Rationalization of Water Rates: An effective tool for Increasing Water Use Efficiency

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ABSTRACT
Water is economic good and social good. Being an economic good, an appropriate cost is to be associated with its delivery, in line with the expenditure by the service provider, both on capital cost as well on O&M cost. Being a social good and a "basic human need", it is incumbent upon the State to provide sufficient water to its population to sustain human life i.e. water required for domestic use (drinking water and sanitation) and water required for the production of food at no cost or nominal cost. These are the two extreme considerations for water rates. In practice, charging of water rates by a State depends on factors like constitutional provisions, legal framework, availability of water in space and time, priorities of different sectors, National objectives, public awareness, institutional mechanisms for water service providers, stakeholder's involvement in management of water resources, socio-economic conditions, political will, etc. The ever increasing demand for water from all sectors and the increasing gap between the demand and supply is forcing the States to take all possible steps to increase the water use efficiency, so that the available water resources are used most efficiently by each sector. It is widely recognised that unless there is a value (scarcity as well as economic) associated with water, the water use efficiency initiatives will not yield desired results. Various high level committees set up by the Govt. of India and the successive finance commissions have also underlined the need for rationalisation of water rates. It has been recognised world over that to have a sustainable water infrastructure, recovery of O&M cost as well as capital cost (or at least a part thereof) is essential through well designed water tariff. Historically, water rates are designed on the basis of recovering O&M cost only, with the objective to make water infrastructure financially sustainable, but as the water scarcity increases, the objective of increasing water use efficiency through water rates gets higher priority. It is well established that rational water rates have profound influence on curtailing the wastages, overuse and inefficient use of water. When used innovatively, water rates can acts as means not only for recovery of costs but can also to convey the scarcity & economic value of it. As demonstrated by the societies where water is treated as economic good, it is a most effective tool for demand management through improving and incentivizing water use efficiency and water conservation. The paper discusses the National policy and recommendations of various committees &commissions in India with regard to the water rates. The large spectrum of international practices for pricing approaches, principals and methods are also discussed with a view to its suitability in Indian context. Independent Water Regulatory Authorities (WRA) can play a vital role in deciding the water rates in line with the National policies & priorities; based on the sound economic and social principals and at the same time, isolating it from the political considerations of the incumbent governments. The paper discusses the role and functions of an effective WRA and examines the case of MWRRA, which is the first WRA in India. The paper focuses on designing water charges and creating an institutional mechanism, which will give the users an incentive to make better use of their water by reducing the amount of water used per unit of output or unit requirement. Considering the interplay of various factors influencing the water rates, it may be difficult to rationalise the rates in one go or in a short period of time. A well laid out strategy will be required to make systemic changes over a period of time. The paper proposes a three phase plan to change over to volumetric water rates for all sectors which will effectively convey the scarcity as well as economic value of water. The gains from rational Water rates can be realized, only when the collection/recovery rate is high. At present, most of the states in India have abysmally low recovery rates particularly for irrigation sector, which is the biggest user of water. The paper discusses various factors which are important for ensuring high recovery rates.

1. INTRODUCTION

There is an ever increasing demand for water from all sectors. In addition to the quantity & quality issues, we have systematic and operational inefficiencies among all water use sectors. The scare water resources are used most inefficiently by all. Water resources are finite and are unevenly distributed in space and time, the problem is further compounded by the impact of climate change, whereby, the extreme evens are becoming more intense and more frequent. The traditional approach

of supply side management is becoming increasingly difficult to implement. This is mostly because, most of the favorable and easy sites for the projects have been used up; new projects have to be located at difficult sites. Land acquisition for water infrastructure is becoming legally and socially difficult; and there is a public opposition to any project which involves resettlement & rehabilitation. Environmental issues have taken center stage; environmentalists, activists, public at large are opposing projects on the basis of environmental concerns of various water resources projects. All these contribute to the high investment cost and unfavorable benefit-cost ratio.

