Political ecology of groundwater: the contrasting case of water-abundant West Bengal and water-scarce Gujarat, India

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Abstract Three apparently disparate themes (groundwater, farmers and politics) interweave in this account of how groundwater-related policies in India have very little to do with the scarcity, depletion or quality of groundwater, and more to do with rural politics manifested, among other things, in terms of the presence or absence of farmer lobbies. Examples from two states of India, the water-abundant state of West Bengal and water-scarce state of Gujarat, were investigated using readily available data, analysis of the literature, interviews and fieldwork. In the case of West Bengal, although there is no pressing groundwater crisis, the government of West Bengal (GOWB) was able to successfully implement strict groundwater regulations along with a drastic increase in electricity tariff. More importantly, GOWB was able to implement these without any form of visible farmer protest, though these measures negatively affected farmer incomes. On the other hand, in Gujarat, where there is a real and grave groundwater crisis, the government of Gujarat has neither been able to implement strict groundwater regulations, nor has it been able to increase electricity tariff substantially. Thus, through the lens of 'political ecology' the contrasting case of these two Indian states is explained.

Résumé Trois thèmes apparemment disparates (l'eau souterraine, les fermiers et la politique) se rejoignent pour mieux comprendre á quel point les politiques indiennes sont peu concernées par la pénurie, l'exploitation et la qualité des eaux souterraines ; et le sont plus par la politique de développement rural manifestée entre autres choses, par la présence ou l'absence de lobbys fermiers. Des exemples de deux états indiens, l'état de Bengal Ouest, bien alimenté en eau, et l'état du Gujarat, ont été étudiés en utilisant des données disponibles, des études précédentes, des interviews et des enquêtes de terrain. Dans le cas du Bengal Ouest, bien qu'il n'y est pas de crises liées á la pression sur les eaux souterraines, le gouvernement (GoWB) a été capable d'instaurer une politique stricte en matière de régulation des eaux souterraines, en même temps qu'une augmentation importante des tarifs de l'électricité. Plus important, le GoWB a été capable d'instaurer ces changements sans aucune protestation visible des fermiers, bien que ces mesures affectent sérieusement leurs revenus. D'un autre côté, en Gujarat oùil y a un réel besoin et une grave crise relative á l'eau souterraine, le gouvernement n'a pas été capable d'instaurer une régulation stricte sur les eaux souterraines, tandis qu'il a augmenté sensiblement les tarifs de l'électricité. Dés lors, á la lumière d'une ≪politique écologique ≫, les deux cas contrastant de ces états indiens, a été expliqué.

Resumen Tres temas aparentemente dispares (agua subterránea, agricultores, y política) se entremezclan en esta situación de cómo las políticas relacionadas con el agua subterránea en India tienen muy poco que ver con la escasez, agotamiento o calidad de agua subterránea, y más que ver con política rural la cual se manifiesta, entre otras cosas, en términos de la presencia o ausencia de grupos a favor de la agricultura. Se investigaron ejemplos de dos estados de India, el estado abundante en agua de Bengala Occidental y el estado con escasez de agua de Gujarat utilizando datos de fácil disponibilidad, análisis de la literatura, entrevistas, y trabajo de campo. En el caso de Bengala Occidental, aunque no existe una crisis de presión sobre el agua subterránea, el gobierno de Bengala Occidental (GOWB) pudo implementar exitosamente regulaciones estrictas de agua subterránea junto con un incremento drástico en la tarifa de electricidad. Más importante aún, GOWB pudo implementar esta medidas sin que se registrara una forma visible de protesta de agricultores aunque estas medidas afectan negativamente los ingresos de los agricultores. Por otro lado, en Gujarat, donde existe una crisis grave y real de agua subterránea, el gobierno de Gujarat no ha estado dispuesto a implementar regulaciones estrictas de agua subterránea ni ha incrementado substancialmente la tarifa de electricidad. De esta manera se ha explicado el caso contrastante de estos dos estados de India a través de la lupa de la 'ecología política'.

Keywords Groundwater resources · Politics · Farmer lobby · Gujarat · West Bengal

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Introduction

This paper interweaves three apparently disparate themes of groundwater, farmers and politics into a story of how groundwater related policies in India have very little to do with the 'groundwater ecology' (defined here as scarcity, depletion, quality problems or the lack of them, as well as the role of groundwater in maintaining the function of ecosystems) and every thing to do with rural politics manifested, among other things, in terms of the presence or absence of farmer lobbies. This will be demonstrated with contrasting examples from two states of India, viz. the water abundant eastern state of West Bengal and the water scarce western state of Gujarat (Fig. 1). In the case of West Bengal, it will be seen that although there is no pressing groundwater crisis, the government of West Bengal (GOWB) was able to successfully implement strict groundwater regulations along with a drastic increase in electricity tariff. More importantly, GOWB was able to implement these without any form of visible farmer protest, though these measures negatively affected farmer incomes. On the other hand, in Gujarat, where there is real and grave groundwater crisis, the government of Gujarat (GOG) has neither been able to implement strict groundwater regulations, nor has it been able to increase the electricity tariff substantially. In fact, the issue of electricity tariff has seen widespread farmer protest all over the state and the GOG had to renege on its original plans. Thus, this paper, through the lens of 'political ecology' (defined later) will highlight the contrasting case of these two Indian states and seek an explanation in terms of politics of groundwater.

The paper is organized thus. The first section, based on principles of political ecology, will compare and contrast the groundwater situation in West Bengal and Gujarat along with brief note on the current political situation in the two states. In the second section, drawing on an example of a successful groundwater-regulation measure from West Bengal, viz. State Water Investigation Directorate (SWID) certificate, the paper will show that in the absence of farmers' lobby, indifferent bureaucracy and environmentally conscious middle class, a state can react to a 'non-existent' groundwater threat even to the detriment of farmer interest, especially the poor farmers who are hit hardest by any curtailment of access to groundwater. In the third section, citing an example of farmer protests in Gujarat after the GOG proposal of increasing electricity tariff, the paper will show that even when faced with a precarious groundwater situation, a strong farmers' lobby supported by politicians and bureaucrats can successfully resist any measure to curb their access to groundwater. However, it is not that all classes of farmers benefit equally; the rich farmers with direct access to groundwater in the form of deep tubewells benefit more than others. The fourth section will try to explain this contrast in terms of the politics of groundwater. The pertinent question that this section will try to answer is: "Why is it that farmers organize themselves in Gujarat and successfully glean concessions from the state vis-à-vis groundwater issues, while farmers in West Bengal do not?" Finally, the paper will conclude by noting that the politics of groundwater in India has given rise to a strange paradox—successful groundwater

