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IRRIGATION SUBSIDIES IN KARNATAKA: A GROWING CONSTRAINT FOR REFORMS

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K V Raju* and H K Amar Nath**

Abstract

Over the last three decades Karnataka has focused more on creating irrigation potential. Financially this has resulted in spending more on creating capacities without a proportionate increase in revenue generation, leading to significant cost and time overruns. This paper has estimated budgetary support at macro level and recovery levels of water charges, by reviewing the unrecovered costs and growing liabilities of the irrigation sector. It has also looked at implications and possible options for bailing out.

Background

Introduction

Karnataka's priorities for water resources development have been influenced by the pressing need to utilize its share of river water vis-à-vis the other co-basin states. This has resulted in larger investment in the creation of storage capacities without commensurate investment on development of distribution systems. Spreading resources thinly over a number of irrigation schemes has led to significant cost and time overruns. For example, the debt repayment burden on the government for borrowing in the two public corporations - Krishna Bhagya Jala Nigam Limited and the Krishna Neeravari Nigam Limited - over the next 11 years is estimated to be Rs 15700 crores. Even the World Bank-supported Karnataka Tank Irrigation Project (1981-89) to increase tank storage capacity was rated unsatisfactory (Raju et al, 2001). Irrigation subsidies were nearly 47 per cent of total non-merit economic services in 1993-94 in Karnataka as compared with 36 per cent for all states taken together (Srivatsava and Sen, 1997). This works out to 21 per cent of the total budgetary subsidies (explicit and implicit) in Karnataka in 1993-94 and 15 per cent for all states. These factors, coupled with the deterioration of the financial

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position of the State, have necessitated an examination of the unrecovered costs and subsidies. This paper mainly reviews the irrigation sector, its growing financial crunch, some policy implications and reform options.

Physical

Features and Water Resources

Karnataka State accounts for 5.81 per cent (19.2 million ha) of the geographical area and 5.31 per cent (45 million as per 1991 Census) of the population of the country. Based on the physiography, the State can be divided into four broad regions[1]: Coastal Region, Malnad Region, Northern Plateau Region, and Southern Plateau Region. Karnataka has an average rainfall of 1800 mm annually. About 80 per cent of the State's rainfall come from the south-west monsoons. However, there are wide variations in rainfall, both across space and time. Generally, rainfall decreases from south-west to north-east. The Coastal and Malnad regions have more assured rainfall than the plateau regions. The average rainfall in the Coastal region is about 4000 mm annually while it is 5000 mm in the uplands and 2000 mm in the forest area of the Malnad region. In the Plateau region, rainfall is about 700 mm in the northern plains and 400 mm in the southern. Rainfall is adequate to meet the potential evapotranspiration requirements for only five months (June-October) when the south-west monsoon is active. Agriculture therefore depends primarily on irrigation. The cultivable area of the State is 14 million ha, the net area sown is 10.7 million ha, and the irrigable area is estimated at 5.5 million ha.

Karnataka has four main river basins: Krishna, Godavari, Cauvery and Pennar, all of which are drained by inter-state rivers. The Krishna basin is the largest, accounting for about 60 per cent of the area. Cauvery is next in importance, draining about 18 per cent of the area of the State. The Krishna drains the northern part while the southern part is drained by the Cauvery. The Krishna basin covers parts of 14 out of the 19 districts of the State. The cultivable area of the basin is about 9.28 million ha of cultivable land, out of which only 6 per cent is irrigated. In the Cauvery basin, of the 2.405 million ha, a mere 5.8 per cent is irrigated. Major part of the Bidar district lies in the basin of the Manjira, a tributary of the Godavari, with a catchment area in the State being 4,434 sq.km. Of the 490 thousand ha of cultivable area, a mere 16 per cent is irrigated, mostly by wells. The Pennar drains nearly one-third of Bangalore and the whole of Kolar district. Numerous tanks - a major feature of this area - irrigate 8.05 per cent of the 1.05 million ha of the cultivable in the catchment. Although there is scope for further development of groundwater, there is limited scope for major and medium irrigation in this region.

Resource Use Potential

The average annual yield of the rivers of Karnataka has been estimated at 97,352 Mcum. This includes rivers and canals, reservoirs, tanks, lakes and ponds. However, the utilisable water potential for irrigation is about 48,000 Mcm. The total net irrigated area was 19.84 lakh ha (in 1993), of which 47 per cent came from canals, 13.7 per cent from tanks and 39 per cent from wells. The ultimate irrigation potential (UIP) from all sources has been estimated at 5.5 million ha, comprising 3.5 million ha under major and medium irrigation, one million ha from minor irrigation using surface waters and another one million ha from groundwater resources. About 60 per cent of the surface water irrigation potential had been created by 1993-94, out of which 85 per cent was utilised (GoK, 1997).

About 58 per cent of the surface run-off of the State is from the west flowing rivers. The Krishna contributes more than 28 per cent of the annual run-off. In relation to their catchment area, the contribution of the west flowing rivers in surface run-off is quite high. This is due to the high rainfall in the coastal regions, which constitute their catchment area. Being inter-state rivers, most of the utilisable water in the State is available under accords with other states.

The total groundwater potential available for exploitation is 9.46 cu km per year, of which about 31.26 per cent is developed (GOK, 2000). However, this utilisation has not been uniform across districts. Utilisation is more than 50 per cent in the three southern plateau districts of Bangalore, Tumkur and Kolar. In Belgaum, Bijapur, Chitradurga and Dakshina Kannada, the utilisation is in the range of 25-50 per cent, and less than 25 per cent in the remaining 12 districts.

Development of Irrigation

Karnataka had only 4 major and 8 medium completed projects before the Plan period. As of 1992, 2 major and 28 minor projects (out of an all-India total of 120 major and 668 minor) were completed. During the Plan period ending March 1997, total investment on irrigation in the State is Rs 71,868 million. This comprises Rs 64,727 million on major and medium irrigation to create 1.6 m ha, and Rs7141 million on minor irrigation (using surface water). Irrigation projects having command area up to 2000 ha are classified as Minor Irrigation Projects. This comprises tanks, pickups, bandharas, barrages, and lift irrigation schemes. Up to end of March 2000, total irrigation potential created was 36.22 lakh ha (including 9.08 lakh ha from groundwater); thus the percentage of potential created to net sown area is 33.85 per cent (GOK,2000). However, over the last four decades, the growth of canal irrigated area increased around four times, while groundwater area more than six times and area under tank irrigation declined by 43 per cent (Table 1).

Table 1. Area irrigated by source of irrigation between 1960-61 and 1996-97 ('000 ha)

Sources of irrigation	1960-61	1980-81	1993-94	1996-97
Canals (from major and medium projects)	236	547	934	918
Open wells	133	364	487	466
Bore/tubewells	—	—	290	367
Tanks	344	304	273	240

Source: a) Brochure on irrigation statistics in Karnataka 1980-81 to 1993-94, b) Directorate of Economics and Statistics, 1995, c) Government of Karnataka and Statistical Outline of Karnataka (1991-97), d) Department of Economics and Statistics (1999).

Administration

The irrigation sector is administratively divided into a minor irrigation department, and a major and medium irrigation department. A secretary heads each department. At the field level there are three types of organisational structure: 1, mainly related to projects; 2, development-oriented - like investigation and hydrology; 3, research and training - Karnataka Engineering Research Centre at Mysore and Water and Land Management Institute at Dharwad.

In fully or partly completed irrigation projects, the Command Area Development Authority (CADA) carries out area development activities with the help of interdisciplinary staff deputed by other departments (e.g, agriculture, soil and water conservation, cooperation and engineering). There are five CADAs in Karnataka[2] and one more (in Gulburga) is to be set up. All irrigation development activities are carried out on river basin basis. There are three major river basins and all small basins are categorised under other basins: Krishna basin, Cauvery basin, Godavari basin, and other basins. All plans, both physical and financial, are designed basin-wise.

