The Electricity-Groundwater Conundrum:
The Case for a Political Solution to a Political Problem

Paper presented at 4th IWMI-Tata Annual Partners' Meet
Session 5: Groundwater Markets and Livelihoods
February 24-26, 2005

Navroz K. Dubash
Senior Fellow
National Institute of Public Finance and Policy
Ndubash@nipfp.org.in

I. Introduction

The problematic interface between electricity use and groundwater access has been a subject of debate for well over a decade. This debate has taken on a renewed urgency following the recent 2004 national elections, after which free or cheap power came roaring back up the political agenda of state governments. The electricity-groundwater conundrum has implications for the productivity, viability, and sustainability of India's agrarian economy, but also for the health and future viability of the larger project of electricity reform in India. Indeed, power to farmers is perceived, in many ways correctly, as being at the heart of the electricity reform agenda. For the viability of both the water and electricity sectors, this interlinked problem needs resolution.

Although the debate on the electricity-groundwater link is long-standing, it is marked by a focus on technocratic approaches to policy-making rather than an appreciation for the entrenched political nature of the problem. Fixes have tended to be economic – raise prices to farmers – and/or technical – install meters. Both are standard elements of the electricity reform prescription that the nation has struggled, largely unsuccessfully, to implement over the last five to ten years. Failures to follow both prescriptions are ascribed to a lack of "political will." And there the matter rests. Until politicians develop a backbone, it is argued, there is little that can be done.

By contrast, this paper seeks to develop a more consciously political interpretation of the electricity-water conundrum, and consequently a case for a more deliberate political solution. The "lack of political will" argument suggests that when technocratic solutions run into a political obstacle, the political process should be by-passed, either by stealth, or by pinning hopes on a political strong-man at the state level who can demonstrate the way forward for the rest.[1] If, by contrast, there is some weight given to the democratic process through which policy change must pass, then the reasons why farmers have been so opposed to the standard reform prescription must be taken seriously, weighed, and addressed. This is not to say that the prescriptions themselves are necessarily wrong, but it is to say that a political solution is needed to provide a larger framework within which technical and economic solutions can be embedded. Efforts to solve the electricity water problem by advocating technological and economic fixes have so far have put the cart before the horse; sustainable reform first requires a workable political bargain to which the various parties involved, particularly farmers, can agree. Technical and economic instruments are then needed with which to implement the political bargain.

This paper is organized around three parts. Part II provides a brief summary account of the electricity-water intersection, and the nature and history of the problem. Part III discusses some of the conventional wisdom on which the standard prescriptions of tariff increases and metering agricultural supply rests, and argues that farmers may indeed have good reason to be concerned about their future under these prescriptions, concerns that are not being taken sufficiently seriously. This discussion provides the basis for a political understanding of the problem. Part IV then briefly reviews some proposed

[1] There is a robust debate on the relative merits of quick and stealthy reform versus slower, more transparent and deliberative reform, in the context of efforts at structural adjustment and neoliberal reform that many countries embarked upon in the 1980s and 1990s. See Rodrik (1996) for a survey.

solutions to assess them in light of the political understanding developed in Part III. Part V provides some reflections toward a political solution.

II. A Synoptic Account of the Electricity Water Nexus

Indian agriculture is heavily dependent on groundwater. Indian farmers extract about 150 km^3 of groundwater, making India by far the largest user of groundwater in the world(Shah et al. 2004). About 55-60% of India agricultural lands rely on groundwater for irrigation (Shah et al. 2004), and this reliance on groundwater supported agriculture contributes about 10% of GDP (World Bank 1998b). Even more significant, about 55-60% of India's population is estimated to depend on groundwater for their livelihoods (Shah et al. 2004). Consequently, although much more public has money has gone into surface irrigation, farmers have invested heavily in small pumps, so that 70-80% of the value of agricultural production is based on groundwater rather than surface water (World Bank 1998b, p. 2). This is quite understandable, since yields are estimated to be one third to one half higher in groundwater irrigated areas than in areas irrigated by other means (Dhawan 1995).

This picture of groundwater dependence varies by region.[2] In the west and south, groundwater dependence is firmly entrenched, water levels have been falling for a couple of decades, and farmers have been engaged in a chase to keep up with water levels, leading to a concentration in control over groundwater. In other parts, notably the Eastern plains, groundwater remains in abundance, but investment in pumps has been limited in part because of a lack of assured electricity supply.

Groundwater-driven agricultural productivity rests firmly on access to electricity. This is particularly so in the areas where groundwater use has become entrenched, such as North Gujarat, Tamil Nadu, and parts of Andhra Pradesh, but also in areas of high agricultural productivity such as Punjab and Haryana. As a result, farmers and agriculture are estimated to account for between a quarter and a third of electricity use (Shah et al. 2004). The Centre for Monitoring the Indian Economy puts this figure at 31% (cited in Kumar 2005). While the numbers are extremely hard to pin down, for reasons discussed further below, there is little doubt that in quantitative terms alone, agricultural users are too large for the electricity sector to ignore.

However, the real complexity in the water–electricity link rests not in the proportion of electricity that is used by agriculture, but in the way in which the use of electricity by farmers has evolved over time. Electricity provision for agriculture has its roots in the Green Revolution strategy of agricultural intensification. Arguably, this strategy was successful, since the Green Revolution technologies would not have been feasible without water, which in turn required electricity. In the late 1970s, various state governments dramatically changed the relationship between farmers and the electricity boards. By providing farmers with electricity at flat rather than metered rates, and eventually for free, successive state governments across India let loose a chain of events with serious long term consequences for the sector. According to some this shift was an indulgence in populist politics to cultivate and seize an important and powerful vote bank

[2] See IWMI-Tata Water Policy Program (2002) for a discussion of the varied regional "socio-ecology" of groundwater in India.

(Dubash and Chella Rajan 2000). Others see it as an inevitable result of the logistical difficulty of metering, the prevalence of harassment by meter readers, and the high transactions cost of a meter-based electricity system (Shah et al. 2004). Whatever the dominant motivation, and it is certainly feasible that both factors were at play, the result was a gradual de-metering of the Indian countryside, the introduction of water use patterns and cropping decisions that do not reflect the scarcity value of either water or the cost of electricity, and a culture of agrarian entitlement to free electricity.

From a water perspective, there are good reasons to believe that flat rate tariffs and cheap power contributed to accelerating groundwater use through the 1980s and 1990s (Narayana and Scott 2004). For example, after a shift to free power in Punjab and Tamil Nadu in 1991, groundwater abstraction rates rapidly increased. As a result, between 1984-85 and 1992-93, the number of blocks registered as “dark” or “critical” in terms of groundwater over-use have been steadily increasing at 5.5%. The impact of rapid groundwater decline is considerable. The economic pain of higher cost water, the centralization of control over water, typically by the more wealthy, the associated health costs in terms of lower quality drinking water, and the ecological costs of groundwater decline on surface flows are all serious (Dubash 2002; IWMI-Tata Water Policy Program 2002; World Bank 1998b).

From an electricity perspective, cheap or subsidized power, particularly administered through a flat rate, has had ripple effects through the sector. De-metering has led to a culture of unaccountability in the sector, leading to theft and line losses being hidden under the agricultural category. Crucially, it has also led to an unbounded system of cross-subsidy from industrial and commercial to agricultural users. As industrial consumers have got ever more fed up with rising cross subsidy costs of agricultural users, they have threatened to leave the system, leaving even less money for maintenance and upgrading. Indeed, the Electricity Act 2003, which facilitates industrial consumers seeking the lowest cost power, may be read as an expression of this frustration. This nest of problems has dogged the process of reforming the electricity system. Any new management system, whether private or public, faces a losing battle seeking to reform a system under the current conditions. Moreover, the current deadlock acts as a drag on efforts to electrify the 50% of India’s rural households without electricity, as one potential source of productive electricity use – irrigation pumpsets – which could cross subsidize household consumption, is instead a loss maker. The net effect is a low level equilibrium in electricity reforms, with farmers suffering ever declining supply of low quality -- even if cheap -- electricity, and industrial, commercial and household users facing a run-down electricity system with little prospect of improvement.

