

Public Expenditures and Subsidies in Indian Surface Irrigation: Who Benefits?

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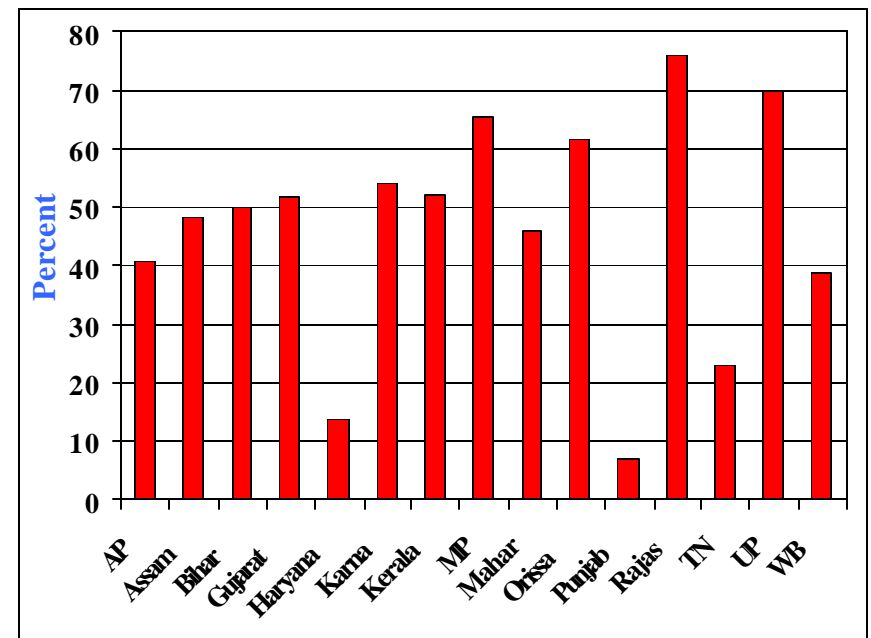
South Asia Rural Development Unit

March 5, 2003

India: An overview

- 1 billion popn, 72% rural
- agriculture share of GDP down to 24% (2002/03)
- 73% of rural labor employed in agriculture
- rural poverty rate—27% (99/00)
- 54% of poor rural HH are Agric HH, varies by state

