

Incidence of Agricultural Power Subsidies: An Estimate

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KARNATAKA

Incidence of Agricultural Power Subsidies

An Estimate

Who benefits from the large electricity subsidy provided to farmers in Karnataka? This note looks at the distribution of the annual subsidy, finding it to be quite inequitable. By far the largest beneficiaries are medium and large farmers and the great majority of the rural population receive no benefits at all.

STEPHEN HOWES, RINKU MURGAI

Farmers in Karnataka who use electricity for irrigation pumpsets are billed only a small fraction of the cost of supply. With only a fraction of bills paid, electricity is virtually provided free of charge to Karnataka's farmers. Many people have wondered whether this huge subsidy (amounting to over Rs 1,800 crore in FY2001) provided to farmers benefits the poor or not.¹ Although there are studies that have looked at the distribution of electricity usage among farmers by landholding, there appear to be no studies which combine this with information on the poverty of households. In this note, household survey data from the National Sample Survey (NSS) 54th and 55th rounds are used to relate irrigation status and poverty in order to estimate the incidence of agricultural power subsidies in rural Karnataka.²

Irrigation Status and Poverty

The NSS 55th round (1999-2000) can be used to calculate the proportion of the rural population which is 'irrigated', i.e., which cultivate irrigated land, and the proportion which is 'unirrigated', i.e., which cultivate no irrigated land (either they cultivate no land at all, or they cultivate unirrigated land). The numbers which cultivate irrigated land can then be further subdivided by land owned: marginal farmers

(<1 ha), small farmers (1-2 ha), medium farmers (2-4 ha) and large farmers (4 ha and above). Comparing the distribution of the rural population and key socio-economic characteristics across land classes, as in Table 1, shows that a relatively small share of the rural population has access to irrigation, and that access is concentrated among the non-poor:

– 72 per cent of the rural population (83 per cent of the poor) does not cultivate any irrigated land. These are people who are either landless (14 per cent of the population), or landowners who do not cultivate any irrigated land (58 per cent).
– The rural population that does not cultivate irrigated land is twice as likely to be poor (with 21 per cent below the poverty line) than those who cultivate irrigated land (11 per cent below the poverty line).

– Likewise, the majority (85 per cent) of people from scheduled castes and scheduled tribes (SC/STs) do not cultivate irrigated land. Of those that do, over 70 per cent own less than two hectares of land.

Even without looking at data pertaining specifically to the use or ownership of electric pumpsets, we can conclude from the above that the electricity subsidy must be highly regressive and of little direct benefit to the poor. The simple facts that nearly all the poor have no access to any form of irrigation (83 per cent) and that so few of those with access to any form of irrigation are poor (11 per cent) lead directly to this conclusion.

Irrigation Status and Electricity Use

We now turn from analysis of irrigation in general to irrigation-based on electric pumpsets. The NSS 54th round (1998) included a special module asking farmers about different modes of irrigation: canal water, groundwater (pumps), conjunctive (groundwater and other sources), and other (tanks, rivers, etc).³ Information is extracted from that survey on farmers who make use of electric pumps (for open wells, bore wells, or lift irrigation) to irrigate five principal crops in the preceding crop year (July 1997 to July 1998). Households are classified into land classes (unirrigated farmers; and marginal, small, medium, and large irrigated farmers) using the same classification scheme used with the 55th round. Since pumping is mainly used for irrigation, the total area irrigated exclusively by electric pumps is a good proxy for the benefits of

Table 1: Irrigation Status and Socio-Economic Characteristics

Irrigation Status	Landholding Status (ha)	Per Cent of Population	Poverty Incidence (Per Cent in Each Group Below Poverty Line)	Distribution of Poor across Groups	SC/ST Incidence (Per Cent in Each Group Who Are SC/ST)	Distribution of SC/ST across Groups
Not cultivating irrigated land Of which	All categories	72.4	20.9	83.1	29.9	85.2
	Landless	14.2	16.9	13.2	31.4	17.6
	Landowners	58.2	21.9	69.9	29.5	67.6
Cultivating irrigated land Of which	All categories	27.6	11.1	16.9	13.6	14.8
	<1	9.0	10.1	4.9	18.7	6.6
	1-2	7.2	16.0	6.4	13.9	3.9
	2-4	5.9	11.6	3.8	10.8	2.5
	>4	5.5	5.8	1.8	8.2	1.8
Total (avg)		100	(18.2)	100	(25.4)	100

Source: NSS 55th round.

subsidised electricity. This irrigated area can be divided up among the various land classes to estimate the distribution of the benefits of the electricity subsidy.

