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**Addressing Agricultural Power Subsidy:
A Case Study of North Gujarat**

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Abstract

Reliable and sufficient power supply for irrigation is one of the important inputs for agricultural productivity. Keeping in view the financial vulnerability of farmers, State Electricity Boards (SEBs) supply power at a subsidised rate to them. On the other hand, they charge industrial usage higher in order to cross subsidize the agricultural sector. Over a period of time, this policy of cross subsidization has contributed towards a steady erosion of the financial health of SEBs.

Every subsidy, once granted creates a lobby with vested interests to see that it is retained in perpetuity. This, as in the case of other subsidies, is also true for agricultural power subsidy. Flat rate power tariff has encouraged farmers to over consume the electricity, as the marginal cost of using the power is zero in the prevailing system. This has also resulted in fast depleting water tables in regions like the North Gujarat posing a serious threat not only to the environment but also to human survival. The sustainability of subsidy is questionable on both, financial as well as environmental grounds.

This paper on the basis of fieldwork in the region of North Gujarat tries to analyse the perceptions among various sections of the farmers and examines whether the subsidy is pro-poor in nature. The paper, by citing field experiences, shows that the big farmers are reaping the benefits of subsidy and selling water to the small and marginal farmers who are at the receiving end. Flat rate tariff structure has resulted in a highly skewed distribution of subsidy which is regressive in nature. Policy intervention is required to reform the subsidy structure so that it becomes targeted, reaches small and marginal farmers and prevents further depletion of ground water resource in a region which has one of the world's most severely overexploited aquifers.

JEL Classification : G28, H20, H54 and Q48

Key Words : Agricultural power subsidy, State Electricity Boards (SEBs), small and marginal farmers, financial and environmental sustainability

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ADDRESSING AGRICULTURAL POWER SUBSIDY:
A CASE STUDY OF NORTH GUJARAT

Vidyut Joshi^a and Akash Acharya^b

I

Introduction

Power tariffs in India are unfortunately embroiled in a complicated web of social, economic and political issues (Jackson 2000). One of the main controversies surrounding power policies is in connection with the issue of agricultural power subsidy. Reliable and sufficient power supply is one of the important inputs for agricultural productivity and keeping in view the financial vulnerability of farmers, State Electricity Boards (SEBs) supply power at a subsidised rate to them. On the other hand, they charge higher industrial usage in order to cross subsidize the agricultural sector.

The argument in support of agricultural power subsidy, like any other subsidy, is that farmers are economically weak and hence the subsidy is required to lower the input cost. Moreover, there is a clear profit motive in the industrial sector and thus the cross-subsidisation from industry to agriculture has economic rationale and is justified. However, the policy of cross subsidisation has, over a period of time, eroded the financial health of SEBs and contributed to depleting water tables in many regions. Questions have been raised about environmental and financial sustainability of agricultural power subsidy.

The underlying assumption behind agriculture power subsidy is that it would eventually trickle down to small and marginal farmers and would create positive equity impact. However, the validity of this assumption needs to be examined at the grass roots level. The research question is whether the power subsidy is indeed reaching the poor small and marginal farmers. In other words the aim of the research is to examine whether this subsidy is pro-poor in nature or not.

To answer this question, the paper has chosen the North Gujarat region for conducting the fieldwork. Unfortunately in Gujarat, ecologically better off regions are catered to through canal irrigation and water scarce regions like North Gujarat, depend almost exclusively on, ground water with no other alternative. Water tables in North Gujarat are depleting rapidly and one of the reasons behind depleting water tables is overuse of the ground water through tube wells which run on subsidised electricity (Dubhash

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2001). Agriculture electricity consumption in North Gujarat accounts for 49 per cent of the total electricity consumption and contributes only 4 per cent of the revenue¹. Since water tables are one of the lowest in North Gujarat, any change in power tariff would eventually affect farmers of this region the most. Therefore, North Gujarat has been chosen for enquiry and an attempt is made in this paper to analyse the perceptions of various stakeholders like policy makers, rich farmers and poor cultivators.

Results which have emerged from discussions with stakeholders suggest that a good amount of subsidy is not targeted and never reaches the small and marginal farmers of this region. Submersible electric pump owners are not poor farmers because constructing a tube-well is a costly proposition, well beyond the reach of small and marginal farmers. Economically better off farmers construct the tube well, absorb the subsidy benefit and sell water to the small and marginal farmers.

This paper aims at analysing the perceptions of stakeholders and based on these, alternatives have been suggested to the current system of agricultural power subsidy. Issues related to pricing methodology and public finance are naturally beyond the scope of this paper. The paper has been organized in five broad sections. Section II gives an overview of the power sector in India and discusses issues in power sector reforms. Section III familiarises the target reader with issues related to the water problems faced in North Gujarat region. Section IV narrates field observations and is based on semi-structured interviews and Focused Group Discussion (FGDs) conducted with the farmers of North Gujarat. Section V concludes the paper and discusses policy implications and alternative ways for passing the relief to small and marginal farmers. These possible alternatives can contribute towards saving precious groundwater which is being pumped out from a region which has one of the world's most severely overexploited aquifers.

II

An Overview of the Power Sector in India

When India gained independence from the British Colonial rule in 1947, private companies or local authorities supplied more than four-fifth of the power in the country. The electricity supply act of 1948 subsequently brought into state purview all new power generation, transmission and distribution facilities, thereby limiting the role of the private sector. As a result of this, nearly every state formed its own State Electricity Boards (SEBs). By 1991, SEBs controlled over 70 per cent of the power generation and virtually all distribution. There were also a small number of private companies that continued to provide electricity services to some cities like Calcutta, Mumbai, Surat, Noida and Ahmedabad where the power supply quality remained noticeably better than SEBs (Dubash and Rajan 2001).

¹ The Times of India, Ahmedabad March 17, 2002.

Under the Indian Constitution, electricity is considered a concurrent subject, meaning that both state and central governments have jurisdiction over the sector. The growth of the economy calls for a matching rate of growth in the infrastructure facilities. The growth rate of the demand for power in developing countries is generally higher than that of the Gross Domestic Product (GDP) growth rate. Therefore, in order to support a GDP growth rate of around 7 per cent per annum, the rate of growth of the power supply needs to be over 10 per cent annually.² The Electricity Supply Act expects the SEBs to function commercially and achieve a minimum 3 per cent return on the capital. Nevertheless, power sector continues to be plagued by major revenue shortfalls due to high transmission and distribution losses, heavy cross subsidies from industry to agriculture, extremely poor collection performance, low utilization of installed capacity and high manpower cost. The sector's heavy reliance on increasingly tight state budget resources has constrained power expansion and systems' upgradation.

Under the existing power policy, industrial tariffs in India are kept higher than the marginal cost of power supply to cross-subsidise agriculture sector. Industrial tariffs in India at Rs. 4 to 5 per kWh or US 7-10 cents are higher than what is charged in developed countries. Typical rate in Western Europe and US are in the range of 6-7 cents. Even among some developing countries which are comparable to India, industrial tariffs are lower - in Brazil and Thailand, 6 cents and in China, 3-4 cents³. On the other hand, the average farmer in India pays only about 10 per cent of the actual cost of power supply. Even the domestic sector is subsidized and pays much less compared to other developing as well as developed countries.

