

Institutional and regulatory arrangement for bulk water tariff system in Maharashtra state, india¹

Shivaji T. Sangle

Former Member, Maharashtra Water Resources Regulatory Authority (MWRRA),
Mumbai-400005, M.S. India. sanglest@yahoo.co.in

Abstract

Introduction: Water pricing is also helpful for regulating water use and ensuring efficiency of the irrigation system and its management. As per the constitution of India, water is a state subject. Constitution does not explicitly recognize the right to water as a basic human right. However, this right is recognized implicitly with the Supreme Court's interpretations of the Article 21 of the Constitution, as right to life with dignity. Maharashtra is the second highest populated, third largest in area, second urbanized and most industrialized state in India.

Materials and Methods: Maharashtra State occupies the western and central part of the country and has geographical area of 307.58 Lakh ha, which includes gross cropped area of 231.75 lakh ha. Maharashtra State is mainly covered by the six river basins and has 126 billion cubic meters of average annual renewable surface and groundwater resources. Integrated State Water Plan (ISWP) for all of the major river basins has been prepared for sustainable development and judicious use of State's scarce water resources, both surface and groundwater. Maharashtra has 87 major, 297 medium and 3519 irrigation minor projects in the water sector of the State, creating the live storage capacity of 43.8 billion cubic meters (BCM). Maharashtra is a pioneer state in India to have Water Resources Regulatory Act (2005) and established Maharashtra Water Resources Regulatory Authority (MWRRA) to regulate water resource; facilitate and ensure judicious equitable and sustainable management; allocation and utilization of water resources as well as to fix the rates for use of water for all of the purposes and matter connected therewith and incidental thereto.

1. **Received:** 2022/08/04; **Received in revised form:** 2022/09/05; **Accepted:** 2022/10/08; **Published Online:** 2023/01/02

Cite this article: Sangle, S.T. (2023). Institutional and regulatory arrangement for bulk water tariff system in Maharashtra state, india. *Water productivity journal*, 3(1): 5-18.

DOI: 10.22034/wpj.2023.168979

© The Author(s).

Article type: Research Article

Published by: Veresk Ettetal.



Results: MWRRA fixes the rates for use of water for agriculture, industries, domestic and other purposes in such a way that the water charges shall reflect the recovery of full cost of irrigation management, administration and maintenance of water resource project (O & M Cost). In this paper, an attempt is made to study the mechanism followed by MWRRA for determination of bulk water rates for agriculture, domestic and industrial users. Water resource has both characteristics of social good as well as economic good. Therefore, pure market mechanism fails to determine the water rates for irrigation. MWRRA has used the modified form of Contingent Valuation Method for determination of water rates for different uses and developed bulk water tariff system in the State of Maharashtra (India). MWRRA, after due consideration of comments and suggestion received from the various line departments, field officers, experts, non-government organizations, water users' associations (WUAs), beneficiaries, etc., has finalized the bulk water tariff for various water users for the period 2018-20. There are the incentives for using drip irrigation and for WUAs and also for treating of municipal sewage water and its reuse. The authority has been using the tariff as a tool to enforce the measures towards prevention of pollution of the natural streams and water bodies. The MWRRA, through consultations with experts and stakeholders had evolved the criteria for sharing of estimated O & M cost of water resource project among the three main water use sectors as domestic (22%), industry (59%) and agriculture (19%).

Conclusions: Transparency and consultations with the stakeholders for seeking their views and experiences was the integral part of the entire process of bulk water tariff system. In order to meet equity, efficiency and economic principles, bulk water rates are based on volumetric. For enhancing water use efficiency (WUE) in agriculture, 25 percent concessions in water rates are given for adoption of micro irrigation. For promoting the participatory irrigation water management, 25 percent concessions in water rates are given to WUAs. For promoting recycling and reuse of water, 25 percent concessions in water rates are given to users who reduce the freshwater consumption to 75 percent of entitlement by way of recycling. 25 Percent concessions in water rates are given for agro-based industries. In order to bring the discipline and responsibilities in the water sector, the authority has made several penal and ancillary provisions in the water tariff system. Such as, penalty at the rate of 10% per year for delayed payment; water used without signing the agreement, will be charged at 2 times the applicable rate, absence of meter or if the meter found to be non-working shall be levied at 1.5 times the applicable rate.

