, the Bill has been heavily criticized for being overtly regulatory and statist in nature without much space for the interest of stakeholders.

In the recent past phrases such as "over development" and "over extraction" have been suggested across the globe regarding water use with the major challenge of governance. In the case of groundwater where the demarcation and delineation is difficult, an emphasis on governance is urgently warranted.

This paper attempts to understand and examine the effectiveness of the Model Groundwater Bill and analyse in depth of the provisions of the bill in the various states of India. The paper also addresses the fundamental debate of groundwater as commons.

2. BACKGROUND

Human interventions in the water systems in India have a reasonably long history with societies in this part of the world being referred to as a "Hydraulic Civilisation" (Bandyopadhyay 2009). Fresh water was used for agriculture in India from centuries and many rulers were involved in building infrastructure for the augmentation of water resources (Mosse 2003). Hardiman (2002) remarked that power of many rulers depended on their capability to promote, build and maintain the irrigation infrastructure in their provinces. Mosse (1997) supported this view, giving lucid descriptions of warriors in South India who created political domains by extending and maintaining the tank irrigation systems in the region.

In the 'Era of Adaptive Irrigation' which lasted till 1830, the emphasis was on surface water resources while groundwater was primarily used for drinking purposes. Shah

(2009) provided a scholarly portrayal of the evolution of irrigation and groundwater use in the South Asia and identifies three broad phases or eras; namely 'adaptive irrigation', 'constructive imperialism' and the 'atomistic irrigation'.

During the colonial rule, infrastructure faced a rapid deterioration due to the dearth of appropriate funds. This led to the intervention by the British in improving the water infrastructure. The colonisers with the belief that nature could be mastered, controlled and tamed, started the project of transforming the face of India (Hardiman 2002). The British were keen to build the canals and hence, make water flow in the directions that were most useful to them. Soon, the rivers were engineered and a mesh of canals engulfed the various parts of the country with highly advanced engineering technologies. The aim of the colonizers was to enhance the productivity of the land specifically in the areas where the rainfall was less (Shah 2009). Hardiman (2002) further elaborated that water resources were taxed at each stage where water rates were an integral part of the land tax system. This era referred to as 'constructive imperialism' (Shah 2009) supported the ideology of build, neglect and rebuild which differed from the earlier phase where maintenance and revenue generation were stressed upon. Thus, water infrastructure was build all across the country and justified in the name of famine control. In the post-independence period, the same ideology prevailed amongst the planners. The idea of progress propagated by the scientists, engineers and planners was to build hydraulic structures that were aimed to store and divert surface water (Bandyopadhyay 2009).

In the present Era of Atomistic Irrigation water extraction mechanisms have revolutionized the entire process of irrigation with the electric and diesel pumps changing the water economy of the region. All countries in South Asia are experiencing the rampant changes where the groundwater resources are being extracted indiscriminately. The use of water was made accessible by water extraction mechanisms (WEM) that gave the power to the individual farmers. Extraction was easy and comparatively cheap. Such easy and cheap access to abundant groundwater resources led to indiscriminate use of groundwater resources across the country. The way out was to sink deeper and deeper. Green revolution intensified the use of groundwater resources. Productivity increased with usage of package of practices. This eventually resulted in stable agricultural production, more employment as well as more food security for the country (Mukherjee and Shah 2005). Interestingly, private investments in the groundwater sector have been higher than in surface water where huge public investments were made. Foster and Rosenzweig (2005) pointed out that this was possible because the farmers invested on tube wells on to extract water. Such individual investment and rather quick action resulted in tapping all the options and opportunities by the farmers but failed to visualise the flip side of increased groundwater use (Shah 2009)

According to the Report by the Expert Group on Ground Water Management and Ownership (2007) "*total water use (including groundwater) is 634 bcm (billion cubic metres), of which 83 percent is for irrigation. The demand for water is projected to grow to 813 bcm by 2010, 1,093 bcm by 2025 and 1,447 bcm by 2050, against the utilisable quantum of 1,123bcm*". Groundwater, in particular, will come under even greater