Using Table 2 to compare the ownership and use of electric pumpsets across land classes confirms that the direct benefits of electricity subsidies accrue mainly to large and medium farmers:

- 70 per cent of large farmers (owning 4 ha or more of land) and nearly 60 per cent of medium farmers (owning between 2 and 4 ha) who cultivate irrigated land own at least one electric pumpset. By contrast, only 22 per cent of marginal farmers (owning less than 1 ha) own these pumps.⁴
- 51 per cent of the benefits of subsidised electricity accrue to large farmers (owning 4 ha or more of land) who use electric pumps for irrigation. Over 80 per cent of the benefits go to medium and large farmers (owning 2 ha or more).

Incidence of Agricultural Power Subsidy

Taken together, the results reported in Tables 1 and 2 show that only a small

share of the population benefits from the bulk of the electricity subsidy. Benefits are concentrated among relatively few people because not everyone cultivates irrigated land, and even among irrigated cultivators, not everyone owns electric pumps. Combining the information in Table 1 on the socio-economic characteristics of irrigated and non-irrigated households with information from Table 2 on the distribution of pumpset-irrigated land (which represents the benefits of the electricity subsidy) enables one to quantify the extent of the regressivity of the electricity subsidy:⁵

- 80 per cent of the benefits of subsidised electricity accrue to farmers who own more than 2 hectares and have access to irrigation. These classes comprise only 11 per cent of the rural population, and even smaller shares of the poor and SC/STs.⁶
- Of the subsidised electricity supplied to Karnataka's farmers, only about 9 per cent directly benefits the poor (through the provision of irrigation); 91 per cent is of direct benefit to the non-poor.⁷ Similarly, only about 10 per cent of the subsidy directly benefits people from scheduled castes and tribes.

Data on the distribution of benefits can also be combined with information on pumpset ownership to estimate how much subsidy, on average, farmers in rural Karnataka receive. If the Rs 1,800 crore subsidy in FY2001 accrued equally to each of the 11.65 lakh pumpsets in Karnataka, the owner of each pumpset would receive about Rs 15,000 per year, or roughly five times the amount that each rural household would receive if the subsidy was divided equally amongst all rural (farming and non-cultivating) households. But this subsidy is far from equally divided even among pumpset owners.⁸ The actual average subsidy per pumpset owner is calculated by first dividing up the total subsidy of Rs 1,800 crore between different land-holding classes (based on the distribution of benefits reported in Table 2), and then computing the average subsidy per owner by using information on the total number of pumpset owners in each land class.⁹

Results show that the average subsidy to farmers who own pumpsets is also highly regressive, with considerable variation in the subsidy received by farmers

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in different land classes (Table 3):

- On average, large farmers who own pumpsets receive a Rs 29,000 subsidy per year. This is roughly 10 times the amount that each household would receive if the subsidy were distributed equally amongst all households in rural Karnataka.
- Pumpset owners with marginal landholdings (owning less than 1 ha) receive a considerably lower subsidy, amounting to approximately Rs 3,000 per year.
- No subsidy is of course received by the overwhelming majority of the rural population (72 per cent), because they are either landless, or landowners who do not cultivate irrigated land. As noted earlier, these are also the vast majority of the poor in rural Karnataka.

Why are there such large differences in the average subsidy across pump owners in different landownership categories? Part of the reason, as mentioned earlier, is that large farmers are much more likely to own more than one pump. According to a recent survey of pumpset owners in rural Karnataka, 47 per cent of large farmers (with > 4 ha of irrigated land) own more than one pump, while only 3 per cent of marginal farmers (<1 ha) own multiple pumps.¹⁰ Another reason for the higher average subsidy for large farmers is that they tend to have larger pumps. The same survey also shows that the average HP of pumps used for open wells increases with

the size of landholding. While the overwhelming share of large farmers with more than 4 ha were found to own 5 HP pumps, about half of the small farmers (with <2 ha) owned three HP pumps.

While it has been well known that the electricity subsidy to farmers is regressive, the degree of regressivity and the size of the subsidy received by large farmers may come as a surprise. Further analysis of these data for Karnataka and other states will likely be a worthwhile endeavour. [27]

Notes

[This article represents the views of the authors, which should not be attributed to the World Bank.]