Agricultural power subsidy was first used as a political tool during the 1977 elections, when the congress-led southern state of Andhra Pradesh offered flat rate tariffs (tariffs based on the capacity of the pump rather than on measured consumption) to farmers as an election promise to help Congress get re-elected. This may have had a demonstration effect for the neighboring state of Tamil Nadu, where a new non-congress party (the ADMK) decided to offer free electricity to some groups of farmers. Subsequently, political leaders in Maharashtra, Karnataka and elsewhere began to view this entitlement as a remarkably effective political device. Power Subsidies have since become popular political instrument (Dubash and Rajan 2001). Since the middle and rich peasant is an increasingly powerful force in the national politics, the game of competitive populism to supply electricity at very low prices to the agriculture sector proved irresistible. Although the flat rate (hp based) has been revised periodically in states like Gujarat, political considerations till date do not allow any significant withdrawal of subsidies.

² Ministry of Power website

³ Address by Edwin Lim, ex-Country Director, World Bank at Conference on Distribution Reforms

The policy of cross subsidisation has resulted in over consumption of power supply by farmers on one-hand and captive power plants by industries on the other. Agricultural consumers have increased many folds whereas SEBs are gradually losing more and creamier customers, *i.e.* industrial groups. Thus, while industrial consumption constituted nearly two-third of the total SEB sales in 1960, by 1991, its share dwindled to about 40 per cent in part because of the growth in agriculture (whose share meanwhile jumped from about 10 to 25 per cent), but also because many industrial consumers had cut back on their consumption from the grid (TERI 1993). The net result was that the additional revenues from industry were no longer able to effectively counter the losses from agriculture. Heavily under priced electricity has led to increased demand, even from scattered farmers who could have used diesel optimally, leading to longer distribution lines, and system losses (see, Morris 2001). Interestingly, some studies (like Reddy 2000) have shown that since the quality of power actually delivered to the farmers has been extremely poor consistently, it is widely accepted that most farmers are likely to prefer metered and priced reliable electricity to unmetered free (or low-tariff) unreliable electricity.

Over a period of time the financial viability of SEBs has worsened. India's electricity sector in general and State Electricity Boards (SEBs) in particular chronically suffer from poor technical commercial and managerial efficiency. In 1992-93 the total financial losses of the power sector came to Rs. 4,600 crore. In a period of about three years, these losses doubled. In 2001, the combined state utility financial losses were estimated at Rs. 26,000 crore, somewhat more than US\$ 5 billion a year⁴. If the current trends continue, in few years from now, the financial losses will reach a figure of Rs. 45,000 crore a year (Dubhash 2001).

To put this magnitude of losses into a proper perspective, Rs. 26,000 crore is half of what all the state governments in India together are spending on all levels of education every year. It is double of what they are spending on health, and three times that of what they are spending on water supply. If financial losses were reduced by only one-third of its present figure, the savings from a single year would be sufficient to fill every teacher vacancy in the country and provide every school with running water and toilet facilities⁵.

From a broad historical perspective, the indiscriminate extension of subsidies in many sectors of the economy, but foremost in agriculture in the 1970s and 1980s became the major cause of the fiscal crises in 1990s. By mid-1990s, electricity subsidies to agriculture were estimated to be in excess of Rs 100 billion. The deteriorating financial viability has led to inadequate investment and maintenance. As a result, in terms of reliability of power supply, India emerges as the ones of the worst amongst

⁴ Annual Report on the workings of the SEBs, Planning Commission 2001

⁵ Motek Singh Ahluwalia Committee May 2001

developing countries. This is a major constraint to growth and development in the country.

Issues in Power Sector Reforms

Electricity Supply Industry (ESI) worldwide has been undergoing a radical transformation since 1990s and the debate continues over the question of which is the appropriate policy for electricity pricing and a consensus across ideological spectrum is yet to emerge. The restructuring has been driven by ideological considerations as well as by a fiscal crisis and power shortage. Distribution has been the weakest link in Indian ESI. Transmission and Distributional losses (T & D losses) of the magnitude (22-23% and 40-45% in case of some SEBs) are unknown elsewhere in the world (Upadhyay 2000). According to some, the management of SEBs, in its race to hide staggering T&D losses, artificially increases the unmetered agricultural consumption which is known as 'hiding behind agriculture' strategy. Thus, according to this view, part of what is accounted for as agricultural consumption is actually 'stolen' domestic and industrial consumption.

The financial losses incurred by SEBs were initially taken care of from the state budget. But with the dwindling state resources, a time came when the states found it extremely difficult to support the SEBs and they started becoming sick one by one. To revitalize the electricity sector (to reduce the reliance on the government, to ensure stable and qualitative power supply and to supply power on demand) in 1991, government removed power from the list of activities which had been reserved for the public sector in the Industrial Policy Resolution of 1956. The amended legal framework of 1991 and 1998 facilitated private investment in generation and transmission respectively. However, private investments have not been readily forthcoming without Central Government assurances of counter guarantees.

Orissa is the first state in the country that has made significant progress in the reform process towards its logical end of unbundling and privatising the key activities such as electricity generation, transmission and distribution. This institutional framework, also referred to as the *Orissa model* (promoted by the World Bank), has shown some encouraging results in reducing commercial losses. As Panda (2003) has pointed out, in a few villages where micro-privatisation programme is being implemented, the increase in electricity revenue in one year has gone up by 19 per cent in Anandpur electrical division and 46.6 per cent in Jajpur road electric division of Orissa. The increase in revenue is due to proper accounting of electricity consumption of legal users, regularisation of illegal connections and addition of new connections. Formation of village committees and usage of the technique of Rapid Rural Appraisal (RRA) has opened possibilities of discussing electricity related problems with village residents. This helps the villagers in gaining fuller understanding of the problem and implementing solutions, which may have a significant component of local specificity.

In the view of the World Bank, “Orissa sets a model for state-level regulatory reform tailored for Indian conditions which may be eventually adopted nationwide”⁶.

But at the same time the Orissa model cannot be termed as a *panacea* for the entire power sector problem in India. Many feel that it is too early to foretell what the long-term implications will be. Recent studies also claim that the Orissa model has failed and unbundling has not improved efficiency. T & D losses have not come down. This model has also doubled the electricity price in the last three years. In short, the drain on the state exchequer has not stopped even after privatization. (Purkayastha 2001). Perhaps, as we have seen in the California power crisis, competition is not effective in case of shortage.

After repeated failures on the generation front, some experts feel that the sequencing of the reforms was not correct. The focus was at the wrong end ‘generation’. Rather than rationalising the tariff rates and making them attractive for the private sector participation, the government preferred to woo the private producers by providing guarantees against the demand risk and losses (see, Morris 2000). Several Independent Power Projects (IPPs) have come into existence during the reform period, from which the SEBs purchase power. However, the ultimate risk of demand and losses rests with the SEBs and that has made the IPPs indifferent towards the cost of production. They sell power to SEBs at a relatively high price which has further deteriorated the latter’s financial situation.