Minor Irrigation

Karnataka has 36,672 minor irrigation tanks[3] with a total command area of around 690,000 ha spread over the 27 districts. Ninety per cent of these tanks have a command of less than 40 ha. The actual irrigated area is estimated to be not more than 240,000 ha (35 per cent of total potential). Over the years there has also been a decrease in net irrigated area through tanks in comparison with other sources of irrigation as shown in Table 1.

Responsibility for operating and maintaining tanks, including ownership, is based on the size of such tanks. The tank irrigation sector consists of a number of tanks located throughout the State, irrigating from 1 to 2000 ha. Tank ownership varies according to size: a) irrigating less than 4 ha area owned by the Gram Panchayats; b) 4-40 ha by Zilla Panchayats; c) 40-2000 ha by the Directorate of Minor Irrigation (DMI). The first two categories of tanks are managed under the overall supervision of the Rural Development and Panchayat Administration department.

Apparently, there is no coordination or common strategy to deal with issues related to all categories of tanks. Further, engineers with no representation from environment, social, economic or other related disciplines dominate the organisational structure of DMI. A top down management system persists in tanks managed by DMI with no formal involvement of the community in water management.

In 2000 the government of Karnataka had set up a separate organisation called the Jala Samvardhane Yojana Sangha (JSYS). It was formed as a special purpose vehicle to implement the HUDCO project and the World Bank-supported project to rehabilitate 5000 tanks during the next five years (2001-2005). The main approach is to promote community-based rehabilitation, thereby, users' role would increase and government costs and its role would considerably reduce. As of April 2001, JSYS had initiated a community-based tank rehabilitation programme on an experimental basis in 50 tanks, covering different parts of the State.

Financial

Inadequate funds, problems of land acquisition, delay in getting sanctions from government, and forest clearance are among the reasons for delay in the completion of projects. During 1992-93 there were 13 major, 12 medium and 5 minor projects pending completion. In view of the Cauvery water dispute, the Planning Commission has not allocated funds for 3 major, 6 medium and 2 minor projects, which are all in the Cauvery basin. Since the State is burdened with a number of incomplete projects, and the costs have increased manifold, there have been repercussions on the potential created and utilised. The share of Karnataka's plan expenditure on major and medium irrigation works in its total plan expenditure has decreased from 41 per cent in the First Plan to 16 per cent in the Eighth Plan. Squeezing budgetary allocations to irrigation are thus likely to jeopardise further development of irrigation potential.

Current Policy and Institutional Framework

Government of Karnataka has recently drafted a State Water Policy for discussion with stakeholders. The draft document reviews the overall water resources in the State and identifies key issues for its sustainable development. As part of the vision, it proposes a river basin approach for

planning, taking into account multi-sectoral and conjunctive use of water, keeping both the quantity and quality dimensions in view. It lists out priorities for usage of water. It covers issues such as water harvesting, desiltation of tanks with user participation, formation of water users associations, revision of water charges to meet at least the operation and maintenance cost, participatory approaches in planning design, development and management or water resources, and effluent treatment. An action agenda has also been included in the policy document. The second draft of the State Water Policy is under circulation for comments expected from various departments to be followed by a State-level seminar with participation of the representatives - stakeholders, NGOs, experts and others - to initiate a constructive debate on the subject. For effective coordination and better implementation of the projects and in tune with other states, all related departments of water resources (like groundwater, minor irrigation, major and medium irrigation and lift irrigation) have been brought under one umbrella, (from February 2001) named as the Water Resources Department.

Concepts and Methodology of Estimation

For the farmer as a water user, irrigation subsidy is the difference between his willingness to pay for water and what he is actually paying. His willingness to pay for water could be equated to what he gets from it in terms of agricultural production, i.e, the marginal value of product (MVP) of water at different levels. Thus, the difference between MVP of water and the actual payment for water is `irrigation subsidy' to the farmer.

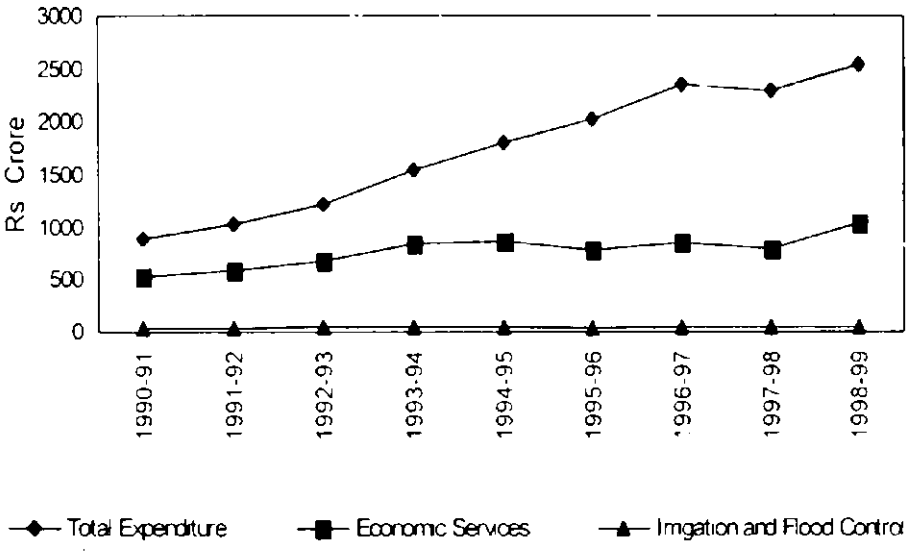
Irrigation subsidy can be viewed from the perspective of irrigation authority supplying irrigation water. From this angle, one can conceptualise irrigation subsidy as the difference between the cost of delivering irrigation water and the revenue received as payment from the users of irrigation water. Thus, this concept is akin to that of `financial losses' incurred by the irrigation authority in delivering irrigation water. Irrigation subsidy can also be viewed from the perspective of society at large. This would amount to defining irrigation subsidy as the difference between true domestic resource cost of providing irrigation water to farmers and what farmers pay to society for irrigation in terms of direct price for water, betterment levies, land tax, and also lower prices for their outputs than they would have got under free trade environment. Primarily, in this paper, we have estimated budgetary support at the macro level, recovery levels of water charges, by reviewing the unrecovered costs and growing liabilities of the irrigation sector.

Volume, Composition and Trends over Time

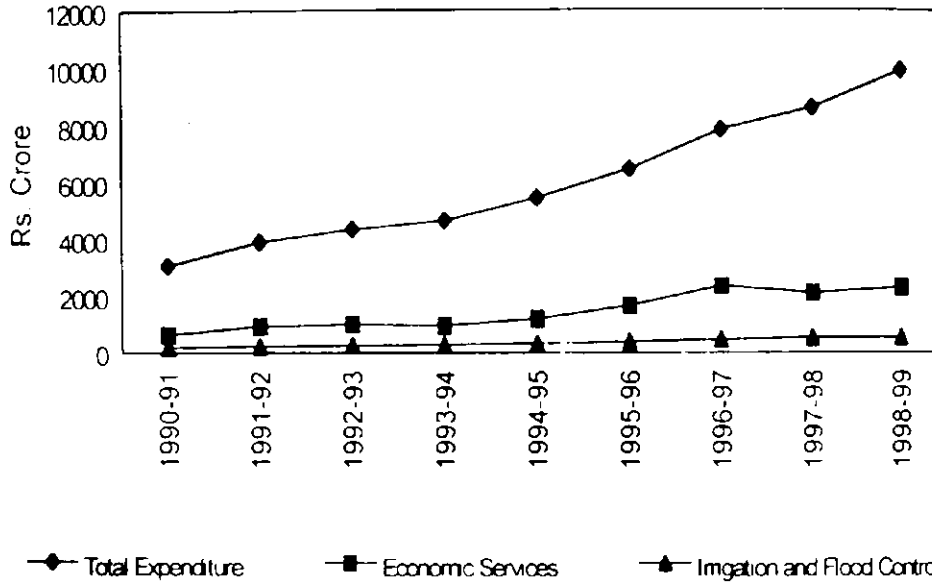
The share of irrigation in the expenditure on economic services has remained at around 30 per cent between 1985-86 and 1998-

99 (see Table 2), while the share of irrigation in revenue expenditure on economic service has come down drastically from around 25 per cent in 1985-86 to 17 per cent in 1998-99. Its share in capital outlay on economic services has increased from 39 per cent to 73 per cent during the same period. Even this increased share on the capital side is not an encouraging factor as it is mainly due to increase in non-plan expenditure. Almost all non-plan capital expenditure on economic services is on the irrigation sector. This is clearly visible in the graphs 1 to 4. Increasing non-plan expenditure is mainly due to delay in implementation of various irrigation projects. Increased expenditure does not always result in improvement of services.

