# To Free or Not to Free Power

## Understanding the Context of Free Power to Agriculture

*That the promise of "free power" to agriculture wins elections was demonstrated in the 2004 elections to Parliament and assemblies (Andhra Pradesh and Maharashtra). There is a need to understand why farmers are demanding quality power and yet not willing to pay for it. This paper, by three pumpset farmers from Chittoor district of Andhra Pradesh, is an exploration in this direction. It explores the spread of pumpset irrigation across the country and the reasons for the farmers' refusal to pay for the power they are consuming: a deliberate neglect of surface irrigation by planners and decision-makers, disparity vis-a-vis canal farmers, increasing input costs and declining incomes. The authors are, however, worried that the present trend in power consumption in agriculture (already covering 58 per cent of irrigated area) is ecologically unsustainable and ruinous to farmers, power utilities and the economy as a whole. A series of measures are suggested to overcome the crisis situation.*

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There is panic all round with the promise of "free power" fetching votes, upsetting the calculations of the "reformers". The proponents of power reforms are a worried lot today. They had argued powerfully that a lot of money, around Rs 36,000 crore,[1] was going down the drain of subsidised power, money that could be productively invested in transmission and distribution to give quality power to farmers. Generation could be left to private companies willing to risk such large-scale investment. Farmers would not mind paying for quality power, it was argued, as they would save on motor burn outs and recover the costs through sale of high value crops which had been watered timely.[2]

What the reformers were oblivious to was the fact that withdrawal of any subsidy should be preceded by an improvement in the paying capacity of the affected and a willingness on the part of the affected to pay. Two questions are pertinent here: Why are farmers desperate for irrigation? And why are they reluctant to pay for the power they consume?

### Farmers' Desperation for Water

Sixty per cent of cultivated area in the country today is under rain fed conditions.[3] Apart from the fact that these crops generally fetch low prices and therefore yield lower income, one missed or untimely rain can undo all the effort and investment of the farmer, forcing him into further debt and migration. One must remember that over 80 per cent of the farmers in India own less than five acres each and another 12 per cent own between five and 10 acres.[4] If there is assured irrigation, the Indian farmer can grow even high risk and value added crops like cotton or medium risk crops like paddy or low risk crops like sugar cane and earn a decent "income"/"surplus" of around Rs 5,000 to Rs 20,000 per acre depending on the yield and prices – if he calculates simply the cash expenses incurred during the season and the price received for his produce as most farmers normally do. This calculation does not take into account the cost of labour of the farmer or his family, rent on land, risk, depreciation on tools and machinery, repairs, management, cost of own farm yard manure, etc. The farmer could even gamble with high risk, volatile crops like tomato which require an investment of anywhere between Rs 25,000 and Rs 40,000 per acre. The price fluctuates between Rs 10 per kg and 10 paise per kg. It could fetch a profit of Rs two lakhs per acre within four months or a loss of Rs 25,000 to 40,000. With quality social services like health and education increasingly privatised and becoming more expensive by the day and social functions like marriages and death ceremonies also becoming prohibitively expensive, the farmer is desperately in need of hard cash and plenty of it. Assured irrigation and an assured price for his produce are, in a nut shell, what the farmer wants. Therefore the stakes for irrigated agriculture are very high indeed.

### *Who Are the Farmers Using More Groundwater and Why?*

A quick glance at Table 1 shows that 60 per cent of the pumpset irrigation is confined to just five states: Andhra Pradesh, Karnataka, Tamil Nadu and Kerala in the south and Maharashtra in the west. The average area irrigated per pumpset in this region is hardly 0.86 hectares. Even within these states, the pumpset density is concentrated in upland areas with relatively low rainfall, poor surface irrigation (Table 2) and extensive transmission and distribution (T and D) network of power to enable pumpset irrigation.

In sharp contrast, the northern plains of Uttar Pradesh, Punjab and Haryana with 40 per cent of the area in the country under well irrigation account for hardly 16 per cent of the pumpsets (Table 1). These are areas of relatively poor rainfall (especially Punjab and Haryana) but with extensive canal network, which also implies good groundwater availability. The region is also supported by extensive transmission and distribution networks of power supply. The area covered by each pumpset is relatively large at 3.58 ha in Punjab, 3.49 ha in Haryana and a very high 11.50 ha in UP. With the aid of pumpsets, farmers in this region are able to supplement canal water to grow crops year round. Pumpset irrigation also enables them to overcome problems of water-logging in some places. It needs to be estimated as to how

much of the 11.50 ha indicated in UP as under each pumpset is under purely pumpset irrigation, how much as a partial supplement to canal irrigation and how much of the irrigation is under diesel as opposed to electric pumpsets.

Madhya Pradesh (including Chhattisgarh) and Gujarat (especially the south) with 10 per cent and 5 per cent of the pumpsets in the country respectively are regions of reasonably good rainfall but with poor surface irrigation networks which compel farmers to go in for extensive groundwater irrigation through pumpsets. The relative abundance of water enables farmers to cultivate relatively larger areas per pumpset (2.86 ha/set in MP and 3.53 ha/set in Gujarat).

Saurashtra, Kutch and Rajasthan represent areas of low rainfall poor surface irrigation and low availability of groundwater. Irrigated dry crops are grown in these regions with each pumpset covering relatively large areas (6.31 ha in Rajasthan).

Eastern India provides a completely different picture, with heavy rainfall, major rivers and frequent floods. Hardly 11 per cent of the groundwater irrigated area of the country is located in the region serviced by 3.65 per cent of the pumpsets. Of late, pumpset density, especially of diesel pumpsets (in Bihar and Jharkhand with poor electric T and D networks) is increasing in the region catering to a rapidly growing water market for timely and adequate irrigation.[5] Pumpset irrigation is insignificant in the north east which is characterised by similar conditions as in the eastern plains but is extensively hilly.

A sharper picture would emerge if one could compare the agro-climatic zones within each state and the distribution of pumpsets. From the above we can safely generalise that groundwater utilisation has developed in three kinds of areas:

(1) Areas where rainfall is low, surface irrigation is poor and the T and D network of power supply is extensive: the south and Maharashtra (excluding the Konkan coastal belt). On the eastern coast aqua farming consumes a lot of power.

(2) Areas where rainfall is low, but having perennial rivers an extensive canal network, a high water table and extensive T and D power network: Punjab, Haryana and western Uttar Pradesh.

(3) Areas of good rainfall but poor development of surface irrigation and reasonably good availability of groundwater: Madhya Pradesh and south Gujarat.

It is farmers in these areas who are extremely agitated over power supply to agriculture. Table 3 shows the share of agriculture consumption in the total power supply of various states. AP, Karnataka, Haryana, Gujarat and Madhya Pradesh are states where supply to agriculture is sizeable (over 34 per cent of total power supply).[6] The larger the share of agriculture the implication is a smaller share of consumers who can subsidise agriculture and therefore the precarious position of the power utility to sustain itself financially. The tariff rates to agriculture consumers in different states however do not seem to bear any relation to this factor. Farmers in AP, Tamil Nadu, Maharashtra and to an extent in Chhattisgarh and MP are enjoying almost "free power" and the rates of tariff vary sharply from state to state indicating that other factors have to be taken into account to explain the situation, viz, the political climate (including closeness of elections), extent of collective pressure of farmers, recurring droughts and other calamities, profitability of groundwater supported agriculture, etc.

