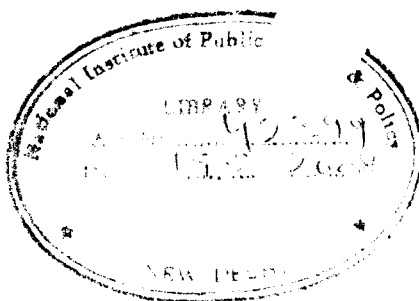


Report

PUBLIC EXPENDITURE ON WATER

Volume I

Om Prakash Mathur



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National Institute of Public Finance and Policy
18/2 Satsang Vihar Marg
Special Institutional Area (Near JNU)
New Delhi 110 067

CONTENTS

List of Tables	v
List of Figures	vii
Preface	ix
1. Introduction	1
I. General context	1
II. Scope of the study	7
III. Sources of data	9
IV. Data limitations	11
V. Layout of the study report	13
2. Institutional Responsibility for the Water Sector	15
3. Public Expenditure on Water: An Overview	19
Part 1: Irrigation	19
I. General	19
II. Public expenditure on irrigation	22
Part 2 : Water Supply and Sanitation	33
I. General	33
II. Public expenditure on water supply and sanitation	37
Annex Table 1. Gross domestic product deflators	42
Annex Table 2. State domestic product (1980/81 prices)	43
Annex Table 3. State domestic product (current prices)	44
4. Public Expenditure on Water: A Four States Analysis	45
Andhra Pradesh	46
I. General	46
II. Public expenditure on irrigation	50
III. Public expenditure on water	56
Karnataka	58
I. General	58
II. Public expenditure on irrigation	61
III. Public expenditure on water supply and sanitation	68
Maharashtra	71
I. General	71
II. Public expenditure on irrigation	74
III. Public expenditure on water	80
Tamil Nadu	83
I. General	83
II. Public expenditure on irrigation	88
III. Public expenditure on water supply	92
5. Summary and Concluding Observations	95
References	103

LIST OF TABLES

Table 1.	Public expenditure in India	1
Table 2.	Composition of public expenditure in India (1980/81 prices)	2
Table 3.	Public expenditure growth in major sectors—1980/81–1994/95 (1980/81 prices)	3
Table 4.	Growth of public expenditure, centre and major states—1980/81–1993/94 (1980/81 prices)	5
Table 5.	Trends in revenue receipts (centre and states combined)	6
Table 6.	Surplus/deficit (centre and states combined)	7
Table 7.	Growth of irrigation in India (<i>net</i>)	20
Table 8.	Plan investment on irrigation in India (1980/81 prices)	21
Table 9.	Public expenditure on irrigation in major states—1993/94 (1980/81 prices)	23
Table 10.	Matrix showing the states' position according to the level and growth of expenditure on irrigation	24
Table 11.	Capital expenditure on irrigation in selected states—1993/94	26
Table 12.	Revenue expenditure on irrigation in selected states—1993/94	27
Table 13.	Receipts from irrigation on revenue account—1993/94	30
Table 14.	Revenue deficit on irrigation account for major states (1980/81 prices)	31
Table 15.	Contribution of irrigation to the total revenue account deficit in major states—1993/94	32
Table 16.	Plan outlays on water supply and sanitation in India (current prices)	34
Table 17.	Water supply and sanitation coverage in India	35
Table 18.	Public expenditure on water supply, sewerage and sanitation in major states—1993/94	37
Table 19.	Per capita budgeted revenue expenditure on water supply sewerage and sanitation—1993/94 (current prices)	39
Table 20.	Revenue expenditure on water supply, sewerage and sanitation and population covered by water supply	40
Table 21.	Recoveries from water as a percentage of revenue expenditure: Rajasthan	41
Table 22.	Per capita SDP for sample states (1980/81 prices)	45
Table 23.	Plan investment on irrigation: Andhra Pradesh (current prices)	47
Table 24.	Finances of Andhra Pradesh	49
Table 25.	Calculated annual average growth rates percent: Andhra Pradesh	49
Table 26.	Public expenditure on irrigation: Andhra Pradesh (1980/81 prices)	50
Table 27.	Calculated annual average growth rates of expenditure on irrigation (percent): Andhra Pradesh	52
Table 28.	Net irrigated area and expenditure on irrigation: Andhra Pradesh	53
Table 29.	Break-up of revenue expenditure on irrigation sector: Andhra Pradesh	54
Table 30.	Percentage break-up of revenue expenditure on irrigation sector: Andhra Pradesh	55
Table 31.	Calculated annual average growth rate of revenue receipts from irrigation: Andhra Pradesh	55

Table 32.	Revenue deficit on irrigation account as a percentage of state's total revenue receipts (1980/81 prices)	56
Table 33.	Revenue expenditure on water supply and sanitation: Andhra Pradesh	57
Table 34.	Trend in development of irrigation: Karnataka (current prices)	59
Table 35.	Calculated annual average growth rate of the finances: Karnataka	61
Table 36.	Capital expenditure on irrigation: Karnataka (1980/81 prices)	62
Table 37.	Revenue expenditure on irrigation: Karnataka (1980/81 prices)	63
Table 38.	Net irrigated area and expenditure on irrigation sector: Karnataka	65
Table 39.	Break-up of revenue expenditure on irrigation sector: Karnataka	66
Table 40.	Percentage break-up of revenue expenditure on irrigation sector: Karnataka	67
Table 41.	Receipts from irrigation on revenue account: Karnataka (1980/81 prices)	67
Table 42.	Calculated annual average growth rate of water supply and sanitation: Karnataka	69
Table 43.	Receipts and expenditure of <i>Bangalore Water Supply and Sewerage Board</i>	70
Table 44.	Irrigation potential and utilization: Maharashtra	72
Table 45.	Plan investment in irrigation: Maharashtra (current prices)	73
Table 46.	Public expenditure/income growth: Maharashtra	74
Table 47.	Calculated growth trends in public expenditure on irrigation: Maharashtra	75
Table 48.	Net irrigated area and expenditure on irrigation sector: Maharashtra	76
Table 49.	Break-up of revenue expenditure on irrigation sector: Maharashtra	77
Table 50.	Percentage break-up of revenue expenditure on irrigation sector: Maharashtra	77
Table 51.	Calculated growth trends in receipts from irrigation: Maharashtra (1980/81 prices)	78
Table 52.	Deficit on revenue account for the irrigation sector: Maharashtra (1980/81 prices)	79
Table 53.	Financial results of unproductive (major) irrigation projects	80
Table 54.	Cities by population norm and status relative to the norm	81
Table 55.	Trends in budgeted expenditure and receipts on water supply and sanitation: Maharashtra	83
Table 56.	Estimated present and future water demand: Tamil Nadu	84
Table 57.	Development of irrigation: Tamil Nadu	85
Table 58.	Plan investments in irrigation: Tamil Nadu (current prices)	87
Table 59.	Calculated expenditure growth rates: Tamil Nadu	88
Table 60.	Public expenditure on irrigation: Tamil Nadu (1980/81 prices)	88
Table 61.	Computed capital ratios to revenue expenditure on irrigation: Tamil Nadu (1980/81 prices)	90
Table 62.	Net irrigated area and expenditure on irrigation sector: Tamil Nadu	90
Table 63.	Break-up of revenue expenditure on irrigation sector: Tamil Nadu	91
Table 64.	Percentage break-up of revenue expenditure on irrigation sector: Tamil Nadu	92
Table 65.	Budgeted revenue expenditure on water supply: Tamil Nadu (1980/81 prices)	93
Table 66.	Increase of gross receipts from major and medium irrigation project relative to productivity of irrigation in major states	97
Table 67.	Percentage recovery of revenue expenditure by receipts in major states	98

LIST OF FIGURES

Figure 1.	Percentage composition of public expenditure in India	2
Figure 2.	Growth rate of state's public expenditure—1980/81–1994/95 (1980/81 prices)	4
Figure 3.	Revenue surplus/deficit as a percentage of GDP (combined for centre and states)	6
Figure 4.	Growth of net irrigated area in India	19
Figure 5.	Cumulative plan investment on irrigation in India (1980/81 prices)	22
Figure 6.	Public expenditure on irrigation (as a percent of the state's total expenditure)	24
Figure 7.	Growth rate of capital expenditure on irrigation—1980/81–1993/94	25
Figure 8.	Growth rate of revenue receipts on irrigation—1980/81–1993/94	29
Figure 9.	Contribution of irrigation deficit to state's deficit on revenue account—1993/94	32
Figure 10.	Water supply coverage of India (urban/rural)	35
Figure 11.	Irrigation sector as a percent of state's capital expenditure: Andhra Pradesh	51
Figure 12.	Revenue expenditure on irrigation: Andhra Pradesh (1980/81 prices)	52
Figure 13.	Percentage composition of revenue expenditure: Andhra Pradesh (rural and urban water supply)	57
Figure 14.	Irrigation sector as a percent of state's capital expenditure: Karnataka	62
Figure 15.	Ratio of capital to revenue expenditure in irrigation sector: Karnataka	63
Figure 16.	Ratio of capital to revenue expenditure in irrigation sector: Maharashtra	75
Figure 17.	Revenue receipts on irrigation: Maharashtra (1980/81 prices)	78
Figure 18.	Irrigation sector as a percent of state's capital expenditure: Tamil Nadu	89
Figure 19.	Ratio of revenue expenditure in irrigation sector: Tamil Nadu	89

P R E F A C E

Recent years have seen in India an increasing discussion on the nature and volume of public expenditures at both the central and state government levels. Much of the discussion is attributable to the fact that public expenditure in the country has, in recent years, risen at a rapid pace, and is considered to be a major source of country's fiscal deficit.

The water sector comprising irrigation, rural water supply, and urban water supply is a major component of public expenditure in India. In 1994/95, it accounted for anywhere between 28–58 percent of the total capital expenditure of the states and between 1.5–8.7 percent of their revenue expenditure. What is significant is that only a small, in fact, an infinitesimal, percentage of revenue expenditure which comprises expenditure on operation and maintenance, wages and salaries, and interest and debt repayments is recovered through the 'sale of water'. In 1994/95, receipts from irrigation were able to cover no more than 10–15 percent of the revenue expenditure incurred on this sector. The uncovered position of expenditure incurred on water is thus phenomenal and has been consistently rising over the years. An attempt is made in this study to analyse, for the period 1980/81 to 1994/95, the behaviour of public expenditure on water and receipts on this account, and estimate the uncovered portion of expenditure. The study has argued that the size of the uncovered portion of expenditure is large, and that it is unsustainable and not in the interest of sound finance of the states. The study has advocated the need to put into effect an appropriate pricing policy on water.

This study has been conducted at the instance and support of the World Bank, Washington D.C. The National Institute of Public Finance and Policy (NIPFP) would like to place on record its appreciation for the support that it has received from the World Bank for undertaking this study.

Om Prakash Mathur, HDFC Professor of Housing and Urban Economics, NIPFP has coordinated the study and prepared the final report. He has been assisted in conducting the study by Lalit Deshpande (formerly Professor of Economics, Bombay University), M.Nageswara Rao, Associate Professor, Symbiosis of Technology Environment & Management, Bangalore, and K.R. Shanmugam (Research Associate, Madras School of Economics) who carried out a first stage analysis of public expenditure in Maharashtra, Karnataka, and Tamil Nadu. At NIPFP, a team of project associates—Sandeep Thakur, Anil Yadav, Sudeshna Ghosh and Alokparna Mitra—assembled the necessary data from the state budgets and finance accounts and prepared statistical tables. Secretarial assistance was provided by Asha Rawat and Bharti Sharma, and Rita Wadhwa undertook the editorial responsibility. We are thankful to all of them.

The Governing Body of the Institute does not assume responsibility for the report or the views expressed in the report. That responsibility belongs to the author of the report.

Raja J. Chelliah
Chairman

INTRODUCTION

1

I. General context

Public expenditure in India has grown rapidly in recent decades. In 1974/75, combined public expenditure of the central government and state governments was placed at Rs 140.6 billion or about 17.5 percent of the country's gross domestic product (GDP). By 1994/95, public expenditure had risen eighteenfold, reaching a staggering total of Rs 2594.12 billion. However, in more recent years, particularly since the 1980s, public expenditure has increased even more sharply—15.5 percent annually at current prices and 6.1 percent at 1980/81 prices. In 1994/95, the total public expenditure accounted for 27.4 percent of the country's GDP (Table 1).

Table 1. Public expenditure in India

Year	Public expenditure (Rs billion)		Annual average growth rate percent		As a percent of GDP
	at current prices	at 1980/81 prices	at current prices	at 1980/81 prices	
1980/81	348.44	348.44	—	—	25.66
1994/95	2594.12	769.50	15.47	6.11	27.43

Source. GoI (1995)

Perhaps three features of public expenditure growth are important to recognize at the outset, the first of these being the phenomenal rise in revenue expenditure of the central and state governments. Revenue expenditure as is evident from Table 2 increased at 1980/81 prices, from Rs 237.11

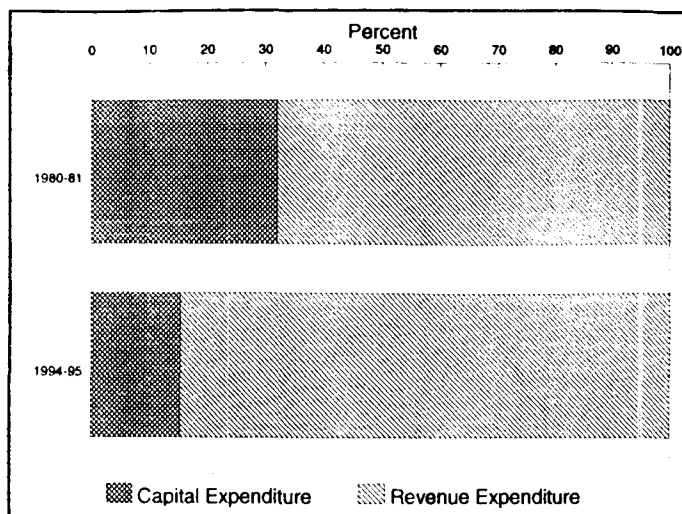


Figure 1. Percentage composition of public expenditure in India

billion to Rs 651.66 billion—at an annual average rate of 7.7 percent during the period 1980/81 to 1994/95; in comparison, capital expenditure rose from Rs 111.33 billion to Rs 117.84 billion, at an annual average rate of 1.05 percent. This period saw, in addition, a dramatic fall—1:0.47 to 1:0.18, in the ratio of revenue to capital expenditure (Figure 1).

Table 2. Composition of public expenditure in India (1980/81 prices)

Year	Composition of public expenditure (Rs billion)				
	capital expenditure	annual average growth rate percent	revenue expenditure	annual average growth rate percent	revenue : capital ratio
1980/81	111.33	—	237.11	—	1:0.47
1994/95	117.84	1.05	651.66	7.66	1:0.18

Source. GoI (1995)

Second, public expenditure growth during 1980/81 to 1994/95 period was noticeably uneven across different sectors. The non-developmental expenditure accounted for at 1980/81 prices, nearly 61 percent of the *net* increase that took place in the total expenditure

of the central and state governments.¹ Other sectors which registered noticeable increase in expenditure included social and community services (20.5 percent), agriculture and allied services (8.5 percent), and power, irrigation and flood control (7.6 percent). These sectors absorbed 37 percent of the increase in expenditure over this period. Expenditure growth in other sectors was relatively low (Table 3).

Table 3. Public expenditure growth in major sectors—1980/81–1994/95 (1980/81 prices)

Sectors	Expenditure growth between 1980/81 to 1994/95	
	amount (Rs billion)	percentage of aggregate growth
Non Developmental Expenditure	261.05	61.40
Developmental Expenditure	171.60	40.36
Railways	-3.03	-0.71
Posts & Telecommunications	-0.87	-0.20
Social & Community Services	87.14	20.50
General Economic Services	1.14	0.27
Agriculture & Allied Services	35.96	8.46
Industry & Mineral less DCUs	-2.95	-0.69
Fertiliser Subsidy	10.27	2.42
Power, Irrigation & Flood Control	32.26	7.59
Transport & Communications	8.67	2.04
Public Works	3.05	0.72
Others	0.00	0.00
Loans & Advances	-7.46	-1.76

Source. GoI (1995)

1 Non-developmental expenditure comprises interest payments, administrative services, defence services, food subsidy and different kinds of relief, compensation, and technical and economic cooperation. For details see *Indian Public Finance Statistics*, an annual publication of the Ministry of Finance.

Public expenditure growth during this period was also found to be uneven between states (Figure 2). By their annual average growth rates as shown in Table 4, states could be placed into three broad categories:

- which registered an annual increase of less than six percent per annum in expenditure over the period 1980/81 to 1994/95. This category comprised the states of Bihar, Orissa, Kerala and West Bengal;

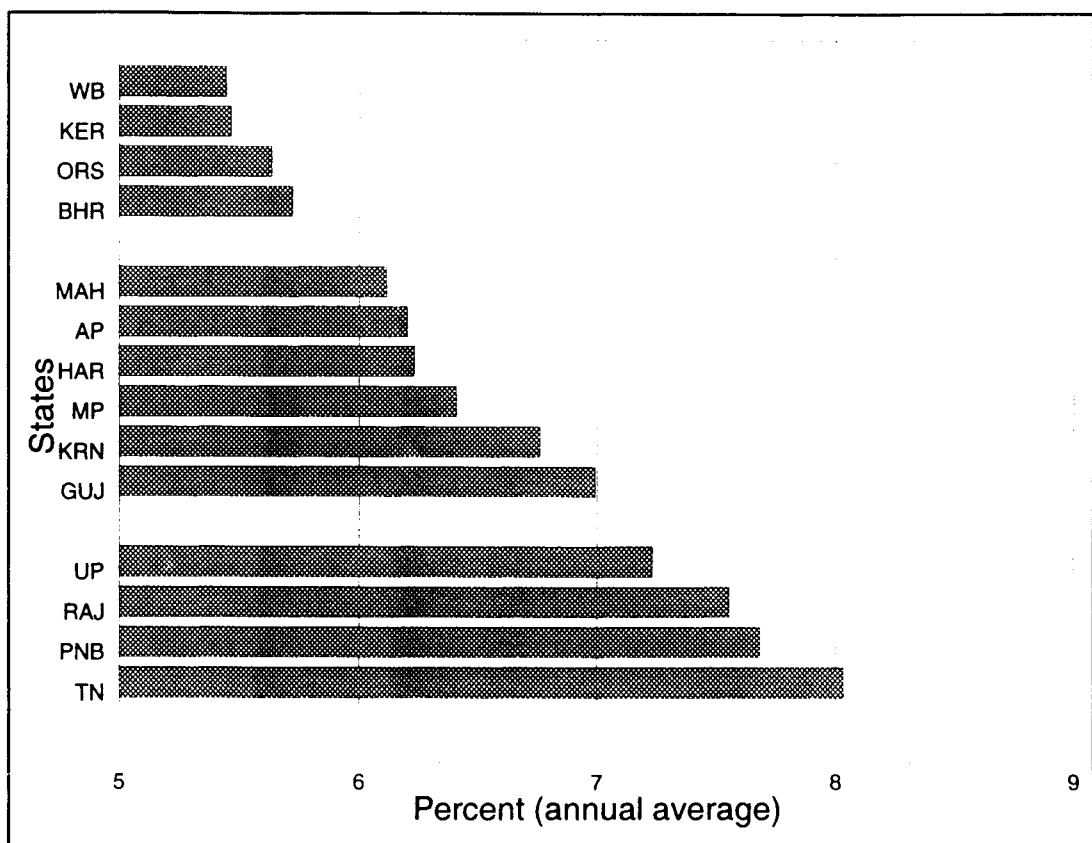


Figure 2. Growth rate of state's public expenditure—1980/81–1994/95 (1980/81 prices)

- which experienced annual growth rates of six to seven percent in expenditure. This group included Andhra Pradesh, Haryana, Gujarat, Karnataka, Madhya Pradesh and Maharashtra; and

- which registered annual growth rates of over seven percent. This group comprised the states of Punjab, Rajasthan, Tamil Nadu, and Uttar Pradesh. The central government also fell in this category.