Keywords: Bulk Water Tariff, Pricing for Water, Water Regulatory Authority, Water use efficiency.

1. Introduction

Water is vital for life and plays very important role for economic and human development. To address the water scarcity issue, better pricing has been recognized as an important tool. Water pricing is also helpful for regulating water use and ensuring efficiency of the irrigation system and its management. As per the constitution of India, water is a state subject. Constitution does not explicitly recognize the right to water as a basic human right. However, this right is recognized implicitly with the Supreme Court's interpretations of the Article 21 of the Constitution, as right to life with dignity. To protect the right to drinking water for all, distribution of entitlements and appropriate pricing of water are the steps forward in this direction. The Government of Maharashtra has enacted the Maharashtra Water Resources Regulatory Authority Act, 2005 and established Maharashtra Water Resources Regulatory Authority (MWRRA) in June, 2005. Maharashtra is the first State in the country to establish a regulatory authority in water sector. The mandate given to the authority is to regulate water resource; facilitate and ensure the judicious equitable and sustainable management; allocation and utilization of water resources as well as fix the rates for use of water for all of the purposes and matter connected therewith and incidental thereto. The authority is required to fix the bulk rates for use of water for agriculture, industrial, drinking and other purposes. The Maharashtra Groundwater (Development & Management) Act 2009 (MGW Act) came into force on December 3, 2013. This Act has entrusted MWRRA, the additional responsibility of regulating groundwater resources of the State. Further, it is responsibility of MWRRA to determine the criteria for the distribution of water entitlements by the River Basin Agencies (RBAs) within each category of use, on prescribed terms and conditions after sectoral allocation is made by the Government. The Government of Maharashtra has decided the sectoral allocation of water at a project level as 15, 10 and 75 per cent respectively to domestic, industry and irrigation sectors. Criteria for distribution of water entitlements by RBAs for domestic and industrial uses were evolved by the authority earlier in November, 2012. Now, the authority has revised these criteria in November, 2017. These criteria are applicable for all entitlements given through surface water (rivers, reservoirs) of the state of Maharashtra and will be followed by Water Resource Department (WRD) and RBAs for issuance of entitlement to Domestic Bulk Water Users (DBWUs) and Industrial Bulk Water Users (IBWUs) of the States. Similarly, earlier authority had fixed the bulk water tariff for domestic, industrial and agricultural water uses in May, 2011 and now in January, 2018 for the period of three years.



2. Water resources in maharashtra

Maharashtra is the second highest populated, third largest in area, second urbanized and most industrialized state in India. Maharashtra State has geographical area 307.58 lakh ha, which includes gross cropped area 231.75 lakh ha. The area of the state is covered under five major river basins namely Godavari, Krishna, Tapi, Narmada and West flowing river basins. Also, a very small area of North-Eastern part of the State comes under the Mahanadi basin. Maharashtra State is pioneer to implement the Integrated State Water Plan (ISWP) in India. The unique feature of this ISWP is that, it is integration of six-basin levels water plans of the State (ISWP, 2018). The estimated average annual availability of water resources of the State is 198 billion Cubic Meters (BCM) which consists of 164 BCM of surface water and 34 BCM of groundwater. With massive investment in irrigation sector, so far state has under taken and completed 87 major, 297 medium and 3519 minor irrigation projects and created 43.8 billion cubic meters live storage capacity. According to the Maharashtra Water and Irrigation Commission Report (1999), the ultimate irrigation potential of the State is 12.6 million ha, comprising 8.5 million ha from surface water and 4.1 million ha through groundwater (MWIC, 1999). However, by the end of June 2019, irrigation potential created is 5.304 M ha on State Sector projects and 1.845 M ha (2018) on Local Sector projects. Thus, the total irrigation potential created in Maharashtra; on State and Local Sector schemes is 7.149 M ha till the end of June 2019.

