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Are We Over-estimating Irrigation Subsidies in Multipurpose Water Resources Projects in India? — Methodological Issues and Evidence

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Abstract

Irrigation subsidies have become a highly contentious issue over the years and alternative approaches and conventions have been evolved in measuring the magnitude of these subsidies. Given the fact that the capital cost is a sunk cost, this paper has used the O&M cost of the project and the gross receipts in computing irrigation subsidies. Further, the paper has suggested an improvement in the subsidy estimation methods by adjusting the O&M cost of the projects to multiple benefits of the irrigation projects using the Separable Cost Remaining Benefit (SCRB) method in three major multipurpose irrigation projects in the state of Andhra Pradesh. The study has revealed that currently irrigation subsidies are over-estimated. For example, the estimated average irrigation subsidy in Nagarjunasagar Project (NRSP) Right Bank canal based on currently practised methods, works out to be ₹ 428 per ha, whereas using the SCRB approach, it come to be ₹ 111/ ha. The irrigation subsidy for NRSP is thus being currently over-estimated to the tune of almost 286 per cent. Similar is the case with the other two projects studied, though the magnitude of subsidy over-estimation could differ. The study has demonstrated how through the use of appropriate accounting methodologies, more informed and transparent estimates of irrigation subsidy can be derived. The inference from this paper is that reliable information about subsidies actually going to the irrigation sector could help in framing better pricing policies for irrigation water and in promoting more efficient use of irrigation water and utilization of subsidies. The outcome from the study will also be useful in fine-tuning the subsidy related discussions in the 12th Five-Year Plan documents.

Key words: Irrigation, subsidies, multipurpose water resources projects, subsidy estimation

JEL Classification: Q15, Q18, H 71

Background

A closer examination of the available estimates of irrigation subsidies suggest that these estimates of subsidy have generally been derived as the difference between the 'cost' of supplying irrigation water and the 'revenue' realized from the sale of irrigation water without clearly elaborating on how the 'costs' and 'revenues' have been defined and measured, particularly in large-scale projects which are multi-purpose and complex in nature. Given all the intricacies associated with irrigation water provisioning, estimating the cost of irrigation water in multi-purpose projects is not easy due to the complexities. In this context, several issues need to be resolved (Malik, 2008). For example, how should the capital costs of irrigation be apportioned in multi-purpose projects? Should the capital cost of existing infrastructure be

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treated as a sunk cost? If not, how much of the capital cost invested in irrigation projects during the past several decades should be accounted for? How should the opportunity cost of irrigation water be measured? Should the cost of externalities be counted when estimating the cost of irrigation? Are the necessary data available to estimate these costs? Does a clear conceptual framework exist to estimate various costs?

As on the cost side, there are similar questions on the revenue-realization side also. Are farmers the only beneficiaries of irrigation water? Should farmers pay for all the costs of irrigation? Is there other revenue for the government from the impoundment and sale of irrigation water? Are enough data available to estimate revenues? Answering the above questions is not easy. Given the complexities surrounding the estimation of the costs of irrigation water and the revenue realized thereafter, one wonders if these complexities have been addressed in the available estimates of irrigation subsidies. A perusal of methods employed in arriving at some of the available estimates of irrigation subsidies suggests that an assortment of methods has been used. While some estimates equate cost of irrigation with only the current O&M cost of irrigation works, others equate irrigation cost with O&M cost plus some fraction of capital cost, without clarifying how the costs of multi-purpose projects have been apportioned and how the capital invested in the past has been accounted for. There is invariably no accounting of opportunity cost or the cost of externalities in any of the available estimates. Since the available estimates differ on both conceptual and methodological considerations, in addition to poor documentation of the data, the estimates so derived are not comparable. A consensus on a working and widely acceptable definition of subsidies, and methods of their measurement is important; however, if subsidies are to be measured in a way that makes their estimates more meaningful, comparable and useful (Malik, 2008).