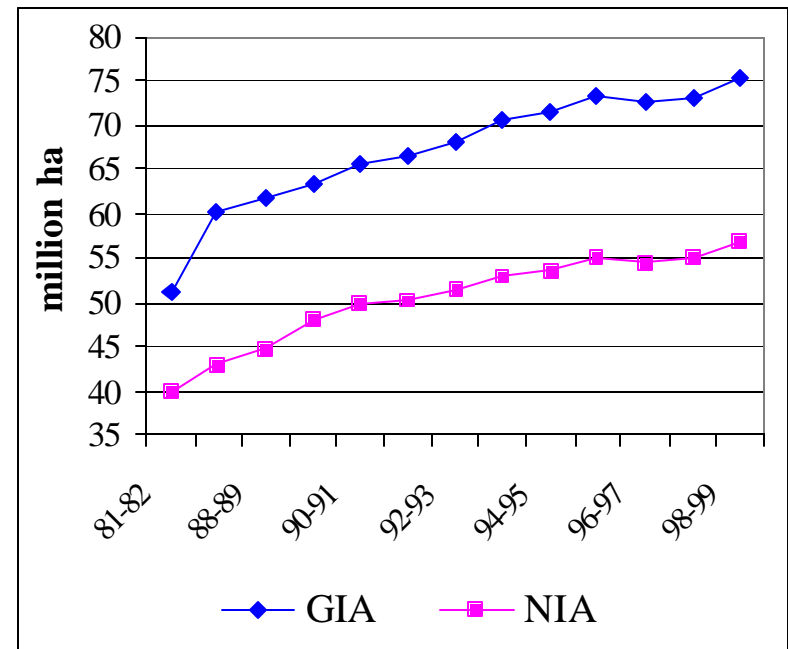
Agric HH as % of Rural Poor HH



Irrigation in India

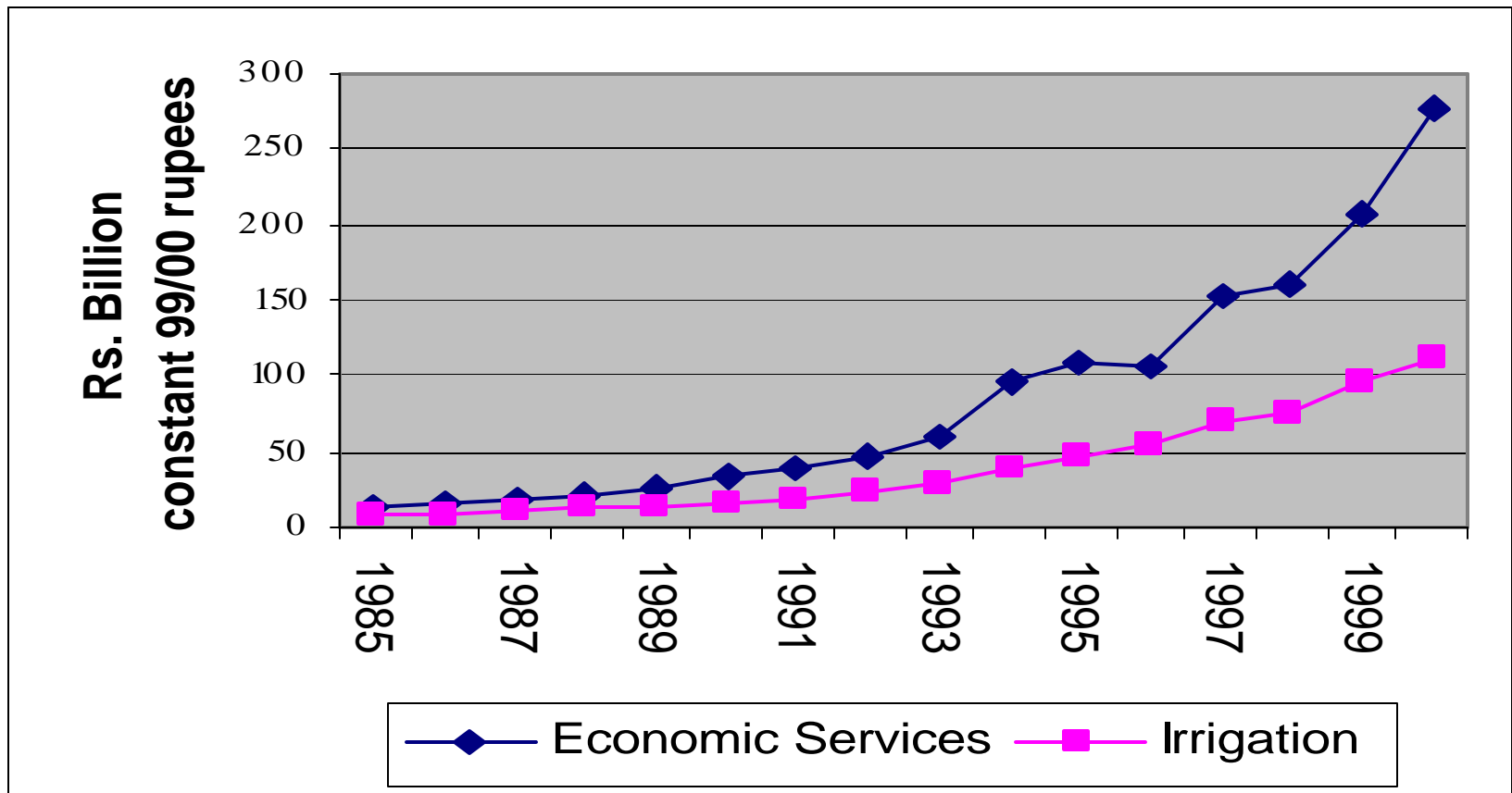
- Key pillar of Govt Strategy: agricultural growth, food security, rural poverty reduction
- 1998/99 GCA = 192 million ha, 40% irrigated (surface, groundwater, others)