- 1 In the absence of reliable information on electricity consumption, the Rs 1,800 crore figure is only an estimate of the subsidy flowing to farmers from the government through the power sector. The total subsidy flowing to farmers, inclusive of cross-subsidisation by other categories of consumer, is higher (approximately Rs 2000 crore). Poor domestic consumers also receive an electricity subsidy, but not of the same magnitude as that received by farmers. Other groups pay full-cost or more. There is no data available in Karnataka on the share of electricity in the farmer's total production costs. Data from Andhra Pradesh (see *India: Power Supply to Agriculture*, World Bank, 2001) suggest that the cost ranges from 2-7 per cent, with a higher cost share for smaller farmers.
- 2 The rural sample sizes of the 55th (combined central and state samples for Karnataka) and

54th round NSS are 5,527 and 3,152 households, respectively.

- 3 These data come from work being done by Dina Umali-Deininger and Mona Sur on irrigation subsidies.
- 4 Since the 54th round did not collect information on the number of pumps owned by each household, the distribution of pumpset owners in Table 2 pertains to whether or not farmers in each land class own at least one pump.
- 5 We combine information on the distribution of benefits from electricity among farmers from the irrigation module of the 54th round with information on socio-economic characteristics of the rural population in the 55th round in order to infer incidence. Neither survey can be used on its own since the 55th round does not have data on different types of irrigation, and the 54th round irrigation module does not have a consumption module and surveys only farmers. Combining results from the two surveys is valid since non-agricultural households, had they been included in the 54th round sample, would have fallen in the 'unirrigated' category which includes non-cultivators.
- 6 Note that the distribution of benefits is likely to be concentrated in an even smaller share of the rural population, and more so among the group of large farmers since, as we have seen from Table 2, not all medium and large farmers own electric pumps, and large farmers are disproportionately more likely to own pumps.
- 7 The result is obtained using a weighted average of the incidence of poverty of different landowning classes among the irrigated cultivators. This calculation requires the assumption that the average irrigated area of the poor and non-poor in any landholding class is the same. Since probably the former is in fact smaller than the latter, 9 per cent will be an overestimate of the benefits to the poor. Note that the percentage of rural poor in Karnataka is 18 per cent, based on the 55th round combined sample and the official poverty line.
- 8 Using land area irrigated by electric pumps as a proxy for electricity consumption assumes that the same amount of electricity is consumed per hectare. However, consumption per hectare may vary depending on cropping patterns, degree of rationing in the area of residence, access to alternative sources of irrigation, etc. In the absence of data directly on electricity consumption, using land area irrigated is currently the best available proxy. Note that the distribution of land area irrigated by electric pumps only takes into account those plots that are irrigated entirely by electric pumps. Therefore, any bias that would arise if large farmers were more likely to use multiple sources of irrigation has been eliminated.
- 9 Due to lack of data, this calculation does not take account of differences in tariffs and bill payments across landholding classes. However, since tariffs are much lower than the estimated average subsidies for the large landowners (see below), accounting for electricity payments is unlikely to change the main conclusion that the power subsidy is extremely regressive.
- 10 These data were collected by the Centre for Management and Social Research (CMSR) on behalf of the Karnataka Power Transmission Corporation.

Table 2: Ownership and Use of Electric Pumpsets for Irrigation

Irrigation Status	Landholding Status (ha)	Pumpset Ownership (Per Cent in Each Group Who Own Pumpsets)	Distribution of Pumpset Owners across Groups	Per Cent of Total Gross Cropped Area in the State Irrigated by Electric Pumps (Proxy for the Benefits of Subsidised Electricity)
Cultivating irrigated land	All categories	42.3	100.0	100.0
Of which	<1	22.3	20.6	4.4
	1-2	37.5	22.9	13.8
	2-4	57.1	29.9	30.7
	>4	69.9	26.6	51.1
Total (avg)		(12.3)	100	100

Source: NSS 54th round.

Table 3: Average Subsidy Received by Karnataka's Farmers, by Landholding Status

Irrigation Status	Landholding Status (ha)	Total Subsidy Received by Land-class (Rs Per Year, in Crore)	Average Subsidy Received Per Pumpset Owner (Rs Per Year)
Not cultivating irrigated land	All categories	0.0	0.0
Of which	Landless	0.0	0.0
	Landowners	0.0	0.0
Cultivating irrigated land	All categories	1,800	15,444
Of which	<1	79	3,296
	1-2	248	9,303
	2-4	553	15,853
	>4	920	29,710
Total		1,800	—

Source: NSS 54th round.