Under the XII Plan, Government of India is proposing a paradigm shift in approaches towards water resources development and management. Due to various constraints for development of water resources, more emphasis will nowbe on demand side management rather than supply side management. The National Water Mission (NWM) which is one of the eight Water Missions identified to overcome the adverse impact of the climate change on water resources and to ensure effective sustained utilization of water resource in various sectors; is also focusing on the demand side management. The objectives of the NWM are conservation of water, minimizing wastage and ensuring its more equitable distribution both across and within states through integrated water resources development and management. However, in a country like India with wide variations in water availability in space and time, varying agricultural, climatic, demographic conditions, the demand side management initself is a formidable challenge.

The ever increasing demand for water from all sectors and the need to bridge the gaps between demand and supply is forcing the states to take all possible measures to increase water use efficiency; so that available water resources are used most efficiently and optimally by each sector. The NWM has proposed the target of increasing Water Use Efficiency (WUE) by 20%. To achieve this target we will have to focus our efforts in an integrated manner by utilizing all the tools, which are available at our disposal. These tools include legal & institutional framework; modernization of water conveyance & delivery system, financial support; incentivization of efficient use; benchmarking and rating mechanisms; water sector reforms; improved agricultural practices, rationalization of water rates and so on. We may use combination of these tools in given situation, however, It is a widely accepted fact that unless there is value (scarcity/economic) associated with water, water use efficiency initiatives will not yield the desired results. Water rates are collected from users for two main reasons. The first is to cover the O&M & Capital cost so that the project is financially sustainable. The second objective involves pricing to encourage users to use less water per unit of output or produce greater net economic returns per unit of water, or both. Historically, the first objective has been paramount, but as water scarcity increases, the water use efficiency objective is growing in importance and is to be given a higher priority.

Water is economic as well as social good. Being an economic good, appropriate cost is to be associated with delivery in line with the expenditure by the service provider both O&M as well as on capital costs. Being a social good and basic human need, it is incumbent upon the Govt. to provide sufficient water to its population to sustain human life i.e. water required for production of food at no cost or nominal cost. These are two extreme considerations of water rates. In practice, charging of water rates depends on multiple factors like constitutional provisions, legal framework, availability of water in space and time, priorities of different sectors, national objectives, public awareness, institutional mechanism for water service providers, stakeholder's involvement in management of water resources, socio-economic conditions, political will etc. In India, the water rates that are being charged for different water uses like irrigation, domestic, industrial; are way below the rate required even for the recovery of O&M cost. Most of the states do not have any dedicated institutional mechanism to decide water rates on the rational basis. The rates are decided on ad-hoc manner without any consistent criteria even within the states.Moreover the collection/recovery of rate is abysmally low.

In this backdrop, the MoWR is considering formation of Bureau of Water Efficiency (BWE) to regulate and promote water use efficiency by different sectors. The proposed BWE is set to work as benchmarking and rating agency for various processes, planning agencies which use water as one of their input. The objective is to replicate the success of Bureau of Energy Efficiency (BEE) in the energy sector. The BEE is established by the Government of India as a body corporate with primary objective of reducing energy intensity of Indian economy and play a pivotal role in formulating strategies for reducing energy efficiency; promoting use of innovative technology; and spreading public awareness.