Electricity Bill

The electricity bill 2003⁷, which will replace previous three acts of 1910, 1948 and 1998, is expected to give momentum to the reform process. It will make generation of electricity license free and also allow NGOs, panchayats, cooperatives to supply electricity in rural areas. Furthermore, it will develop spot market for electricity and remove all cross-subsidies by converting them into explicit subsidies as and when required. These are indeed far reaching reforms and would lead to an electricity sector quite different in profile from than what we have known during past 50 years. For the first time, the electricity sector is being recast to strip away all social objectives that had been built into the sector. Instead, what is being attempted is a sector that will function on commercial lines and generate enough profits to fund its own expansion. The state’s role will be limited to regulating the sector and providing explicit subsidies to any group of consumers that is considered economically vulnerable in dire need of such subsidies (Purkayastha 2001). The bill basically aims to convert electricity into a commodity that can be traded freely. It is expected that competition

⁶ World Bank Staff Appraisal Report: Orissa Power Sector Restructuring Project, 1996.

⁷ First draft of this paper was developed in 2002 when the electricity act 2003 was not made public. This section will be revised after reviewing the act in detail and before submitting the working paper in a peer-reviewed journal.

in generation coupled with improved efficiency levels will lead to reduction in electricity prices.

But critiques of this market driven approach (which is reflected in the bill) believe that unbundling, competition and private power (including IPP) projects strategies have failed not only in Maharashtra but also in countries like Hungary and Indonesia. They also consider the Orrisa Model (which was conceived and executed with the help of the World Bank) to be a complete failure.

It is estimated that there will be a global deficit of power particularly in developing countries where there are at present over two billion people who have no access to electricity. Being a scarce commodity, which is short supply, Demand Side Management (DSM) assumes greater importance in case of power. The potential for DSM in the Indian power sector is large and a case for including DSM in a reform package is strong. It is evident that in both subsidised segments (domestic as well as agriculture) there is a gross over consumption of power. Apart from rationalising tariff structure, creating public awareness about this scarce commodity can go a long way in curtailing the demand and thereby bridging the gap between demand and supply. There is an urgent need for an informed public debate on the future of power sector. Intensive dialogue among different stakeholders will suggest ways to achieve not only financial health but also long term social goals. As Dubash and Rajan (2001) have pointed out, in a democratic polity, without explicit attempts at bringing diverse groups into the debate, the political sustainability of policy reforms will always hang in balance.

III

Introduction to the Region and People of North Gujarat

North Gujarat comprises four districts, viz Mehsana, Patan (a newly carved out district from parts of Banaskantha and Mehsana), Banaskantha and Sabarkantha. The region receives around 700-mm rainfall and is one of the most water scarce regions of the world. Banaskantha and Sabarkantha, as the names imply are the basin area of the Banas and Sabar rivers whose catchments extend to the neighboring state of Rajasthan. Dams built on these two rivers brought canal irrigation to some parts of these two districts. Mehsana on the other hand, does not have a perennial river. But Sabar and Banas rivers flow through the eastern and western boundaries of the district. So the Northeastern and Northwestern parts of Mehsana are irrigated on a limited scale by the dams built on these rivers.

Most part of the region is a flat terrain with sandy loam soil. It is a semi-arid region that heavily depends, indeed almost exclusively, on groundwater. Without groundwater irrigation, the thin, sandy soil would be singularly unsuited for

cultivation. The hard rock strata are very deep and are not easily penetrable even when Deep Tube Wells (DTWs) are bored at a depth of over 1000 feet. There are however three aquifers at a depth of 70-150 feet, 200-300 feet and 400-600 feet. All three aquifer layers have been over exploited, partly on account of subsidized power and the newer bores are being dug at a depth exceeding 1000 feet (Nagar 2000). The region has experienced rapid groundwater depletion in recent years, with effects that have attracted national and international attention of hydrologists, groundwater scientists, economists and sociologists. Moreover, the phenomenon of widespread sale of groundwater was first extensively documented in this region (Shah and Vengama 1998). The highly complex institutions that govern these ground water markets are the focus of policy debates on equity and sustainability of groundwater markets (Dubash 2002).

Patels and Chaudharis are the dominant castes in North Gujarat and SCs or Dalits mostly work as agricultural labourers. Sabarkantha has a sizable tribal population in its hilly regions. Agriculture and animal husbandry are the main occupations of this region. Of late, agriculture is becoming unprofitable due to water problems as has been confessed by the farmers of this region. Several people have started migrating to nearby cities in search of employment or some petty business.

The Dairy Sector of North Gujarat

The dairy sector is well developed in the North Gujarat region which supports one of the fastest growing dairy economies. Dairying is an integral part of the farming enterprise here. Milk production in this region has been growing steadily over the years. The 'Doodhsagar' dairy of Mehsana is the biggest dairy not only of India but also of Asia. The 'Sabar' dairy of Sabarkantha is also well known. The three dairy unions of North Gujarat, namely Banas dairy, Dudhsagar dairy and Sabar dairy, procure approximately 24 lakhs litres of milk a day during the peak of winter. The average daily milk collection in Dudhsagar dairy Mehsana is nearly 15 lakh litres, that in Banas dairy is 8 lakh litres and that in Sabar dairy amounts 6 lakh liters. The dairy sector provides direct and indirect employment to thousands of people. Almost every village in the region has a village dairy cooperative with apex unions at the district level. Of late, the dairy sector has become a major source of livelihood as conventional farming is becoming less and less viable (Singh and Kishore 2004). Many farmers expressed the opinion that but for the dairy sector, they would not have been able to survive. Dairying is labour intensive and landholding is not a precondition for entering into this sector as one can earn livelihood by keeping cattle. Moreover, price risk is negligible in case of dairying due to a well developed cooperative structure and returns are fairly consistent and stable over the years (Singh and Kishore 2004).

However, ground water is also used extensively in this industry and thus the issue of agricultural power subsidy is also related to the dairy sector as in a way, it is also being indirectly subsidised. Mehsana has Asia's largest dairy plant sitting over one of the world's most severely overexploited aquifers. As per Singh and Kishore's estimates, one cross-bred cow consumes 2060 liters of water to produce one liter of milk and a buffalo consumes 1200 liters more (3260 liters). Thus, the water productivity of milk is significantly lower than all cash and food crops which makes dairying even more water intensive than farming (Singh and Kishore 2004). Keeping in view the shift from agriculture to dairying in this region, water problem is likely to become more acute.

Water Problem of the Region

North Gujarat is one of the most water scarce regions of the world. It receives low to moderate rainfall and has arid to semi-arid climatic conditions. The western part of Banaskanth district receives the lowest rainfall of 350 mm per annum and the North-East part of Sabarkantha district receives the highest rainfall. The rainfall is highly erratic and the mean value of the number of rainy days varies from 25 in Banaskantha to 35 in Sabarkantha. According to the district-level analysis carried out by the Gujarat Agricultural University (GAU), the mean of the average annual rainfall (1901-1990) varies from a minimum of about 578mm in Banaskantha district to a maximum of about 807mm in Sabarkantha district. All rivers remain dry for most part of the year except during the few days of monsoon rains.

