Consumption of Electric Energy in Agriculture – Some Facts[1]

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1. Introductory Remarks

I feel greatly honoured on being invited by the Indian Society of Agricultural Statistics to deliver Dr. V.G. Panse, Memorial Lecture on the occasion of 57th Annual Conference of the Society at Pant Nagar. I had no formal association with Dr. Panse as I was working in the State Department of Agriculture of U.P. upto middle of 1968 by which time he had retired from ICAR and joined as advisor in the Planning Commission. But for a decade, i.e. 1958 to 1968 I had the privilege to meet him on various occasions and got the benefit of his insight and hold over the subjects brought to his notice for solution. I take this opportunity to pay my humble tribute to Dr. Panse who was truly a great Agricultural Statistician and Scientist.

Dr. Panse had made outstanding contributions not only in the field of theoretical statistics but in applied statistics and agricultural planning. In the beginning, he contributed a lot in the field of statistical methods in agronomy and quantitative genetics. As time passed, he made profound impact on developing statistical methodology for conducting large scale agronomical trials on cultivators fields, sampling techniques in cost of cultivation studies, conduct of agricultural censuses, sample surveys for estimating livestock product, evaluation of various on going programmes for agricultural development and some other contributions to economic planning. Dr. Panse tried to develop objective method of estimating production of major crops at the lower level, like Blocks, without increasing the cost component relating to the conduct of crop cutting experiments but utilizing the eye appraisal of production for a large number of fields and then using this information for building the estimates at block level. Somehow this endeavourer of Dr. Panse was not followed by states in the spirit it was conceived.

Dr. Panse used statistical tools for accelerating the growth of agriculture. He had convinced the planners that the quantitative yardsticks based on experimented results and field studies were a must for formulating, executing

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[1] Dr. V.G. Panse Memorial Lecture delivered during the 57th Annual Conference of Indian Society of Agricultural Statistics held at GB Pant University of Agriculture and Technology, Pantnagar from February 5-7, 2004.

and evaluating the plans so that the public investment in agriculture was highly cost effective. With these remarks, I once again pay my tribute to the outstanding person of Dr. V.G. Panse.

Friends, I now come to an aspect of input use in agriculture. As you all know, electric power in the modern age has acquired a unique place in the development: be it industrial development, development of agriculture, or overall human resource development. In agriculture, irrigation is one of the most important input and for irrigation, surface and groundwater are the two most important sources. As far as groundwater is concerned, several lifting devices are being used, viz. wells, persian wheels, pump sets and tube wells. For pump sets and tube wells, electric power is a very important input. Besides providing irrigation to the crops, electric power is also used by the owners of these private tube wells (PTWs) for threshing, chaff cutting, hulling, cane crushing, small oil extractors etc. The owners of these PTWs not only use these PTWs for their own use, they irrigate the fields of their neighbours and use them for threshing of the crops of other farmers on rent basis.

In the country as a whole, State Electric Boards (SEBs) have reported a consumption of about 18000[1] million units in agriculture against a total consumption of 95000 million units for the year 1982-83. This comes out to about 18.64 percent. With the passage of time, the use of electricity is reported to have increased both in absolute measure as well as in percentage share in the total consumption. During 1994-95, the consumption of electricity for agriculture is reported to have increased to 79000 million units i.e. 31 percent of the total consumption and during 1997-98, the consumption of electricity for agriculture is reported to have further increased to 91000 million units out of 297000[2] million units.

It is on the basis of these statistics provided by different electricity boards that huge amounts are shown as subsidies on consumption of power to agriculture. During 1997-98, at the national level, it has been estimated that electricity had been provided for agriculture at a tariff of 27.7[3] paise per unit against a cost of 228 paise per unit implying a total amount of Rs. 18283 crore (9127.7 × 2.003) as subsidy. This covers two States of Punjab and Tamil Nadu also where electricity is free for agriculture.