2. RECOMMENDATIONS OF HIGH LEVEL COMMITTEES/COMMISSIONS

The Government of India has from time to time has constituted various High Level Committees/Commissions to look into the issues of water rates and formulate a guidelines for the states to follow. The Irrigation Commission of 1972, recommended that water rates should be related to the "benefits" from the water use rather than "cost" of supplying water. For Irrigation, depending upon the cropping pattern, the rate should be linked to the type of crop and season. The Commission recommended that the water rate should be about 5% for food crops and about 12% for cash crops of the total value of the farm produce. The National Water Policy 1987 differed from this position of the Irrigation Commission and it linked water rates with the O&M cost and part of the fixed cost. The policy also stated that *"Water rates should be such as to convey the scarcity value of the resources to the users and to foster the motivation for economy in water use. The water rates for surface and ground water should be rationalized with due regard to the interests of small and marginal farmers".* The National Water Policy 2002 also reiterated that the water charges for various uses should be fixed in such a way that they cover at least the operation and maintenance cost initially and part of the capital costs subsequently. This policy also supported subsidy on water rates to poorer section of society. It can be seen that the initial thinking of the water rates as percentage of total income, changed over a period of time and settled for the recovery of O&M Cost only to begin with. The experience of implementation of water rates on the basis of above principles over a period of time has forced this change in thinking.

Now the draft National Water Policy 2012 dwells on the water pricing in more details. It specifies that over and above the pre-emptive and high priority uses, water should increasingly be subjected to allocation and pricing on economic principles. This is a clear deviation from the earlier thinking. It has been realized that unless we give the water an economic value, the water use efficiency efforts will not yield desired results. The need for having institutional mechanism in place for each state has also been recognized. Establishment of Water Regulatory Authority, for fixing and regulating water tariff system in accordance with the principles stated in the policy in an autonomous manner has been included. The policy also recommends that the water charge should be preferably/as a rule to be determined on volumetric basis. The policy has also recognized that the heavy under pricing of electricity leads to wasteful use of both electricity and water.

The Vaidyanathan Committee constituted by the Government of India in 1992 on 'Pricing of Irrigation Water' had clearly stated that," *it is difficult to accept the case for subsidizing such a user oriented and capital oriented infrastructure as irrigation. The government is not in a position to sustain subsidy on irrigation and for that matter on any infrastructure*." The Committee recommended a two-part tariff in the first place, comprising a fixed membership fee per hectare and a variable charge to recover annual O&M cost and 1% interest on capital cost with the ultimate objective of moving towards full cost recovery. Though the government accepted most of the recommendations of the Committee, it did not accept the recovery of fixed cost as a part of water rates. National commission on Integrated Water Resources Development (NCIWRD)in its report in 1999 had suggested combining the recommendations of Irrigation Commission and Vaidyanathan Committee. The report proposed that all O&M costs; 1% of farm produce for food crops and higher percentage for cash crops should be recovered. It also suggested incentivization /dis-incentivization of water users with the ultimate objective of moving towards volumetric pricing. The Committee recommended that in case of supplies for industrial purpose, the principle of "user pays, polluter pays" has to be applied and water rates be fixed accordingly.

Thus, it is seen that in the last few decades, there has been consistent emphasis on rationalization of water rates based on recommendations of various Committees and Commissions. However, very little of these have actually been transformed in practice and got implemented. For the first time, the 13th Finance Commission incentivized the implementation of rationalized water rates. The Commission has set aside Rs.5000 crore as a grant for O&M cost of irrigation infrastructure. This grant is linked with the states effecting recovery of the water charges in accordance with the recovery rates specified by the Finance Commission, It is also linked up with the setting up of Water Regulatory Authority by March 2012 by each state (NE exempted except Assam). This had some positive impact on state governments and now the states have started setting up Water Regulatory Authorities. States like Maharashtra, Kerala, Andhra Pradesh, Arunachal Pradesh, Gujarat have established WRAs, whereas, states like Himachal Pradesh, Odisha, Madhya Pradesh etc. are in the process of setting up.

3. COST RECOVERY PRINCIPLES

It is well established fact that water rates are user charges and not a tax. Full cost of providing water can be divided into three categories; (i) Direct Project Cost; (ii) Environmental Cost; and (iii) Opportunity Cost.