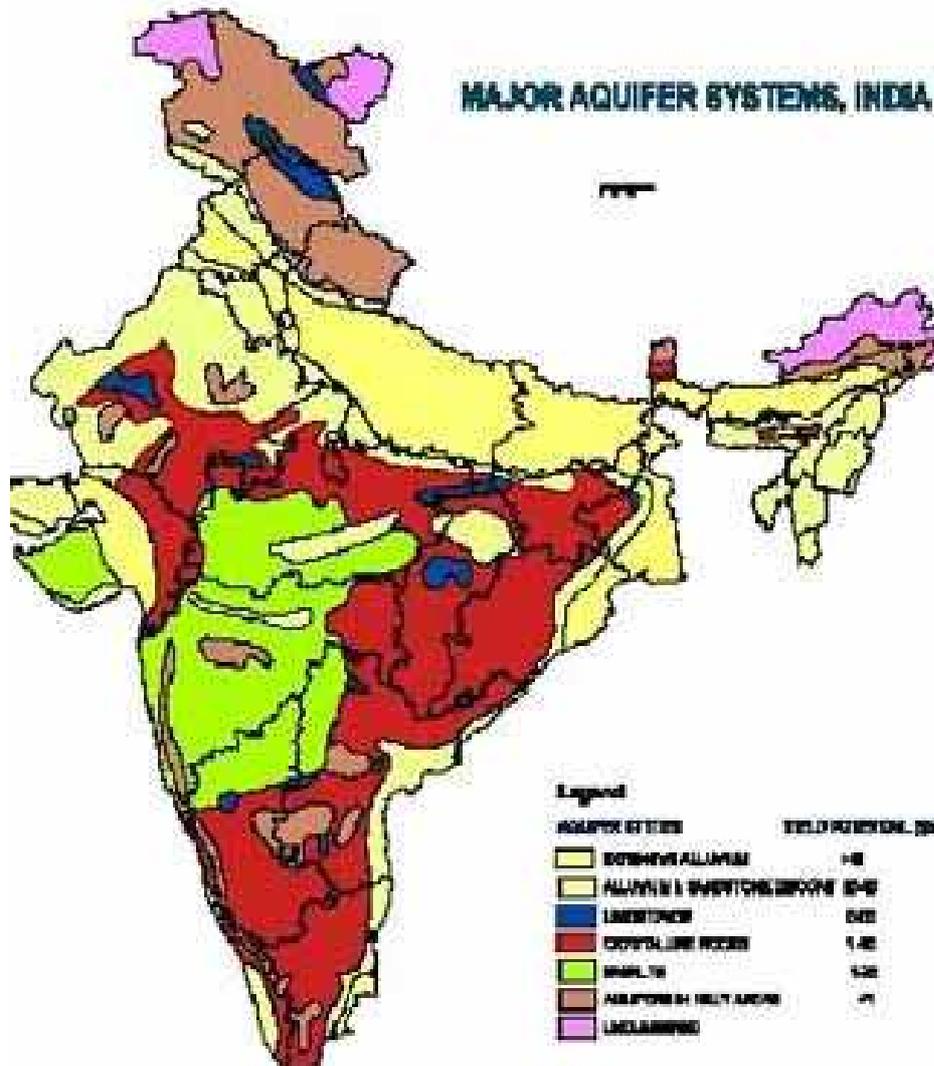
pressure in the intervening years, it added. Almost last three decades of rapid expansion of groundwater use has resulted in higher production in agriculture. This has also led to the greater access over drinking water along with the demands from rest of the sectors.

The above discussion elucidates the evolution of the irrigation systems and groundwater use in India. The change from the use of surface water to the extensive use of groundwater resources for agriculture clearly shows the problem of depleting groundwater resources.

3. THE PROBLEM

The recent World Bank Report (2010) addresses the problem of groundwater overexploitation and the grim scenario looming across the country. There is a vast spatio- temporal variation in the groundwater availability across the states in India. Such variations exist due to the differences in the hydro geological and topographical set up of the country. Physiographic differences with alluvial plains in the Northern and hard rock topography of the South, divides the country into two major recharge zones. The map (Fig.1) below shows the various aquifer systems indicating the variations in the recharge zones of the country.

Fig 1: Map of the Major Aquifer Systems of India



Source: Central Groundwater Board

3.1 Availability of groundwater resources

The annual replenishable groundwater resource of India is 433 billion cubic metre (bcm) and net annual groundwater availability is 399 bcm. According to the Central Groundwater Board Report (2004) the annual groundwater draft for 2004 was 231 bcm.

Table 1: Groundwater Resources Availability and Status of its Utilization in India (2004)

Regions	Annual Replenishable Groundwater Resource	Natural Discharge during non-monsoon season	Net Annual Groundwater Available	Annual Groundwater Draft	Stage of Groundwater Development
	(bcm)	(bcm)	(bcm)	(bcm)	(%)
Northern Himalayan states	5.4	0.48	4.92	1.84	37
North Eastern Hilly States	33.99	3.02	30.98	5.63	18
Eastern Plain States	111.63	9.03	102.5	43.97	43
North Western Plain States	80.78	6.92	73.85	72.17	98
Western arid Region States	27.38	1.97	25.4	24.48	96
Central Plateau States	90.723	5.19	85.53	36.11	42
Southern Peninsular States	82.78	7.14	75.65	46.4	61
Islands	0.34	0.01	0.32	0.01	4
Country Total	433.02	33.77	399.26	230.63	58

Source: Jha & Sinha 2009

Southern peninsular states – Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Pondicherry; North Eastern hilly states – Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura; Eastern plain states – Bihar, Orissa (part) , Eastern Uttar Pradesh and West Bengal; Central Plateau states – Chhattisgarh, Jharkhand, Madhya Pradesh, Maharashtra, Dadra & Nagar Haveli; North Western plain states – Delhi, Haryana, Punjab, Western Uttar Pradesh, Chandigarh; Western arid states – Gujarat, Rajasthan, Daman & Diu; Northern Himalayan states – Himachal Pradesh, Jammu & Kashmir, Uttarakhand; Islands – Andaman & Nicobar, Lakshadweep.