Table 4. Growth of public expenditure, centre and major states—1980/81–1993/94 (1980/81 prices)

Centre/states	Increase in expenditure (1980/81–1993/94) (Rs million)	Annual average growth rate of expenditure percent
Centre	312259.76	7.28
Andhra Pradesh	16942.56	6.20
Bihar	10654.02	5.72
Gujarat	13836.91	6.99
Haryana	7171.42	6.23
Karnataka	13761.51	6.76
Kerala	7335.93	5.46
Madhya Pradesh	14665.64	6.41
Maharashtra	26042.17	6.11
Orissa	6115.24	5.63
Punjab	8675.90	7.68
Rajasthan	13343.04	7.55
Tamil Nadu	18531.95	8.03
Uttar Pradesh	24915.89	7.23
West Bengal	11851.78	5.44

Source. State Budget Documents (relevant years)

Table 5. Trends in revenue receipts (centre and states combined)

Year	Revenue receipts (Rs billion)		Annual average growth rate percent	
	current prices	at 1980/81 prices	current prices	at 1980/81 prices
1980/81	231.46	231.46	—	—
1994/95	1753.01	520.00	15.31	5.96

Source. State Budget Documents (relevant years)

Compared to the growth of expenditure, total receipts of the central and state governments comprising tax and non-tax sources of revenues increased somewhat, slowly. During the period 1980/81 to 1994/95, receipts on revenue account increased at 1980/81 prices, at an annual average rate of 5.96 percent; the

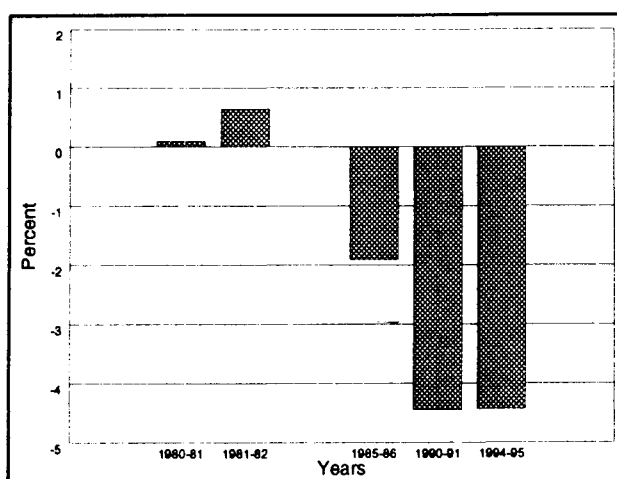


Figure 3. Revenue surplus/deficit as a percentage of GDP (combined for centre and states)

differential between the growth rates of revenue receipts and revenue expenditure has led to a substantial deficit on revenue account (Table 6). According to the *table*, the centre and the states (combined) had a surplus on revenue account of 0.09 percent of the gross domestic product (GDP) in 1980/81, which in 1994/95 turned to a deficit of 4.43 percent in 1994/95 (Figure 3). An important issue here relates to the source of deficit—which of the sectors have contributed most to the deficits of the centre and states? Are the sources of deficits uniform across states?

Table 6. Surplus/deficit (centre and states combined)

Year	Revenue surplus/deficit as a percent of GDP
1980/81	0.09
1994/95	-4.43

Source. State Budget Documents (relevant years)

II. Scope of the study

It is in the general context that this study on public expenditure on the water sector has been undertaken. The water sector comprising irrigation, rural water supply and sanitation, and urban water supply and sanitation is an important sector from the public expenditure standpoint. As this report will subsequently show, in most states, the water sector accounts for anywhere between 8–20 percent of the total public expenditure. Moreover, it is the singlemost important sector accounting for, with very few exceptions, 30–60 percent of the capital expenditure of state governments. This study is designed to analyse the behaviour of public expenditure on water which is largely responsible for influencing the pattern of overall expenditure. In addition, it analyses the trends in revenue receipts from water (Table 5) and the impact of the same on the finances of state governments.

The study focuses on three aspects. Firstly, it analyses the trends in public expenditure, both capital and revenue, on the three main constituents of water, namely, irrigation, rural water supply and sanitation, and urban water supply and sanitation. As pointed out earlier, in recent years, the pattern of overall public expenditure has undergone

significant changes in recent years in the country. The issue that has been discussed is the extent to which the general trends observed for the overall expenditure apply to the water sector. Wherever supportive data is available expenditure on revenue account is analysed with respect to its main components, namely wages and salaries, operations and maintenance costs, and interest liabilities.

Secondly, the study analyses the trends in revenue receipts on water account, i.e., receipts from the sale of water for domestic, irrigation and other purposes, sale proceeds from canal plantations, rent and other receipts including the income from sale of tender forms and contractors' registration fees. In reviewing the trends, the study also looks at the structure of water rates and the frequency at which these rates are revised to reflect the increase in wages and salaries, operation and maintenance charges, and interest payments and liabilities. The study has also examined the impact of receipts on the finances of states.

Finally, the study has attempted to examine, in a limited way, the efficiency of public expenditure on at least one component of water supply, i.e., irrigation. It has been done by looking at the output per unit of expenditure incurred on irrigation.

In short, this study of public expenditure on water sector comprises analysis of:

- the trends in the level of public expenditure on water—including irrigation, rural water supply and sanitation, and urban water supply and sanitation. Public expenditure is divided into two parts, namely, capital expenditure and revenue expenditure. To the extent permitted by the availability of data, this study indicates the share of expenditure incurred by different levels of

governments, institutions such as the Life Insurance Corporation (LIC) and Housing and Urban Development Corporation (HUDCO), and public expenditure originating from external agencies but channelled via the state governments;

- the trends in the level of receipts on revenue account;
- the efficiency of public expenditure on irrigation, measured essentially in terms of the potential created per unit of capital expenditure incurred; and
- the expenditure-receipts balance referring to deficits incurred on water account or surpluses generated by the water sector, and its impact on the finances of the state.

III. Sources of data

The main sources of data are the *budget papers* and *finance accounts* of state governments and the annual publication of the Government of India entitled, *Indian Public Finance Statistics*. The budget papers provide a general review of the finances of the state, accounts for the year under reference, and the budget estimates for the following year. The accounts relate to both the receipts and expenditure on current account, with details of capital outlays on different sectors and subsectors. It also gives details in respect of loans and advances and public debts.

The *finance accounts* present the accounts of the receipts and outgoings of the state governments, together with the financial results disclosed by the revenue and capital accounts, and accounts of the public debt, liabilities and assets as worked out from the

balances recorded in the accounts.² The *Indian Public Finance Statistics* provide a comprehensive overview of the budgetary transactions of the centre, states and the union territories.³

In addition, data as provided for in the following have also been used in this study:

- Five-Year-Plans of Andhra Pradesh, Karnataka, Maharashtra, and Tamil Nadu;
- *Report of the Committee on Pricing of Irrigation Water (1992)*⁴. This report has examined the financial performance of public irrigation systems in India, and is particularly useful in providing data on plan outlays and expenditure on major and medium irrigation and minor irrigation works.
- *Pricing of Water in Public System in India (1993)*⁵. It provides a review of the financial performance of irrigation projects, and gives statistical results of the review separately for the central and state governments.
- *Report of the Working Group on Major and Medium Irrigation Programme (1996)* for the *Ninth-Five-Year-Plan (1997–2002)*, Government of India (1996).
- *Report of the Working Group on Urban Water Supply and Rural Water Supply for the Ninth-Five-Year-Plan (1997–2002)*, Government of India (1996).

2 The *Finance Accounts* are certified by the Comptroller and Auditor General of India. The budget papers are prepared by the state governments in connection with budgetary/plan preparation exercises.

3 It is an annual publication of the Department of Economic Affairs, Ministry of Finance, Government of India.

4 *Report of the Committee on Pricing of Irrigation Water*, Planning Commission, Government of India, 1992.

5 *Pricing of Water in Public System in India*. 1993. Central Water Commission, Government of India.

IV. Data limitations

Notwithstanding the wide data base on public outlays, expenditure and receipts, the entire system of maintaining the data base is beset with limitations and ambiguities, in particular, the classification of data and the numerous and frequent adjustments made therein.

These limitations are reflected specially in four ways:

1. Ambiguities in respect of the classification of data. Public expenditure data are classified in three major types: (a) plan/non-plan; (b) capital/revenue; and (c) developmental/non-developmental. Plan expenditure consists of both the capital expenditure and the revenue expenditure although much of the plan expenditure is on capital account. Non-plan expenditure also consists of capital and revenue expenditures, but here, much of the expenditure is on revenue account. This study has used the capital/revenue classification—capital expenditure referring to all expenditure incurred on the creation of new assets and potentials, and revenue expenditure referring to all expenditure on the operations and maintenance of assets, payment of wages and salaries, interest liabilities, and other miscellaneous items. The plan/non-plan classification is used sparingly in this study. In view of the fact that all expenditure on water is classified as developmental expenditure, no attempt is made here to use the developmental/non-developmental classification.

2. Absence of clarity with respect to the sources of expenditure on capital account. Capital works relating to water are financed out of provisions made in the state budgets, funds originating from the financing institutions, and

external funds. The state budgets generally reflect those areas of expenditure which are incurred out of budgets, and specially that component of institutional and external finance which is channelled through the states. On account of the inadequacies in the systems to track down inter-agency flow of funds, there exists almost invariably an element of uncertainty in respect of the *net* public expenditure flows.

3. Public expenditure comprises expenditure incurred by *all* levels of governments and public institutions. The expenditure incurred by local governments, in particular, the *Panchayats*, municipal corporations and municipal bodies on the provision of water supply is rarely captured in the state budgets. Nor are the receipts of local bodies included in the revenue receipts of state governments. Since the local governments' finance data are dispersed and not coordinated at any level, these are excluded from the review. It needs to be stated that the responsibility of municipal corporations and municipal bodies rests essentially in the operations and maintenance of the water supply and sewerage systems; few of them, however, are able to finance capital works out of the internally generated resources.
4. Revenue expenditure is composed of expenditure incurred on the operation and maintenance, wages and salaries, and interest liabilities and payments. Such details are not maintained in the finance accounts of the states. A typical classification of revenue expenditure includes expenditure on direction and administration, machinery and equipments, training and research, expenditure

on selected subsidies, and other expenditures, making it difficult to analyse the pattern of growth of the important components of revenue expenditure. Interest liabilities, for instance, are lumped together for all sectors which are a hindrance in estimating the interest liabilities for individual sectors, e. g., for water, and more important, to determine the impact of the same on the operation and maintenance of such sectors. One exception to this general method of accounting is the irrigation sector for which interest liabilities are shown separately in the *budget documents*, and are reported to be a charge on the irrigation department. Attempt is made here to analyse data (wherever available), on interest liabilities of the irrigation sector. Apart from these limitations, there is lack of consistency in the data produced by different agencies. The report, therefore, has been prepared within these limitations.

V. Layout of the study report

The study report is laid out in five sections. Section II discusses in brief the institutional framework within which the water sector operates. Section III gives an overview of the public expenditure on water sector in the major states of the country, primarily, to indicate the trends in public expenditure on irrigation, rural water supply and urban water supply and receipts therefrom. It is then followed in Section IV, by more detailed analyses of the trends of expenditure and receipts on this sector in respect of four states, namely, Andhra Pradesh, Karnataka, Maharashtra, and Tamil Nadu. Section V enumerates the major findings and observations.

INSTITUTIONAL RESPONSIBILITY FOR THE WATER SECTOR

The *Seventh Schedule* of the Constitution of India divides the responsibility for the water sector between the Union, i.e., the central government and the state governments. According to the *Schedule*, the central government is responsible for the regulation and development of inter-state rivers and river basins to the extent such regulation and development are declared by Parliament to be expedient in public interest. However, barring few specific projects, e.g., the *Damodar Valley Development*, the Parliament has not considered it necessary to impose any limitation on the regulation and development of inter-state rivers and basins. In consonance with the constitutional responsibility, the central government has armed itself with a *River Board Act (1956)* and *Inter-State Water Disputes Act (1956)* to deal with problems of inter-state river and basin disputes. It has also formulated a *National Water Policy (1987)* which permits the central government to refer any water dispute for adjudication to a legal tribunal whose findings are final and binding. Furthermore, it integrates various water planning departments under the umbrella of Ministry of Water Resources.

With the exception of the authority of the central government in respect of the inter-state rivers and river basins, all matters relating to water, i.e., water supplies, irrigation and canals, drainage, embankments, water storage and water power—subject to the limitation imposed by *Entry 56* of the Union List are the responsibility of state governments. This provision means that the states have full authority over water use and legislation within their borders. For groundwater development, however, the state governments have exclusive

constitutional authority. On account of water being a state subject, the institutional arrangements for water and its supply like for irrigation, rural water supply, and urban water supply vary between different states. The main features of some of the institutional arrangements are discussed below.

Major and medium irrigation is the responsibility of the irrigation department of the state governments. While the irrigation department undertakes the preparation of feasibility reports and projects, and monitors their progress, the responsibility for minor irrigation is shared between the departments of *Panchayats* and Rural Development. Selectively, the users, such as the *Water User Associations* have been established in a few states, who are taking a lead in managing minor irrigation projects; although the involvement of users in management is a recent phenomenon.

Considerable diversity exists in the procedure for the assessment and collection of irrigation fees and revenues. On one hand, are the old irrigation works of Andhra Pradesh, Tamil Nadu and parts of Karnataka where irrigation fees stand merged with land revenues. While on the other hand where separate water charges are levied, the responsibility for both assessment and collection of charges vests in the irrigation/water resources department (e.g., Bihar, Madhya Pradesh, Maharashtra, and selectively in Gujarat and Rajasthan); again in some, assessment is done by the irrigation department, and collection by the revenue department. In yet others, the revenue department is responsible for both the functions.

Irrigation projects in India are financed largely out of the state budgets which are made up of states' own internally generated resources and funds that accrue to them under

the *Five Year Plans* and centrally sponsored schemes. Multilateral agencies, such as, the World Bank have also provided credit for a few major and medium scale irrigation projects, besides some minor irrigation projects.

Institutional responsibility in respect of rural and urban water supply differs widely both within and between states. Rural water supply is the responsibility of the *Public Works Department* of the ministries concerned with rural development. The *Zila Parishads* and *Panchayats* participate in the provision of water supply and management of rural water works. The significant factor here is that rural water supply is financed, in a major way, by budgetary sources. On a smaller scale, multilateral agencies, such as, UNICEF, DANIDA, and NORAD have supported rural water supply projects in several states.

The responsibility in respect of urban water supply is fragmented between different agencies which include, besides the public health engineering departments of state governments, often the state-level parastatal agencies, such as, the water supply and sewerage or drainage boards, city-level water supply and sewerage boards, and local governments. In Karnataka (except Bangalore), urban water supply is the responsibility of the *Karnataka Water Supply and Drainage Board* which undertakes all capital works, wholesales water to municipal bodies, and in a few cases, retails and distributes water to cities. In other states, such as, Tamil Nadu, (with the exception of Chennai) the *Tamil Nadu Water Supply and Sewerage Board* is responsible for all water supply projects but not for distribution of water. In Andhra Pradesh, this responsibility rests with the *Public Works Department*, excepting for Hyderabad city. In these states, there are separate boards for capital cities which handle the augmentation of water supply, and the operation, maintenance and running of water supply works.

The financing of urban water supply is complex as well, involving at least three major sources, namely, the budget financing, the institutional finance, and external agencies, like the World Bank. Institutions, such as, the LIC and in recent years, the HUDCO have also invested large sums of funds in water supply and sewerage projects. These funds are channelled directly from the financing institutions to cities with guarantees furnished by respective states; in a few cases, such funds are said to have been channelled through the state governments. In the case of Bangalore, the *Bangalore Development Authority*, certain public sector undertakings and the *Bangalore Metropolitan Corporation* have also invested in augmenting water supplies. *Bombay Municipal Corporation* is responsible for its own water supply.

PUBLIC EXPENDITURE ON WATER: AN OVERVIEW

The section is divided into two parts. While the first part discusses the trends in public expenditure on irrigation, the second part deals with rural and urban water supply.

Part 1 : IRRIGATION

I. General

Irrigation is an extremely significant sector in India. In 1950/51, the net area under irrigation was estimated at 21 million hectares. This base took a relatively long time to establish in the country, and the net irrigated area doubled to 42 million hectares by 1984/85, an expansion of about 0.6 million

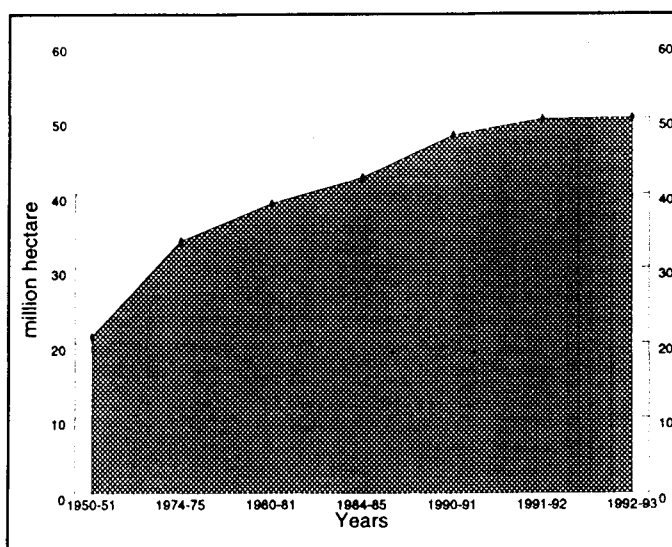


Figure 4. Growth of net irrigated area in India

hectares per annum. By 1992/93, the net irrigated area had risen to 50.1 million hectares, annually adding about one million hectares (Figure 4 and Table 7). The growth in the net irrigated area during this period was propelled by two principal developments: (i) large scale public investment in canal irrigation which resulted in doubling of the area under surface irrigation—8.3 million hectares to 17.4 million hectares between 1950/51 and 1990/91; and (ii) growth of irrigation through tubewells, mainly private, which expanded from a minimal

base in the 1960s to 14.2 million hectares in 1990/91. It may be worth noting here that owing to public investment in surface irrigation and private investment in tubewell and groundwater irrigation over one-third of the gross cropped area is now well under irrigation. In 1950/51, only 17 percent of the cultivated land was irrigated. This has had a major impact on agricultural production, income levels, regional development and poverty reduction, particularly in the rural areas.⁶

Table 7. Growth of irrigation in India (*net*)

Year	Net irrigated area (million ha.)
1950/51	20.9
1974/75	33.7
1980/81	38.7
1984/85	42.2
1990/91	47.8
1991/92	49.9
1992/93	50.1

Source. CWC (1996a)

Over the long planning period i.e. the *First-Five-Year-Plan* onwards, nearly Rs 5 76 300 million at 1980/81 prices have been invested in major, medium and minor irrigation projects. This amount includes the investments of the central government which are infinitesimal (1.2 percent of the total), investment of state governments which account for over 80 percent of plan investments in irrigation, and institutional investments constituting roughly 16–17 percent of the total investment in irrigation. A greater part of plan investment

⁶ For a discussion on the impact of irrigation, see, *India: Irrigation Sector Review*, 1991, The World Bank, Washington D.C.

has been diverted to major and medium irrigation projects. Trends in plan investment are shown in Table 8.

Table 8. Plan investment on irrigation in India (1980/81 prices)

Plan period	Investment in irrigation (Rs million)					
	major & medium states	minor		major, medium and minor irrigation (combined)		
		states	institutions	cumulative	average per year	percent of expenditure on irrigation to total
1951-56	21549	3758	—	25306	5061	23
1956-61	19507	7301	993	53108	5560	12
1961-66	23665	13398	4740	94910	8361	12
1966-69*	12469	9321	6810	123510	9533	15
1969-74	28757	11718	15302	179287	11155	15
1974-78	36477	9097	11580	236440	11431	14
1978-80*	26529	6333	6131	275433	19496	14
1980-85	64010	17193	12487	369123	18738	11
1985-90	70033	19747	19300	478203	21816	9
Annual plan						
1990-91	13194	4067	3383	498847	20644	8
1991-92	12435	3717	2968	517967	19120	7
1992-93	12193	3980	3247	537387	19420	7
1993-94	12929	3871	3233	557420	20033	7
1994-95	11985	3594	3343	576342	18922	6

Note. Figures have been rounded and may not, therefore, tally.
Source. CWC (1996a)

Investment in irrigation has been an important component of plan expenditure in the successive *Five-Year-Plan* periods. Its importance, however, when measured in terms of its proportion to total plan expenditure has dwindled over the years (Table 8). From a high of about 12–15 percent of

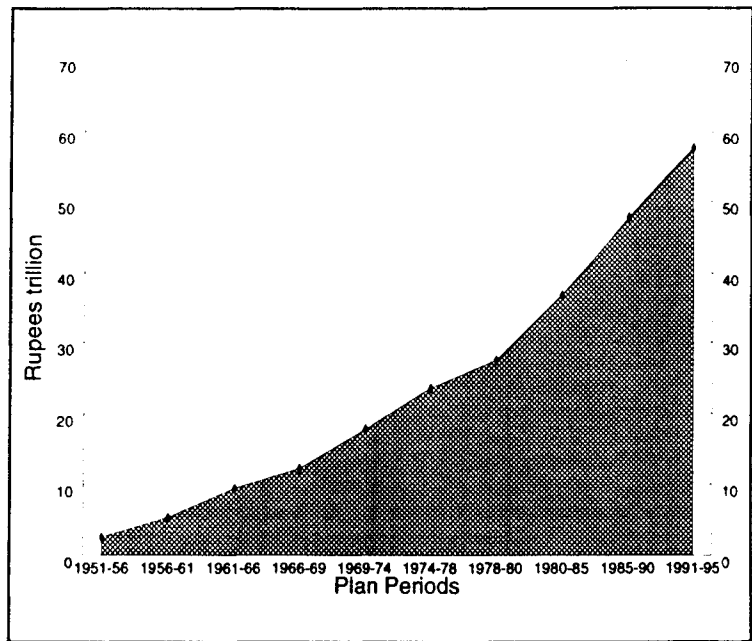


Figure 5. Cumulative plan investment on irrigation in India (1980/81 prices)

the total plan investment incurred on irrigation in the earlier *Plan* periods, it now forms only about 6–7 percent. Furthermore, annual investments on irrigation have in recent years reached a plateau, and appear to have stabilized at approximately Rs 18000–20000 million per annum.