Given thus the lack of clarity on various conceptual and methodological issues relating to estimation of 'costs' and 'revenues' in estimation of irrigation subsidies, the present paper attempts at entangling one of the important issues relating to attribution of 'cost' for irrigation in a multi-purpose project context. Based on separation of irrigation cost in a multi-purpose project, the paper derives more meaningful estimates of irrigation subsidy drawing evidence from three major multi-purpose projects in the state of Andhra Pradesh.

Allocation of Joint Costs in Multi-purpose Projects: Methodological Issues

An important characteristic of many public utilities is that they provide multiple goods and services simultaneously. Most large water-resource projects have this characteristic, providing at the same time some or all of the following services: irrigation water, municipal water supply, flood protection, hydro-electric power, recreation, navigation, fisheries and so forth. While some of these demands are competitive (such as agricultural and industrial consumption), others are complementary. For example, in some cases releases for agriculture can be passed through turbines to generate power and be used by ships for navigation without detriment to other consumers (Perry, 1986).

In addition to these formally understood multiple purposes for which a project is built, there are several informal uses of the irrigation infrastructure in the developing countries which are more difficult to address (van Koppen *et al.*, 2006). These may include informal diversion and use, such as for livestock, fish culture and small enterprises (e.g., brick making and beer brewing). In Asia, for example, 90 per cent of the dams for irrigation are multi-purpose (Easter and Liu, 2003). Often, the initial trigger to set up a water project may be one specific factor relating to the control or use of water, yet frequently the combination of factors is such that the achievement of some particular objective may be better promoted by combining other objectives with it. In addition to helping realize the greatest total benefit from the natural resource, the multiple nature of the project also helps make the project more cost-effective, since the sum of marginal costs of each component may be less than the total cost of the project. Thus, a multiple-purpose project may be practicable where a single-purpose project may be impracticable.

The traditional methods most commonly used in water-resource planning practices to allocate joint costs are: (i) to allocate costs in proportion to some single numerical criterion, such as use, population or level of benefits; or (ii) to allocate certain costs (e.g., marginal costs) directly and divide the remainder on the basis of some scheme similar to the first method (Young *et al.*, 1982). Chief among variants of the first

method is the use-of-facilities (UOF) method. This method entails that each of the purposes served by one structure, with uses being irrigation, domestic and commercial water supply, be charged in proportion to the capacity (e.g., acre-feet, cubic-feet per second) to which that purpose is entitled. Such a cost-allocation method, however, usually is not efficient.

The fundamental concept of fairness stipulates that for a fair allocation of costs, no user should individually pay more in the joint venture than he would have to pay on his own. This constitutes the minimum incentive for an individual to join. The UOF method, however, does not promote efficient use of resources in the greatest public interest by assuring a maximum practicable return per dollar invested (Perry, 1986). There are also difficulties in relating consumptive to non-consumptive uses of water (navigation and hydropower, for example). The approach is also highly dependent on disaggregated data, which most irrigation districts or authorities do not automatically generate or retain (Lewis and Hillal, 1995). On the other hand, the transparency of the approach is appealing.

Among the second group of methods, the two main ones are: (1) alternative justifiable expenditures (AJE); and (2) separate costs, remaining benefits (SCRB) methods (Easter and Liu, 2003; Young and Haveman, 1986). The first approach allocates joint costs based on the remaining benefits after subtracting specific costs, where specific costs refer to costs directly attributable to a single purpose (e.g., irrigation) and exclude the costs of a change in project design due to the inclusion of a particular purpose. The second approach, SCRB, is similar to the first one. It assigns costs that serve a "single" purpose to the benefiting purpose, including the costs of any project design changes required to include the added purpose. The remaining "joint" costs are assigned in proportion to the remaining benefits derived for each type of use after subtracting the separable costs (Perry, 1986).