Table 1 details the annual replenishable groundwater, net annual availability, net annual draft and the stage of groundwater development across the states in the country. North Western Plain States and Western Arid States paint a very gloomy picture with 80.78 (bcm) and 27.38 (bcm) of annual replenishable groundwater respectively but have the annual groundwater draft as high as 72.17(bcm), 24.48 (bcm) resulting in groundwater development stage as high as 98% and 96%. The Southern Peninsular States with the hard rock topography has the groundwater development stage at 61% followed by Central Plateau States at 43%. The overall state of groundwater development in the country is as high as 58%.

3.2 The methodology of estimation of groundwater resources

The Central Groundwater Board estimates the groundwater resources in the country through an estimation methodology. Earlier the CGWB followed what is known as the Groundwater Estimation Committee-1984 methodology (GEC-1984). Under this methodology, the groundwater assessment units were classified into four categories depending on the level of groundwater development, viz. as 'white' where the level of development (or withdrawal to recharge ratio) is less than 65%, as 'grey' when this was between 65 and 85%, 'dark' when between 85 and 100% and 'over-exploited' when this ratio exceeded 100%. However, it is important to note that the CGWB has changed its estimation methodology as per the recommendations of the Groundwater Estimation Committee-1997 (GEC- 1997). Under this methodology the assessment units are categorized as Safe, Semi-Critical, Critical and Overexploited.¹

According to the recent Central Groundwater Board Report 2004 out of 5723 assessment units in the country, 4078 have been identified 'safe' and 839 as 'overexploited' while 550 come under the category of 'semi critical'. The number of assessment units falling under the category of critical is 226 accounting to 4% of the assessment units. It should be noted that over-exploitation is more prevalent in Northwestern, Western and Peninsular India.

Table 2: Various categories of groundwater development in some states

Serial No.	States and UT	Total No. of assessed units	Safe No.	Safe %	Semi Critical No.	SC %	Critical No.	Critical %	OE No.	OE %
1	Delhi	9	2	22	0	0	0	0	7	78
2	Punjab	137	25	18	4	3	5	4	103	75
3	Rajasthan	237	32	14	14	6	50	21	140	59
4	Haryana	113	42	37	5	4	11	10	55	49
5	Karnataka	175	93	53	14	8	3	2	65	37
6	Tamil Nadu	385	145	38	57	15	33	9	142	37
7	Andhra Pradesh	1231	76	62	175	14	77	6	219	18
8	Gujarat	223	97	43	69	31	12	5	31	14
9	UP	803	665	83	88	11	13	4	37	5
10	Kerala	151	101	67	30	20	15	10	5	3
11	Maharashtra	318	287	90	23	7	1	0	7	2

