

## Concept Note on Cost Recovery in Indian Water Sector<sup>1</sup>

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### 1. Introduction

In the context of the initiative “Blueprint for Water Accounting in India” of the [India-EU Water Partnership](#), several workshops have been held so far and three topics are aimed to be addressed in detail: Water Quality, Water Efficiency Indicators and Cost Recovery Ratios. At the [4<sup>th</sup> meeting](#), “the task force on cost recovery was asked to develop an initial concept note on cost recovery principles across sectors, in coordination with NIPFP and OECD.”

### 2. Introduction to pricing instruments for water management

Economic theory claims that putting a price on water can signal where water is scarce, or abundant; urge water users to avoid wastage; allocate water where it creates most value; stimulate (private) investment when and where appropriate. Water prices play two roles: i) signal scarcity; this is predominately the role of abstraction charges; and ii) generate revenues to cover the costs associated with water management and the provision of water services; this is predominately the role of tariffs for water-related services such as water supply, irrigation, or sanitation.

In practice, pricing becomes a contentious issue when property rights are not well-defined. In the case of water, the issue is not so much about who owns the water – few countries would agree that water can be appropriated by private hands - but who has a right to use it and when. Unlike natural resources like minerals and fossil fuels, rights to use water vary across sources (surface and ground water) and spaces (riparian rights). The public good nature of several services associated with water leads to market failure. In the absence of a market for rights to use water, it is difficult to set prices that reflect the value of water for users. Therefore, underpricing and improper pricing of water lead to inefficiencies both in production, conservation and allocation of water across sectors.

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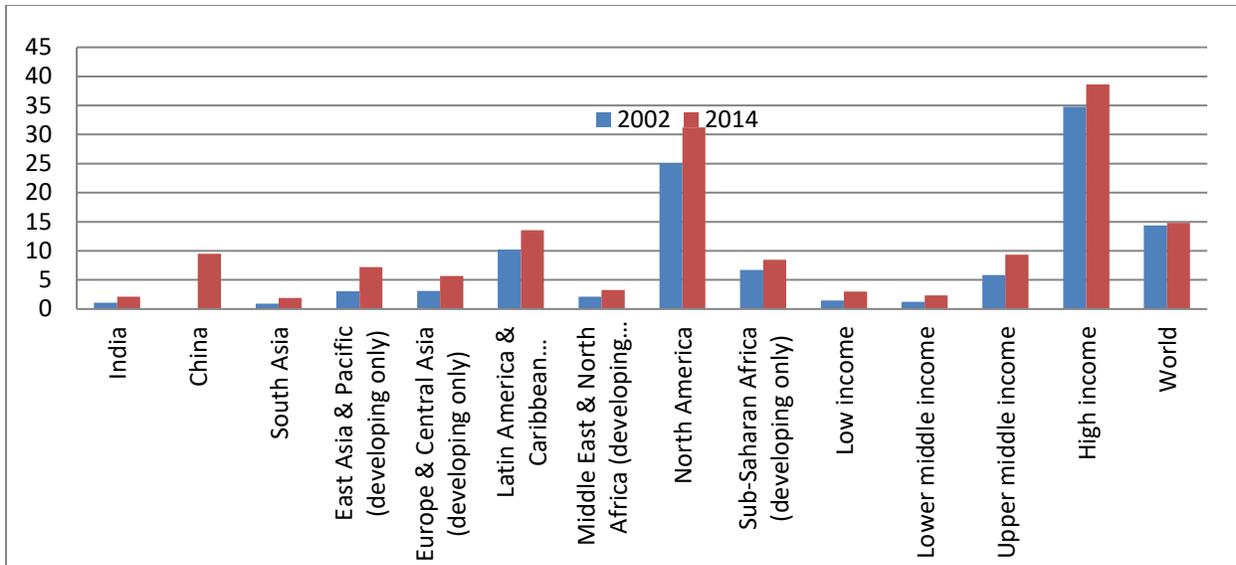
There are several components of costing water – *resource cost* (costs of water development/ collection, treatment and supply/ distribution), *environmental cost* (costs associated with depletion and degradation of water), *opportunity cost* (costs associated with not allocating water for best alternative uses and across generations) and *cost of resource recovery* (cost of pollution abatement, water reclamation). Similarly, several pricing instruments can be combined to cover these costs: *tariffs* for water supply and sanitation services are meant to recover resource cost; they apply to bulk water production as well; *abstraction charges* are designed to signal the opportunity cost of using water (they are higher when water is scarce or competition to access it is fierce); *pollution charges* make pollution costly and recover the cost for downstream or future users.