While hardly 40 per cent of cultivable land in the country is currently irrigated (2000), during the last 30 years (1970-71 to 1999-2000), surface irrigation by canals, promoted by the government, has grown very slowly, by 34 per cent (Tables 4, 5 and 6) while traditional water harvesting structures in upland areas, such as tanks, have been grossly neglected, resulting in the area

**Table 1: State-wise Area Irrigated by Groundwater and Pumpset Density**

| Region | State | Extent of Well Irrigated Area (in 000 Ha) | Percentage Share of Well Irrigated Area in the Country 1999-2000 | Number of Pumpsets as on March 31, 2000 | Percentage Share of Pumpsets in the Country as on March 31, 2000 | Density of Irrigation (Ha/Pumpset) |
|---|---|---|---|---|---|---|
| South | Andhra Pradesh | 1900 | 5.64 | 19,32,913 | 15.43 | 0.98 |
| | Tamil Nadu | 1453 | 4.32 | 16,80,312 | 13.41 | 0.87 |
| | Karnataka | 959 | 2.85 | 11,81,903 | 9.43 | 0.81 |
| | Kerala | 122 | 0.36 | 3,73,862 | 2.98 | 0.33 |
| | Sub-total | 4434 | 13.17 | 51,69,050 | 41.25 | 0.86 |
| West | Maharashtra | 1921 | 5.17 | 22,75,531 | 18.16 | 0.84 |
| | Gujarat | 2430 | 7.23 | 6,70,422 | 5.35 | 3.53 |
| | Rajasthan | 3867 | 11.50 | 6,13,061 | 4.89 | 6.31 |
| | Sub-total | 8218 | 24.44 | 35,59,014 | 28.40 | 2.31 |
| Central | MP and Chhattisgarh | 3712 | 11.04 | 12,98,108 | 10.36 | 2.86 |
| North | UP and Uttaranchal | 9403 | 27.96 | 8,17,673 | 6.53 | 11.50 |
| | Punjab | 2705 | 8.04 | 7,55,141 | 6.03 | 3.58 |
| | Haryana | 1433 | 4.26 | 4,11,022 | 3.28 | 3.49 |
| | Sub-total | 13541 | 40.26 | 19,83,836 | 15.84 | 6.82 |
| East | Bihar and Jharkhand | 2089 | 6.21 | 2,72,629 | 2.18 | 7.32 |
| | West Bengal | 712 | 2.12 | 1,09,291 | 0.87 | 6.52 |
| | Orissa | 836 | 2.49 | 74,526 | 0.60 | 11.22 |
| | Sub-total | 3687 | 10.82 | 4,56,446 | 3.65 | 7.97 |
| North-east | Assam | | | 3675 | 0.03 | |
| | Nagaland | | | 176 | | |
| | Meghalaya | | | 65 | | |
| | Manipur | | | | | |
| | Tripura | 4 | | 2094 | 0.02 | 1.91 |
| North-north | Jammu and Kashmir | 2 | | 5621 | 0.05 | 0.36 |
| | Himachal Pradesh | 13 | 0.04 | 5762 | 0.05 | 2.26 |
| Union territories | Delhi | 53 | 0.16 | 37,985 | 0.30 | 1.40 |
| | Goa | 18 | 0.05 | 6,658 | 0.05 | 2.70 |
| All India | | 33,632 | 100.00 | 1,25,28,445 | | 2.69 |

*Source:* Column 3 derived from *Statistical Abstract India 2001*, Central Statistical Organisation, Ministry of Statistics and Programme Implementation, New Delhi quoted in *Agriculture*, CMIE, Mumbai, February 2004, p 34; Column 5 derived from *Power Development in Andhra Pradesh, (Statistics), 2000-01* APTRANSCO Ltd, Hyderabad.

irrigated by them coming down by about 20 per cent. In sharp contrast, the area irrigated under open wells has gone up by 64 per cent and by tubewells has shot up by 259 per cent during the same period. Together they constitute 57 per cent of irrigated area in the country today,[7] employing a large number of rural poor (62 per cent of the population)[8] in agriculture and allied activities. Experience also shows that surface irrigation by canals has often left tail enders high and dry, who then turn to tubewells.

## Limits to Groundwater Irrigation

The spread of groundwater-based irrigation in the country needs a deeper analysis. If one were to examine the decennial growth since the 1970s (Table 7) growth of canal irrigation which was a modest 1.5 per cent per annum in the 1970s became almost stagnant during the 1990s growth at just 0.3 per cent per annum. As far as tank irrigation is concerned, the sharp decline in the 1970s by (-)1.5 per cent per annum has tended to taper off by the 1980s to a relatively moderate -0.76 per cent per annum and continued to be more or less at that rate during the 1990s (-0.81 per cent per annum). This does not however imply that revitalisation efforts have arrested the process. On the other hand it indicates that the neglect of tanks continues, albeit at a lower pace. The remaining functional tanks in the country continue to survive not because of government patronage but irrespective of it, based on the inherent strength of the technology as well as the strong institutional traditions of water management surviving in those regions.

In the case of wells there is a very sharp increase in the area under tubewells during the 1970s by about 11 per cent per annum. But this has slowed to a steady 4.74 per cent a year in the 1980s and continued at about that rate during the 1990s (4.70 per cent), which was still a high rate of growth. With overdrawal of groundwater, beyond the recharging capacity, as is invariably happening in almost all regions, this trend can be expected to fall sharply in future as we reach a saturation point. That is, even though many more tubewells may be sunk, the volume of water pumped out and the area irrigated may not go up significantly (it might even decrease if the present trend continues).

As the above figures indicate (Tables 4, 5 and 6) groundwater harvesting has emerged as the primary mode of irrigation in the country covering 57 per cent of the irrigated area. This trend is likely to continue to cover perhaps a maximum of 70 per cent of irrigated area over the next decade or two.[9] Further extension of surface irrigation is likely to be a slow and expensive affair involving lift irrigation in many cases and proposed linking of rivers with possible ominous consequences. But tapping of groundwater is limited by the recharging capacity of the under ground aquifers and therefore the growth rate is likely to taper off at an optimum level. However, the extent of area under groundwater needs a rider. In different parts of the country, groundwater is used in conjunction with surface irrigation, to supplement both tank and canal irrigation, especially by the farmers in the tail end region. This makes it difficult to clearly demarcate the exact area irrigated primarily by wells as opposed to being a supplementary effort. There is need for such a data base for a better understanding of the situation.

Such critical (and growing) demand on groundwater as the principal source of irrigation, invariably mining more water than the recharge capacity of the aquifers at greater expense of money and energy sounds alarm bells for the future of irrigated agriculture in the country. That the trend has been obvious for over two decades and precious little has been done to reverse it points the finger squarely at the policy planners and decision-making elite of the country who are now trying to pass the buck to the "unscrupulous", "greedy", "kulak" farmers.