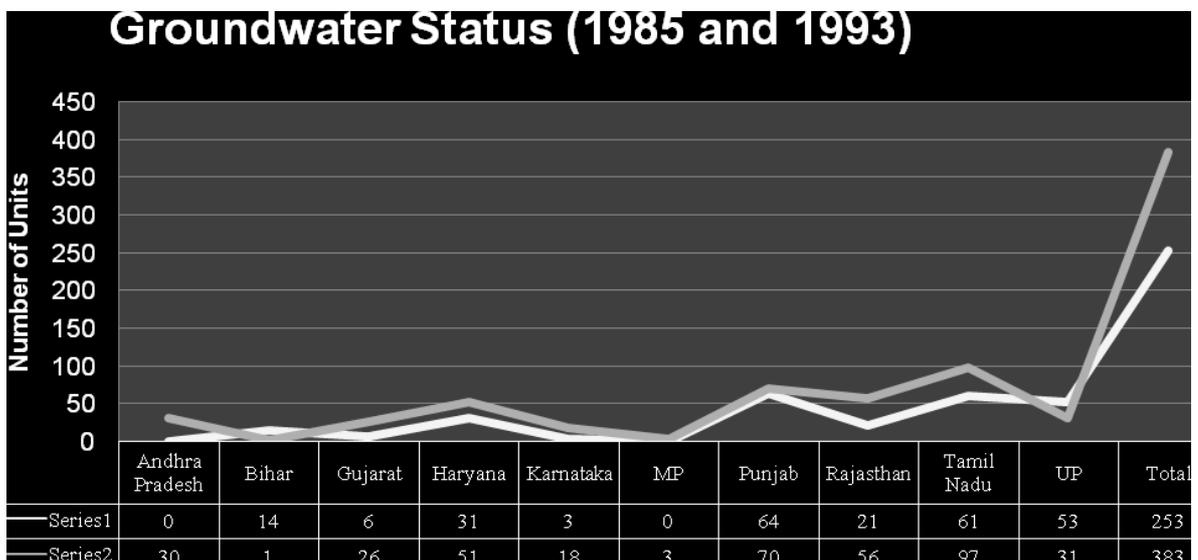
Source: Central Groundwater Board, 2004

The above table provides the details of the states where the percentage of the over exploited assessment units are the higher compared to the other states. Delhi tops this list with 78% of the assessment units falling under the category of over exploited. Such a high percentage can be well attributed to the rapid urbanization and ever-increasing water demands in this semi arid zone. Second in the list is Punjab which is considered

¹ When the groundwater development is above 100 percent it is termed as over exploited. Critical, when the groundwater development is between 90-100 percent. Semi Critical, when the groundwater development is between 70-100 percent and safe, when the groundwater development is below 70 percent.

to be the grain house of the country. The agricultural state has been dependent on the groundwater resources over last couple of decades particularly after the Green Revolution. The over-extraction of groundwater in the state has resulted in 103 assessment unit being declared as the over exploited where the groundwater development rate is very high. Haryana is the other state where the Green Revolution was adopted but is not much behind and 49% of its blocks fall under the category of over exploited. Karnataka and Tamil Nadu both a part of the hard rock topography have 37% of the assessment units under the over exploited category. In the case of Andhra Pradesh, though overall percentage under over exploited is 18% but the actual number of assessment units under this category is highest at 219.

Figure 2: Groundwater Status 1985-1993(Over Exploited and Dark Blocks)



Source: CGWB 1991, 1995 cited in World Bank Report, 1998

The number of blocks under the category of over-exploited has increased by manifolds over the past years (Figure 2); the comparison shows the increase in the number of over-exploited and dark blocks in some of the states. In most of the states there is huge increase in the number of over exploited and dark blocks within a short period of eight years. The total number of dark and over exploited blocks has jumped from 253 to 383.

Table 3: Groundwater Status 1995

Groundwater Status , 1995	Total no of assessment units	Dark		Over Exploited	
		No	%	No	%
No of Blocks	4272	107	3	231	5

No of Mandals	1104	24	2	6	1
No of Taluks	184	14	8	12	7
No of Watersheds	1503	34	2		
Total	7063	179	3	249	4

Source: Planning Commission Report, Sept.2007

Table 4: Groundwater Status 2004

Groundwater Status, 2004		Semi Critical		Critical		Over Exploited	
		No.	%	No.	%	No.	%
Blocks/mandals/taluks	5723	550	10	226	4	839	15

Source: Planning Commission Report, Sept.2007

The above tables show the groundwater status in India in 1995 and 2004. It is important to note that number of over exploited assessment units has increased from 4% in 1995 to 15% in 2004 indicating an increase of more than four times in a period of less than ten years.

4. SOLUTION: THE MODEL GROUNDWATER BILL

The Model Groundwater Bill of 1992 consisting of 24 provisions has been one step towards a regulatory mechanism to manage the groundwater resources in country. The Ministry of Water Resources, since long, has pursued the matter regarding enactment of law on groundwater with all states and union territories through this Bill. The Model Groundwater Bill was initially circulated as early as 1970. Ever since then it has been re-circulated from time to time. Firstly in the year 1992 then in 1996 and recently in 2005, to the states and the union territories to enable them to enact suitable legislation for regulation and control of groundwater development on the lines of Model Bill.

The following 11 states and the union territories have enacted the legislation in this regard. These are as follows: Andhra Pradesh, Goa, Lakshadweep, Kerala, Pondicherry, Tamil Nadu, West Bengal, Himachal Pradesh, Bihar, Chandigarh and Dadra and Nagar Haveli. 18 other states and union territories are in the process of enactment of legislation. States like Nagaland, Sikkim, Tripura, Arunachal Pradesh, Manipur and Punjab are not very keen on enactment of law regarding groundwater resources in their respective states (Press Information Bureau Release 2010).