To elaborate the concepts, specific costs in multi-purpose projects are the project components and costs that are specific to only one purpose, such as the cost of a pipeline to deliver water to a city. Separable costs in a multi-purpose project are the extra costs that are incurred when an additional purpose is added to it. If irrigation is added as a project purpose, the separable costs would be the cost of the irrigation canals plus the costs of increasing the reservoir capacity. The latter cost is not a specific cost, but it is separable in that the reservoir would be smaller without the irrigation purpose. The separable costs are calculated by comparing project costs with and without each purpose separately.

Irrigation projects in Andhra Pradesh, can provide a good example of how the costs of different types of uses or purposes of a multi-purpose project can vary depending upon the method chosen for cost allocation. Two alternative cost allocations were calculated for the distribution of project costs. The first allocation is based on the quantity of water delivered for each purpose or use. Since the allocation is based on water delivery, only the three consumptive uses are allocated a share of the costs, with between 95 and 98 per cent of the cost allocated to irrigation (*see*, Table 1). When the costs are allocated based on benefits generated, all five major water uses are allocated costs, and irrigation's share drops to between 88 and 94 percent (*see*, Table 2). Thus, in multi-purpose projects, irrigation is likely to be allocated a major share of the costs but, with growing domestic and industrial demand for water, irrigation's share is likely to drop significantly over time. In projects that include an important flood-control component, irrigation's cost-share would drop even more.

Table 1. Cost Allocation for three consumptive uses based on water delivery

(in percentage)

Project	Water supply		
	Domestic	Industry	Irrigation
Nagarjunasagar	2	0	98
Tungabhadra	1	4	95
Sri Ram Sagar	2	3	95

Source: Easter and Liu (2003)

Table 2. Cost allocation among three projects based on benefits

(in percentage)

Purpose or Use	Project		
	Nagarjunasagar	Tungabhadra	Sri Ram Sagar
Irrigation	94.3	91.3	88.1
Hydropower	4.0	4.2	3.0
Domestic	1.6	2.1	3.0
Industry	0.1	2.3	4.3
Fisheries	0.1	0.1	1.6

Source: Easter and Liu (2003)

Thus, of the various methods discussed above, it is necessary to choose rationally the most appropriate method. Apart from some of the considerations discussed above, the choice of the method should take into consideration the simplicity in terms of its practical applicability and computational and informational demands. Of the last two approaches to joint cost allocation, we chose SCRB to allocate costs. The choice of SCRB for the present study was guided by two considerations. First, the allocation should be understandable, transparent and reasonably fair for user groups. Second, data should be available to implement the procedure at a reasonable cost.

Scope and Data Sources

The present study draws evidence from the state of Andhra Pradesh which is one of the leading states in India in terms of investments in irrigation infrastructure. Besides providing subsidies on irrigation water from surface water projects, it also provides huge amounts of subsidies on providing electricity for irrigation pumping. The study focuses on three major irrigation systems of Andhra Pradesh, viz., Nagarjunasagar Project (NRSP) Right Bank canal situated in the Coastal region, Sri Ram Sagar Project (SRSP) in the Telangana region, and Tungabadhra Project (TBP) Lower Level canal in the Rayalaseema region. These three irrigation projects account for about 50 per cent of the gross area irrigated of all the major irrigation projects in Andhra Pradesh.

The data on cost allocation and estimation of irrigation subsidies is limited and not readily available. Several data sources have been used to derive the required data for the present study. The important sources of information and type of data derived from each of these sources include:

(a) Irrigation and Command Area Development (I&CAD) Department, Government of Andhra Pradesh (GoAP): Capital investments and O&M expenditure made on the irrigation infrastructure, revenue from imposing water charges and area irrigated by different sources in the state (GoAP, various years).

(b) Departments of Agriculture, GoAP: Data on the extent of crop irrigated, production, productivity etc.

(c) State Electricity Regulatory Commission: Data on generation of hydropower, sale of hydropower, investments made on hydropower infrastructure, and electricity used for irrigation, pumping.

