Water Pricing in India

4.1 Historical Background

In the early British days, irrigation works in India were treated as commercial undertakings and therefore the schemes which could pay for the annual expenses on maintenance and operation and meet the interest charges on the loan raised were sanctioned. The criteria those were evolved and finalized by a Select Committee of the British House of Commons in 1872 provided that irrigation projects should be able to yield, after a gestation period of 10 years, a specified rate of return on the capital cost of the project and should also cover arrears of interest on the capital during the gestation period. But this approach attracted criticism even during the British period due to recurrence of several famines and the state accepted the responsibility for constructing protective irrigation works in areas prone to famines without regard to the financial return criterion. Subsequently, it was felt that the development of irrigation was being held up by the rigid application of the criterion of earning the prescribed minimum rate of return, which ignored the fact that apart from direct irrigation revenues, other benefits accrued to the Government in the shape of increased revenue from excise duties, income tax, sales tax, transport tax etc.

The post-Independence period witnessed a marked change in Government's attitude to irrigation investment. Irrigation came to be viewed more and more as part of the necessary infrastructure for agricultural development rather

than as a commercial proposition. To begin with, the minimum financial return expected was reduced from 5 per cent to 3.75 percent with effect from 1st April 1949. This facilitated the clearance of projects pending approval and led to a big step-up in public investment in irrigation.

In 1958, the Planning, Commission initiated studies of some of the major projects to assess the overall benefits and to find a better criterion for deciding whether various irrigation projects should be undertaken. These studies conducted under the guidance of Professor D.R. Gadgil and completed in 1961 showed that large benefits accrued from irrigation in terms of double cropping, diversification and better quality crops, higher yields, larger income and greater opportunities of employment for hired labor. Indirect benefits that accrued were the establishment of processing industries, the expansion of consumer industries, retail trade and transport and communications. The total benefits from irrigation were thus far larger than the direct financial returns accruing to Government from irrigation rates.

This was followed in 1964 by the appointment of a Committee under Professor Gadgil's chairmanship to review the criteria for approval of irrigation projects. This committee recommended that the economic benefit criterion should be adopted for sanctioning irrigation projects instead of the financial criterion. The Government accepted this recommendation and since then the Benefit- Cost (BC) ratio has been adopted as the basis for the approval of irrigation projects. Irrigation projects with a BC ratio greater than 1.5 were considered acceptable from the economic point of view. A benefit-cost ratio of 1.5 instead of 1.0 was suggested as a prudent precaution against likely increases in the cost of projects. With the adoption of the BC ratio as the basis, the requirement that projects should earn a minimum financial return on the capital invested in them was given up.

The position was reviewed by the 2nd Irrigation Commission, 1972. They were also of the view that the economic benefit criterion was more suitable than the financial return for evaluating irrigation projects: it was Simpler and provided a more comprehensive measure of the net benefits to society. The BC-ratio had also come into vogue in many other developing countries. The Commission therefore recommended the continued use of the BC ratio as the basis for decisions concerning investment in irrigation projects. They also endorsed as a prudent precaution that projects with a BC ratio of less than 1.5 should generally not be considered for acceptance, although theoretically a ratio of unity should meet the criterion. However, they recommended that this rule should not be rigidly applied in the case of irrigation projects in the drought-affected areas where a BC ratio of 1 may be accepted. Such a dilution of the criterion was presumably considered justified on the social ground that drought-prone areas needed special consideration from the state. The Commission also observed:

"The application of the benefit-cost ratio criterion in recent years has, however, had certain undesirable effects; it minimizes the importance of securing an adequate return from investments on irrigation projects. We feel that this trend must be checked. We recommend, therefore, that at the time of considering a project for acceptance, the financial return of the project should also be carefully examined. If the return does not cover working expenses and interest charges on capital, the impact of the project on the irrigation revenues of the State should be examined to see if an upward revision of water rates in the State would be necessary. If an upward revision appears to be necessary, the State should be advised accordingly at the time of conveying approval of the project." (GOI, Min. of Irrigation & Power, 1972:253).

It further mentioned that:

"There is a view that irrigation projects should be undertaken not as much for the purpose of earning revenue but as a measure of social welfare and that the irrigation rates should be kept low. This approach would be valid if the benefits from irrigation projects were more or less evenly distributed over the entire fanning community. But this is not the case as the main beneficiaries are only a section of the cultivators in the command area. It would be highly inequitable to call upon dry-farmers and the general tax-payer to pay for benefits enjoyed by irrigators. We are, therefore, of the view that irrigation works as a whole should give an annual income at least equal to their annual cost of operation and that no part of the burden for providing irrigation should fall on the general tax-payer," (ibid, 264-5).

The Public Accounts Committee in a report presented to the Lok Sabha in 1983 noted that there were enormous cumulative losses from investment on irrigation. They were in agreement with the recommendations of the Irrigation Commission on not subsidising the irrigated farmers at the cost of the general tax-payers. The Committee was of the view that it was imperative that irrigation works be made to pay for the maintenance, operation and depreciation charges and also yield some interest on the capital. The procedures for the cost-benefit analysis of irrigation projects were reviewed in 1983 by a Committee constituted by the Planning Commission which recommended replacing the benefit-cost ratio by the internal rate of return (IRR) criterion and suggested that projects should normally earn a minimum IRR of 9% to qualify for approval; however, in drought-prone, hilly areas and in areas where 75% of dependable flows of the basin had been utilised, a lower minimum IRR of 7% was prescribed. The Committee did make a number of

recommendations to improve the methodology and data base for social cost-benefit analysis, but these have not yet been fully implemented.

The National Conference of Irrigation and Water Resources Ministers in 1986 noted that the prevailing water rates were too low to meet even the operation and maintenance charges, and wanted the rates to be increased, gradually taking into consideration the rising cost of irrigation projects, in regard to both capital outlays and operation and maintenance charges. They felt that the rates should be such as to provide signals to the beneficiaries regarding the precious value of scarce water supplies. The Jakhade Committee, set up in 1987, recommended certain norms regarding the operation and maintenance grants to be given to different categories of projects.

The Fifth, Sixth and Seventh Finance Commissions suggested that the financial returns should not only cover working expenses but also a specified percentage of interest on the capital investment. The Fifth Finance Commission specifically recommended a rate of return of 2.5 per cent on capital invested while the Sixth and Seventh Finance Commissions adopted a lower norm of 1 per cent. The Eighth Finance Commission exhorted a minimum effort from the State Governments to ensure that the receipts cover at least the cost of maintenance. The Ninth Finance Commission observed that the fiscal position had since worsened because of the dismal financial performance of the irrigation works. It also adopted the diluted norm of the Eighth Finance commission namely that the receipts should cover at least the cost of maintenance. The Tenth Finance Commission also expressed concern over rising interest payment and growth of wages and salaries, which have to be regarded as committed expenditures and the maintenance ex-

penditure has been treated as residual item. As a result most of the irrigation systems are operating at the levels much below the capacity on account of poor maintenance and continued neglect. It also recommended that the irrigation receipts should cover not only O&M costs but also give a return of 1% per annum on the capital. The 12th Finance Commission emphasised need for recovery of an O&M cost norm of Rs. 600 per ha for utilised potential and Rs. 300 per ha for unutilised potential to be considered for maintenance of irrigation works of major and medium irrigation projects. This norm for minor irrigation works should be half of those for major and medium irrigation projects. The Working Group on Water Resources for the XI plan also suggested the same norm as recommended by the 12th Finance Commission. It talked of subsidy on water rates to the disadvantaged and poorer section of the society in a well-targeted and transparent manner motivation policies like giving concessions and incentives to improve the water use efficiency and recovery of water charges. It also recommended that the state governments to initiate appropriate action to recover 1% of capital cost in addition to achieving O&M cost fully. The 13th Finance Commission also recommended for cost recovery of the irrigation projects.

4.2 Policy Paradigm

Pricing of water has been in the minds of the policy makers in India for quite some time. This has been reflected in the National Water Policy Statement of 1987 which specifically states,

"*The Water Rates should be such as to convey the scarcity value of the resource to the users and to foster the motivation for economy in water use. They should be adequate to cover the Annual Maintenance and Operation Charges and a part of the fixed costs of irrigation works. Efforts should be made to reach this*

ideal over a period of time while ensuring assured and timely supplies of irrigation water. The Water Rates for Surface Water and Ground Water should be rationalized with due regard to the interest of small and marginal farmers."

The subsequent National Water policy, 2002 also mentioned that

"the water charges for various uses and should be fixed in such a way that they cover at least the Maintenance and Operation charges of providing the service initially and a part of the Capital Costs subsequently. These rates should be linked directly to the quality of service provided. The subsidy on Water Rates to the disadvantaged and poorer sections of the society should be well targeted and transparent".