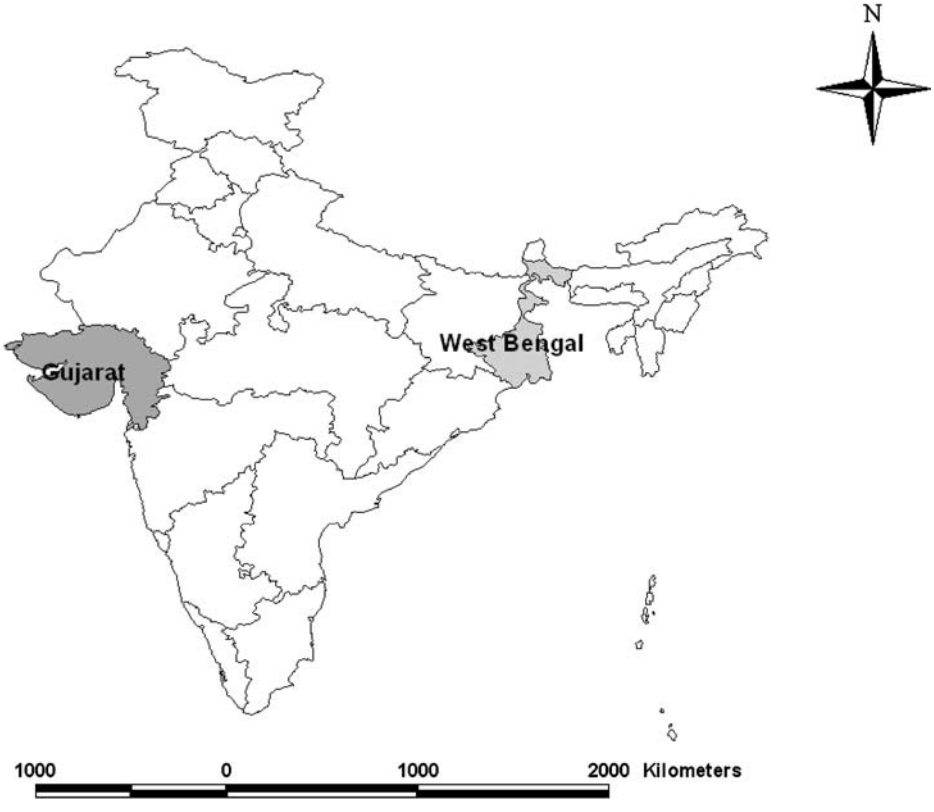

Fig. 1 Location of Indian states of Gujarat and West Bengal

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regulation where little is needed and a virtual free-for-all access to it where the resource condition is precarious.

Groundwater ecology and politics: comparative analysis of West Bengal and Gujarat

Political ecology, as a discipline, looks at, among other things, the political struggles over access to natural resources and how this struggle in turn is shaped by existing power relations among various actors. The origin of the term 'political ecology' is traced back to a paper by Wolf in 1972 that linked "human strategies to ecological success to cultural adaptation" (quoted in Walker 2005; p. 74). To begin with, this field drew inspiration from biological and earth sciences. However by the mid-1970s, through writings of Andre Gunder Frank (Frank 1969) and Wallerstein (1974) the focus had squarely shifted to the question of 'unequal power relations' in a globalized capitalistic economy and the way this affected human interactions with the physical environment. Blaike and Brookfield (1987) insightfully summed up political ecology as a discipline that ". . . combines the concerns of ecology and a broadly defined political economy. Together, this encompasses the constantly shifting dialectic between society and land-based resources and also within classes and groups within society itself" (p. 17).

Thus political ecology is concerned with power and the way unequal power relation among various actors affects their access to natural resources. This paper uses the framework of political ecology to understand how two states in India posed with entirely different hydrogeological regimes managed to arrive at entirely contradictory groundwater policies, viz. that of restriction in water abundant West Bengal and almost no effective policy and hence status quo as far as groundwater extraction is concerned in water scarce Gujarat. Of the various ways of conceptualization of power (see Mullins 2004; Bryant 1992, 1998 for further discussion), two are relevant in this context, viz. 'indirect discursive control through ideas' and 'control over access to resources'. The former is manifested in the state of West Bengal where through the use of mass media, the government has been able to influence public opinion especially that of the influential urban intelligentsia to the point that they believe that the state is faced with a precarious groundwater situation that needs immediate amelioration—while the reality, as will be seen shortly, is quite the contrary. On the other hand, quite another manifestation of power is seen in Gujarat, where the farmers who already have access to this dwindling resource are fighting hard to keep this control intact, and through successful negotiation in the political space, have been so far more or less able to do so, starting a race to the bottom of the aquifer that, although seemingly just begun, is now almost ended in many parts of North Gujarat where aquifers have been pumped dry. The following section compares groundwater ecology as well as political situation in West Bengal and Gujarat.

Groundwater ecology in West Bengal and Gujarat

With a population of about 82 million in 2001, West Bengal is the fourth most populous state in India. Accounting for about 2.7% of India's area, but about 7.8% of the country's population, this state ranks first in terms of density of population (904 persons per square km) as per the 2001 Census. Situated in the eastern part of the country, West Bengal's climate varies from humid to sub-humid with an average rainfall from 1,430–2,662 mm/year. On the other hand, Gujarat is the tenth most populous state in India with an estimated population of 50.6 million in 2001 and an average population density of 260 persons per square km. It has an area of 195,984 km^2 and lies in the western semi-arid region of India, and some 27% of the total area of the state is drought prone. Gujarat on average receives rainfall ranging from 573 mm/year in the Saurashtra and Kutch region to about 1,100 mm/year in the Gujarat plains. Table 1 and Table 2 show some of the salient demographic, economic and agricultural characteristics of the two states.

While the gross cultivated area in Gujarat is marginally higher than that of West Bengal, cropping intensity as well as irrigation intensity in the state of West Bengal is higher than that of Gujarat. This is because of the favourable agro-climatic condition in West Bengal. Gujarat on the other hand is predominantly groundwater dependent for its agriculture in that as much as 82% of the net irrigated area in the state is groundwater-irrigated. In West Bengal, the corresponding figure is around 59%. Thus, groundwater is the most important source of irrigation in both the states and surpasses surface water sources of irrigation. In the following paragraphs, the groundwater situation in these two states is discussed.

The Central Groundwater Board (CGWB) along with its various counterparts at the state level is entrusted with the task of estimating groundwater resources in the country. For doing so, the CGWB till recently followed what is known as the Groundwater Estimation Committee-1984 methodology (GEC-1984). Under this methodology, the scale of groundwater development of an assessment unit (these are administrative units, not hydrological units, which are also known as 'blocks' or *talukas* or *mandals*, and in India are an intermediate administrative unit between a village and a district) is calculated as the ratio of the gross groundwater draft to the total replenishable groundwater resource of that unit. However, recently the CGWB has changed its estimation methodology as per the recommendations of the Groundwater Estimation Committee-1997 (GEC-1997). Both these methods are explained in further detail in the next section. Here, suffice it to say that groundwater assessment units were classified into four categories (as per GEC-1984) 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%. As per GEC-1997, the categories stand modified and are now called 'safe', 'semi-critical' and 'critical'.

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Table 1 Some important demographic and economic indicators of Gujarat and West Bengal

Sl. No	Indicators	Unit/year	Gujarat	West Bengal
1	Total population	Millions/2001	50.60	80.22
2	Geographical area	Km^2/2001	195,984	88,752
3	Population density	Persons per km^2/ 2001	258	904
4	Per capita State domestic product ($)	$ per person/year/2000–2001	~US$ 380	~US$ 320
5	Percent of population below poverty line	Percentage/2002	24.21	35.66

Source: Serial numbers (Sl.) 1-3: Census of India 2001, Sl. No. 4: GOWB 2004, Sl. No. 6: Ministry of Consumer Affairs, Food and Public Distribution Department, Govt. of India, 2003. All data in this table, except Sl. No. 4, were downloaded from the website www.indiastat.com (Datanet 2005)

Table 2 Net cultivated area, net irrigated area and source-wise irrigated area in Gujarat and West Bengal

Source: Agricultural Census of India, Part 1 and 2, 2002, Ministry of Agriculture, Government of India. All data in this table were accessed from the website www.indiastat.com (Datanet 2005)

Sl. No	Indicators	Unit/year	Gujarat	West Bengal
1	Net cultivated area	1,000 ha/2000–2001	9,443	5,472
2	Gross cultivated area	1,000 ha/2000–2001	10,690	9,545
3	Cropping intensity (%)	Percentage/2000–2001	113	174
4	Net irrigated area (NIA)	1'000 ha/2000–2001	2,979	2,354
5	Gross irrigated area	1'000 ha/2000–2001	3,626	3,521
6	Irrigation intensity (%)	Percentage/2000–2001	122	150
7	Of NIA, percentage area irrigated by groundwater	Percentage/2000–2001	82.3	59.3

The latest estimation of groundwater resources in the state of West Bengal (WIDD 2004) shows that the state as a whole has 27.4 km^3 of replenishable groundwater of which some 11.3 km^3 is used annually. The stage of groundwater development, measured as the percentage of the total replenishable groundwater resources to gross the groundwater draft, in the state varies from as high as 84.6% in the Nadia district to as low as 5% in the Jalpaiguri district, the average for the state being 41.3%. Thus, none of the 17 districts fall in the category of over-exploited. On the other hand, the total replenishable groundwater resource of the state of Gujarat was estimated at 17.3 km^3 of which 10.2 km^3 was withdrawn annually (CGWB, 1995). Table 3 shows the estimated groundwater resources of Gujarat and West Bengal.