Graph 1: Plan Revenue Expenditure



Graph 2: Non-plan Revenue Expenditure



Graph 3: Non-plan Capital Expenditure

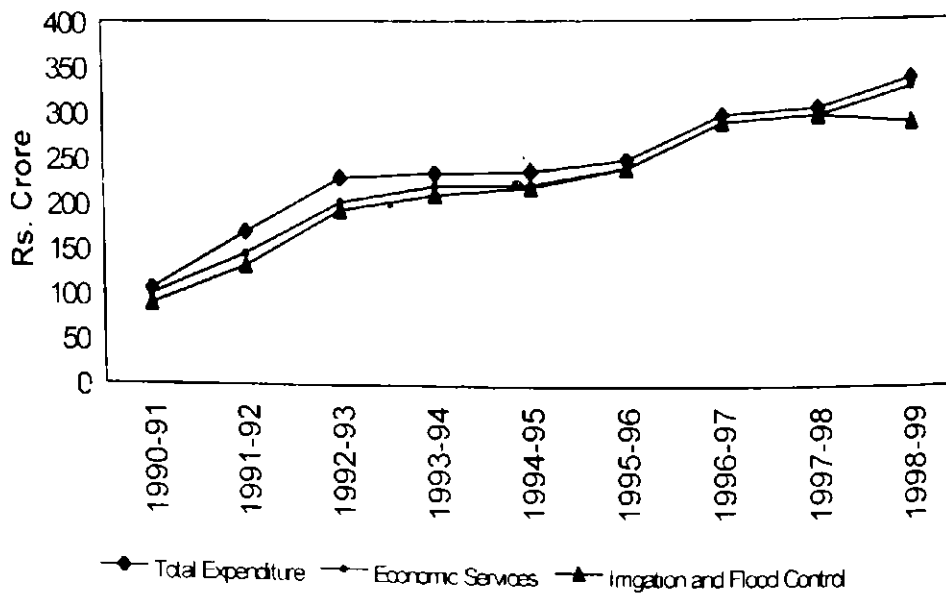


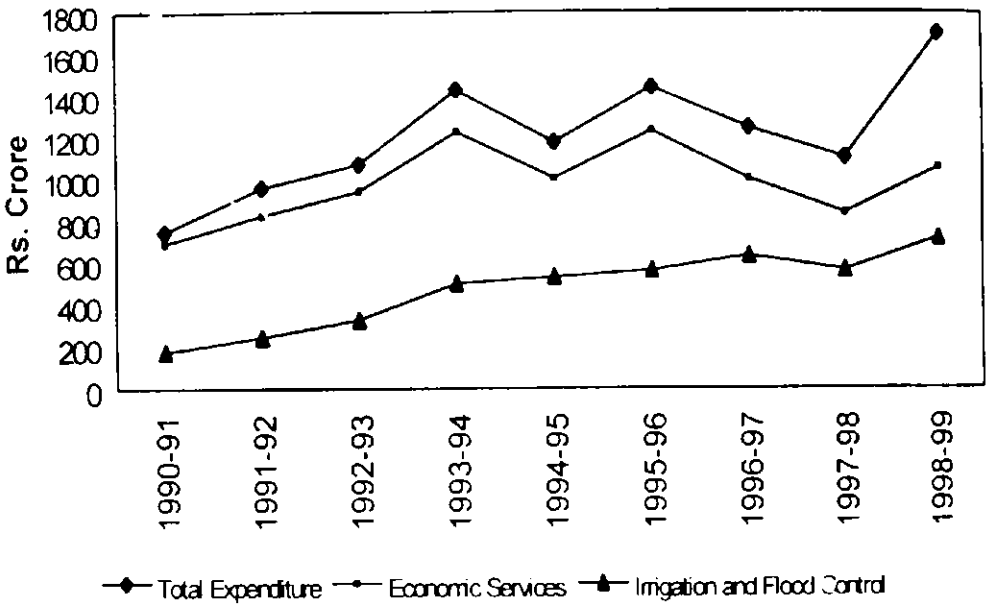
Table 2: Expenditure on Irrigation in Karnataka

Rs Crore

Year	Plan				Non Plan			
	Revenue Account		Capital Account		Revenue Account		Capital Account	
	Economic Services	Irrigation	Economic Services	Irrigation	Economic Services	Irrigation	Economic Services	Irrigation
1985-86	249.8	28.0	354.4	90.4	340.3	117.6	119.1	94.0
1986-87	269.9	30.9	485.5	139.9	361.6	129.5	101.8	66.3
1987-88	317.3	26.2	474.2	139.9	405.9	145.6	46.8	21.3
1988-89	337.4	29.8	439.2	140.8	488.3	169.3	79.0	55.2
1989-90	316.1	29.9	540.1	162.7	686.2	180.0	93.3	73.9
1990-91	521.9	35.3	691.1	175.4	637.4	198.0	99.7	89.1
1991-92	584.0	39.0	823.4	242.6	937.4	230.7	144.9	131.1
1992-93	678.9	46.9	938.7	324.5	1006.2	262.1	201.3	192.7
1993-94	844.0	42.3	1225.3	496.8	957.0	282.1	219.8	209.6
1994-95	870.3	44.4	999.8	526.3	1192.7	329.3	220.8	218.1
1995-96	788.3	36.6	1228.3	557.6	1657.2	377.9	239.1	238.9
1996-97	852.3	48.1	997.7	626.3	2348.0	459.2	288.7	288.7
1997-98	791.0	45.2	830.8	556.4	2105.2	521.3	296.4	296.2
1998-99	1045.0	41.8	1052.1	712.3	2285.5	534.3	326.7	288.7
1999-00	1336.6	45.7	756.2	562.6	2313.6	578.8	270.9	268.4
2000-01	1434.4	51.0	1354.4	1043.2	3019.2	640.2	307.0	300.0

Source: Reserve Bank of India, Finances of State Governments, and RBI bulletins (various Issues)

Graph 4: Plan Capital Expenditure



As for unrecovered cost or subsidy, there is almost a 100 per cent subsidy like any other public good. Irrigation subsidies have been worked out on the basis of actual collection of receipts and costs against the working expenses plus two per cent depreciation in real terms of capital stock and imputed interest or return on investments. Here, receipts are revenue receipts, interest receipts of State Government from Irrigation Department. The costs include revenue expenditure, depreciation and interest on capital stock and interest on loans and advances made by the State government to the irrigation department and investment made in the irrigation department by the State. Depreciation rate is 2 per cent in real terms, plus previous ten years average inflation (8.5 per cent). Imputed interest is the average rate at which the Government borrows (10.2 per cent for 1990-91 and 12.44 per cent for 1998-99).

Over the years these subsidies have increased to alarming proportions. One of the major reasons was considerable increase in non-plan expenditure, both under capital and revenue heads. During the nineties (1990-91 and 1998-99) costs have more than doubled, while receipts have increased by less than 25 per cent; this has led to a significant increase in subsidy. The recovery rate has shown a sharp decline from 2.4 per cent in 1990-91 to 0.9 per cent in 1998-99. Of the total volume of Rs2335 crore (in 1998-99) of irrigation subsidy, 89 per cent (Rs2088 crores) is on major and medium irrigation alone (refer Table 4). There are virtually no returns on the capital invested and even the recovery on variable cost is quite negligible (3.6 per cent). Of Rs 2088 crores of unrecovered costs of major and medium irrigation in 1998-99, the interest paid (Rs 416.67 crores) on the capital through revenue expenditure need

to be netted out (Budget Document of GOK, 2001-2002). Then, the unrecovered cost of major and medium irrigation costs works out to be Rs 1672 crores while for total irrigation it is Rs 1918 crores.