The relative dimensions of costs are inter-dependent and vary across space and time. For example, depletion or degradation of local sources of water (i.e. environmental costs) results in sourcing water from distant sources at higher cost of transportation and distribution (i.e. resource costs). Similarly, avoiding costs of pollution abatement may result in higher costs for water treatment. In addition, human right aspects associated with access to safe sources of drinking water often make it politically difficult to recover full cost of water services from all beneficiaries or for all services. Moreover, uncertainties associated with projecting prospective revenue stream of investment in water services infrastructure often discourage private investors to make investment in these services.

International experience shows that some countries charge for only *resource cost* while others charge for *resource* and *recovery costs*. Even under *resource cost* pricing, not all costs are passed on to users or beneficiaries. There are instances when water is priced based on only *operation and maintenance* (O&M) costs whereas capital costs are borne by the government. Not charging for capital costs (or costs associated with interest payment on outstanding loan) erodes the fiscal space of the government and leads to lower allocation of resources for other public goods and services (e.g., education and health).

Underpricing or not charging full cost pricing of water leads to inefficiency in production and distribution, which in turn reduces productivity of water in terms of gross value addition. India's total water productivity (as measured in terms of constant 2005 USD GDP per cubic meter of total freshwater withdrawal) is very low and it is even lower than in developing countries in Sub-Saharan Africa (Figure 1). It follows that pricing for water essentially is a development issue. Where and when water is a limiting factor to growth, water pricing is essentially an economic issue: underpricing leads to lost opportunities for economic and social development, through wasting water that could have been available for valuable uses; misallocation of water to low value uses while more valuable uses are deprived of access; additional cost to treat polluted water before it can be used again, thus affecting productivity of agriculture or industries; etc.

**Figure 1: Water productivity, total (constant 2005 US\$ GDP per cubic meter of total freshwater withdrawal)**



Setting the price of water is not a stand-alone problem. First pricing instruments do not operate in isolation. Experience shows they deliver best when they are combined with regulation and information-based policy instruments. Typically, abstraction charges should be combined with well-defined rights or entitlements to use water. Second, the price (level of the charge or tariff) does not come in isolation. It should be considered together with the structure of the pricing instrument, which can be based on measured consumption or release, for instance. Also, the level of the price should be considered together with the process for setting the price: stakeholder consultation or data collection can contribute to enhanced legitimacy and accuracy of prices; literacy of users about water availability, water use and management; and to a higher willingness to pay the price of water. Third, the efficiency of pricing instruments very much depends on the quality of the expenditure programmes financed through the revenues of water charges. When water users see the benefits that accrue from these expenditures, they are more willing to pay the price and to use water wisely.

Finally, charges and tariffs are often based on some measurement of water availability and use, and discharges. When and where such measurements are difficult, costly, or inappropriate, other options can be considered. Pricing can be based on estimations or proxies. The point is that difficulties for measuring use are not an excuse for not charging. A related point is that the design of the charge or tariff should reflect to availability of data and monitoring capacity.