### *Why Are Farmers Reluctant to Pay*

First let us look at the economics of sinking a borewell as given below:

| | |
|---|---|
| Cost of sinking a borewell (up to 400 feet) | Rs 30,000 |
| Cost of pumpset (5 to 10 HP of ISI quality) | Rs 25,000 |
| Cost of accessories suction pipe, cable wire, for 200 feet, starter, cost of delivery pipes, etc | Rs 30,000 |
| Service connection charges (in AP) | Rs 15,000 |
| Total fixed cost | Rs 1,00,000 |
| Recurring expenditure: | |
| Interest on investment @ 24 per cent pa | Rs 24,000 |
| Depreciation @ 10 per cent pa (assuming a lifespan of 10 years for a borewell) | Rs 10,000 |
| Maintenance and repairs | Rs 4,000 |
| Total recurring expenditure per annum | Rs 38,000 |
| Average area irrigated per pumpset (all India) | 2.69 ha |
| Average cost of irrigation per hectare per annum 38,000/2.69 = | Rs 14,126 |
| or (excluding electricity tariff) say | Rs 14,000 |
| Average cost of irrigation per acre per annum = | Rs 5,666 |
| or say | Rs 6,000 |

*Note*: The above calculation does not take into account the element of risk in striking water and the lifespan of a new borewell which is progressively growing less.

*Source:* Personal experience of the authors in Chittoor district of Andhra Pradesh.

In states like Andhra Pradesh, with 23.5 lakh officially recognised agricultural services and another three lakh unofficial and the average area irrigated per pumpset is hardly one hectare, the cost works out to Rs 38,000/ha or Rs15,378 per acre. The AP government has spent Rs 10,087.65 crore between 1950 and 2000 to create a surface irrigation potential of 23 lakh hectares (Neeti Samakhya 2003). This works out to Rs 43,859 per hectare or Rs 17,750 per acre, which is 15 per cent higher than under well irrigation. It must be remembered that this is only the "potential" created. In practice, it has rarely crossed 40 per cent of the potential (Planning Commission's observations). Which implies that the actual cost of providing surface irrigation by the government of AP would be over Rs 35,000 per acre (or double the cost under well irrigation). But in the former case the government bears the entire cost while in the latter case the farmer has to bear the burden!

### *Step Motherly Treatment: Pumpset versus Canal Irrigation*

Pumpset farmers argue that they cannot take on a another burden after spending so much on sinking a borewell and installing a pumpset. They argue that in the case of canal irrigation government is not only covering all the capital costs but also charging only a nominal price for water supplied at around Rs 250 per season to Rs 400 per acre per annum in AP. Since the demand for power by the pumpset farmer is basically a demand for water, they demand that the government should only collect water cess charges from them instead of power supply charges. Unlike the

canal farmer, the upland pumpset farmer is bearing the entire cost of capital expenditure and yet he is being asked to pay 10 to 20 times the water cess charges being collected from the canal irrigated farmer. This argument is further strengthened by the fact that a sizeable number of pumpset farmers are also tail enders of canal irrigated areas who rarely get adequate quantities of water in time. This is the genesis of the demand for concessional power for agriculture crystallised by the political parties trying to be one up over their rivals, as "free power to agriculture".

There are a few other important reasons why farmers prefer pumpset irrigation to surface irrigation: pumpset irrigation allows a farmer to have greater individual control over the release of water to his field unlike in canal irrigation where one has to wait for his/her turn under the 'warabandi' system. This applies to tank irrigation as well, where one is bound by several collective obligations regarding release of water, maintenance and repairs etc. In pumpset irrigation despite the heavy investment if there is adequate water in the well, power supply steady and the price of the produce reasonably remunerative to absorb the cost of the heavy capital expenditure over a couple of seasons the farmer would be able to break even within three to five years. Unfortunately for him, all these have turned out to be big 'ifs'! The mirage of prosperity continues to elude him. Prices fluctuate dramatically between supply and demand, even more so now with the competition (often unfair, heavily subsidised) of imports from various countries under the WTO dispensation. Power supply is poor with the rapid expansion of pumpset irrigation and an ill equipped transmission and distribution network resulting in frequent motor burn outs. Water tables are falling rapidly to dangerously low levels with many borewells going dry.

In a study of groundwater use in the panchayat area of E Palaguttapalli of Pakala mandal(block), Chittoor district Andhra Pradesh[10] several interesting facts came to light. Out of 220 families in the nine hamlets of the panchayat, 127 families were well/pumpset owning farmers. Seventy-five of these farmers (59 per cent) had less than five acres each and another 52 farmers (41 per cent) had holdings between five and 15 acres. The total number of traditional, open wells dug over the years were 161. No new open wells have been sunk in the last 10 years. The number of borewells (a phenomenon only two decades old) sunk was 189. In the peak summer of 2004, a drought year, hardly 30 wells/borewells were functioning (all the wells had in-well bores drilled in them). That is out of a total of 350 wells/borewells sunk hardly 8.57 per cent were functioning. For the 127 farmers with wells this works out to an average of 23.6 per cent functioning wells.

Let us try and estimate the investment per farmer on groundwater mining. The amount for 350 open and borewells for 127 farmers works out to an average of 2.76 wells per pumpset owning farmer. At an average cost of Rs 50,000 per well (open or bore) this works out to a whopping investment of Rs 1.75 crore. If the cost of pumpset and accessories is to be taken into account for 127 surface motors plus 127 submersible motors and replacement of existing motors by more powerful pumpsets at a modest rate of Rs 50,000 per farmer for 127 farmers this works out to Rs 63.5 lakh. So that the total capital investment by farmers of one small panchayat is not less than Rs 1.75 crore + Rs 0.635 crore = Rs 2.39 crore – or Rs 1.88 lakh per pumpset owning farmer.

For the 1,25,28,445 pumpset farmers in the country (as on March 31, 2000), at a modest investment of Rs 1 lakh per farmer on his well, pumpset, accessories and service connection, this works out to a whopping investment of over Rs 1,25,284 crore!