The increasing contingent liabilities on account of guarantees given to KJBNL and KNNL and their inability to raise further revenues may increase the burden of the State government to blow the unrecovered cost. These estimates do not include the assistance given by the State government to cover up the loss incurred by the autonomous bodies (like KBJNL, KNNL) and contingent liabilities and interest guarantees for various funds raised by the irrigation sector. These contingent liabilities are to the tune of Rs2619 crores of principal and Rs210 crores (in 1999-2000) towards interest[4]. The major share of these guarantees go to KBJNL (Rs2139 crores of principal and Rs204 crores towards interest) and KNNL (Rs475 crores of principal amount) as on March 2000. Interestingly, the KBJNL borrowed at a higher interest rate of 15.75 per cent during the initial years in 1997 and later came down to 12 per cent in 2000 and again raised to 15 per cent in 2001. Repayment of these bonds has recently started in addition to the regular interest payments. If KBJNL continues to function without mobilising any additional revenues, the burden of

Table 3. Water rates on crop-area basis

Sl. No.	Crops	Existing rates (revised in July1985)		Revised rates (effective from July 2001)	
		Rs/ha	Rs/acre	Rs/ha	Rs/acre
1	Sugarcane	555.75	225*	988.45	400
2	Paddy	86.45	35**	247.10	100
3	Cotton	98.80	40	148.25	60
4	Horticultural Crops	98.80	40	148.25	60
5	Wheat	54.34	22	148.25	60
6	Groundnut	59.28	24	148.25	60
7	Sunflower	—	—	148.25	60
8	Jowar, Maize, Bajra, Ragi & semi-dry crops	49.40	20	86.50	35
9	Pulses	37.05	15	86.50	35
10	Tobacco	61.75	25	86.50	35
11	Fodder crops	19.76	8	37.05	15
12	Others	—	—	86.50	35

Note : * For 12-18 months crop. For less than 12 months crop, Rs150.
** For 1st crop. For 2nd and subsequent crops, Rs40.

Source: Department of Minor Irrigation, Bangalore, 2001.

repayment along with the interest may eventually fall upon the State government.

The sharp increase in unrecovered costs over the last decade is due to various factors. Some of them are: a) non-revision of user charges, b) increase in expenditure due to inordinate delays in project completion[5], c) lax enforcement of water charges collection, d) lack of linkage between the user charges payment and providing service, e) poor accountability of users or users group for non-payment, f) lack of coordination between these departments. While service is provided by the irrigation department, water charges are collected by the revenue department.

Ground realities provide more clarity on the emerging problem. Water rates (1965) have now been raised to 2.5 times the current level (effective from 1987). Again, from July 2001, the rates will be raised by almost two times[6]. However, the rates still fall short of an official estimation of O&M requirement varying from Rs500-600 per ha to achieve full cost recovery. Collection of water charges is as low as 30 per cent (though reported later at 60 per cent) of estimated revenue accrual. In the case of minor irrigation projects, the water rates are only a fraction of those levied for major projects (one-half for the first one-third of the length of the main canal and one-fourth for the remaining two-thirds).

But from July 2001, it is proposed to levy the same rates for all types of irrigation projects (major, medium and minor) as shown in Table 3. What is unfortunate is that a special committee for immediate implementation in 1991 suggested the proposed water rates, but was approved only in 1996 and took five more years to finally implement in 2001.

Even with the revised water rates (of July 2001) the estimated collection will be around Rs 56 crores based on irrigated area of 23 lakh ha as on March 2000 (see Table 5A). Yet, this revenue is far from the unrecovered variable cost of Rs555.18 crores, including interest during 1998-99. Thereby, the revised water fees would be able to generate only 9.6 per cent of the current expenditure. Hypothetically, to recover the entire current expenses, the water fees should be Rs2496/ha, which by any standard is very high. The average cost comes down to Rs734/ha if only maintenance and establishment costs are considered. Thereby, it is clear that the actual current expenses need to be drastically reduced. Indeed, the major portion of the current expense is on staff costs. Though the 90s witnessed a liberalisation wave blowing across the country and across the various sectors, Karnataka (similarly many other states) took longer to revise the water rates. But still the unanswered question is what mechanisms are being formulated to enhance the recovery rate. Low cost recovery contributes to poor maintenance and operation of irrigation system, which in turn makes it even more difficult to collect the water charges currently levied.

Table 4. Un-recovered Cost of Irrigation in Karnataka Rs Lakh

Details	Revenue Receipts	Revenue Expendi-ture*	Annualised Capital Cost	Returns on Capital & Loans	Unrecovered Variable Cost	Recovery Rate (per cent)	Unrecove-red Capital Cost	Total Unrecov-erd Cost	Recovery Rate (per cent)
1998-99									
Total Irrigation	2084	57602	177999	0	55518	3.62	177999	233518	0.88
Major & Medium Irrigation	1845	48895	161821	0	47049	3.77	161821	208870	0.88
i) Major Irrigation	1023	4699	131866	0	3676	21.77	131866	135542	0.75
ii) Medium Irrigation	8	324	17987	0	316	2.34	17987	18303	0.04
iii) Others	815	43872	11968	0	43057	1.86	11968	55025	1.46
Minor Irrigation	239	6425	14591	0	6186	3.72	14591	20776	1.14
Command Area Development	0	2250	42	0	2250	0.00	42	2292	0.00
Flood Control	0	34	1545	0	34	0.00	1545	1579	0.00
1990-91									
Total Irrigation	1758	23331	49523	3.59	21573	7.53	49519	71092	2.41
Major & Medium Irrigation	1689	16876	42934	0.00	15187	10.01	42934	58120	2.82
i) Major Irrigation	169	2772	42934	0.00	2603	6.10	42934	45536	0.37
ii) Medium Irrigation	5	186	0.00	0.00	182	2.48	0	182	2.48
iii) Others	1516	13918	0.00	0.00	12402	10.89	0	12402	10.89
Minor Irrigation	69	3923	6444	0.00	3854	1.75	6444	10298	0.66
Command Area Development	0	2523	36	0.00	2523	0.00	36	2559	0.00
Flood Control	0	9	110	3.59	9	0.00	106	115	0.00

Source (basic data): Comptroller and Auditor General, Finance Accounts - Karnataka, 1990-91 and 1998-99

Notes: * Of these revenue expenditures, Rs 41667.23 lakh is interest paid on the capital (in major and medium irrigation), which is already included in the computation of annualised costs leading to double counting. If this is netted out, subsidies will come down to that extent (also see the text section 2.3).

Table 5 : Estimated Revenue from the Revised Rates Effective from July 2001

Crop	Gross Irrigated Area in ha 1993-94	Water fees effective from July 2001 (Rs/Ha)	Estimated Revenue based on July 2001 rates (Rs Lakh)	Water Rates In Andhra Pradesh Effective from July 1997	Estimated Revenue based on July 1997 rates Andhra Pradesh (Rs Lakh)
Paddy Kharif	295020	247.10	729	494	1457
Paddy Rabi	28144	247.10	70	494	139
Paddy Summer	133874	247.10	331	494.	661
Jowar Kharif	30452	86.50	26	247	75
Jowar Rabi	43846	86.50	38	247	108
Jowar Summer	3235	86.50	3	247	8
Ragi	37951	86.50	33	247	94
Bajra	17798	86.50	15	247	44
Maize	108419	86.50	94	247	268
Wheat	44758	148.25	66	247	111
Total Cereals & Millets	**743902**	**86.50**	**405**	**247**	**2966**
Total pulses	**29821**	**86.50**	**26**	**247**	**74**
Total Food Grains	**773723**		**1431**		**3040**
Sugar cane	149932	988.45	1482	864.5	1296
Chillies	13971	86.50	12	247	35
Betelnut	30211	86.50	26	247	75
Banana	10242	86.50	9	247	25
Total food crops	**1035655**	**86.50**	**3010**	**247**	**4478**
Coconut	42109				
Groundnut	151475	148.25	225	247	374
Sunflower	133201	148.25	197	247	329
Soyabean	10538	148.25	16	247	26
Total oil seeds	**340162**	**148.25**	**442**	**247**	**736**
Cotton	67982	148.25	101	247	168
Mulberry	31502	148.25	47	247	78
Non food crops (Incl oil seeds)	**452929**		**147**		**246**
All Crops	**1488584**		**3599**		**5460**
Average Water Rates/ha			**241.78**		**366.79**

