Rural Water Sector Policies and Reform – A Review

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Abstract:This paper is an attempt to describe the major components of drinking water in rural sector and its tariff design. With an integrated approach towards improving Quality of Life (QoL) of rural people, ensuring equity and effective public participation as willingness to pay for water. The pressure of rural development programme has been made a frontal attack on poverty through pricing of drinking water. Therefore, water tariffs should be fixed to make people understand the value of water.
Present paper describes various works done till date in this field of research.
 Keywords: **Rural Water Sector Water Demand, Drinking Water Supply, Water pricing,**

1. INTRODUCTION

Rural water supply is most promising sector having conflicts between Technology, Policies & its Implementation. It can be divided into distinct phases of water safety programs as early independence which includes provision of safe water to citizens as a right to potable water along with introduction of piped water supply scheme (NRDWP). Secondly transition to Modifications in earlier reforms such as NRDWP to ARWSP by GoI to accelerate pace of coverage of water supply.

According to census data of 2001 the percentage of access of rural population to safe drinking water had been increased from 56 to 78. Keeping this in mind the Rajiv Gandhi National Drinking Water Mission (RGNDWM) fixed a target to attain 100 percent access to safe water by the year 2007, which is yet not attained.

 It should be marked that even if safe water is available many a times other problems persist such as distance from user end, shortage of quantity, high prices and poor design of schemes. Drinking water availability mainly depends upon Ground Water and Surface Water sustainability which is in danger today due to increasing population, water demands, falling Ground Water levels and rising Surface Water pollution. Rural water sector is facing lack of continuous & regular monitoring in terms of proper access, reasonable price and adequate distribution of authority at District or Block level.

As Ground Water Level is falling day by day so hand pumps and piped water scheme based on Ground Water is becoming non functional which results in a shift of attention towards surface sources of supply through a regulated or metered piped water supply in villages.

 In this regard a regulatory body is to be set to generate revenue for operation and maintenance from user end by adopting different models of water pricing / tariffing. It is controversial in implementation because of its conflict between motive of water pricing and its design parameters depending upon policy makers and society. This sector lacks empirical /mathematical work which can change users attitude towards pricing by helping the user to know that how changes in price can affect user.

A village pipelined water supply scheme can be a solution to drinking water availability problems of regions having ground water shortage and non perennial source of surface water. These schemes should be economically affordable and can provide a good quality service to the areas having acute shortage of water.

2. REVIEW OF LITERATUE

This part of paper deals with the review of past researches and study of different aspects of water projects and their connections to the economic evaluation of rural drinking water supplies.

Providing clean drinking water has always been a priority in Indian constitution with Article 47 explaining the need to provide clean drinking water and thus improving public health standards to the state.

I. Review of Rural Drinking Water Sector Policies

Rural water supply (RWS) in India is divided in distinct phases as per, Khurana and Sen. (2008), are as follows :

➢ **Early independence (1947-1969)**
1949: The Environment Hygiene committee recommends the provision of safe water supply to cover 90 percent of India's population in a span of 40 years.
1950: Indian constitution confers ownership of all water resources specifying it as a state subject as a right, "Right to potable water".
1969: National Rural Drinking Water Supply programme launched along with UNICEF and Rs. 254.90 crore is spent during this phase, with 1.2 million bore wells being dug and 17,000 piped water supply schemes being provided.

➢ **Transition from Technology to policy (1969-1989)**

1972-1973: Introduction of the Accelerated Rural Water Supply Programme (ARWSP) by Indian government to accelerate pace of coverage of water supply.
1981: India as a party to the International Drinking Water Supply and Sanitation Decade (1981-1990) declaration sets up a

national level Apex Committee to define policies to achieve the goal of providing safe water to all villages.

1986: The National Drinking Water Mission (NDWM) is formed.

1987: Drafting of the first National Water Policy by the Ministry of Water Resources.

> **Reconstructing phase (1989-1999)**

1991: NDWM is renamed as Rajiv Gandhi National Drinking Water Mission (RGNDWM).