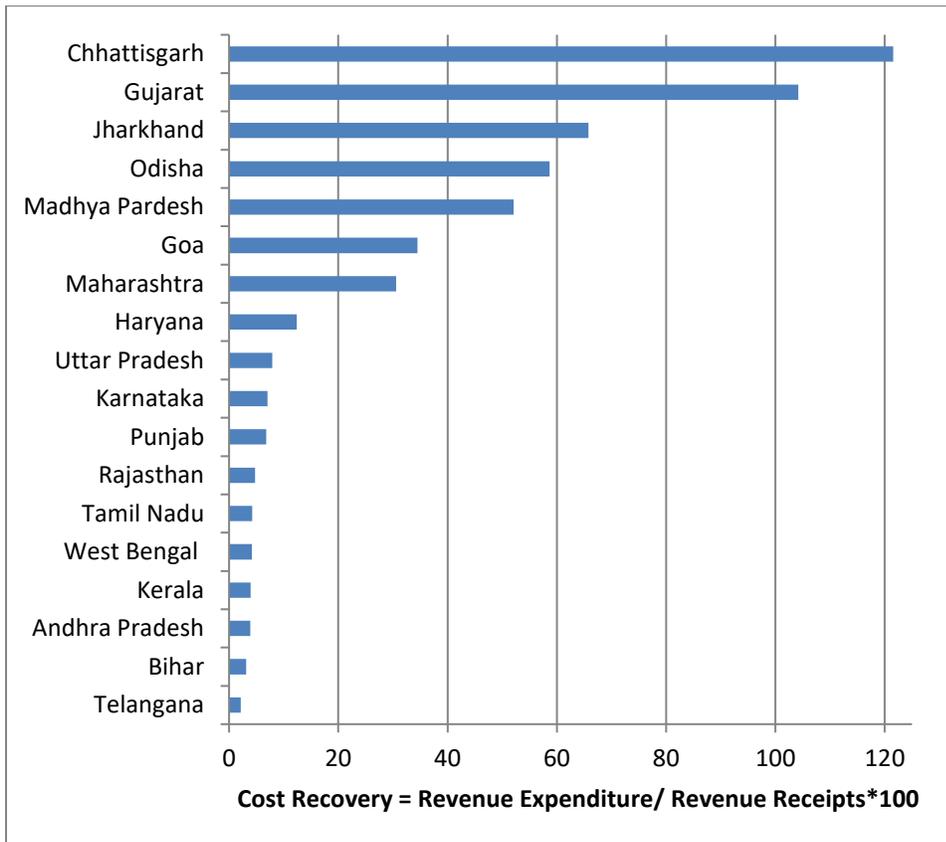
### 3. Recovering costs for water management. State of play in India

Though water is a state subject according to the Indian Constitution, the Union Government also incurs expenditures to provide various water related services (e.g. water supply and sanitation, soil and water conservation, irrigation)<sup>6</sup>. For example, in 2014-15, Union Government's share in total

<sup>6</sup> Water, that is to say, water supplies, irrigation and canals, drainage and embankments, water storage and water power subject to the provisions of Entry 56 of List I.

revenue expenditure on ‘water supply and sanitation’ was 1.23 percent (INR 2.61 billion) whereas in irrigation (excluding flood control and drainage) it was 3.49 percent (INR 10.15 billion). This shows that a substantial part of revenue expenditure on basic water related services (for domestic water supply and irrigation) is spent by the state governments. Given limitations in expanding the fiscal space, non-recovering of costs of water constrains states to allocate larger resources for other public goods and services (e.g., on merit goods like health and education) and/or betterment of public water services delivery.