The National Water policy of 2012 in its Para-7.1 & 7.4 mentions the following: "Para-7.1 - *Pricing of water should ensure its efficient use and reward conservation. Equitable access to water for all and its fair pricing, for drinking and other uses such as sanitation, agricultural and industrial, should be arrived at through independent statutory Water Regulatory Authority, set up by each State, after wide ranging consultation with all stakeholders." And "*Para-7.4-*The principle of differential pricing may be retained for the pre-emptive uses of water for drinking and sanitation; and high priority allocation for ensuring food security and supporting livelihood for the poor. Available water, after meeting the above needs, should increasingly be subjected to allocation and pricing on economic principles so that water is not wasted in unnecessary uses and could be utilized more gainfully."*

The above policy statements talk of pricing of water in its various uses but restricts its full cost pricing in view of other national priorities which has been reflected in the various water pricing structures being followed in the country.

4.3 Governing principles for fixation of water price in states/UTs

The wide variety of systems and norms being followed at present in the fixation of the water rates by the States has led to sharp variation in the water charges. The approach adopted by the State Governments and Union Territories for fixing the water rates/ charges is not uniform. By and large due consideration is being given by the States/UTs in fixation of water rates/ charges to ensure that they provide revenue sufficient to cover cost of creation of irrigation potential, hike in labour rates, establishment & other related recurrent costs of Operation & Maintenance of the system and take into account the Crop Water requirement, availability of water, support price of agriculture products, net benefit to the farmers from the produce thereof and the water rates being charged by the neighbouring States besides the paying capacity of the irrigators/ farmers (CWC, 2010).

4.4 System of Assessment and Collection of Revenue

Irrigation water requirement broadly depends on 5 factors viz. Potential Evaporation Transpiration (PET), Consumptive use co-efficient, Effective rainfall, Duration of crop period and Non-consumptive use. The duration of the crop can be accounted for by treating bi-seasonal crop as two crops and perennial as three or more crops related to relevant cropping seasons. Primarily total irrigation requirements depend on the duration of crop. In general, water requirements for bi-seasonal crop would be more than seasonal crop and water requirements for perennial crop would be more than bi-seasonal crops. The factor of the Consumptive use co-efficient varies with type of crop and the stage of crop growth. The water supplied to the farmers has to be appropriately charged after adequate assessment.

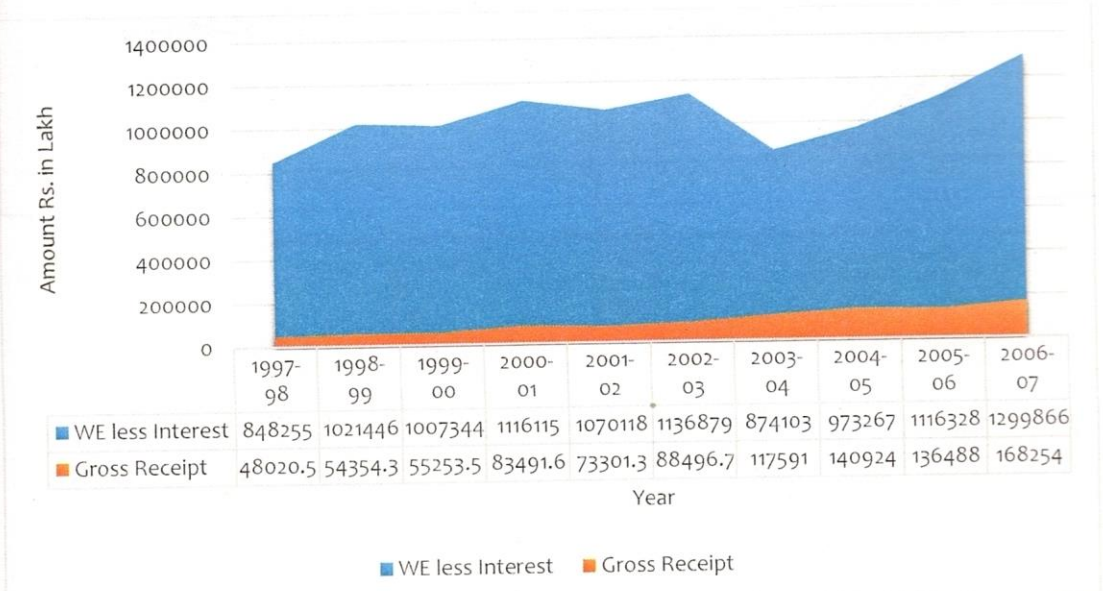
4.5 Frequency in revision in water charges

In many States/UTs, no revisions in the water rates have been carried out over several decades like: Goa =22 Years; Tamil Nadu =23 years; Kerala= 36 years; West Bengal =33 years; Daman & Diu =30 years. Even in case of the States which have revised their water rates during the decades (1991-2000) the gap between current and previous revisions has been prominently large like in Andhra Pradesh =14 years, Assam =10 years, Chhattisgarh =11 years, Haryana =10 years, Karnataka =10 years, Rajasthan =11 years, Uttarakhand =15 Years, Uttar Pradesh =15 years and Dadra and Nagar Haveli =14 Years.

4.6 Recovery of water charges from irrigation (All India)

The details of the year wise Working Expenses vs revenue recovery is placed at Annexure – A. The working expenses in this case include the O&M expenses, direction & administration charges less the interest charges on capital. The situation at national level is presented below:

Figure 10: Gap between WE and Gross Receipt for India

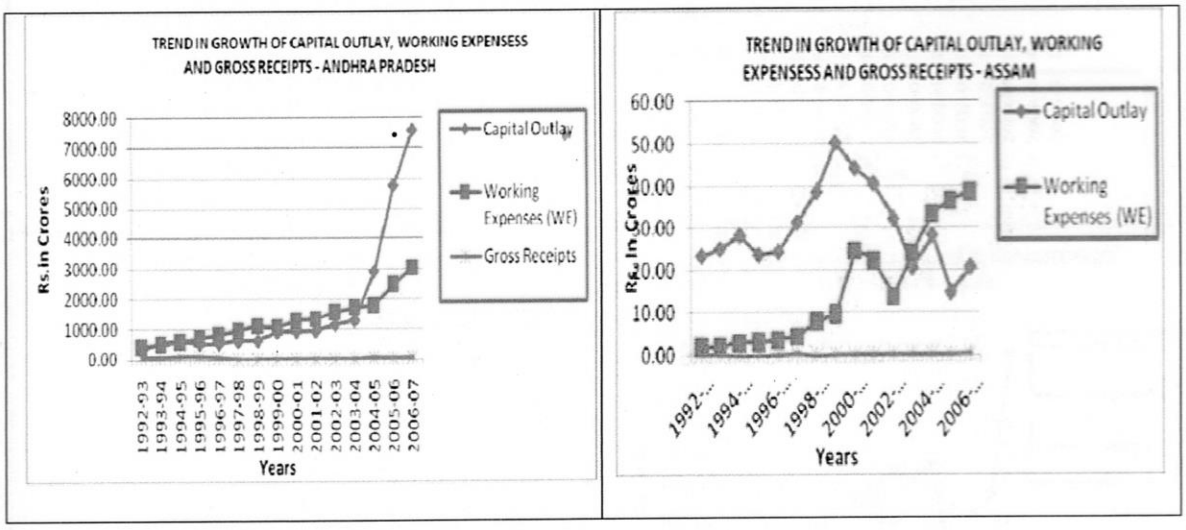


This shows wide gap between the working expenses and the revenue realised from the irrigation water supply in the entire country. The gap is so wide that there is hardly any chance of meeting the working expenses on irrigation from the revenue receipts. This fact is also corroborated from the state wise analysis of the gaps indicating that no state could achieve the same.

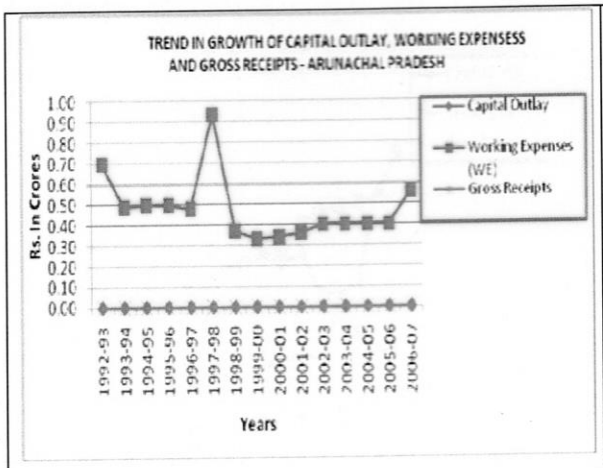
The gap is much wider if the capital expenditure is also taken in to account. The state wise details presented below graphically in Figure – 11 basing on the data compiled by CWC[30] in 2010.