If he, a small or middle farmer, can mobilise Rs 1 to 2 lakh to sink wells/borewells, why can't he pay a paltry Rs 7,206 (the full cost to serve for a 5 HP motor running for six hours for 200 days in an year: 5 ×.746 x 6 × 200 × 1.61 (cost to serve)) towards

**Table 2: State-wise Extent and Sources of Irrigation – 1999-2000**
*(In per cent)*

| Region | State | Irrigated Areas as Percentage of Cultivated Area | Percentage Distribution of Irrigated Area by Source | | | |
|---|---|---|---|---|---|---|
| | | | Canal Irrigation | Tank Irrigation | Wells | Other |
| South | Andhra Pradesh | 41.32 | 37.27 | 14.55 | 43.34 | 4.54 |
| | Tamil Nadu | 54.39 | 29.21 | 21.30 | 48.89 | 0.61 |
| | Karnataka | 24.34 | 39.01 | 9.62 | 37.64 | 13.74 |
| | Kerala | 16.97 | 22.63 | 13.95 | 32.11 | 31.32 |
| West | Maharashtra | 16.80 | 35.36 | | 64.64 | |
| | Gujarat | 31.88 | 19.53 | 0.81 | 78.84 | 0.81 |
| | Rajasthan | 36.18 | 28.85 | 1.39 | 68.91 | 0.84 |
| Central | Madhya Pradesh | 37.56 | 17.70 | 2.33 | 65.57 | 14.40 |
| | Chattisgarh | 22.19 (1998-99) | | | | |
| North | Uttar Pradesh | | | | | |
| | (+ Uttaraanchal) | 72.17 (1998-99) | 24.49 | 0.75 | 72.93 | 1.84 |
| | Punjab | 94.48 | 32.37 | | 67.56 | 0.07 |
| | Haryana | 81.31 | 49.90 | 0.03 | 49.62 | 0.48 |
| East | Bihar(+Jharkhand) | 49.55 (1998-99) | 37.52 | 13.76 | 37.26 | 11.46 |
| | West Bengal | 34.93 | | | | |
| | Orissa | 34.40 | 45.41 | 14.59 | 40.00 | |
| North-east | Assam | 21.18 | 63.29 | | | 36.71 |
| | Tripura | 12.54 | 60.00 | 14.29 | 11.43 | 14.29 |
| | Mizoram | 9.89 | 100.00 | | | |
| | Meghalaya | 20.00 | | | | 100.00 |
| | Nagaland | 24.14 | | | | 100.00 |
| | Manipur | 46.43 | | | | 100.00 |
| | Arunachal | 21.08 | | | | 100.00 |
| Extreme north | Jammu and Kashmir | 41.34 | 92.08 | 0.99 | 0.66 | 6.93 |
| | Himachal | 18.51 | 2.94 | | 12.75 | 83.33 |
| Others | Goa | 15.49 | 18.18 | | 81.82 | |
| All India | | 40.53 | 31.44 | 4.73 | 58.76 | 5.08 |

*Source:* Derived from *Agriculture*, 2004, CMIE, pp 35 and 39.

electricity charges for any year or even the Rs 2,000 they are being asked to pay? For one thing, all this investment by the farmer was not made in a day. While most of the wells were sunk two or three generations ago, all the borewells are less than two decades old – a significant number in the last two years of extreme drought sunk by farmers in desperation – many of them are either instant failures or dried up within a few months, after heavy investment in new and more powerful pumpsets, etc. Much of the money for such investments, in this do or die battle, as the farmer sees it, in his desperation for water, comes from borrowed money either from relatives and friends or from moneylenders at high interest rates of 24 to 36 per cent. If we are to add lack of remunerative price following a bumper harvest or cheaper imports (often heavily subsidised by the exporting country) through free trade, under WTO regulations, the ever receding mirage of prosperity, the anger and frustration of the pumpset farmer at being asked to pay for the power he is consuming, can be better appreciated.

No data is available on the break up of pumpset farmers category wise and the extent of land cultivated by them .But some idea can be had from the agricultural census data put out by the government from time to time. As per the 1995-96 figures 62 per cent of farmers in India are marginal cultivating 17 per cent of cultivable area, 19 per cent are small (2 to 5 acres) cultivating 19 per cent of area, 12 per cent are semi-medium (5 to 10 acres) cultivating 24 per cent area, 6 per cent are medium (10 to 25 acres) cultivating 25 per cent of area and 1.2 per cent are large farmers (above 25 acres) cultivating 15 per cent of cultivable area. Thus those having more than 10 acres, accounting for around 7 per cent of the farmers control/cultivate 40 per cent of the cultivated land, which is indeed substantial. The bulk of pumpset farmers are small and semi-medium (between 2.5 and 10 acres) constituting 31 per cent of farmers cultivating 42 per cent of the cultivated area (*Agriculture*, CMIE, February 2004). Considering that 59 per cent of irrigated area is under well irrigation in the country and the fact that many of the cultivators having irrigation tend to have smaller holdings (since irrigation enables survival on tiny holdings as well), it can be safely assumed that the majority of the pumpset farmers are small and medium occupying a critical and substantive extent of the land under irrigation in the country.

In a bid to make the rich pay for the power consumed, the AP government announced a modification of its free power policy (in January 2005) asking those farmers who have more than three services, income tax payees as well as those under medium and major irrigation projects to pay for power. It could however net in hardly 10 per cent of the farmers. Our own field experience in Chittoor district (as in the case study cited above) confirms this.

Apart from the question of parity with the canal farmer on water charges, the economics of the pumpset farmer has to be understood. Pumpset farming compared to canal irrigation, is expensive and highly risky. The risk is accentuated as groundwater tables in the area decline. The question, therefore, is to what extent is well irrigated farming remunerative? The economics need to be studied over a five-year span to give a balanced view through the vagaries of the weather and prices, which tend to even out over a period.

### *What About Power Subsidies to Agriculture?*

Scholars like Ashok Gulati have pointed out that power subsidies to agriculture have gone up from Rs 46 billion in 1990-91 to Rs 288 billion in 2000-01 at current prices, a six fold jump in 10 years which is also making the state electricity boards (SEBs) increasingly bankrupt.[12] In the first place, the figures are suspect. As agricultural services in almost all states are not metered (due to the slab system of tariff) it is convenient for the concerned officials to pass off a substantial amount of transmission and distribution losses (T and D losses) as consumption by the agriculture sector – a fact acknowledged by even the World Bank. Several studies by various agencies have confirmed this pilferage by all categories of consumers including farmers.

We would therefore put the figure of agriculture consumption at around half the official estimate of around 25 per cent (Table 3) to around 12 to 15 per cent on an all India basis. Therefore, Gulati's figure of power subsidies to agriculture will have to brought down substantially by at least 50 per cent to around Rs 144 bn which is still large and the question has to be answered. Table 3 shows that on an all India basis while the cost to serve the agriculture sector (assuming the high level of consumption projected by the authorities) was around 350 paise per unit, the actual charge to the farmer was around 42 paise per unit meaning a subsidy of around 88 per cent.Three factors have to be taken in to consideration here: (a) neglect of surface irrigation by the state and encouragement to farmers to go in for groundwater-based irrigation; (b) heavy investment by the farmers in terms of capital investment in tapping groundwater with the produce fetching the same price in the market as that of the canal/surface irrigated farmer at nominal water cess charges and (c) lack of a level playing field with farmers of other countries, especially the OECD countries, compared to whom the subsidies enjoyed by our farmers are just peanuts.

### *Borewell Technology: The Modern 'Bhasmasura'?*

Like the demon, 'Bhasmasura' in Hindu mythology who won a boon from Lord Shiva that whosoever is blessed with his hand will turn to ashes, the Indian farmer is today armed with borewell technology. Wherever he sinks a borewell, sooner or later, the water disappears, ultimately ruining the water table and the farmer himself (just as Bhasmasura himself finally turned to ash). This is the third dimension of the issue. There are laws of course to prevent indiscriminate sinking of borewells which like the Dowry Act no one bothered about .Very soon, within 10 years, by the early 1980s, utter chaos prevailed. Increasingly, open wells were becoming unviable as a neighbour sinking a borewell automatically implied one's own well went dry, forcing one to sink deeper at great expense. As the farmers went deeper and deeper, the cost of groundwater mining kept growing, with old pumpsets discarded for new and more powerful submersible ones demanding/consuming more power but drawing out less water and the life of the borewell growing shorter (from an average of 10 years in the last decade to 5 years now). Two or three years of consequent drought and all hell will break loose, as wells dry up rapidly and new wells are sunk in desperation ,which in most cases, either fail to strike water or dry up as summer advances. As stated earlier, many of the suicides by farmers were directly related to failed borewells.