As suggested above, the present situation is the result of a path dependent outcome stemming from early populist policies. This history has frequently been turned into a narrative of greedy farmers standing in the way of much-needed national level reforms. While this may indeed be part of the picture, I believe it is too simple a presentation of reality. The next section examines more closely the situation and incentives that farmers face in order to better understand the underlying politics of the water-electricity conundrum.

III. Farmers and Electricity: A Second Look at the Conventional Wisdom

Farmers and State Finances

Farmers, it is frequently argued, are largely responsible for the problematic state of the finances of State Electricity Boards (SEBs), and consequently the significant drag on state finances as a whole. To what extent is this statement true, and to what extent does it conceal the underlying problems?

That SEB finances are in a mess, and that the burden on states is considerable, are both indisputable. In 2001-02, commercial losses of all the SEBs and Electricity Departments was Rs. 24,063 crore, which amounted to about 23% of the gross fiscal deficit of the states. Explicit subventions by the state governments accounted for only Rs. 8,680 crore. At the level of individual states, the levels of SEB commercial loss are at similar levels to important social expenditures such as on health and education.

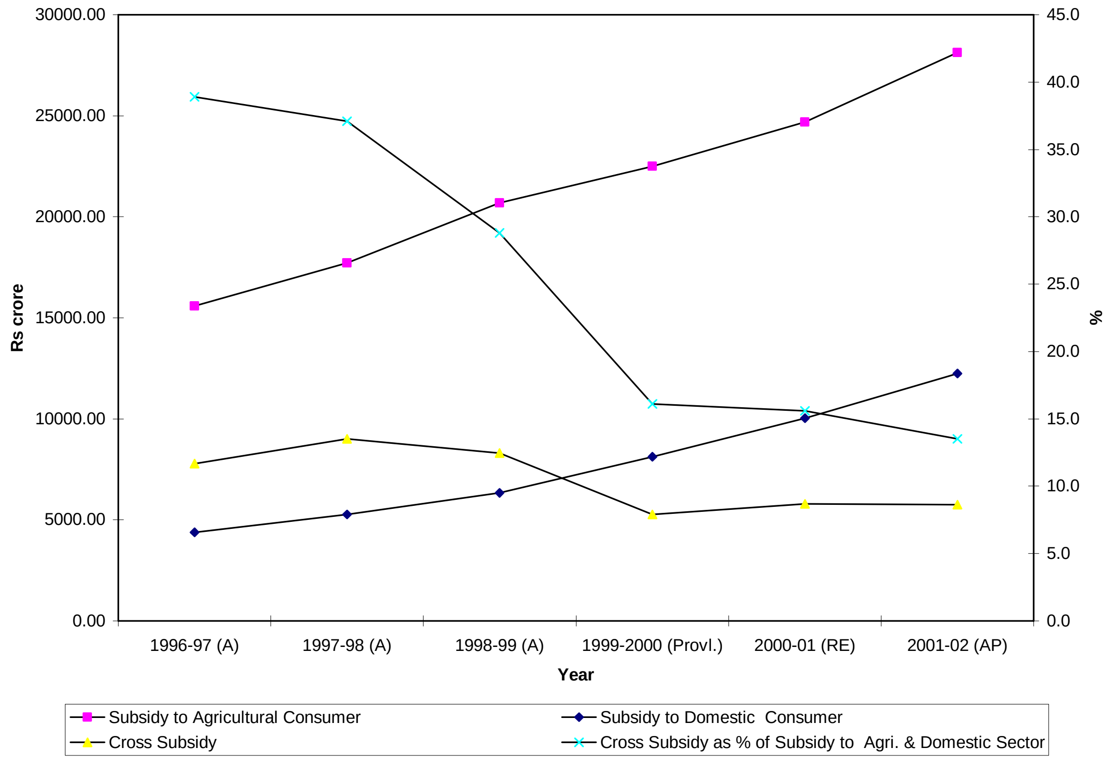
Table 1: SEB Finances

Rs. Crore	**1991-92**	**2001-02**
Subsidy due to agriculture	5,938	24,013
Total subsidy	7,449	34,587
Subventions from state govt	2,045	8,680
Commercial losses*	4,117	24,063
States fiscal deficit	18,787	106,595
Elec. Subsidy as % of fiscal deficit	22%	23%

* Commercial losses are not equal to (total subsidy – subventions) because a number of other factors such as inter-state sales of electricity and other commercial activities of SEBs also come into play.
Source: Government of India, Economic Survey, 2002-03.

It is also the case that subsidy accounted to agricultural consumers is the single largest share of the uncovered subsidy that forms the bulk of SEB commercial losses. The average agricultural tariff in 2000-01 of Rs. 0.42 was just over 8% of the average supply cost of Rs. 3.50. Through the late 1990s, agricultural subsides accounted for 70-80% of gross subsidies to the sector. As Figure 1 shows, agricultural and household subsidies have been rising consistently in absolute terms, even while the available cross subsidy from industry and commercial users has been relatively constant. Consequently, the cross subsidy as a proportion of total subsidy has steadily declined, raising the pressure on state finances. All these numbers point to the importance of agriculture in understanding, and therefore addressing, the parlous condition of state finances.

Figure 1: Agricultural Subsidy and Cross Subsidy (1996-2001)



However, a growing body of evidence is confirming what many had always suspected: by no means are all the subsidies placed under the agriculture column actually going to agricultural users. Since unmetered consumption is composed of agricultural load and T&D losses, there is considerable scope for manipulation in agricultural use, simply through apportionment of the total unmetered consumption among the two categories. In recent years, it is striking that the same picture of over-estimates of agricultural use and under-reporting of T&D losses has emerged from a broad range of states.

An early study in Andhra Pradesh based on a survey of pumpsets suggests that agricultural load was over-stated and T&D losses were underestimated by about 6% (Sankar 2003). In practice, it appears the electricity board maintained the T&D losses at a convenient level and booked the residual loss as agricultural consumption. Similar findings for Karnataka in 1994-95 suggest an even larger discrepancy – pumpsets accounted for 26% of consumption as compared to 37% booked by the utility, with T&D losses of about 30% as compared to 19% used by KEB (Reddy and Sumithra 1997). The study also notes that the official assignment of T&D losses is further suspect because KEB has been reporting decreasing losses over time, even while the LT load is increasing which, in the absence of system improvements, should lead to higher loss rates.

In Maharashtra, a Prayas Energy Group study showed that MSEB overestimates the number of pumpsets in use, and hence agricultural consumption, by 23% as compared to the minor irrigation census (Dixit and Sant 1997). The poor state of data on which assumptions about agricultural consumption rest are illustrated by a recent MSEB tariff filing which suggests that Maharashtra agricultural load remains roughly constant over the year, irrespective of cropping season even while the distribution loss dips mysteriously during the monsoon months when agricultural load is lowest (Prayas Energy Group 2004)! Similarly, a World Bank study in Haryana based on pump metering found that consumption by agriculture is as much as 35% below utility estimates (World Bank 2001).

Recent efforts by electricity regulatory commissions (ERCs) to scrutinize actual loss figures have added to the evidence. Based on recent tariff orders, T&D loss estimates were revised from about 18% to 32% in Maharashtra, from 19% to 32% in Karnataka and 19% to 35% in Andhra Pradesh and from 27% to 42% in Uttar Pradesh (Honnihal 2004).