At the state level, the scale of groundwater development is higher in Gujarat than West Bengal. At a lower administrative level, viz. blocks, as they are called in West Bengal, and talukas as they called in Gujarat, the comparison between the two states vis-à-vis their groundwater status provides a starker picture. Table 4 shows that the number of over-exploited blocks has increased from 1 to 31 in Gujarat within 13 years, and in West Bengal there are no over-exploited blocks even in 2002–2003. In fact, in West Bengal, the number of white (now called safe blocks) has increased since 2001, while that of grey and dark blocks (roughly equivalent of semi-critical and critical) have declined.

Besides the block-level comparison of the number of dark and over-exploited blocks in the two states, another meaningful comparison is that of decline in the water level measured across various observation wells in the state. Table 5 shows that as many as 71% of the observation wells in Gujarat recorded a decline in water level during the period of May 2000 to May 2003. Of the wells that showed a declining trend, as many as 34% recorded a water level decline of more that 4 m. The corresponding figures for West Bengal are 45% and 14%, respectively. However, while interpreting these figures, it has to be kept in mind that these relate to the pre-monsoon period. Monsoon rainfall accounts for the bulk of recharge and in this way, post-monsoon water levels recover in most aquifers, the extent of recovery depending on the amount of rainfall and the nature of the aquifer. In a region like West Bengal, characterized by ample rainfall (above 1,400 mm on average) and an alluvial aquifer, rainfall recharge is very high, which means that if the post-monsoon trends in the water level are considered, then the decline in water levels will be far less significant in West Bengal than in semi-arid Gujarat. That the groundwater condition is more precarious in Gujarat than in West Bengal is supported by another set of data that says that all the 19 districts in Gujarat recorded more than a 4-m fall in the

Table 3 Estimated groundwater resources of Gujarat and West Bengal

Sl. No	States	Total replenishable groundwater resources (cubic km/year)	Utilizable groundwater resource for irrigation in net terms (cubic km/year)	Net draft (cubic km/year)	Degree of groundwater development (%)
1	Gujarat	17.3	15.6	10.2	58.96
2	West Bengal	27.4	17.7	11.3	41.30

Source: Annual Report 2002–2003, Ministry of Water Resources, Government of India. All data in this table were downloaded from the website www.indiastat.com (Datanet 2005)

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Table 4 Status of groundwater development in different blocks in Gujarat and West Bengal

State/year	Gujarat			West Bengal		
	1984	1991	1997	1993	2001	2002–2003[a]
White	162	121	95	256	191	205 (safe)
Grey	13	26	43	34	38	27 (semi-critical)
Dark	6	10	8	1	62	59 (critical)
Over-exploited	1	24	31	0	0	0
Saline	1	2	7	0	0	0
Total	183	183	184	291	291	291

Source: For Gujarat, Hirway 2000 p. 3113; For West Bengal, WIDD (2004)

[a]This refers to the revised groundwater estimation for the state of West Bengal calculated using the new GEC-1997 methodology, while all the other figures were derived using GEC-1984 methodology

Table 5 Number of observation wells showing decline in water level and their percentage, May 2000–May 2003

State	No. of observation wells	No. of observation wells/percentage showing decline						Percentage of observation wells showing decline
		Decline 0–2 m		Decline 2–4 m		Decline >4 m		
Gujarat	618	203	32.85%	86	13.92%	148	23.95%	70.7
West Bengal	377	120	31.83%	25	6.63%	25	6.63%	45.1

Source: Rajya Sabha, question number 2227, dated 24th August 2004. All data in this table were accessed from the website www.indiastat.com (Datanet 2005)

Table 6 Total number of pumpsets (electric and diesel) and pump capacity per hectare of net irrigated area

Sl. No	Indicators	Unit/year	Gujarat	West Bengal
1	Number of diesel pumps	1,000 numbers/1997–1998	73	77
2	Number of electric pumps	1,000 numbers/1997–1998	65	9
3	Total number of pumps	1,000 numbers/1997–1998	138	86
4	Average capacity per pump set	Horse power per pump/1999	7.42	4.21
5	Total pumping capacity	1,000 Horse power (HP)	1,024	362
6	Net irrigated area (NIA)	1,000 ha/2000–2001	2,979	2,354
7	Pump capacity per hectare of NIA	HP/100 ha of NIA	34.4	15.4
8	Pump density	No. of pumps/1,000 ha of NCA	46.3	36.5

Source: Serial numbers (Sl.) 1–3: NSSO 54th round, 1997-1998 (NSSO 1999), Sl. No. 4: Central Electricity Authority, Government of India, Sl. No. 6: Agricultural Census of India 2003, Ministry of Agriculture, GOI, Sl. Nos. 5, 7 and 8: calculations by the author. Figures for serial numbers 4 and 6 were downloaded from website www.indiastat.com (Datanet 2005)

water level during the pre-monsoon period of 1982–2001; the corresponding figure for West Bengal was 7 districts out of 17 (Rajya Sabha[1] question No. 93, dated 18.2.2003, accessed from website www.indiastat.com, Datanet 2005).

Similarly, the size and the nature of the groundwater economy also differ in the two states. While Gujarat had 1.38 million pump sets in 1997–1998, of which around 50% were electric pumps, West Bengal had 0.86 million, overwhelmingly diesel pump sets. The average pump capacity (horse power) is higher in Gujarat than in West Bengal because in the former, water has to be pumped from a much deeper level than the latter. Therefore, both the pump capacity per net irrigated area as well as pump density is higher in Gujarat than in West Bengal as Table 6 shows.

Thus, from the forgoing section, it becomes amply clear that while the groundwater situation in Gujarat, especially in North Gujarat is alarming, that of West Bengal is far from being so, indeed new data based on revised methodology show that the groundwater situation is much better than was hitherto thought. In fact, in West Bengal, it is very often the case that even after withdrawal rates of more than 95% over a sustained period of time (a decade or longer), no long-term decline in the water table has occurred in 10 out of 17 districts. This is because of plentiful rainfall-induced recharge, owing to the nature of the alluvial aquifer and the fact that the state overlies one of the most prolific of all aquifers in the world, viz. the Ganga-Meghna-Brahmaputra (GMB) river aquifer system.

Political situation in West Bengal and Gujarat

Like the groundwater situation, the political situations in the two states are equally, if not more, diverse. The state of West Bengal has the distinction of having voted to power the longest running communist government anywhere in

[1] Rajya Sabha is the upper house of the Indian Parliament. The fact that a question regarding the groundwater situation in the country was asked in the Parliament points to the interest the politicians take in groundwater issues.