Trends in Irrigated Area



Public Expenditures in Irrigation

Capital Expenditures on Major and Medium Irrigation (1985-2000)





Rationale for the Study

Escalating Crisis in the Irrigation Sector

- Fiscal crisis in many states, irrigation subsidies major contributor
- Deterioration of irrigation infrastructure
 - *Inadequate O&M expenditure*
- Low water charges lead to inefficient use of water, environmental problems (e.g. waterlogging, salinity)



Policy Challenge: Formulating an appropriate & equitable cost recovery strategy

Knowledge gaps:

- Who benefits from irrigation subsidies?
 - *Equity issue*
- Appropriate cost sharing among multiple beneficiaries
 - *Consumptive: farmers, drinking water, industry, gw recharge*
 - *Non-consumptive users: power generation, fisheries, recreation*
- Institutional inefficiencies
 - *How much are users being taxed?*



Cost Recovery Issues:

Revenue Side

- Water charges very low, rarely revised
- Poor collection efficiency
- Revenue collection goes to state treasury, not ID

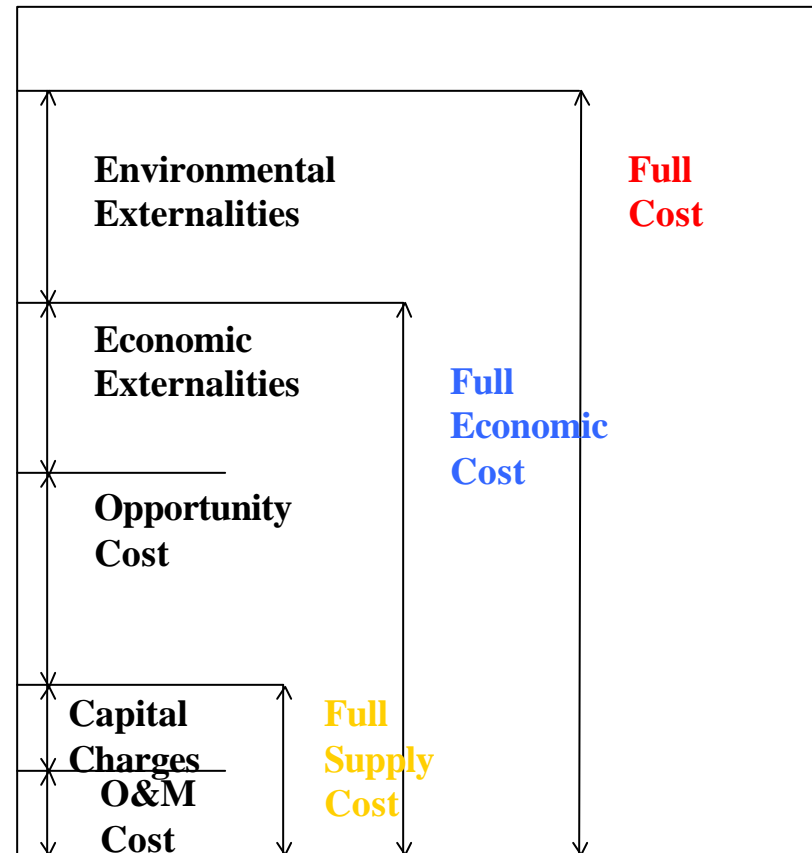
Cost Side

- Adequacy of budget allocation from State Govt
- Irrig Dept budget composition
 - *Staff and admin costs accts for largest share of O&M expenditure*

Measuring Irrigation Subsidies

Cost to State Govt:

- S1: Total O&M Expenditure minus revenue demand (assessed charges).
- S2: Total O&M Expenditure minus actual collection.