4.1 Main features of the model Bill

The 3rd provision of the Bill authorises the states to make a groundwater authority that is given the right to notify the areas which are deemed necessary to be regulated, where permits are granted by the groundwater authority to sink wells. Every user needs to apply for a permit unless it is a hand pump or where the water is drawn manually. The application for registration must contain the details on the water sources, extraction mechanisms, quantities extracted, water uses, period of extraction, area served and

service details. The basis for granting or denying permits is based on technical reasons like availability of groundwater quality and quantity, spacing between the structures, etc. The authority takes into account the purpose for which the water is drawn. But it does not give any priority to domestic use over the other uses of the groundwater. For structures which are exclusively used for drinking purposes there is no need for a permit (Cullet 2009, 2010). The authority is to give permits only after a detailed account of the use of water, competing users, availability of water etc. The existing users are supposed to get registered with the authority and define their use of water. The judicial power in a case filed under this Bill is not vested in the hands of the civil courts but rather lies with state government and the authority (Moench 1994; Vani 2009).

4.2 State experiences

There are certain differences and similarities across the states that have adopted the Model Bill and have groundwater legislation in place. For instance, in Goa, Himachal Pradesh, Kerala, Tamil Nadu and West Bengal the groundwater legislation primarily addresses only the groundwater issues. On the other hand, in Maharashtra, Madhya Pradesh and Karnataka the Groundwater Act concentrates largely on drinking water. Interestingly, Andhra Pradesh is the only state where groundwater is linked to the surface water resources and an integrated approach has been adopted. In Himachal Pradesh first priority is given to drinking water but a royalty is taken for groundwater use in the notified area (Cullet 2009).

Interestingly, the powers and membership composition in the groundwater authority also varies from state to state. The groundwater legislation in West Bengal gives the authority the right to develop a policy to conserve groundwater. The groundwater authority can henceforth organise people's participation and involvement in planning and use of groundwater. Andhra Pradesh has a new cell comprising of civil servants and members nominated by the governments because of their expertise. In West Bengal majority are civil servants while in Kerala only four members are civil servants and the rest comprise of the experts from various fields. All these variations in provisions of the Groundwater Acts in states try to address the complexities in groundwater management. The effort is to restrict indiscriminate extraction of groundwater resources.

4.2.1 Case of Kerala

According to the Central Groundwater Board the net annual groundwater availability in Kerala has been assessed as 6.23 bcm while the present annual draft for irrigation is 1.82 bcm and 1.10 bcm for domestic and industrial uses. The stage of development is assessed as 47%. The groundwater legislation in the state came into effect in December 2003 as 'The Kerala Groundwater (Control and Regulation) Act, 2002' with the Kerala Groundwater Authority formed within a month from the enactment. The Groundwater Authority under the Section 6(1) can recommend the State government to

notify any area within the State for the purpose of regulating groundwater extraction in public interest. The Act does not have any emphasis on the supply side management however; the Act recognises the role PRIs in the management of groundwater resources.

4.2.1.1 Plachimada: The Coca Cola Case

With respect to groundwater resources, Kerala has drawn attention in the recent past with the Plachimada controversy. Plachimada, a small village in Perumatty Gram Panchayat, has portrayed an excellent example of resistance by the local community and their struggle against the mighty multinational corporations. The Coca Cola plant was set up in 2000 in the village but soon the villagers complained of the falling water table in the area resulting in water shortage. In 2003 the Gram Panchayat passed a resolution and hence did not renew the Company's license on the behest of complaints of groundwater shortage and contamination of drinking water. Soon, a case was filed and legal process started. The case involved the Coca Cola Company and the Panchayat, to which the function of local water supply is delegated from the State. Since then this case has been heard twice in the High Court of Kerala. The Single Judge affirmed with Panchayat decision and invoked the doctrine of public trust in this regard. However, soon this decision was challenged and Company filed a petition with Division Bench. The High Court's ruling declared groundwater a private water resource and the owners of the land have the proprietary rights over groundwater. Moreover, the ruling stated that the Panchayat did not have any rights over '*this essentially private resource*' (Vani 2009). In this case, ownership of groundwater became a central issue where various stakeholders were involved (Vani 2009). Rights over the resources were challenged, and grassroots bodies played a vital role in the case. The Panchayat played a crucial part in the entire issue. The judgements in case of Plachimada have invoked a lot of criticism from various corners of the world. Both the principles of public trust and sole proprietorship have been used in this case. The entire debate revolves around the judgements passed by the High Court in regard to declaration of groundwater as private resource and the also questioning the legitimacy of the Panchayat over natural resource like water. It also illustrates the challenges with respect to the regulation of groundwater where, the Kerala Groundwater Authority is unable to do anything as the Coca Cola plant was set up in Plachimada in 2000. Though the Kerala Groundwater Act under Section 12(c) can limit the extraction of groundwater and holds the power to cancel the permit given to the respective party, The Plachimada picture is different. Nonetheless, it is important to mark that the situation would have been different if the Groundwater legislation was enacted beforehand. Presently, the case is with the Supreme Court.