The annual average per capita renewable freshwater in the region is estimated to be 427 m³ (IRMA/UNICEF, 2001) while the same for the country was estimated to be approximately 2,000 m³ (Engelman and LeRoy, 1993). Over a period of time, most *talukas* have traveled the path of whitezone-grey-dark and overexploited zones. Water tables are below 1000 feet at many places. Moreover, every year they deplete further by 20-25 feet due to intensive groundwater extraction (mainly on account of power subsidy) through electric pump sets. Low levels of water availability do not seem to have any bearing on the way in which water is used in the region.

Today irrigation pumsets or tubewells are found almost on every farm. More than 90 per cent of the irrigation in North Gujarat is dependent on groundwater and in case of Mehsana where this problem is acute; the figure is 96 per cent⁸. More than 4 lakh hectares of land in Mehsana is irrigated by ground water. Table 1 gives information about growth in the number of electric motors in Gujarat during 1960-1999. Table 2 gives the break-up for three (Patan was not a separate district then) districts in the year 1999-2000.

⁸ Vyas Misha, 'Impact of Groundwater Irrigation on Agriculture: A case study of Mehsana' (in Gujarati).

Table – 1
Growth of Private Tubewells and Electric Motors in Gujarat

Year	No of private tubewells	No of electric motors used for irrigation
1960-61	21	NA
1970-71	2010	51901
1980-81	6097	142354
1990-91	15365	246584
1999-00	46787	334080

Source: Statistical abstract of Gujarat State 2003, Directorate of Economics and Statistics, Govt. of Gujarat, Gandhinagar.

Table – 2
No. of Private Tubewells and Electric Motors in North Gujarat (1999-2000)

District	No of private tubewells	No of electric motors used for irrigation
Mehsana	10838	15981
Banaskantha	9461	32424
Sabarkantha	1552	43128

Source: Statistical abstract of Gujarat State 2003, Directorate of Economics and Statistics, Govt. of Gujarat, Gandhinagar.

If one travels by road in these districts, one can see many tubewells on both sides of the road. A tube well will cost in range of 10-20 lakhs depending on horsepower (hp), which in turn depends on the depth of water tables. As the water tables are going down further and further, most farmers prefer to fix a high hp motor so that tube well will function for a long period of time. Earlier there were cases where even tube well became redundant as water tables depleted to such an extent that it was beyond the capacity of the tube well to extract water from these depths. Moreover not all tube well are successful, forty per cent fail as per one estimate (vyas 2001). Earlier simple wells and other forms of irrigation were in operation. But now they are no more useful (not a single well is helpful in Mehsana) and only electric motors are used for water extraction. One of the reasons for the preference of electric motor to diesel engine is cheap electricity on account of agricultural power subsidy. As water is being increasingly extracted from greater depths, it is hot (40° C) with high fluoride content, which is harmful for crops as well as for general health. Extensive exposure to drinking water containing high levels of fluoride cause problems of dental and skeletal fluorosis. Large populations in the region are affected by this menace (Kumar 2002).

Mehsana is an intensively cropped district. There has been a steady increase in the use of ground water for irrigation in North Gujarat in general and Mehsana in particular. In most villages of Mehsana (which do not fall into the canal network) there are, on

an average 100 to 150 Deep Tube Wells (DTWs). The water table is receding at an alarming rate of 2 columns or 20 feet annually and the farmers have to lower column pipe in the bore wells⁹ by that much depth every year. It is estimated that 10 to 15 per cent of the tube wells that were 300-500 feet deep, have become dysfunctional on account of receding water table (Nagar 2002).

Now farmers calculate an average 25-30 feet of water tables depletion in a year and construct the tube well accordingly. This means even if the requirement is of say 60hp motor, farmers prefer to go for 75hp thinking in terms of long-term benefits. This coupled with the flat rate charges of GEB, encourages farmers to extract more and more water as the **marginal cost of extraction under the flat rate system is zero**. We have discussed this wasteful over consumption in detail in the forthcoming sections.

Water Markets

One interesting aspect here is the development of water markets, which has been well documented in the work of Tushar Shah and his team. The owner (or group of owners known as ‘Water Company’ in most cases!) sells water to the small and marginal farmers on cash or crop basis. Some charge on an hourly basis whereas some ask for a share (often 1/3 of the production – Many a times during our fieldwork, we heard the farmers saying *Trijo bhag panino* meaning third part of crop is to be given away for water) in crop. These charges are four or six times higher than that of canal irrigation charges according to one estimate. The value of ground water extracted and used for irrigation every year according to Shah (1988) was around Rs. 6000 million and 60 percent of that is sold to the poor farmers who are not in a position to gain direct access to water by owning a tube well. In some cases, water companies also issue printed receipts and maintain accounts. Along with the water, the well owner also provides fertilizers and pesticides. Generally, the price of water comes down during summer, when the demand is less in comparison with winter. Normally, the buyers are assured of the quantity and reliability.

Investment in partnership wells or tube well companies is one of the most energetic social/entrepreneurial responses to groundwater depletion. Partnership tube wells are common in many parts of Mehsana and Banaskantha districts. With the water levels depleting further and the cost of well construction becoming astronomically high, farmers in these areas have started investment in partnership. They lay out underground pipelines for conveyance of water from the tube well location to the member farmers’ fields. Tube well companies with a membership of 30-50 farmers are very common in Mehsana district. Each shareholder has a stake in the tube well

⁹ As far as this paper is concern we mean same by Deep Tube Well (DTW), bore well and tube well. We have used these words interchangeably.

company proportional to his/her land holding (Shah, 1993; Gass et al., 1995; Kumar et al., 1998).

Access to groundwater in this region is highly inequitable. Hundreds of thousands of small and marginal farmers are deprived of direct access to groundwater. But the rich well owners continue to enjoy unlimited access to groundwater using heavily subsidized electricity. It now clearly emerges how the entire logic behind subsidy is flawed. This subsidy is cornered by large farmers who own tubewells (solely or jointly) and sell water to the small and marginal farmers. Water charges represent a major proportion in production cost especially for small and marginal farmers. There is an increasing trend of seasonal migration seen among these groups. There is effectively no restriction on these water markets. Owners of the land and tube wells automatically become the owner of the water beneath the land and they keep selling this water. All decisions relating to who should be given water, when and in how much quantity etc. are taken by the owners of the tube well. This device (tube well) has become a business instrument for many well off farmers. Instead of irrigating their own land, they often they prefer to sell water. One of the main reasons behind the development of these water markets is agricultural power subsidy, which has created far-reaching ramifications.

The gravity of the problem can hardly be overemphasised. Many studies by Tushar Shah, Dhawan (1991), Navroz Dubash (2001) etc. have warned that if the situation is not controlled through proper intervention (which does include tariff rationalization) the region of North Gujarat in general and Mehsana district in particular will face severe water crisis and the entire population of these regions will face survival problems.