**Figure 2: Performance in Cost Recovery from Irrigation across General Category States: 2014-15**

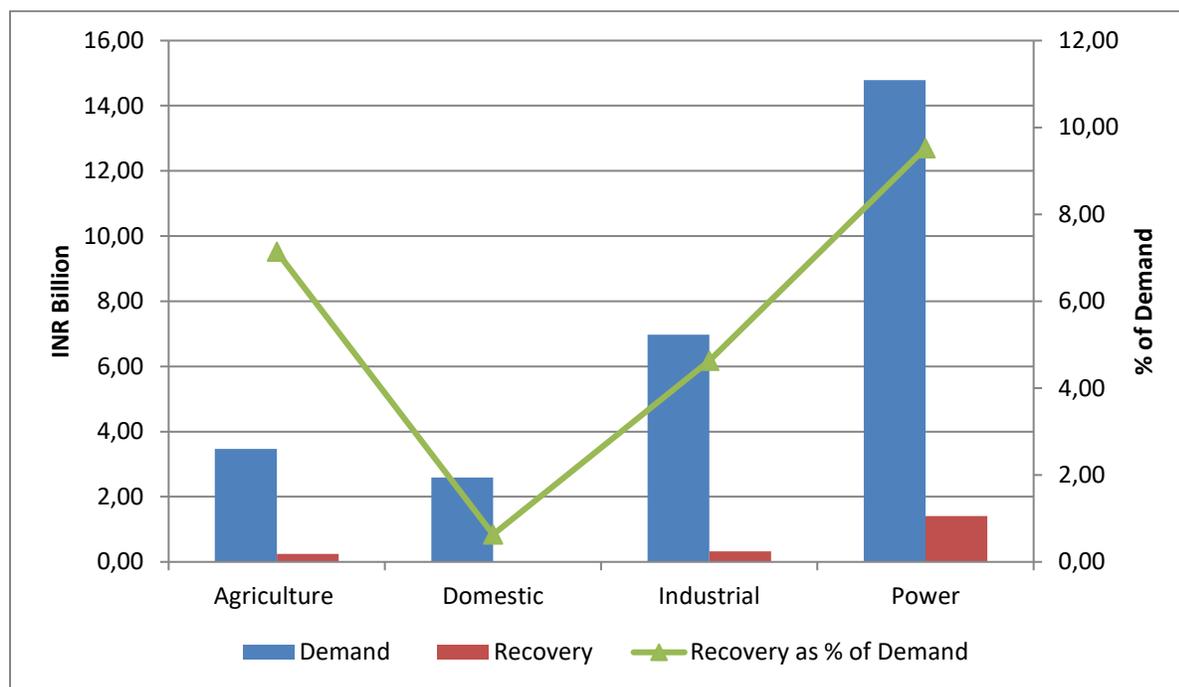


Combined revenue recovery (as percentage of revenue expenditure) of Union and State Governments from ‘water supply and sanitation’ was 3.5 percent and 16.8 percent from irrigation in 2014-15. The recovery performance varies across states and performance is commendable for Chhattisgarh and Gujarat (Figure 2). For Union Government, revenue recovery from ‘water supply and sanitation’ was 0.87 percent and for irrigation it was 1.81 percent. For state governments, the average recovery was 3.5 percent and 17.4 percent for ‘water supply and sanitation’ and irrigation respectively. Though, local governments charge for water supply (mostly for house connections), the revenue mobilization of the local governments will not be reflected in the state budget.

Therefore, the recovery of costs from water supply and sanitation is meagre as compared to irrigation.

In addition to revenue expenditure, both Union and State governments incur annual capital expenditure on water services.<sup>7</sup> Total capital expenditure up to 2014-15 on water supply alone (excluding sanitation) was INR 12.30 billion, of which Centre’s share was 1.02 percent. If we apply an annual opportunity cost (interest) of capital of 8 percent, an additional annual revenue of INR 0.98 billion needs to be recovered from water supply services alone to service the interest component of the invested capital.

**Figure 3: Performance in Cost Recovery for Water in Madhya Pradesh: 2016-17**



*Source: Water Resources Department, Government of Madhya Pradesh.*

According to end uses of water, water services can be classified into four major categories – agriculture, domestic, industrial and power; the environment should be considered another end use, as water is required to sustain freshwater ecosystems on which our livelihood and economies rely. Since information on cost recovery for all states is not available in the public domain, as a case in point, we provide the information for Madhya Pradesh. Figure 3 shows that cost recovery is not uniform across sectors. Annual recovery from all sectors is INR 2 billion which is only 7.2 percent of total annual demand (arrears & current demand). Recovery performance of outstanding arrears is 6.4 percent and that of current demand is 11 percent. The outstanding arrears was INR

<sup>7</sup> In 2014-15, Union Government’s share in annual capital expenditure for ‘water supply & sanitation’ was 0.48% (INR 0.91 Billion) and in irrigation was 0.01% (INR 0.06 billion). All States’ capital expenditure on water supply was INR 188.24 billion and in irrigation was INR 487.85 billion.