II. Public expenditure on irrigation

The combined public expenditure of the central and state governments⁷ on irrigation at 1980/81 prices amounted to Rs 30.47 billion in 1993/94, or 3.4 percent of the total expenditure. Public expenditure on irrigation includes all expenditure incurred directly by the central government and state governments, institutional investment routed through the state governments, and external funds. In terms of expenditure, irrigation occupies an

⁷ This includes the expenditure of the central government and 14 major states. The low percentage is explained by the inclusion of large expenditures of the central government in the total. The central government's expenditure on irrigation is insignificant.

important place in the portfolio of public expenditure in the country. It is important to highlight the following features of public expenditure on irrigation.

1. The central government expenditure on irrigation is negligible. In 1993/94, the share of the central government in expenditure on irrigation was assessed at 1.64 percent of the total public expenditure on it. This position is in conformity with the provisions in the Constitution which assign to the central government only those matters that relate to inter-state rivers and river basins.

Table 9. Public expenditure on irrigation in major states—1993/94 (1980/81 prices)

State	Expenditure on irrigation (Rs billion)					
	capital	revenue	total	annual average growth rate percent (1980/81–1993/94)	as a percent of states' total expenditure	as a percent of SDP
Andhra Pradesh	2.06	1.87	3.93	4.21	12.62	2.64
Bihar (1992/93)	0.54	0.73	1.27	-2.33*	5.94	1.40
Gujarat	0.85	2.00	2.85	3.30	11.49	2.63
Haryana	0.37	0.66	1.02	0.76*	8.37	1.72
Karnataka	2.29	0.99	3.28	3.79	13.42	3.03
Kerala	0.38	0.19	0.57	-1.06*	3.70	0.91
Madhya Pradesh	1.29	0.56	1.84	-0.41*	6.73	1.46
Maharashtra	2.80	3.05	5.85	4.72	12.07	1.95
Orissa	0.62	0.28	0.90	-2.10*	6.72	1.75
Punjab	0.90	0.45	1.35	5.50	9.50	1.58
Rajasthan	0.93	1.10	2.03	1.90	8.55	2.54
Tamil Nadu	0.28	0.53	0.81	1.77	2.60	0.58
Uttar Pradesh	0.90	1.46	2.36	1.28*	5.04	1.04
West Bengal	1.32	0.57	1.89	2.36	7.86	1.32
Centre	0.02	0.48	0.50	—	—	—
Total	15.5	14.92	30.4	—	—	—

Note. * Insignificant at 1 percent level of significance

Source. State Budget Documents (relevant years)

2. There exist sharp inter-state variations in the level of expenditure on irrigation, which are as low as 2.6 percent of the total expenditure for Tamil Nadu and as high as 13.42 percent for Karnataka (1993/94). As a percentage of state domestic product (SDP), expenditure on

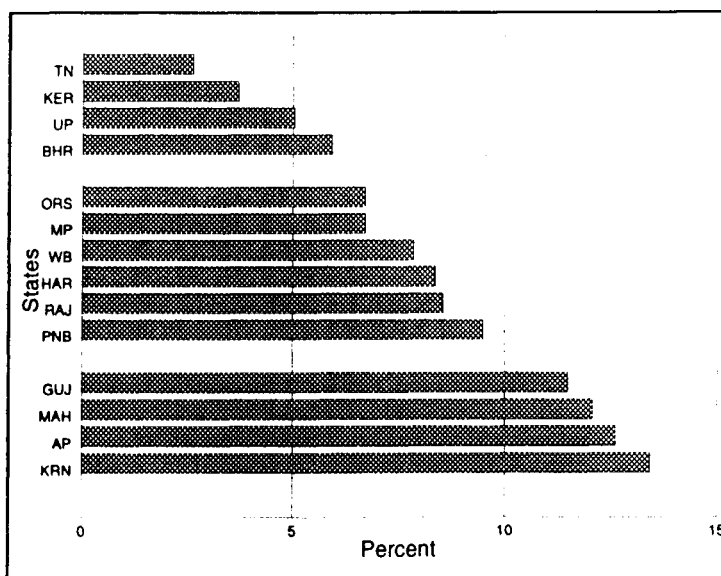


Figure 6. Public expenditure on irrigation (as a percent of the state's total expenditure)

irrigation ranges between 0.58 to 3.03, indicating differential order of priority assigned to irrigation by different states. The growth rate of expenditure on irrigation varies widely between states, with several states having posted a decline in expenditure on irrigation in real terms (Table 9).

Table 10. Matrix showing the states' position according to the level and growth of expenditure on irrigation

Level of expenditure on irrigation percent (1993/94)	Annual average growth rate of expenditure on irrigation (1980/81-1993/94)			
	over 4 percent	2-4 percent	under 2 percent	negative
over 10 percent	Andhra Pradesh Maharashtra	Gujarat Karnataka		
5-10 percent	Punjab	West Bengal	Haryana Rajasthan Uttar Pradesh	Bihar Madhya Pradesh Orissa
under 5 percent			Tamil Nadu	Kerala

On the basis of the level of expenditure and long-run growth rate covering the period 1980/81 to 1993/94, the states of India can be classified under several groups (Table 10).

3. A crucial aspect of public expenditure relates to its composition i.e., capital and revenue expenditure. Data in this respect are provided in Tables 10 and 11. Four broad features emerge from analyses of states' expenditure on irrigation.

- Irrigation is the most important component of capital expenditure in the states. This sector absorbed in 1993/94, 28 to 58 percent of the states' total public expenditure in all states excepting Tamil Nadu, where capital expenditure on irrigation formed 15.4 percent of the state government's total capital expenditure.⁸ In

states, such as, Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, and Punjab, consistently higher levels of expenditures, i.e., in

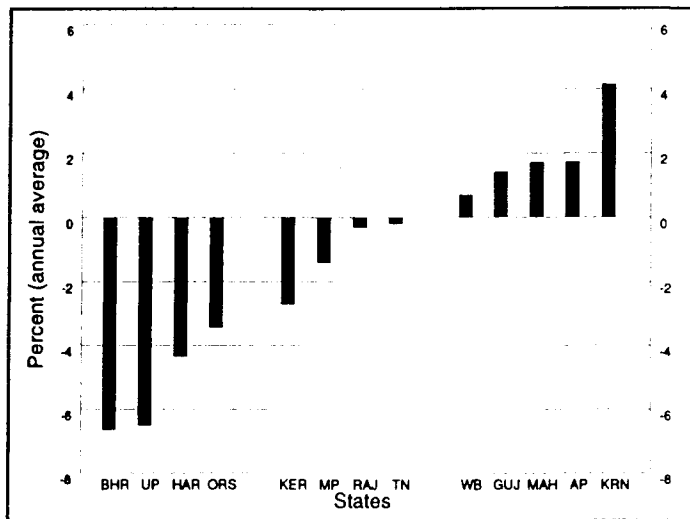


Figure 7. Growth rate of capital expenditure on irrigation—1980/81–1993/94

excess of 40 percent of capital expenditures, were allocated to irrigation, signalling the importance of this sector in the economy of these states.

8 Comparatively lower level of capital expenditure on irrigation is explained, at least in part, by highly developed surface and groundwater resources. See, *India Irrigation Sector Review*. 1991. Washington D.C: The World Bank.

- Trends reveal a decline in the capital expenditure on irrigation by most states in the country. As indicated in Table 11, the capital expenditure on irrigation fell sharply during 1980/81 to 1993/94 in Bihar (6.64 percent annually), Uttar Pradesh (6.5 percent), Haryana (4.35 percent), and Orissa (3.44 percent). In several other states, expenditure increased but the rate of increase was, at best, low, ranging between 1–2 percent per annum. Karnataka was an exception which posted an impressive annual growth of 4.64 percent during the period 1980/81 to 1993/94.

Table 11. Capital expenditure on irrigation in selected states—1993/94

State	Capital expenditure on irrigation (percentage)		
	as a percent of total capital expenditure	annual average growth rate 1980/81–1993/94	as a percent of GDP
Andhra Pradesh	45.82	1.73*	1.39
Bihar (1992/93)	34.33	-6.64	0.59
Gujarat	41.38	1.42	0.78
Haryana	36.63	-4.35	0.61
Karnataka	58.54	4.14	2.11
Kerala	31.53	-2.72	0.61
Madhya Pradesh	48.42	-1.40	0.10
Maharashtra	50.80	1.71	0.93
Orissa	32.13	-3.44	1.20
Punjab	55.27	—	1.05
Rajasthan	36.20	-0.32	1.17
Tamil Nadu	15.38	-0.20*	0.20
Uttar Pradesh	28.76	-6.50	0.39
West Bengal	31.17	0.70	0.29

Note. * Annual average growth rate is based on the values at 1980/81 prices

Source. State Budget Documents (relevant years)

Table 12. Revenue expenditure on irrigation in selected states—1993/94

State	Revenue expenditure on irrigation (percentage)		
	as a percent of total revenue expenditure	annual average growth rate*, 1980/81–1993/94	as a percent of GDP
Andhra Pradesh	7.01	6.76	1.26
Bihar (1992/93)	3.70	6.82	0.81
Gujarat	8.77	3.86	1.85
Haryana	5.85	5.11	1.10
Karnataka	4.83	3.03	0.92
Kerala	1.34	2.95	0.30
Madhya Pradesh	2.25	3.20	0.04
Maharashtra	7.05	8.57	1.01
Orissa	2.45	3.38	0.54
Punjab	3.38	4.75	0.53
Rajasthan	1.33	4.10	0.28
Tamil Nadu	1.81	3.06	0.38
Uttar Pradesh	3.34	4.79	0.64
West Bengal	2.50	3.01	0.40

Note. * Annual average growth rate is based on the values at 1980/81 prices.

Source. State Budget Documents (relevant years)

- Contrary to capital expenditure where large scale inter-state variations are observed and which have experienced a decline over the years, the behaviour of revenue expenditure displays greater consistency. Revenue expenditure on irrigation for instance, rose in all states during the period 1980/81 to 1993/94, at rates varying between 2.95 percent and 8.57 percent. Revenue expenditure on irrigation formed in 1993/94, 1.85 percent of state domestic product (SDP) in the case of Gujarat; in Tamil Nadu, however, it was only

0.38 percent of GDP. A notable characteristic of these trends is that in terms of both capital and revenue expenditure, irrigation has lost its importance over the period 1980/81 to 1993/94. Capital expenditure on irrigation has declined at a faster rate in relation to the states' total expenditure, where it increased at a rate lower than the rate of growth of states' total expenditure. Likewise, revenue expenditure on irrigation rose far more slowly than the total revenue expenditure of states.

- Finally, in terms of the magnitude of public expenditure, the role of minor irrigation is negligible. All states are committed to develop surface irrigation potential and have assigned large expenditures to the development of major and medium irrigation. As an item of expenditure, minor irrigation is important in Bihar, Kerala, Orissa, Uttar Pradesh and West Bengal where minor irrigation accounts for over 50 percent of the total revenue expenditure on irrigation.

4. Recoveries from the sale of water, commonly pooled as irrigation charges, are regulated by rates determined by different states. States use multiple water rates or charges, which vary according to the crop; according to the first, second or subsequent irrigation; season; volume of water; and other criteria. A common characteristic of water rates in states is the absence of regular revision to reflect wage escalation, increase in operation and maintenance (O&M) cost, and other inputs that have a bearing on rates. The next section will provide details on the structure of rates in respect of four states, namely, Andhra Pradesh, Karnataka, Maharashtra and Tamil Nadu; it may be pertinent to point out here that first, revenue receipts from irrigation account for in all, but two states, less than 1 percent

of the total revenue receipts of the states, and less than 0.3 percent of GDP, and second, revenue receipts from irrigation at 1980/81 prices, have declined over the period 1980/81 to 1993/94. At 1980/81 prices, receipts from irrigation registered a decline in a large number of states including Bihar, Haryana, Kerala, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal.

It is observed that revenue receipts from irrigation cover a rather small proportion of revenue expenditure incurred on irrigation. As will be noted, with the exception of Andhra Pradesh, Haryana, Madhya Pradesh, Maharashtra and Punjab where receipts covered over 10 percent of the revenue

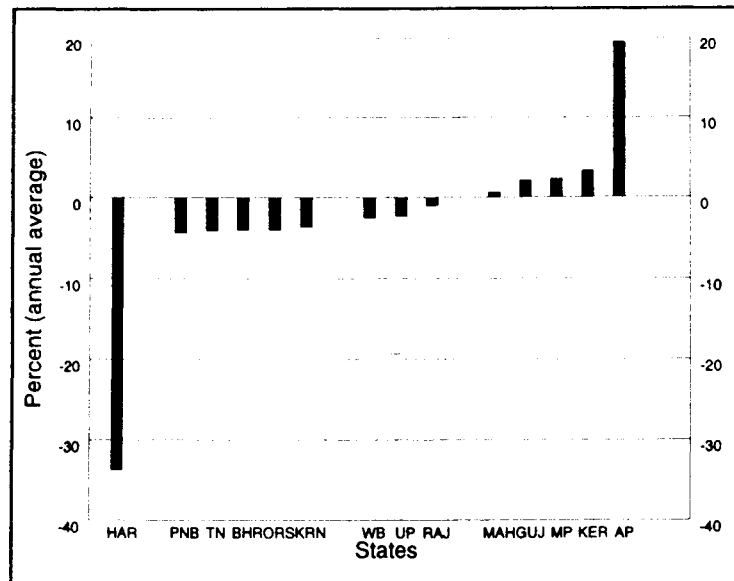


Figure 8. Growth rate of revenue receipts on irrigation—1980/81–1993/94

expenditure on irrigation, in all other states receipts formed a small proportion. The uncovered portion of the expenditure is thus uniformly large as may be observed from Table 13.

Irrigation, thus, has a major impact on the finances of the state governments. As seen in Table 13, revenue receipts from irrigation constitute a small proportion of the revenue expenditure. The uncovered portion of the expenditure is large. Table 14 shows the deficit on revenue account for two reference years (at 1980/81 prices) which also reflects the pace

at which deficit has increased since 1980/81. In several states as would be evident from the *table*, revenue account deficit from irrigation has risen several fold : in Bihar, Rs 219 million to Rs 659 million; in Gujarat Rs 784 million to Rs 1894 million, and in Maharashtra, Rs 930.8 million to Rs 2751 million. It is only in Uttar Pradesh that the magnitude of deficit on irrigation account has dropped from Rs 1056 million to Rs 860 million.

Table 13. Receipts from irrigation on revenue account—1993/94

State	Receipts from irrigation on revenue account (percentage)		
	as a percent of total revenue receipts	annual average growth rate, 1980/81–1993/94 at 1980/81 prices	receipts as a percent of revenue expenditure on irrigation
Andhra Pradesh	1.04	19.47	15.3
Bihar (1992/93)	0.39	-4.02	9.9
Gujarat	0.70	2.13	5.4
Haryana	0.59	-33.80	10.3
Karnataka	0.22	3.36	4.7
Kerala	0.07	-3.64	4.7
Madhya Pradesh	0.46	0.64	19.1
Maharashtra	0.69	2.35	10.5
Orissa	0.20	-4.02	7.4
Punjab	0.51	-4.40	12.1
Rajasthan	0.56	-1.03	9.4
Tamil Nadu	0.07	-4.09	3.7
Uttar Pradesh	1.51	-2.30	4.2
West Bengal	0.12	-2.51	4.0

Source. State Budget Documents (relevant years)

Revenue account deficits on irrigation sector are thus pervasive. All states faced deficits in 1980/81—a trend which has continued unabated over time. It is important to note

that in 1980/81, most states had surpluses on revenue account—exceptions being Gujarat, Kerala and West Bengal; however, except for the irrigation sector which posted large deficits, the surpluses of many of the states would have been higher—94 percent in Andhra Pradesh, 114 percent in Karnataka, 76 percent in Maharashtra, and 58 percent in Uttar Pradesh. In the case of Gujarat, Kerala and West Bengal which were classified as deficit states in 1980/81, if irrigation sector had not posted the deficits, their own deficits would have been much smaller than the actual deficits. For example, the overall revenue deficit of Gujarat would have been lower by 36 percent, of Kerala by 43 percent, and of West Bengal by 157 percent.

Table 14. Revenue deficit on irrigation account for major states (1980/81 prices)

State	Revenue deficit (in Rs million)		Percentage change from 1980/81–1993/94
	1980/81	1993/94	
Andhra Pradesh	-975.70	-1 582.56	62.2
Bihar (1992/93)	-219.70	-659.10	200.0
Gujarat	-784.61	-1 894.25	141.4
Haryana	-278.38	-587.77	111.1
Karnataka	-668.95	-946.39	41.5
Kerala	-117.05	-179.65	53.5
Madhya Pradesh	-356.88	-450.54	26.2
Maharashtra	-930.80	-2 751.02	195.6
Orissa	-241.44	-260.59	21.5
Punjab	-154.70	-395.37	155.6
Rajasthan	-447.25	-997.14	122.9
Tamil Nadu	-315.84	-508.61	61.0
Uttar Pradesh	-1 056.43	-860.66	-18.5
West Bengal	-356.44	-544.99	52.9

Source. State Budget Documents (relevant years)

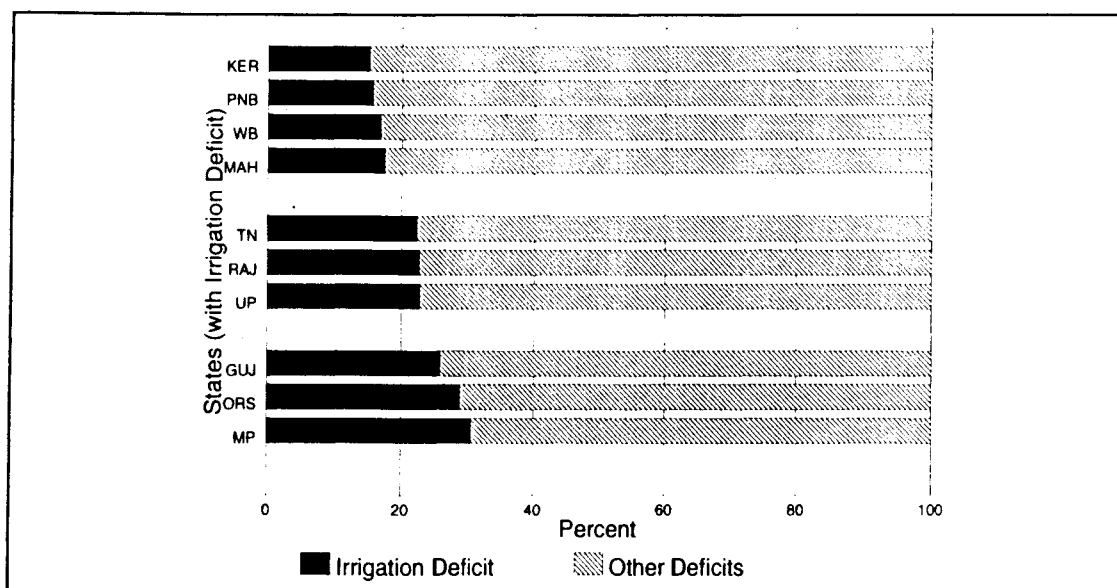


Figure 9. Contribution of irrigation deficit to state's deficit on revenue account—1993/94

Table 15. Contribution of irrigation to the total revenue account deficit in major states—1993/94

State	Revenue deficit on account of irrigation (Rs million)	Overall states deficit/surplus on revenue account (Rs million)	Percent of irrigation account deficit to states' deficit
Andhra Pradesh	-1582.6	765.2	—
Bihar (1992/93)	-659.1	621.4	—
Gujarat	-1894.2	-7335.6	25.8
Haryana	-587.8	265.0	—
Karnataka	-946.4	383.5	—
Kerala	-179.7	-1189.3	15.1
Madhya	-450.5	-1476.3	30.5
Maharashtra	-2751.0	-15762.4	17.4
Orissa	-260.6	-904.0	28.8
Punjab	-395.4	-2526.4	15.7
Rajasthan	-997.1	-4403.8	22.6
Tamil Nadu	-508.6	-2279.1	22.3
Uttar Pradesh	-860.7	-3784.0	22.7
West Bengal	-545.0	-3240.2	16.8
Total	12618.64	38816.13	32.5

Source. CWC (1996a)

In 1993/94, most states were in deficit on account of their revenue. These deficits ranged between 0.5 and 7 percent of the SDP. Irrigation contributed very significantly to the revenue deficits of the states (Table 14).