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the world. The Left Front (comprised of the Communist Party of India (Marxist), referred to as CPI(M) from now onwards, and its various left allies) have ruled the state since 1978 and have won six consecutive general elections since then, a feat unequalled by any other provincial government in India. This government is also credited with implementing one of the most successful land reform programs in India and is generally thought to be pro-poor (Leiten 1990, 1992 and 2003; GOWB 2004). This is again the only state in India to have held regular and uninterrupted election down to the lowest tier of Indian democratic structure, viz. the *panchayats* (village council) and has seen remarkable degree of devolution of power to the villages (Webster 1992; Mukarji and Bandopadhyay 1993; Ghatak and Ghatak 2002). However, in spite of its pro-rural, pro-poor stance, very few leaders of the CPI(M) have emerged from amongst the farming community, and it is still dominated by urban and educated intelligentsia—the so called '*bhadralok*' or the gentlefolk (Ruud 2003). Second, West Bengal is one of the few states in India that does not have a separate political organization for either the farmers (who cultivate their own land or leased land) or the agricultural labourers (who work on land owned by others). Instead, both of these classes, with antagonistic class interests, are represented by a single peasant body called the '*Krishak Sabha*' (KS farmers' union) and this forum, as will be seen later, is co-opted by the ruling party and as such rendered ineffective in voicing the concerns of either class. Thus, while the states' record in terms of land reforms and decentralization of power is commendable, West Bengal lags behind many other Indian states in terms of poverty alleviation (see Table 1), rural literacy, health care, infrastructure and most importantly industrial development, of which Gujarat, along with the state of Maharashtra, are front runners in India (Ghatak and Ghatak 2002).

In contrast to the communist government in West Bengal, Gujarat is governed by the rightist Bharatiya Janata Party (BJP), which the western press often calls the 'Hindu Nationalist' party. Unlike West Bengal, where CPI(M) and its allies have faced almost no political opposition from any other political party for the last two and half decades, the BJP had to contend with opposition from the Congress party—the main opposition party. Gujarat undertook no formidable land reforms and panchayats exist only on paper, yet agrarian politics in the form of a farmer lobby has been a dominant factor in the state's power struggles. The Bharatiya Kisan Sangh (BKS), the radical peasant wing of the BJP has always been active in the state. The 'Patel' farmers (the dominant farming caste in the state) and farmer voices have provided leadership to the BKS, as will be seen later, and have played a decisive role in state politics and, therefore, groundwater policies. However, the point to be noted here is that the farmer lobby is mostly the lobby of large landholding farmers and they do not necessarily voice the concerns of the small and marginal farmers or the sharecroppers and agricultural labourers.

In this section, the contrasting groundwater ecologies as well as the very different political milieu in the two Indian states of West Bengal and Gujarat were documented. In the next two sections, citing specific examples from West Bengal and Gujarat, it will be seen how the prevalent political situation in the state has moulded groundwater policies, even though the policies are highly unsuitable and even regressive for the states in question.

State, groundwater departments and farmers: the case of West Bengal

As mentioned earlier, the GOWB has successfully implemented a groundwater regulation known as the SWID certificate. This measure was introduced in 1993 on the basis of concerns raised about depletion of groundwater resources in the state. The factual basis of the SWID regulation was the groundwater estimation done by the CGWB using a methodology (GEC-1984) which later was thought to be flawed. Thus, based on data whose veracity itself was questionable, the GOWB devised rather draconian rules whereby farmer access to groundwater was curtailed through restrictions on electricity supply. The section is divided into two subsections, the first looks into the old and new CGWB methodology of estimation of groundwater in India, and the second traces the genesis and effect of the SWID certificate in West Bengal.

Groundwater estimation: changed methods, new results

Though attempts at estimating the total groundwater availability in India first started way back in 1949, it was not until 1979 that a high-level committee known as the Groundwater Over-Exploitation Committee[2] deliberated upon scientific ways of calculating India's groundwater resources. Later, another committee known as the Groundwater Estimation Committee finalized the methodology used for estimating groundwater resources and this came to be known as the GEC-1984 methodology. This method was used for the first-ever district-level estimation of groundwater and the results were published in 1995 (CGWB, 1995). According to GEC-1984, calculating utilizable groundwater reserves involved two components: annual groundwater recharge,[3] and annual groundwater draft.[4] The blocks were then categorized into four classes depending on the scale of groundwater development, viz. white, grey, dark or over-exploited,

[2] This name was quite a misnomer because at that time the major problem facing policy makers in almost all parts of India was to coax farmers to use groundwater and reap the benefits of a "green revolution". Groundwater over-exploitation was not a problem yet. But then, there is confusion regarding definition of 'over-exploitation' (see Custodio 2000) not only in India, but also elsewhere.

[3] Annual groundwater recharge in turn included several components such as recharge from rainfall, canal seepage and return irrigation flow, seepage from tanks and also the potential recharge from waterlogged and flood prone areas.

[4] Annual groundwater draft is calculated by multiplying the average discharge of groundwater structures with the number of working hours in a year.

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Table 7 Criteria for classification of groundwater assessment units as per GEC-1984 and GEC-1997

GEC- 1984 methodology				
Categories	Level of groundwater development (%)			
White	≤65%			
Grey	>65% but ≤85%			
Dark	>85% but ≤100%			
Overexploited	>100%			
GEC- 1997 methodology				
Categories	Level of groundwater development (%)	Falling trend in groundwater levels (pre-monsoon period)	Falling trend in groundwater levels (post-monsoon period)	Comments
Safe	≤70%	Yes	No	Falling trend in only one period- either pre or post monsoon
	>70% but ≤90%	No	No	No falling trend in either pre or post monsoon
Semi-critical	>70% but ≤90%	Yes	No	Falling trend in either pre- or post-monsoon
Critical	>90% but ≤100%	Yes	Yes	Falling trend in both pre- or post-monsoon periods
	>100%	Yes	No	Falling trend in either pre- or post-monsoon

Source: CGWB 1995 and 1998

which in turn was calculated as follows:

$$\text{Level of groundwater development} = \frac{\text{Net yearly draft (million ha m/year)}}{\text{Utilizable resource for irrigation (m ha m/year)}} \times 100$$

However, after a decade or so, the GEC-1984 norms were felt to be inadequate and another committee was set up which recommended the modified GEC-1997 methodology. This differed from the GEC-1984 methodology in several aspects, the most important of which was the explicit inclusion of water table trends for calculating the groundwater status of an assessment unit,[5] which then were divided into safe, critical and semi-critical categories. Table 7 shows the categorization of blocks according to the GEC 1984 and 1997 methodology.

As a result of this change in methodology, the groundwater status of many blocks in West Bengal changed. There were 47 blocks that changed from white under GEC-1984, to semi-critical or critical in GEC-1997, and another 61 blocks that changed from grey/dark to the safe status. Finally, the third group of blocks (181) more or less maintained status quo. Of much concern to the present paper is the second category of 61 blocks, where farmers for the last 11 years had to queue up for SWID certificates when none were needed—all because the groundwater department used a method that was later judged by them to be inaccurate.

SWID certificate: its genesis, clauses and consequences

Based on GEC-1984 methodology and 1st Minor Irrigation Census data (GOI, 1986), SWID calculated the block-level groundwater resources in the state. This report published in 1993 categorized only one block as dark, while 34 blocks came under the grey category. However, the number of dark blocks had increased from 1 to 62 by the time new groundwater estimates were made in 2001 using the old GEC-1984 methodology. The main cause for such change was the increase in summer rice cultivation—which incidentally propelled the state to very high levels of agricultural growth rates, surpassing even that of agriculturally developed states of Punjab and Haryana (Saha and Swaminathan 1994; Rawal and Swaminathan 1998). Water levels during the summer season declined in many places necessitating the use of submersible pumps instead of centrifugal pumps. However, in most places, water levels recuperated during the post-monsoon season. In addition, even in the pre-monsoon period, in very few locations did the water table decline below 15 m (50 feet) and as such,

[5] Water table trend was calculated as a linear equation where the *b* coefficient of the equation shows whether the groundwater has a falling trend (if the value of *b* is positive) or a rising trend (if *b* value is negative). For purposes of calculation, the water table trend was assumed to be rising if the value of *Z* (coefficient *b* multiplied by 100 to give the depth of the groundwater table below the ground level in cm) is less that –5 cm/year; it was assumed to be falling if *Z* is greater than +5 cm/year or neither falling nor rising if *Z* is between –5 and +5 cm/year.