3.1 Direct Project Cost (DPC)

This refers to the cost arising from capturing & delivery of water to the users. DPC can be further divided into two components i.e. (i) fixed cost; and (ii) variable cost. Fixed cost refers to the investment made for creating water resources structures like reservoirs, canals, conveyance & distribution network, pumping stations, metering systems etc. It also includes depreciation and interest on investment made. Some part of the top level establishment cost, which do not vary with the quantity of water is also considered as a part of fixed cost. Variable cost covers operation and maintenance including lower rungs of establishment and administrative charges; cost of the electricity in case of pumps; cost due to water loss; conveyance losses etc.Among all categories of the cost, DPC is the only cost that can be can be measured or computed easily.

3.2 Environmental Cost

This is the equivalent of the environmental damage caused due to excavation; soil erosion; submergence; water logging; salinity caused by the water infrastructure. This cost also includes indirect cost of adverse environmental impacts associated with discharge or disposal of the waste, which is more applicable to the industrial and domestic sector. Normally, Environmental Cost is difficult to measure. Only in few countries like South Africa & Australia, this concept have taken roots, where the Environmental Cost is partly recovered in the form of water charges.

3.3 The Opportunity Cost

This is the present value of the future sacrifice due to the current resources use. This basically means that because of the current (excessive) use of surface as well as ground water, future water supplies will become less accessible and more expensive. In case of aquifer, it may happen that due to over exploitation, the aquifer gets depleted and is no more available and the future users will have to spend more in getting water from longer distance and alternative sources. The cost that future generations will have to bear due to the water use by current generation, should be charged to current generation only.

Though in the purest economic terms, all the three costs should be recovered in full from the users, in practice only some components of these costs are recovered due to various factors. These factors are National Policy, Priority sectors, current level of development of water resources & economy, social perceptions about natural resource, social awareness, economic impact of social policies etc.

In India, as in most of the other developing countries, the efficiency and conditions of water delivery system fall far short of satisfactory levels of performance. Financing of these services and recovery of at least the operation & maintenance costs of the delivery system has emerged as a key factor for performance improvement. In India, as per the latest NWP, only the O&M cost is to be recovered initially and part of the direct cost subsequently. Water pricing remains a complex process and is required to meet diverging financial, economic, environmental and social objectives. A major challenge therefore is designing tariffs in a way that strikes an appropriate balance among competing objectives.

4. COST RECOVERY METHODS

Full cost recovery implies that revenue is fully adequate to meet all cost categories, the equation for this is expressed as:

RR = (O&M + D) + T + CC + EC + OC
RR – Revenue Requirement
O & M – Operation & Maintenance Costs
D – Depreciation
T – Taxes
CC – Cost of Capital Including Interest

EC – Environmental Cost
OC – Opportunity Cost

The method to be adopted in practice will be influenced by the decision on which of the above cost components is to be reflected in the water rates. Three main pricing models are applicable in the context of water ratesviz. average cost based pricing, marginal cost based pricing and opportunity Cost based pricing.

The Average Cost based pricing method considers total cost including both fixed and variable cost over total volumetric supply to derive arithmetically the average cost per unit of water supplied. In this method incremental supply does not distinguish between old and new users and all users pay the average of fixed and variable costs.The Marginal Cost based pricing method distinguishes between fixed cost and variable cost and pricing is based on the cost of providing an incremental unit of water.Opportunity Cost based pricing method is more relevant for retail or sub-bulk supply in situations where pricing is purely a function of demand and supply with the service provider treating water as any other commodity. A refined socio-economic Opportunity cost can probably built as a theoretical construct but would require allocation of weightages to the value of water for various uses to various users and would carry a substantial subjective element.

5. COST ALLOCATION TO VARIOUS SECTORS

One more important issue in recovery of the cost from different sectors is; what percentage of total cost should be allocated to each sector. For e.g. Multipurpose project may provide water for hydropower generation, irrigation, domestic, industry, navigation, recreational facilities etc. So, it becomes necessary to allocate total cost in some proportion to each of these user categories. There are three main methods for allocation of cost amongst the various users, firstly, **the use of facilities (UOF)**, where the cost is charged to different type of user in proportion to water used by each sector. The second method is **alternative justifiable expenditure (AJE)** recovers the cost based on the remaining benefit after subtracting specific cost, where specific cost refers to costs directly attributable to single purpose and excludes the cost of change in project design due to inclusion of a particular purpose. The third method is **separate costs remaining benefits (SCRB)**; this method is similar to AJE, however, it assigns costs that serve a “single” purpose to the benefiting purpose, including the costs of any project design changes required to include the added purpose. The remaining “joint” costs are assigned in proportion to the remaining benefits derived for each type of use after subtracting the separable costs.AJE easier to calculate than SCRB because, it relies on specific costs rather than separable costs.