From above discussion picture clearly emerges that the demand for electricity is basically a derived demand for water. It is very important for farmers to understand that this wasteful over consumption of water is not in their interests. They are in dire need of a fuller understanding of this problem for its proper management. Although the Motibhai R Chaudhary Foundation (MRCF) and Swadhyay parivar have been working to spread awareness of this problem in this region, a lot more needs to be done to address this acute situation. For the entire North Gujarat region, tubewell irrigation continues to be the most vital accounting for over 95 per cent of net irrigated area. Although the threat of depleting water tables is not very serious in Banaskanth and Sabarkantha as of now, intensive irrigated agriculture in these areas with ground water (farmers cultivating rice in kharif and wheat in winter) may soon create a situation similar to that of Mehsana. Failed monsoon in North Gujarat resulted in a severe drought in all three districts during the last decade. In four out of last five years, over 85 per cent of villages in three districts were drought affected

(Nagar 2002). Improved water management practices coupled with rational electricity tariffs will contribute to the easing of this situation.

IV

Perceptions of the Stakeholders

Field visit in this area helped us in gaining a better understanding of the problem from the stakeholders' point of view. We consider farmers (big, small and marginal), agricultural labourers, representatives of Gujarat Electricity Board (GEB) and Bhartiya Kisan Sangh (BKS) as stakeholders in this issue of agricultural power subsidy. 200 farmers¹⁰ from Mehsana (which includes farmers from newly carved out Patan district) and 100 farmers each from Sabarkantha and Banaskantha were interviewed using a structured pre-coded, pre-tested schedule. Tense field situations compelled us to enter only those villages and interview only those farmers who were not very aggressive. More weightage was given to Mehsana as the problem is more acute in this region. Quantitative analysis has been done in the report but is not being shared in this paper for contractual reasons. This section is based on an analysis of field observations and informal discussions held with stakeholders during the survey.

We feel that it is important to point out the gravity of the field situation in this region. Electricity is an extremely sensitive issue here and farmers become aggressive as soon as one starts discussing the issue. Every week we could see some rally, *dharana* etc. in front of Gujarat Electricity Board (GEB) offices at various places. GEB officials fear to enter many villages especially in Mehsana district. In fact we had a tough time when farmers took us for GEB officials and threatened to manhandle us. Very few people know about Gujarat Electricity Regulatory Commission (GERC) except may be some of the educated Bhartiya Kisan Sangh (BKS) members. They perceive GEB as their enemy number one. There are various reasons behind this animosity, which we came to know during our stay in villages and we have tried to outline them in this section.

Caste

Caste plays an important role even in this matter relating to supply of electricity. Patels and Chaudhris are the two dominant castes in this region who own the land as well as the tube wells. Most of the agricultural labourers and marginal farmers are Dalits. They neither own a tubewell nor are they partners in the tubewells. Not only it is beyond their means to construct a tube-well on their own, the upper caste farmers deliberately marginalize dalits when it comes to constructing tubewells in partnership. Marginal farmers have no other alternative except to buy water from the upper caste

¹⁰ It was difficult to stratify the sample based on landholding as most of the farmers are in category of small farmers as per talati's records.

tubewell owners. They are not allowed to participate in the meetings of tubewell owners where they decide an hourly charge (or percentage of crop) for selling water.

Cropping Pattern

The main food crops of this region are bajra, jowar, wheat, maize, barley, rice, tur & gram whereas the non-food crops are cotton, castor and groundnut. Most farmers grow two-three crops in a year. It is important to point out here that the consumption of water (which determines the usage of electricity) is directly related to the type of crops farmers decide to grow and the manner in which they irrigate them. Interestingly, agricultural power subsidy has adversely affected agricultural productivity and the cropping pattern has undergone considerable changes during the last few years. Formerly, favorite crops like cotton, groundnut etc. have now given way to crops like wheat, bajri, jowar etc.

Tubewell Ownership

Finding single owners of the tubewell is becoming increasingly difficult especially in Mehsana district due to the prohibitive cost of constructing a tubewell which comes to more than Rs. 15 lakhs. This is the reason why most of the farmers in this region are using tubewells in partnership. But then very often, even partnership is beyond the reach of small and marginal farmers who have no option but to buy water from the rich farmers.

Constructing an electric tubewell in partnership is very common in this area. Partners range from 2 to 62. On an average there are 5-6 partners per tube well. The reason is high cost coupled with failure rate. For example, Harji jiva of Kumbhasan village in Banaskantha says,

Out of 10 tubewells only 1 succeeds here. We cannot take this risk on our own and therefore we prefer joint investment which reduces the risk.

All the expenses relating to tubewells (purchase, electricity bill, maintenance etc.) are shared among the partners as per the terms of the partnership. Not all partners contribute an equal amount while constructing the electric tubewell.

The cost of digging the tubewell is positively related to the depth of the water table. The deeper the water tables, the higher the cost. As the water tables are the lowest in some parts of Mehsana districts (e.g. Unzha) the cost is very high in these areas. Costlier tubewells also consume more electricity, as a higher hp motor is required to lift the groundwater. Most farmers prefer to go for deeper and deeper tubewells because they know that within a few years down the line, the water tables would plunge further and the tubewell would be of no use if they only go up to the existing water levels. For example, if the ground water was available at 600 feet, farmers would fix an electric motor that is capable of extracting at 900 feet. This eventually

results into over consumption (and consequently creation of water markets) not only of electricity but also of groundwater.

Many farmers have purchased tubewells on credit basis. Of late, institutional credit has become tough for tubewell, as there are restrictions. So farmers usually borrow from friends, relatives etc. for the tubewell. This can also be seen as an investment as tubewell is perceived as an instrument by means of which one can run a groundwater business.

Power Requirement for Agriculture

Most farmers say that they require 15-16 hours of power supply at present rate and quality. If quality is improved then 10-11 hours of supply would be sufficient and farmers are ready to pay more but they are not ready to express this in Bharatiya Kisan Sangh (BKS). Our field perception is that this demand is overstated. Water planning for crops with the help of water management experts can considerably bring down this demand.

It is interesting to analyse the perception of farmers about electricity. They feel that it is their right to get free electricity. For example Maganbhai Patel from Dela village in Mehsana told us:

Farmers should be given 24 hours electricity free of charge. How can the government charge money from the farmer who is considered as father of world (Jagat no tat)? This is immoral.

They hardly realise that electricity is a scarce product and other consumers (industries) are paying much more so that they get power at a cheaper rate through cross-subsidisation. Most farmers do not know the cost of generating a unit of power and the fact that they are being cross subsidised by industrial consumers. And it is not true that all industrialists are wealthy and all farmers are poor. Why should a small-scale unit holder pay more to subsidize rich landlords?

Apart from inadequate power, there is a plethora of complaints about the poor supply quality of electricity supplied by GEB. Farmers complain that the supply is never continuous and there are many interruptions (trippings) that damage tubewells. Every now and then they have to repair it, which turns out to be a costly affair. Farmers also complain about the timings of the electricity supply. Vagjibhai Chaudhari from Magroda village says,

We have to wake up at midnight because that is the time when power is supplied. Agricultural labourers are reluctant to work in the night as there is a fear of snakebites. Why can't GEB supply electricity during the day as they do for industries?