While it is hard to prove definitely, several commentators suggest that a substantial proportion of agricultural consumption may, in fact, be due to theft by non-agricultural users, including commercial and industrial users, which is accounted for as agricultural consumption (Gulati and Narayanan 2003; Gurtoo and Pandey 2001; Reddy and Sumithra 1997; Sankar 2003). Indeed, State Electricity Boards and their employees may have benefited from the ability to hide inefficient functioning and what may be collusion in theft behind agricultural use. The state level information collated above suggests that agricultural use is, in fact, about a quarter or a third less than is reported, and that "commercial loss" or theft, combined with other factors, accounts for an equivalently greater share of total consumption.

This conclusion is supported by other circumstantial evidence, which shows that since the mid-1980s, power consumption in agriculture has far outpaced the growth in connected load, while this has not been the case for other LT users, such as industry (Gulati and Narayanan 2003; World Bank 1998a). This observation would be true only if installed pump capacity utilization is growing.[3] But, instead, across the country, hours of electricity available to farmers have been shrinking, which should lead to the opposite result; connected load outstripping consumption. If much or all of this rapid growth in consumption over connected load is indeed non-agricultural consumption, it also raises a further important point: a substantial, if indeterminate, portion of the *growth* in electricity subsidies may be due to non-industrial theft. Limiting this unmetered non-agricultural consumption is an important first step to containing the problem, and to ensuring that the subsidy burden does not continue to spiral out of control.

There are two important conclusions to be drawn from this brief survey. First, and most obviously, while farmers do contribute to problems with state finances, their contribution to the problem is substantially over-stated, perhaps to the extent of 25-35%. Second, knowledge of the extent to which farmers are contributing to state fiscal problems, and, equally important, how much they are likely to do so in the future (the growth in agricultural load vs. other load) rests on a solution to the accounting problem.

In the absence of individual meters, full metering of distribution transformers is one important, if partial, solution to this accounting problem (Rao 2004). It would enable an assessment of how much electricity is going to agriculture, and how much is used by

[3] Another, alternative explanation is that connected load is increasing, but is not reported as such because of the practice of "plate-switching" to show a lower power rating on pumps (Kishore and Sharma).

others whilst being falsely attributed to agriculture. This information would also enable an estimate of the true per unit price of electricity paid by farmers, rather than an artificially low estimate based on higher than accurate consumption figures. In turn, this information would be valuable for the political decision-making process around agricultural pricing. Political debate could proceed based on a more realistic estimate of future subsidy burden, and farmers may be freed, in some part, of carrying the entire blame for state fiscal deficits due to the electricity sector.

Are Farmers Misguided in Demanding Subsidized Electricity?

The conventional wisdom on the motivation for subsidized electricity rests on a perception of farmers as misguided at best and greedy at worst. For example, an otherwise important and useful World Bank study (described further below) starts with the statement that progress on electricity reform has been slowed by “understandable but misplaced” farmer concern that higher tariffs would hurt them (even though the subsequent text, in my view, does not support this statement). To what extent are farmers misguided in demanding subsidized electricity? This section addresses this question by first examining the costs of electricity to farmers and discussing their “willingness to pay” for electricity. The next section then turns to the “greedy farmer” issue: how do we interpret evidence that subsidies are largely captured by large farmers. Finally, this discussion is located in the larger context of the politics of electricity subsidies to farmers.

There is indeed a potentially strong case that subsidies are bad for farmers, and that farmers are misguided in seeking continuation and even expansion of subsidized electricity. In essence, the case rests in a viscous and destructive cycle within which farmers and SEBs are trapped. Low farmer tariffs have contributed to precarious SEB finances, both directly, and by forcing higher cross subsidies from industry, which in turn results in industry exit from the grid. Parlous SEB finances contribute to poor maintenance and technical standards, which translate into poor service and rationing. Since farmers are loss-making, they are the first option when load needs to be shed. Bad quality power feeds into farmer unrest and translates into refusal to pay high tariffs for low quality. There is little doubt that farmers and electricity utilities are trapped in a low level equilibrium.

However, to say that there is a better, higher level equilibrium where farmers receive better quality electricity and electricity utilities are able to charge farmers higher prices begs the question of how to get to this higher state. The challenge lies in the transition, and it is here that there is good reason to believe farmers are being hard-headed realists, rather than either misguided or greedy, in their stance against removal of subsidies. Two studies based on survey data illuminate the economics of groundwater irrigation and shed light on farmers' political positions.

The first, undertaken by the World Bank (2001) was a substantial survey of 1659 farmers in Haryana and 2120 farmers in Andhra Pradesh (AP) complemented by an attitude survey. As Table 2 shows, a heavily subsidized tariff accounts for a relatively modest proportion – 8% in Haryana and 4.5% in AP – of irrigation cost. However, it is only when other costs due to poor quality power are factored in that the true cost to farmers becomes apparent. Motor burnout costs, for example, are of the same order of magnitude as tariffs. The cost of re-winding motors (not shown in the table) is 23-33% of tariff in Haryana and 80-110% of tariff in AP. [4] Transformer burnout, amount of power available per day, and unscheduled power cuts were also found to take a toll on net farm income.[5] Putting tariff, motor winding costs and pump maintenance (travel and other costs) together yields a variable cost of irrigation of 8-26% of gross farm income in Haryana and 5-17% in AP. Marginal farmers account for the high end of these numbers while large farmers account for the low end. When annualized fixed costs are added, irrigation cost climbs to an average of 25% of gross farm income in Haryana and 34% in AP. For marginal farmers, these numbers climb as high as 38% of gross farm income in Haryana, and 64% in AP. Interestingly, the study also shows that diesel based irrigation costs – both variable and total -- are of the same order of magnitude, and canal irrigation costs are a small fraction of groundwater irrigation costs.

Table 2: Irrigation Costs as a Percentage of Gross Farm Income in Haryana and AP

Irrigation Costs as % of Gross Farm Income	***Haryana***	***Andhra Pradesh***
Electricity Tariff (Average)	6-13 (8)	2-7 (4.5)
Electricity Variable costs (tariff + motor burnout + maintenance) (Average)	8-26 (15)	5-17 (9)
Electricity total irrigation cost (annualized fixed cost + variable cost) (Average)	15-38 (25)	18-64 (34)
Diesel variable costs (average)	8-15 (12)	8-13 (11)
Diesel total costs (average)	17-45 (31)	18-78 (48)
Canal irrigation	0.5	4

A second study of farmers in AP based on a sample of 449 farmers, reports results with the same broad trends. Instead of benchmarking costs against gross farm income, Dossani and Ranganathan (2004) use annual income as measured by the proxy of personal expenditure, hence excluding production costs.[6] Farmers are categorized by pumpset size rather than by land-holding.

Farmers are found to be massively subsidized, to the extent that on average farmers pay only 11% of the cost of supply. Despite this huge subsidy, electricity tariffs are, on average, 15% of income. This figure starts at a low of 3% for small pump owners and rises to 24% for large pump owners.[7] Pump burnouts, which happen on average 1.6 times a year, increase irrigation costs by 78%, very much in line with the World Bank study.

[4]The range represents different assumptions on how much of the cost of rewinding motors can be attributed to poor quality electricity. The lower bound represents 70% of costs, while the upper bound represents 100% of costs.

[5]The details of these effects are not entirely intuitive and require further exploration. For example, the effect of transformer burnout and unscheduled power cuts are significant only for medium and large farmers, while the effect of power availability is a signficant cost only on marginal and small farmers (Dossani and Ranganathan 2004, pp. 23-24).