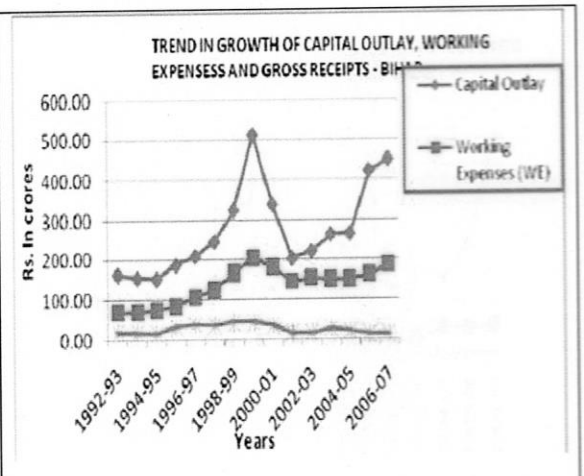
4.7 State wise comparison of revenue recovery to CAPEX[31] & OPEX[32]

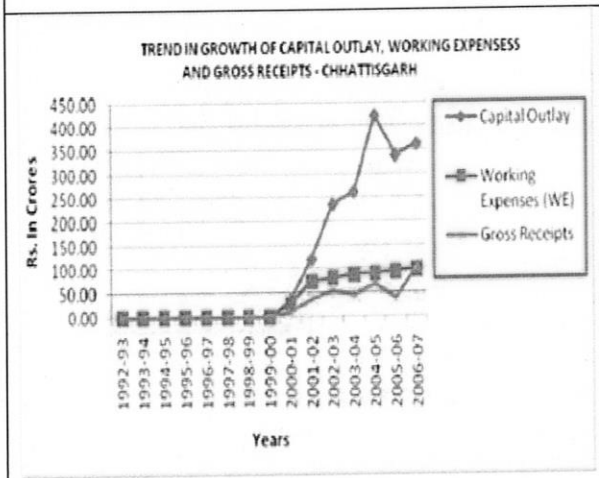
Figure 11: WE- Capital Outlay-GR for different states

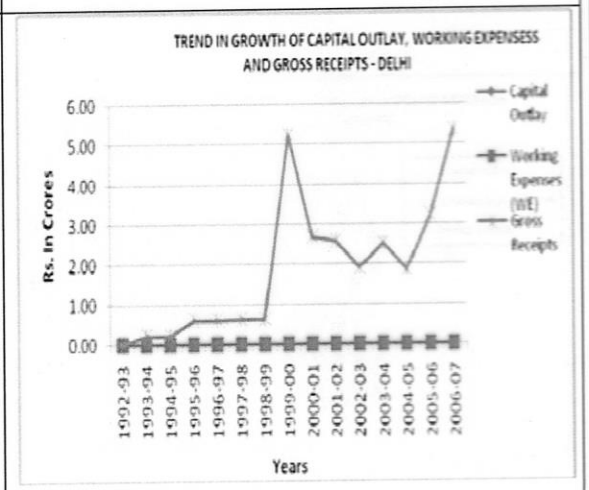


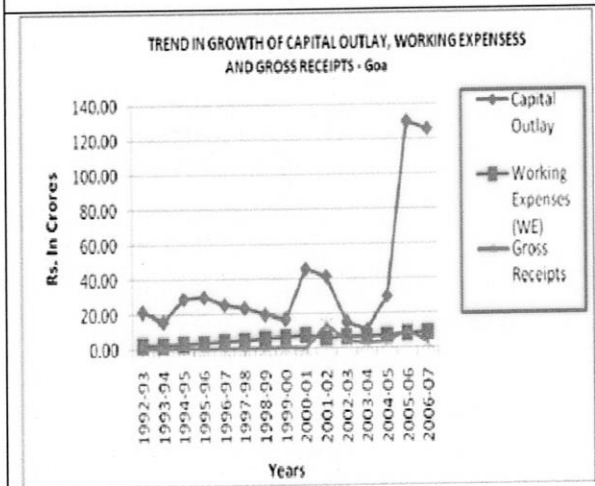
[30] Central Water Commission (CWC) is an attached office of Ministry of Water Resources, India.
[31] Capital expenditure
[32] Operating Expenditure less interest on capital

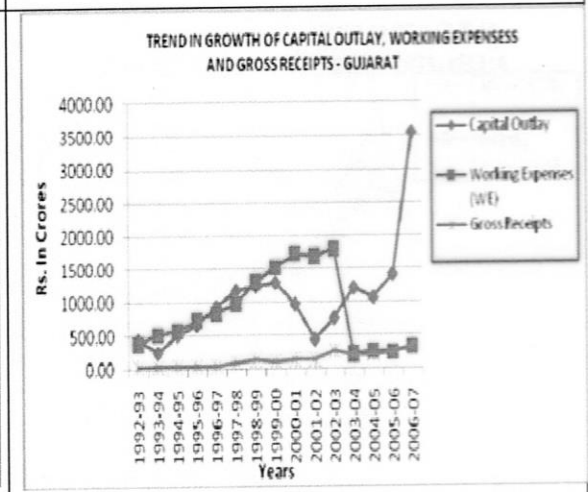

TREND IN GROWTH OF CAPITAL OUTLAY, WORKING EXPENSESS AND GROSS RECEIPTS - ARUNACHAL PRADESH
Rs. In Crores
Years
Capital Outlay
Working Expenses (WE)
Gross Receipts

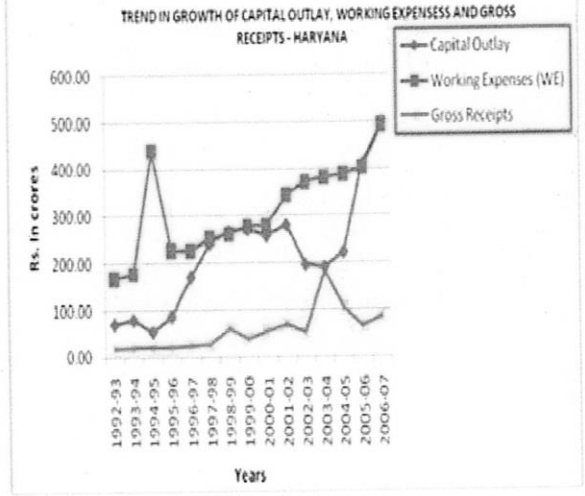

TREND IN GROWTH OF CAPITAL OUTLAY, WORKING EXPENSESS AND GROSS RECEIPTS - BIH
Rs. In crores
Years
Capital Outlay
Working Expenses (WE)

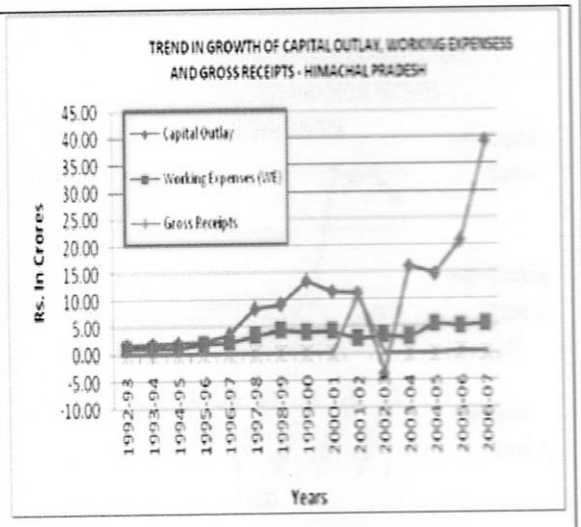

TREND IN GROWTH OF CAPITAL OUTLAY, WORKING EXPENSESS AND GROSS RECEIPTS - CHHATTISGARH
Rs. In Crores
Years
Capital Outlay
Working Expenses (WE)
Gross Receipts

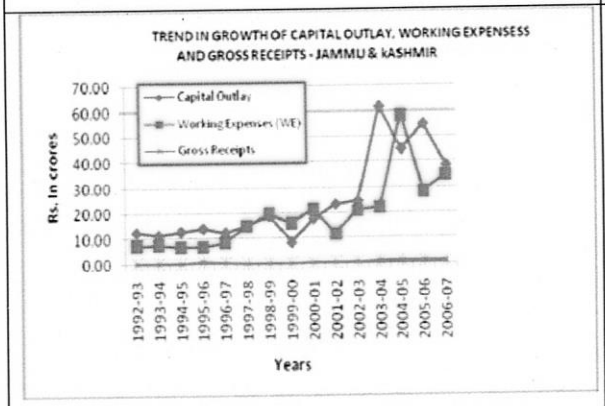

TREND IN GROWTH OF CAPITAL OUTLAY, WORKING EXPENSESS AND GROSS RECEIPTS - DELHI
Rs. In Crores
Years
Capital Outlay
Working Expenses (WE)
Gross Receipts

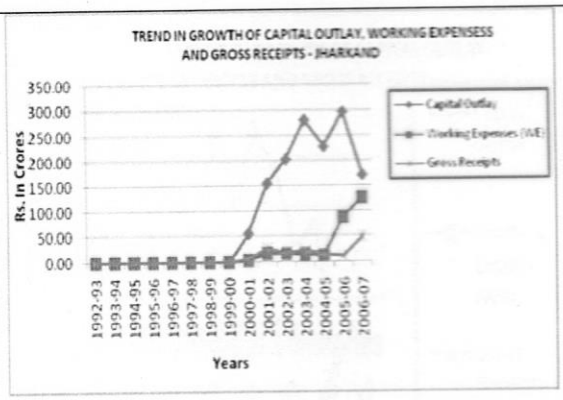

TREND IN GROWTH OF CAPITAL OUTLAY, WORKING EXPENSESS AND GROSS RECEIPTS - Goa
Rs. In Crores
Years
Capital Outlay
Working Expenses (WE)
Gross Receipts