Willingness to Pay (WTP)

During our detailed talks and group discussions (GDs) with farmers, some agreed with us that if they want quality power supply, they should be prepared to pay more. But they are not ready to discuss this sensitive issue in BKS.

Since we were interested in farmers' views on fixing meters on farms, we asked them to express their opinion. Most farmers are not only against the idea of fixing meters but even threaten to damage them if they are fixed against their wish. This sentiment is reflected in a statement by Kanjibhai from Magroda village in Mehsana. He says,

We will see how GEB people dare to fix meter on our farms. We will crush them (meters), throw them or burn them.

Most farmers either want to continue with this system or they want free electricity. They are against charging market rate for electricity (but at the same time they sell water even above market rate and see nothing wrong in this kind of unfairness!). Farmers seem to have developed some sort of an allergy for meters. Even if promises are given to continue subsidies, farmers view the meter with suspicion. They apprehend that GEB officials might tamper with the meter and the blame might fall on the farmers. As has been mentioned earlier, attempts to fix meters are likely to be met with stiff resistance.

Farmers prefer to stick to the current hp system as they don't have any experience of other modes (electricity cooperatives, distribution managed by Gramsabhas etc.) But this should not deter GERC from experimenting with other innovative forms of power distribution. In fact, many of the water distribution models (WDMs) can also be utilised in electricity distribution. We feel their perceptions might change if they are given proper guidance about the long-term harmful effects not only to GEB and Govt. of Gujarat but also to themselves. They must realise that depleting water tables will pose very serious problems for the quality of life in general and agricultural activities in particular even if electricity is supplied free of cost.

We met the Superintendent Engineer of GEB at Mehsana. He has to face the brunt of frequent farmer agitations. When we went to meet him he was up against a small crowd of BKS members who were on *Dharana* in front of the GEB office. He explained to us the financial position of GEB. One unit of power which GEB generates (or purchases from independent power producers IPPs) costs approximately Rs. 4.50 per unit. The recovery from farmers at existing flat rate is 20 paise. Even in the flat rate system, theft is possible with the help of some technical device that can increase the capacity of the motor. Flat rates remain unrevised since 1988 due to a strong farmer lobby. In fact the rates were lowered in 1996. This is simply not sustainable for GEB and it only leads to losses in the GEB balance sheet year after

year. On the other hand, he said that farmers are well into the business of selling water despite the continued depletion of water tables in this region.

To know the situation on the other side, we conversed with the BKS members who were staging a dharna in front of GEB office. Since they had seen us emerging out from the Chamber of the SE, they looked at us with suspicion. But we were able to convince them that we were an objective party and were interested in knowing viewpoints of both the sides. Of course, we had to hide the fact that we were doing a study for GERC. We said that we were University students from South Gujarat University, Surat and were interested in comparing the situation of North Gujarat farmers with their counterparts in South Gujarat.

They began by blaming GEB officers as amongst the most corrupt people. They also claimed that a nexus between industrialists and GEB officials is responsible for harassing poor farmers. One of them said,

Farmers are the fathers of world who feed the entire world. We are not businessmen then how can the government charge business rates from us? In fact government should grant us everything free. Well dressed city slickers like you must realize that your entire existence is dependent on us. Avoid playing with the sentiments of farmers.

Most of the BKS members were quite aggressive and they were all giving voice to their grievances simultaneously. All of them placed the blame on GEB officials.

As the discussion was interesting and many new points had begun to emerge, we decided to have a Focused Group Discussion with them. They too agreed but asked us to come next day. Next day we came across some farmers who were more articulate. Hirabhai Ambalal Patel who is Mehsana District Secretary narrated the geographical situation of the region and said that this is a drought prone region with water tables which have depleted to the levels of 500 to 2000 feet. A tubewell costs here in the range of 7 to 20 lakhs. While explaining about the power requirements of farmers, he told that farmers require power at least for 12 hours a day. The present supply of 9 hours is inadequate. He said, "What we require is water, if you can give us water, we do not want electricity". When asked about the capacity to pay more, one member said that they could pay more if they could get higher prices on their crops. But then many did not agree with him and said that they were already paying a lot for their electricity bill. One farmer described GEB as a thief and placed the blame entirely on it for incurring losses. Most farmers were of the opinion that providing them with sufficient water was the state's responsibility. They also demanded subsidies for tubewell construction.

One member explained the flawed logic of GEB for differentiating among small and big farmers on the basis of the motor they use. Those farmers who use a 7.5 hp motor

or more are categorised as big farmers and are charged more. Now the hydrological situation in North Gujarat is such that a motor of less than the capacity of 60 hp will not be effective irrespective of the fact whether the farmers own one acre or 100 acres. It is out of compulsion that farmers have to use higher hp motors. This does not mean that they are necessarily rich farmers. He said that in North Gujarat, 95 per cent of farmers have land ranging from 0.5 to 4 acre. Only five per cent of the farmers have more than 5 acres of land.

One educated farmer told that GEB should layoff its staff or reduce their salary to contain losses. Farmers should not be blamed for the losses. There was no unanimous opinion on tariffs. Some want free electricity and others said that farmers do not ask anything for free but they demand higher crop prices. Some are ready for experiments in distribution by giving the responsibility to the gram panchayat whereas some do not trust *Sarpanchs*. Some said that the farmers of North Gujarat are at a clear disadvantage as compared to the farmers of South Gujarat as water tables are higher in South Gujarat and the irrigation facility is well developed. Some also demanded that electricity rates should be fixed as per the level of water tables.

Bhartiya Kisan Sangh (BKS)

We also visited BKS office in Gandhinagar where we came across many farmers discussing the same issue. We could not meet Rameshbhai Chaudhari but we talked to Kanubhai Patel. He claimed that the present hp based flat rate system is not only good for farmers but also for GEB. According to him, when flat rate system was introduced, the income of GEB had gone up. Now GEB at the direction of GERC which in turn is directed by the Asian Development Bank (ADB) is trying to fix meters which would only increase the financial burden of GEB by Rs. 120 crores. He said that any attempt to fix meters or to increase the flat rates would be opposed by all 25 district presidents of BKS. He emphasized his point by adding that in North Gujarat, if meters were fixed, the electricity bill would amount to around Rs. 1.5 to 2 lakhs. No farmer can possibly afford that.

We spent more than a month in various parts of North Gujarat. At some places we were well received, at others we had a tough time. Although this was not an anthropological study, we also stayed overnight in some villages in order to get the feel of the situation. Overconsumption of groundwater was evident as many villagers (including their cattle) were taking bath under the tubewell extracted water. Farming activities were continued during the night as power was supplied at night. Most farmers are unhappy with the night supply as agricultural labourers refuse to work during the night due to the fear of snakebites. Magubhai Chaudhari from Kharvada asks “If GEB does not harass industries by providing power supply some times during the day and some times during the night, then why is GEB harassing us?”

The electricity demand of farmers does not remain uniform throughout the year. For example demand during monsoon is quite low and vice versa during summer. This is also applicable to various crops. Some crops require more water and some less. Whether this differing water requirement can be matched with the requirement of power supply (so that overall demand reduces) is an issue which remains to be explored further with the help of water management experts and electrical engineers.