(d) Fisheries Department: Data on inland fish production from the major multipurpose irrigation projects and revenue receipts through sale of fishing rights.

(e) Andhra Pradesh Pollution Control Board: Data on current charges on water usage for industries and other users from the major irrigation infrastructure, and the revenue from imposing water cess on industries.

(f) Budget reports of the GoAP (GoAP, various years).

(g) Andhra Pradesh State Groundwater Board: Data on groundwater abstraction and various groundwater sources and users.

(h) Survey Data: Cost of cultivation of irrigated and non-irrigated crops in the study area (GoAP, 2006-2008).

Results and Discussion

The various costs involved in SCRB analysis included:

(a) Total cost of the project, obtained by adding the construction cost and operation and maintenance cost at present worth.

(b) Alternate cost is the cost of most economic single purpose project that could provide one of the same benefits provided by the multipurpose project.

(c) Separable cost is expenditure that could be avoided if one purpose were excluded from the project. Separable cost for each purpose is the minimum allocation that will be charged for that purpose.

(d) Justifiable expenditure for each purpose is either the benefit or total alternative cost, whichever is less.

(e) Benefit is the annual project benefit.

The Separable Costs and Specific Costs were basically the same in the case of the projects being examined in Andhra Pradesh (little design change was required to add the other purposes). Further, on the

basis of our field visits, it appeared that since we were undertaking an *ex-post* analysis and both the canals and the reservoirs in the case study schemes serve multiple uses, virtually all the costs could be viewed as joint costs. The canals convey water for irrigation and also supply water to protected tanks for drinking water, water to industries and hydro-power plants. The reservoirs store water for irrigation and drinking purposes as well as provide flood control benefits and support fisheries.

Further, the adjusted separable costs remaining benefits method was developed to adjust for the potential inequity in the SCRB formula by applying a credit to the separable costs so that separable costs could be subtracted from the justifiable costs on a more than 1: 1 basis. The rationale for applying a credit to the separable costs in allocating joint costs was that the separable costs share in the benefit provided by the joint costs (Gittinger, 1982). This procedure provides better results than the SCRB method for meeting the equity criterion.

The following two cost types were used to workout the cost of providing irrigation water in this paper:

Type 1: O&M costs of the projects

Type 2: Adjusted O&M costs of the projects using SCRB method

Calculating the Project Benefits

Estimating project benefits is an essential part of the cost allocation analysis. The selection of a particular benefit calculation method for allocating costs depends on three important considerations: (i) the nature of the project purpose and the type of benefits provided, (ii) the needs and preferences of those performing the cost allocation, and (iii) the availability of data. The details of the methods used are given in Table 3.

For estimating irrigation subsidies, the usual practice in India is to treat capital cost of the project as a sunk cost and estimate subsidy as the difference between O&M cost and the revenue realization. Vaidyanathan Committee recommended that one per cent of the cumulative capital cost at historical prices plus O&M expenses should be charged as the price of irrigation water (GoI, 1992). Gulati and Narayanan (2003) have also computed the irrigation subsidy using O&M costs and gross receipts. Earlier, the Finance Commissions had been pleading for recovering at least 2.5 per cent of the cumulative capital cost, which was reduced to one percent and finally even that was given up. Hence, in this paper, we followed the O&M costs and gross receipts for deriving subsidy. We however, derived estimates of irrigation subsidy following the two scenarios relating to estimation of O&M cost: (a) business-as-usual scenario when the O&M cost of

Table 3. Methods for benefit calculation

Cost/Benefit category	Single purpose alternative cost estimation	Benefit calculation
Agriculture	O&M cost of canals	Net primary returns
Rural water	O&M cost of pumps, water distribution system, treatment system	Well and incremental cost of a deep aquifer supply; providing pipe line from other locations such as storage tanks
Urban water	O&M cost of pumps, water distribution & treatment system	Well and incremental cost of deep aquifer supply; cost of tanker supply
Flood control	O&M cost of dam for dead and flood control storages	Estimated value of flood damages prevented by dam
Commercial fishing	O&M cost of dam - costs separated for flood control	Market value of fish harvest
Hydro-power	O&M cost of dam - costs separated for flood control	Cost of saving over thermal energy alternative