Despite the Congress government in AP announcing relief measures for the families of the victims, suicides by farmers continue to haunt the state with pathetic regularity (over 165 suicides in the first 10 months of the new government's rule). The government attempted a stricter implementation of the Water, Land and Tree Conservation Act, 2002 to regulate sinking of new borewells. But come summer and all the enforcement goes haywire.

Throughout the country, wherever farmers have taken to groundwater mining, as a rule, there has been overdrawal of water,

beyond the recharge capacity of the aquifers, resulting in rapid decrease of groundwater to dangerous levels with often irreversible consequences. In several coastal areas, indiscriminate groundwater mining, by both rural and urban dwellers, has resulted in seepage of sea water inland turning all groundwater brackish. Coastal areas in Gujarat and Chennai are good examples of this man-made tragedy. In almost all the districts of AP, fluorosis has become endemic affecting large sections of the people (especially the physically weak who are mostly poor) and animals (over 12,000 villages were affected in 2003). And the problem is multiplying as groundwater table recedes in more areas. Arsenic poisoning in West Bengal is another tragic consequence directly attributable to indiscriminate groundwater mining.

### *Competitive Politics and Free Power*

The situation is further complicated by competitive electoral politics. Come elections and the politicians have to win. All rules of the game are thrown overboard. If one party offers concessional power to some sections of farmers, the rival promises free power to all. If one party says all loans will be rescheduled the rival says all loans will be written off if voted to power. Invariably, the party in opposition can claim more liberal reliefs to the voters (read farmers) than the one in power, who is on the defensive. If the promises of a party carry enough credibility it will be voted to power. In defence of the politician, it must be admitted, that to appeal to voters, they require simple and direct slogans. The candidate or party cannot say we will give concessions to only such sections below a certain limit. Such clauses and sub-clauses will give scope for doubt about the party's promises. The message will not get across. The voters, having seen several elections, do not trust the political leaders to sustain their promises beyond immediate relief of writing off bad debts/past loans and reversing the promises (of free power, etc) after a while (e g, Punjab). There is no agenda of a radical shake up of the present system which will have to start with values, more practised than preached.

### *Where Do We Go from Here?*

The question of free power supply to farmers is, as can be seen, quite complex, intertwined as it is, with questions of parity, development of surface irrigation (or failure to do so), of remunerative prices, quality power supply, sustainability of power utilities, sustainability of groundwater levels and preventing their deleterious affects, containing competitive politics, setting right regional imbalances etc, etc. Obviously, the present state of drift will only lead to disaster on all fronts. A positive and holistic approach needs to be taken.

Energy experts sympathetic to the farmers have made some positive suggestions. A K N Reddy, examining the Karnataka scene, suggested greater emphasis on measures demand-side management (DSM) among other things.[13] T L Sankar suggests reserving cheaper sources of power, like hydel and older thermal plants for agriculture.[14] Poor communications, poor accountability on all sides, lack of attractive schemes have so far failed to induce farmers to accept simple DSM measures in a big way. Sankar's proposals, although breaking fresh ground theoretically, will ultimately end up with a large electricity bill for the farmer.

Like Sankar, Sidharth Sinha also suggests separation of agricultural/rural feeders from the rest for "better monitoring of agriculture supplies and targeting subsidies" as he fears, "…Elimination of power subsidies for agriculture appears infeasible in the short-term given the critical role of groundwater irrigation in agriculture. The poor condition of canal irrigation along with flat rate subsidised power tariffs has led to increasing reliance on pumped groundwater. Groundwater provides a more flexible and reliable source of irrigation than surface water, in spite of poor quality of power supply."[15] We may add in this regard, that Tamil Nadu has done this and has been giving free power to the farmers for over 20 years now. A brief attempt at making the farmers pay at least partly for the power met with an electoral rebuff for the ruling party which then quickly reversed its stand.

Sumir Lal in a refreshing article[16] observes that the promise of improvement in quality of supply of power as a result of

**Table 3: Agricultural Power Consumption and Tariffs in Different States (2002-03)**

| Region | State | Share of Agricultural Consumption/Total Consumption (in Per Cent) | Average Rate for Agricultural/Irrigation (Paise/Unit) | Unit Operating Cost (Paise/ Kwh) | T and D Losses (Per Cent) |
|---|---|---|---|---|---|
| South | Andhra Pradesh | 41.2 | 31.00 | 238.00 | 30.11 |
| | Tamil Nadu | 24.4 | 1.34 | 309.82 | 17.31 |
| | Karnataka | 39.2 | 38.80 | 374.58 | 24.57 |
| | Kerala | 2.1 | 67.21 | 347.35 | 27.45 |
| West | Maharashtra | 21.3 | 82.28 | 357.54 | 34.01 |
| | Gujarat | 37.7 | 62.00 | 365.39 | 28.52 |
| | Rajasthan | 29.7 | 46.33 | 368.16 | 42.61 |
| Central | MP | 34.2 | 7.20 | 324.92 | 43.31 |
| | Chhattisgarh | 11.6 | | | 37.86 |
| North | UP(+Uttaranchal) | 19.1 | 119.00 | 383.64 | 34.16 |
| | Punjab | 27.6 | | 285.18 | 24.42 |
| | Haryana | 44.1 | 47.71 | 411.90 | 37.65 |
| East | Bihar(+Jharkhand) | 27.5 | 13.37 | 377.08 | 37.98 |
| | West Bengal | 4.3 | 91.86 | 376.78 | 25.93 |
| | Orissa | 2.5 | | 184.90 | |
| North-east | Assam | 2.6 | 287.15 | 589.10 | 38.30 |
| | Meghalaya | | 51.01 | 264.98 | 21.92 |
| North-north | Jammu and Kashmir | 3.3 | 220.00 | 412.32 | 45.55 |
| | Himachal Pradesh | 0.8 | 50.00 | 235.38 | 21.16 |
| Others | | | | | |
| All India | | 24.90 | 41.50 | 350.33 | 32.54 |

*Sources:* Power Development in AP (2002-03), APTRANSCO, p 155;
Planning Commission, 2002: *All India Electricity Statistics, General Review 2002-03.*

reforms "is an unconvincing promise that no one will believe until it is actually delivered...the most powerful reason for non-cooperation is that all farmers have a real fear of paying higher electricity prices." He calls for a strategy to "bypass the elite (big farmers) and mobilise the communities. The key will be in getting the local farm community to 'own' the problem (rather than forcing a solution on it). And empowering it to negotiate its own solutions with the electricity utility, such as, where conditions permit, forming a cooperative to control local distribution." This is easier said than done. The experience with rural electricity cooperatives is rather depressing: sunk into a morass of debts and inefficiencies, including open pilferage. Part of the reason has been perceiving the office of the chairman and other positions in the organisation as political dividends to be dished out to the faithful. One has yet to come across a successful rural electricity cooperative, not that it cannot be done.