25.82 billion as on 31 March 2017 and half of the arrear is associated with power sector, one fourth with industrial sector and the rest with other two sectors.

### **3.1. Pricing for irrigation water**

In most of the states, water pricing for canal irrigation is based on crop, season of cultivation (*kharif* or *rabi*), area under cultivation and number of irrigation.<sup>8</sup> Water price is relatively low for foodgrains as compared to vegetables and commercial crops. If water is abundant, the present system of water pricing may not be an instrument to change the behavior of the farmers to conserve water. Both pricing and recovery of water charges are interconnected and collection efficiency varies across states and sectors. Pricing irrigation water is a challenge in the absence of information on volumetric consumption of water. Development of a methodology based on cropping pattern, season of cultivation, and relative scarcity of water could help government to discover the price of irrigation water. Ground water pricing basically means charging for power. Providing free power means that there is over-extraction of water apart from hurting the finances of the electricity boards. In states like Gujarat water is extracted and pumped through pipelines. Here volumetric pricing is possible.

There are many ways farmers can adjust to higher water prices: they can invest in water saving technologies or practices; they can adjust their cropping pattern based on potential water availability and the true cost of water. The transition to water-relevant practices can be accompanied, for instance by recycling parts of the revenues generated by water charges to support investment in water saving technologies or practices, or towards higher-value crops.

### **3.2. Pricing for domestic water**

There are several reasons for low recovery from domestic water sector. In many states bulk water is supplied to local governments or water supply agencies by the State Water Resources Department for a price. Though price is recovered from beneficiaries by the local governments, but dues are not paid to the Water Resources Department; as a result, arrears start building up. The process makes holes into state finances and erodes the fiscal space, as State government makes budgetary allocation to Water Resources Department without considering the recovery aspects. Urban drinking water particularly in large cities is priced either by water meters or by flat rates (as in Chennai). Rural drinking water is not priced except if there is house connection under piped supply. Improving efficiency in cost recovery and volumetric pricing for domestic water could help to sustain fiscal health of water supply agencies. Not charging for water for those who could afford to pay hinders expansion of organized water services infrastructure. As a result large section of the society is left out of access to organized water services.

Service providers can adjust to well-designed abstraction charges through managing water demand, minimizing leaks, or using alternative water sources (such as rain or storm water, or reclaimed water). Regulation is required to ensure that water tariffs entail an incentive for water

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<sup>8</sup> <http://www.mpwr.gov.in/water-rates>

utilities to enhance their efficiency, and not simply pass costs to domestic users. Expenditure programmes should be regulated to ensure that service providers make the best of available water, built assets, and financial resources. Targeted social measures can address affordability issues, when they arise; they are more efficient than cheap water for all, which benefits well-off domestic users already connected to the service and leaves the poor unserved.

### 3.3. Pricing for industrial water uses

Industrial water use generally attracts the highest water rates particularly in cities. States may also prescribe rates for both domestic and industrial water use. Apart from water rates there is also the water cess levied by Pollution Control Boards. Water charges that industries pay is a miniscule percentage of total input costs and total sales/ turnover of industries and often recovery of the cost is meagre (e.g., 4.63 % in Madhya Pradesh).<sup>9</sup> A revision in water charges for industrial uses is warranted. A mechanism for upfront payment of annual water charges at the beginning of the year may be introduced. A large number of small scale industries do not pay any water charge. Therefore, introduction of a flat-water charge for MSME sector may promote water use efficiency.