Source: Palanisami and Mohan (2010)

Table 4. Cost allocation based on adjusted SCRB method — NRSP

(in million ₹)

Item	Irrigation	Hydro	Drinking	Industry	Flood	Fishing	Total
Benefit	13621.266	576.00	101.105	6.662	681.060	9.842	14995.935
Alternate cost	614.426	543.840	31.147	3.790	61.440	61.440	1316.083
Justifiable cost	614.426	543.840	31.147	3.790	61.440	9.842	1264.485
Separable cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cost for all other purposes	95.170	95.170	95.170	95.170	95.170	95.170	571.02
Justifiable cost for each purpose	701.657	772.243	1284.936	1312.293	1254.643	1306.241	
Justifiable cost for all other purposes	95.170	95.170	95.170	95.170	95.170	95.170	
Adjustment factor	7.46	6.71	1.33	1.04	1.65	1.10	
Adjustable separable cost	0.00	0.00	0.00	0.00	0.00	0.00	
Remaining benefit	614.426	543.840	31.147	3.790	61.440	9.842	1264.485
Joint cost proportion	0.49	0.43	0.02	0.00	0.05	0.01	1.0
Adjustable joint cost	46.244	40.931	2.344	0.285	4.624	0.741	95.17
Total allocated cost	46.244	40.931	2.344	0.285	4.624	0.741	474.80
Percentage	48.59	43.01	2.46	0.30	4.86	0.78	100

irrigation was not netted out from the total O&M cost of a multi-purpose project and the entire project cost was assumed to be borne by the irrigation, and (b) SCRB scenario when the O&M cost of irrigation was netted out of a multi-purpose project cost and only the netted out cost was used for estimating subsidy.

Allocation of Cost to Different Project Use Components based on Adjusted SCRB Method

Following the adjusted SCRB method for allocation of capital cost of a multi-purpose project into its different use components, we present in Tables 4 to 6, respectively the allocation of the O&M cost in the case of the three projects — NRSP, SRSP and TBP. Cost allocation based on SCRB shows that in case of NRSP, the irrigation component accounted for 48.59 per cent of the total cost. The share of hydropower, drinking, industry, flood and fishing accounted for 43 per cent, 2.46 per cent, 0.29 per cent, 4.85 per cent and 0.77 per cent, respectively. In the case of NRSP, the irrigation accounted for 81.31 per cent. The share of other purposes, viz., for hydro power, drinking, industry, flood and fishing was 81.31 per cent 3.67 per cent, 1.97 per cent, 3.78 per cent, 6.8 per cent and 2.4 per cent, respectively. For Tungabadhra Project, the irrigation component accounted for 47.04 per cent. The other purposes accounted for hydropower, 4.78 per cent; drinking, 17.63 per cent; industry, 22.81 per cent; flood control, 4.7 per cent; and fishing, 3.02 per cent.

Allocation of O&M Cost for Irrigation Water

During the period 2004-05 to 2007-08, the actual O&M cost per hectare of the NRSP project varied between ₹ 555 and ₹ 964, with the average cost of ₹ 616/ha. Following the Separable Cost Remaining Benefit (SCRB) procedure, the actual O&M cost for irrigation component during the period worked out between ₹ 269/ha and ₹ 468/ha, with the average of ₹ 299/ha. Similarly, the average per hectare O&M cost of irrigation component worked out to be ₹ 197 in the case of SRSP and ₹ 214 in the case of TBP (Table 7).