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this was not alarming given that in other parts of India such as Gujarat, farmers extract groundwater from over 60 m (200 feet) and below and yet sustain a thriving agriculture. Thus, there was no real cause of concern, yet the GOWB decided to take a conservationist stand and adopted an indirect control over the installation of submersible pumps through the mechanism of SWID certificate.

In April 1993, the West Bengal State Electricity Board (WBSEB) was directed to issue new electricity connection to submersible pumps only after SWID clearance. This restrictive measure was applicable to seven districts in the state which also happened to be the most dependent on groundwater for its irrigation. The official process for obtaining SWID certificate is documented below.

First, an application has to be made in a given SWID format, then signed by the *Gram Panchayat* (GP) *Pradhan*[6] (Gram Panchayat means village council, Pradhan means village council head) and submitted to the local SWID office. Effective from 2003, the farmers also have to pay an application fee of Rs 500 (US$ 10). The local SWID office makes the decision to grant permission when the block in question is a white block or downright reject it in the case of a dark block, while in the case of a grey block, it forwards the application to Kolkata (formerly called Calcutta-the capital city of the state of West Bengal) SWID office. SWID, in consultation with the CGWB, either grants permission or rejects it. Once the permission is granted, the farmer can apply to the WBSEB for electricity connection. Table 8 shows the status of issue of SWID certificates in one district called Hugli in West Bengal till 2004.

The table shows that of the total applications received, only 54% were sanctioned by September 2004, while 40.2% of the applications were rejected. Note that a large number of applications (30%) were also rejected in the so-called white blocks. The SWID records do not show why a certain application was rejected and as such there is no way to conjecture whether or not the applications rejected in the white areas were legitimately done. In view of this, a small number of applicants had approached the High Court and in Hugli district alone some 42 cases were resolved through court intervention and another 32 are still sub judice. However, not many farmers can approach the court because of prohibitory high costs in terms of money and time.

To make the matters worse for the farmers, the procedure of granting a SWID certificate is an intensely political process; this is micro-politics played out at the village level. The way the procedure for the procurement of a SWID certificate was designed necessitated the involvement of the Gram Panchayat (GP) which in West Bengal comprises of 10–12 villages (population of 12,000–15,000). Each village elects a representative[7] to the GP and the head (pradhan) is elected from amongst them. The entire process is intensely political and elections are hard fought under political party banners. The ruling coalition of the Left Front controls some 66% of the GPs in West Bengal. In the course of fieldwork, the author came upon instances when the GP head (pradhan) had refused to forward an application either because the applicant did not belong to his political party or because it harms the interests of his party supporters. Similarly, the villages which sent the most influential leader to the GP got a disproportionately higher number of SWID certificates issued as compared to other villages. In one village in Bardhaman district, some 20 submersibles came up within a span of 5 years (1993–1998) when the GP member of that village happened to be the GP head (pradhan). Even an influential member of the party structure, e.g. a member of CPI (M) local committee was able to get 12 co-operative submersibles sanctioned in his village in a grey block in 1996. Thus, in the highly politicized rural Bengal, the farmer who does not support the right party is very often denied access to groundwater. This discrimination on political lines is not exclusive to access to groundwater; it is quite evident as far as any developmental expenditure in the village is concerned. The author has financial statements of one panchayat in the North 24 Parganas district to show that relatively smaller funds were allocated for developmental activities in a village that elected an opposition candidate to the GP. Similar evidence has been found by other scholars in recent times (Webster 1999).

The necessity of the SWID certificate and the fact that all costs pertaining to electrification of wells and tubewells have now to be borne by the farmers, has had serious implications in terms of the pace in the growth of the number of electric pumps in the state. Figure 2 shows the number of electric pumps in the state from 1978 to 2004 (cumulative), while Fig. 3 shows the number of new connections (incremental) given from 1979 to 2004.

Figures 2 and 3 show that the largest increase in the number of pumps took place during the 10 years of 1983–1993. This period also coincided with the remarkable increase in the state's agricultural growth (Rogaly et al. 1999; Saha and Swaminathan 1994; Rawal and Swaminathan 1998). From 1993 onwards, there has been a distinct slump in the number of new electricity connections. The effect of these strictures have prevented the latecomers (who are most likely to be poorer farmers) from sinking tubewells. Unable to procure an electricity connection, more and more farmers have invested in diesel pumps. West Bengal is one of the few states in India that depends overwhelmingly on diesel pumps. While there are only 0.11 million electric pumps, the number of diesel pumps is around 0.8 million (NSSO, 1999). With increasing diesel costs, net agricultural returns for those dependent of diesel pumps has fallen sharply as Table 9, which is based on data collected from 12 villages across North 24 Parganas, Nadia and Murshidabad districts shows.

As seen in Table 9, the net return from paddy, especially summer *boro* paddy, is very low for those farmers using diesel pumps. In addition, crop prices have remained stagnant over the last few years bringing profits further down. In West Bengal, the rice crop is the main food crop. Of the around 9 million ha gross of cultivated area in the state,

[6] The *pradhan* certifies that the applicant is a bonafide resident of the village, that he owns land with a clear title deed in the village and that he has cleared all dues to the government and finally there are no submersible pump sets within 600 m from his proposed site.

[7] In the case of a very small village, there might be no representative and for large villages there might be more than one.

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Table 8 Status of SWID applications in various blocks of Hugli district as of 30th September 2004

Block name	No. of applications received	No. of certificates issued	No. of certificates pending	No. of certificates rejected	Groundwater status as per GEC-1984	Groundwater status as per GEC-1997
Gogaht-I	1,458	594	107	757	Grey	Semi-critical (NC) safe (C)
Goghat-II	1,321	436	304	581	Grey	Critical (NC) safe (C)
Balagarh	173	113	6	54	Grey	Safe
Arambagh	1,198	494	0	704	Dark	Critical
Pursurah	1	0	0	1	Dark	Semi-critical
Khanakul-I	521	192	2	327	Dark	Safe
Khanakul-II	16	14	2	0	White	Critical
Tarakeshwar	169	121	6	42	White	Safe
Dhaniakhali	758	520	17	221	White	Safe
Haripal	903	637	9	257	White	Critical
Singur	523	404	7	112	White	Semi-critical (NC) safe (C)
Jangipara	845	504	41	300	White	Critical
Chanditala-I	277	201	3	73	White	Safe
Chanditala-II	15	13	0	2	White	Safe
Sreerampur	2	2	0	0	White	Safe
Chinsurah	13	9	1	3	White	Critical (NC) Critical (C)
Polba Dadpur	1,345	827	25	493	White	Safe
Pandua	584	412	27	145	White	Critical
Total	10,122	5,493	557	4,072	NA	NA

Source: Unpublished SWID records; *NC* Non-canal command area, *C* Canal command area, *NA* not applicable

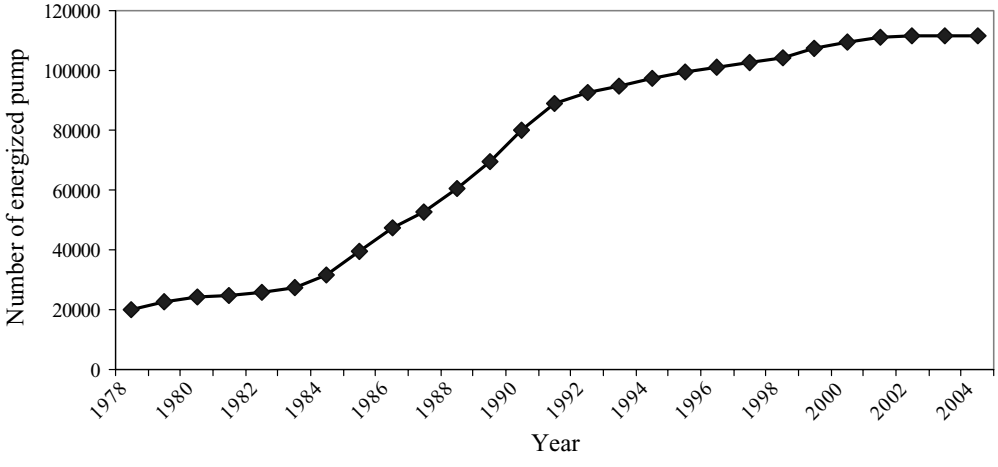

Fig. 2 Pace of progress in electrification of pumps in rural West Bengal (cumulative), 1978–2004