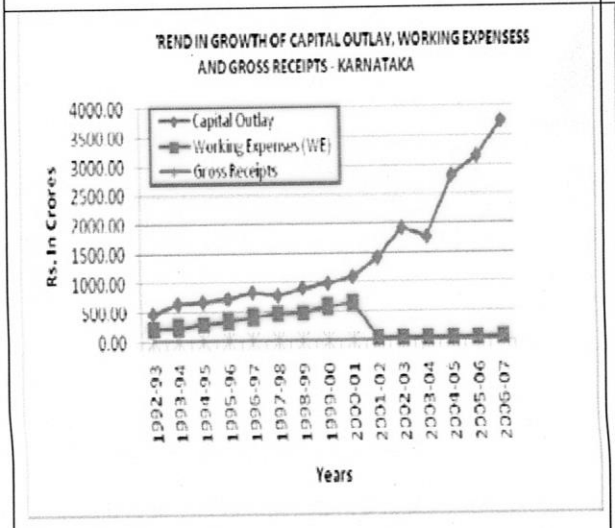

TREND IN GROWTH OF CAPITAL OUTLAY, WORKING EXPENSESS AND GROSS RECEIPTS - GUJARAT
Rs. In Crores
Years
Capital Outlay
Working Expenses (WE)
Gross Receipts

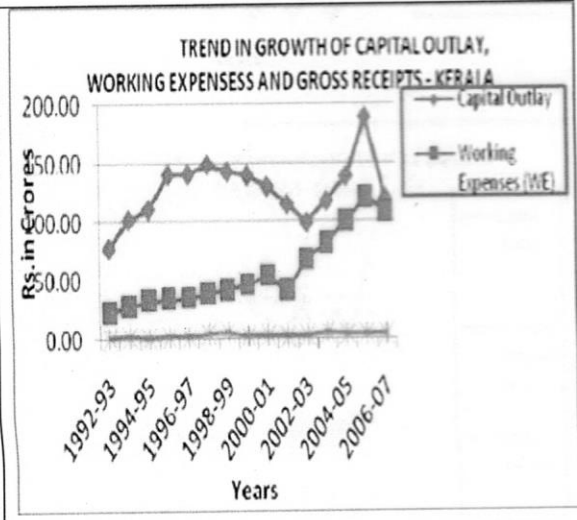

TREND IN GROWTH OF CAPITAL OUTLAY, WORKING EXPENSESS AND GROSS RECEIPTS - HARYANA
Capital Outlay
Working Expenses (WE)
Gross Receipts
Rs. In crores
600.00
500.00
400.00
300.00
200.00
100.00
0.00
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-00
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
Years

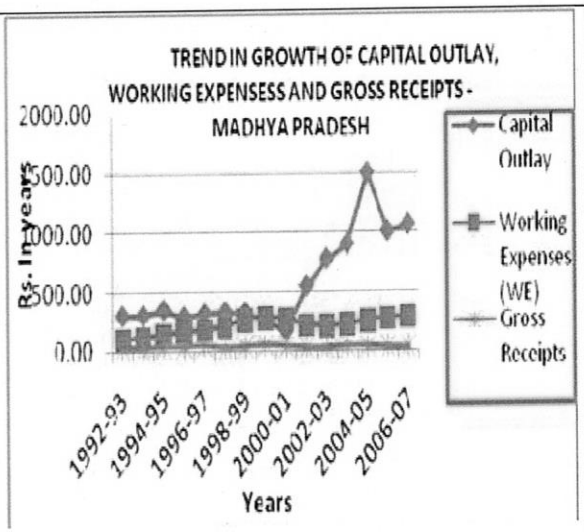

TREND IN GROWTH OF CAPITAL OUTLAY, WORKING EXPENSESS AND GROSS RECEIPTS - HIMACHAL PRADESH
Capital Outlay
Working Expenses (WE)
Gross Receipts
Rs. In Crores
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
-5.00
-10.00
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-00
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
Years

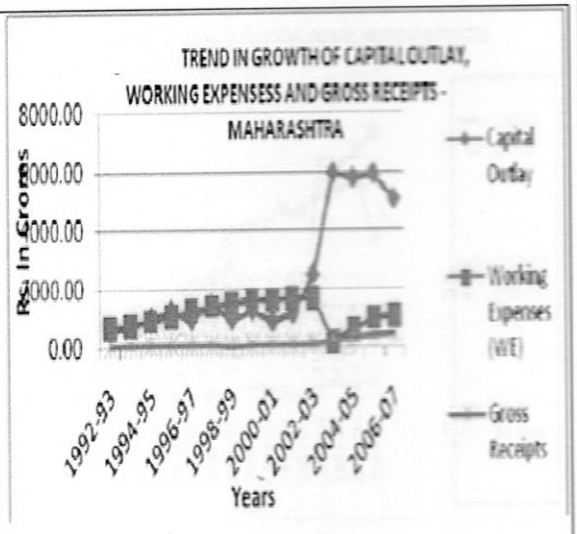

TREND IN GROWTH OF CAPITAL OUTLAY, WORKING EXPENSESS AND GROSS RECEIPTS - JAMMU & KASHMIR
Capital Outlay
Working Expenses (WE)
Gross Receipts
Rs. In crores
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-00
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
Years

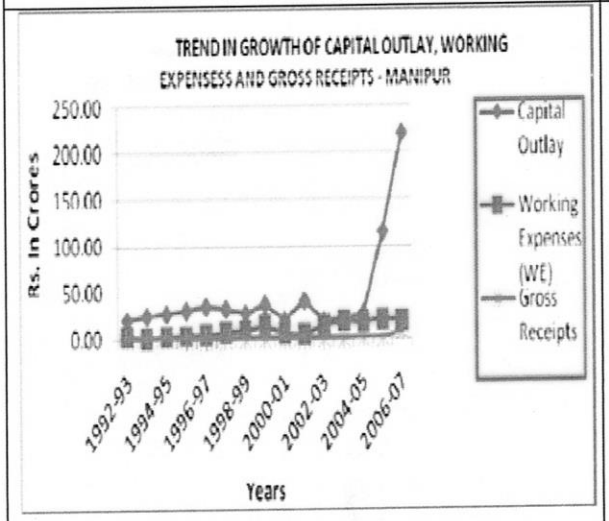

TREND IN GROWTH OF CAPITAL OUTLAY, WORKING EXPENSESS AND GROSS RECEIPTS - JHARKAND
Capital Outlay
Working Expenses (WE)
Gross Receipts
Rs. In Crores
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-00
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
Years

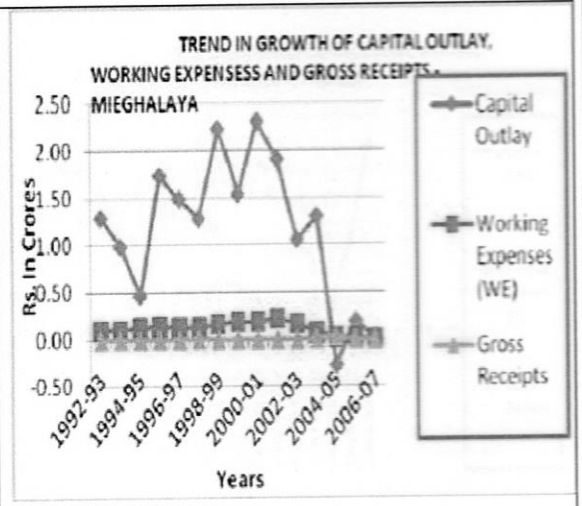

TREND IN GROWTH OF CAPITAL OUTLAY, WORKING EXPENSESS AND GROSS RECEIPTS - KARNATAKA
Capital Outlay
Working Expenses (WE)
Gross Receipts
Rs. In Crores
4000.00
3500.00
3000.00
2500.00
2000.00
1500.00
1000.00
500.00
0.00
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
1999-00
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
Years

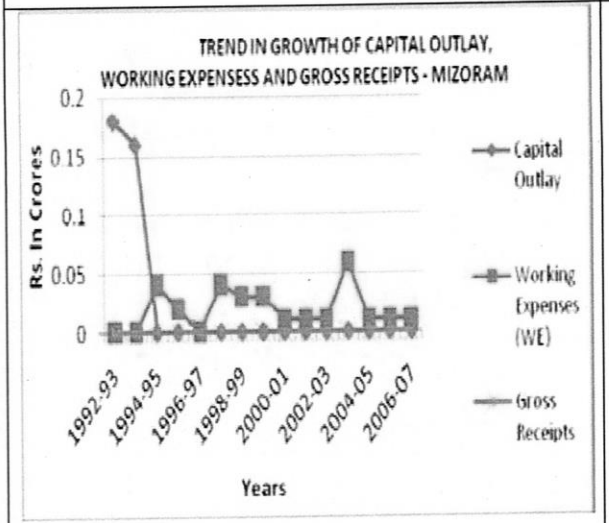

TREND IN GROWTH OF CAPITAL OUTLAY, WORKING EXPENSESS AND GROSS RECEIPTS - KERALA
Capital Outlay
Working Expenses (WE)
Rs. in crores
200.00
150.00
100.00
50.00
0.00
1992-93
1994-95
1996-97
1998-99
2000-01
2002-03
2004-05
2006-07
Years