[6]This is a less satisfactory benchmark than gross farm income, as it excludes production costs altogether. Moreover, it is unclear how good a proxy expenditure is for income.

[7] Note that while the World Bank study finds tariffs are regressive with land ownership, this study finds that they are progressive with pump size.

The study also examines a further cost to farmers, the practice of "rostering" or providing interrupted supply. Rostering raises effective costs by forcing farmers to re-water portions of land that were left incompletely watered, and requiring the farmer to purchase multiple pumpsets. The authors estimate that rostering leads to excess use of power by 15.5%. Dossani and Ranganathan then ask how much the subsidy could be lowered if the utility took what they felt to be a slew of reasonable measures. By eliminating burnouts (and capturing the benefits for the utility through higher prices), curtailing rostering, and by raising user fees 50% for pumpsets larger than 15 HP (based on willingness to pay as recorded in the survey), the authors find that average subsidy can be brought down from 89% to 74%, a modest drop of 15%.

The main message that emerges from these studies is that at current quality levels, the real cost of groundwater irrigation even with subsidized power is a considerable proportion of farmer costs (World Bank) or income (Dossani and Ranganathan). For marginal farmers, variable irrigation costs can be as high as a quarter of gross income, and total irrigation costs as high as two thirds of gross income when quality problems are factored in. Phrased differently, tariff increases, without up front quality improvements, place a real burden on farmers.

Studies such as these are often used to make the argument that farmers are willing to pay more for better quality power, and that farmers should be willing to pay in financial terms for better quality power what they are effectively paying through income foregone due to pump winding costs, transformer burnouts, rostering and so on. Indeed, the World Bank study computes farmer willingness to pay for various measures of quality improvement and quantity improvement as measured by the estimated change in income for a given change in electricity quality or quantity. The study finds, in general, significant willingness to pay, although the details of the results raise some questions as to the credibility of the conclusions.[8] However, even accepting the general point, studies such as this only measure what economists think farmers *should* be willing to pay based on estimates of potential economic gains from changes in power quality or quantity. Their actual *willingness* rests in large part on farmer perception that quality or quantity improvements will be forthcoming in a timely manner. And the studies show quite forcefully that if tariff increases are loaded on without immediate quality improvements, the burden to small and marginal farmers, at least, will indeed, be high.

Given the current state of electricity supply to farmers, and the failure to improve quality in the last decade, it seems quite likely that SEBs face a considerable credibility gap with farmers. Farmers are well aware that agricultural load is heavily subsidized and is a loss making segment for utilities. They also know that utilities have little prospect of recovering the costs of quality improving investments in the short or medium term, and that, so far, the volumes of bridge financing to enable short term quality improvements simply are not available. In this context, I believe farmers quite correctly conclude that,

[8] However, the details of the results are somewhat peculiar. For example, the study finds that marginal and small farmers willingness to pay for improvements in reliability and days lost due to transformer burnout is not significant, but it is for larger farmers. Yet it is small farmers who are unlikely to have over-invested in pumping capacity and likely to be most hurt by unreliable power. Conversely, large farmers have zero willingness to pay for an additional hour of power a day, whether in the short term or in the medium term, allowing for shifts in cropping patterns, irrigation capacity etc. This also seems an unlikely result.

in reality, they face a choice between low quality power at low prices, or low quality power at somewhat higher prices. In this situation, it may well be entirely rational for individual farmers to lobby for low prices, extract as much surplus from agriculture as possible, and use the surplus to exit agriculture. Indeed, there is good evidence that this is what is occurring in Gujarat (Dubash 2002). The threat of groundwater depletion makes this exit strategy even more compelling.

Farmer willingness to participate in paying the up-front costs of improving quality are further reduced by two important perceptions. First, in conversation groundwater dependent farmers argue that they are interested in water, not electricity. From this perspective, they compare their situation unfavourably with their brethren who have access to canal irrigation at negligible cost (0.5% of gross farm income in Haryana and 4% in AP).[9] Admittedly, the frequency and reliability of canal irrigation is extremely poor compared to that of groundwater irrigation, but nonetheless, the perception that groundwater dependent farmers are hard done by compared to farmers in the command of surface irrigation projects remains.

Second, farmers implicitly contest the extent of subsidy they receive by arguing that the quality of the power they receive is hardly worth paying for. And indeed, there is a good basis for challenging the computation of the subsidy on sound economic grounds. Sankar (2003) argues that since agriculture is typically supplied at off-peak times there is a case for not including the fixed cost in their cost to serve. Moreover since farmers essentially face an interruptible supply, for which the standard practice is to give a price benefit, they should be given a further discount. Based on these two factors, he argues that the real cost to serve for farmers is about 50% of the average cost to serve, and hence the real subsidy is, in fact, far smaller than typically claimed.[10]

Taken together, that poor power quality imposes real costs on farmers, and that there is a considerable lack of SEB credibility on the quality question suggests that far from being mis-guided, farmers are being realistic and are, at least in the short term, acting rationally in their self interest in resisting up-front tariff hikes, and even arguing for tariff reductions. While this is not a sensible medium term strategy -- the prospect of ever declining power quality and quantity is highly undesirable – short run motivations appear to dominate. The need of the moment, therefore, is a strategy to bridge the credibility in the short run, and to allow the possibility of more productive medium term strategies.

Do Electricity Subsidies Benefit Only Greedy Large Farmers?

Even if farmers are not misguided, but are acting rationally in their own self-interest, this self-interest may well cross over into greed, particularly for larger farmers. And indeed, studies on the distribution of electricity subsidies described further below are a salutary reminder that not all farmers are equal, and it is problematic and mis-leading to generalize across farmers. At the same time, if electricity subsidies benefit only a few,

---

[9]That this is a politically potent argument is attested to by the use of just this argument by Chief Minister YSR Reddy in his announcement of a modification to the free power policy in Andhra Pradesh (Hindu Business Line 2005).

[10] Shah et. al. (2004) also argue that the lower cost of off-peak service is seldom factored into calculations of subsidy, and additionally note that since power to agriculture is charged on a flat rate basis, the cost of metering and billing should be further deducted when computing the true cost to serve farmers.

why do we not see a break down in farmer solidarity over the question of subsidies? This section addresses both the available evidence on subsidy incidence, and the more confused question of farmer solidarity given the distribution of subsidies.

Information available on the incidence of agricultural power subsidy is relatively thin given the available information. Yet the limited information does indicate that agricultural power subsidies are disproportionately captured by a few.

A study of Maharashtra based on data on agricultural pumpsets combined with assumptions about pump HP, crop choice, hours of use and other parameters suggests that 79% of farmers receive no subsidy at all (Sant and Dixit 1996b). Instead a small number of lift irrigation societies that control just 2% of landholding receive 19% of the subsidy, while owners of small irrigation pumpsets (IPS) who own 14% of the land receive 80% of the subsidy. In 1993-94, this translated into an absolute annual subsidy of Rs. 11,777 for members of lift irrigation societies, and Rs. 7049 for small IPS. Sant and Dixit also heavily critique the use of fixed rates for electricity, noting that where water is available, fixed rates encourage the use of more thirsty crops. Thus, the effective unit electricity rate for sugarcane cultivation is Rs. 0.19, while for jowar it is Rs. 1.03. Put differently, sugarcane growers pay a nominal 1.1% of their gross income for electricity, while jowar cultivators pay 5.2%. From a water depletion perspective, the perverse incentives are clear: the more thirsty the crop, the lower the cost per unit of irrigation.