Table 5A: Estimated Revenue from Water Rates

Particulars	As per revised water rates of Karnataka effective July 2001	As per revised water rates of Andhra Pradesh effective July 1997
Estimated Revenue based on Irrigated Area 1993-94 (Rs Lakhs)	3599	5460
Average Revenue/ha (Rs)	**241.78**	**366.79**
Gross Irrigated Area as on March 2000 (Lakh Hectares)	23.07	23.07
Estimated Revenue based on Irrigated Area 2000 (Rs Lakhs)	5578	8463
Revenue Receipts 1998-99 (Rs Lakhs)	2084	
Revenue Expenditure Net of Interest on Capital 1998-99 (Rs Lakhs)	16936	
Revenue Expenditure Including Interest on Capital 1998-99 (Rs Lakhs)	57602	
Total Cost (Revenue Expenditure + Annualised Capital Cost) (Rs Lakhs)	194935	
Average cost/ha (Rs)		
Current Cost (excl. Interest on Capital)	734.05	
Current Cost (incl. Interest on Capital)	2496.61	
Total Average Cost (current expenditure + annualized capital cost)	8448.95	

Source: a) Finance Accounts Documents, b) Budget Documents, c) Water Resources Department, all from Government of Karnataka, 2001, d) K.V.Raju, 2001

Table 6. Share of Salaries in the Revenue Expenditure (Rs Lakh)

Major Heads	Revenue Expenditure	Salaries	Share of Salaries in Total (in per cent)
Major and Medium Irrigation*	7228	4420	61.15
Minor Irrigation	6425	3713	57.78
Command Area Development	2250	22	0.87
Total Revenue Expenditure	15903	8154	51.28
* Excludes Interest on capital of Rs 41667.23 Lakhs			

- The irrigation department has hardly considered the provision of irrigation as a commercial service. It neither charges commercial rates nor works like a commercial service provider. As in other states of India, it has always considered irrigation provision as a social obligation of the State and levies a nominal charge. Water charges are never levied to meet the operational expenses of the department. Thus, the rationale of the work culture and its objectives need to be understood.

- Owing to this anomaly of putting operation and maintenance expenditure into revenue expenditure, the sector presents more of revenue expenditure. In reality, there is a huge O & M expenditure (financially termed as *"revenue expenditure"*). Within O & M expenditure, non plan expenditure remained high over the last fifteen years; it has gone up from Rs211 crores in 1985-86 to Rs940 crores in 2000-01, while the plan expenditure is up from Rs118 crores in 1985-86 to Rs1094 crores in 2000-01. In other words, plan expenditure has increased by 9 times over the last fifteen years and the non-plan expenditure by 4 times.[7]

- In the case of capital outlay over the last fifteen years (1985-86 to 2000-01), plan expenditure has increased by around 11 times and non-plan expenditure only by 3 times (see Table 2).

- Godavari Diversion Scheme (awarded as part of the Bachawat Award), over a period was least developed. Less than one per cent of the allocated amount was spent on this project and hardly any potential has been utilised (see Table 8). While Krishna and Cauvery basins are faced with interstate disputes, other basins could have been given more importance. Financial utilisation is just six per cent of the allocations and actual achievement till March 2000 is 33 per cent of the planned resource utilisation.

Table 7. Status of water resources in Karnataka till April 2000.

Particulars	Planned	Achieved (till March 2000)	Balance	per cent of balance to be planned
Utilisation (in TMC)	1286.30	887.16	399.14	31.03
Financial (Rs in Lakhs)	2169703* (796750**)	1174648	996066	45.90
Potential (in lakh ha)	39.62	26.76	12.86	32.45

Note: a) All figures are cumulative, b) * Present cost, c) ** Approved cost
Source: Water Resources Department, March 2001.

Table 8. Status of Basinwise Irrigation Projects in Karnataka State till March 2000

Sl. No.	Project	Utilisation (in TMC)		Financial (Rs in Lakh)		Potential (in ha)		
		Planned	Achieved up to 3/2000 in per cent	Admn approved cost	Present cost	Expenditure up to 3/2000 in per cent	Planned	Created up to 3/2000 in per cent
1.	Krishna Basin	729.00	73.00	640015	1468446	54.73	2572819	67.14
1.1	Godavari Diversion Scheme	23.00	0.00	0	23709	0.20	49859	0.00
2.	Cauvery Basin	408.62	75.15	120364	558918	59.73	1110692	75.11
3.	Godavari Basin	22.37	58.69	33038	45560	72.26	68763	62.17
4.	Other Basins	103.31	33.63	3333	73070	6.02	160346	44.89
	Grand Total	**1286.30**	**68.96**	**796760**	**2169703**	**54.13**	**3962479**	**67.54**

Note: All figures are cumulative

Source : Water Resources Department, March 2001.

Table 9. Status of Major and Medium Irrigation Projects in Karnataka State till March 2000.

Sl. No.	Project	Utilisation (in TMC)		Financial (Rs in Lakh)		Potential (in ha)		
		Planned	Achieved up to 3/2000 in per cent	Admn approved cost	Present cost	Expenditure up to 3/2000 in per cent	Planned	Created up to 3/2000 in per cent
1.	Completed (40 projects)	248.91	100.00	13766	13766	100.00	453054	100.00
2.	Ongoing (40 Projects)	680.52	59.57	673465	1920083	56.40	2297671	56.08
3.	New (29 projects)	106.33	0.00	30240	135671	4.73	211754	0.00
	Total	1036.76	64.07	717471	2069620	53.30	2962479	58.79
4.	Minor irrigation	250.54	92.94	79279	100183	71.28	1000000	93.49
	Grand Total	**1286.30**	**68.96**	**796750**	**2169703**	**54.13**	**3962479**	**67.54**

Note: All figures are cumulative

- All costs, including establishment, maintenance, and operational costs, for all 40 ongoing and another 29 new projects (as on April 2000) are considered as capital cost (see Table 9). At present costs, it works out to 92.74 per cent of the total costs incurred[8]. In other words, the department does not consider it as operational expenses. However, some of these projects are generating revenue (through water rate collection) from the area currently under irrigation. In practice, 74 per cent (12.88 lakh ha) of the total area under major and medium irrigation is irrigated by ongoing projects.

- Both in old and new projects, emphasis is laid on construction activities rather than utilisation. This has resulted in more capital expenditure, and less revenue generation. In spite of repeated warnings, both in the national five-year plans and State plans to complete the ongoing projects, stress on creating additional potential has not declined. As a result, till March 2000, though 40 projects have been completed, another 40 projects are ongoing, which consume nearly 92 per cent of the total capital expenditure. On the other hand, another 29 new projects have been initiated at a revised cost of Rs1356 crores. Obviously, the water resources department requires better financial discipline and a more professional approach to complete the ongoing projects.