Above arithmetical procedures to allocate water costs would require us to ignore the other important parameters viz. (i) affordability; (ii) accessibility: (iii) quantity & timeliness; and (iv) water use efficiency i.e. the value addition to the water used and/or saved by each user group. Taking into account these factors requires lot of subjective judgment as these are difficult to quantify. One of the method is to construct a matrix by allocating weightages representing the relative importance of each of these parameters to each of the water use sector viz. Irrigation, Drinking water and Industry and then applying them to the basic O & M based arithmetical unit cost to derive a weightage based differential pricing structure with the weightages justifying the difference. While a matrix allocating weightages of this type cannot altogether eliminate the subjective element, at least we have some basis to differentially charge various sectors on sound principals.

6. WATER RATES FOR IRRIGATION SECTOR

This sector is one of the most inefficient sectors in India and also the biggest user of water. This sector uses about 83% of available water, thus even if a small percentage of saving by this sector will make huge impact on quantity of water available for other sectors. There are many tools available for this sector to ensure water use efficiency like cropping pattern, irrigation scheduling, advanced irrigation techniques; scientific agricultural processes, improving O&M for the water supplying structures, lining of canals, canal automation, reduction in conveyance loss, formation of water user associations etc. However, even if all or some of these tools are adopted, the water use efficiency will not improve unless there are appropriate water rates and an economic value is attached to the water supplied.

In India, there is wide variation in water availability across the states and within a state across river basins. Water availability also varies seasonally, e.g. in some part of Rajasthan the annual rainfall is as low as 100 mm; whereas in the NE states there are some places which get highest rainfall in the world. Most of the river basins receive rainfall during three-four months monsoon period and for the remaining period the rainfall is almost nil. Due to this varied climatic conditions& agricultural practices, it may not be possible to adopt uniform pricing system in India or even across a state. Innovative pricing mechanism will have to be designed based on the sound principals and national/state priorities, so that they have the right impact on water use efficiency; yet fulfill the social obligations of the State. There are three major methods of pricing of water for irrigation; the same are briefly discussed below:

6.1 Area Based Pricing

This method is most suitable where water available is plenty. The advantage of this method is, it is simple to calculate and easy for farmers to understand and no metering is required so the implementation cost are lower. However, this method does not give any incentive to minimize water use per hectare. The water charges based on this method does not have any effect on farmer's water consumption because, marginal cost of applying additional quantity of water per hectare is zero. Secondly, with this method, the demand for water is usually higher and leads to overuse of water by farmers, particularly, near the head of the canal, whereas, tail enders suffer from shortage of water. This method is appropriate only in places where water available is plenty, where crops are not changed, where installation of meters is difficult or costly. Even in the area where water is abundant, area-based pricing methods leads to inefficient use of water thereby reducing yield per hector and giving rise to problems of salinity and water logging. In India, there are very few places where this method can be applied e.g. North East region; Konkan region etc. Though pure area-based pricing system is not "efficiency friendly", the modified area pricing methods like area-crop; area-irrigation; area-season; area-technology removes some of the disadvantages of this system and can be adopted to ensure efficient use of water.

In area-crop based method, charges are to be recovered depending on the area as well as type of crop grown. More water consumptive crops like sugarcane, rice etc. are charged more per hectare, whereas, for other crops like wheat, groundnut etc. charges are lower. This method can also be used to force farmers to change the cropping pattern and align it in line with national/state food policy. This method can also be used to discourage or encourage food/cash crops.