The message on skewed subsidies comes through equally if not more strongly in Howes and Murgai (2003) who study Karnataka by combining household survey data and irrigation data from the National Sample Survey (NSS). They find that 72% of the population is either landless or irrigates no cultivated land, and therefore is presumed to receive none of the subsidy. Moreover, the proportion of non-irrigators below the poverty line is twice as high as irrigators, suggesting the subsidy is targetted to the non-poor. Medium and large farmers (those who own more than 2 Ha) account for 11% of the population but receive 80% of the subsidy. The subsidy is also highly unequally distributed between those who do benefit. Marginal farmers (< 1 Ha) receive about Rs. 3000 while large farmers (> 4Ha) receive Rs. 29,000, which is about 10 times what they would receive if the subsidy were equally distributed among all rural households.

While the information is thin and limited to a few states, what is available suggests there is a solid case that agricultural power subsidies disproportionately benefit wealthy farmers. Not only is the subsidy highly regressive, its form – flat rate tariffs -- also contribute to reinforcing cropping patterns that are highly problematic from a water use perspective. Despite all this, the information that subsidies are pernicious and highly regressive does not clinch the argument that subsidies should only be supported by a few rich farmers and opposed by the rest, for at least four reasons.

First, what is likely to matter most for farmers is the *absolute* subsidy they receive, not the *relative* subsidy. And there is some evidence to suggest that across the board electricity subsidies add to farmer disposable income. Dossani and Ranganathan's (2004) survey data show that electricity subsidy is equivalent to anywhere between 45% (3 Hp pump owners) to 130% (15 Hp pump owners) of farmer income (or more properly personal expenditure, which they use as a proxy for income) with an average of 120%

since ownership is skewed toward larger pump sizes.[11] Also, as argued above, the true subsidy to farmers may be as much as 50% lower than computed here based only on the average cost to serve, due to the fact that they are provided off-peak and interruptible supply. Even so, subsidy levels half that reported by Dossani and Ranganathan, of 22.5% to 65% of expenditure, are considerable. If correct, and there is an important need to verify this result with other studies in other states, this result helps explain why most farmers support the subsidy even though it is regressive.

Second, agricultural power subsidies likely bring spill-over benefits to labour, and hence to landless populations and marginal farmers. Shah (1993) has long argued that increased and enhanced access to irrigation provides more labor opportunities and can also lead to higher wages. Irrigation allows double cropping and use of otherwise marginal land. While electricity subsidies may indeed lead to excess irrigation – irrigation in excess of the marginal value product – this fact is not relevant from the point of view of labourers for whom employment benefits are paramount.

Third, power subsidies are likely passed through to buyers in groundwater markets, which allows small and marginal farmers, as well as share-croppers to gain from subsidies. Dubash (2002) finds that in parts of North Gujarat, groundwater markets are regulated through a form of social negotiation and bargaining between buyers and sellers, and that electricity price is a key element in determining what is deemed a legitimate and acceptable price for water, and what is determined an exploitative price and hence contested. Put differently, since higher electricity prices are deemed a legitimate reason for raising water prices, it is in the interest of water buyers, among whom small and marginal farmers and share-croppers disproportionately number, to seek continuation of electricity subsides.

Finally, it is important not to underestimate the solidarity building effects of shared experience, and that farmers are likely not moved by economic rationality alone but by social forces. Farmers share a common experience of low quality and unreliable supply, having to irrigate their fields in the middle of the night, and dealing with unresponsive utility staff. These social factors are backed up by a strong political one -- relations of power and domination in the countryside leave many small farmers and landless with little choice but to follow the lead of large farmers. In this light, appeals to an urban-rural divide, or agricultural-industrial divide, are likely far more resonant than implications that some farmers benefit more than do others.

In the light of these important qualifications, perhaps it is futile to expect farmer solidarity to break down in the light of information on the incidence of subsidies. The micro-politics of agricultural power subsidies indicate little reason to expect cracks, at least in the short term, in farmer demands for free or cheap power. How do these demands translate to the macro-political level?

---

[11] Unfortunately this data is not presented by land-holding size, so the benefit for small farmers cannot be isolated. It would be incorrect to assume that small farmers necessarily own small pumps, since pump Hp is driven to a great extent by geohydrology and land size, in addition to wealth. However, from land-holding data alone, the average land-holding of the bottom 20% is 3.1 acres, and the next 20% is 6.1 acres (personal correspondence, Rafiq Dossani, 15/2/2005), which suggests that the sample includes a significant number of relatively small farmers.

The Macro Politics of Agricultural Power Subsidies

Agricultural power subsidies are not only key for farmers' interests, they have also become a litmus test of a government's commitment to a larger program of economic reform. Thus conditions on power subsidies are central to World Bank adjustment loans to states. As Lal (2005) usefully suggests, politicians are forced to tack between an urban policy and financial elite -- which includes international donors and investors – who judge actions against a long term theoretically defined trajectory of change, and his or her political constituency, of whom farmers are an important part, for whom short term impacts of policy measures are more important. The jagged trajectory of economic reforms, and indeed of agricultural power subsidies can usefully be viewed through this lens.

In 2003, seemingly bold measures in Andhra Pradesh, Tamil Nadu and Punjab seemed to signal that fresh concessions to farmers were unlikely, even if old concessions would not be withdrawn. A line seemed to have been drawn in the sand. By mid 2004, all such expectations had vanished. Following the victory of Dr. Reddy in Andhra Pradesh, in whose campaign free power to farmers figured prominently, other states fell in line in rapid succession. Within days, the AIADMK government in Tamil Nadu, which had previously been congratulated for raising farmer tariffs somewhat and instituting metering, issued a statement that they would be stopping all metering, and would re-establish free power (2004c). Within a couple of months, Maharashtra announced free electricity to farmers and a waiver of interest on loans (2004b). Shortly thereafter, Haryana shifted from a progressively increasing fixed tariff to a flat tariff for all pump sizes that was lower than the lowest slab under the earlier tariff structure (2004a).

Were these events democracy at work or raw populism? To address this question requires understanding the inner workings of state-level politics which are a murky subject and well beyond this paper. As the foregoing sections have argued, however, perhaps the best answer is that it was a bit of each, as is normally the case for most policy changes. However, drawing a line between and assigning proportions to each explanation is not easy to do.

In many ways, attempting to do so is fruitless, as the *perception* of whether power subsidies to farmers are politically important is as significant as the reality of whether they are. In Andhra Pradesh, Dr. Reddy's Congress carried both rural and urban areas, which suggests that the impact of the free power pledge may be overblown. Yet, the perception was sealed, and other states rapidly fell in line. For better or for worse, the national elections of 2004 have cemented the perception that agricultural power subsidies are a potent political tool.

Given this reality, there is little point arguing what would have happened had the Congress not succumbed to the populist lure, if that is indeed what it was. Given the unfortunate history of unmetered power provided free or at a flat tariff described earlier, calling for politicians to stand firm against pressures, whether democratic or populist, is only fighting against time. And using the commitment device of a donor's condition does little to ease the long term pressures. The conundrum of free or cheap power calls for a more permanent political solution.

IV. What are the Options?

A viable solution to the electricity groundwater conundrum should address both the electricity and water dimensions of the problem, should be a long term and structural solution, and should help to untangle the political thicket that this paper has argued surrounds the use of electricity for agriculture. This section briefly re-visits and critiques the conventional prescription of metering and tariff hikes, then turns to an important and potentially influential prescription of a "rational flat tariff". There are no doubt other possible solutions, such as direct transfers to farmers, but these are not discussed further in this section.