3. Global experiences in bulk water pricing

Water sector is a complex sector and each country is unique in the development of its water sector. However, it may be possible to draw same lessons from the experiences of other countries in this regard. With this view, the authority has taken review of international experiences in bulk water pricing for developing bulk water tariff system in the State. Several countries have taken efforts to develop a framework for bulk water pricing, such as Australia (Murray Darling Basin, New South Wales etc.), South Africa, Turkey, Mexico, Brazil, China, Chile, etc. The International Conference on Water and Environment (ICWE) organized by the United Nations at Dublin in Ireland in January 1992 has adopted guiding principles, known as Dublin Principles for improving the sustainability of water supply and sanitation services. These principles continue to remain relevant for dealing effectively with the emerging trends of over consumption and pollution and the rising



threats from droughts and floods. In commending the Dublin Statement to the world leaders assembled at the United Nations Conference on Environment and Development (UNCED) in Riode Janeiro in June, 1992, the conference participants urged all governments to study, carefully its specific recommendations and to translate them into urgent action program for sustainable development of water resources. Maharashtra State has adopted the Dublin Principles along with international experiences in bulk water pricing for developing bulk water tariff system in the State.

4. Legal frame work for bulk water tariff

Maharashtra state have developed very strong legal and regulatory framework and adopted innovative reforms in water sector in general and water pricing in particular. Maharashtra Irrigation Act, 1976 is land mark in irrigation sector. The Maharashtra Water Resources Regulatory Authority (MWRRA) Act, 2005 has been enacted inter-alia for the purpose of regulating the water resources within the State of Maharashtra and for facilitating and ensuring judicious, equitable and sustainable management and allocation of water resources in the State. One of the powers, duties and functions of the authority is to establish a water tariff system and fix the criteria for water charges at sub-basin, river basin and state level, after ascertaining the views of the beneficiary public based on the principle that water charges shall reflect the full recovery of the cost of irrigation management, administration, operation and maintenance of water resources project (O & M cost). Further, enactment of Maharashtra Management of Irrigation System by Farmers (MMISF) Act, 2005 and Maharashtra Groundwater (Development & Management) Act, 2009, framing of the new Maharashtra State Water Policy 2019 for efficient, equitable and sustainable use of the State's Water Resources were carried out.

5. Apportionment of O and M cost

Apportionment of O & M cost among each of the three categories of users viz., Agriculture, Domestic and Industry is very crucial task. The Authority, through consultations with stakeholders and experts had evolved the criteria for sharing of estimated O & M costs among the three main water use sectors as Agriculture (19%), Domestic (22%) and Industry (59%). However, sectoral allocations of water resource among these sectors are respectively domestic (15%), industry (10%) and agriculture (75%). This proportion of appointment of O & M cost among these three categories of users is based on four



fundamental parameters viz., Affordability, Quality and Accessibility, timeliness of supply and impact on water quality. Firstly, a percentage weight has been assigned to each of the four parameters which are common to all of the users. The values assigned to parameters affordability, quality and accessibility, timeliness of supply and impact on water quality are 60%, 10%, 10% and 20% respectively (MWRRA, 2014). Secondly, the percentage weightages are assigned to each category of use of each of the four parameters viz., affordability, accessibility, timelines and impact on water quality. The weightages thus assigned are given in Table No.1.