In the aggregate, irrigation sector alone was responsible for 32–33 percent of the states' deficit on revenue account, referring directly to the grossly inadequate attention that was given to the rate structure, revision in the rate structure, and collection efficiency.

Part 2 : Water Supply and Sanitation

I. General

Even though domestic water supply consumes no more than 5–6 percent of the total water consumption in the country, for reasons of it being a "basic need" and for reasons of various associated externalities, the importance of water supply in the hierarchy of sectors has risen phenomenally over years. The *International Decade* which called for provision of potable drinking water for all by 1991 and more recently, the *National Water Policy, 1987* have further underlined its importance in the Indian economy. Financial provisions for water supply and sanitation have risen substantially over the years to respond and reflect its crucial connections with the growth and quality of life; from a modest plan investment of Rs 490 million in the *First-Five-Year-Plan* (1951–56), the total investment has jumped in nominal terms to Rs 167110 million in the *Eighth-Five-Year-Plan* (1992–97). As a proportion of the total plan outlay, investment in water supply and sanitation has also risen from 1.5 percent during the *First Plan* to nearly 3.8 percent in the *Eighth Plan*.

More striking has been the rise over the successive plan periods in the plan outlays for rural water supply. During the *First Plan* period, rural water supply and sanitation accounted for only 0.2 of the total plan outlay; in the *Eighth Plan* period, plan outlay for rural water supply and sanitation had risen to 2.5 percent—a significant jump in the plan provision for water supply in the rural areas. Plan proportions for urban water supply have been maintained at about 1.2–1.3 percent, notwithstanding the fact that the urban population has risen from 62.4 million in 1951 to 217 million in 1991 and approximately 250 million in 1995/96.

Table 16. Plan outlays on water supply and sanitation in India (current prices)

Plan period	Plan outlays (Rs million)			
	rural water supply & sanitation	urban water supply & sanitation	total amount	percent of total plan outlay
1951–56	60.0	430.0	490.0	1.46
1956–61	280.0	440.0	720.0	1.07
1961–66	163.3	893.7	1057.0	1.23
Annual	NA	NA	1064.2	1.80
1969–74	1550.0	2820.0	4370.0	2.75
1974–79	4812.4	5494.4	10306.8	2.62
Annual	2322.9	1979.3	4302.2	3.43
1980–85	22803.2	17666.8	40470.0	4.15
1985–90	35556.7	29657.5	65224.7	3.62
Annual	27059.2	17213.7	44272.9	3.23
1992–97	107287.9	59822.8	167110.30	3.85

Source. GoI (1996)

Drinking water supply and sanitation sector, thus, is in sharp contrast with the irrigation sector where, as noted earlier, plan provisions have shrunk over the successive Plan provisions.

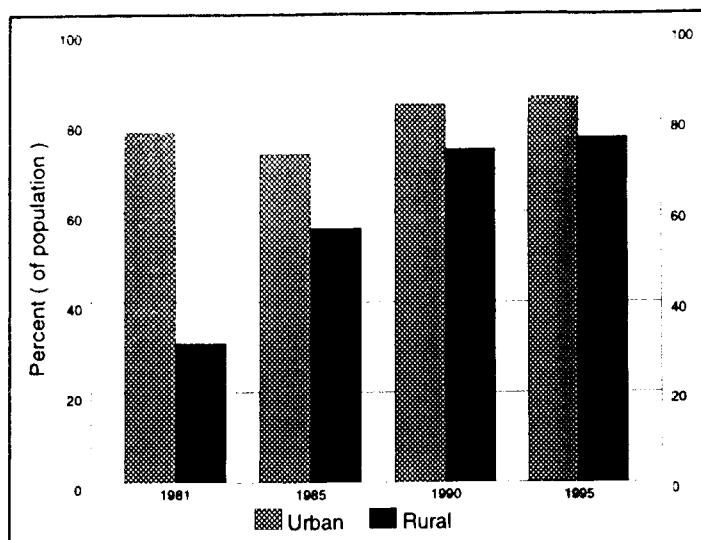


Figure 10. Water supply coverage of India (urban/rural)

Due to increasing plan investments, water supply coverage of population has risen both in the rural and urban areas. In the rural areas, for instance, population coverage has increased substantially from 30.9 percent in 1981 to over 76 percent in 1995; similarly, population coverage has increased from 77.8 percent to 85.3 percent during the same period. Performance of the sanitation sector has, however, continued to be dismal as may be seen from the following table:

Table 17. Water supply and sanitation coverage in India

Year	Water supply				Sanitation			
	population (million)		population percent		population (million)		population percent	
	rural	urban	rural	urban	rural	urban	rural	urban
1981	162.1	115.5	30.9	77.8	2.8	40.0	0.5	26.9
1985	313.9	127.2	56.4	72.9	4.0	49.6	0.7	28.4
1990	444.2	182.0	73.9	83.8	14.8	99.7	2.5	46.0
1995*	480.4	185.6	76.4	85.3	22.9	101.5	3.6	46.6

Note. * March 1994

Source. Sengupta (1996)

Although the general limitation of data availability has been pointed out earlier, it is worth noting again that in the case of particularly the rural water supply particularly, the distinction between capital and revenue expenditure is grossly thin and blurred. Consequently no capital expenditure is reported to have been incurred in several states. These states include, Andhra Pradesh, Haryana, Karnataka (except for proforma transfer in 1987/88), Madhya Pradesh, Maharashtra, Orissa, Uttar Pradesh, and West Bengal [CWC (1996)] . Other major states, such as, Punjab, Tamil Nadu and Kerala have either stopped incurring expenditure or the allocation to this sector is negligible. According to an estimate made by the *Central Water Commission*, the cumulative expenditure on rural water supply schemes on capital account was estimated at about Rs 24778 million upto the year 1991/92, a meagre amount considering the size of the rural population and the water supply requirements. The recurrent expenditure on rural water supply is also reported to be very small. Recoveries of recurrent expenditure are placed at less than 2 percent of the total revenue expenditure.

The financial aspects of urban water supply are more complex in view of the fragmented institutional responsibilities. It is reiterated here that in several states capital works in respect of urban water supply are managed by state-level parastatal agencies, while in others these responsibilities are shared by the departments of health, urban development and municipalities of the state governments. In addition, there are several other financing channels. resulting in little consistency in the growth trends in capital/revenue expenditures. Furthermore, several states (e.g. West Bengal, Haryana, and Karnataka) have made no budgetary provision for urban water supply schemes.

II. Public expenditure on water supply and sanitation

The share of water supply, sewerage and sanitation in the total public expenditure is small; it was estimated for 1993/94 at 2.1 percent of the total expenditure in a sample of 14 major states. As a proportion, it ranges between 0.35 percent (Karnataka) and 7.02 percent in the case of Rajasthan. West Bengal's expenditure on water supply for 1993/94 is 0.21 percent of the state's GDP; it is 1.93 percent for Rajasthan which is a chronically water-deficit state.

Table 18. Public expenditure on water supply, sewerage and sanitation in major states—1993/94

State	Public expenditure (percentage)		
	as a percent of total expenditure	annual average growth rate percent 1980/81–1993/94	as a percent of GDP
Andhra Pradesh	1.83	3.84	0.38
Bihar (1992/93)	2.69	3.37	0.63
Gujarat	2.01	6.75	0.46
Haryana	2.70	5.20	0.55
Karnataka	0.35	1.73*	0.36
Kerala	1.79	0.83*	0.44
Madhya Pradesh	3.46	4.91	0.75
Maharashtra	1.82	2.54*	0.31
Orissa	2.87	4.09	0.78
Punjab	1.25	6.03	0.22
Rajasthan	7.02	6.36	1.93
Tamil Nadu	3.78	8.35	0.85
Uttar Pradesh	1.30	8.19*	0.27
West Bengal	1.25	0.36*	0.21

Note. * Insignificant at 1 percent level of significance

Source. State Budget Documents (relevant years)

It is important to note that public expenditure on water, sewerage and sanitation has increased across states, at annual rates that have ranged between 0.83 percent and 8.35 percent over the period 1980/81 to 1993/94. Expenditure growth on this sector has been particularly high in Gujarat (6.75 percent), Haryana (5.20 percent), Rajasthan (6.36 percent), Tamil Nadu (8.35 percent), and Uttar Pradesh (8.19 percent). Comparatively lower levels of expenditure are reported from Andhra Pradesh, Bihar, Karnataka, Kerala, Maharashtra and West Bengal.

A specific feature that distinguishes the pattern of expenditure on water supply from that of irrigation is with respect to capital expenditure, which is reported to be *nil* in the case of several states. It needs to be mentioned here that capital expenditure on water supply, sewerage and sanitation for the year 1993/94 are significant in Bihar (9.4 percent), Gujarat (14.3 percent), Haryana (8.7 percent), and Rajasthan (26.9 percent).⁹ The behaviour of capital expenditure growth even in these states is erratic.

A full-fledged analysis of revenue expenditure on water is not possible as the budgeted expenditures are partial, and as a large part of the expenditure on maintenance of the water supply systems is undertaken by local governments, city-level boards, and selectively by the state-level water supply and sewerage boards. For this very reason, revenue expenditure on this sector are also small. For instance, on a per capita basis, the budgeted revenue expenditure on the sector are as in Table 19.

⁹ The figures in parenthesis indicate the percentage of capital expenditure on this sector to the total capital expenditure of the states.

At the same time, revenue expenditure on water supply, sewerage and sanitation has consistently risen in all states during the period 1980/81 to 1993/94. At 1980/81 prices, revenue expenditures have risen sharply in Gujarat, Kerala, Tamil Nadu, and Uttar Pradesh where as a result, population covered by safe drinking water has risen to 69.8 percent in Gujarat, 67.4 percent in Tamil Nadu and 62.2 percent in Uttar Pradesh. In Kerala, however, population coverage still continues to be very low. Table 20 gives the annual average growth rates of revenue expenditure together with figures on population covered by safe drinking water.

Table 19. Per capita budgeted revenue expenditure on water supply sewerage and sanitation—1993/94 (current prices)

State	Per capita revenue expenditure (Rs)
Andhra Pradesh	26.02
Bihar	9.40
Gujarat	16.29
Haryana	46.24
Karnataka	26.36
Kerala	28.59
Madhya Pradesh	43.04
Maharashtra	29.94
Orissa	27.83
Punjab	27.91
Rajasthan	58.69
Tamil Nadu	58.47
Uttar Pradesh	13.23
West Bengal	13.45

Source. CWC (1996a)

Revenue receipts on water account are, at best, partially captured in the budget documents, and do not reflect the field-level position where charging for water is the responsibility of either the local bodies or that of the parastatal agencies. For this reason, the total receipts from the sale of water are infinitesimal, ranging between virtually no collections (Kerala and Uttar Pradesh) to about 1 percent of the total receipts of the state. It is only in Haryana, Punjab and Rajasthan that some part of the revenue expenditure is covered by charges. In other states, receipts through water charges are able to recover not more than 4-5 percent of the revenue expenditure.

Table 20. Revenue expenditure on water supply, sewerage and sanitation and population covered by water supply

State	Annual average growth rate percent 1980/81-1993/94 (at 1980/81 prices)	Percent population @ covered, 1994 (estimated)
Andhra Pradesh	5.49	55.08
Bihar (1992/93)	6.34	58.76
Gujarat	9.14	69.78
Haryana	3.50	74.32
Karnataka	1.73	71.68
Kerala	16.37	18.89
Madhya Pradesh	5.07	53.41
Maharashtra	3.04	68.49
Orissa	3.12	39.07
Punjab	6.85	92.74
Rajasthan	4.31*	58.98
Tamil Nadu	7.48	67.42
Uttar Pradesh	8.68*	62.24
West Bengal	0.37	81.98

Note. * Insignificant at 1 percent level of significance

Source. State Budget Documents (relevant years)

Table 21. Recoveries from water as a percentage of revenue expenditure: Rajasthan

Year	Receipts on revenue accounts (Rs million)	Revenue expenditure (Rs million)	Percent of receipts to expenditure
1987/88	26.35	49.88	52.8
1988/89	29.59	57.86	51.1
1989/90	33.72	68.70	49.1
1990/91	34.32	83.32	41.2
1991/92	36.50	94.30	38.7

Source. CWC (1996a)

A separate compilation of financial accounts, made by the *Central Water Commission* confirms the above-stated position. In the case of the rural water supply, with the exception of Rajasthan, recoveries are reported to be insignificant, and are able to meet less than 0.5 percent of the revenue expenditure. This position shifts only marginally in the case of urban water supply where recoveries are able to meet, on the whole, 16–19 percent of the revenue expenditure. Rajasthan is one state where recoveries have accounted for 38–51 percent of the expenditure, however, the proportion of recoveries to revenue expenditure has consistently declined in Rajasthan over the period 1987/88 to 1991/92, as can be observed from Table 20.

To conclude, domestic water supply contributes little to the income of states and constitutes a load on the finances of states.

Annex Table 1 Gross domestic product deflators*

Year	GDP deflators
1974/75	0.6854
1975/76	0.6750
1976/77	0.7149
1977/78	0.7547
1978/79	0.7739
1979/80	0.8964
1980/81	1.0000
1981/82	1.1026
1982/83	1.1846
1983/84	1.2850
1984/85	1.4409
1985/86	1.4846
1986/87	1.5814
1987/88	1.7168
1988/89	1.8551
1989/90	2.0092
1990/91	2.2292
1991/92	2.5566
1992/93	2.7771
1993/94	3.0357

Note. * GDP deflator = GDP current prices/GDP 1980/81 prices

Source. CSO (1996)

Annex Table 2. State domestic product (1980/81 prices)

(Rs million)

State	1974/75	1980/81	1985/86	1990/91	1991/92	1992/93	1993/94
Andhra Pradesh	68900.21	73240.00	90340.43	139804.70	146067.47	142113.85	148853.53
Bihar	60398.21	63 492.00	83301.27	101790.74	98257.20	99362.95	109964.92
Gujarat	44027.44	65474.00	81529.02	108214.18	97905.18	109859.83	108364.30
Haryana	20850.11	30319.00	38986.19	54864.09	57029.44	56331.19	59482.25
Karnataka	46364.87	56115.00	69532.13	92386.84	103600.57	107029.91	108465.10
Kerala	30428.91	38227.00	43807.18	54609.29	59068.46	61845.55	62050.36
Madhya Pradesh	55538.04	70165.00	81182.78	119213.73	114673.37	116535.11	126036.69
Maharashtra	107377.35	151626.00	178279.47	256463.69	252427.93	282287.19	300452.73
Orissa	24684.55	34427.00	41936.58	43353.59	48913.28	48107.18	51698.20
Punjab	34720.03	44493.00	56227.77	75214.62	79375.68	82880.36	85653.85
Rajasthan	36991.80	41257.00	51660.06	82009.49	78644.25	83420.13	79998.80
Tamil Nadu	53091.18	72182.00	92164.55	126454.51	129194.45	136192.95	138837.38
Uttar Pradesh	104384.79	140118.00	166172.11	217800.16	218790.63	146614.93	227692.14
West Bengal	76102.18	87195.00	105748.46	141583.38	140983.81	146614.93	143500.23
Centre	1068550.00	1360630.00	1766480.00	2402380.00	2412550.00	2539790.00	2638710.00

Note. SDP at 1980/81 prices are obtained by using GDP deflators (Annex Table 1).

Annex Table 3. State domestic product (current prices)

(Rs million)

State	1974/75	1980/81	1985/86	1990/91	1991/92	1992/93	1993/94
Andhra Pradesh	47 222	73 240	134115	311650	373440	394666	451874
Bihar	41395	63492	123665	226910	251207	275942	333820
Gujarat	30175	65474	121034	241229	250307	305093	328961
Haryana	14290	30319	57877	122302	145803	156438	180570
Karnataka	31777	56115	103224	205947	264868	297234	329267
Kerala	20855	38227	65034	121734	151016	171752	188366
Madhya Pradesh	38064	70165	120520	265749	293177	323631	382609
Maharashtra	73593	151626	264665	571704	645364	783943	912083
Orissa	16918	34427	62257	96643	125053	133599	156940
Punjab	23796	44493	83473	167667	202934	230168	260019
Rajasthan	25353	41257	76692	182814	201064	231667	242852
Tamil Nadu	36387	72182	136823	281890	330302	378223	421468
Uttar Pradesh	71542	140118	246691	485516	559366	611714	691204
West Bengal	52158	87195	156989	315615	360443	407166	435623
Centre	732350	1360630	2622430	5355340	6167990	7053280	8010320

Source. CSO (1989)

PUBLIC EXPENDITURE ON WATER: A FOUR STATES ANALYSIS

The analysis of public expenditure on water made in the earlier section is elaborated here with additional details from four states, namely, Andhra Pradesh, Karnataka, Maharashtra, and Tamil Nadu. In terms of population these are middle-sized states, and are growing demographically at rates that are lower than the national average. In terms of SDP, except Maharashtra whose per capita SDP is substantially high, other states fall within an annual per capita income range of Rs 2000–2500. Basic details on these states are provided in the following table.

Table 22. Per capita SDP for sample states (1980/81 prices)

State	1993** population (million)	1993**		1992/93 *SDP (Rs million) at 1980/81 prices	Per capita SDP (Rs) at 1980/81 prices
		urban population (million)	population percent of total		
Andhra Pradesh	69.45	18.54	27.88	142113.85	2046.16
Karnataka	46.73	14.30	31.78	107029.91	2290.20
Maharashtra	82.64	21.56	39.98	282287.19	3416.04
Tamil Nadu	57.84	19.42	34.77	136192.95	2369.34

Note. * at 1980/81 prices

** Respected projected population on applying 1980/81–1990/91 growth rates.

A number of important rivers flow through these states. Andhra Pradesh, for instance, is endowed with two important rivers, namely, Godavari and Krishna; Karnataka

state has a large navigable length of over 1200 km provided by the rivers Cauvery, Tungabhadra, Krishna, Malaprabha and Sharavathi; and Tamil Nadu has a total length of nearly 2400 km from Cauvery, Cheyyar, Polar, and Panniyan. These states also have large water resources of various types consisting of tanks, ponds, lakes and reservoirs.¹⁰

It is in this context that this section discusses the trends in public expenditure on water. As in the previous section, water is divided into three sections, namely, irrigation, rural water supply, and urban water supply.

Andhra Pradesh

I. General

With its two main rivers, namely, Krishna and Godavari, Andhra Pradesh is equipped with water resources. In 1993, it had approximately 11500 kms. of rivers and canals and over 851000 hectares of water bodies. According to the *Central Ground Water Board*, Andhra Pradesh had 35.29 cubic meter/year of replenishable groundwater resources, of which only about 24 percent were effectively developed.¹¹

Net irrigated area in the state forms about 38.5 percent of the total net sown area, and 25.4 percent of the total cultivable area of the state. It is estimated that for every 1000

10 Andhra Pradesh has 0.85 million hectares, Karnataka has 0.57 million, Maharashtra has 0.32 million, and Tamil Nadu has 0.86 million hectares of water bodies. See for details, CWC (1996a).