- Minor irrigation (including groundwater) is a sure bet for better performance. Both owing to largely controlled by individual owners, and in the case of minor surface irrigation, local groups control the source and distribution. Also it's shorter lag period. For the same reasons (see Table 9) its resource utilisation and actual irrigated area (against the planned) is more than 92 per cent. The minor irrigation department needs to streamline its activities and move towards transferring the management of all minor irrigation structures to users' groups. The Jal Samvardhane Yojana Sangha was created precisely for this purpose in 2001. It plans to hand over some 5000 irrigation tanks in the State to tank users' associations over the next five years

Key Issues

Reducing subsidy levels means raising costs to users. Users can pay better if service delivery is improved in a sustained manner. They can also pay more if their payments are properly accounted for and judiciously spent on system improvement as per their needs. This requires minimum system rehabilitation to achieve designed levels of system operation and water deliveries. Thereby, a holistic approach is required to enhance the performance levels in the irrigation sector. Some key issues follow:

Raising revenue: At the outset, current water rate levels and even the proposed revised rates (see Table 3) are quite low. While the neighbouring State of Andhra Pradesh has increased the water rates by three folds in 1997 itself, Karnataka has proposed to double or less than double the water rates from July 2001. Yet the gap between the current expenditure and current revenue still remains, for the following reasons:

- The revised water fees (effective July 2001) would be able to generate only 9.6 per cent of the current expenditure of Rs576 crores.
- To recover the entire current expenses (of Rs576 crores), the water fees should be around Rs2496 ha, which by all standards is very high.[9]
- The major portion of the current expenses which is on staff costs (ranging 40-60 per cent at various levels) needs to be pruned (see Table 6).
- If we take out the minimum staff costs by 60 per cent and interest is netted out, the current expenditure will be Rs 64 crores.
- Lot of technical inefficiencies in the current operating system need to be reduced
- Raising revenues should cover three dimensions: reducing staff costs; increasing technical efficiencies; and raising water fees every year at the rate of 20 per cent for the next five years This will give Rs89.5 crores, which is around 26 per cent of the current expenditure, excluding staff costs.[10]

For a long time, the State has not revamped its mechanisms to collect water fees. While demand statements (water fee to be collected) are prepared by the Irrigation Department (separately for major and medium and minor irrigation projects - above 40 ha command) actual collection has to be made by the Revenue Department. The Village Assistant, as part of his many jobs, also collects the water rates and remits it to the taluk/district treasury. At no stage is there coordination or understanding between the Irrigation Department and Revenue Department. An ineffective mechanism to collect water fees currently exists, resulting in poor water fee collection and low or no follow-up on revenue collection. For defaulters, there is hardly any punishment. Hence, there is less incentive to pay even the existing water rates. (For more details, see section on low 'revenue collection').

Inadequate database: Water fee collections are low also because of the poor database. The format has neither changed over time owing

to field realities nor is the current system effectively monitored. Regular update of the database is another constraint. In the present environment, plot-wise crop area and source of irrigation are not recorded. Currently, data is collected through eye estimates and hearings from farmers. This becomes handy for defaulters and non-surface irrigation water users. The tremendous rise in groundwater use across the State and even within the command area further supports this fact. Besides, the water users have more options on sources of water. Declining performance levels of irrigation projects and lesser than the designed discharge levels have also added to the misery of the poor database. Irrespective of the quantity of water the user has to pay the fixed water rates on crop-area basis. The current database has failed to recognise the complexity of this nature.

Inter-departmental coordination: The Irrigation Department handles development of irrigation potential, system operation and maintenance. Crop-related aspects are looked after by the Agriculture Department and water fees is collected by the Revenue Department. Vertically each department controls its activities and meaningful horizontal relationship hardly exists. Hopefully, under the revised Water Resources Department (earlier known as the Irrigation Department) this may happen. A functional plan is yet to be evolved.

While farmer's capacity to pay is high, capacity to charge and collect more is low: From the policy perspective, it is essential to know whether the farmer is capable of paying more than the officially listed water rates. In practice, the farmer is paying more. Earlier studies (e.g., Ashok Gulati, Ruth Meinzen-Dick and Raju, 2001) of the Upper Krishna Project and Vishweshvaraiah Canal command areas and also in other States have concluded that the farmer pays more. But most of it goes to rent seekers; the transaction costs are much higher than the listed water rates. The studies have also indicated that the farmer is willing to pay more (3-4 times of the current rates) if water is assured both on time and in quantity. Part of the problem is that the farmer has inadequate information on water arrival time and quantity. Now the question is how to capitalise on the farmers' willingness to pay by ensuring the required type of supplies. Indeed, the groundwater buyer pays almost three to four times more than the canal water rate.

Poor Service Delivery: In continuation of the above point, there is low stress on service delivery. Owing to inadequate orientation of the staff, and poor management perspective, the Irrigation Department hardly works as a service provider. In practice, farmers have to `service' the department to get water. Over time, this has led to a wrong image of the department in the users' mind. This is one more reason for reluctance to pay the existing water rates.

Low Revenue Collection: In Karnataka, revenue generation from the irrigation sector is not very encouraging. Out of Rs230 crores outstanding, actual collection is only Rs30 crores. Penal water fees of around Rs215 crores were waived during the parliamentary elections held in March 1996.

Constraints

Some of the major constraints are:

a) Poor quality structures, particularly canal distribution network structures; in some places, both in old and new projects, major canals breaches; this has led to additional expenses, and crop loss; local newspapers regularly feature the shortcomings and problems in the irrigation project areas.

b) The department is dominated by a single discipline; skill upgradation and training are not given adequate importance; improved management of irrigation systems necessitates multi-disciplinary personnel.

c) Persisting inadequacies in the irrigation sector. The National Water Policy, 1987, as well as many research and action research studies have recommended[11], management transfer through participatory irrigation management at different levels of the system. This will enhance, as the studies indicate, water efficiency, improved revenue collections to the State, reduced expenditure on operation and maintenance, and improved management of the irrigation systems. So, there is a strong need to involve the user in planning, execution, system rehabilitation, operation and maintenance, water distribution, fee collection, and conflict resolution.

d) To facilitate the above process, the State needs to suitably modify its irrigation acts and administrative rules. There is a need to rethink in the existing conditions, what kind of legal framework is required.[12]

e) The State has to come up with suitable guidelines, followed by administrative rules to take care of the emerging conflicting demands by the three different sectors i.e., domestic, industrial, and agricultural. Currently, the conflicting demands are met mostly through ad-hoc measures. In the process, the agricultural sector gets deprived.

f) The department has to broaden its purview, both in its personnel skill and coverage, to restructure its focus to whole water resources, rather than mere irrigation. The department has to reorganize and downsize some wings and create new wings, to meet the emerging demands of the sector for the next 20 years[13]. Probably, it can follow `2020 vision' as envisaged by the International Food

Policy Research Institute and supported by the World Bank[14]. Alternatively, the State can formulate its own long-term vision.

g) The Water Resources Department should focus more on resource consolidation, effective harvesting of its various sources of water, its sustainable development and efficient usage, design rule making and rule enforcement mechanisms, guidelines for effective implementation of its plans and programmes, wholeheartedly support users participation in its activities, open up the sector for private participation, bring in and maintain transparency and accountability in the department's activities.

h) The current allocation levels for operation and maintenance are inadequate; up to 60 per cent of it is spent on establishment and related costs; thereby, the actual work component gets lower than required; this has severely affected maintenance and repairs of distribution structures; as a result, the canal carrying capacity has reduced, in some cases up to 50 per cent.

i) In the present context, the field offices are not in a position to guarantee the supply quantity and timeliness. This is true both at main system and outlet levels. Owing to this, users are not keen to participate in system management and field officials are not in a position to collect water fees.

Institutional Reforms

Understanding the situation of irrigation in India requires looking from the macro to the micro level. Many policies regarding irrigation, including much of the investment in systems, originate at the national level. However, because irrigation is a State subject, it is implemented by the States, through specific irrigation projects, with the outcomes being ultimately determined at the local level.

Water control is essential for agricultural progress. Many States have ongoing investments in major canal irrigation systems, as well as a need to maintain older systems. Some States which face greater pressures to develop their water resources (as in Krishna basin), have implemented an innovative corporate structure to finance the capital cost of irrigation development. Many States have also adopted policies of 'Participatory Irrigation Management' to improve ongoing operation and maintenance.

Despite the vast amounts of money that have gone into irrigation system development and operation, there has been relatively little attention to financing issues, especially of capital costs (except in few States). Official statistics under-represent the magnitude of irrigation expenditure by neglecting the effect of inflation, gestation lags, and pure time preference. The empirical studies suggest that it is not only physical drought, but also financial drought, that irrigation systems need to worry about.

It is also necessary to examine whether the farmers are extracting large rents at the expense of the rest of society, by looking at the full picture of direct and indirect financing. This has changed over time, from direct cost recovery in the colonial period, to more indirect charges on farmers after Independence. In the context of ongoing economic liberalisation, there is a case of shifting back from indirect to direct cost recovery to improve the efficiency of the irrigation system management. We need to examine various types of irrigation fees, including volumetric pricing, wholesaling to water users' associations, and crop-area base charges in terms of their practical feasibility, as well as the incentives they create for water conservation.