4.2.2 The Case of Maharashtra

With Maharashtra having introduced the groundwater legislation 'Maharashtra Groundwater (Regulation for Drinking Water Purpose) Act 1993' for more than a decade, it is very important to retrospect and examine the experience of groundwater regulation in the state. The main provisions of the Act aimed to control the overdraft of groundwater resources and had provisions which imposed restrictions on sinking of

wells near public drinking sources. Literature illustrates that the Act was not able to achieve much due to various reasons. Phansalkar and Kher (2006) discussed the case of Maharashtra in detail with a case study of fifteen villages in Vidarbha region of the state. The study discusses some of the challenges associated with the implementation of Groundwater Act in the area. Apart from other challenges the study suggested that the community involvement for the management of the groundwater resources is a necessity. Without taking into consideration the existing systems and norms regarding the groundwater, the legislation is merely an addition in the set of laws that already exist regarding resources. Hence, community participation coupled with respect of the social ethos can be a way forward in this regard. The revised version of the Groundwater Act called the Maharashtra Groundwater (Development and Management) Act, 2009 has been adopted by the state. The major thrust of the Act is on supply demand management of groundwater. The Act focuses on protecting public drinking water sources. Under the Act Groundwater authority has been constituted at the state, district and regional level in Maharashtra. Aquifer management is an important and unique component of the Act where groundwater resources are being managed at the aquifer level. There are measures for demand side management ranging from decisions on cropping patterns to use of fertilizers (Ravandale, 2010). The provisions of the Act are formulated to promote community participation in the process. Two years down the formulation of the Act, groundwater management remains a challenge due to the complexities in its governance.

4.2.3 The Case of Punjab

With 75% of its blocks falling under the category of over exploited, Punjab (the grain basket of the country) ranks high for the groundwater exploitation rates. The Green Revolution peaked since the 1960's and groundwater resources demand urgent attention. Punjab has not taken any step towards the groundwater legislation in the state. According to the Central Groundwater Board *"the Punjab Ground Water (Control and Regulation) Act, 1998 was prepared on the basis of Model Bill and was submitted to the Punjab State Water Resource Committee. The Committee observed that the draft is too harsh on users and Model Bill circulated by the Ministry of Water Resources (MoWR) not in the larger interest of the farmers and suggested that a system of incentives is better"* (Central Groundwater Board, http://cgwb.gov.in/gw_profiles/st_Punjab.htm)

Such legislation can only be implemented after detailed scrutiny and discussion with all the stakeholders in the state. Recently, the Planning Commission had written to the state expressing serious concerns regarding the "rapidly deteriorating situation regarding groundwater" in Punjab, and asked the state to reconsider its policy of free power to farmers, which "is contributing to over drawal" of groundwater (Indian Express, <http://www.indianexpress.com>). The politics of Punjab which is dominated by a strong farmers' lobby has been the major reason for the state government to oppose the Groundwater Legislation. The recent political drama in the state where Shiromani Akali Dal suspended Manpreet Singh Badal, the state finance minister was deeply influenced by the similar factors. *'He has been vocal in demanding the scrapping of free power to farmers, pointing out that it has not only led to wastage and pilferage of power but has*

also increased pressure on the water table. The state has been losing at least Rs 3,100 crore revenue on account of the power subsidy every year' (Indian Express, 13th October, 2010). Mukherjee (2006) illustrates a similar case in Gujarat where again the state government has strongly opposed the Groundwater Legislation. She uses the political ecology framework to show how two states of West Bengal and Gujarat arrive at two contradictory groundwater policies bypassing hydro geological conditions and presents the case how the state simply over rides the ecological concerns. The presence of strong farmer lobbies and their state patronage leads to further depletion of water resources in over exploited zones in states like Punjab and Gujarat.

Punjab is looking for other alternatives to cut down its groundwater demands and hence manage the crisis effectively. The state is trying to find other ways in the recent past to overcome some of the problems related to overexploitation of groundwater. In 2008 the state prohibited the farmers from sowing the paddy early; this would eventually cut down the groundwater demands significantly. Apart from this the government of Punjab is trying to come with other water saving techniques like the leveling of fields using laser techniques, soil moisture-based irrigation timing, short-duration rice varieties and the system of rice intensification. Such measures propagated by the state can only become a reality when the farmers are ready to adopt these efficiently. Such efforts are mere delusions when evaluated in the backdrop of the rampant groundwater extraction and the irrigation power nexus in the state (World Bank 2010).

5. CHALLENGES IN IMPLEMENTATION OF THE MODEL GROUNDWATER BILL

The experiences in some of the states illustrate that there are a number of challenges associated with the implementation of the Model Groundwater Bill. Moench (1994) asserts that there are two basic problems in the implementation of the acts '*first is the sensitivity of the state attempting to regulate the open access resource for the landowners*' and secondly, there is lack of effective mechanism for the implementation of the same. Model Bill tries to regulate the use of wells through licensing but this can only be possible in the wake of registration of millions of wells across the country.