11 Central Ground Water Board, *Ground Water Resources of India*, 1995, as quoted in CWC (1996a).

persons, the net irrigated area in the state is 60.58 hectares which compares well with the average of 59.20 hectares for the country as a whole.¹²

Table 23. Plan investment on irrigation: Andhra Pradesh (current prices)

Plan Period	Major and medium irrigation (Rs million)	Minor irrigation (Rs million)		Total (Rs million)
		state	institution	
First Plan 1951-56	375	—	—	375
Second Plan 1956-61	574	71	3	648
Third Plan 1961-66	915	292	73	1280
Annual Plan 1966-69	609	168	312	1089
Fourth Plan 1969-74	1187	190	432	1809
Fifth Plan 1974-79	2691	233	656	3580
Annual Plan 1978-80	2577	226	706	3509
Sixth Plan 1980-85	7296	782	1272	9350
Seventh Plan 1985-90	12724	176	4048	16948
Annual Plan 1990-92	5504	114	1544	7162
Eighth Plan 1992-97	20688	2374	6540*	29582

Note. * upto 1994/95

Source. GoI (1996a)

Over the successive *Five-Year-Plans*, plan expenditure on major and medium irrigation has increased in nominal terms, from a relatively low base of Rs 375 million in the *First-Five-Year-Plan* (1951-56) to Rs 20688 million in the *Eighth Plan* (estimated plan outlay), and Rs 71 million to Rs 234 million on minor irrigation (estimated plan outlay excluding institutional finance) during the same period. Institutional spending on minor

irrigation has risen substantially over the plan periods—about Rs 3 million in the Second Plan to nearly Rs 6540 million in the first three years of the *Eighth Plan*.

The record of Andhra Pradesh in respect of the provision for domestic water supply was unsatisfactory during 1991; 51 percent of the states' rural population and 26 percent of urban population did not have adequate access to safe drinking water. However, it needs to be pointed out that the population coverage in respect of water supply has increased in the state, especially after 1981 when the rural population coverage was only 41 percent and urban population coverage only 55.3 percent. Rural sanitation coverage continues to be meagre—a bare 12.39 percent of the total rural population.

The broad aggregates on the finances of the state are presented in Tables 22 and 23. As shall be noted, the total expenditure of the state government at 1980/81 prices has risen since 1974/75 at 6.8 percent annually, with the 1980/81 to 1984/85 period posting an annual increase of 8.9 percent. What is significant here is that the revenue expenditure in the state increased at an alarmingly high rate of 7.7 percent over the two decade period of 1974/75 to 1993/94. The rate of growth was particularly high during the early 1980s, when it escalated to 10.5 percent annually. In contrast, the state government's performance in respect of capital expenditure growth has been abysmally poor; capital expenditure during this period rose at an annual rate of 1.27 percent. The second half of the 1980s, in particular, witnessed gross neglect of capital expenditure in the state, which, as would be noted from the tables, declined at 1980/81 prices. Only in 1992/93 has the capital expenditure growth taken an upsurge.

Table 24. Finances of Andhra Pradesh

Year	State's expenditures as a percent of GDP			Capital : revenue expenditure ratio
	total	capital	revenue	
1974/75	11.14	1.91	9.23	1 : 4.83
1980/81	19.40	3.39	16.02	1 : 4.73
1985/86	23.71	2.82	20.89	1 : 7.40
1990/91	19.29	1.48	17.81	1 : 12.02
1991/92	18.55	1.12	17.43	1 : 15.52
1992/93	20.41	2.03	18.38	1 : 9.03
1993/94	20.93	3.02	17.91	1 : 9.24

Source. Andhra Pradesh State Budget Documents (1974/75–1993/94)

The state government's receipts on revenue account compared to revenue expenditure have risen at 6.38 percent annually over the 1974/75 to 1993/94 period, leaving a substantial deficit on revenue account (Table 25). As a result, the finances of the state are in a shambles (Table 24).

Table 25. Calculated annual average growth rates* percent: Andhra Pradesh

Period	State's expenditure			State's receipts on revenue account
	total	capital	revenue	
1974/75–1993/94	6.78	1.27 (t=1.34)	7.71	6.38
1980/81–1993/94	6.20	1.44 (t=0.95)	6.82	6.30
1980/81–1984/85	8.93	0.34 (t=0.12)	10.49	6.06
1985/86–1989/90	4.80	-3.46 (t=1.05)	5.81	5.49
1990/91–1993/94	5.13	33.56	2.32	4.19

Note. * In real terms (at 1980/81 prices)

II. Public expenditure on irrigation

In 1993/94, the total public expenditure on irrigation was estimated at Rs 3930 million at 1980/81 prices and Rs 11932.86 million at current prices. It constituted 12.62 percent of the state government's total expenditure and 2.64 percent of the SDP. During the two decade period of 1974/75 to 1993/94, the total expenditure on irrigation increased at 4.42 percent annually, though it would be observed that the level of total expenditure on irrigation at 1980/81 prices remained unchanged in the early 1980s. As a proportion of the state's total expenditure, expenditure on irrigation has oscillated between a low of 10.9 percent in 1991/92—a year when the state's overall expenditure also stagnated, to a high of 16.5 percent in 1980/81.

Table 26. Public expenditure on irrigation: Andhra Pradesh (1980/81 prices)

Year	Total expenditure on irrigation (Rs million)	As a percent of state's total expenditure	As a percent of SDP
1974/75	1119.75	14.59	1.63
1980/81	2351.33	16.55	3.21
1985/86	2816.36	13.15	3.12
1990/91	3138.36	11.64	2.24
1991/92	2964.40	10.94	2.03
1992/93	3218.79	11.10	2.26
1993/94	3930.85	12.62	2.64

Source. Andhra Pradesh State Budget Documents (1974/75–1993/94)

The growth trends in respect of the two constituents of expenditure on irrigation, namely, capital expenditure and revenue expenditure are shown in Figures 11 and 12. The

graphs and the accompanying data therein focus on the various important features discussed below.

- In terms of capital expenditure, irrigation is the most important sector in the state accounting for anywhere between 35 to 77 percent of its total expenditure. On creation of new assets, this level of expenditure has helped the state to increase the net irrigated area to 60.6 hectare per 1000 persons, and achieve 95 percent of the irrigation potential created in the state.¹³ It may be highlighted here that despite the low growth rate of the total capital expenditure in the state—estimated at 1.27 percent annually, the capital expenditure growth on irrigation was maintained at a somewhat higher level (2.72 percent) over the 1974/75 to 1993/94 period.

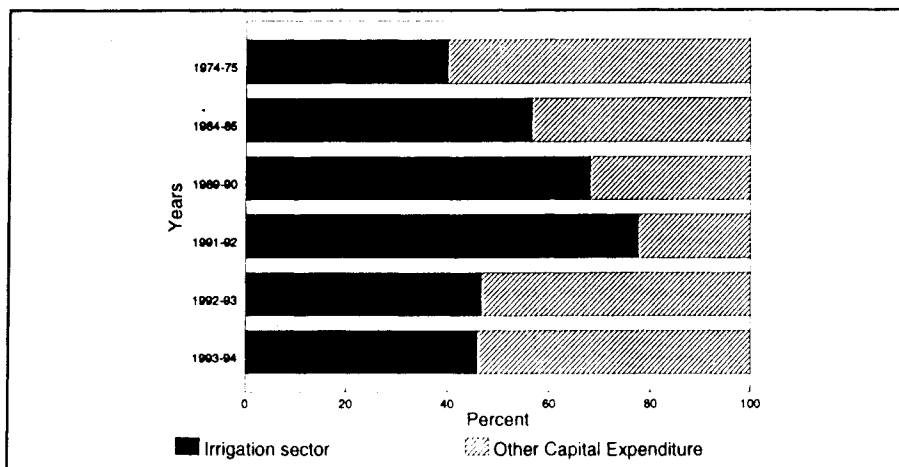


Figure 11. Irrigation sector as a percent of state's capital expenditure: Andhra Pradesh

- While the long-run growth rate of revenue expenditure on irrigation was impressive—6.3 percent annually, it witnessed wide fluctuations on a year-to-year basis. Revenue expenditure, for example, dipped by 20.7 percent in

13 See, CWC (1996a) for figures on irrigation potential.

1982/83 and again by 20.02 percent in 1987/88 over the previous years. These fluctuations in revenue expenditure combined with the fact that the levels of revenue expenditure (excluding

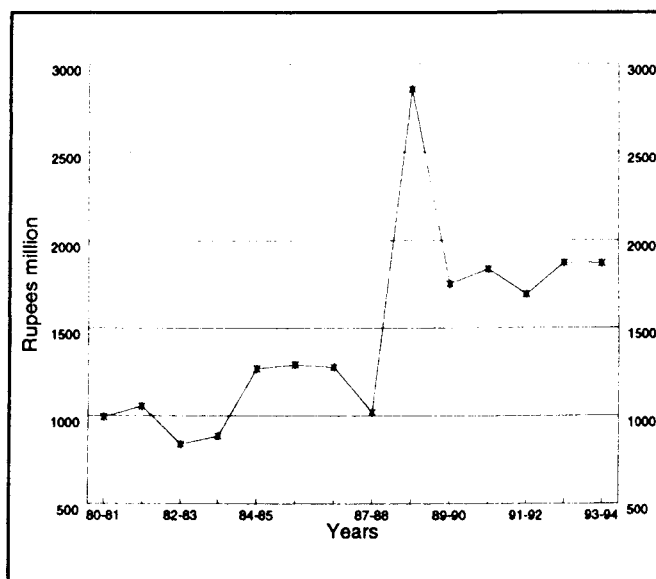


Figure 12. Revenue expenditure on irrigation: Andhra Pradesh (1980/81 prices)

the interest liabilities) are far below the norms are a matter of concern in as far as this sector is concerned.

Table 27. Calculated annual average growth rates* of expenditure on irrigation (percent): Andhra Pradesh

Period	Capital expenditure	Revenue expenditure	Total expenditure
1974/75-1993/94	2.72	6.30	4.42
1980/81-1993/94	1.73 (t = 1.6)	6.76	4.21
1980/81-1984/85	0.41 (t = 0.17)	3.15	1.64 (t = 0.44)
1985/86-1989/90	-0.19 (t = -0.66)	15.25	7.30 (t = 1.52)
1990/91-1993/94	15.47	1.53	7.87

Note. * In-real terms (at 1980/81 prices)

- relative importance of the two forms of expenditure has shifted over the years; the early years i.e., the 1970s and 1980s saw greater emphasis on building up irrigation infrastructure in the state with the consequence that capital expenditures were higher than the revenue expenditures. More recent years

have seen revenue expenditures exceeding the expenditure on capital works.

- minor irrigation is a small component of expenditure on irrigation. In recent years, its importance both in terms of capital expenditure and revenue expenditure appears to be increasing in the state. During the period 1990/91 to 1993/94, capital expenditure on minor irrigation on an annual basis increased by 5.04 percent, and revenue expenditure increased at 5.32 percent.

Andhra has a lower capital expenditure on irrigation (around 42 percent) and higher revenue expenditure on irrigation (about 58 percent). The per hectare total expenditure on irrigation in 1990/91 was Rs 729 but the following year it had a negative growth of -6.54. It showed an annual change of 20.84 percent over 1991/92 mainly because of a negative growth in the previous year (Table 28).

Table 28. Net irrigated area and expenditure on irrigation: Andhra Pradesh

Year	Net irrigated area (,000 ha.)	Capital expenditure on irrigation (Rs million)	Revenue expenditure on irrigation (Rs million)	Capital expenditure on irrigation (Rs per ha.)	Revenue expenditure on irrigation (Rs per ha.)	Total expenditure on irrigation (Rs per ha.)
1990/91	4305	1300.85	1837.52	302.17	426.83	729.01
1991/92	4351	1272.98	1691.42	292.57	388.74	681.31
1992/93	4029	1347.24	1871.55	334.39	464.52	798.91

Source. Andhra Pradesh State Budget Documents (relevant years)

Direction and administration (D&A) constitute about 3–4 percent of the total revenue expenditure under major and medium (M&M) category and one or less than one percent in the case of minor irrigation. The ‘others’ category in M&M is above 96 percent and in the case of minor irrigation it is above 98 percent making any analysis very difficult (Table 29).

Table 29. Break-up of revenue expenditure on irrigation sector: Andhra Pradesh

Year	Major and medium (in Rs million)				Minor irrigation (in Rs million)			
	revenue expenditure	direction & admin.	machinery & equipment	others	revenue expenditure	direction & admin.	machinery & equipment	other expenses
1987/88	1346.36	104.91	7.53	1233.92	405.92	3.64	—	402.28
1988/89	4909.85	-73.15	-55.42	5038.42	390.01	4.26	—	385.75
1989/90	3155.37	136.29	-2.17	3021.25	364.68	4.54	—	360.14
1990/91	3603.23	148.19	2.07	3452.97	492.93	4.89	—	488.04
1991/92	3921.06	130.60	1.56	3788.90	403.26	5.29	—	397.97
1992/93	4304.08	147.30	9.52	4147.26	893.43	6.61	—	886.82
1993/94	5044.16	157.78	13.40	4872.98	629.22	7.75	—	621.47

Source. Government of Andhra Pradesh (relevant years)

Revenue income from irrigation in 1993/94 was estimated at Rs 286.35 million (at 1980/81 prices) which formed 1.04 percent of the total revenue receipts of the state and 0.19 of SDP. It covered in 1993/94, only 15 percent of the revenue expenditure on irrigation. The one redeeming feature of the trends on revenue income is that on an annual basis, receipts have shown an impressive growth record. During the period 1974/75 to 1993/94, receipts rose at an annual average rate of 14.2 percent, as may be seen in Table 26. It is important to note that over 90 percent of the revenue expenditure on both major, medium and minor irrigation is shown as 'others' which comprise essentially of expenditure on irrigation liabilities.

Table 30. Percentage break-up of revenue expenditure on irrigation sector: Andhra Pradesh

Year	Major and medium (in percentage)				Minor irrigation (in percentage)			
	revenue expenditure	direction & admin.	machinery & equipment	others	revenue expenditure	direction & admin.	machinery & equipment	other expenses
1987/88	100.00	7.79	0.56	91.65	100.00	0.90	0.00	99.10
1988/89	100.00	-1.49	-1.13	102.62	100.00	1.09	0.00	98.91
1989/90	100.00	4.32	-0.07	95.75	100.00	1.24	0.00	98.76
1990/91	100.00	4.11	0.06	95.83	100.00	0.99	0.00	99.01
1991/92	100.00	3.33	0.04	96.63	100.00	1.31	0.00	98.69
1992/93	100.00	3.42	0.22	96.36	100.00	0.74	0.00	99.26
1993/94	100.00	3.13	0.27	96.61	100.00	1.23	0.00	98.77

Source. Government of Andhra Pradesh (relevant years)

Table 31. Calculated annual average growth rate* of revenue receipts from irrigation: Andhra Pradesh

Period	Annual average growth rate percent
1974/75 to 1993/94	14.23
1980/81 to 1993/94	19.47
1980/81 to 1984/85	61.23 (t = 1.51)
1985/86 to 1989/90	15.48 (t = 0.66)
1990/91 to 1993/94	22.95 (t = 0.59)

Note. * In real terms (at 1980/81 prices)

The *Central Water Commission* has estimated that in 1991/92, gross receipts per hectare of irrigation potential utilised was Rs 48; as against this, the working expenses inclusive of interest on capital were placed at Rs 1377. Gross receipts covered only 3.5 percent of the working expenses (CWC 1996a).

Irrigation sector is thus financed out of the general tax and other non-tax revenues of the state government. Over the 20 year period, the irrigation sector has meant drawing out 5–6 percent of the state’s total revenue income for maintaining the current revenue expenditure levels. Data to support the same is shown in Table 32.

Table 32. Revenue deficit on irrigation account as a percentage of state’s total revenue receipts (1980/81 prices)

Year	Revenue deficit on irrigation account (Rs million)	State’s revenue receipts (Rs million)	Percent of revenue deficit to state’s revenue receipts
1974/75	568.07	7763.49	7.3
1980/81	975.69	12765.29	7.6
1985/86	1188.15	18826.21	6.3
1990/91	1606.44	24194.12	6.6
1991/92	1625.25	24793.56	6.6
1992/93	1597.15	25671.74	6.2
1993/94	1582.54	27419.49	5.8

Source. Andhra Pradesh State Budget Documents (1974/75–1993/94)

III. Public expenditure on water

The importance of public expenditure for domestic water supply and sanitation has grown considerably in Andhra Pradesh. At 1980/81 prices, revenue expenditure on water supply and sanitation has risen from Rs 135 million in 1974/75 to Rs 587 million in 1993/94, approximately at an annual rate of 9.8 percent. This rate is substantially higher than the rate of growth of the state’s total revenue expenditure. As a percentage of the state’s revenue

expenditure, the expenditure on water and sanitation peaked at 3.78 in 1987/88, and is now around 2.2 percent; as a percentage of SDP, it has ranged between 0.35 to 0.42 percent in the 1990s. However, recent years have witnessed compression in revenue expenditure on water supply.

Table 33. Revenue expenditure on water supply and sanitation: Andhra Pradesh

Year	Revenue expenditure at 1980/81 prices (Rs million)	As a percent of state's revenue expenditure	As a percent of SDP
1974/75	135.32	2.13	0.20
1980/85	282.16	2.14	0.39
1985/86	620.14	3.29	0.69
1990/91	496.59	1.99	0.36
1991/92	512.25	2.01	0.35
1992/93	590.20	2.26	0.42
1993/94	587.76	2.21	0.39

Source. Andhra Pradesh State Budget Documents (1974/75–1993/94)

An important feature of the expenditure on water is that rural water supply now accounts for 70 percent of the total expenditure on water supply. Also, revenue expenditure on rural water supply has risen during the 1974/75 to 1993/94 period at 9.8 percent per

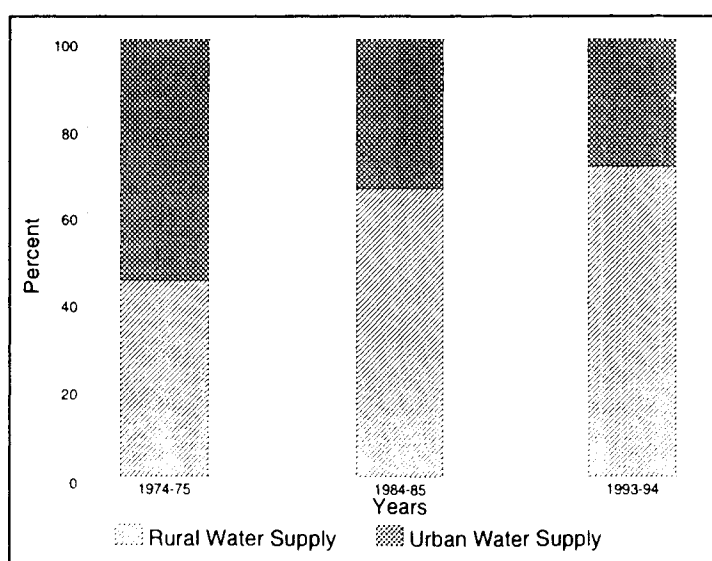


Figure 13. Percentage composition of revenue expenditure: Andhra Pradesh (rural and urban water supply)

annum compared to the annual rate of 4.8 percent for urban water supply. It must be emphasised here that there are complex institutional arrangements for water supply and the budgeted expenditure forms only part of the total public expenditure on water supply and sanitation.

Receipts from insignificant component of the revenue expenditure on water supply and sanitation, covering only about 2.2 percent of the total expenditure. Moreover, in real terms (1980/81 prices), receipts from water supply and sanitation have declined at an annual rate of 5.6 percent over the past two decades. Significantly, receipts in the 1970s covered anywhere between 10–25 percent of the expenditure; however, on account of the inability of the water rates to keep up with the cost of provision, almost the entire revenue expenditure is met out of the other revenues of the state. Thus, together with irrigation, domestic water supply and sanitation constitute a major strain on the state's financial resources.

Karnataka

I. General

The state is endowed with seven river basins of which the Krishna basin drains 59 percent of the total area of the state, followed by Cauvery basin with 18.9 percent, west flowing river basin with 12.8 percent, Pennar (south and north) basin with 5.6 percent, and Godavari and Polar basins draining 3.9 percent. The total water available in the state out of the river systems is estimated to be 3440 TMC of which 165 TMC is found to be utilisable.

The ultimate irrigation potential from all sources is estimated at about 5.5 million hectares, comprising 3.5 million hectares under major and medium irrigation and 1.0 million hectares under minor irrigation, utilising surface water besides another 1 million hectares from groundwater resources.

Table 34. Trend in development of irrigation: Karnataka (current prices)

Year	Area under irrigation (cumulative) (million ha.)	Plan investment (Rs million)
1985/86	20.86	1851.0
1990/91	22.29	2762.1
1991/92	22.77	3798.3
1992/93	23.27	5099.6
1993/94	24.04	6946.3
1994/95	24.43	7220.9
1995/96	25.19	11380.4

Source. Karnataka State Budget Documents (relevant years); and MoF (1996).