1994: The 73rd Constitutional Amendment assigns Panchayati raj institutions (PRIs) the responsibility of providing drinking water.

1999: For ensuring sustainability of the systems, steps are initiated to institutionalise community participation in the implementation of rural drinking water supply schemes through sector reform. It shifts paradigm from the 'Government – oriented supply driven approach' to the 'People –oriented demand –responsive approach'. Under this reform, 90 percent of the infrastructure is funded by the government, with the community contributing 10 percent of the remaining.

Table no. 1 Investments in rural drinking water (1951-2012)

Plan Period	Investment in crores	
	Centre	State
First (1951-56)	0	3
Second (1956-61)	0	30
Third (1961-66)	0	48
Fourth (1969-74)	34	208
Fifth (1974-79)	157	348
Sixth (1980-85)	895	1530
Seventh (1985-90)	1906	2471
Eighth (1992-97)	4140	5084
Ninth (1997-2002)	8455	10773
Tenth (2002-07)	16254	15102
Eleventh (2007-12)	39211	49000
Total	71052	84597

Source: Twelfth plane five year: An overview Vol. p.p.300

> **Consolidation phase (2000 onwards)**

2002: Nationwide scaling up of sector reform as Swajaldhara.

2002: The National Water Policy is revised according to priority to serving villages that did not have adequate sources of safe water and to improve the service level for villages which are partially covered

2002: India commits to the Millennium Development Goals to halve by 2015 from 1990 levels the proportion of people without drinking water and basic sanitation.

2004: All drinking water programmes are brought under RGNDWM.

2005: The Government of India launches the Bharat Nirman programme for overall development of rural areas as housing, electricity, telephone, irrigation and drinking water to every rural habitation various programmes were launched and implemented

but could not yielded satisfactory results and the problem has not reduced significantly .

2007: Pattern of funding under the Swajaldhara Scheme changes from the previous 90:10 central-community share to 50:50 centre-state shares.

II.   Review of work done in past:

Layard and Walter (1978) considered the economic logic for setting price equals the short run marginal cost. He considered a community with an inverse demand curve for W&S services

$$P = \beta_1 - \beta_2 x$$

Where p = price of the services, x is the quantity of W&S services that can be supplied per time period, and β_1 and β_2 positive coefficients. Let C equal the fixed costs per period of the W&S system, which is by definition assumed not a function of x. The investment is able to provide an amount of water Qc per period, where β_1 and β_2 is less than Qc. Net benefits are maximized when the optimal quantity of W& services x* is provided

Noppen (1996) mentioned in his report that village level operation and maintenance (VLOM) should be part of project design and structures should be designed in accordance with the strengths and weaknesses of the community and supporting institutions.

As per OECD (1999c) in order to achieve the goals discussed before for tariffs, some tariff structure combinations were used. These combinations are dependent on specific situation and characteristics of society & utility and behaviour of customers. Some of them are connection charges, fixed charge, volumetric charge, block charge and minimum charge.

The national water policy (2002) on user charges states that "There is a need to ensure that water charges for various uses should be fixed in such a way that they cover at least the operation and maintenance charges of providing the service initially and a part of the capital cost subsequently. These rates should be linked directly to the quality of service provided. The subsidy on water rates to the disadvantaged and the poorer sections of the society should be well targeted and transparent, "

Yasumoto (2002) discussed in his report that Water Supply projects in rural areas are also considered as projects of Women in Development (WID). It is women who use water, and waterworks should benefit them the most. In the societies where the sense of unity is not strong, the benefits are often put behind .to treat each group of people equally, it is necessary to select representatives from the society.

As per, DDWS (GoI) (2004), after independence the sector has been creating more and more infrastructure and tries to analyse it as compared to policies and reforms implemented at national level. Outcomes at National Level With a population of over 80 crores people to be served daily with adequate safe droning

water over an area comprised of about 16 lakhs habitations in the country.