Industries will be able to adjust their water use by shifting to water saving processes, recirculating water to minimize use of freshwater; they will invest in less polluting practices or in water treatment to minimize the cost of pollution. Potential impacts on competitiveness of selected industries should be measured thoroughly (they are usually over-emphasized by corporates); they can be smoothed by supporting the transition through recycling parts of the proceeds of abstraction and pollution charges; additionally well-performing industries might benefit from social and environmental recognition. Such impacts should also be compared with the cost for Indian economy and society of inefficient uses of water.

### 3.4. Charging for hydropower

Not all states collect water charge for hydropower generation and water charges vary substantially across States. Table 1 shows that in Chhattisgarh one-third to one-fourth of revenue from hydropower is charged as water cost. Water charges for hydropower may be introduced for states where there is no charge at present. It can be based on a range of variables, such as a fee per volume of water release, a fee per kWh of electricity production, a fee per kW of generation capacity. Each basis has its strengths and limitations, which should be considered in line with policy objectives.

**Table 1: Cost of Water for Hydropower Generation as Percentage of Revenue from Hydro Power (%) – A Comparison across States**

States	2009-10	2010-11
Chhattisgarh	33.21	26.80
Jammu & Kashmir*	N.A.	23.15
Madhya Pradesh	5.0	9.1

<sup>9</sup> Based on CMIE's ProwessIQ database for 2014-15, for 215 listed companies annual 'water charges' as percentage of total expenses (excluding indirect taxes) is 0.26% and as percentage of total sales is only 0.33%.

Andhra Pradesh	1.85	1.36
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**Note:** \*Implies the estimation is based data available for NHPC hydropower projects only.  
**Source:** Rao, Mukherjee and Sengupta (2013)<sup>10</sup>

### 3.5. Charges for water pollution

Water cess charged by the State Pollution Control Board is very low; for instance, INR 0.30 per kilolitre for processing whereby water gets polluted and the pollutants are i) not easily biodegradable; or ii) toxic; or iii) both toxic and not easily biodegradable. The cess has not been revised since 2003.

The cess ideally should reflect the *environmental costs* (over and above the pollution abatement measures taken up by the water users) as well as *resource recovery cost* (cost of reclaiming water from the effluents / sewage) associated with water uses. Revision of water cess, bringing differentiation in water cess according to pollution load, risks for environment and human health, the sensitivity of the receiving water body, could be useful to stop the menace of water pollution in rivers and groundwater. The cess should be coupled with an urgent revision of effluent disposal standards on land and inland water bodies.

### 3.6. A need for information and a well-defined ambition

A large part of water related expenditures and recovery of cost made by local government remains outside the state budget. Therefore, understanding the present state of government expenditures (explicit and implicit) in water sector (e.g. water supply and sanitation, irrigation) and cost recovery is important for effective policy design. This is also important to understand the linkages between expenditures and outcome (e.g., coverage of households in access to safe drinking water and sanitation) for estimating the cost of achieving universal access to safe drinking water and sanitation by 2030 under Sustainable Development Goals (SDGs).

Efficiency in water cost recovery varies across States and sectors. While acknowledging that states face different challenges and may consider charging water differently, it is important to encourage a coordinated (not uniform) approach. Some basic principles could be discussed, in a pragmatic way. For instance, states may wish to align charging with expenditure programmes developed at state or basin level. They may wish to focus on large water users or polluters (large firms and farms, energy suppliers and utilities), as these generate the largest pressure on the resource, and would generate the lion's share of revenues from water charges: this would be a way to promote reform while keeping transaction costs low. Such coordination would minimize competition across states, which could have detrimental consequences for water management and economic and social development. The federal government has a role to play, such as setting reference values or ranges for water charges, and supporting states via incentivizing programmes.

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<sup>10</sup> Rao, R. Kavita, Sacchidananda Mukherjee and D. P. Sengupta (2013), "Revenue Potential of Himachal Pradesh: An Assessment and Suggestions for Reform", National Institute of Public Finance and Policy, New Delhi, May 2013.