In almost all the States, electric supply for agricultural consumption is unmetered. For long there has been a controversy about the quantity of electric power used for agriculture purposes. The farmers had been complaining about the shortage and irregular supply of electric power and the SEBs had been maintaining that the electric supply was exceeding 30 percent of the total supply and cash recovery was about 10 percent only. About two decades back, a decision was taken in this very university, (GBPUAT) to conduct a professional

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[2] UPPCL Statistics at a Glance, March, 2002.

[3] Kannam and N. Vijayamohan Pillai: Plight of the power sector in India – Working paper No. 308, Centre for Development Studies, Kerala.

study to ascertain the actual consumption of electric power in U.P. for agriculture - partiularly for irrigation purposes. Sri R. Venkatanarayanan, the then Agriculture Production Commissioner of U.P. and Sri Kripa Narain, the then Vice Chancellor of this University constituted a small group of five experts to do this job. I, as Director of Agricultural Statistics and Crop Insurance acted as convener of the group. The other four members of the group were Dr. V.K. Sharma, Dr. R.N. Mahendra and Dr. C.S. Jaiswal from Pant University and Sri K.L. Gupta from the Department of Minor Irrigation, U.P. Govt. This study was completed during 1983-84. After this study, two more studies were conducted in U.P. for estimating the actual consumption of electric power for agricultural purposes. Thus the following three studies had been conducted

(i) A Study of electric power consumption in agriculture in U.P. during 1983 – 84 - Directorate of Agriculture Statistics and Crop Insurance, U.P., Lucknow in collaboration with the G.B. Pant University of Agriculture.

(ii) Electric Power Consumption and transmission losses in rural areas during 1994 - Centre of Advanced Development Research (CADR), Lucknow.

(iii) A study on deriving the basis for calculation of agriculture subsidy to UPSEB, 1999 – U.P. Development Systems Corporation Ltd. (UP DESCO).

All these three studies have been carried out in Uttar Pradesh and consequently some of the results may not be applicable to other states.

Notwithstanding this limitation, the results are quite revealing. As the study conducted by U.P. Development System Corporation. (UP DESCO) Govt. of Uttar Pradesh is the latest and as the results embodied in this study do confirm the results obtained in the previous two studies, I will discuss the main results of this study.

The study by UP DESCO was based on 1331 private tube wells spread over 30 districts. The information from these 1331 PTWs was collected by recall-method through trained investigators. As the power supplied to the PTWs was unmetered, detailed information relating to irrigation of various crops, number of waterings given, hours required to provide a single irrigation to a crop etc. were collected.

Based on the results of the enquiry made in respect of these 1331 PTWs, the main findings that emerged were

(i)	Average H.P. of PTW	5.61
(ii)	Average hours a PTW ran for irrigating	394.48
	(a) Own crops	350.67
	(b) Crops of other farmers (sale of water)	43.81
(iii)	Non irrigation purposes like threshing, chaff cutting etc.	72.86
(iv)	Total (ii) + (iii)	467.34

If we go by UPSEBs statistics, the cost of one unit of energy during 1997-98 was 244* paise against a realisation of 50* paise. Thus the amount of subsidy at the rate of 194 paise per unit on the consumption of 9455 million units works out to Rs. 1834.27 crores. However, according to these studies, the energy consumed by 7.59 lakh PTWs was only 1424 million units. Even if we add some 500 to 1000 million units consumed by about 30000 state tube wells and lift canals, the upper limit of consumption of electric power in agriculture for irrigation and other purpose would be less than 2500 million units. As power to state tube wells is quite accurately documented and that on lift irrigation is metered, there is no subsidy on these two sources of use of power. All this subsidy of Rs. 1834 crores is on the supply of power for the unmetered PTWs.

As against the estimate of subsidy of Rs. 1834 crores, the subsidy worked out on the basis of the results of this study is Rs. 151 crores as given in Table 1.