In area-irrigation method, the water charges are adopted based on the irrigation method used e.g. gravity/lift irrigation. In a country like India, where there is large seasonal variation in water availability, the method of area-season is appropriate. Higher prices are charged during dry season when water is scarce and lower rates are charged during monsoon or wet season when water available is relatively plentiful.

Another variation is area-technology based pricing, where farmer are encouraged to go for water saving technologies like drip or sprinkler irrigation, as this generally allow better water control and more output per unit of water delivered than flood irrigation. Various combinations of area-based pricing schemes can be adapted to suit the local requirements. When all variations of this method are combined together; effectively this method approaches volumetric pricing.

6.2 Volumetric Pricing

It has been acknowledged that volumetric pricing is the best method of pricing for all the sectors of water use. This method is a must, when the objective is to improve the water use efficiency, encourage users to use less water per unit of output / or to encourage maximum net economic returns per unit of water. This method makes it possible to implement the concept of efficient and economy, whereby, the user is encouraged to maximize the benefits from water supply subject to technical and physical limitations. In this method rate is based on quantity of water delivered. On purely economic terms, rates should be set equal to the full cost of providing water, and it also requires accurate measurement of supply of water through meters. This method is best amongst all other methods, however, the implementation cost is very high as meters are required to be installed and monitoring of distribution is to be done effectively and correctively. With Block Pricing system having adopting telescopic rates, it is possible to guard interest of small or marginal farmers or poorer section of the society by charging nominal amount for the first block and telescopically charging higher amount for

the subsequent blocks. Volumetric pricing is relatively easy to implement in respect of domestic and industrial sector. Extending this method for irrigation sector will have to be done in phases. Water User Associations play an important role in implementing this system for irrigation. The efforts will have to be directed to create Water User Associations for all irrigation projects. Subsequently, the O&M works, distribution of water amongst farmers and recovery of water rates will have to be handed over to Water User Associations.

For the irrigation sector, volumetric based pricing is the best method for charging water usage. However, it is not possible to implement this method within a short span of time, as it will require water sector reforms, legal and institutional framework; formation of water user associations, system for measuring discharge in the canal network and effective monitoring and implementation strategy. It is proposed to implement this volumetric pricing system for irrigation in three phases as below.

- The first phase should be to rationalise and simplify the existing system of ad-voc assessment to a combination of modified area based pricing systems, i.e. area-crop, area-irrigation, area-season, area-technologyetc.
- The second phase should be to implement a fully volumetric system in the course of the 10-15 years.
- The third phase spread over a much longer period would seek to extend and consolidate the system of WUAs, and implement, with the involvement and participation of such groups, a programme for upgrading the system to a higher level of efficiency in water-use and therefore of productivity.

7. WATER RATES FOR INDUSTRIAL SECTOR

Normally, this is a sector which normally has to bear the cost of cross-subsidy to other sectors. Industries have profound impact on the quality of water discharged back to the system. It is also this sector which is having maximum affordability as well as capability to invest in advanced technology to ensure efficient water use. Considering that the water used by the industry is mostly for cooling and industrial processing purpose, it will be appropriate if the water rates are based on three aspects;(i) amount of water supplied to the industry; (ii) amount of water actually consumed by the industries for various processing including evapo-transpiration; and (iii) quality of water returned back to the system. Mathematically this can be written as :

Water Charge = $(Q_w x K_o x P_u) + (Q_c x K_c \ x P_u) + ((Q_w - Q_{c)} x K_q x P_u)$

Where,

Q_w is the water supplied to the industry;
$K_o$is the multiplier depending on the type of industry;
P_u is the unit price in rupees per meter cube;
$Q_c$is consumptive use of water;
$K_c$is the multiplier depending on the type of industry.
$K_q$is the multiplier depending on quality of water in terms of BOD, COD, heavy metals etc.