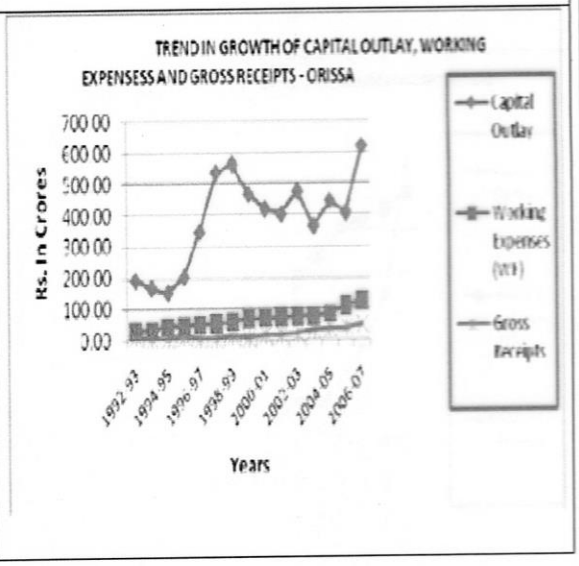

TREND IN GROWTH OF CAPITAL OUTLAY, WORKING EXPENSESS AND GROSS RECEIPTS - MADHYA PRADESH
Rs. In years
2000.00
500.00
000.00
500.00
0.00
1992-93
1994-95
1996-97
1998-99
2000-01
2002-03
2004-05
2006-07
Years
Capital Outlay
Working Expenses (WE)
Gross Receipts

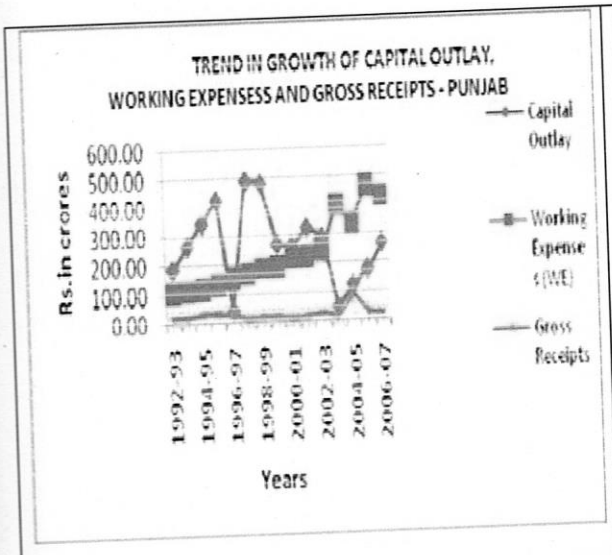

TREND IN GROWTH OF CAPITAL OUTLAY, WORKING EXPENSESS AND GROSS RECEIPTS - MAHARASHTRA
Rs. In Crores
8000.00
000.00
000.00
000.00
0.00
1992-93
1994-95
1996-97
1998-99
2000-01
2002-03
2004-05
2006-07
Years
Capital Outlay
Working Expenses (WE)
Gross Receipts

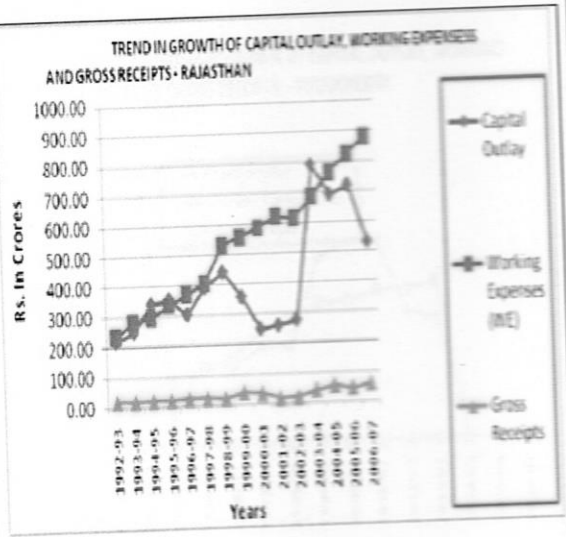

TREND IN GROWTH OF CAPITAL OUTLAY, WORKING EXPENSESS AND GROSS RECEIPTS - MANIPUR
Rs. In Crores
250.00
200.00
150.00
100.00
50.00
0.00
1992-93
1994-95
1996-97
1998-99
2000-01
2002-03
2004-05
2006-07
Years
Capital Outlay
Working Expenses (WE)
Gross Receipts

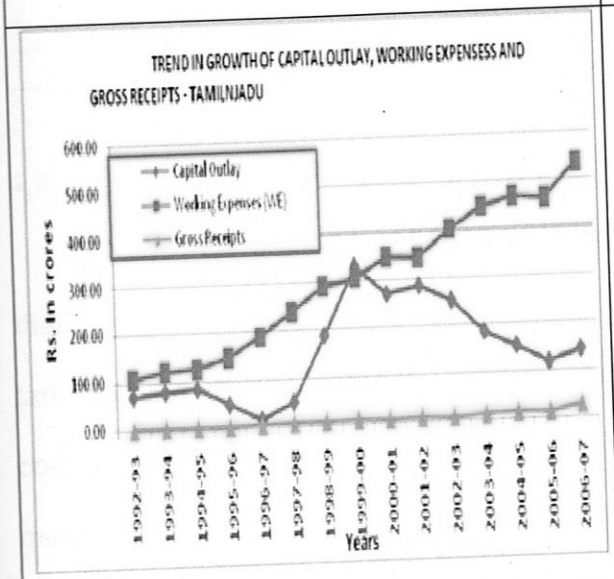

TREND IN GROWTH OF CAPITAL OUTLAY, WORKING EXPENSESS AND GROSS RECEIPTS - MIEGHALAYA
Rs. In Crores
2.50
2.00
1.50
1.00
0.50
0.00
-0.50
1992-93
1994-95
1996-97
1998-99
2000-01
2002-03
2004-05
2006-07
Years
Capital Outlay
Working Expenses (WE)
Gross Receipts

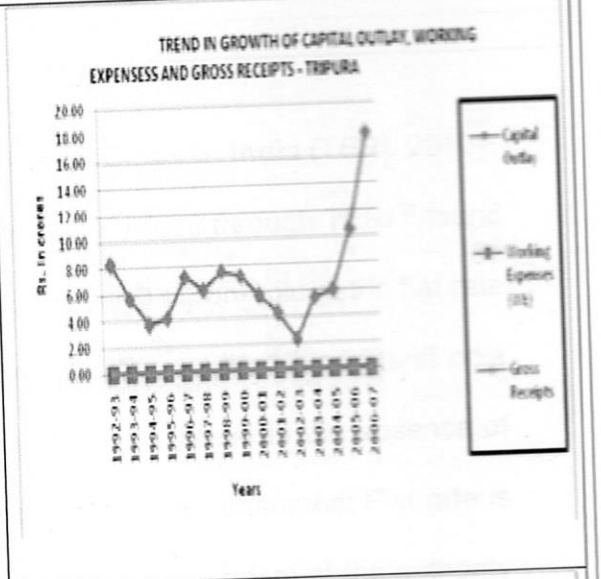

TREND IN GROWTH OF CAPITAL OUTLAY, WORKING EXPENSESS AND GROSS RECEIPTS - MIZORAM
Rs. In Crores
0.2
0.15
0.1
0.05
0
1992-93
1994-95
1996-97
1998-99
2000-01
2002-03
2004-05
2006-07
Years
Capital Outlay
Working Expenses (WE)
Gross Receipts

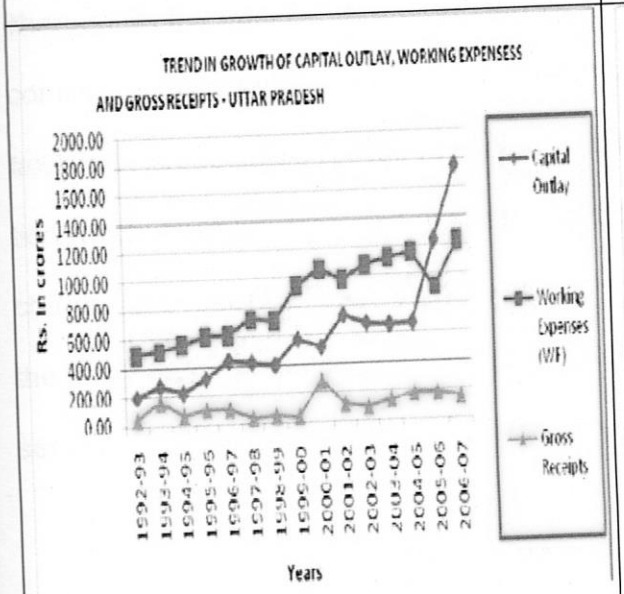

TREND IN GROWTH OF CAPITAL OUTLAY, WORKING EXPENSESS AND GROSS RECEIPTS - ORISSA
Rs. In Crores
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
1992-93
1994-95
1996-97
1998-99
2000-01
2002-03
2004-05
2006-07
Years
Capital Outlay
Working Expenses (WE)
Gross Receipts