Revenue Realised from Sale of Water for Irrigation

The revenue data available from I&CAD for the sales of irrigation water in the three projects during 2004-05 to 2007-08 were used in the calculation of the irrigation subsidies (Table 8). During the four-year period, the revenues realised from the sales of irrigation water were ₹ 712 million in the case of NRSP, ₹ 107 million for SRSP and ₹ 71 million for TBP.

Table 5. Cost allocation based on adjusted SCRB method — SRSP

(in millions ₹)

Item	Irrigation	Hydro	Drinking	Industry	Flood	Fishing	Total
Benefit	2594.218	125.860	99.840	75.840	129.711	91.697	3117.166
Alternate cost	1116.700	48.950	40.941	50.400	111.600	111.600	1480.191
Justifiable cost	1116.700	48.950	40.941	50.400	111.600	91.697	1460.288
Separable cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cost for all other purposes	24.760	24.760	24.760	24.760	24.760	24.760	148.560
Justifiable cost for each purpose	363.491	1431.241	1439.250	1429.791	1368.591	1388.494	
Justifiable cost for all other purposes	24.760	24.760	24.760	24.760	24.760	24.760	
Adjustment factor	46.10	3.04	2.09	3.10	4.77	2.37	
Adjustable separable cost	0.00	0.00	0.00	0.00	0.00	0.00	
Remaining benefit	1116.700	50.419	27.082	51.912	93.419	33.852	1373.384
Joint cost proportion	0.81	0.04	0.02	0.04	0.07	0.02	1.00
Adjustable joint cost	20.132	0.909	0.488	0.936	1.684	0.610	24.760
Total allocated cost	20.132	0.909	0.488	0.936	1.684	0.610	24.760
Percentage	81.31	3.67	1.97	3.78	6.80	2.47	100.00

Table 6 . Cost allocation based on adjusted SCRB method — TBP

(in million ₹)

Item	Irrigation	Hydro	Drinking	Industry	Flood	Fishing	Total
Benefit	3174.124	157.260	50.776	56.446	158.706	4.202	3601.514
Alternate cost	65.400	6.650	24.514	31.724	6.540	6.540	141.368
Justifiable cost	65.400	6.650	24.514	31.724	6.540	4.202	139.03
Separable cost	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cost for all other purposes	1315.100	1315.100	1315.100	1315.100	1315.100	1315.100	7890.60
Justifiable cost for each purpose	73.630	132.380	114.516	107.306	132.490	134.828	
Justifiable cost for all other purposes	73.630	132.380	114.516	107.306	132.490	134.828	
Adjustment factor	0.11	0.11	0.11	0.11	0.11	0.11	
Adjustable separable cost	0.00	0.00	0.00	0.00	0.00	0.00	
Remaining benefit	65.400	6.650	24.514	31.724	6.540	4.202	139.03
Joint cost proportion	0.47	0.05	0.18	0.23	0.05	0.03	1.0
Adjustable joint cost	618.626	62.903	231.881	300.081	61.863	39.747	1315.10
Total allocated cost	618.626	62.903	231.881	300.081	61.863	39.747	1315.10
Percentage	47.04	4.78	17.63	22.82	4.70	3.02	100.00

Irrigation Subsidy Estimation

The irrigation subsidy was estimated as the difference between the cost of providing irrigation water and the revenue realized from sale of this water. The estimates of irrigation subsidy for each of the four study years for the three projects under the above two cost estimation scenarios are presented in Table 9. The results obtained demonstrate how the choice of an appropriate methodology for estimation of irrigation subsidies could significantly alter the quantum of

Table 7. A comparison of costs on providing irrigation water in major projects in Andhra Pradesh

(₹/ha)

Year	NRSP		SRSP		TBP	
	O&M cost of the project	O&M cost adjusted to irrigation component	O&M cost of the project	O&M cost adjusted to irrigation component	O&M cost of the project	O&M cost adjusted to irrigation component
2004-05	555	269	241	198	289	136
2005-06	441	214	236	192	494	235
2006-07	504	245	286	232	505	238
2007-08	964	468	208	169	535	251
Average	616	299	242	197	456	214