Cost to State Governments 1997/98

| | <i>Rajasthan</i> | <i>Maharashtra</i> | <i>AP</i> | <i>Karnataka</i> | <i>UP</i> |
|--------------------|------------------|--------------------|--------------|------------------|--------------|
| O&M Expenditures | 915 | 4,308 | 2,438 | 578 | 3,784 |
| Assessed Charges | 182 | 1,173 | 1,137 | | |
| Actual Collections | 155 | 816 | 755 | 193 | 1,007 |
| Subsidy 1 | 733 | 3,136 | 1,301 | | |
| Subsidy 2 | 760 | 3,492 | 1,683 | 385 | 2,777 |

Units: Rs Million

For Rajasthan both actual collections and assessed charges are for farmers only.

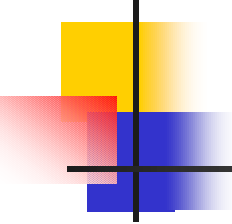
The Opportunity Cost of Canal Irrigation Subsidies

| State | Estimated O&M Subsidy (S2) \$million | O&M Subsidy as a Percent of | | | |
|----------------|--|-----------------------------|-------|------------------------|---------------------------|
| | | Fiscal Deficit | GSDP | Health Expenditures | Education Expenditures |
| Andhra Pradesh | 34.4 | 7.00% | 0.20% | 17.70% | 6.00% |
| Karnataka | 7.9 | 2.60% | 0.10% | 5.30% | 1.70% |
| Maharashtra | 71.3 | 6.00% | 0.20% | 29.10% | 6.40% |
| Rajasthan | 15.5 | 2.80% | 0.10% | 8.50% | 2.60% |
| Uttar Pradesh | 56.7 | 3.70% | 0.20% | 19.40% | 4.70% |



Estimation of Farmer Irrigation Subsidy

- S1: Total Farmer Share of O&M Expenditures minus assessed irrigation charges.
- S2: Total Farmer Share of O&M Expenditures minus actual payments by farmers.



How much of the Subsidy do farmers get?.....Caveats....

- Farmer O&M share proportional to volume of surface water going to irrigation
- Canal irrigated area for 5 principal crops only (approximation of gross cropped area)
- Subsidy proportional to canal irrigated area
 - No differences between head- vs. tail-enders.
 - Quality of service reasonable and uniform.
- Uniform collection efficiency
- Crop mix may affect subsidy amounts
- 100% canal delivery efficiency

Estimated Subsidy Received by Farmers in Rajasthan

| | Unadjusted Subsidy | Subsidy (less institutional transfer) |
|---------------------------|--------------------|---------------------------------------|
| | Rs million | Rs million |
| O&M Expenditures | 759.45 | 435.07 |
| Works cost (Rs/ha) | 94.25 | 94.25 |
| Staff cost (Rs/ha) | 395.72 | 186.45 |
| O&M/ha (Rs/ha) | 489.97 | 280.69 |
| Assessed Charges | 182 | 182 |
| Actual Collections | 155 | 155 |
| Subsidy 1 | 577.45 | 253.07 |
| Subsidy 2 | 604.45 | 280.07 |
| Collection Efficiency (%) | 85.16 | 85.16 |
| Hectares | 1.55 | 1.55 |
| Subsidy 1 (Rs/ha) | 372.55 | 163.27 |
| Subsidy 2 (Rs/ha) | 389.97 | 180.69 |

-Institutional transfer: additional cost due to excess staff . Estimate based on ISR study by PWC (2002).