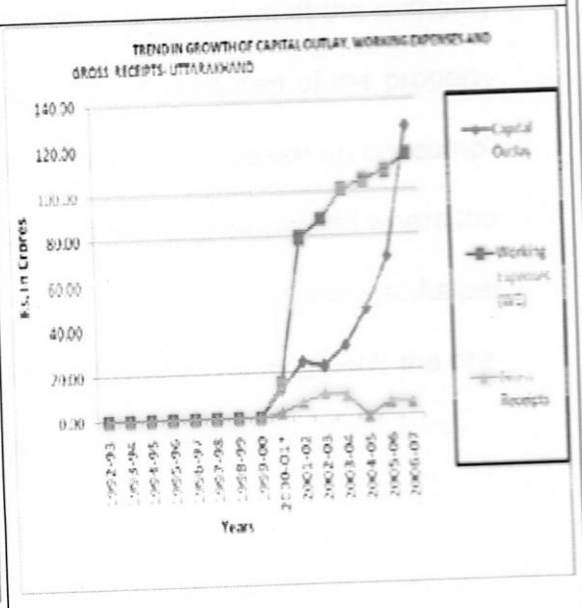

TREND IN GROWTH OF CAPITAL OUTLAY, WORKING EXPENSESS AND GROSS RECEIPTS - PUNJAB
Capital Outlay
Working Expense s (WE)
Gross Receipts
Rs. In crores
600.00
500.00
400.00
300.00
200.00
100.00
0.00
1992-93
1994-95
1996-97
1998-99
2000-01
2002-03
2004-05
2006-07
Years

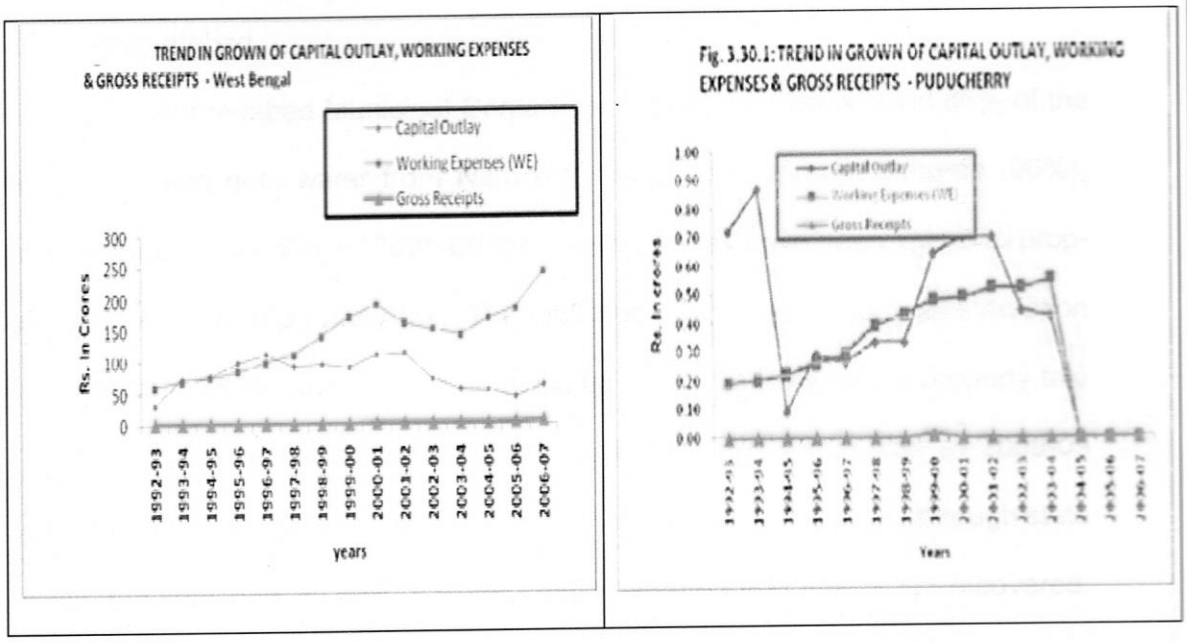

TREND IN GROWTH OF CAPITAL OUTLAY, WORKING EXPENSESS AND GROSS RECEIPTS - RAJASTHAN
Capital Outlay
Working Expenses (WE)
Gross Receipts
Rs. In Crores
1000.00
900.00
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Years


TREND IN GROWTH OF CAPITAL OUTLAY, WORKING EXPENSESS AND GROSS RECEIPTS - TAMILNJADU
Capital Outlay
Working Expenses (WE)
Gross Receipts
Rs. In crores
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Years


TREND IN GROWTH OF CAPITAL OUTLAY, WORKING EXPENSESS AND GROSS RECEIPTS - TRIPURA
Capital Outlay
Working Expenses (WE)
Gross Receipts
Rs. In crores
20.00
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Years


TREND IN GROWTH OF CAPITAL OUTLAY, WORKING EXPENSESS AND GROSS RECEIPTS - UTTAR PRADESH
Capital Outlay
Working Expenses (WE)
Gross Receipts
Rs. In crores
2000.00
1800.00
1600.00
1400.00
1200.00
1000.00
800.00
600.00
400.00
200.00
0.00
Years


TREND IN GROWTH OF CAPITAL OUTLAY, WORKING EXPENSES AND GROSS RECEIPTS- UTTARAKHAND
Capital Outlay
Working Expenses (WE)
Gross Receipts
Rs. In Crores
140.00
120.00
80.00
60.00
40.00
0.00
Years



4.8 Pricing of Drinking Water Supply in Major Cities in India (TERI, 2010)

The study conducted by Ministry of Urban Development through TERI[33] found that in urban areas various tariff structures are used like non-volumetric flat rate tariff, non-volumetric water tax, uniform metered tariff, metered block tariff or a combination of the above. Non-volumetric flat rate is charged in the absence of metering wherein the monthly bill is independent of water consumed; Flat rate is charged on the basis of size of the ferrule or as per the judgment of the authority concerned. In case of non-volumetric water tax, it could be a part of the property tax like in Ahmedabad (30%). In case of volumetric tariff, it is based on consumption which could be either uniform metered tariff or increasing block tariff where the charges are lower for lower blocks and higher for higher blocks of usages. As per the study report submitted by TERI to the Ministry of Urban Development, the present practices in few major Indian cities are as follows:

[33] The Energy Research Institute (TERI), New Delhi.

4.8.1 Ahmedabad

The Ahmedabad Municipal Corporation (AMC) supplies around 85% of the city's need and gets water from Narmada Canal Development Scheme (90%), ground water(10%). Since, 2008-09 the water charges have been linked to property tax (i.e. 30% of property tax). The tariff has been fixed without consideration of the costs involved and there is no basis for fixing it at 30% of the property tax. The AMC could recover 60-65% of its O&M expenditure on water in 2008-09 against O&M expenditure of Rs.110 crore. The AMC bridges the gap through state grants and subsidies. In AMC's water tariff, even the O&M cost is not recovered. The collection efficiency is around 75% and loss of water is around 20%.

4.8.2 Delhi

The Delhi Jal Board (DJB) which was created under Delhi Water Board Act 1998 passed by the parliament is responsible for retail distribution of water in areas under Municipal Corporation of Delhi (MCD) and supply of bulk water to areas under New Delhi Municipal Corporation (NDMC) and Delhi Cantonment Board. The DJB gets water from River Yamuna (90%) and remaining from ground water. Though section 55 of the DJB Act gives power to the Board to levy fees, charges, including developmental charges, rentals etc. and recovering them from the services rendered as a practice it takes the approval of the state government for any hike in the water tariff as the members are from the state government. The DJB follows two part pricing model operating on a cost plus basis. It charges fixed connection charge from all registered metered consumers to meet the cost of access and O&M costs. Volumetric meter charges is taken based on block tariff rate depending on the actual consumption and the category of the consumer (1st block at 6kl and last 30kl). It charges 50% of the consumption charge towards sewerage

maintenance. There is an annual increment of 10% on the fixed connection charges imposed at the beginning of each financial year. The actual cost of water supply is recovered from the bulk water supply to NDMC and Delhi Cantonment. It also levies one time extraction of ground water and water cess.

4.8.3 Costs and Revenue of DJB (1997-98)

Cost		Revenue	
Item	**% share in total**	**Item**	**% share in total**
O & M	47	Water charges	44
Salary, wages, etc.	20	Water cess	1
Electricity charges	20	Connection charges	2
Consumables	2	Bulk Supply charges	53
Repair and maintenance	2		
Others	3		

In 1997-98, the actual O&M cost per kl of water supplied by DJB was Rs.2.30 / kl. If the financing cost is added it was Rs. 4.90 /kl. But the revenue generated was Rs.0.80 /kl which is just 34% of the O&M cost and mere 16% if financing cost is added (NIUA 2005). The main reasons cited for this gap are: (i) The water tariff do not reflect the actual costs; (ii) Huge amount of subsidies given out to the consumers through tariff; (iii) Metering not adequate; (iv) Low collection efficiency; (v) Huge water losses.