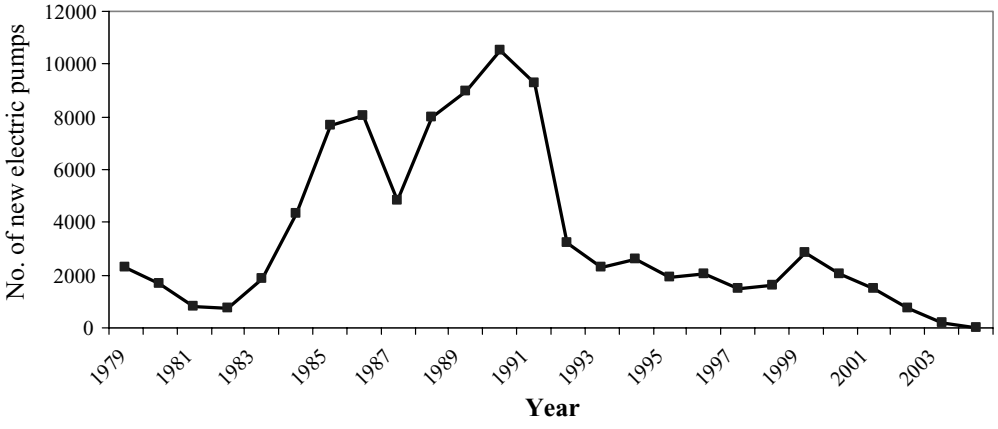

Fig. 3 Number of incremental (new) electric pump connections given by WBSEB in rural West Bengal, 1979–2004

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Table 9 Economics of paddy cultivation in selected villages in West Bengal

Pump type	Crop[a]	Sample size	Average production (Q/ha)	Gross returns ($/ha)	Cost of cultivation ($/ha)					Net return ($/ha)
					Irrigation	Fertilizer	Labour	Others	Total	
Electric	Boro	66	52.3	560.2	65.9	65.4	137.9	61.2	330.4	229.8
Diesel	Boro	28	54.7	601.5	307.4	55.6	143.6	67.0	573.6	27.9
Electric	Aman	65	39.2	391.5	25.4	42.8	124.4	48.3	240.9	150.6
Diesel	Aman	45	44.8	447.8	116.7	51.5	130.8	51.8	350.8	97.0

Source: Author's fieldwork, September to December 2004

[a] Aman and boro are two types of paddy (rice) crops grown in the monsoon and summer season respectively

6.3 million ha is given to cereal crops. Of this 6.3 million, 5.8 million ha or 92% of the area is under rice cultivation. Unlike many of the developed countries such as Spain, where groundwater is used to cultivate high-value crops like tomatoes, or grapes, in India and more so in West Bengal, summer rice remains the most important groundwater irrigated crop. Therefore, high irrigation costs hurt these, overwhelmingly rice-growing farmers. Thus, after the initial growth in agricultural production in the mid 1980s and early 1990s, there has been stagnation (Rogaly et al. 1999), which, as this evidence shows, was mostly brought about by indifferent public policies.

Groundwater, government and farmers' lobby in Gujarat

In stark contrast to the preceding example of groundwater regulation in West Bengal, stands the case of Gujarat. In this section, citing two examples, one of the stance of the GOG against CGWB's caution regarding the groundwater situation in the state and the other concerning the widespread farmer protest in the face of a proposal to increase the electricity tariff, GOG's political compulsions and its response will be discussed.

In the face of a severe groundwater crisis, the state of Gujarat strongly opposed the CGWB's suggestion that groundwater extraction be banned in blocks facing over-exploitation. In fact, the Water Resources Secretary, GOG, Mr. MS Patel was reported to have said that "The CGWB or any other Central agency has no business interfering in a State subject (groundwater utilisation). Instead of giving us unsolicited advice, the CGWB should provide us financial and technical assistance to help Gujarat implement its proposed groundwater recharge schemes in different districts" (Indian Express, May 17, 2000, http://www.expressindia.com/). Similarly, the Chairman of Gujarat Water Resource Development Corporation (a counterpart of SWID in Gujarat) had reportedly sent a letter to the then Chairman of CGWB stating that "without providing an alternative surface water supply and without implementing surface-water recharge projects, the government cannot prevent farmers from extracting groundwater which is their only water source" (Indian Express, May 17, 2000). Thus, even in view of really precarious groundwater conditions, the GOG maintained a pro-farmer stand as opposed to GOWB, which proceeded on the basis of erroneous data to curtail farmer access to this precious resource.

The second example is of a farmer movement vis-à-vis electricity pricing for groundwater irrigation. An instance of the strength of farmers' lobby in Gujarat is well exemplified in the recent agitation of the farmers against the proposal to raise the electricity tariff in the state. In June 2003, the GOG had announced a hike in the electricity tariff for agriculture from the then existing rates of Rs 500/HP (US$ 10/HP) to Rs 1,260/HP (US$ 25.2/HP). Immediately, hundreds of thousands of farmers under the leadership of Bharatiya Kisan Sangh (BKS)—the farmer wing of BJP—

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had assembled in the capital city of Gandhinagar to protest against the cost hike. They also protested against the Gujarat Electricity Board's (GEB) proposal to install meters for farm pumpsets; so far like in most states of India, agricultural use of electricity is un-metered and a fixed amount per annum irrespective of quantum of use is charged. With the BKS agitation gaining support, the government reduced the tariff to Rs 900/HP (US$ 18/HP) in October 2003. After hectic negotiations and high political drama that threatened to dislodge the current Chief Minister from power, the BKS and the GOG arrived at a compromise and electricity tariff was reduced from proposed Rs 900/HP to Rs 850/HP. However, this was seen as a defeat of the BKS and immediately after, thousands of farmers de-affiliated themselves from the BKS and joined another peasant party, the Congress backed Khedut Sangarsh Samiti (KSS). The net effect of farmer unrest was that against a proposed hike to Rs 1,260/HP (US$ 25.2/HP), the actual hike was Rs 850/HP (US$ 17/HP). However, in West Bengal, electricity tariff is still higher at Rs 1,200/HP (US$ 24/HP) and so far there has been no protest whatsoever. This instance given above is not the only example of farmer protest and its consequent effect on groundwater policy in the state. Shah (1993) documents another such movement which took place in 1986–1987. The demand was to replace the then existing metered electricity tariff with a flat-rate tariff. Spearheading the movement were large resourceful farmer leaders who demanded that like other states, Gujarat should also shift to a very low flat-rate tariff. Instead, the government of Gujarat revised its tariff in such a way that the flat-rate electricity tariff for those owning higher capacity pumps (10 HP and above) worked out to be even higher than the metered tariff that they were already paying, while on the other hand, the electricity tariff to be paid for pumps with less than 10 HP came down drastically. However, this hurt the interest of the big landholders (who also happened to be influential peasant leaders) because they generally owned large capacity pumps. Hence, agitation continued. Unfortunately, that very year (1987), Gujarat was hit by drought and the government had to relent to farmer demand and the electricity tariff was fixed at Rs 500/HP/year (US$ 10/HP/year) for pumps above 10 HP categories. This tariff, as was seen earlier remained fixed from 1987 till present. It was only in 2003 that attempts were made to revise this tariff and these attempts were partially rebuffed by farmers lobbies.