The above method of water pricing will encourage the industry to draw minimum water from the source and adopt recycle and reuse. It will also encourage reducing the consumptive use by using advanced technologies for processes and cooling. This will also penalize the users for discharging effluents back to the system without treatment. Such type of water pricing system is successfully implemented in Brazil.

8. WATER RATES FOR DOMESTIC SECTOR

In all countries, the highest priority of water allocation is for domestic sector, which includes water required for drinking, sanitation and water required for sustaining the livelihoods of marginal section of the society. Water is partly a social good, it is the responsibility of the government to provide certain minimum quantity of water required for certain basic needs at marginal or nominal cost. However, charging a flat rate or supplying water without metering, ultimately leads to its inefficient use and wastage. Even though there are norms to provide 130 LPCD for basic needs in urban areas, but in practically, in many places the consumption is much more than the norms prescribed. This is because there is no incentive or disincentive for usage of water either efficiently or inefficiently.

Metering system for urban users must be made compulsory and the water rates should be structured telescopically so that minimum quantity is given at a nominal rate and further drawl is charged progressively higher to discourage wastage.

9. WATER RATES FOR NAVIGATION & RECREATION

Though, both these sectors are non-consumptive and have minimum impact on the quality of water, the users will have to be charged appropriately to recover some part of the opportunity cost of the water. Opportunity cost would be that cost, which would have been recovered, had the water been provided to other sectors like domestic, irrigation etc.

10. WATER MARKETS

In a society where water is treated as economic goods, water rates are left to market forces to decide. This method brings in maximum economic gain for water. However, the poorer, disadvantaged sections of the society may have to bear the burden of higher water charges. This method fixes the water rates amongst companies, individuals, groups and stakeholders at a particular market equilibrium price that will change depending upon economic gains from the water use. To operate effectively, such water markets require a well-defined institutional mechanism, a clear and comprehensive set of rules for trading, legal framework and institutions to manage water delivery, judicial body to oversee trading activities and resolve disputes. It also requires well developed conveyance and networking system for easy transportation of water to all the stakeholders. In a water market, pricing will be effectively adjusted by the supply and demand. The countries like Chile, Australia, part of the South Africa and few states of Brazil have successfully implemented water markets and at the same time guarded the interest of poorer section of the society and marginal farmers through legal provisions.

11. WATER REGULATORY AUTHORITY

In the last few decades many high level Committee/Commissions have been set up by the government to formulate a guidelines for the water rates. The National Water Policy and State Water Policies also provided the guiding principles for rationalization of the water rates; however, implementation has not taken off in real terms. It is basically because, in a country like India, water is considered more as social good than an economic good. Charging of water by the water service providers is invariably opposed by the people at large; media; activists; NGOs on various grounds. The administrative issue of recovery of water rates gets transformed into sensitive political issue. As a result, the water rate remains very low across all sectors; without any incentive or disincentive for efficient water use. There has to be an independent institution for regulating and fixing water charges for all sectors. This institution would be entrusted with the responsibility of fixing and regulating water tariff for various sectors based on factors like water availability; direct costs involved; priorities; allocation of water to each sector; affordability; accessibility; quantity; quality; timeliness etc. The independent institution can consult all stakeholders and formulate a methodology for arriving at applicable water rate to each sector. Factors considered and data used for arriving at a particular water rate should be kept in public domain, so that all stakeholders are well informed about these. The 13th Finance Commission has incentivized formation of Water Regulatory Authority by keeping aside a conditional grant of Rs.5000 Crores, which has been linked with the water charges recovery rate and formation of Water Regulatory Authority by the respective states. The minimum mandate for the Water Regulatory Authorities has also been fixed by the 13th Finance Commission. This incentive had good effect and states have started establishing Water Regulatory Authorities. Maharashtra is the first state that has established Maharashtra Water Resources Regulatory Authority (MWRRA) in 2005 followed by other states like Andhra Pradesh, Karnataka, Gujarat etc.