Table 1. Estimate of subsidy on power consumed by PTWs during 1997-98

1	Average BHP of a PTW	5.61
2	Average hours of running a PTW	467
3	Estimates of units consumed by a PTW	1954
4	Total units consumed by 7.29 lakh PTWs	1424 million
5	Average tariff paid by a PTW @ Rs. 40 per BHP per month	Rs. 2693
6	Average tariff per unit of power	Paise 138
7	Subsidy per unit of power (244-138)	Paise106
8	Total subsidy on 1424 million units	Rs. 151 crore
9	Estimated subsidy as % of the subsidy claimed by SEB	8.23

The calculation of subsidy of Rs. 151 crores are based on the tariff of Rs. 40 per BHP of a PTW per month. The tariff is now Rs. 50 per BHP of a PTW per month. On this basis, the average tariff would come to 172 paise per unit implying only a subsidy of 72 paise per unit of power. Thus the total subsidy on 1424 million units of electric power supplied to PTWs would further reduce to 102.53 crores only against a subsidy of Rs. 1834 crores claimed by UPSEB.

If we assume that the situation in other states is similar to those obtaining in UP, we can safely assume that the total units consumed in agriculture would be about 15 percent of what is being reported by State Electricity Board i.e., the total consumption of electricity in the country for agriculture would be 13650 million units and taking a subsidy of 10.6 paise per unit, subsidy on consumption of electric power would be about Rs. 1500 crores against Rs. 18283 crores being shown now.

* UPPCL Statistics at a Glance, March, 2002.

2. Power Ministers Recommendations

It is worthwhile to mention here that the issue of supply of power to agriculture at a huge subsidy has been put forward as a major financial constraints of State Electricity Boards. The State Power Ministers discussed this issue at a conference held in January 1993 and decided that the minimum tariff should be 50 paise per unit during 1996. Again, it was decided that the tariff for agriculture purposes should rise to 50 percent of the cost of generation by the end of 1999. In view of these ground realities in Uttar Pradesh, the actual tariff is not only more than 50 paise per unit, but it has become more than 50 percent of the cost of power much before the time limit of 1999. We presume that the actual tariff in other states also, except those where electricity is supplied free as in Punjab and Tamil Nadu, is more than 50 percent of the cost of generation.

3. Another Dimension of this Issue

Information about the annual draft of groundwater is available through the state ground water organisations. For 1997-98, at the national level, the net draft of ground water has been recorded as 1,15,170 million cubic meter. To this net draft, gross draft comes out to 1,64,530 million cubic meter. If we take an average of 6 to 8 cubic meter of water pumped out by a PTW per unit of electric power, the entire gross draft would require only 20566 million units. With this knowledge, it is not at all possible to adopt the figures of more than 91000 million units of electric power. We have also to bear in mind that groundwater is not being lifted by electrical pump sets/ tube wells alone but also by millions of diesel operated pump sets/ tube wells, dug wells, persian wheels etc. In Uttar Pradesh, there are about 30 lakh diesel operated pump sets/ tube wells compared to less than 10 lakh electric operated pump sets/ tube wells. The gross draft of ground water of 40914 million cubic meter in Uttar Pradesh would require only 5114 million units of power rendering all other sources of lifting devices redundant. Thus the comsumption of 9455 million units of electric power for agriculture in U.P. cannot be accepted.

4. Concluding Remarks

In view of the above information and analysis, one concludes that the electric power consumption in agriculture is highly overestimated, and so are the estimates of subsidy on this input. As a matter of fact, the technical audit of the state electricity boards needs a lot of improvement. Of the total energy available at bus bar in a state, they have the break up into 10 classes, viz., (i) Domestic, (ii) Commercial, (iii) Industrial, (iv) Public lighting, (v) Public water works and sewage, (vi) Traction, (vii) Agriculture, (viii) Bulk supply, (ix) Miscellaneous and (x) Transmission and distribution losses.

All these categories except agriculture and T&D losses are metered. The balance of energy available at Bus bar is booked to the two unmetered categories, viz. (a) Agriculture and (b) Transmission and Distribution (T&D) losses. As the administration take an adverse notice of rising T&D losses and looks favourably at the increasing supply to agriculture, the authorities in SEB book higher part of the unaccounted supply to agriculture. In this balance sheet, there is no provision for theft, pilferages and other unaccounted supply, and as such unmetered supply to agriculture provide a very safe opportunity to SEBs for camouflaging high TD losses and theft as supply to agriculture.