-Estimates do not factor in non-consumptive uses

Who gets the canal irrigation subsidies?

| | % of Ag HHs with access to canals | | | | | Distribution of HH using canals (%) | | | | |
|----------------|-----------------------------------|----------|-------|--------|-------|-------------------------------------|----------|-------|--------|-------|
| | All | Marginal | Small | Medium | Large | All | Marginal | Small | Medium | Large |
| Andhra Pradesh | 19.9 | 13.4 | 3.4 | 1.7 | 1.5 | 100 | 67.1 | 16.9 | 8.4 | 7.7 |
| Assam | 2.0 | 1.2 | 0.5 | 0.3 | 0.1 | 100 | 56.2 | 25.3 | 14.7 | 3.8 |
| Bihar | 13.1 | 8.8 | 2.3 | 1.3 | 0.7 | 100 | 67.3 | 17.4 | 9.9 | 5.4 |
| Gujarat | 9.5 | 6.8 | 1.1 | 0.9 | 0.7 | 100 | 71.6 | 11.5 | 9.7 | 7.1 |
| Haryana | 19.8 | 6.5 | 5.9 | 4.1 | 3.3 | 100 | 32.9 | 29.8 | 20.4 | 16.9 |
| Karnataka | 15.6 | 7.4 | 3.8 | 2.8 | 1.7 | 100 | 47.2 | 24.1 | 17.7 | 11.0 |
| Kerala | 12.3 | 11.3 | 0.6 | 0.2 | 0.2 | 100 | 91.4 | 5.1 | 1.6 | 1.9 |
| Madhya Pradesh | 11.3 | 4.2 | 3.1 | 2.4 | 1.5 | 100 | 37.7 | 27.9 | 21.5 | 12.9 |
| Maharashtra | 4.7 | 2.1 | 1.5 | 0.8 | 0.4 | 100 | 44.4 | 31.4 | 16.3 | 7.9 |
| Orissa | 15.5 | 10.1 | 3.8 | 1.3 | 0.4 | 100 | 65.1 | 24.5 | 8.1 | 2.4 |
| Punjab | 16.8 | 5.1 | 5.2 | 3.1 | 3.4 | 100 | 30.3 | 30.9 | 18.4 | 20.4 |
| Rajasthan | 10.4 | 3.4 | 2.3 | 2.0 | 2.7 | 100 | 32.5 | 22.5 | 19.5 | 25.5 |
| Tamil Nadu | 15.4 | 12.6 | 1.9 | 0.7 | 0.2 | 100 | 81.8 | 12.4 | 4.6 | 1.2 |
| Uttar Pradesh | 12.5 | 9.0 | 2.2 | 1.0 | 0.4 | 100 | 71.9 | 17.4 | 7.6 | 3.1 |
| West Bengal | 16.5 | 13.7 | 1.8 | 0.8 | 0.1 | 100 | 83.5 | 11.2 | 4.8 | 0.5 |
| All-India | 12.7 | 8.2 | 2.4 | 1.3 | 0.9 | 100 | 64.3 | 18.6 | 10.5 | 6.7 |

How much of the subsidy do they get?