However, the pertinent question is: Does the agitation by the farmer lobby help all the farmers equally? The answer is unequivocally, no. The benefits of unrestricted access to pump groundwater is disproportionately appropriated by the large-scale landholding farmers who have the capital to drill deeper, while the poorer farmers are thrown out of the race and come to depend on these big tubewell owners for their livelihood. This has been well documented in the work of Bhatia (1992) and Dubash (2002). True, wealth generated from groundwater irrigation has helped in the social transition of a large number of farming families, but this trend has been limited to the large- and medium-scale landholding farmers. More recently, Prakash (2005) has shown that poor and marginal farmers in the groundwater-scarce villages of North Gujarat, are increasingly becoming sharecroppers, the terms of which are overwhelmingly in favour of the landlord, who also happens to be the owner of the water. However, in isolated cases (Shaheen and Shiyani, 2005), it was seen that through the emergence of co-operative ownership of tubewells, the small and marginal farmers were able to share the benefit of water access. Yet, the fact remains that if groundwater extraction in Gujarat continues at the current pace, then very soon, aquifers in North Gujarat will dry up, leaving the poor and marginal extremely vulnerable, while the richer farmers would then move to greener pastures elsewhere—i.e. via migration or socio-economic transition to non-farm occupations.

Political ecology of groundwater in India: all politics and no ecology

Thus far, this paper has argued that in West Bengal, with ample groundwater resources and low levels of resource development, the state government has assumed a strong regulatory posture. This has successfully slowed down the pace of resource development on the one hand and reduced farmer income on the other—and yet the farmers there have failed to put up effective resistance. In contrast, in Gujarat, where strict regulation is needed because the resource is extensively over-developed, the politicians as well as bureaucrats are steeped in a resource development mode and the farmers too offer strong resistance to any attempts to curb their access to groundwater. This throws up the question, viz. "Why do farmers organize around groundwater issues in Gujarat and not West Bengal?" This section tries to answer this question. There are a possible three sets of explanatory factors including:

1. Contextual (pertaining to specific context of the two states)
2. Perception of the urban intelligentsia, bureaucracy and politicians vis-à-vis groundwater issues
3. The organizational and ideological imperatives of the main farmer organizations in these states, viz. Krishak Sabha (KS) in West Bengal and Bharatiya Kisan Sabha (BKS) in Gujarat

Of the contextual issues, the first is the degree of dependence on groundwater for farming activities. In many parts of Gujarat, the dependence on groundwater is much more critical than in West Bengal. For example, in North Gujarat, agriculture would shrink drastically if use of groundwater was curtailed, while in West Bengal, regulation impedes further growth in agriculture; though due to abundant rainfall, farmers can still revert to rain-fed farming. So, it may be asserted that farmers in Gujarat are more likely to organize and agitate on groundwater issues than farmers in West Bengal. To add force to this argument is the fact that the number of large- and medium-scale landholding farmers (also called 'bullock capitalists' by Rudolph and Rudolph 1987) who spearhead the 'new agrarian movements' are

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in majority in Gujarat but comprise only 2.1% of the total farmers in West Bengal. However, this explanation in itself is not entirely satisfactory. In reverting to rain-fed farming, as many Bengali farmers have already done due to lack of electricity connection and high diesel costs, farm incomes plummet drastically and this indeed gives rise to immense dissatisfaction among the farmers, as this author had the opportunity to experience during fieldwork in the state. However, this unrest among the farmers does not find expression in the form of farmers movements because of the lack of support from the only farmer organization in the state—the KS. This will be elaborated on later. The second contextual reason is that of path dependency—i.e. the farmers in Gujarat have a long tradition of groundwater irrigation as compared to that of Bengal farmers. In Gujarat, 70–80% of irrigated areas were served by wells and pumps at the start of the twentieth century (Dr Tushaar Shah, International Water Management Institute, India, 2005, personal communication). In West Bengal, groundwater irrigation has become important only during the past 20 years. So around 1990, when discussion about the environmental threat of groundwater over-exploitation began in a serious way, Gujarat already had an over-developed groundwater economy while West Bengal was still at the early stages of groundwater development. People in Gujarat were long accustomed to groundwater irrigation; it was far more difficult to wean them away from it, while it was much easier to apply the 'precautionary regulation principle' in West Bengal and since this works, it might as well be justified. However, this explanation too is unsatisfactory because irrespective of when groundwater irrigation started, the farmers who become used to groundwater irrigation find it difficult to do without as indeed is the case in West Bengal. However, the fact that voices of dissent are scarcely heard does not mean that there is no dissent; it merely means that these voices do not find expression due to lack of support from the farmer organization in the state—i.e. the KS. The third contextual reason could be the global notoriety generated by the arsenic problem which, whether justified or not, has also caused panic amongst West Bengal politicians and bureaucrats. However, the SWID certificate is not just limited to arsenic affected areas, but also extends to all seven districts where the officials believe (though data belies) that groundwater over-exploitation takes place. Thus, none of the three specific reasons outlined in this paragraph are adequate to explain the lack of a farmer movement in West Bengal around groundwater issues.

The second factor that might partly explain this anomaly is the perception of the urban intelligentsia, politicians and bureaucrats regarding groundwater issues. In West Bengal, environmentally conscious urban middle class very often hear and read the inaccurate accounts of dwindling groundwater resources and arsenic contamination and are not aware of the beneficial impacts of groundwater use. Thus they tend to form a negative perception about groundwater use and hence have little sympathy for the farmers. Under such a situation of tacit support from the urban intelligentsia and no visible and active opposition from the peasant community, the GOWB was able to undertake and implement one of the most effective groundwater regulations in India. This is also precisely the reason why caste-based politics has never found favour in West Bengal, while in most other states, including Gujarat, caste lobbies are quite common. Indeed, in Gujarat, the 'Patel' (predominantly farmers) lobby is a force to reckon with. In West Bengal, "... the overall dominance of modes of culture and thought of urban intelligentsia... (Chatterjee, 1997, p. 82)" have prevented both caste-based affiliations as well as sympathy for the newly emerged capitalist farmer who depends on markets for survival. The overall 'left leaning' urban intelligentsia still rejoices in the 'land to the tiller' slogan little realizing that rural realities have changed since the decade of the 1970s and that now all farmers, be it a sharecropper or a one-acre farmer or a large-scale landholding farmer, are inextricably linked to the market, and that input cost (including that of groundwater) and output prices are their major concerns.

The nature and the political ideology of the state also matters. For example, the socialist-communist ideology of the GOWB has moulded its attitude towards groundwater use. After the independence of India in 1947, land distribution in the state of West Bengal was one of the most inequitable in the country. This was the legacy of a particular form of exploitative land tenure system (called the *zamindari* system) legalized by the colonial British rulers with the aim of maximizing their revenue. After independence, this system was abolished and land-reform initiatives were instituted which aimed at conferring ownership rights to the cultivator of the land on the one hand and distributing excess land seized from the very large landholder to the rural landless on the other. These measures, however, were only half-heartedly implemented not only in West Bengal, but elsewhere in India. However, things changed with the ascent of the CPI(M) to power in 1978. This government, committed to the cause of the poor sharecroppers and landless labourers, took up land reform in earnest and showcased one of the most successful land reforms in India (though most scholars echo this positive view, voices of dissent and criticism of land reforms in West Bengal can be found in Mallick 1993). These poor farmers became the major support base of the CPI(M) and the richer peasants were looked upon as 'class enemies'. However, given the democratic set up of India, and the pragmatism of the CPI(M), the party chose the path of reform rather than revolution and became a party of 'middleness' which was careful not to antagonize the landed peasants beyond redemption (Bhattacharya 1999). However, certain prejudices remain; for example, there was still a tendency to look at pump owners as exploitative water lords (Adnan 1999; Webster 1999), not withstanding the fact that various studies had shown that informal groundwater markets were at the very heart of agrarian transformation in West Bengal. Thus, for instance in the context of the SWID certificate, the concern was not only of lowering the water table, which in any case was admitted to be a seasonal phenomena, rather it was the fact that many of the new structures were being made more

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for commercial purposes than for personal purposes.[8] So, in addition to a negative attitude to groundwater in general, this also reflected a negative attitude to the evolution of an active groundwater market in the state, which many researchers have shown to be the most beneficial institution for the farmers (Palmer-Jones 2001; Hariss 1993).