4.8.4 Chennai

The water supply and sanitation services in Chennai is overseen by Chennai Metropolitan Water Supply and Sewerage Board (CMWSSB) constituted under Chennai Metropolitan Water Supply and Sewerage Act, 1978. The CMWSSB supplies water and provides sewerage collection and disposition services. The main source of water is Viranam Lake, Krishna water and Ground water. Though the Board is an independent agency it does not have the financial autonomy for revising water tariff. However, the existing tariff is able to recover the O&M cost, financing cost and debt servicing. As per the study of ADB in 2007, the average tariff of water is Rs. 10.87/m^3 against O&M cost of Rs. 6.09/ m^3.

4.8.5 Hyderabad

The Hyderabad Metropolitan Water Supply and Sewerage Board (HMWSSB), an independent agency formed under Hyderabad Metropolitan Water Supply and Sewerage Act 1989 looks after the urban water supply and sewerage functions in the city. But its financial decisions particularly the tariff is highly influenced by the state government which is evident from the fact that the CM heads the Board of Directors. The tariff structure is volumetric tariff based on actual consumption and a monthly minimum charge in case of non-metering based on pipe size. The tariff is designed to recover O&M cost, debt-servicing cost and depreciation.

4.8.6 Bangalore

The Bangalore Water Supply and Sewerage Board was constituted under Bangalore Water & Sewerage Sanitary Act 1964 to take care of the water services and the sewerage services. The sources of water supply are River Cauvery, Arkavatty- T GHalli and Hessarghatta. The Board is allowed full cost recovery at no

profit no loss basis. It claims to have achieved 100% metering with collection efficiency of 99%. It charges volumetric tariff, metering at supply and customer end. However, the loss of water is about 50%. The per unit cost of water is Rs.12.98 /kl against cost recovery through tariff is Rs.13.79/kl. For any tariff review a proposal is prepared by the Board which is voted by the councilors before sending it to the government for approval. The hike in electricity charges are automatically accommodated in the tariff.

Table - Break-up of costs of BWSSB

Cost components	**% of Total**
Establishment	20.1
Electricity	59.5
Chemicals	-
General Repairs	7.6
Raw Water	-
Interest payments	12.8
Others	-
Total	**100**

SOURCE: K S Sridhar and C P Mathur. 2009

4.8.7 Raipur

In Raipur it is the Raipur Municipal Corporation (RMC) which is responsible for water supply, billing, maintenance and other O&M expenses. The Public health Engineering Department (PHED), Chhatisgarh undertakes capital investment. The major source of water is Gangarel Dam on river Mahanadi and Kharun River. Around 80% of the demand is met through surface water rest from bore wells. The RMC charges water at a flat rate based on ferrule size. One time annual water

charges is collected every year. The tariff has been fixed without any cost consideration. RMC recovers only 34% of its cost from tariff. Around 50% of the water is lost through 7000 public taps and leakages.

4.8.8 Findings

(i) The price of the urban water supply is low compared to the cost involved. Roughly 22-25% lower than the O&M cost.

(ii) Arbitrary pricing structures- usually no principle is followed. Strong political influence keeps the price very low.

(iii) Underpricing has resulted in poor service and reduced incentives to expand the spatial coverage of the services.

(iv) The objective of large scale subsidization on the ground of affordability by poor has not been achieved.

(v) Underpricing has affected the state finances adversely.

(vi) Breeds inefficiency such as unaccounted for water, poor quality, low cost recovery etc.

The Working Group on urban, Industrial water supply and sanitation for 12th plan in their recommendation state that:

"All economists talk about the need for pricing water supply. This is undisputable. But the unforeseen outcome of the increased water tariff is the increased dependence on groundwater. Across the country, as the price of water begins to pinch the company bottom-line, water's bottom-line is exploited. Bangalore, Chennai and even Hyderabad are clear instances of this water-switch. In this way the water agency loses twice over – it loses the paying customer, who could help cross-subsidize its expenditure and it has severely depleted sources of water."

4.9 Necessary Regulatory Reforms:

Till now no central level regulatory reform has taken place in India as it is a state subject. Some states had started some kind of reform processes which are yet to show much success. In 1997, Andhra Pradesh government passed the Andhra Pradesh Water Resource Development Corporation Act to set up an autonomous body for promoting and operating irrigation projects, command area development and schemes for drinking water and industrial water supply and flood control. But this could not achieve its objectives. In 2005 Maharashtra Government passed The Maharashtra Water Resources Regulatory Authority Act with the objective of regulating bulk water supply and provide guidelines for fixing water rates for water use in agriculture, industry, domestic and other purposes. This is functional and has brought out several guidelines. The Government of Arunachal Pradesh also enacted The Arunachal Pradesh Water Resources Management Authority (APWRMA) in 2006 in similar lines as MWRRA but yet to be operational. In 2008 Government of Uttar Pradesh passed The Uttar Pradesh Water Management & Regulatory Commission (UPWMRC) Act with the objective of having a regulatory commission to regulate state water resources, facilitate and ensure judicious, equitable and sustainable management, allocation and optimal utilization of water resources. It would also fix rates for water use for agriculture, industrial, domestic, power and other purposes and carry out flood control activities. However, it is yet to make its presence felt.

4.10 Comparison of Electricity and Water Pricing in India

In India the electricity sector reforms started in 1990s. Through Electricity Act. 2003 the State Electricity Regulatory Commissions were empowered to specify the terms and conditions for determination of tariff and ensure transparency in

the process. While the EA 2003 provided the legal framework for tariff determination the policy framework was provided in National Tariff Policy (NTP) and National Electricity Policy (NEP). The NTP recognizes the need for rational and economic pricing of electricity for energy conservation and sustainable use of ground water. Initially, the SERCs followed the rate of return or the cost plus approach in tariff determination. The NTP however suggested performance based cost of service regulation known as Multi Year Tariff (MYT).

4.10.1 ROR[34] or Cost plus Approach

The aim of this approach is that a utility should be able to collect all its prudently incurred expenses, in addition to a regulated return on prudent investment. The formula for calculation is:

$ARR = [RB*RoR] + E_{PPC} + E_D + E_{O\&M} + T$,Where,

ARR = Total annual revenue requirement of the utility (after taking credit for any subvention from state government)

RB= The Rate base (required investment) of the utility i.e. the Capital base in case of a licensee and Fixed assets in case of the Board

RoR = the allowed Rate of Return on investment (debt & equity)

E_{PPC} = Annual Power Purchase Cost

E_D = Annual Depreciation

$E_{O\&M}$ =Annual Operation and Maintenance Expense

T = Annual Taxes paid by the Utility

4.10.2 Performance based MYT approach

This method introduces an element of incentives and disincentives for effecting improvements in certain key function areas based on performance above

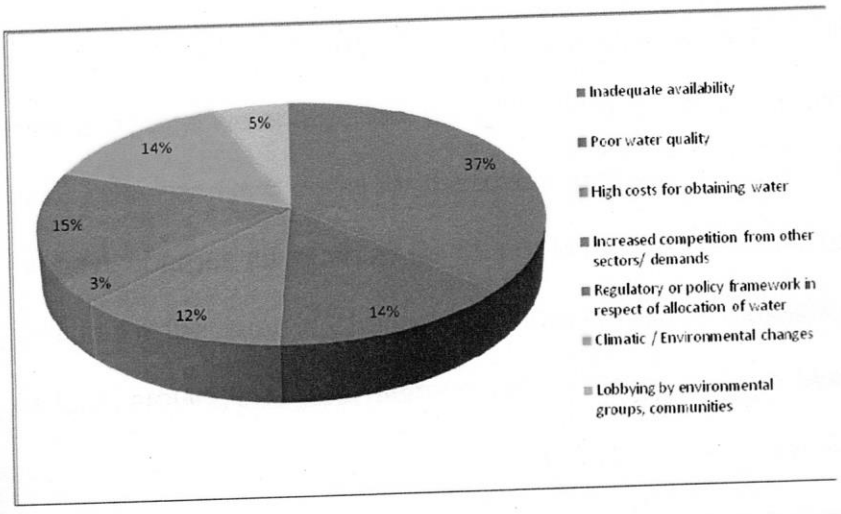
[34] Rate of Return

or below the 'normal range'. Under this system the SERC fixes certain factors which are controllable in nature like O&M expenses, financing costs, Transmission and distribution losses and other performance measures. In case the utility exceeds target it makes profit and if it falls short it makes loss. The other uncontrollable cost factors resulting from fuel costs, power purchase cost, taxes, inflation etc. which are uncontrollable are passed through ARR method as prescribed by the regulator. Benchmarking is an integral part of the MYT regulation. As per the NTP suitable benchmarking studies should be carried out to establish the desired performance standards.