Trying to ride roughshod over the farmer and announcing high tariff rates or making it difficult to get new service connections for farmers will only lead to greater pilferage by the farmers. Assessing power pilferage in rural areas of Rajasthan, Sudhir Katyar in a study for Prayas,[17] makes some shocking revelations: that 70 per centof the energy purchased by the power utility is unaccounted for. With power rates at 90 paise per unit for agriculture against a cost to serve of Rs 2.13 per unit for the distribution utility, there is extreme reluctance to give new connections, with a minimum charge of Rs 25,000 to be paid for a new connection, resulting in a huge backlog of a waiting list of 15 years. Obviously, no farmer who has water, will wait for 15 years for the utility to give him the required connection. In connivance with the employees of the utility they will directly tap from the line…so that in most villages illegal connections outnumbered legal connections by three to one. He concludes: "The framework for intervention that emerges is holistic in nature and proposes interventions along all aspects of the system – technical, commercial, social and institutional…large-scale-theft…cannot be curbed unless the utilities devise methodologies to involve consumers in distribution management at the local level leading to social vigilance." He feels strongly that it is not possible to control theft by mere technical solutions, however superior they may appear on paper such as the Feeder Rehabilitation Programme (FRP) involving spending thousands of crores of rupess to replace existing low tension transformers with those of smaller capacity to serve two to five agricultural services and giving cabled service connection to the respective services from the new transformers. (A similar scheme has been launched in AP called the high voltage distribution scheme, estimated to cost Rs 5,000 crore.) All such purely technical schemes, as Katiyar points out, are doomed to failure as farmers not having a regular service connection, in collusion with the staff of the power utility, will soon find a way to tap power illegally.

## Why Farmers Don't Trust the Government

### *Case of Water from the Sardar Sarovar*

Yet another dimension in farmers' attitudes and behaviour needs to be understood. Jayesh Talati and Tushaar Shah studied water distribution under the Sardar Sarovar Project (SSP) in Gujarat in 40 villages in different parts of the command area (IWMI-Tata Research) in late 2002.[18] SSP planners expected to construct only the main canals and distributory network up to the pucca minor, beyond which it was expected that the farmers would form into collectives of water users' associations (WUAs) and construct the subminors and field channels to take water to their fields. The WUAs were the key link in the system. They were expected to be responsible for collecting the water fee from the farmers and indenting for the water required and also responsible for ensuring proper distribution and maintenance of the subminor and field channels. They were expected to collect Rs 157 per hectare from the water users and retain Rs 7 of the collection for their own expenditure. "The idea was that participatory irrigation management (PIM) in the SSP should start at the beginning, rather than come midstream when system managers have taken all the crucial decisions". To maximise the spread of benefits, it was felt that water would be supplied to the farmers in five irrigations during the rabi season "rather than supporting a small, intensively irrigated command" growing crops like sugar cane and banana. They wanted to

**Table 4: Irrigation: All India – by Source**
*('000 hectares)*

| Five-Year Average | Canals | Tanks | Tubewells | Other Wells | Total Wells | Other Sources | Total Irrigated Area | Net Sown Area |
|---|---|---|---|---|---|---|---|---|
| 1970-71 to 1974-75 | 13,106 | 3,782 | 5,357 | 7,571 | 12,929 | 2,332 | 32,148 | 139,468 |
| 1975-76 to 1979-80 | 14,430 | 3,839 | 7,876 | 8,005 | 15,882 | 2,423 | 36,574 | 140,993 |
| 1980-81 to 1984-85 | 16,092 | 3,210 | 10,625 | 8,488 | 19,113 | 2,387 | 40,802 | 141,177 |
| 1985-86 to 1989-90 | 16,529 | 2,780 | 13,030 | 8,997 | 22,027 | 2,718 | 44,055 | 139,759 |
| 1990-91 to 1994-95 | 17,226 | 3,176 | 15,762 | 11,103 | 26,865 | 3,261 | 50,528 | 142,466 |
| 1995-96 to1999-2000 | 17,453 | 3,041 | 19,226 | 12,416 | 31,642 | 3,352 | 55,488 | 142,189 |

*Source:* Derived from *Agriculture*, 2004, CMIE, pp 32-33.

**Table 5: Irrigation by Source – All India**
*(Percentage)*

| Five-Year Average | Canals | Tanks | Tubewells | Other Wells | Total Wells | Other Sources | Total Irrigated | Irrigated Area as Percentage of Net Sown Area |
|---|---|---|---|---|---|---|---|---|
| 1970-71 to 1974-75 | 40.77 | 11.76 | 16.66 | 23.55 | 40.22 | 7.25 | 100 | 23.05 |
| 1975-76 to 1979-80 | 39.47 | 10.50 | 21.53 | 21.89 | 43.42 | 6.63 | 100 | 25.94 |
| 1980-81 to 1984-85 | 39.44 | 7.87 | 26.04 | 20.80 | 46.84 | 5.85 | 100 | 28.90 |
| 1985-86 to 1989-90 | 37.52 | 6.31 | 29.58 | 20.42 | 50.00 | 6.17 | 100 | 31.52 |
| 1990-91 to 1994-95 | 34.09 | 6.29 | 31.20 | 21.97 | 53.17 | 6.45 | 100 | 35.47 |
| 1995-96 to 1999-00 | 31.45 | 5.48 | 34.65 | 22.38 | 57.03 | 6.04 | 100 | 39.02 |

*Source:* Derived from *Agriculture*, 2004, CMIE.

"introduce volumetric delivery and charge at all levels right from the beginning".

From their study, Talati and Shah observe that:

> it is very unlikely that irrigation communities will construct sub-minors and field channels in a hurry, if at all. Half-hearted statements and rumours that the government might after all take over the responsibility of building distribution systems within village service areas has further reduced the chances that irrigation communities would take any initiative in this direction…Almost every village we visited had 10-20 diesel pump renters who also provided up to1,000 to 1,500 feet of rubber pipes. Conveying lifted water 1-1.5 km using rubber pipes is quite common in the area. Therefore, rather than investing money and labour in building field channels and sub-minors, farmers will very likely use lift irrigation on a large scale. In many villages we found that farmers were already preparing to invest in diesel pumpsets and pipes…Thus the SSP water fees are just a small fraction of the actual value farmers place on that water, and should not be difficult to collect at all; this however does not mean that SSP will be able to collect its Rs 6 crore/season easily.