12. MAHARASHTRA WATER RESOURCES REGULATORY AUTHORITY (MWRRA)

MWRRA has formulated a methodology in consultation with the stakeholders for deciding water rates for bulk users. The principles that have been adopted by MWRRA are :

- Only O&M cost to be considered for recovery. No capital cost interest on investment or depreciation is to be considered. This is in line with the mandate given to MWRRA by Govt. of Maharashtra
- Calculation are based on actual cost and not on marginal cost;

- MWRRA has adopted area-based pricing to start with for irrigation sector coupled with the combination of crop, technology, season and irrigation methods;
- It has adopted volumetric system of pricing for WUAs, domestic and industrial sector;
- The share of each sector in the cost is decided on the basis of matrix constructed by allocating weightages representing the relative importance of each of the following parameters to each of the water use sector;(i) affordability; (ii) accessibility: (iii) quantity & timeliness; and (iv) water use efficiency
- The tariff is decided by computing annual likely use of water by each sector. The annual projected O&M cost including the cost of the establishment is derived. The apportionment of the projected O&M cost among the all category of users is done as per finalized criteria and basic rate for each category of use is worked out.
- Then within each category of user, tariff is fixed based on the incentive, disincentive, policy of the government etc.
- The volumetric pricing for agriculture is derived based on average cropping pattern and crop-wise tariff;
- The gap between revenue likely to be earned through water rates and O&M cost is then subsidized by the state government through budgetary support;
- As per the policy of Government of Maharashtra, marginal farmers having upto 1 ha land are charged 50% of the basic rate. Small farmers with 1-2 ha holdings are charged 75% of the basic rate. No tariff is charged from the tribal farmers. The gap in revenue generation due to this social concession is made up through government subsidy.
- The MWRRA also encourages the farmers to adopt advanced irrigation technologies by charging them only50% of the basic rates.
- Farmer family having more than two children is charged 1.5 times the basic rate. This is a classic example how water rate can be used as a tool for water use efficiency and also as a tool for social interventions;
- The Gram-Panchayats using upto 40 LPCD is charged 75% of the basic rate; ULBs using upto70 LPCD are charged 90% of the basic rate; ULBs drawing more than 130 LPCD are charged 1.25 times of the basic rates; corporations are given further concession of 50% on volume of sewage treated.
- For industries, discharging untreated sewerage and effluents in violation of MPCB norms are charged twice the basic rates.

It is seen that the MWRRA has used the water rates as a tool to achieve multiple objectives.

13. CONCLUSION

It is well established that any initiatives for increasing water use efficiency will not yield desired results unless the value (scarcity and economic) is assigned to water used by each sector. Water rate is the only tool which can convey its scarcity and economic value to the users. If handled rationally and non-politically, water rate is an effective tools for recovery of O&M cost; capital investment in full or part. In few cases, it is also possible to recover some portion of environmental cost of water resources infrastructure. It is also an effective tool for cross subsidy of water amongst more affluent and marginal users. Water being economic good, its economic value must be conveyed through water rates. With higher emphasis being given in the coming years to the demand side management, the need is to focus our efforts in an integrated manner by utilizing all the tools, which are available at our disposal. Among the various tools available, water rates is the most powerful yet flexible tool available for demand side management through improving and incentivizing water use efficiency and water conservation. It can also be used a penalizing tool for ensuring quality of the water discharged back to the environment by industries, townships and corporations etc. As demonstrated by MWRRA, it is a potential tool for social incentives as well. The implementation of rational water rates will be possible only through strong legal framework; advanced technology solutions; community based management initiatives; institutional mechanism specifically created to regulate water rates like Water Regulatory Authorities & mass awareness. Over the last few decades much has been discussed and published on water pricing theory; but little is to done for practical implementation of effective assessment and collection mechanisms. In India and even in many countries, the issue is not principally how to determine the level of water charges, but how to enforce the rational water rates and improve collection efficiency.