In Gujarat, on the other hand, many of the politicians and government officials have strong rural roots (a phenomenon mostly absent in West Bengal) and indeed take pride along caste lines, for example, a Patel would generally be proud of the fact he is a Patel, which is the epitome of the good farmer. Thus, officials of the electricity board and groundwater departments can and do empathize with the farmers' plight. In contrast, officials of West Bengal are more likely to characterize farmers as being opportunistic and always seeking concessions.

While both the context specific factors and the attitude of the decision makers are important, what matters most in terms of a farmer movement is the organizational set up of the farmers' union that spearheads such agitation. This is clearly demonstrated by the contrast between the BKS in Gujarat and the KS in West Bengal. BKS is a farmers' organization recruiting its members from amongst farmers, and the leadership is also in the hands of the farmers. On the other hand, membership to KS is open to farmers (and sharecroppers), landless labourers as well as the so-called rural intelligentsia who are predominantly school teachers; the leadership of the KS is in the hands of the intelligentsia and not the farmers. For example, in one district of West Bengal, viz. Nadia, there are approximately 55,000 members of the KS, of which 50% are landless labourers, 30% are farmers and the remaining 20% are not directly related to agriculture, viz. teachers and rural traders. The leadership of the organization, in most cases is in the hands of the teachers, because they are thought to be educated enough to lead an ideologically motivated party like the CPI(M) and its related organizations (district leader of the KS, Nadia district, 2005, personal communication). Ironically, the interests of the farmers, the agriculture labourers as well as the intelligentsia are very different and at times even diametrically opposite. For instance, while the labourers bargain for a hike in wages, it is in the interest of the landowning farmer to keep wages low. Again, while the farmer would like to get higher prices for his produce, the labourer and the rural non-farm dependent people, who buy food from the market, would like the food prices to be kept low in perpetuity. It is then hardly surprising that the KS has so far not taken any stand against the state government regarding the issue of either SWID certificate or electricity tariff. Thus, while the KS did launch an agitation against the Jute Corporation of India in 2004, a government of India body, for offering low procuring price for jute, it has not to date spearheaded any protest against the state government's policy of increasing the electrical power tariff. In West Bengal, from 1996 to 2004, there had been a progressive increase in the electricity tariff from Rs 1,100 (US$ 22) per year per pump to Rs 6,000 (US$ 300) per year per pump, a six fold increase over 8 years.[9] Most of the pumps in West Bengal are of 5 HP. Thus per HP, the electricity tariff works out to be Rs 1,200 (US$ 24), which is one of the highest in the country. Yet, other than few sporadic farmer protests where 100-150 farmers assemble to protest in front of a local WBSEB office, there has been no organized protest at all, while the ruling front has since then organized hundreds of rallies on themes as unconnected to farmer interest as the Iraq War and US policy, religion based riots in Gujarat and so on. Indeed, the interests of taxi drivers (seventy thousand or so) are better represented than that of the 11 million farmers in West Bengal because the state faces a transport strike every time there is a hike in the petrol/diesel price. Thus, in effect, GOWB has successfully co-opted and consequently captured the only farmer organization in the state, the CPI(M)s Krishak Sabha, which in turn has lost its voice and acts as a spokesperson for the ruling alliance. In Gujarat, on the other hand, the BKS successfully protested against the rise in electricity tariff, even though the BJP (of which BKS is the peasant wing) was in power in the state. This happened precisely because the leadership of the BKS is in the hands of the farmers unlike that of the KS.

Conclusion

The examples of the two states of Gujarat and West Bengal have amply demonstrated the fact that groundwater policies in India are largely dictated by political agenda without any regard to ecological reality. These two are by no means isolated cases, indeed in all the states where dependence on groundwater is high, and resource conditions are precarious, farmer lobbies oppose any move to curb their access to the resource. Examples are the states of Punjab, Haryana, Maharashtra, Karnataka and Andhra Pradesh. In Andhra Pradesh, for example, during the last Parliament election in 2004, the ruling Telegu Desam Party (TDP) had faced electoral defeat at the hands of the opposition Congress party. The reason was widespread dissatisfaction among the farming community who alleged that the TDP chief minister (CM) had overlooked farmer concerns, especially that of irrigation. Upon election, the new Congress CM immediately resorted to the populist policy of free electricity power for agricultural users. Similarly in Gujarat, in the same election in 2004, voters in districts facing acute water scarcity such as in the North Gujarat and Saurashtra region brought back candidates belonging to the main opposition party (Congress) by defeating the ruling BJP members. Recently, the newly elected government of Haryana cancelled pending electricity bills of farmers worth millions of rupees. There are indeed real political constraints,

[8] The concern regarding use of groundwater structures for commercial reasons was expressed by the Secretary, Minor Irrigation Department to the Secretary, Department of Power, GOWB in a letter dated 4 March 1993 where he stated that "... quite often the purpose of these structures are more commercial than personal. . .."

[9] In 2005, the electricity tariff has further risen to Rs 11,000/year/pump, which works out to be Rs 2,200/horsepower given that most pumps are 5 HP.

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basic issues still dominate the rural electorate in South Asia and any measure that harms the livelihood options of the people has the potential of destabilizing governments and this did happen in the 2004 Parliamentary election in India (Mukherji and Shah, 2005).

In summary, all those states in India that depend overwhelmingly on groundwater also have formidable farmer lobbies. For instance, the issue of the metering of tubewells and the hike in the electricity tariff has been a central election issue in states like Gujarat, Maharashtra, Andhra Pradesh, Punjab and Haryana. On the other hand, farmer lobbies are almost totally absent in the eastern Indian states such as West Bengal, Bihar and Orissa. However, in the pre-independent era, these eastern states had a history of peasant struggle—the so-called 'old' agrarian movements which were the struggle of the 'have-nots' against the 'haves'. One sterling example of such a movement was the *tebhaga* (Bangla word, literally means one third) movement in Bengal, it was a movement of the share-croppers demanding one third share of the crop output. Since then, the very nature of the peasant movement in India has undergone a change. After the success of the green revolution, there emerged a class of 'bullock capitalist farmers' (defined by Rudolph and Rudolph 1987) who organized themselves into caste affiliated farmers groups in order to safeguard their interests. The agrarian movements since the 1970s have been led by these new farmer leaders. Thus the rise of the 'new agrarian' movement as opposed to the 'old agrarian' movement has closely followed the green revolution and the subsequent tubewell revolution. It is then no coincidence that states with strong farmer lobbies are also states that make the most intense use of groundwater for agriculture. On the other hand, in states where the use of groundwater is relatively more recent, farmer lobbies have not developed. Another factor that seems to favour the existence of farmer lobbies is the presence of medium and large landholding farmers (4 ha of land and above). In all the states mentioned above where farmer lobbies are strong, the medium and large landholding farmers constitute over 20% of the total farmers. This figure is only 2.1% in West Bengal. Most importantly, however, the political ideology of the party in power also shapes the course of peasant movements. All in all, the presence or absence of a farmer lobby determines whether or not groundwater regulations can work in India; where farmer lobbies are weak as in West Bengal, groundwater regulations can be successfully implemented and where they are strong, as in Gujarat, any effort to control groundwater exploitation remains but a pipe dream. Thus, the politics of groundwater has given rise to a strange paradox in India—successful groundwater regulation where little is needed and a virtual free-for-all access to it where the resource condition is

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