(Data may not be comparable on account of revisions made in 1984/85)

At the beginning of the *First-Five-Year-Plan* 1950–51, the area under irrigation in the state was only 0.67 million hectares, consisting of 0.22 million hectares under major and medium irrigation (32.2 percent), and 0.45 million hectares under minor irrigation. The progress during the first four *Five-Year-Plans* was impressive; the area under irrigation rose to 1.70 million hectares of which the share of major and medium irrigation was 52.6 percent. Since then, the progress of the area under irrigation has been moderate standing at 25.2 million hectares (1995/96). Major and medium irrigation has contributed significantly to the gains made under irrigation. It is important to note that in the case of Karnataka state, benefits of particularly the major and medium irrigation are reported to have been confined

to smaller parts of the state. According to the Government of Karnataka, 81 percent of the benefits of total investment on major and medium irrigation have accrued to 10 percent of the total number of *talukas*. Seventy percent of the *talukas* have not benefitted at all from these projects. On the other hand, benefits of minor irrigation have reached out and spread more evenly within the state.

Similar to the development of irrigation, the Karnataka state has made significant progress in extending water supply and sanitation cover to its population. The coverage of rural population with drinking water which was 30 percent in 1981 rose to nearly 82 percent by 1995, being a direct result of the adoption by the state of a *Handpumps Programme*. Urban population coverage has also increased significantly in recent years, and is currently placed at 93 percent of population (1991). According to Sengupta (1996), the progress on this front has been made possible by plan investments in programmes, such as, the *Minimum Needs Programme*, *Accelerated Rural Water Supply Programme*, and HUDCO's financing of water supply projects in the urban areas.

Total public expenditure in the state comprising capital expenditure and revenue expenditure forms about 21–22 percent of the state's GDP.¹⁴ Capital expenditure, i.e., expenditure on the creation of new assets and potential constitutes approximately 14–19 percent of the total public expenditure of the state. The balance consists of expenditure on revenue account, i.e., expenditure on salaries and wages, operations and maintenance, and

14 As pointed out earlier, state expenditures are classified into revenue/capital/loans, plan/non-plans, development/non-developmental, and general/social/economic services. These classifications suggest that (i) capital expenditure constitutes 14–19 percent of total expenditure; (ii) plan/non-plan classification indicates only 25 percent as plan expenditure; (iii) 70 percent of the total expenditure is classified as developmental; and (iv) social services consume 36 percent of the total expenditure.

interest liabilities. Capital expenditure in the state at 1980/81 prices has risen over the period 1974/75 to 1993/94 at an annual average rate of 4.8 percent; in comparison, revenue expenditure has increased at 7.3 percent annually during the same period. At current prices, the growth rates of capital and revenue expenditure for the same period work out to 8.0 and 16.5 percent respectively (Table 35).

Table 35. Calculated annual average growth rate of the finances: Karnataka

Account	Annual average growth rate percent 1974/75-1993/94		Annual average growth rate percent 1980/81-1993/94	
	current prices	at 1980/81 prices	current prices	at 1980/81 prices
Capital expenditure	8.0	4.80	14.8	5.6
Revenue expenditure	16.5	7.30	16.1	6.9
Revenue receipts	15.3	6.30	15.4	6.2

The finances of the state government have suffered a setback in recent years and with deficits on revenue account to the tune of 3-4 percent of the total revenue expenditure. As would also be seen from the tables in volume II of the *report*, the state government had enjoyed a surplus on revenue account consistently until 1983/84¹⁵.

II. Public expenditure on irrigation

An important sector in the state budget of Karnataka, irrigation accounts for anywhere between 10-20 percent of the its total expenditure, and about 2.3-3.9 percent of the state's GDP. Capital expenditure on irrigation is significant has absorbed, notwithstanding the large

15 See volume II of this report, Karnataka State Table Nos. KR1.3 and KR1.4.

scale fluctuations, 40–75 percent of the total capital expenditure in the state. During the period 1974/75 to 1993/94, capital expenditure on irrigation increased at an annual average rate of 3.83 percent (at 1980/81 prices) (Table 36); the growth rate during the 1980s dropped down considerably but regained in the 1990.

Table 36. Capital expenditure on irrigation: Karnataka (1980/81 prices)

Year	Capital expenditure (Rs million)	Percent of total capital expenditure	Percent of SDP
1974/75	577.77	67.21	1.25
1980/81	1119.13	65.19	1.99
1985/86	1238.02	66.06	1.78
1990/91	1178.41	40.12	1.28
1993/94	2290.57	58.54	2.11
Period		Annual average growth rate percent	
1974/75–1993/94		3.83	
1980/81–1993/94		4.64	
1980/81–1984/85		-0.42 (t = 0.51)	
1985/86–1989/90		-3.13 (t = 0.69)	

Source. Karnataka State Budget Documents (relevant years)

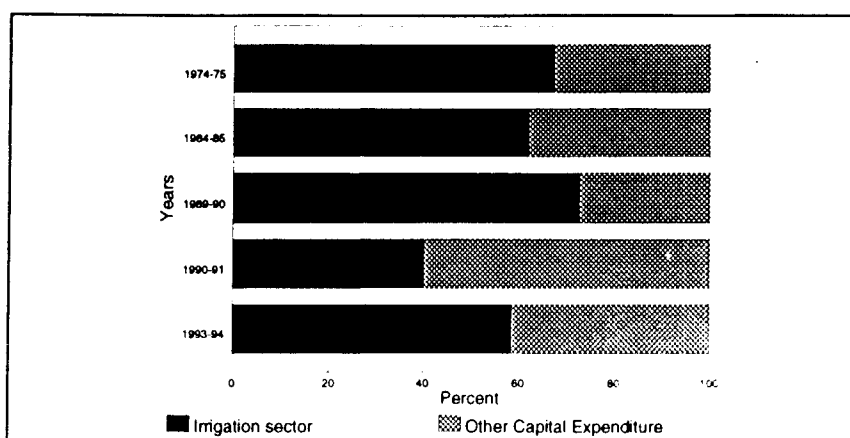


Figure 14. Irrigation sector as a percent of state's capital expenditure: Karnataka

Table 37. Revenue expenditure on irrigation: Karnataka (1980/81 prices)

Year	Revenue expenditure on irrigation (Rs million)	Percent of total revenue expenditure	Percent of SDP
1974/75	405.70	7.57	0.88
1980/81	710.86	7.91	1.27
1985/86	813.22	5.77	1.17
1990/91	933.01	5.22	1.01
1993/94	993.35	4.83	0.92
Period		Annual average growth rate percent	
1974/75–1993/94		4.10	
1980/81–1993/94		3.04	
1985/86–1989/90		3.91	
1990/91–1993/94		2.45	

Source. Karnataka State Budget Documents (1974/75–1993/94)

Revenue expenditure on irrigation forms about 5–7 percent of the total revenue expenditure in the state. Revenue expenditure which consists of expenditure on wages and salaries, operations and maintenance, and interest payments has risen steadily over the period 1974/75 to 1993/94, registering on an annual average basis, a growth rate of 4.10 percent (Table 37). In recent years, the growth of revenue expenditure on irrigation has declined which corresponds to the state-wide trends during the period.

The relationship of capital expenditure to revenue expenditure has some bearing on public expenditure. It is often felt that an increase in revenue expenditure cuts into the creation of new assets, and furthermore, within the revenue expenditure, it is the non-discretionary component of expenditure (i.e. wages and salaries, and interest payments) that accounts for a greater share of the total expenditure. Although there is little evidence of this

relationship, its impact has been experienced to some extent.

- capital to revenue expenditure ratio has ranged between 1:0.42 to 1:0.79 over the period 1974/75 to 1993/94. It must be noted that the ratio has shown signs of decline in recent years, with a

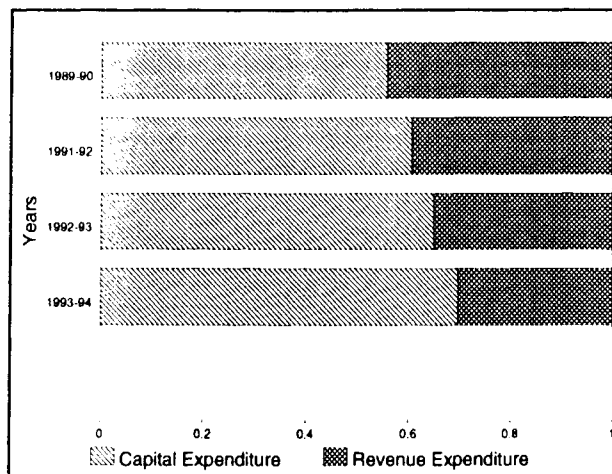


Figure 15. Ratio of capital to revenue expenditure in irrigation sector: Karnataka

significantly lower growth in revenue expenditure and a step-up in the rate of growth of capital expenditure.

- the long-run growth rates of both the capital and revenue expenditure on irrigation have been lower than those observed for the total capital and revenue expenditure of the states.
- Major and medium irrigation constitutes the bulk of the capital expenditure on irrigation. Capital expenditure on major and medium irrigation have uniformly been in excess of 85 percent of the total expenditure on irrigation, having touched 93 percent in 1993/94. It registered an increase of 4.3 percent annually at 1980/81 prices over the period 1980/81 to 1993/94. On the other hand, capital expenditure on minor irrigation declined during this period at the rate of 0.89 percent annually. Notwithstanding the emphasis on major and medium irrigation, it needs to be noted that it has been able to create only about 0.12 to 0.13 million hectares, while with limited investment, minor irrigation has catered to an area of nearly 0.25 million hectares.

It should be noted that in Karnataka capital expenditure is higher (and steadily rising) than the revenue expenditure. From a total per hectare expenditure of Rs 999 in 1990/91 it reached Rs 1293.70 in 1992/93. The percentage change over the previous year was over 24 percent (Table 38).

Table 38. Net irrigated area and expenditure on irrigation sector: Karnataka

Year	Net irrigated area (,000 ha.)	Capital expenditure on irrigation (Rs million) (80/81 prices)	Revenue expenditure on irrigation (Rs million) (80/81 prices)	Capital expenditure on irrigation (Rs per ha.)	Revenue expenditure on irrigation (Rs per ha.)	Total expenditure on irrigation (Rs per ha.)
1990/91	2113	1178.41	933.01	557.70	441.56	999.25
1991/92	2308	1449.06	944.68	627.84	409.31	1037.15
1992/93	2194	1841.33	997.05	839.26	454.44	1293.70

Source. Karnataka State Budget Documents (relevant years)

The expenditure on D&A in the case of M&M irrigation has gone down from 10.62 percent in 1987/88 to 2.66 percent in 1993/94 and though the revenue expenditure on minor irrigation at current prices have gone up but if it is assessed at 1980/81 prices it also has gone down from 157 million in 1987/88 to 146 million in 1993/94. In percentage terms also it declined from 23 percent in 1987/88 to about 18 percent in 1992/93, though it rose again in 1993/94. Expenditure under machinery and equipment (M&E) as also 'suspense accounts' under total irrigation have also gone down. The 'others' category in the case of M&M constitute more than 95 percent and in the case of minor irrigation above 80 percent indicating much higher expense on interest liabilities etc (Table 39).

Table 39. Break-up of revenue expenditure on irrigation sector: Karnataka

Year	Major and medium (in Rs million)					Minor irrigation (in Rs million)			
	revenue expenditure	direction & admin.	machinery & equipment	suspense	others	revenue expenditure	direction & admin.	machinery & equipment	other expenses
1987/88	1288.25	136.78	2.90	0.81	1147.76	269.56	63.50	3.22	202.84
1988/89	1384.32	73.37	1.28	0.94	1308.73	361.27	47.87	11.60	301.80
1989/90	1536.18	28.61	0.52	0.17	1506.88	332.59	59.83	10.91	261.85
1990/91	1687.56	64.43	0.52	0.06	1622.56	392.27	70.27	7.77	314.23
1991/92	1954.27	55.38	0.52	-0.23	1898.60	460.90	80.33	6.22	374.35
1992/93	2230.16	72.06	1.94	0.56	2155.61	538.74	96.24	5.01	437.49
1993/94	2572.01	68.34	1.27	-0.93	2503.33	443.50	104.32	3.47	335.71

Source. Government of Karnataka (relevant years)

Table 40. Percentage break-up of revenue expenditure on irrigation sector: Karnataka

Year	Major and medium (in percentage)				Minor irrigation (in percentage)		
	direction & admin.	machinery & equipment	suspense	others	direction & admin.	machinery & equipment	other expenses
1987/88	10.62	0.22	0.06	89.09	23.56	1.19	75.25
1988/89	5.30	0.09	0.07	94.54	13.25	3.21	83.54
1989/90	1.86	0.03	0.01	98.09	17.99	3.28	78.73
1990/91	3.82	0.03	0.00	96.15	17.91	1.98	80.11
1991/92	2.83	0.03	-0.01	97.15	17.43	1.35	81.22
1992/93	3.23	0.09	0.03	96.66	17.86	0.93	81.21
1993/94	2.66	0.05	-0.04	97.33	23.52	0.78	75.70

Source. Government of Karnataka (relevant years)

Table 41. Receipts from irrigation on revenue account: Karnataka (1980/81 prices)

Year	Revenue receipts from irrigation (Rs million)	Percent of total revenue receipts	Percent of revenue expenditure on irrigation
1974/75	51.69	0.85	12.74
1980/81	41.90	0.44	5.89
1985/86	51.72	0.38	6.36
1990/91	78.85	0.43	8.45
1993/94	46.96	0.22	4.73
Annual average growth rate			
1974/75-1993/94		1.00 (t = 0.76)	
1980/81-1993/94		3.36 (t = 1.90)	
1980/81-1984/85		-0.62 (t = 0.67)	
1990/91-1993/94		-19.99 (t = 1.39)	

Source. Karnataka State Budget Documents (relevant years)

Revenue receipts from irrigation which consists of all receipts from the sale of water, charges and betterment levies form a small proportion—0.22 to 0.75 percent—of the total revenue receipts of the state. The crucial point here is that receipts from the sale of irrigation water constitute between 4.7 to 19 percent of the total revenue expenditure, and in this respect, irrigation is a source of major burden on the state's finances. Notably, receipts from irrigation in the early 1970s covered over 10 percent of the revenue expenditure; this proportion has now declined to 4.7 percent, as may be seen from Table 41. At 1980/81 prices, receipts have grown at 1 percent per annum.

III. Public expenditure on water supply and sanitation

The organisational arrangements in Karnataka State for the provision of water supply and sanitation have been mentioned earlier. These are administered in the rural areas by the *Rural Development* and the *Panchayati Raj Department*, and by the *Housing and Urban Development Department* in the urban areas. Until the early 1980s, the *Public Health Engineering Department* was responsible for executing the rural water supply and sanitation works alongwith minor irrigation projects. However, with the setting up of *Zila Parishads* and *Mandal Panchayats* in 1986, this department has been transferred to *Zila Parishads*; only planning, monitoring, and technical guidance activities are retained at the state and divisional levels. Likewise, the urban water supply which was earlier the responsibility of the PWD (excepting in Bangalore) was shifted to the *Karnataka Water Supply and Drainage Board* in 1974.

Table 42. Calculated annual average growth rate* of water supply and sanitation: Karnataka

Period	Annual average growth rate percent		
	revenue expenditure on water supply and sanitation	revenue expenditure on	
		rural water supply	urban water supply
1974/75–1993/94	6.15	6.88	1.57 (t = 1.11)
1980/81–1993/94	1.73 (t = 1.31)	1.55 (t = 1.16)	-0.21 (t = -0.81)
1980/81–1984/85	16.72	17.71	11.77
1985/86–1989/90	-10.01 (t = 4.88)	-7.11 (t = 4.18)	-27.04 (t = 4.7)

Note. * In real terms (at 1980/81 prices)

The state budgets do not reveal any capital expenditure having been incurred on water supply and sanitation; clearly, the responsibility for capital works rests with either the state-level parastatal agencies (e.g., the *Karnataka Water Supply and Sewerage Board* and the *Bangalore Development Authority, Bangalore Water Supply and Sewerage Board and Bangalore Municipal Corporation*), or the local bodies themselves. The total revenue expenditure on water supply and sanitation in 1993/94, was estimated at Rs 390.6 million, or 1.90 percent of the state's total expenditure. Over the period it has risen at an annual average growth rate of 6.15 percent. During the 1980s, the share of water supply and sanitation suffered fluctuations in the state's total revenue expenditure, to the extent that it registered a decline in the latter half of the decade, but has since regained its expenditure buoyancy.

On the other hand, the budgeted expenditure has been consistently higher on rural water supply as compared to urban water supply. It has also risen at a higher rate (6.88 percent annually) over the past two decades, as compared to a rate of 1.57 percent for

water supply in urban areas. Receipts from water supply and sewerage are negligible, with the concomitant conclusion that the budgeted expenditure on this sector is met out of the general revenues and is absorbed almost wholly by the state government.

As earlier stated, the budgeted expenditure on water supply and sanitation is a partial representation of the public expenditure on the sector. It is particularly so with urban water supply whose responsibility is shared between the *Karnataka Water Supply and Drainage Board*, the *Bangalore Water Supply and Sewerage Board*, and the municipal governments. The basic question here is whether these parastatal agencies are able to maintain the level of expenditure that is required to provide these services at predetermined norms and even generate sufficient resources to be able to maintain that level of expenditure.

Table 43. Receipts and expenditure of *Bangalore Water Supply and Sewerage Board*

Year	Capital account (Rs million)		Revenue account (Rs million)		Percent of revenue account surplus/ deficit to total revenue expenditure
	receipts	expenditure	receipts	expenditure	
1980/81	106.64	101.21	150.21	129.49	+16.0
1986/87	59.71	102.18	228.07	305.67	-25.4
1990/91	488.00	384.64	368.24	521.80	-31.3
1993/94	68.80	177.30	812.50	966.80	-16.0

Source. Rao (1995)

The expenditure and receipts of *Bangalore Water Supply and Sewerage Board* indicate that even such autonomous boards are not able to maintain the required levels of expenditure nor are able to meet out their expenditure through the internally generated resources.

In fact, their deficits on revenue account constitute a high proportion of the revenue expenditure (Table 43).

It would be apt to state here that the majority of the urban local bodies in Karnataka which maintain the water supply systems have water tariff structures far below the average cost of maintenance and operation. According to a recent study, 80 percent of such bodies have deficit water supply budgets (Rao 1995). While annual average per capita expenditure on water supply was of the order of Rs 20, the average income was only Rs 14 (1991). It contributes significantly to the financial charge which is met by the state government out of its own budgets.

Maharashtra

I. General

The availability of underground and surface water in Maharashtra is grossly inadequate to meet the increasing demand for water for irrigation, drinking and other uses. Nearly 82 percent of the state is formed of hard volcanic rocks called the *Deccan Traps*. These are not conducive to large underground storage and flows of water. Moreover, of the 123 billion cubic meters of surface water available in the state, only 74 billion cubic metres or 60 percent of it can be used in accordance with the awards and agreements governing inter-state water flows.

By 1995/96, 24.20 million cubic meter of storage capacity had been built with the help of 50 major, 182 medium, and 1950 state sector minor irrigation projects. Only about 36 percent of the irrigation potential of 3.05 million hectares (1995) is said to be under irrigation. It constitutes only 13 percent of irrigable land in the state.¹⁶

Since 1970/71, the net irrigated area in Maharashtra has increased at 2.61 percent per annum compound, gross irrigated area has increased at 3.10 percent per annum compound, and gross cropped area has increased at 0.56 percent per annum compound. Consequently, the share of net and gross area irrigated in gross cropped area has increased respectively from 7.19 percent and 8.38 percent in 1970/71 to 11.77 percent and 15.41 percent in 1994/95.

Table 44. Irrigation potential and utilization: Maharashtra

Year	Irrigation potential (million ha.)	Area under irrigation (million ha.)	Percent utilization
1985/86	21.90	7.86	35.89
1990/91	24.64	9.72	39.45
1991/92	26.63	9.82	36.86
1992/93	27.17	9.60	35.33
1993/94	27.29	11.00	39.43
1994/95	29.61	11.91	40.22
1995/96	30.51	10.95	36.89

Source. GoI (1996a)

¹⁶ About 8.4 million hectares or 46 percent of the cultivable area of 182.41 lakh hectares in Maharashtra can be irrigated (*Maharashtra: Eighth-Five-Year-Plan, 1992-97*, pp 225).

Investments in irrigation have risen substantially over the successive *Five-Year-Plan* periods. An interesting feature of investment growth is the increasingly important role of institutional finance in funding minor irrigation projects. During the *Seventh-Five-Year-Plan* (1986–1990), 23.6 percent of the total plan investments in irrigation accrued from financing institutions. Nearly 75.5 percent of minor irrigation financing was executed with funds from these institutions.

The total public expenditure in Maharashtra was placed at 1980/81 prices, at Rs 12703.17 million in 1974/75, constituting 11.8 percent of the state's SDP. By 1993/94, it had risen to Rs 48698 million and its proportion to SDP to 16.21 percent. At 1980/81 prices, the annual growth of public expenditure was 6.9 percent during this period.