In some cases, it was evident that the farmers were clearly exaggerating the situation. For example at *Maktupur* village in *Unjha* taluka the owner of the tubewell said that his financial situation was so bad that he would have to commit suicide if there was an upward revision of hp rates by GEB. While he was talking, we could see a mobile phone in his pocket and an Opel Astra (a luxurious car) parked outside his farm. When questioned about these belongings, he said that they belonged to his son, who was a businessman in Ahmedabad.

We found that problem was acute in almost all talukas of Mehsana districts. In talukas like *Unjha*, the situation is worst and all motors are of a capacity 85 hp. We came across many owners who employed an operator for the tubewell and paid him as salary. In talukas like *Chanasma* and *Harij* farmers complained of saline water. Whereas the situation was not so bad in some parts of Sabarkantha and Banaskantha where even diesel pumps and small hp motors on wells were seen on the farms situated near rivers. This is because the water tables have not depleted to such an extent (as compared to Mehsana) in this region. But looking the scale of water extraction in these areas, it would not be very long before these regions too would be described as water scarce regions. Some farmers demand that North Gujarat should fall under the Narmada Command area. If water can be provided to far-off regions of Saurashtra it should also be provided to North Gujarat.

Many farmers blame politicians for this entire problem. They feel that during the regime of Congress party, Amarsingh Chaudhari introduced the flat rate system to woo the South Gujarat farmers. Today many farmers claim that they have to incur debt to pay their electricity bill. So how can any claim be made that the hp system has benefited the farmers of North Gujarat?

We also met the former Finance Minister of Gujarat State Mr. Parbatbhai Patel in Tharad to understand the situation in Banaskanth and to know his political viewpoint of the entire issue. He said that Banaskantha is also going Mehsana's way. Electric tubewells were not very common in Banaskanth three or four years ago but now the situation is changing. In talukas like *Vav*, water tables are at 650 feet and one requires at least a 25hp motor to extract water. *Disa*, *Dhanera* and *Kankrej* are relatively in a better position where 15hp motors are functioning well. Banaskantha also has an access to water from *Dantivada* and *Dharoi* dam. The western part of Banaskantha

has tubewells since 1978 but it is only since 1994-95, that tubewells can be seen on Palanpur side. Parbatbhai agrees that cheap electricity extracts more water and situation is going from bad to worse in talukas like *Vav*. He said that it was increasingly becoming difficult to obtain 'No Objection Certificate (NOC)' from *Jal Sampatti Bhavan* for tubewell. He says that due to the unrevised hp rates, electricity usage has become cheaper as compared to diesel usage. The rates of diesel were Rs. 400 per barrel in 1987 when the hp system was introduced. Today the rate has gone up to Rs. 4000 per barrel and the hp rates are more or less the same. When flat rate system came into existence, very few connections were in existence but thereafter the growth has been phenomenal. He suggested that a testing meter could be placed on bore to measure the consumption first. But he preferred revised higher hp rates to fixing meters.

The situation in Sabarkantha is also moving in the same direction as in Mehsana. Twenty years ago, Bhartiya Kisan Sangh (BKS) was established here. This is the only district which does not fall under the command area of Narmada. Some parts of both, Mehsana as well as Banaskantha fall under the command area of Narmada. Farmers have expressed the feeling that Sabarkantha must be given special subsidy as it does not fall within the Narmada command area.

In talukas like *Khedbrahma*, *Ider* and *Bhiloda* water tables are in range of 600 to 800 feet. In *Parntij* and *Talod* the situation is better. The cost of tubewell in these areas is considerably lesser as PVC pipes are cheaper and are functioning effectively in this area. In Mehsana these pipes do not function and they require iron pipes which are quite expensive. But here too farmers are demanding electricity for 12 hours a day. Farmers in Sabarkantha complain that government does not provide the Minimum Support Price (MSP). Government only purchases at the time of *Gramsabha* election and as soon as the election is over the purchasing activity by the government is stopped. Karsanbhai Patel from Vaktapur village in Sabarkantha district says "Government has fixed Rs. 103 for corn but it hardly buys at this rate and the market price hovers around Rs. 87-88." Some farmers said "Give us electricity whenever we demand, we will pay whatever you ask".

Most farmers feel quite cut up about the fact that water from *Mesvo* dam goes to *Kheda* despite the fact that the dam is situated near *Shamlaji* in Sabarkantha. Some aggressive farmers also threatened that if their problem was not solved they would destroy the canal which is connected to Kheda district. Production cost for those who have access to canal water is considerably low in comparison to those farmers who have to use groundwater. But the market price of crops is same for both segments. Production cost is highly correlated to the geographical situation. This geographic inequality concern was expressed by many.

It is a well-recognised fact that subsidy is given in the name of the poor and therefore we decided to put this to test by interviewing some marginal farmers. Prahlad Patel is from Kamana village in Mehsana district. He has less than 5 *vighas* of land. He says,

I cannot afford a tubewell even if I invest my life time's earning in it. Becoming an owner in partnership is also beyond my reach. I buy water from the owner of the tubewell. He takes Rs. 30 for half flow (Aadadho Relo) and Rs. 60 for the full flow per hour. If I take full flow, it takes 4-5 hours to irrigate one vigha of land. I give 1/3 portion of the crop to the tubewell owner. Sometimes they (joint owners) decide to charge money (instead of crop sharing) and the charge is fixed according to their whims. Small and marginal farmers who are buyers of water are not called to participate in the meeting. Whenever we want water, we have to inform the well owner three-four days in advance as there is a lot of demand.

V

Policy Implications

Our field experience suggests that cheap power supply is mainly being consumed by rich farmers, as they are the tubewell owners. A tubewell costs more than Rs. 10 lakhs and is obviously beyond the reach of the small and marginal farmers. At most places during our fieldwork in the villages, we came across marginal farmers buying water (for a payment in cash or kind) from the tubewell owners. It is very clear that the subsidy is not targeted and those who do not need it, are getting the benefit of it which has far reaching implications. Subsidy has eroded the financial health of Gujarat Electricity Board (GEB) and is not sustainable for GEB. On the other hand it has resulted in massive ground water extraction on a commercial basis in a water scarce region like North Gujarat. The rate at which water tables are depleting is alarming and not sustainable from environment point of view.

It was interesting to discuss these things with farmers. They fail to comprehend the financial burden and the precarious situation of GEB but they do admit that water tables are depleting because of groundwater extraction. Although the Bhartiya Kisan Sangh (BKS) is not ready for any price hike, during our fieldwork in the villages of North Gujarat, we came across many farmers who were willing to pay higher charges for power, provided they received assured and quality supply. But they were unanimous in their opposition to installing meters.

Keeping in mind the difficulties of the situation, our perception is that installation of meters is likely to lead to violent opposition if such a step is taken unthinkingly. Therefore, the immediate practical step should be to avoid fixing meters. This does not mean that the idea of fixing meters should be thrown away with bath water. Any ideal distribution channel must involve a device for measurement but then forceful enforcement is not a practical solution to the problem looking to the field reality.