| | Distribution of HH using canals (%) | | | | | Distribution of canal irrigated area (%) | | | | |
|----------------|-------------------------------------|----------|-------|--------|-------|--|----------|-------|--------|-------|
| | All | Marginal | Small | Medium | Large | All | Marginal | Small | Medium | Large |
| Andhra Pradesh | 100 | 67.1 | 16.9 | 8.4 | 7.7 | 100 | 34.3 | 22.8 | 16.7 | 26.1 |
| Assam | 100 | 56.2 | 25.3 | 14.7 | 3.8 | 100 | 32.2 | 22.5 | 24.3 | 21.1 |
| Bihar | 100 | 67.3 | 17.4 | 9.9 | 5.4 | 100 | 30.4 | 23.0 | 20.1 | 26.6 |
| Gujarat | 100 | 71.6 | 11.5 | 9.7 | 7.1 | 100 | 37.3 | 11.8 | 19.3 | 31.5 |
| Haryana | 100 | 32.9 | 29.8 | 20.4 | 16.9 | 100 | 24.0 | 18.5 | 20.5 | 36.9 |
| Karnataka | 100 | 47.2 | 24.1 | 17.7 | 11.0 | 100 | 17.2 | 21.5 | 25.8 | 35.6 |
| Kerala | 100 | 91.4 | 5.1 | 1.6 | 1.9 | 100 | 53.6 | 12.4 | 4.4 | 29.6 |
| Madhya Pradesh | 100 | 37.7 | 27.9 | 21.5 | 12.9 | 100 | 11.7 | 20.4 | 27.6 | 40.3 |
| Maharashtra | 100 | 44.4 | 31.4 | 16.3 | 7.9 | 100 | 21.6 | 33.4 | 23.5 | 21.5 |
| Orissa | 100 | 65.1 | 24.5 | 8.1 | 2.4 | 100 | 34.4 | 30.0 | 19.4 | 16.3 |
| Punjab | 100 | 30.3 | 30.9 | 18.4 | 20.4 | 100 | 9.0 | 19.6 | 22.1 | 49.3 |
| Rajasthan | 100 | 32.5 | 22.5 | 19.5 | 25.5 | 100 | 8.6 | 10.5 | 16.3 | 64.6 |
| Tamil Nadu | 100 | 81.8 | 12.4 | 4.6 | 1.2 | 100 | 52.2 | 24.1 | 14.5 | 9.2 |
| Uttar Pradesh | 100 | 71.9 | 17.4 | 7.6 | 3.1 | 100 | 39.8 | 24.1 | 20.0 | 16.1 |
| West Bengal | 100 | 83.5 | 11.2 | 4.8 | 0.5 | 100 | 55.7 | 24.7 | 16.8 | 2.9 |
| All-India | 100 | 64.3 | 18.6 | 10.5 | 6.7 | 100 | 26.7 | 20.7 | 20.4 | 32.2 |

Estimated Subsidy by Farm Size in Rajasthan

| Canals-ALL | Average farm size | % of Ag HHs | % of HH using canals | Distribution of Canal Irrigated Area | Subsidy (S1) /HH | Subsidy (S2) /HH |
|---------------------|-------------------|-------------|----------------------|--------------------------------------|------------------|------------------|
| All | 2.71 | 10.40 | 100.00 | 100.00 | 693.56 | 766.74 |
| Marginal | 0.51 | 3.39 | 32.54 | 8.64 | 184.19 | 203.62 |
| Small | 1.40 | 2.34 | 22.47 | 10.49 | 323.97 | 358.15 |
| Medium | 2.78 | 2.03 | 19.50 | 16.30 | 579.69 | 640.85 |
| Large | 7.86 | 2.65 | 25.49 | 64.56 | 1756.77 | 1942.12 |
| Canals-ST_SC | | | | | | |
| All | 1.72 | 4.49 | 43.12 | 23.60 | 379.53 | 419.57 |
| Marginal | 0.50 | 2.17 | 20.87 | 4.35 | 144.40 | 159.63 |
| Small | 1.37 | 1.02 | 9.76 | 4.50 | 319.60 | 353.32 |
| Medium | 2.74 | 0.87 | 8.37 | 7.13 | 591.17 | 653.54 |
| Large | 7.20 | 0.43 | 4.12 | 7.62 | 1283.18 | 1418.56 |

-Assumes per hectare subsidy for all canal irrigated area is equivalent to the per hectare subsidy for area under ID.

-Subsidy estimates are net of institutional transfers.



Policy Implications

- Who Benefits from Canal Subsidies?
 - Subsidies are regressive
 - Limits to using water pricing to address equity issues. Would need to involve water quota rules.
 - Non-tariff measures.
- Ensuring Financial Sustainability of Systems
 - Raising water charges to cover O&M is critical, but need to be matched with institutional reform to improve service quality
 - Improving collection efficiency essential.
- Institutional reform of water agencies to improve efficiency/reduce costs imperative
 - Rationalization of structure and staffing.