Vani (2009) remarks that the Bill propagated by the Central Government has certain flaws on the legal grounds. She further discusses that the lacuna in these attempts to regulate the rights without any change in the present property structure. The common laws have given immense powers to the landowners across the country. Groundwater has been considered being an intrinsic part of the land owned by the individual under the Easement Act, 1832. Vani (2009) argues that the Easement Act which is the base on which groundwater rights are defined has been used very loosely. There are various complexities attached to the act that needs more clarity and precision. The Easement Act refers to groundwater as an illustration of natural advantage that is co existent with right possessed by every owner of immovable property to enjoy that property without disturbance by another. Further, at the state level there is no legislation to define rights to groundwater and thereby leaving ground water in the realm of common law doctrine.

The groundwater operating framework is based on the common law which gives the landowners dominant control over the water.

Another major challenge is in terms of economic efficiency. Shah (2009) discusses that in case of groundwater the transaction costs of monitoring and collection is considerably high. With millions of wells scattered across the country such monitoring and regulation is very difficult. In case of Israel irrigation diversion and delivery points are monitored and metered and in Jordan groundwater withdrawal charges are levied. However, he remarks that such approaches have been successful where initiatives have been for high value for water. The example of community aquifer management in Mexico and Spain illustrates that though these practices have adopted along the Coasean logic but even after many years the results are partial. Groundwater associations can work as agents in monitoring and enforcement of government. As in certain cases the recording of groundwater rights remains incomplete (Shah 2004, 2009).

The correlation between electricity and groundwater is another challenge which needs a lot of deliberations on the part of the state along with the various stakeholders. The evidence of Punjab, Gujarat and some other states shows that even when the electricity regulations are tried they are not insulated from various hassles. Next to availability of electricity is then associated with charges /prices for water if the prices are low the water is easily available but then there is more extraction which further leads to water depletion. Such has been the case in Punjab where electricity is subsidised. This has been referred to as the '*energy irrigation nexus*' (Shah 1993 cited in Mukherjee 2007). Cullet and Gupta (2009) remark that even when electricity is highly priced rich farmers can extract more groundwater leading to inequalities in access. Cost is not the only consideration in this case as this has direct impact on the drinking water. The electricity board can cut off the power but this is usually not possible as the rural population is unable to pay the bills but cutting off the power will be a threat on the food security of the country (Moench 1994). In the regulation of groundwater the linkages between electricity and water has been sidelined at policy level (Cullet and Gupta 2009). It is definitely and directly linked to the question of cutting vote banks. The nexus between electricity subsidies and groundwater exploitation is becoming evident each day.

Besides, the groundwater legislation does not address the question of equity and fails to take inequity in land rights into account. Regarding the involvement of the local bodies for the management of groundwater is also contested as the local bodies do not have such power. They can exercise only such powers as may be delegated to them (Vani 2009). The case of Kerala where the power of the Panchayat has been challenged and nullified by the ruling of the High Court illustrates a similar example in this regard. There is fragmentation as all the sections in water are managed differently. Also the other sectors also influence water management. With such a structure the Groundwater Authority will be just another agency added with no real powers (Moench 1994).

6. The Model Groundwater Bill- A Critical Look

The Model Groundwater Bill has been heavily criticised for various reasons. The experiences across the country illustrate that the groundwater legislation in the present form is difficult to implement. Cullet (2010) remarks that the Bill is dated as the provisions were framed decades back when the usage of groundwater was low and it was considered as a marginal source of water. While this Bill was first introduced in 1970's when there was not much need for the same the irony is that it has been adopted in the same form in 2005. Moreover, it is inappropriate as it was based on the nexus between the groundwater and land ownership which is based on inheritance and thus is inequitable and unsustainable. There is a lacuna in the framework itself with no solutions to the groundwater laws that give importance to land ownership and groundwater access. Vani (2009) argues that the rights of the various stakeholders have not found place in the provisions of the Bill.

Even though the groundwater is a largely localised affair, the regulations are centralized, which poses numerous problems. Hence, the need is to give rights to Panchayats under the constitution. The Bill in its present form is not in line with the 73rd amendment and does not take into consideration the water sector reforms (Cullet 2009). The state is the final decision maker in the entire process. But the present Bill nonetheless limits the possibility of participation by the users as there is no provision for the representation by the users. All the powers lie with the authority ranging from the area that can be notified to the use of the groundwater. In sum the Model Bill limits the scope of participation by the users. It actually seeks to limit the interference by the users (Moench 1994).

Another problem is that surface and groundwater have been dealt separately. Cullet (2009) adds that the model Bill continues to do so by extending the legal regime for groundwater distinct with links to land. There are no restrictions on the amount of groundwater to be drawn in most of the cases. But the recent laws put a barrier where groundwater cannot be exploited beyond the replenishable rate.