Financial Reforms

Irrigation development in Karnataka is already facing a severe financial crunch. Most of its major and medium projects are funded by multilateral funding agencies, donor agencies, and the central government. Though there is potential for development, owing to inadequate resources, the State has to go slow unless some major funding agencies or donors chip in.

The State budgetary allocation for maintenance and repairs is mainly consumed for establishment and staff costs. Even in the funds allocated for works, only 50-65 per cent get spent on actual work. This has resulted in poor quality of irrigation infrastructure, inadequate maintenance and repairs; in turn, occurrence of frequent breaches of both major and minor canals, crop production losses, seepage losses during conveyance (up to 40 per cent), crop violation (mainly towards water loving crops); all these have resulted in more problems in irrigated areas, actual data are hardly reflected in the official statistics, double counting, inadequate irrigation than what was originally projected (e.g., two irrigations in place of four to five), wastage of water, frequent agitation by farmers, road blocking and non-payment of water fees.

To surmount the emerging financial crunch, and World Bank withdrawal from UKP funding, the State government has established a corporate body to mobilise funds from the public; the Krishna Bhagya Jal Nigam Limited (KBJNL) established in 1994, has issued four public bonds, so far, promising high returns (14.5 per cent to 17.5 per cent) and mobilised Rs 2110 crores till June 1999. After five years of the KBJNL formation, it has not improved water fee collection levels though it has promised in its agenda that the water fees would be raised by 15 times to cover its costs. This move was severely opposed and till June 1999 not implemented. Instead, the KBJNL is taking State budgetary support to pay the promised interest to bond holders

Such financially autonomous agencies like KBJNL have also been suggested as a powerful means of restructuring agency staff incentives,

to make them more farmer friendly, when the agency becomes dependent on the irrigation service charges collected. The study (Raju, Ashok Gulati, and Ruth Meinzen-Dick, 1999) finds that the Nigam structure has allowed the State to mobilise large amounts of money from private sources, to complete the irrigation project expeditiously. However, it has not had a major influence on the motivation of agency staff to work with farmers

If farmers cannot be persuaded to pay more for the government staff to do proper operation and maintenance of the irrigation systems, participatory irrigation management reforms attempt to get farmers to take on more of the operation and maintenance tasks directly. Across the States, various approaches have been adopted in terms of level of organisation of the users and changes in irrigation charges, and then reviews the types of legislative reforms required for participatory irrigation management policy statements to succeed in changing the management of irrigation systems. The government in this regard cannot carry out policy reforms alone - they require that farmers take an active role.

Policy and Legal Measures

- Major and Medium irrigation systems in Karnataka have been wholly state-managed. At the State level, the government has been attempting to revise the existing policies, formulate new policies and design programmes providing long-term physical and financial support for the implementation of participatory irrigation management.

- The irrigation sector has to be restructured to reduce non-plan expenditure, increase efficiency of plan and non-plan spending and the available manpower may have to be re-deployed based on needs. Water rates for various uses will be revised in a phased manner and fixed so as to cover at least the operation and maintenance charges of providing services. The other required actions are to improve governance, bring transparency in administration, reduce corruption and ensure accountability in administration.

- Close monitoring of projects to identify bottlenecks to obviate time and cost overruns have to form part of the project planning and execution. Performance and impacts of projects have to be effectively monitored.

- A system of water rights with suitable enforcing mechanisms need to be established. The prime requisite for resources planning and introducing water rights is a well-developed information system. A state-of-art system will be developed using recent advances in information technology. This information system shall contain data

on surface and groundwater availability and actual use for diverse purposes in different basin/sub-basins.

- Private sector participation has to be encouraged in various aspects of planning, investigation, design, construction, development and management of water resources projects for diverse uses, wherever feasible. Private sector participation would help in introducing corporate management to improve service efficiency and accountability to users. Depending on the specific situation, various combinations of private sector participation, in building, owning, operation, leasing, and transferring of water resources facilities will be considered.

- The Command Area Development programme identified farmer involvement in system management as part of the programme when it was started in 1974. However, no significant efforts were made in this area until the mid-1980s. The Sixth Plan emphasised the need for participation of farmers in the scientific management of water resources. The Seventh Plan reiterated the need for participation of farmers in the management of irrigation. Since 1985, the CAD programme has issued a series of guidelines, exhortations, and offers to the States to take up aspects of irrigation management transfer.

- The National Water Policy (both 1987, and 1998) has also stressed the involvement of farmers in various aspects of the management of the irrigation system, particularly in water distribution and collection of water rates. In recent years, initiatives to implement participatory irrigation management included set up a high power committee, revising the State irrigation act, holding frequent workshops, seminars and training programmes for field officials and farmers.

- Owing to the inadequate policy and legal framework to support participatory irrigation management in the Irrigation Act, water users associations have remained weak. In recent years, as per the high power committee suggestions, the irrigation act was revised to include legislative backing for participatory irrigation management practices in the State. However, the State is yet to formulate a comprehensive and integrated water resources policy.

Strategy and Action Agenda

a) Establish State Water Resources Board and Technical Secretariat. Completely review existing policies and formulate new policies. Review the existing legislative framework, draft new legislation or propose amendments to the existing legislative framework.

b) Establish Water Resource Data and Information Centre and collaborate arrangements with departments/agencies concerned. Develop protocols for data sharing and exchange. Develop a monitoring and evaluation system for the water sector. Establish water management units with direct access to the Water Resource Data Centre's databases and decision support systems, like GIS and MIS.

c) Restructure the Irrigation Department to improve planning and management capabilities, eliminate multiplicity of functions, increase efficiency of plan and non plan expenditure, re-deploy staff based on needs, change operating rules to ensure transparency and accountability and make the department responsive to user needs.

d) Mobilise community and stakeholders' participation through Users' Organisations, empower them, provide training and technical support and create public awareness. Form and empower Water Users' Cooperative Societies and Federations for Participatory Irrigation Management. Provide training and technical support to Water Users' Cooperative Societies and Federations.

e) Strengthen research and development institutions in the water and related sectors: to meet technology requirements; carry out applied participatory research; support the State Water Board and Monitoring and Evaluation cells; support basin planning and the participatory approach.

f) The good practices of Andhra Pradesh, Madhya Pradesh, and some pilot experiments in various states (Gujarat, Tamil Nadu, Bihar, and Maharashtra) have indicated that functionally effective participatory irrigation management would help boost irrigation revenues. It will also help reduce government costs in operation and maintenance.

g) Installing volumetric measuring devices would be a costly affair. Instead, selling to groups or water users' associations or tank users' associations would be more practical and functionally easy, and cost effective.

Future Reforms

The estimated unrecovered cost, as shown in Table 4, is Rs2335.18 crores in 1998-99. If the interest on capital (Rs416.67 crores) under the revenue expenditure of major and medium irrigation is netted out, as it is included in computation of the annualised capital cost, then the unrecovered cost is Rs 1918.51 crores.

The estimated revenue accrual as per the revised water rates (effective from July 2001) is indicated in Table 5. Water rates are quite

low for all crops (except sugarcane) compared to water rates prevailing in Andhra Pradesh introduced in 1997; it is 50 per cent less (compared to Andhra Pradesh) for irrigated crop like paddy. The difference is more for other crops. The average water rate is around Rs242/ha in Karnataka and Rs367/ha in Andhra Pradesh. Table 5A shows the estimated revenue both based on water rates of Karnataka and Andhra Pradesh. Even if Karnataka revises water rates on par with Andhra Pradesh, the additional revenue accrual will be around Rs30 crores based on latest estimates of gross irrigated area (excludes groundwater irrigated area) of 23.07 lakh ha as of March 2000.