*Adjusted values were arrived using SCRB method

Table 8. Irrigation water charges collected from major irrigation projects

(in million ₹)

Year	NRSP	SRSP	TBP
2004-05	55.17	27.51	7.14
2005-06	164.69	58.9.97	20.84
2006-07	81.38	47.0	29.42
2007-08	410.82	32.34	13.67
Total	712.06	106.85	71.07

Source: GoAP (2010)

subsidies being attributed to the irrigation sector. It is interesting to note that the actual subsidy using the SCRB method is much less than the estimated subsidies using the traditional approach. In the case of NRSP, for example, the estimated average per hectare irrigation subsidy, based on currently practised methods, for the period from 2004-05 to 2007-08 worked out to be ₹ 428, while a more realistic estimate of irrigation subsidy, after netting out of the cost of irrigation in a multi-purpose project, for the same period would be Rs 111. The irrigation subsidy for NRSP is thus being currently overestimated to the tune of almost 286 per cent. Similar is the case with the other two projects studied, though the magnitude of subsidy overestimation could differ.

It is important to underline that since the multiple users of the project are paying their fees for water usage, these must be accounted for in the estimation of subsidies from a multi-purpose project. In projects like TBP, in fact no subsidy is accounted for and these projects receipts are paying for the O&M cost of the projects.

Conclusions

The study has demonstrated how through the use of appropriate accounting methodologies, more informed and transparent estimates of irrigation subsidy can be derived. Subsidies enjoyed by different beneficiaries of a multipurpose water resources project should not be attributed to the irrigation sector alone. Reliable information about subsidies actually going to the irrigation sector could help in framing better pricing policies for irrigation water and in promoting more efficient use of irrigation water and utilization of subsidies. It is important that the government agencies associated with managing multipurpose water resources projects collect all the relevant information on costs and revenues from different beneficiaries, so that estimates of actual subsidy going to the different sectors could be easily derived.

Table 9. Cost, revenue received and subsidy for major irrigation projects in Andhra Pradesh

Year/ Project	Area irrigated (ha)	Actual revenue received (million ₹)	Actual revenue received (₹/ha)	Cost of irrigation water (₹/ha)	Subsidy per year (million ₹)	Subsidy per ha (₹/ha)
NRSP (Full O&M cost of the project)						
2004-05	801295	55	69	555	389	486
2005-06	988669	165	167	441	271	274
2006-07	941319	81	86	504	393	418
2007-08	953865	411	431	964	509	533
Average	921287	178	188	616	394	428
NRSP (O&M cost adjusted to irrigation component)						
2004-05	801295	55	69	269	161	201
2005-06	988669	165	167	214	47	48
2006-07	941319	81	86	245	149	159
2007-08	953865	411	431	468	36	38
Average	921287	178	188	299	102	111
SRSP (Full O&M cost of the project)						
2004-05	288876	28	95	241	42	146
2005-06	294323	59	200	236	10	35
2006-07	263453	47	178	286	28	107
2007-08	257823	32	125	208	21	82
Average	257823	41	150	243	26	92
SRSP (O&M cost adjusted to irrigation component)						
2004-05	288876	28	95	198	30	103
2005-06	294323	59	200	192	-3	-9
2006-07	263453	47	178	232	14	54
2007-08	257823	32	125	169	11	44
Average	257823	41	150	198	13	48
TBP (full O&M cost of the project)						
2004-05	61163	7	117	289	11	173
2005-06	61163	21	341	494	9	153
2006-07	61163	29	481	505	1	24
2007-08	61163	14	223	535	19	311
Average	61163	18	291	456	10	165
TBP (O&M cost adjusted to irrigation component)						
2004-05	61163	7	117	136	1	19
2005-06	61163	21	341	235	-7	-106
2006-07	61163	29	481	238	-15	-243
2007-08	61163	14	223	251	2	29
Average	61163	18	291	215	-5	-76

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