The Conventional Approach: A Disregard for Politics

The conventional solution to the electricity and groundwater problem – metering plus a tariff hike – is based on a straightforward neoclassical economic interpretation of the situation. Farmers receive an incentive distorting subsidy that lowers the price of electricity and the effective price of water far below where it should be, indeed well below the average cost of supply. Therefore, tariffs need to move at least toward the cost of supply. Moreover the fixed rate tariff fails to provide any signals to farmers on the scarcity value of electricity and water, and therefore should be reversed in favour of per unit tariffs. Finally, metering would not only allow rational economic pricing, but would also solve the serious accounting problem in the sector which gives rise to scope for mis-management and graft, ultimately making for a more efficient, well run and profit making sector. The result would be a shift out of the current low level equilibrium and to a new high level equilibrium of higher prices, but also vastly improved better service quality.

At one level, there is little to fault these arguments. Metering and tariff hikes would indeed send more appropriate price signals, encourage better management and more efficient use. However, this solution ignores the political context within which the sector is embedded. It assumes that electricity can and should be treated as a commodity, but this ignores a half century during which electricity was an instrument of social policy. During this time, farmer practices and farmer investments have developed around the notion of cheap power, power at flat rates, and ultimately free power in some cases. This history has also shaped political alliances. Monetary gains, much of it benefiting from the accounting chicanery enabled by unmetered power, has become entrenched. All these practices may be bemoaned, but they cannot be wished away instantaneously. Instead, they have to slowly and deliberately be re-shaped over time, and may require some second best solutions in the interim.

A "Rational Flat Tariff": A Practical Solution to Political Realities?

The idea of a "rational flat tariff" is one such solution that has received some attention.[12] Even though it flies in the face of economic orthodoxy, this proposal is worthy of a close look because in its more detailed and careful articulations it promises not only to solve the twin electricity and water problems, but also to manage the political context that hamstrings the conventional solution. While I believe the argument has more merit than many critics accord it, the idea is not a viable long term solution.

The flat tariff argument begins with a critique of the administrative and political feasibility of metering electricity in India today. Proponents of the flat tariff point out that where both flat tariffs and metered options are available, with metering at lower costs, farmers still opt for the flat tariff. They locate this reluctance in a history of harassment by meter readers. Moreover, the costs of metering are high. In 1985, metering costs were estimated as a sizeable 26% of agricultural power revenue in Uttar Pradesh and 16% in Maharashtra. In Orissa, after a push to install meters during the privatization on the late 1990s, collections have steadily declined from 90% of billing in 1995-96 to 75% in 1999-2000. Metering, the argument goes, is near impossible to implement in the Indian context of inadequate authority of utilities over farmers, lack of control over corrupt meter readers, and lack of financial incentives to comply with the regime. The case of China, it is argued, where relatively high agricultural tariffs relative to other sectors and high collection rates are seemingly effortlessly achieved, is the exception that proves the rule. China has achieved this outcome through strong local institutions, married to effective monitoring systems and incentives to collection agents (Shah, Giordano, and Wang 2004). The absence of strong local level institutions and structures of authority, it is argued, doom any Indian effort at replicating the Chinese experience.

Having argued against the feasibility of per unit tariffs, advocates for a flat tariff in electricity note that there are several precedents for a flat tariff where a per unit tariff introduces unreasonable transactions costs, such as monthly passes for transit systems, flat rate income taxes and the like. In the context of electricity, the current flat tariff is irrational becomes it combines a flat rate with a promise (albeit unkept) of unrestricted access to power. A *rational* flat tariff would combine flat tariffs with intelligent supply management. For example, a supply schedule could mimic the pumping behaviour of diesel pump sets in the same area which are subject to a per unit tariff. Alternatively, scheduling could be based on agronomic conditions and crop choice, to mimic availability in canal systems, through a demand-based system organized around feeder-level farmer groups, or some combination of these.[13] Supply could and should be assured during periods of high moisture stress, and can be correspondingly reduced during the non-growing season.

This approach provides several levers to address the electricity groundwater conundrum. Electricity rationing provides an effective means of limiting groundwater overdraft and in all likelihood a surer means than electricity price increases due to uncertainty about the price elasticity of electricity. Progressively rising flat tariffs offer an opportunity to manage fiscal pressures and an incentive to shift to smaller pump sizes. Since farmers

---

[12]See for example, Shah (1993), Kishore , Shah (2004). The description of this approach in this section closely follows the presentation in Shah et. al. (2004.

[13] Tushaar Shah, Presentation at a Workshop on Energy-Water Nexus: Policy Issues in Governance", Hyderabad, June 10, 2004, International Water Management Institute.

will be assured water at peak growing periods, political opposition to rising flat tariffs is likely to be muted. By comparison, providing quality improvements in conjunction with rising per unit tariffs and unlimited supply will be a more challenging and longer term exercise.

Deliberately controlling the timing of electricity supply over the cropping calendar offers two considerable advantages. First, since there will be large periods of the year when minimal electricity will be delivered than under the current system, the amount of time the system is exposed to leakage (and, although the authors do not explicitly say it, scope for theft) is reduced. Second, since electricity will be available to farmers for many fewer hours in the year (although far better timed), and less electricity will be used, the absolute subsidy burden will be smaller. As a result, the increase in the per HP flat tariff necessary to cover average cost will be lower than under the current scenario. For example, the Government of Gujarat is reported to be prepared to raise the per HP rate from the current level of Rs. 500 to Rs. 2100 to cover costs under the current "irrational" flat tariff. Under the rational flat tariff, a per HP charge of Rs. 825 would suffice to cover costs, if electric pumps followed diesel pump usage patterns.

Most important, the rational flat tariff idea holds out the promise of political acceptability. From a farmer's perspective, power supply quality will improve because it will be available when farmers need it, while flat tariffs will rise, the increase will be on the order of 50-70% instead of 400-500%, and farmers will not have to endure metering, with all its negative history and connotations.

While persuasive, the case for a "rational flat tariff" is by no means watertight. First, while seemingly daunting, the case against the feasibility of metering may be somewhat overblown. China is not the only country that has achieved high rural electricity collection rates. Nearer to home, Bangladesh has achieved collection rates of over 95% and line losses o 15-17% based on a rural electrification cooperative structure (Waddle forthcoming),[14] and in the complete absence of anything resembling the strong local level Communist Party structure that has worked to achieve the same ends in China. Clearly, strong and effective local authority systems may be sufficient, but are not necessary for metering and effective bill collection. In Bangladesh, high collection rates are arguably facilitated because Bangladeshi farmers and rural households see their interest reflected in a well functioning rural electricity system, and in turn are convinced of the need for both meters and payment of bills. While this condition is clearly absent in India today, it is precisely bringing about this transformation that is required to achieve acquiescence to metering and reasonable collection rates. As I argue below, meeting this challenge will require a process of political negotiation and compromise with farmers.

Second, while use of flat rate tariffs is certainly a viable business strategy in other arenas, the wisdom of applying it to groundwater (by applying it to electricity) remains questionable. Services such as telephony or bus transport likely have a very high component of fixed cost. Adding one more passenger to a bus running along a pre-determined route adds little to the cost of running the bus. One could even argue that this logic may be appropriate to power, where the fixed costs are a relatively high proportion

---

[14]In reality, it is less the cooperative structure and more the strong central control of the Bangladesh Rural Electrification Board that has enabled this outcome.

of overall costs. However, with an exhaustible resource like groundwater, there are strong grounds for providing price signals that value each additional unit of water used. Since water is currently unpriced, the price of electricity is *de facto* the price of groundwater, and needs to be priced with this linkage in mind.

Third, a rational flat rate tariff places an enormous pressure on administrative capabilities of the SEB and other authorities to, indeed, be rational. But for just the same reasons that the metering system is difficult to implement, the rational flat tariff will pose a challenge. Whatever the rationing system, the rational flat tariff poses large information requirements, of diesel pump use, of agronomic patterns and so on. The more finely grained and localized the system, the more effective it will be (with the limiting case being farmer by farmer choice, which is exactly what a metering system provides) but also the greater the monitoring challenge and opportunities for graft. It is easy to imagine, for example, feeder level staff either being captured or bought off to increase hours of electricity to a locale. Moreover, political pressures will simply shift from demanding lower cost to more hours of electricity. Over time, it is quite possible that a deliberate electricity rationing system will spawn its own sub-structure of corruption and influence seeking.