To ease the financial position, hp rates can be revised gradually. We believe that a moderate revision might be accepted by farmers with little opposition but the quality of the power supply must also improve. Moreover, other innovative forms of distribution can also be experimented in some villages. For example, village panchayat can be given the responsibility of distribution; power cooperatives can be formed and so on and forth. But these alternatives can be merely tried on an experimented basis. Moreover, the support of farmers is also required in these experiments. If GEB tries to impose new methods without consulting the farmers and taking them into confidence, the method are likely to fail.

This problem of power subsidy essentially is a problem of water management as the demand for electricity is a derived demand. Hence, the demand of power should be viewed in the context of the demand for water. In order to have a better co-ordination between electricity and irrigation, the farmers' group should have a crop-plan which delineates the requirements of water in every season. Farmers do not require constant electricity supply on a daily basis. The demand varies and the supply should match that demand so that electricity can be saved and farmers do not end-up over irrigating their farms. Farmers can prepare and submit their timetable on their electricity needs to GEB. But the pre-requisite for such an outcome is that the GEB officials and farmers would have to interact better. GEB officials would also have to try to understand and appreciate the difficulties faced by the farmers. Although there is interaction between GEB and farmers, apparently it is not sufficient.

The removal or gradual phasing out of subsidy is likely to face an opposition from the farmer lobby but at the same time agricultural power subsidy is not sustainable either on the financial front or on the environment front. Year after year this subsidy is adding more and more losses to the GEB balance sheet on one hand and is resulting in a depletion of water tables on the other. After staying in villages of North Gujarat for more than a month and observing the usage pattern of farmers, we have firmly come to the conclusion that this subsidy is not justified and some other system has to be evolved which will take care of both, the problems of financial health of GEB and also contain the depletion of water tables in this region. We present few alternatives which have emerged after discussions with the farmers themselves and with the subject experts in this area.

Revision of Flat Rates

The most pragmatic option as of now is to revise the flat rates on a gradual basis. A sudden and steep rise is likely to be opposed by Bhartiya Kisan Sangh (BKS) but most farmers are likely to accept a gradual rise. We can say this because most farmers have told us that they are ready to absorb a gradual upward revision if they get quality

and assured power supply. If GEB can manage to assure farmers that they will receive quality power supply, the upward revision will not be opposed.

Fixing Meters

Metering is desirable for social equity, reduction of water and electricity wastage and for monitoring and improving the efficiencies of GEB. We also share the view of GERC that “What cannot be measured properly cannot be managed properly”, but at the same time we suggest not to strictly enforce this at present. During our fieldwork, we could sense clearly the allergy and resentment against the word ‘meter’ among farmers. They strongly believe that they would be harassed by GEB officials if meters are fixed on their farms. Forcefully trying to fix meters would only make the situation worse and there would be violent opposition. Moreover fixing meters on so many remote farms cannot be done overnight and would also increase the administrative costs for GEB. At the most, a few testing meters can be placed on selected farms. Even before doing this, farmers would have to be taken in to confidence initially. Thus, we would not recommend an immediate metering drive on farms. Nonetheless, all efforts should be made to gradually increase the spread of meters on farms.

Flat Rated Based on Geographical Condition

Most farmers in North Gujarat feel that they are at a great disadvantage compared to the South Gujarat farmers. In south Gujarat, even a 5 hp motor can extract sufficient groundwater but here in North Gujarat, even a 75 hp motor is sometimes ineffective. Thus, South Gujarat farmers pay electricity bills that are substantially lower simply because there the water tables are comparatively higher. In North Gujarat, the electricity bill is the major component of the cost of production. To remove this inequity, many farmers have opined to develop a flat rate system in which rates will be low in the area where water tables are low, and vice versa. We do not know whether this is technically feasible or not but this option is worth giving a thought to.

Pre-paid Electricity Cards

In a country like South Africa, day to day management and maintenance of conventional meters in rural and semi-urban areas had become an impossible task for the Electricity Company known as Eskom. This was mainly because of socio-economic attitudinal problems. Consumers tampered with meters to use electricity illegally, which used to add repairment cost to Eskom. Then they introduced the system of pre-paid electricity cards and educated the consumers regarding the techniques of Social Marketing. This has solved many of the problems of Eskom. Lessons learnt from South Africa can be used to estimate the prospects for pre-paid electricity in India.

Distributional Reforms

Post Enron, now most power experts agree that the focus of the power reforms was on the wrong end, i.e. Generation. The reforms should have been initiated from the distribution side. There have been some attempts made at unbundling and privatising the distribution channels but so far the results are mixed as can be seen from the Orrisa example. Innovative techniques like power cooperatives, giving the responsibility of distribution to NGOs or Gram Panchayats etc. can be tried wherever the consumers are ready for the experiments. Without their consent, involvement and cooperation, no innovation is likely to be successful. Farmers of the villages can come together to form some kind of an institution. The need for participation should come from them. If such an institution is formally imposed by government, without undergoing a social process of attitudinal change, the institution will not be effective. This has happened to many of our co-operative structures. Such an institution should be culturally suitable to people.

All those farmers who draw electricity from one outlet (may be a sub-station) have to come together. The role of GEB should end at the outlet. It is the user's organization which is responsible for further distribution. GEB may collect charges from the organization on the basis of electricity consumption at the outlet level. Irrigation need and electricity need should be made to match. Every group of farmers' should prepare their timetable and submit it to GEB. In turn, GEB should assure power supply to meet the irrigation requirement as per the timetable. In order to have better co-ordination between electricity and irrigation, the farmers group should have a crop-plan and a scientific water management plan. Generally farmers over irrigate their farms. A scientifically drawn and executed plan would save both water as well as electricity.

The relationship between GEB and farmers should be equal in nature. What has happened is that GEB comes to rural society as an outside agency for providing electricity as per their design and the rural society remains at the receiving end. This is a relationship between two unequals. In such a situation, only command and obey relationship comes into being. This vertical relationship has to be replaced with horizontal one where farmers can place their arguments before the authority and can suggest some alternative method. Such a two-way communication process would increase farmer's participation in resource management.

Electricity engineers of GEB are preoccupied with physical parameters of the electricity system. They are not trained to think in term of social system. Hence, they tend to give priority to machines over men. Moreover, frequent transfers and rigidity of the bureaucratic structure also inhibit efforts to establish rapport with farmers. The hierarchical, formal, rational, cosmopolitan culture of bureaucracy inhibits the bureaucrat to interact with farmer as an equal partner. Even in joint meetings, two

different cultures are clearly visible. There should be sufficient interaction between farmers and engineers and there should be a clear sense of similarity of goals among them. In most *shibirs* (workshops), experts arrange farmers' meetings, deliver lectures and ask farmers to change their culture and adapt to their own (authority's) culture. This is a complex cultural problem. Farmers as well as authority both would have to jointly evolve a new and participative culture. The real transformation is not brought about by leaders alone. It is brought about by both acting together. Organising and educating farmers will be one of the main tasks before implementing any distributional reforms. As GEB Officials themselves are important stakeholders, some external/independent training agency should be hired for this purpose. We sum up the paper in the words of Kanjibhai, a marginal farmer who says "Even if electricity is given free for 24 hours, what can we possibly do if there is no water left to extract?"

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