Puttaswamaiah (2004), stated in his report that rural water supplies depend upon groundwater which is facing major risks of depletion. The pressure exerted by supply and demand side factors on water resource have caused several environmental problems in drinking water supply categorized as inadequate quantity of drinking water supply , a problem of scarcity and governance, natural factors, seasonality and management.

According to Das (2006) Bhore committee in 1944 was appointed to look after hygiene and health in rural India; it recommended that the pure water supply should be provided to every inhabitant of the town or the village within a period of 35 years.

According to Whittington (2006) the two part tariff system and increasing block tariff structure are commonly used.
1) Single part tariffs
  (a) Fixed charge: monthly water bill is independent of the volume consumed.
  (b) Water use charge.
   i. Uniform volumetric tariff
   ii. Block Tariff: unit charge is constant over a specified range of water use and then shifts as consumption increases. It is further classified as Increasing & Decreasing block tariff.
  (c) Increasing linear tariff : unit charge increases linearly as water use increases
2) Two part tariff : fixed charge + water use charge

Ruijsa et al (2007) estimated two sets of water demand models, each using two functional forms. First set estimates water demand as a function of the average water price. The second follows a marginal price concept and a difference variable account for the effect of price on water demand. Two specifications are estimated using both income and natural logarithm of income as one of the independent variables. The average price model for month r is specified as follows:

$Q_r = x_o + x_1 ap_r + x_2 y_r + x_3 t_r + x_4 R_r + x_5 ra_r + x_6 time_r + x_1$

In which Q_r is per capita consumption of water (m^3/month), ap_r is the average price (Real/m^3), y_r is per capita income (Real/month), t_r is average temperature in month r (degrees Celsius), R_r is rainfall (mm/month), ra_r is a dummy for whether rationing occurred in month r and time t is a time trend.

According to Frija et al (2008); Herrera et al (2004); Speelman et al (2010a, 2011) discussed that willingness to pay for water is affected by the institutional context and enables us to use contingent valuation to distinguish between demand management tools.

Haller et al. (2007) reported that the basic methodological framework for an integrated action plan to be developed that will guarantee the reliable calculation of the Full Water Cost (FWC), as defined by the WFD 2000/60/EC. FWC comprises of three cost components naming DC- direct cost, EC – environmental cost and RC – resource cost. And it helps in calculation of water distribution losses. The role of water utility is examined, considering its responsibilities in water losses.

According to Water Safety Plan (WSP), (2010), important element in this is to prevent dirty water from getting into the well. To achieve this, a cement apron is normally constructed around the well. Raising the apron helps to separate it from the muddy ground around the hand pump. Proper drainage and regular maintenance is required.

Ministry of Drinking Water & Sanitation (MDWS) (2010) has taken steps to ensure that every rural person has enough safe water for drinking and cooking and other domestic needs as well as livestock throughout the year including during natural disasters. By 2022, every rural person in the country will have access to 70 lpcd within their household premises at a distance not more than 50 meters from their household without barriers of social or financial discrimination.

Pal (2012) stated in his work that in fourth Five Year Plan, the Government of India provided assistance to the states to carry out identification of the villages which are defined as where no source of safe water is available within a distance of 1.6 km or at least 15 metres in depth or water source has excess salinity, iron, fluorides etc where water is exposed to bacterial contamination.

According to Maurya et al (2013) there is a definite need for effective technical and management facilities in order to maintain the functionality of projects. Village schemes have potential to provide quality services and long term feasibility solutions in areas with water scarcity but they may require significantly higher investment, technical capabilities and coordination of several agencies, the cost of such technical support represents a large proportion of the overall cost of operation

3. CONCLUSION

From this literature review it can easily be stated that almost all the policies and reforms are focussed on increasing access to safe drinking water. It can be analyzed that the progress and achievement in rural drinking water sector is focussed on coverage and supply, providing safe water supply is given the highest value in successive five year plans.

To achieve economic efficiency and recover the operation cost from user water should be priced at a short run margin.

There is lack of empirical approach towards water pricing in rural sector hence a lot more can be done in this area.

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