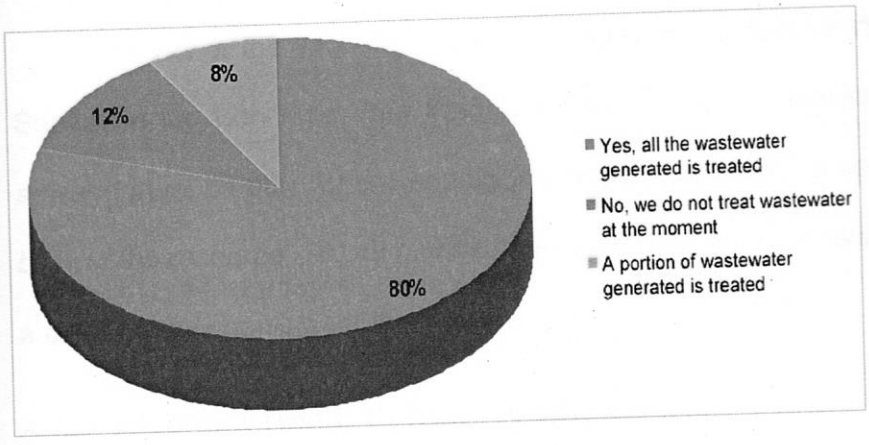
Can the water sector follow the same path of reform and pricing as the electricity? This is possible in the cities for the supply of drinking water as well as for irrigation and other bulk supply sectors. But such efforts have not yet succeeded in states like Andhra Pradesh and Maharashtra purely due to lack of a revenue model. Today for energy one has to spend and obviously cannot get for free. It is not a common good in any form unlike water. Moreover, water is a survival need and there are competing uses from the ecology and environment. Hence, water pricing may need separate treatment.

4.11 **Pricing of water for Industry** (FICCI, 2011)

As per the survey report of FICCI the perceptions of the Indian industries on the risks associated with water is presented in the chart below which inter alia includes high cost of obtaining water, poor quality and inadequate availability. The water sector pricing issues must take in to account the apprehensions of the Indian industry.



As per the report nearly 80% of the industries surveyed reported to have undertaken wastewater treatment and reuse in their companies. The result of the findings are presented in the chart below:



One of the main reasons for companies to undertake wastewater treatment is the declining availability of freshwater. The industries see a merit and an economically value in reusing wastewater for purposes where water quality is not an important criterion. As per the survey conducted by the CWC, the price charged from industries vary from state to state and the details of which is at Annexure- 4.

In a survey of water utilities, jointly by the Union ministry of urban development and the Asian Development Bank, commercial and industrial consumption of water averaged to 15 per cent in the 20 cities surveyed which accounted for 40%

of the revenue. In Bengaluru, while the commercial and industrial usage is 5 per cent of its total water supplied, the billing amounts to almost 40 per cent. This city, which charges Rs 6 per kl for the lowest domestic slab and Rs 36 per kl for the highest, charges as much as Rs 60 per kl for industrial and commercial use. The situation is the same in Chennai and other key cities. Hyderabad has also revised its tariff, arguing that most metropolitan cities like Chennai, Mumbai and Bengaluru charge higher rates for non- domestic use. Its tariff is now Rs 35 per kl, against Mumbai's Rs 40 per kl and Delhi's Rs 50 per kl. But interestingly, Hyderabad is the only city, which charges increased rates -- Rs 60 per kl -- where water is used as a raw material–in bottled water, soft drinks or alcoholic beverages.

Report of the Working Group on Urban and Industrial Water Supply and Sanitation for 12th Five Year Plan (2012-2017) recommended that "*Water and sewage must be paid for but equally important is recovery of costs and sustainability of the resource. Future planning must take this into account.*" Without giving a clear cut mechanism for the same.

4.12 Important Trends in Water Pricing in India

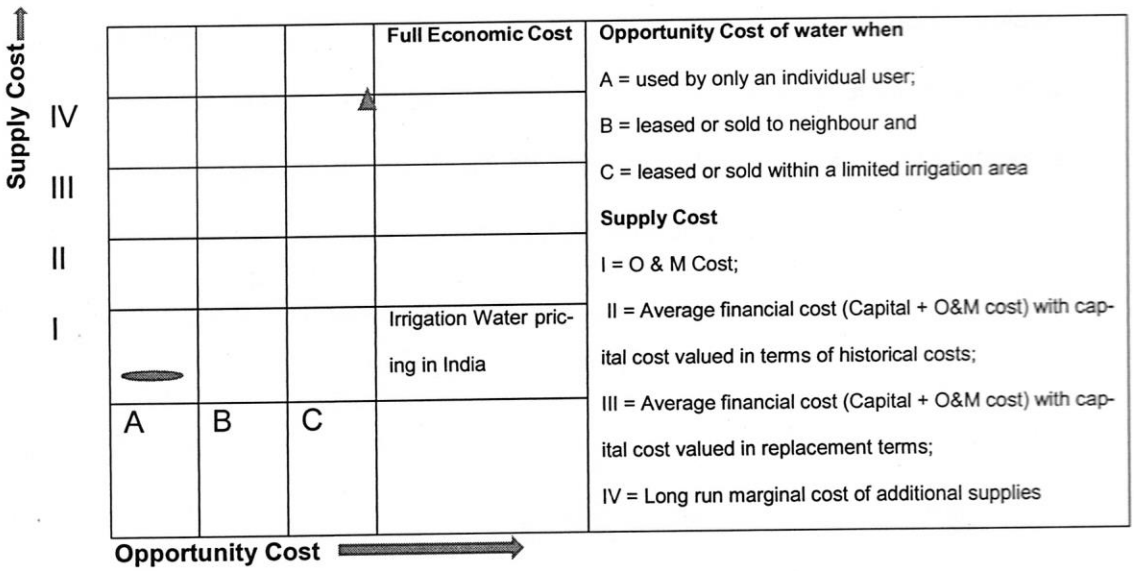
1. In India almost 80% of water is used by the agriculture sector where there is wide variation in the supply of water. The rates also vary depending upon the crop, type of irrigation, season, availability and the prices in the nearby states.
2. The pricing of irrigation water has been attempted by several committees and mostly all are cost based approaches which have failed due to its impracticability and non-acceptance which is evident from the wide gap in the working expenses less interest payment and the revenue realised.

3. In case of the domestic sector there is also wide variations due to various factors like the O&M expenses, scarcity and political considerations. But it is interesting to see some of the cities have implemented 100% metering and full recovery of supply cost successfully.
4. In case of water supply to industries there is no fixed criteria. It is basically the availability and a premium price to cross subsidize the domestic supply.
5. All the pricing methods being followed in India do not have any rational basis nor confirm to the sustainability norms. The institutional framework is also not so robust to work for sustainability of the resource. It is still a supply side management in India.

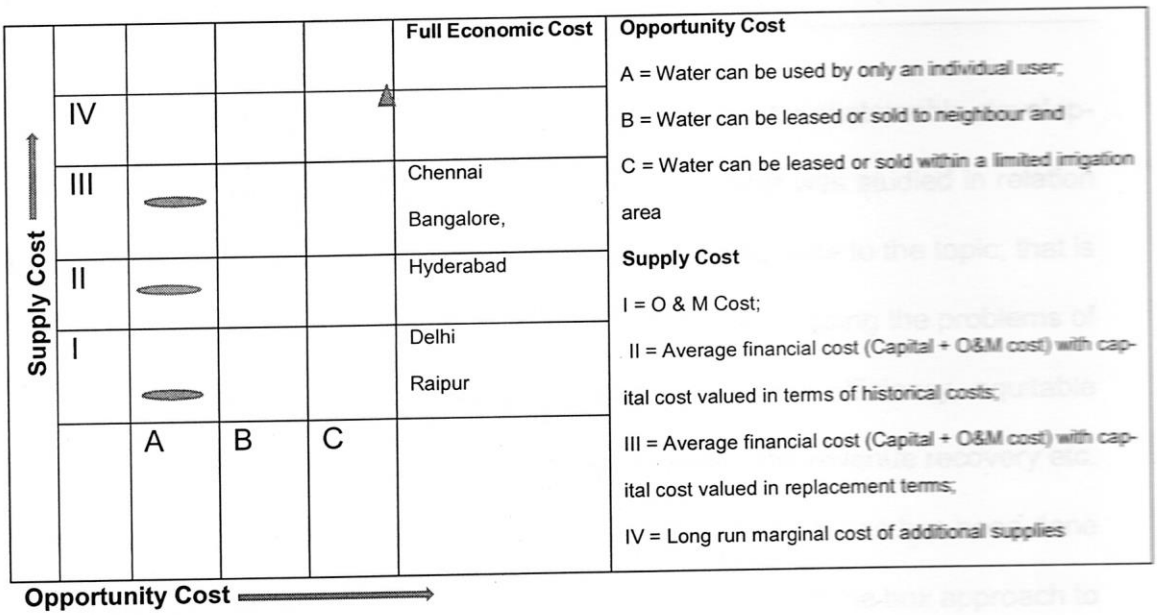
4.13 Discussion

The present pricing pattern in India can be described in the economic pricing model as follows:

Status of Water Pricing for Irrigation in India



Status of Water Pricing for Domestic use in major Indian Cities



To achieve the sustainable water management it is proposed that phased implementation of full cost pricing can be schemed in which first step could be average supply cost pricing with capital valued in terms of historical costs, second step could be average supply cost pricing with capital costs computed in replacement terms, third step could be long-run marginal supply cost pricing, and eventually towards the full cost pricing, in which the opportunity cost and environmental externalities are included. When water price is changed step by step the corresponding quantity demanded can be calculated as follows:

$$Q2 = Q1 \times (P1 / P2)^{E}$$

Where Q2 is the quantity of water consumption at raised water price P2, Q1 is the quantity of water consumption at original water price P1. ^{E} is the price elasticity of demand. This will help in effective demand side management.

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