Since groundwater is the primary source of drinking water, regulation is essential considering both the sustainability of groundwater resources and the welfare of the community. Model Bill is the initiative taken in this area but the problem is that it does not give broad mandate to regulate groundwater in general. The Bill does not set any priority for any sector and hence there are no differences between commercial and non-commercial uses.

Literature suggests that the groundwater authority has not had much impact on the groundwater regulation. The problem is exaggerated by more power subsidies given in power structure. Some states have adopted the Bill while the others do not want to initiate it as there are various dynamics attached with the same. The groundwater authority is given the right to notify the areas which are deemed necessary to be regulated. But the lacuna lies in its inability in providing any solution for the existing use of ground water as it is focused on the future use.

7. GROUNDWATER AS “COMMONS”

In the recent years there has been a shift from the community-based use and maintenance to individual use of groundwater due to easily available extraction mechanisms resulting in increased exploitation of groundwater. Groundwater governance is urgently required when the resources are over exploited and the efforts are to regulate the extraction and minimise third party externalities and social ill fare (Shah 2009). Primarily, there are issues related to governance of water resources as they are linked to ownership of land. The Easement Act 1832 governing ground water in the country refers to *ground water as an illustration of natural advantage that is co existent with right possessed by every owner of immovable property to enjoy that property without disturbance by another*. This complicated the issue as groundwater resources were perceived as private resource due to the above-mentioned act. Law did not recognise the characteristic of groundwater resource as commons. Groundwater governance needs structural change to address the complexities associated the groundwater as commons. Primarily, the problem of subtractability and sustainability is closely associated with the groundwater resources as commons. The regulatory regime and the competing users pose challenges to groundwater governance.

“Groundwater governance is about creating institutional structures, processes, mechanisms and policy tools for harmonizing the interests of resource users and the wider interests of society and future generations” (Shah 2009).

The vision of the groundwater governance requires the ingredients of access, equity, supply- demand management as well as efficiency. But the question of regulation remains a challenge with regulation mechanism of the government remaining contested at various levels. At the policy front the state is trying to implement the Model Groundwater Bill which falls short to meet many expectations. Much needed participation is not there in most of the cases of groundwater governance which further poses challenges to monitor and regulate the groundwater resources. Examples of Spain and Mexico where monitoring of the groundwater resource have not resulted as desired show that it is not easy to regulate groundwater resources.

With participation and decentralisation as two of the main ethos of the governance groundwater governance can be well understood under the parameters of CPR. Hence, formation of units at the grass root level in the country can facilitate the governance of groundwater. The existing three-tier i.e. Panchayati Raj system gives a framework as well as an opportunity to initiate this process. Sustainable groundwater management can be well based to include the essence of common property resource. The interaction between the resource and community on the lines of collective action and self-governance can be part of the home grown solutions for the India groundwater problem (Shah 2009). Though the community based management is the given option but it also requires scrutiny as the society is not unbiased. There are power structures existing in the system and this needs to be considered while formulating the policy.

New approaches and techniques for groundwater governance are being promoted across the country. There is a thrust on aquifer management for groundwater. Under this the basis of management of would be the aquifers and not the political or administrative boundaries (Kulkarni and Shankar 2009) However, it is important to note that it is a difficult solution and requires abundant resources as well as scientific

expertise. The viability of such options still needs to be examined. Hence, it is still a long way to go to manage the groundwater as commons and requires fundamental changes at the policy front where the present Model Bill fails to address the problems effectively.

The recent World Bank Report (2010) illustrates the example of community based groundwater management system. It further discusses the characteristics of CPR where collective action of the community is the key for groundwater governance. The report comments that the CPR design has to go beyond the present dimensions to address the challenges and complexities of groundwater as commons.

8. CONCLUSION

The paper has discussed in detail the problem of depleting groundwater resources in the country. The grim situation requires urgent and effective intervention by the state. However, the present Model Bill fails to deliver the desired results. The cases of Kerala, Maharashtra and Punjab have illustrated that the Model Bill needs fundamental change in order to effectively manage the groundwater resources across the country. The mere presence of the Bill cannot lead to groundwater governance. It requires various other factors such as effective legal regime, political will along with consideration of the interests of various stakeholders. In short, groundwater governance should entail the ethos of participation through community based management systems. However, such endeavours need to be supported by the state at various levels. Efforts need to be directed towards improving and upgrading the Model Groundwater Bill. The Public Doctrine Trust framework can be weaved in to the management of groundwater resources. Clear definitions of rights would satisfy the requirements of sustainability and equity along with institutional frameworks that give representation to all stakeholders (Vani 2009). The equity concerns instead of efficiency driven market approach needs to be at centre stage in debates of groundwater as commons. The complexity of groundwater governance needs to incorporate the principles of community management along with the changes in the policy structure.

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