Of the total revenue expenditure after netting out interest on capital, around 51 per cent is on establishment and 49 per cent is on maintenance (see Table 6). The immediate concern of the government should be to recover this current expenditure through user charges. At present, the average current cost (i.e., excluding interest on capital) is around Rs734/ha (see Table 5A) while the average revenue is around Rs242/ha; this is based on the revised water rates (July 2001) with a revenue yield of Rs55.78 crores and a gross irrigated area of 23.07 lakh ha.

Two reforms scenarios are proposed to reduce the government's recurrent costs, and to increase revenue levels and the user's role. The proposals are in tune with the current trends at the global level and in some progressive states in India, like Andhra Pradesh, Madhya Pradesh, Rajasthan, and Tamil Nadu. Also, lot of spadework has been carried out in Karnataka over the last few years in the following areas:

- High power committee on participatory irrigation management
- State water resources policy (draft) and also national water policy
- Recent amendments made to the Irrigation Act
- Community based rehabilitation of minor irrigation tanks
- Empirical evidence of WUAs on a pilot basis
- CADA's programme.

The proposed reform agenda supports: a) creation of water users associations, b) transfer of system maintenance and repairs to WUAs, c) reduction of the government's costs on maintenance, repairs and establishment, d) improvement in water use efficiency and better system performance, e) higher revenue generation, and e) higher role for the users' organisations and lesser role for the government.

Reform Scenario -I : The reform scenario should aim at the following:

- Increase the water rates by 20 per cent every year for the next five years and then review the status. This should be done with prior consultations on a wider scale with the WUAs.
- Share 50 per cent of the revenue with water users' associations in the first year 2000-01.
- Of the remaining 50 per cent, increase WUA share by 10 per cent from the second year 20 per cent in the third year, 40 per cent in the fourth year and so on up to 2010-11
- After adjusting for average inflation (assumed at 10 per cent), reduce the maintenance cost by 20 per cent every year.
- After adjusting for average inflation (assumed at 10 per cent) reduce the staff cost by 20 per cent every year.
- The gap between the revenue and current expenditure (net of interest on capital) would fall from Rs91 crores in 2000-2001, to zero in 2009-10. Besides it would generate a surplus of Rs13 crores in 2010-2011.
- Water charges per ha shall increase from Rs348 in 2000-2001 to Rs1796 in 2009-10.

Reform Scenario-II

- Water charges in Karnataka will be revised on par with Andhra Pradesh at the earliest.
- Average tariff will be around Rs528/ha in 2000-01.
- Rest of the agenda will be same as in Reform Scenario-I
- The gap between the revenue and current expenditure (net of interest on capital) would fall from Rs70 crores in 2000-2001, to a surplus of Rs6.5 crores in 2005-06.
- The water charges per ha shall increase from Rs528 in 2000-2001 to Rs2725 in 2009-10.

If Reform Scenario-I is followed, the irrigation sector will be generating surplus from 2010-11. This would enable to meet investment costs for the future period. In case, Reform Scenario-II is implemented from 2005-06, there would be surplus which can be utilised to meet future investments and costs. By facilitating better water users' role through WUAs, the government can generate additional revenue and reduce its maintenance costs too.

Table 10: Proposed Reforms

	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
Scenario I													
Revenue Expenditure net of Interest (10 per cent annual increase)	169	186	205	225	248	273	300	330	363	399	439	483	532
Estimated Revenue (based on July 2001 water rates of GOK)	56												
Estimated Revenue based on Andhra Pradesh water rates	85												
Establishment Cost (60 per cent of the Revenue Expenditure)	102												
Maintenance Cost (40 per cent of the Revenue Expenditure)	68												
Reduce the Maintenance Cost by 20 per cent*		60	52	46	41	36	31	28	24	21	19	17	15
Reduce Staff Cost by 20 per cent*	102	89	79	69	61	54	47	42	37	32	28	25	22
Total Revenue Expenditure	169	149	131	115	102	89	79	69	61	54	47	42	37
Increase Water rates by 20 per cent	56	67	80	96	116	139	167	200	240	288	345	414	497
Share of Water users association*			40	53	69	90	117	150	192	245	311	373	448

	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
Revenue to be accrued by the Government*			40	43	46	49	50	50	48	43	35	41	**50**
Gap			**91**	**72**	**55**	**41**	**29**	**19**	**13**	**10**	**13**	**0**	**-13**
Scenario II													
Increase Water rates by 20 per cent	85	102	122	146	175	211	253	303	364	437	524	629	755
Share of Water users association*			61	80	105	137	177	227	291	371	472	566	679
Revenue to be accrued by the Government*			61	66	70	74	76	76	73	65	52	63	75
Gap			**70**	**50**	**31**	**16**	**3**	**-7**	**-12**	**-12**	**-5**	**-21**	**-39**
Total Irrigated Area Lakh Hectares	**23.07**												
Average Tariff Rs/ha. (a) Karnataka			348	418	501	602	722	866	1040	1248	1497	1796	2156
(b) Andhra Pradesh			528	634	761	913	1095	1314	1577	1893	2271	2725	3270

* 50 per cent of Revenue accrual to be devolved to water users' association in First year 2000-01 and to reduce the government share by 10 per cent every year

Notes

1. The Coastal Region which runs along the west coast covering about 300 km from Karwar in the north to Mangalore in the South. It is a narrow strip and rarely exceeds a width of 30 km. The Western Ghats are responsible for heavy rainfall in this region with average rainfall estimated at 3022 mm during the south-west monsoon from June to October. The annual average rainfall is even higher at 3414mm.

   The Malnad Region lies to the east of the coastal region and is mountainous. This region too has a sidth of only 40 to 60 km. and runs parallel to the coastal belt. The districts of Kodagu, parts of Chikmagalur, Shimoga, Uttara Kannada, Hassan, Belgaum and Mysore form this region.

   Northern Plateau is formed by the plains of Belgaum, Bidar, Gulbarga, Bellary, Dharwar and Raichur. It is drained by the Krishan, Bhima and Tungabhadra rivers It receives an average rainfall of only 610 mm annually or less and is the most arid region in the state. The Krishna is the economic lifeline of this region.

   Southern Plateau comprises the districts of Shimoga, Hassan, Chikmagalur, and the whole districts of Mandya, Tumkur, Bangalore, Kolar and Chitradurga. It is drained by the Cauvery, Tungabhadra and the Pennar rivers, Cauvery being the most important river in this region. This region receives scanty rainfall : 500 mm in the noth-west and 762 mm in the west.

2. A) Upper Krishna Project, b) Tungabhadra Project, c) Malaprabha and Ghataprabha Projects, d) Bhadra Project, and e) Cauvery Project.

3. Tanks with command area of less than 2,000 ha.

4. For more details see Government of Karnataka. March 2001. Budget Memorandum (Details of guarantees, shares, securities, etc) 2001-2002. p. 128-130.

5. For details see Government of Karnataka. March 1999. Report of the CAG (Civil).

6. For more details see Government Order No. MI/16/NPC/99, Bangalore dated 13-07-2000.

7. Computed on the basis of basic data on State Finances, RBI as given in the Table 2.

8. This excludes minor irrigation projects owing to non-availabilty of such break-up data for ongoing and new projects.

9. Based on total area irrigated by major and medium irrigation and minor irrigation. It excludes groundwater irrigation, which is primarily in the private hands.

10. Assuming the lower level of staff costs and technical inefficiencies in the total current expenditure is not more than 40 per cent.

11. The studies include, reports of the Management and Training Project, WALMI's action research studies, ISPAN study, Irrigation Management Transfer studies by IIMA-IIMI, and other studies sponsored by some donor agencies. Besides, the High Power Committee of the state has also recommended participatory irrigation management.

12. see e.g., the irrigation acts of Gujarat (bill), Andhra Pradesh, and guidelines for formation of water users association in Maharashtra.

13. e.g., the groundwater wring is under the mines and geology department. In most states it is under the water resources department.

14. More or less on similar lines, the government of Andhra Pradesh, has designed its plans and programs; the state has already made changes in its legal acts, policy guidelines, and administrative rules; e.g., formation and functioning of water users association has been made compulsory in all irrigation systems of the state; and elaborate legal act has been introduced on the one hand, and on the other enforcement mechanisms are stuitably modified.

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