### **3.7. Institutional arrangements for pricing instruments and water management**

The Thirteenth Finance Commission recommended setting up a statutory autonomous Water Regulatory Authority in each state and specification of a minimum level of recovery of water charges. The Commission proposed the following functions for the Authority:

- i) To fix and regulate the water tariff system and charges for surface and sub-surface water used for domestic, agriculture, industrial and other purposes.
- ii) To determine and regulate the distribution of entitlement for various categories of uses as well as within each category of use.
- iii) To periodically review and monitor the water sector costs and revenues.

The Commission recommended for allocation of INR 50 billion for the period 2010-11 to 2014-15 and also linked the allocation of the fund based on performance achievement in cost recovery from irrigation sector. Some states have set up Water Resources Authority and it would be useful to utilize the existing institution to set the water price and recover with active coordination with other institutions/ agencies.

International best practice can help define the key regulatory functions for water pricing, and the most appropriate institutional arrangements to discharge these functions in the Indian environment, at federal and state level.

## **4. Towards an action plan**

### **4.1. Recommendations for a 3-Year Action Plan**

The following actions shall be envisaged:

- Initiate policy dialogue with stakeholders (state and local governments, industries, citizens) on water pricing reforms, to make the case for reform, explain the benefits, and anticipate potential harmful consequences. A clear distinction should be made between abstraction and pollution charges – which essentially manage the resource – and tariffs for water services – which essentially finance service operation.
- Make the case for change by signaling the economic, social and environmental costs incurred by the current situation of underpricing, and the potential benefits of better pricing. Distributional issues should be emphasized, as it is well established that cheap water hurts the poor. This could be done through compiling available information and data (as the issue has been intensively researched in India) and showcasing good and bad examples.
- Set principles for abstraction and pollution charges, and tariffs for water-related services. Set minimal (and maximal?) charges and tariffs, promote good practices as regards the structure of the charges and tariffs and the tariff-setting process. Experience shows that charges and tariffs should be set right from the start, as i) too low prices do not deliver any benefit that users can see; and ii) prices are difficult to increase.

- Set principles for the most efficient allocation and spending of revenues from water charges (abstraction and pollution charges) and for the expenditures of water utilities. Set up the regulatory framework and institutions that can monitor expenditure programmes. This is a requisite for water prices to deliver and for water users to pay the price and adjust their practices. Transitory measures can be implemented or pilot tested. Good practices should be rewarded, for instance through privileged access to federal financial support (conditionalities to access federal support could relate to the setting up of appropriate rules, regulations, and institutional frameworks at state or city levels).
- Consider a parallel reform of water rights and entitlements and water regulation. This is a requisite to avoid harmful unintended consequences, such as uncontrolled substitution of surface water by groundwater use. Key principles could be endorsed at federal level. Good practices would be identified, shared and promoted.
- Encourage charging water for those who can afford to pay. Support the design of well-targeted accompanying measures for those who cannot afford to pay, or for well-identified industries or farmers whose competitiveness would be affected by water charges. Accompanying measures are best considered outside the water bill (they should not be managed through special tariffs).
- Revise water prices for industrial uses
  - Abstraction charges should contribute to water use efficiency and be adapted to the capacity to monitor use
  - Pollution charges should be tailored to pollution loads and hazards for environmental and human health.

Encourage adoption of volumetric water charges in cities and towns, and stimulate metering of water consumption.

#### **4.2. A 7-Year Strategy**

- In most of our rivers freshwater flow during lean seasons has gone down over the year. Keeping in mind the changing hydrological regime and eco-system status of rivers, effluent discharge standards required revision in every seven years. Setting absolute liability for pollution control based on ambient concentration of signature pollutant (e.g., concentration of chromium / TDS in rivers) may help to control pollution from industrial clusters like textile bleaching and dying, tanneries.
- Water cess should be assessed and potentially revised every seven years to adjust it with a) inflation, b) changing water environment, c) changing pollution profile of the industries and other uses, and d) rising cost of water reclamation/ recovery.

#### **4.3. A 15-Year Vision**

- Improving water productivity at least at the level of world average by 2030.