Finally, the implementation difficulties of the flat tariff become even greater when viewed in a dynamic context. Farmers frequently adjust cropping patterns year to year to reflect output prices, prevalence of crop-specific disease, availability of processing or marketing facilities and the like. Even at an aggregate level, these changes can lead to substantial shifts in water demand which are hard to predict. Moreover, if agronomy is used as the basis for rationing, would certain water intensive crops be "grandfathered" in? For example, would parts of Banaskantha district in Gujarat receive an entitlement to large amounts of electricity, simply because they have a recent history of growing water-intensive potato crops? If not, who would decide whether this entitlement is legitimate, and if not, when it would be cut off? Would not these sorts of decisions, in attempting to keep pace with changing circumstances, introduce many avenues for capricious, malicious and self-serving action?

In sum, the attractiveness of the rational flat tariff is as a stop gap, a band aid to curtail the worst excesses of the current irrational flat tariff. It would be worth implementing if it also shifted farmers and electric utilities down the road to a true long term solution. However, by cementing acceptance of a lack of metering, and further undermining a per unit tariff, it risks working against a long term solution. It may be useful in certain dire contexts as a stop gap; it cannot be a lasting solution.

V. Toward a Real Political Solution

What are the elements of a lasting political solution to the electricity groundwater conundrum? Steps toward a political solution should include: a deeper understanding of the perspectives of the various sides to the conflict (toward which this paper hopes to contribute); exploring potential bargains and trade-offs that all sides might be willing to accept and that help resolve the problem; forging a consensus (or as close as possible) around a set of trade-offs; and finally exploring the most effective ways of meeting the bargains.

a) Deepen understanding of farmer perspectives

The problems of SEBs are well known: falling revenues, rising costs, shrinking cross-subsidies, lack of ability to monitor electricity use, low morale, low management ability, internal structures that do not incentivize efficiency or profitability and so on. With respect to the contribution of farmers to the problems of SEBs the most critical are the accounting problem, the collection problem and the problem of low tariffs. These are reasonably well understood. This paper has argued, however, that there is an incomplete and potentially incorrect understanding of farmers' perspectives, particularly among the urban based elite that tend to dominate the policy debate around electricity. The following points made in this paper, if explored and ultimately accepted by the policy elite, might serve to lay the groundwork for dialogue:

- there may well be a legitimate case for continued electricity subsidy to farmers in the short and medium term;
- although rich farmers benefit disproportionately, the rural economy as a whole also benefits, and the absolute benefit to many, including small farmers, is significant (although much more work needs to be done to substantiate this point);
- farmers are not the only nor even necessarily the main villains in undermining the finances of SEBs; more detailed work needs to be done to assess the true extent of commercial losses and the culprits;
- low quality power provided to farmers is also cheaper power, and calculation of the extent of subsidies should reflect this lower-than-average cost of supplying farmers (although more work needs to be done to quantify the real costs);
- farmers are justified in seeking a credible commitment to improving quality of power delivered before agreeing to any changes such as metering or tariff increases.

b) A grand bargain with farmers?

Farmers are justified in being skeptical of promises of future quality improvements in exchange for metering and tariff hikes now, or of assurances that metering now will not lead to uncapped tariff hikes in the near future. What might be elements of a political bargain that address both the tariff issue and the quality issue?

First, to win farmers' trust will require a credible subsidy commitment. In the current situation of loss-making SEBs and industry agitating for lower prices, a simple political assurance is insufficient. Farmers will likely feel the need to continue agitation to keep the pressure on governments. To win some breathing room will require a subsidy commitment mechanism that is clear and believable. At the same time, for the health of the SEB's and the state governments, it cannot be an open ended subsidy.

One recent idea that meets these conditions is to partition generation to set aside low cost capacity for rural and agricultural use (Sankar 2002). This low cost power could be used to provide agricultural consumers with a minimum power entitlement. The attractiveness of the idea is considerable. First, it provides an assured mechanism for subsidy provision, the amount of which does not vary with the political winds. Second, from a utility perspective, this approach has the benefit of releasing them from the pressure of forcing recalcitrant governments to make good on their promises and actually pay for subsidies provided. Finally, the subsidy is finite and not open ended. Indeed, it provides a window for adjustment while low cost power exists and is viable. If agricultural power consumption grows, additional growth would have to be accommodated within the subsidy implicitly provided by low cost power. While there are a number of implementation issues related to this idea, such as whether this idea would be applied at the state level, and what would happen to states without low cost sources of power, it is well worth exploring further.

It is worth noting that this mechanism of subsidy provision was and is used in the USA through a policy of "preference power" which set aside power from large public generators such as the Tenessee Valley Authority for the use first of rural electrification cooperatives, and only then for other users.[15] The logic then was that since TVA and other such generators were built with public resources, the public should have first claim on the power that was produced. This logic certainly is applicable in India as well.

Second, the arguments for a rational flat tariff notwithstanding, metering has to be a lynchpin of any long term solution to electricity for agriculture. Farmers can and should be asked to accept metering and per unit tariffs as the *quid pro quo* for credible subsidies. As Sankar (2002) also points out, if a subsidy is credibly committed to through a mechanism such as preference power, then farmer resistance to metering, on the grounds that it is a trojan horse for tariff increases, is likely to be greatly diminished. If metering in the current climate seems an impossible task, metering in a climate where farmers are reassured about short and medium term prices may well be an entirely different, and far more manageable, proposition. In this climate, the chances of success of billing and collection franchisees and other decentralized approaches will likely be enhanced.

From the SEB perspective, metering at least at the feeder level is essential to proper electricity accounting as a first step toward better management and theft reduction. However, it is important to continue moving toward metering at the pump level in order to send appropriate price signals to farmers, so that electricity and water price is factored into cropping choice and there are at least some incentives for careful use.

Third, an essential immediate measure that will help both SEBs and farmers is to increase the efficiency of agricultural pumpsets. A Prayas Energy Group (Sant and Dixit 1996a) study suggests the scope for improvements is considerable. They argue that a slew of measures, such as efficiency standards and installing pipes of the appropriate size can reduce energy consumption by 35%. For farmers, more efficient pumps mean less time consumed in irrigation and lower irrigation costs, savings which will become apparent after metering. Moreover, pump energy efficiency measures more than pay for themselves, a highly desirable feature in the cash strapped electricity sector.

Through commitments such as these, farmers would receive a political credible commitment to subsidies, short run benefits of energy efficiency, and potentially longer term improvements in service quality. The SEBs and non-farmer consumers gain a narrowing of the current gap in electricity accounting, a mechanism to limit the financial losses of the SEBs, breathing room to address quality problems, and a promise of metering and potentially more sensible groundwater use.

c) Forging a consensus

[15] See, for example, http://home.europa.com/~ruralite/energy%20topics/Preference%20power.pdf

Essential to a political solution to the electricity-groundwater conundrum is that it be negotiated and forged through a political process. In other words, any solution is only workable if it is developed through broad consultation, participation, and ultimately agreement. Too often, debates over proposed solutions to policy problems of this sort are discussed among policy elites and experts, and the resulting conclusions are presented as a *fait accompli*. By contrast, the process proposed here will require extensive engagement with farmers and organized farmers interest groups. Indeed, to be credible, identification of possible elements of a bargain and forging a consensus will have to be an iterative process of dialogue and research.