Table 45. Plan investment in irrigation: Maharashtra (current prices)

Plan period	Major & medium (Rs million)	Minor (Rs million)	
		state	institutional
Second	526.5	102.7	40.0
Third	631.0	370.5	506.4
Annual	580.0	261.3	563.1
Fourth	1663.3	367.9	792.5
Fifth	3616.3	414.0	715.7
Annual	2928.0	316.0	425.6
Sixth	11871.7	903.7	2159.6
Seventh	15618.7	1727.0	5326.6

Source. CWC (1996a)

In this pattern of expenditure growth, capital expenditure has lagged behind and risen by 3.8 percent on an annual basis, compared to a growth rate of 7.4 percent in revenue expenditure. The post 1984/85 period experienced a general resource crunch in the state

wherein the growth rates of both the capital and revenue expenditure fell for behind. The state also suffered deficits in revenue accounts as may be seen in Table 46.

Table 46. Public expenditure/income growth: Maharashtra

Year	At 1980/81 prices			
	expenditure (Rs million)			receipts on revenue account (Rs million)
	total	capital	revenue	
1974/75	12703.17	1918.51	10784.66	11712.18
1980/81	22656.11	3485.73	19170.38	20380.63
1985/86	34169.77	3919.56	30250.21	28117.26
1990/91	43592.76	4324.20	39268.56	39023.37
1993/94	48698.28	5516.44	43181.84	42780.27
Period	annual average growth rate percent			
1974/75–1993/94	6.89	3.82	7.36	6.30
1980/81–1993/94	6.11	2.51	6.63	5.94
1985/86–1989/90	6.40	4.91	6.60	6.72
1990/91–1993/94	4.17	10.49 (t = 1.85)	3.47	2.56 (t = 1.56)

Source. Maharashtra State Budget Documents (1974/75–1993/94)

II. Public expenditure on irrigation

Growing at 6.25 percent per annum at 1980/81 prices, the total expenditure on irrigation in Maharashtra has risen fourfold from Rs 1395.9 million in 1974/75 to Rs 5847.8 million in 1993/94; capital expenditure grew at 4.04 percent but with wide fluctuations from the trend rate, and revenue expenditure increased at 9.2 percent annually during the same period.

The total expenditure on irrigation works out to 10–14 percent of the state’s total expenditure. As a proportion of GDP, the expenditure on irrigation which peaked in the early part of the 1980s—reaching 2.47 percent in 1983/84, has since been stable at around 11–12 percent of the total expenditure and around 2 percent of the GDP.

The capital expenditure on irrigation has been in excess of 50 percent of the state’s total capital expenditure for most of the period in the last two decades. On the other hand, the share of revenue expenditure on irrigation is relatively small, ranging between 5–7 percent of the total revenue expenditure. One shift that

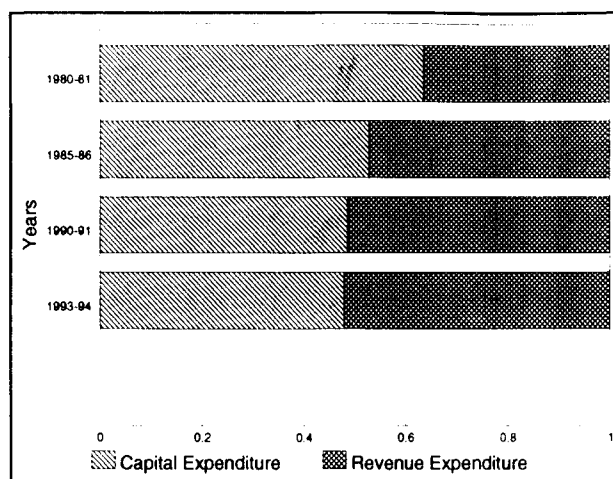


Figure 16. Ratio of capital to revenue expenditure in irrigation sector: Maharashtra

has occurred in the pattern of expenditure on irrigation is the increasing emphasis on revenue

Table 47. Calculated growth trends in public expenditure on irrigation: Maharashtra

Period	Expenditure on irrigation (at 1980/81 prices)			Ratio of revenue to capital expenditure
	total	capital	revenue	
1974/75–1993/94	6.25	4.04	9.17	1:0.68 – 1:1.08
1980/81–1993/94	4.73	1.71	8.57	1:0.58 – 1:1.08
1980/81–1984/85	7.03	5.67	9.31	1:0.58 – 1:0.66
1985/86–1989/90	8.81	9.73	7.87	1:0.89 – 1:0.89
1990/91–1993/94	4.44 (t = 1.11)	4.33	4.59	1:1.06 – 1:1.08

Source. Maharashtra State Budget Documents (relevant years)

expenditure, vis-a-vis, the capital expenditure. The proportion of capital to revenue expenditure has changed over the years in favour of revenue expenditure, although in terms of annual average growth rates no special tilt has occurred in favour of revenue expenditure since the mid-1980s.

Table 48. Net irrigated area and expenditure on irrigation sector: Maharashtra

Year	Net irrigated area (,000 ha.)	Capital expenditure on irrigation (Rs million) (80/81 prices)	Revenue expenditure on irrigation (Rs million) (80/81 prices)	Capital expenditure on irrigation (Rs per ha.)	Revenue expenditure on irrigation (Rs per ha.)	Total expenditure on irrigation (Rs per ha.)
1980/81	1835	1884.36	1076.82	1026.90	586.82	1613.72
1985/86	1949	2077.05	1856.15	1065.70	952.36	2018.06
1990/91	2433	2567.23	2711.20	1055.17	1114.34	2169.52
1991/92	2726	2050.28	2634.78	752.12	966.53	1718.66
1992/93	2470	2407.27	2911.84	974.60	1178.88	2153.49
1993/94	2514	2802.45	3045.39	1114.74	1211.37	2326.11

Source. Maharashtra State Budget Documents (relevant years); and CWC (1996a).

Major and medium irrigation constitutes over 80 percent of the public expenditure on irrigation. While capital expenditure has witnessed sharp fluctuations during the two-decade period on major and medium irrigation, on minor irrigation it has experienced consistent growth. The behaviour of revenue expenditure is more secular, both in respect of major and medium, and minor irrigation. There is a clear trend of declining capital expenditure on irrigation from the eighties (above 50 percent) until the nineties when the revenue expenditure became more than the capital expenditure on irrigation. The per hectare total expenditure on irrigation rose steadily from Rs 1613.72 in 1980/81 to Rs 2169.52 in 1990/91 but in the following year, it dropped to 1718.16 (annual change of -20.78). It is because of this that a high annual increase of 25.30 is seen in 1992/93.

Table 49. Break-up of revenue expenditure on irrigation sector: Maharashtra

Year	Major and medium (in Rs million)				Minor irrigation (in Rs million)			
	revenue expenditure	direction & admin.	machinery & equipment	others	revenue expenditure	direction & admin.	machinery & equipment	other expenses
1987/88	3176.53	-94.67	464.31	2806.89	506.94	9.04	—	497.9
1988/89	3598.22	257.96	62.33	3277.93	651.147	12.37	—	638.777
1989/90	4389.45	559.19	3.29	3826.97	725.532	13.2	—	712.332
1990/91	5093.86	617.6	0.17	4476.09	949.892	15.91	—	933.982
1991/92	5830.32	568.84	82.29	5179.19	905.833	17.64	—	888.193
1992/93	6676.56	777.23	73.39	5825.94	1409.94	19.94	—	1390.00
1993/94	7576.71	817.35	65.21	6694.15	1668.18	121.91	—	1546.27

Source. Government of Maharashtra (relevant years)

Table 50. Percentage break-up of revenue expenditure on irrigation sector: Maharashtra

Year	Major and medium (in percentage)				Minor irrigation (in percentage)			
	revenue expenditure	direction & admin.	machinery & equipment	others	revenue expenditure	direction & admin.	machinery & equipment	other expenses
1987/8	100.00	-2.98	14.62	88.36	100.00	1.78	0.00	98.22
1988/8	100.00	7.17	1.73	91.10	100.00	1.90	0.00	98.10
1989/9	100.00	12.74	0.07	87.19	100.00	1.82	0.00	98.18
1990/9	100.00	12.12	0.00	87.87	100.00	1.67	0.00	98.33
1991/9	100.00	9.76	1.41	88.83	100.00	1.95	0.00	98.05
1992/9	100.00	11.64	1.10	87.26	100.00	1.41	0.00	98.59
1993/9	100.00	10.79	0.86	88.35	100.00	7.31	0.00	92.69

Source. Government of Maharashtra (relevant years)

Expenditure on direction and administration (D&A) in the major and medium (M&M) category is above 10 percent whereas expenditure on machinery and equipment (M&E) has gone down. In the case of minor irrigation, expenditure on D&A is about two percent for most of the years though in the year 1993/94 it rose to over 7 percent. The 'others' category

constitutes, more than 88 percent of the total revenue expenditure on irrigation (Tables 49 and 50).

Receipts from irrigation are low, and cover only 4–14 percent of the revenue expenditure incurred on this sector. Notwithstanding the increasing emphasis on fixing the rates to be able to

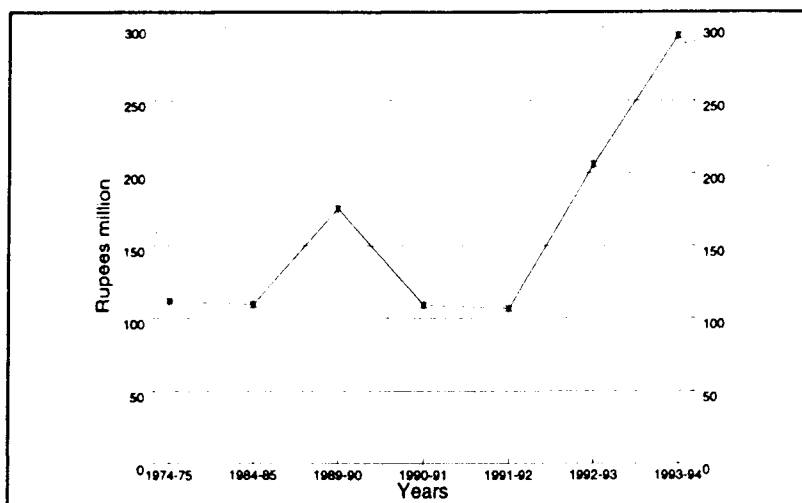


Figure 17. Revenue receipts on irrigation: Maharashtra (1980/81 prices)

cover at least the O&M costs, receipts have grown at only 1.65 percent annually. During the early 1980s, receipts, in fact, declined at an annual rate of over 5 percent, although these continued to cover broadly the same proportion of revenue expenditure as in the latter years. The recent revisions in the rates to be charged for irrigation have however, led to an increase in receipts from Rs 108.9 million in 1990/91 to over Rs 294 million in 1993/94.

Table 51. Calculated growth trends in receipts from irrigation: Maharashtra (1980/81 prices)

Period	Annual average growth rate (percent)	Percent of receipts to revenue expenditure
1974/75–1993/94	1.65 (t = 1.86)	19.76@ – 9.67£
1980/81–1993/94	2.35 (t = 1.32)	13.56 – 9.67
1980/81–1984/85	-5.38 (t = -1.51)	13.56 – 7.27
1985/86–1989/90	5.98 (t = 1.74)	7.11 – 6.89
1990/91–1993/94	43.93	4.01 – 9.67

Note. @ gives the initial year and £ shows the terminal year figures.

Irrigation sector is a major drain on the state's total resources, and over the past two decades this sector is being sustained by continuous drawl on its other total revenue receipts. What is important is that the dependence of this sector on the state's resources has consistently risen—from 3.87 percent in 1974/75 to 6.67 percent in 1990/91, as may be observed from Table 52.

The *Study Group on Irrigation* constituted by the Government of Maharashtra for its *Ninth Plan* has noted that the O&M costs of irrigation projects increased at 12 percent per annum and the establishment costs at 10 percent per annum over the *Eighth Plan* period, and therefore, there was a need to adjust the rates to inflation. It also noted that the collection of charges averaged only 71 percent of the assessment for irrigation (and 57 percent for other uses) and, therefore, an obvious way to reduce the deficit of this sector was to improve the collection.

Table 52. Deficit on revenue account for the irrigation sector: Maharashtra (1980/81 prices)

Year	Deficit/uncovered portion of revenue expenditure on irrigation (Rs million)	Deficit/uncovered portion as a percent of state's total revenue receipts
1974/75	453.73	3.87
1980/81	930.08	4.56
1985/86	1724.24	6.13
1990/91	2602.26	6.67
1992/93	2751.01	6.43

Source. Maharashtra State Budget Documents (relevant years)

An interesting aspect of the financial performance of irrigation projects is obtained from the irrigation department which classifies the major projects into productive and

unproductive categories. The latter's estimated net revenues (gross revenues minus working expenses) after 10 years from the date of closure of construction failed to cover the prescribed annual interest charges on the capital invested. The distribution of such major projects is shown in Table 53.

Table 53. Financial results of unproductive (major) irrigation projects

Year	Unproductive projects	Projects not covering working expenses	Projects not covering working expenses and interest	Rate of return percent
1982/83	19	18	19	-7.25
1985/86	19	13	19	-8.25
1991/92	18	16	18	-8.57
1992/93	18	13	18	-8.79
1993/94	18	11	16	-8.30

Source. Government of Maharashtra (relevant years)

III. Public expenditure on water

A survey conducted in 1991/92 identified 16 790 villages and 18420 hamlets in Maharashtra which faced difficulties in accessing water. These villages and hamlets, officially referred to as 'problem villages', lacked a public source of water or if they had one, it was inadequate, seasonal or polluted. Under the *Rural Water Supply Scheme*, the governments have accepted the responsibility of providing 40 litre of piped water per capita per day to the rural population. The scheme is considered part of the social sector, and is, therefore, fully funded by government grants through the *Minimum Needs Programme* and by the central government, through the *Accelerated Programme for Rural Water Supply*.

Although not enjoying the same order of priority as the rural water supply schemes, norms of water supply have also been established for cities, depending on their size, norms being higher for larger cities. According to a recently prepared *White Paper on Drinking Water Programme* (1995), the number of cities which were below the norm were identified by the state government. According to the *White Paper*, 78 percent of the total number of cities and towns were inadequately served with water. It was also felt that larger cities faced more acutely the problems of meeting the norms (Table 54).

As in the case of other states, the budgeted government expenditure on water supply is low as the schemes of water supply and sewerage are prepared and implemented by the *Maharashtra Water Supply and Sewerage Board* (MWS&SB). Mumbai is excluded from its purview; similarly, the municipalities of Pune and Nasik plan and implement the water supply projects by themselves. The MWS&SB implements rural water supply schemes if their capital cost is in excess of Rs 1 million.

Table 54. Cities by population norm and status relative to the norm

City size	Number of cities/towns	Norm lpcd	Cities below norm	Percent share below norm
Below 20000	25	70	8	32.0
20000–60000	98	100	75	76.5
60000–100000	48	125	42	87.5
Over 100000	72	150	64	88.9

Source. *White Paper on Drinking Water Programme* (1995)

The total budgeted revenue expenditure of the state on water supply and sanitation at 1980/81 prices was placed at Rs 854.99 million in 1992/93, having increased at an annual

average rate of 3.68 percent over the 1974/75 to 1992/93 period. A closer examination of the growth trends shows disconcerting trends particularly in the post-1985 period which has seen total expenditure on this sector declining from Rs 1336 million in 1985/86 to a low of Rs 854.99 million in 1992/93. The decline in annual average terms was 10.78 percent during 1985/86 to 1989/90 and 4.42 percent in the early 1990s.

No clear trends are visible in respect of either the rural water supply or the urban water supply. The summary results, however, reveal that the trends are erratic and the consequences of growth rates are not significant. Nonetheless two points need special mention.

- In order of priority, rural water supply is gaining greater attention of the state governments. This is evident from the relative proportions of expenditure on rural and water supply system.
- No attempt has been made to recover any part of the budgeted expenditure on water supply and sanitation. In 1992/93, total recoveries from this sector were estimated at Rs 7.8 million, or 0.91 percent of the total revenue expenditure on the sector.

Low levels of budgeted expenditure on water supply and sanitation are, however, compensated by the relatively larger budgets of the MWS&SB and the Municipal Corporation of Bombay. Some points in respect of the pattern of expenditure and income of MWS&SB are to be noted.

- The capital expenditure on water supply and sewerage incurred by MWS & SB constitutes approximately 40 percent of the total expenditure incurred by

it on the sector. There has occurred no noticeable shift in the proportion of capital to total/revenue expenditure.

- The growth behaviour of the capital and revenue expenditure has been largely similar over the period 1980/81 to 1994/95.
- The MSW&SB is facing a deficit on revenue account, not being able to collect charges from the municipalities; the board uses the funds that it receives from the state government to cover operations and maintenance, instead of using the same for new schemes.

Table 55. Trends in budgeted expenditure and receipts on water supply and sanitation: Maharashtra

Period	At 1980/81 prices annual average growth rates (percent)	
	revenue expenditure	revenue receipts *
1974/75-1992/93	3.68	-1.78 (t = -0.26)
1980/81-1992/93	2.88	35.38
1985/86-1989/90	-10.78 (t = -5.6)	46.27 (t = 1.98)
1990/91-1992/93	-4.42 (t = -0.70)	62.64 (t = 1.94)

Note. * Receipt figures relate to the year 1993/94 and not 1992/93

Tamil Nadu

I. General

Irrigation in Tamil Nadu has ancient roots, as early in *Grand Anicut*, whose basic designs persist even today. During the pre-Plan period, the total irrigation potential in the state was placed at 1101000 hectares. At the end of the *Third Plan* period, the irrigation

potential was estimated at 1373000 hectares which rose to 1452000 hectares during the early 1990s. Irrigation is the largest consumer of water in the state, accounting for 95 percent of the total water resources. Its domestic use is placed at 1.95 percent for urban areas and 0.89 percent for rural areas. A recent study has, however, pointed out that irrigation water use for irrigation will decline by AD 2020 to 90 percent while domestic water supply use will rise to nearly 5 percent.

Table 56. Estimated present and future water demand: Tamil Nadu

Sector@	1994		2019	
	present demand (volume MCM)*	percent of total	estimated demand (volume MCM)	percent of total
Domestic-urban	592.36	1.95	1 117.19	3.65
Domestic-rural	269.74	0.89	371.86	1.22
Agriculture	28596.87	94.31	27367.66	89.48
Power	14.10	0.05	40.76	0.13
Others	848.30	2.79	1689.34	5.52

Note. * MCM – Million Cubic Meter; @ excluding Cauvery basin

Source. Institute of Water Studies (1997)

Irrigation in Tamil Nadu, like in the other states, is categorised into canal, tank, well and others. Table 57 depicts the development of irrigation by source in the state. The net irrigated area in the state increased from 1998000 hectares in 1950/51 to 2373000 hectares in 1990/91, registering an increase of approximately 9375 hectares per annum. This is attributed mainly to mainly on account of the extraordinary development of well irrigation in the state and large investments that were made in electrification and provision of free electricity to agriculture. In recent years, however, the net irrigated area has registered a

marginal decline as can be seen in Table 57. On the whole, the surface water resources are highly developed through a number of large and small dams and a multitude of tanks. The scope for capturing additional run-off surface water for irrigation is, therefore, limited. The groundwater resources of the state are also fairly well developed holding more potential.

Table 57. Development of irrigation: Tamil Nadu

Year	Canal	Tank	Well	Others	Net irrigation
1950/51	794	654	498	52	1998
1970/71	862	902	681	41	2486
1975/76	911	750	869	35	2565
1980/81	889	590	1067	24	2570
1985/86	774	672	1030	25	2501
1990/91	769	531	1059	14	2373

Note. * Figure relates to the year 1951/52

Source. CMIE (1996)

These figures suggest a phenomenal increase in investments in irrigation under the *Plan* head. Of particular attention is the rate at which plan expenditure on minor irrigation has risen, with funds flowing in from financing institutions.

Several *departments* and *boards* forming the institutional framework in Tamil Nadu have specific responsibilities in regard to water supply and sanitation.

- *The Madras Metropolitan Water Supply and Sewerage Board* is responsible for planning, programming, designing, constructing, and operating and maintaining of water supply and sanitation systems in the Madras metropolitan area;

- *The Tamil Nadu Water Supply and Drainage Board* is responsible for planning, programming, designing and construction of water supply and sanitation programmes in Tamil Nadu, other than the Madras metropolitan area;
- *The Directorate of Municipal Administration* whose mandate includes operation and maintenance of water supply and sanitation systems in municipalities and municipal townships, and construction of minor works of not more than a specified amount;
- *The Directorate of Rural Development* is responsible for the operation and maintenance of water supply and sanitation systems in *Panchayats* (village, town and townships) and construction of a few minor works;
- *The Tamil Nadu Housing Board* carries out programming, designing and construction of water supply and sanitation facilities in housing colonies constructed by the *Board*; and
- *The Directorate of Tribal Welfare and Ad-Dravidar* is partly responsible for planning, programming, designing and construction of water supply sources.