Among the reasons for this difficulty they mention:

> One idea that was deeply ingrained in the minds of farmers is that SSP's need to release water into the system is greater and stronger than the farmer's need to use the water; allowing this impression to continue must further erode SSP's capability to establish an orderly institutional arrangement for irrigation.
>
> ...most farmers did not believe that water indents will not be honoured unless they are made through WUAs; that WUAs who do not make an indent will not get water; that WUAs which do not pay their dues will be refused water for the next irrigation; and that lift irrigation will actually be charged at the same rate as flow irrigation. It seemed to us that farmers take the SSP and the government so lightly that they were totally nonchalant about SSP's new water policy, which they did not believe would be vigorously implemented.

The above case reveals some interesting features: (a) The government has poor credibility; (b) government institutions (SSP in this case) are perceived to be duty bound to deliver goods at the citizen's/consumer's/farmer's door step and not charge the consumer/farmer for the service; (c) given the inefficiency of the cooperative, the government and its institutions, farmers prefer, even at much higher cost, a more dependable private, individual lift irrigation scheme which can serve their needs in time. The authors have not revealed what crops the farmers grew in these areas with water lifted from the main distributaries.

The above case is a mirror image of what happens in the case of power distribution, not only for agriculture and rural areas but also in case of urban consumers (domestic consumers for example). These problems have arisen because there is very little transparency in the functioning of the government or its labyrinth institutions. There is very little attempt at participatory and accountability exercises, to give a sense of involvement to the people/beneficiaries of various projects/consumers from the beginning. The top-down approach and bureaucratic controls at every level, encourage corruption and misuse of the system(s).Those at the top, the political leaders and decision makers, have to set personal examples and standards against corruption of all kinds as people tend to justify their corrupt practices citing them as seen in the Rajasthan study above.

All this of course does not obviate the need for reform and accountability in consumption. The challenge is for innovative solutions that work and not stop at generalisations. We suggest some measures below in this direction.

Power to agriculture is basically a demand for adequate and timely supply of water. If usage of groundwater is minimised, power consumption by the agriculture sector would automatically reduce. This can be possible only when (a) surface irrigation is available in adequate quantities and at the right time to the maximum area possible and (b) crops requiring less water are raised.

(a) *Improving availability of surface irrigation:* This is possible in several ways: (i) By revitalising traditional harvesting systems such as tanks, technically and institutionally; (ii) streamlining and rationalising usage of water under existing canal irrigation systems so that available water is shared rationally by all the ayacutdars; (iii) early completion of ongoing projects of surface irrigation; (iv) launching of new surface irrigation projects (major, medium and minor) and (v) reducing/ceasing diversion of surface water to meet urban needs at the cost of rural areas.

All these exercises, to be reasonably successful have to be transparent, participatory and accountable to the victims and beneficiaries at every stage and imply devolution of power and economic control to the panchayat level. But more importantly, the limitations of surface irrigation must also be realised. With all the available and potential schemes it would not be possible to enhance irrigated cultivation by more than another 10 per cent to say 50 per cent of cultivated area from the present 38-40 per cent. And greater the inefficiency of surface irrigation, greater will be the recourse to groundwater mining which of course has its limits, and in many areas, in just over two decades, that limit has already been reached and is likely to be reached in the rest of the country within the next two decades at most.

(b) *Packages of region specific cropping patterns and tree farming practices*: These would involve less consumption of water and are at the same time equally, if not more, remunerative to the farmer than water-intensive crops, addressing the question of how to make a two acre farm viable with the least use of assured water. This is a tall order, requiring farmer leaders, scientists, administrators and political leaders to combine their efforts. In the present context, more than anything else, an attractive and remunerative price is what would attract the farmer to growing a particular crop. Planners and decision-makers would do well to keep this highly motivating factor in mind in evolving schemes, if they are to be successful.

**Table 6: Change in Irrigation by Different Sources – All India 1970 to 2000**

*(In million ha and percentage)*

| Source | Million Hectares | Change in Area (Percentage) | Change in Share of Total Irrigated Area (Percentage) |
|---|---|---|---|
| Canals | + 4.347 | + 33.17 | - 9.32 |
| Tanks | - 0.741 | - 19.59 | - 6.28 |
| Tubewells | + 13.869 | + 258.90 | +17.99 |
| Other wells | + 4.845 | + 63.99 | - 0.54 |
| Total wells | + 18.713 | + 144.74 | +16.81 |
| Other sources | + 1.020 | + 43.74 | – 1.21 |
| Total | + 23.340 | + 72.60 | +15.97 |

*Source:* Derived from Tables 4 and 5.

**Table 7: Growth of Irrigation by Different Sources – All India**

*(Per cent per year)*

| | Canals | Tanks | Tubewells | Open Wells | Total |
|---|---|---|---|---|---|
| 1970-71 to 1979-80 | + 1.5 | - 1.5 | + 10.86 | + 1.52 | + 5.03 |
| 1980-81 to 1989-90 | + 1.2 | -0.76 | + 4.74 | + 2.49 | + 3.50 |
| 1990-91 to 1999-2000 | + 0.3 | -0.81 | + 4.70 | + 2.15 | + 3.62 |

*Source:* Derived from *Agriculture*, CMIE, February 2004, pp 32-33.

(c) *Minimal water for maximum coverage*: The use of sprinkler and drip irrigation techniques extensively need to be encouraged by the concerned agencies with suitable incentives and propaganda. Similarly cultivation practices, such as the new SRI method of rice cultivation (System of Rice Intensification – the Madagascar model) which enable saving of nearly 30 per cent of water need to be demonstrated to farmers.

(d) *Augmenting and regulating groundwater*: This will prevent farmers from sinking deeper borewells ruining themselves financially while drawing more power and leading to deleterious environmental and health effects. This is a slow and difficult exercise. It involves watershed development, through construction of water harvesting structures from hills to farmers' fields, bunding, contour trenches, digging farm ponds, extensive tree plantation, afforestation and forest conservation measures. The critical link between availability of groundwater and good forests needs to be emphasised and demonstrated powerfully to all. This can be a very good employment and resource generating exercise for the poor and marginal farmers.

A package of incentives through credit, support prices, procurement/marketing and crop insurance of low water consuming crops will go a long way in mitigating the groundwater crisis. Consumers need to be educated to see the merits of millets and such other low water consuming crops,especially in the upland areas where many have given up their traditional, nutritious food habits and switched over to consumption of polished rice.

(e) *Saving energy*: Every unit of energy saved is equal to twice the energy produced, especially in sectors like agriculture, which are heavily subsidised. On an all India average, the rates charged from farmers for power supplied for agriculture use are hardly 12 per cent of the cost to serve. It is estimated that nearly 30 per cent of the power supplied to the agriculture sector is wasted through the usage of inefficient pumps (at an efficiency of 15 to 20 per cent), crude metal foot valves and metal suction pipes and non-installation of suitable capacitors. These need to be replaced by attractive exchange schemes for installing efficient pumpsets, frictionless foot valves, HDPE suction pipes and installation of suitable capacitors. The need to save energy, emphasised by A K N Reddy, in all his writings, is not just for the farmer but all categories of consumers. Domestic consumers and offices can switch over to CFL bulbs, offices can switch off unnecessary lights and fans, especially during day time and airconditioners during winter. Those at the helm of affairs should take a lead in the matter, creating a fever, a fervour to save and use energy efficiently.