One potential way forward is to convene “multi-stakeholder dialogues” at the state level, which bring together various consumer interests -- farmers groups, industry lobbies, consumer organizations – with utility representatives, regulators and government officials – to identify iteratively what is feasible, what is desirable, and ultimately, what is acceptable. Such dialogues are necessarily a time intensive and cumbersome process, but offer several advantages if done well.

First, if sufficient trust is built up between participants over time, they help broaden the information base for decisions. For example, what are farmer perspectives on their medium term prospects if the current cycle of low prices and bad quality continues? Second, they allow different stakeholders to understand each others' perspective. For example, the challenges of managing electricity look very different from a utility manager's perspective and from a farmer's perspective. Third, they allow identification of the costs and benefits of different measures to different groups, as an important component of working toward a shared plan of action. While there is little experience with such approaches in India, there is a growing body of international experience attempting to complement traditional approaches to decision-making with such stakeholder dialogues. Such approaches are particularly well suited to situations that resist straightforward solutions, where destructive patterns have become deeply entrenched over time, and where political deadlock has resulted in harmful policy paralysis. The electricity-groundwater conundrum certainly would appear to be a good candidate for such intervention.

d) Exploring effective ways of meeting bargains

The electricity sector in India is currently experiencing considerable ferment. In the area of electricity to farmers there are numerous experiments under way, such as franchisee operations at the feeder level, decentralized bill collection, voluntary consumption restrictions in exchange for better quality and many other such ideas. Many of these experiments hope to achieve broader impact through a demonstration effect. This ferment and experimentation is extremely helpful and welcome.

However, it would likely be even more productive if such micro-efforts were couched within discussions on a larger political bargain. Exploring effective implementation mechanisms is extremely critical to understanding the feasibility and realism of various bargaining options. The various experiments currently under-way could be productively linked to state level bargaining processes.

A real political solution would require *all* of the steps above. For example, just introducing dedicated low cost power for agriculture – preference power – without a process of political negotiation and consensus building risks squandering a valuable opportunity. Similarly, political bargaining without the groundwork on viable solutions may lead to frustration and be counter-productive. This approach is open to the criticism that it will simply take too long and that the current situation calls for urgent and desperate measures. The appropriate is that it will indeed be time intensive, but on the other hand, the nation has wasted 15 years and more trying to apply band aids to a massive wound. Failing to tackle the underlying political problem any longer is to simply put off the inevitable.

References

2004a. Chautala Increases Farm Power Subsidy by Rs. 138 Crore. *The Financial Express*, September 13.

2004b. It's Shinde's Turn to Switch Off Reforms with Free Power. *The Indian Express*, July 28.

2004c. TN CM's Statement. , May 19.

Dhawan, B.D. 1995. Magnitude of Groundwater Exploitation. *Economic and Political Weekly* 30 (14):769-75.

Dixit, Shantanu, and Girish Sant. 1997. How Reliable are Agricultural Power Use Data? *Economic and Political Weekly* (April 12-18).

Dossani, Rafiz, and V. Ranganathan. 2004. Farmers' Willingness to Pay for Power in India: Conceptual Issues, Survey Results and Implications for Pricing. *Energy Economics* 26:359-369.

Dubash, Navroz K. 2002. *Tubewell Capitalism: Groundwater Development and Agrarian Change in Gujarat*. New Delhi: Oxford University Press.

Dubash, Navroz K, and Sudhir Chella Rajan. 2000. Power Politics: Process of India's Power Sector Reform. *Economic and Political Weekly* XXXVI (35):3367-3390.

Gulati, Ashok, and Sudha Narayanan. 2003. *The Susidy Syndrome in Indian Agriculture*. New Delhi: Oxford University Press.

Gurtoo, Anjula, and Rahul Pandey. 2001. Power Sector in Uttar Pradesh - Past Problems and Initial Phase of Reforms. *Economic and Political Weekly* (August 4):2943-2953.

Hindu Business Line. 2005. Draft Power Policy to Bill Corporate Farmers in AP. *Business Line*, January 26.

Honnihal, Siddharth. 2004. Estimating Power Consumption in Agriculture. *Economic and Political Weekly* XXXIX (8):790-792.

Howes, Stephen, and Rinku Murgai. 2003. Incidence of Agricultural Power Subsidies. *Economic and Political Weekly* (April 19):1533-1535.

IWMI-Tata Water Policy Program. 2002. The Socio-Ecology of Groundwater in India. Vallabh VIdyanagar, Gujarat: IWMI-Tata Water Policy Program.

Kishore, Avinash, and Abhishek Sharma. Use of Electricity in Agriculture: An Overview.

Kumar, M. Dinesh. 2005. Impact of Electricity Prices and Volumetric Water Allocation on Energy and Groundwater Demand Management: Analysis from Western India. *Energy Policy* 33:39-51.

Lal, Sumir. 2005. Can Good Economics Ever be Good Politics? Case Study fo the Power Sector in India. *Economic and Political Weekly* 40 (7 (February 12)).

Narayana, Peesapaty, and Christopher Scott. 2004. Effectiveness of Legislative Controls on Groundwater Extraction. Paper read at IWMI-Tata Water Policy Program Annual Partners Meet, at Vallabh Vidyanagar, Gujarat.

Prayas Energy Group. 2004. Power Supply to Agriculture. Paper read at TERI/MoP Meeting on Power Supply to the Agricultural Sector, November 10, at Hyderabad.

Rao, S. L. 2004. Target Power Subsidies Properly: A National Policy on Free or Cheap Power for Farmers is Unnecessary. *The Financial Express*, November 18.

Reddy, Amulya K N, and Gladys D Sumithra. 1997. Karnataka's Power Sector - Some Revelations. *Economic and Political Weekly* XXXII (12):585-600.

Rodrik, Dani. 1996. Understanding Economic Policy Reform. *Journal of Economic Literature* XXXIV (March):9-41.

Sankar, T. L. 2002. Towards a People's Plan for Power Sector Reform. *Economic and Political Weekly* (October 5).

Sankar, T. L. 2003. Power Sector: Rise, Fall and Reform. *Economic and Political Weekly* (March 22-29):1171-1178.

Sant, Girish, and Shantanu Dixit. 1996a. Agricultural Pumping Efficiency in India: Role of Standards. *Energy for Sustainable Development* 1 (1 (May)).

Sant, Girish, and Shantanu Dixit. 1996b. Beneficiaries of IPS Subsidy and Impact of Tariff Hike. *Economic and Political Weekly* XXXI (51):3315-3321.

Shah, Tushaar. 1993. *Groundwater Markets and Irrigation Development*. Bombay: Oxford University Press.

Shah, Tushaar, Mark Giordano, and Janxia Wang. 2004. Irrigation Institutions in a Dynamic Economy: What is China Doing Differently from India? *Economic and Political Weekly* XXXIX (12 (March 26)):3452-3462.

Shah, Tushaar, Christopher Scott, Avinash Kishore, and Abhishek Sharma. 2004. Energy-Irrigation Nexus in South Asia: Improving Groundwater Conservation and Power Sector Viability. Colombo, Sri Lanka: International Water Management Institute.

Waddle, Danel B. forthcoming. Rural Poverty adn Electricity Challenges in Bangladesh. In *Meeting the Challenge of Rural Electrification in Developing Nations: The Experience of Successful Programs*, edited by ESMAP. Washington DC: World Bank.

World Bank. 1998a. India Water Resources Managtement Sector Review: Groundwater Regulation and Management Report. Washington DC: World Bank and Ministry of Water Resources, Government of India.

World Bank. 1998b. India: Water Resources Management Sector Review. Washington DC: World Bank and Government of India.

World Bank. 2001. India: Power Supply to Agriculture. Washington DC: World Bank.