Similar to other states, the finances of Tamil Nadu are also strained. The total expenditure of the state has risen at 1980/81 prices at 7.79 percent during the two decade period of 1974/75 to 1993/94. Of the two constituents of expenditure, the capital expenditure growth has been tardy, with the levels of expenditure stagnating particularly during the 1980s. Capital expenditure growth has, however, risen during the 1990s.

As opposed to stagnation and low growth in the state's capital build-up, the revenue expenditure has increased during the same two decade period, at an impressive annual rate of 8.07 percent. However, in contrast with the growth trends of capital expenditure, the revenue expenditure has grown more consistently, excepting in the years 1992/93 and 1993/94 when it registered a decline of 9.03 percent over 1991/92 and of 6.33 percent over 1992/93.

On the revenue side, the state government has been posting a deficit which at 1980/81 prices, stood at Rs 2279 million or roughly 7 percent of the revenue expenditure in 1993/94. It is also important to note that the state has been experiencing a deficit on revenue account from 1987/88 onwards.

Table 58. Plan investments in irrigation: Tamil Nadu (current prices)

Plan Period	Investment (Rs million)			major & medium
	total	minor		
		state	institutional	
First Plan	254.2	—	—	254.2
Second Plan	268.7	63.2	23.5	182.0
Third Plan	586.0	229.8	47.6	308.6
Annual Plans	670.4	304.7	960.8	269.5
Fourth Plan	1584.9	354.6	960.8	269.5
Fifth Plan	1208.5	263.9	395.3	548.4
Annual Plans	489.7	106.6	97.8	285.3
Sixth Plan	2455.9	490.6	155.8	1809.5
Seventh Plan	4999.5	1002.0	1743.1	2254.4

Source. CWC (1996a)

Table 59. Calculated expenditure growth rates*: Tamil Nadu

Year	Annual average total expenditure	Growth rate percent	
		capital expenditure	revenue expenditure
1974/75-1993/94	7.79	3.33	8.07
1980/81-1993/94	8.03	0.95 (t = 0.77)	8.48
1980/81-1984/85	7.75	7.14 (t = 1.14)	7.82
1985/86-1989/90	8.50	0.26 (t = 0.39)	8.96
1990/91-1993/94	3.77 (t = 0.62)	20.36	3.04 (t = 0.47)

Note. * In real terms (at 1980/81 prices)

II. Public expenditure on irrigation

In comparison to other states, irrigation in Tamil Nadu is not a high priority sector, if expenditure incurred is the yardstick. The public expenditure on irrigation in the state has been less than 4 percent for most of the period over the past one decade; even as a

Table 60. Public expenditure on irrigation: Tamil Nadu (1980/81 prices)

Year	Capital expenditure (Rs million)	Revenue expenditure (Rs million)
1974/75	139.69	278.86
1980/81	184.45	342.92
1985/86	310.59	376.56
1990/91	212.97	507.57
1993/94	273.83	527.90
Period	annual average growth rate percent	
1974/75-1993/94	0.69 (t = 0.71)	2.73
1980/81-1993/94	-0.20 (t = 0.13)	3.06
1985/86-1989/90	-12.06 (t = 5.42)	6.61 (t = 1.83)
1990/91-1993/94	12.20 (t = 1.92)	1.87 (t = 1.56)

Source. Tamil Nadu State Budget Documents (1974/75-1993/94)

component of the state's total capital expenditure, expenditure on irrigation has been less than 25 percent. In 1993/94, the total capital expenditure on irrigation at 1980/81 prices was placed at Rs 278 million or 15.38 percent of the state's total capital expenditure, and only 0.20 percent of the SDP. Expenditure on irrigation has grown slowly—at an annual average rate of 1.97 percent over the 1974/75 to 1993/94 period, which is significantly lower than the overall expenditure growth rate.

Revenue expenditure on irrigation has also had a slow growth even as it forms a relatively small component of the total revenue expenditure of the state. In 1974/75, revenue expenditure on irrigation was placed at Rs 278.86 million which has risen to Rs 527.90 million in 1993/94, recording an annual average growth rate of 2.73 percent.

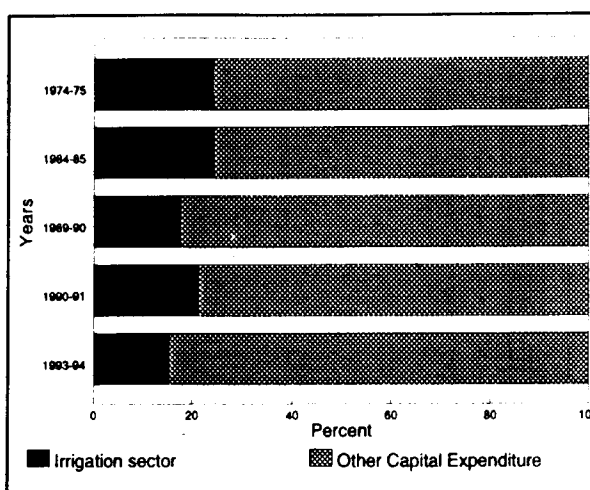


Figure 18. Irrigation sector as a percent of state's capital expenditure: Tamil Nadu

The pattern of expenditure on irrigation in Tamil Nadu is very different from that observed in other states. In Tamil Nadu, revenue expenditure on this sector is consistently higher than the capital expenditure, with the primacy of revenue expenditure persisting throughout

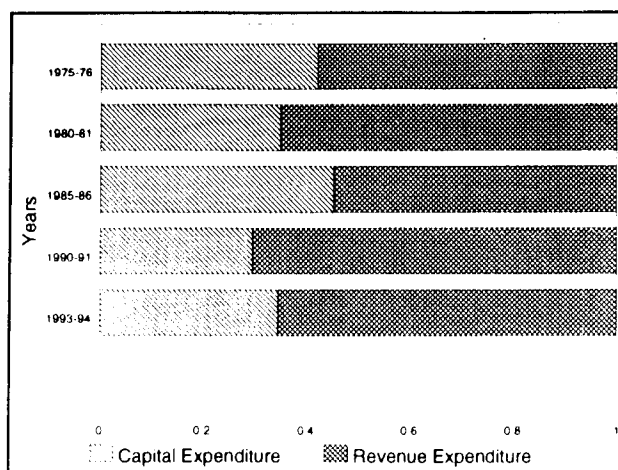


Figure 19. Ratio of revenue expenditure in irrigation sector: Tamil Nadu

the period of this study. Indeed, the capital to revenue expenditure ratios are higher and weighed in favour of revenue expenditure as may be seen in Table 61.

Table 61. Computed capital ratios to revenue expenditure on irrigation: Tamil Nadu (1980/81 prices)

Year	Ratios
1974/75	1:1.99
1980/81	1:1.86
1985/86	1:1.21
1990/91	1:2.38
1993/94	1:1.89

It is interesting to note that the per hectare capital expenditure on irrigation has gone down from mid-eighties to early nineties while that of the revenue expenditure has risen. The total per hectare expenditure on irrigation has steadily risen from Rs 205.20 in 1980/81 to Rs 295.25 in 1992/93 except for 1991/92 when the annual percentage difference was -13.45 over the previous year (Table 62).

Table 62. Net irrigated area and expenditure on irrigation sector: Tamil Nadu

Year	Net irrigated area (,000 ha.)	Capital expenditure on irrigation (Rs million) (80/81 prices)	Revenue expenditure on irrigation (Rs million) (80/81 prices)	Capital expenditure on irrigation (Rs per ha.)	Revenue expenditure on irrigation (Rs per ha.)	Total expenditure on irrigation (Rs per ha.)
1980/81	2570	184.45	342.92	71.77	133.43	205.20
1985/86	2501	310.59	376.56	124.19	150.56	274.75
1990/91	2373	212.97	507.57	89.75	213.89	303.64
1991/92	2605	188.61	495.99	72.40	190.40	262.80
1992/93	2698	265.79	530.80	98.51	196.74	295.25

Source. Tamil Nadu State Budget Documents (relevant years)

Interest charges are the single most important component of revenue expenditure on irrigation followed by maintenance works which claimed 16.52 percent of expenditure in 1994/95. The state government's demand for grants for the irrigation department estimated that the salaries and wages formed 6.38 percent of the total expenditure and 5.19 percent were utilised as establishment charges.

Though at current prices the revenue expenditure on irrigation has risen from Rs 953 million in 1987/88 to Rs 1602 million in 1993/94, in real terms it has actually come down over the years (from Rs 544 million in 1987/88 to Rs 527 million in 1993/94). The expenditure on D&A in the case of major and medium irrigation has increased slightly during the same period. More than 96 percent of the expenditure details come under the 'others' category which basically includes the liabilities (Table 63).

Table 63. Break-up of revenue expenditure on irrigation sector: Tamil Nadu

Year	Major and medium (in Rs million)				Minor irrigation (in Rs million)			
	revenue expenditure	direction & admin.	machinery & equipment	others	revenue expenditure	direction & admin.	machinery & equipment	other expenses
1987/88	693.75	19.33	—	674.42	241.28	—	0.06	241.22
1988/89	639.50	21.30	—	618.20	151.38	—	5.56	145.82
1989/90	808.99	32.09	—	776.90	209.95	—	0.05	209.90
1990/91	804.49	30.20	—	774.29	326.97	—	0.09	326.88
1991/92	892.02	26.18	—	865.84	376.04	—	0.09	375.95
1992/93	1076.22	29.24	—	1046.98	397.86	—	0.11	397.75
1993/94	1216.44	42.64	—	1173.80	386.11	—	0.07	386.04

Source. Government of Tamil Nadu (relevant years)

Receipts from irrigation are meagre, representing 0.07 percent of the state's total receipts and 3.66 percent of the total revenue expenditure on irrigation. Moreover, receipts from irrigation have declined at an annual rate of 2.61 percent during the 1974/75 to 1993/94 period. Irrigation sector is, thus, essentially financed out of the general tax revenues and non-tax receipts from other sectors.

Table 64. Percentage break-up of revenue expenditure on irrigation sector: Tamil Nadu

Year	Major and medium (in percentage)				Minor irrigation (in percentage)			
	revenue expenditure	direction & admin.	machinery & equipment	others	revenue expenditure	direction & admin.	machinery & equipment	other expenses
1987/88	100.00	2.79	0.00	97.21	100.00	0.00	0.02	99.98
1988/89	100.00	3.33	0.00	96.67	100.00	0.00	3.67	96.33
1989/90	100.00	3.97	0.00	96.03	100.00	0.00	0.02	99.98
1990/91	100.00	3.75	0.00	96.25	100.00	0.00	0.03	99.97
1991/92	100.00	2.93	0.00	97.07	100.00	0.00	0.02	99.98
1992/93	100.00	2.72	0.00	97.28	100.00	0.00	0.03	99.97
1993/94	100.00	3.51	0.00	96.49	100.00	0.00	0.02	99.98

Source. Government of Tamil Nadu (relevant years)

III. Public expenditure on water supply

The importance of water supply and sanitation—both rural and urban—has grown sharply in the state. The total revenue expenditure on water supply and sanitation accounted for in 1993/94 3.7 percent of the state's total revenue expenditure and 0.78 percent of its GDP. In 1974/75—the first year of this study—revenue expenditure on water supply and

sanitation was only 0.61 percent of the revenue expenditure of the state and 0.09 percent of the GDP. Its importance is also underlined in the long-run growth rate which works out to 13.7 percent for the period 1974/75 to 1993/94.

Table 65. Budgeted revenue expenditure on water supply: Tamil Nadu (1980/81 prices)

Year	As a percent of total revenue expenditure		
1974/75	36.82 (0.47)	8.29 (0.11)	45.11 (0.58)
1980/81	217.15 (1.86)	23.92 (0.20)	241.06 (2.07)
1985/86	337.01 (2.02)	147.11 (0.88)	484.13 (2.90)
1990/91	284.56 (1.11)	309.76 (1.21)	594.32 (2.32)
1993/94	318.65 (1.09)	732.66 (2.51)	1051.31 (3.60)

Source. Tamil Nadu State Budget Documents (1974/75–1993/94)

As compared to the growth rate of expenditure on rural water supply, urban water supply has shown higher growth rates as may be observed from the following table. Expenditure on rural water supply rose at an annual average growth rate of 8.86 percent during the period 1974/75 to 1993/94; the situation being 25.7 percent for urban water supply. Moreover, the proportion of budgeted revenue expenditure on water supply has increased over the years. Receipts from this sector are negligible with no indications of attempts to improve cost recovery.

SUMMARY AND CONCLUDING OBSERVATIONS **5**

Water holds a significant place in public expenditure. The growing levels of expenditure on water are having a vital impact on the country's economy and quality of life. It is, therefore, not surprising that this sector comprising irrigation, rural water supply and urban water supply, and sanitation has received high priority of state governments and has accounted for 7-25 percent of the expenditure of states. In addition, it has absorbed substantial funds from financing institutions.

Among the various constituents of the water sector, irrigation is by far the most important and enjoys high consideration in the allocation of public resources. With few exceptions, the irrigation unit as brought out in the earlier sections, has formed 28-58 percent of the capital and 1.3-8.7 percent of the revenue expenditure of states. Three points with regard to the behaviour of expenditure need to be stressed.

1. In terms of expenditure levels, the importance of the irrigation sector appears to have reached a plateau; if not actually receding. Several factors are responsible for this trend. Firstly, vast irrigation potential has been created in the states over the past four decades, with the result that it does not enjoy in terms of investment the same order of importance as it did in earlier years. Investment priorities are shifting to other neglected sectors, such as, domestic water supply and sanitation. Secondly, greater emphasis is being placed on better and

fuller utilization of the already created irrigation infrastructure rather than on creation of additional infrastructure. In many states, the utilization factor is said to be particularly low. Moreover, the cost per hectare of irrigation potential created has risen rapidly over the years, underlining the need to better utilise the created potential.¹⁷ Thirdly, on account of its better spread many states have shifted priorities towards minor irrigation which have low capital intensity as compared to major and medium irrigation works.

2. Irrigation has had a major impact on the finances of the state governments. The estimates provided in the earlier sections and other supplementary data produced by the *Central Water Commission* point to the fact that the sector is being maintained with funds drawn from other revenue resources of the state governments. Receipts from irrigation are able to cover no more than 4–19 percent of the revenue expenditure incurred on this sector. Another estimate shows receipts to be only 0.1 to 2.6 percent of the value of production per hectare of irrigation lands which are significantly lower than the norms fixed in this regard by the irrigation department. Since the receipts include items other than the water charges and cesses levied on irrigated lands accounting for about 27 percent of the total receipts, the actual incidence of irrigation charges is even lower.

17 In the *First Plan*, the cost per hectare was stated to be Rs 8619 which increased to Rs 18770 in the *Sixth Plan* and to Rs 29587 during the years 1990/92.

The state of Tamil Nadu has the lowest, and Maharashtra the highest per hectare total expenditure on irrigation among the four states analysed. Karnataka is the only state having higher capital expenditure than revenue expenditure and also the only state without negative growth. Interesting here is to note that the negative growth in the total expenditure on irrigation in the three states (Andhra Pradesh, Maharashtra and Tamil Nadu) is during the year 1991/92. This concludes that Karnataka places greater emphasis on creating irrigation infrastructure whereas in the other three states the emphasis is on utilising the available infrastructure.

Table 66. Increase of gross receipts from major and medium irrigation project relative to productivity of irrigation in major states

State	Gross receipts per ha. GIA (Rs)	Value of production per ha. of irrigated area (Rs)	Percent of receipts to value of production
Andhra Pradesh	27	6689	0.4
Bihar	33	2993	1.1
Gujarat	139	6353	2.2
Haryana	70	4462	1.6
Karnataka	58	6825	0.8
Madhya Pradesh	90	3391	2.6
Maharashtra	140	7415	1.9
Orissa	66	3958	1.7
Punjab	53	5997	0.9
Rajasthan	93	3426	2.7
Tamil Nadu	9	6689	0.1
Uttar Pradesh	111	3875	2.9
West Bengal	7	5634	0.1

Source. Planning Commission (1992)

The financial aspects of this sector suffers from two problems. The basic problem is related to irrigation charges and the frequency at which these are adjusted to the cost of production, wages and salaries, and general inflation. Almost uniformly, the rates are inadequate and their revision too infrequent. The second problem relates to collection inefficiency which as the field-level data show, is extremely high.

Table 67. Percentage recovery of revenue expenditure by receipts in major states

State	Years			
	1974/75	1980/81	1985/86	1990/91
Andhra Pradesh	15.5	7.0	36.9	16.0
Bihar	72.5	63.2	29.3	—
Gujarat	71.1	34.4	25.8	6.0
Haryana	55.3	64.4	46.8	16.0
Karnataka	97.6	7.6	6.8	10.0
Kerala	51.2	49.5	24.9	9.0
Madhya Pradesh	129.3	45.5	41.8	22.0
Maharashtra	166.0	93.8	48.9	4.0
Orissa	30.7	46.8	134.9	22.0
Punjab	63.2	73.8	48.3	16.0
Rajasthan	49.6	55.9	19.3	11.0
Tamil Nadu	22.5	15.6	6.8	3.0
Uttar Pradesh	123.3	134.4	169.8	9.0
West Bengal	38.2	11.0	7.3	3.0
All India	64.2	45.8	46.0	9.0

Source. State Budget Documents (relevant years)

Suggestions to address these problems have often been made by various committees and commissions. The *Working Group on Major and Medium Irrigation* set up in connection with the *Ninth-Five-Year-Plan* has, for instance, reiterated the earlier recommendations that full cost recovery of irrigation cost spread over a period of five years from 1995/96 is crucial for managing this sector efficiently. It has proposed a norm of Rs 300 per hectare for operation and maintenance of utilised potential and Rs 100 per hectare for unutilized potential. It has also proposed action to enhance the water rates to recover 1 percent of capital cost in addition to operation and maintenance.

A key suggestion relates to the assignment of aggregate funds for the irrigation sector. The *Working Group* has suggested that 10 percent of plan investments be set aside for major and medium irrigation projects, and efforts be directed to involve the private sector in such sectors.

As opposed to irrigation sector, the expenditure importance of the water supply and sanitation sector has grown phenomenally over the years. Water supply and sanitation which accounted for 1.8 percent of the state's total expenditure in the 1970s, now accounts for 3.5 percent. In the four states covered, the budgeted expenditure varied between 0.35 to 3.78 percent of the total expenditure. In specific to be noted is the increasing attention to rural water supply which has witnessed over the years manifold increase in expenditure. In terms of recovery, however, performance of the water sector is no different from that observed for irrigation, as receipts are able to cover only about 1–1.5 percent of the budgeted revenue expenditure.

The water supply and sanitation sector is dominated by institutional financing and management. However, with few exceptions, even the parastatal agencies which were established to function on commercial lines, are unable to meet their operation and maintenance charges. The incidence of losses in respect of institutions is, of course, lower.

The problems encountered by the water supply sector are, however, of a different nature. Firstly, notwithstanding the increased attention to extending the water supply coverage, the fact is that the task ahead is significantly larger than that normally put out in the statistics. Recent surveys revealed that there were 114000 villages which had virtually no access to safe drinking water supply and another 430000 villages which had only partial coverage, besides the problem of quality of water. In the urban areas, the rate of population coverage by safe drinking water is not able to keep pace with the growth of population. Secondly, the sector has not been able to utilise the funds set aside for it, for instance, during the *Eighth-Five-Year-Plan*. The *Working Group on Rural and Urban Water Supply* set up in connection with the *Ninth Plan* has reported substantial slippages on the expenditure side. At the same time, institutional finance flows have also been low.

The *Working Group on Urban Water Supply* has proposed full cost recovery of the operation and maintenance costs and the increased role of institutional finance on the one hand, and of the private sector on the other. These resources are viewed as essential from the point of view of first, the acceleration of investment flows into the water sector, and second, better and efficient management of the sector.

Whichever way the sector is looked upon, its impact on the finances of the states is phenomenal. The successful functioning of the sector and unquestionably the financial viability of the states hinges significantly on irrigation and water rates, and the steps that are involved in setting them. That the rates are far below the cost of production of irrigation water and domestic water is established; the key responsibility is to bridge the gap between what these charges are able to cover and what these sectors cost and the efficient use of investments.

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