(f) *Energy audit and metering*: Whether power is supplied to agriculture free or not, it is essential to know how much power is being consumed by the agriculture sector as unmetered agriculture consumption has often been the easy explanation to pass off pilferage as agricultural consumption. Separating agricultural feeders as in Tamil Nadu could be explored. Meters could be fixed on the LV side of distribution transformers (DTRs). User committees could be formed at the transformer level, rewarding consumers for saving power and penalising excess usage. Farmers are suspicious of individual meter installation schemes, as Sumir Lal pointed out, as they fear sooner or later the tariff rates will be raised enormously especially since the Electricity Act, 2003 specifically mentions the same. It is therefore necessary to give written assurances on long-term cheap power to farmers, say for 10 years, before metering of individual services is resorted to. Compulsory metering of individual farmer's services, or leaving it to their choice or opting for a slab system, all have their merits and demerits and need to be approached cautiously, depending upon the local situation. Forcible installation of meters, as noted above, will only result in farmers and personnel of the utility colluding/cooperating to simply bypass the existing meter most of the time defeating the very purpose.

(g) *Checking pilferage*: It is estimated that a substantive amount of power being generated, between 10 and 22 per cent across the country, is being pilfered and unaccounted for by all categories of consumers, some more, some less. It is indeed shocking that the figure is very high even in the capital, New Delhi (around 42 per cent shown as T and D losses) where there is hardly any agriculture. Reform measures initiated by the World Bank have had some positive effect through installation of meters at every point of interface in transmission and distribution, from HT to LT and have made for some improvement in the HT and EHT sectors. However, these measures seem to have had little effect at the ground level, at the consumer end where collusion between staff of the power utilities and consumers is rampant. Forming transformer level consumer associations, fixing meters at the transformer level, fixing tariffs at affordable and stable rates and evolving a culture of accountability at all levels and by all constituents are some measures by which the problem could be tackled.

In their entire experience with the power sector, farmers have been reactive: responding to the new technology and incentives for tapping groundwater and demanding concessions from the government/utility when they find their farm economics going haywire, tapping power freely when governments/utilities fail to respond adequately. The situation actually demands proactive measures by farmers, especially farmers' organisations. We mention some of them below:

(i) Seek local solutions for water shortage problems as far as possible, appropriate water harvesting techniques and cropping patterns (including combinations with tree crops).

(ii) Food first and self-reliance before selling in the markets should be the guiding principle, especially in the light of free trade under WTO, where agricultural markets have become internationally sensitive. Organic farming practices with local materials for inputs can be a viable strategy for farmers to consider in their present plight. Playing in the international market would need capacity to regulate markets. This can be done only collectively by strong farmers' organisations which would be market sensitive and capable of regulating production by farmers. Farmers need to organise themselves into strong and disciplined bodies instead of relying on political parties for their largesse and generosity.

(iii) Farmers should demand decentralised, uniform and quality health care and educational services in rural areas, which are now being withdrawn under the so-called reforms, paving way for expensive private services. The government must look upon this as an investment in human resources and not on short-term cost to serve basis.

(iv) They should initiate campaigns to cut down expenditure on social functions/ceremonies such as marriages/deaths, etc. These practices are partly a hangover of the feudal past and partly a response to the consumerist culture developing today.

As one can see most of the above suggestions to farmers are outside the power sector but they have to be considered because they have a powerful bearing upon the economic well-being of the farmer or, in other words, his ability to pay for the power he consumes. Above all, it needs a change in mindset from the present consumerist trend to one of limiting wants and needs not just for the farmer but for all of us. As Gandhiji reminds us: "Nature has enough for every man's needs but not every man's

greed". It must be recognised that there cannot be one uniform solution for all the power utilities in the country.

## Summary and Conclusions

The present state of affairs, is a sure recipe for disaster as it is unsustainable with rapidly multiplying adverse consequences: suicides by debt-ridden farmers, depleting groundwater resources way beyond recharge capacity, rising costs of pumping, adverse health and environmental affects, wastage of power, pilferage leading to overloading of the distribution system, consequent motor and transformer burnouts resulting in heavy losses to the utilities and the farmers. In other words, there are really no winners! Without experiencing or at least perceiving any substantial benefits no reforms will succeed. Innovative and imaginative solutions are called for, which are region and environment specific sensitive to the local socio-political and economic conditions of the farmers. The reform processes will have to be transparent, participatory and accountable at all levels requiring much groundwork. Some suggestions in this direction are listed below:

(i) Freeze all tariff changes for agriculture for 10 years. Concentrate on energy audit and energy saving measures, with adequate propaganda by all concerned and involving farmers organisations and peoples' representatives at all levels.

(ii) Improve surface irrigation facilities: revitalisation of traditional water harvesting structures, stabilising and rationalising distribution of water under existing irrigation projects, early completion of ongoing irrigation projects and development of new surface irrigation projects in that order.

(iii) Improve efficiency of surface irrigation through drip and sprinkler irrigation and adoption of minimal water requiring methods of cultivation (such as the SRI method of paddy cultivation).

(iv) Ensure attractive prices for rain fed and irrigated dry crops, evolve combinations of less water requiring crops and tree farming which are local /region specific and remunerative for a two acre farmer.

(v) Development of watershed and afforestation programmes to boost/recharge groundwater.

(vi) Encourage roof water harvesting and restoration of water bodies in and around urban areas and minimise diversion of surface water from irrigation to urban dwellings.

(vii) Encourage adoption of DSM measures in pumpset farming through attractive incentives, propaganda and a carrot and stick policy.

(viii) Encourage energy saving measures by all categories of consumers with policy-makers setting personal examples and penalising excess usage and wastage.

(ix) A thorough re-examination of all the PPAs entered into with various IPPs, including non-conventional energy developers, and bringing them in line with standard international norms for energy projects vis-a-vis performance of state units. Total transparency in the working of these institutions so that effective steps can be taken to curb corruption in the functioning and dealings of the various utilities.

(x) Suitable amendments to the Electricity Act,2003 to remove anomalies and make for healthy growth of the power sector and making cheapest and quality power available to the consumers on a sustainable basis.

(xi) Farmers' organisations should campaign among farmers to seek local solutions for water problems, minimising usage of groundwater; for self-reliance before production for market, regulation of production, organic farming as a serious strategy of self-reliance, demand decentralised quality and free health and educational services and cut down on expenses on social ceremonies (marriages, death rituals, etc).

Energy experts and decision-makers, including those of the World Bank, should view power supply to agriculture in a positive manner, as an incentive assisting productive investment and not as a burdensome subsidy. They should appreciate both the risk taken and private investment made by the farmer, as well as the overall positive impact and spin off effects it has on the economy. As they are aware, the concessions/incentives/subsidies given to our agriculture sector are hardly 3 per cent of our agriculture GDP while the developed countries such as the US and other OECD countries spend between 20 and 75 per cent, ignoring the WTO. If economists and energy experts continue their biased mechanical and academic approach to the problem of concessional or free power to agriculture, ignoring the ground realities, it will only result in more failed policies. EPW

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[The authors are grateful to Aparna Krishnan for typing assistance.]

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