Table 1. Parameter and user wise assignment of weights

Sr. No.	Parameter	Weightages Assigned (%)			
		Agriculture	Domestic	Industry	Total
1	Affordability	15	15	70	100
2	Quantity and Accessibility	60	15	25	100
3	Timeliness	20	30	50	100
4	Impact on water quality	10	45	45	100

(Source: Data compiled from MWRRA 2014 - Final Criteria for Determination of Bulk Water Tariff in Maharashtra (2013-16), MWRRA, Mumbai (M.S), India)

The Application of percentage weightages of the parameters to the above weights shall result in the following allocation of O&M Cost to the three categories of users as given in the Table No.2

Table 2. Parameter and user wise weights and allocation of o & m cost

Sr. No.	Parameter	Weightages Assigned and O & M Cost Allocation (%)		
		Agriculture	Domestic	Industry
1	Affordability	$15 \times 0.6 = 9.0$	$15 \times 0.6 = 9.0$	$70 \times 0.6 = 42.0$
2	Quantity and Accessibility	$60 \times 0.1 = 6.0$	$15 \times 0.1 = 1.5$	$25 \times 0.1 = 2.5$
3	Timeliness	$20 \times 0.1 = 2.0$	$30 \times 0.1 = 3.0$	$50 \times 0.1 = 5.0$
4	Impact on water quality	$10 \times 0.2 = 2.0$	$45 \times 0.2 = 9.0$	$45 \times 0.2 = 9.0$
5	Total	19	22.5	58.5
6	Say	19	22	59

6. Criteria for water entitlements

One of the functions of the authority is to fix criteria for distribution of surface water entitlement by River Basin Agencies (RBA) for domestic and industrial



uses. Now, Authority have reviewed and revised earlier criteria of November 2012 and issued new order of criteria for distribution of water entitlements by RRA, for different users on September 22, 2017 (Addendum on June 25, 2018 and December 27, 2018). While fixing these criteria, authority has considered various norms and methodology. The Central Public Health and Environmental Engineering Organization (CPHEEO), which is a technical wing of the Ministry of Urban Development, Government of India has suggested norms for water supply and these norms are being followed by cities and towns in the country while designing water supply schemes. Water requirement norms for various industries have been critically examined and specific water consumption values have been reviewed and revised with an intention to promote the best technological alternatives available elsewhere in the world for water saving / recycling. The applicable per capita norms for entitlement to Domestic Bulk Water Users (DBWU) are given in the Table No. 3.

Table 3. Criteria for domestic water use¹

Sr. No.	Category	Norm (lpcd)
1	Rural Water Supply Schemes	55
2	Peri-urban Area	70
3	Municipal Councils (3a) C – Class (3b) B – Class (3c) A – Class	70 100 125
4	Municipal corporations (having population less than 50 lakh)	135
5	Metropolitan centers (having population equal to or more than 50 lakh)	150
6	Integrated Township Projects / Townships in Hill Stations notified by the Urban Development Department	90
7	Floating population: Bathing facilities provided: Bathing facilities not provided:	45 25

7. Bulk water tariff in maharashtra

One of the key functions of the authority is fixing the criteria for bulk water tariff for agricultural, domestic and industrial users. Authority shall review and revise water charges after every three years. The first bulk water tariff exercise for the period 2010-13 was carried out and the tariff order was issued in May 30, 2011 (MWRRA, 2012). Since then, the bulk water rates have not been

1. Lpcd: liters per capita per day



revised or increased, although in the meanwhile, Cost Inflation Index (CII) has increased by 63%. The second bulk water tariff exercise was taken up in 2017 and the tariff order for the period 2018-20 was issued on January 11, 2018 (MWRRA, 2018). MWRRA fixes the rates for use of water for agriculture, industries, domestic and other purposes in such a way that the water charges shall reflect the recovery of full cost of irrigation management, administration and maintenance of water resource project (O & M Cost). Water resource has both characteristics of social good as well as economic good. Therefore, pure market mechanism fails to determine the water rates for irrigation. MWRRA have used modified form of Contingent Valuation Method (CVM) for determination of water rates for different uses and developed the bulk water tariff system in the State of Maharashtra (India). MWRRA prepared draft tariff proposal which has given wide publicity through newspapers, website, and local concerned offices. MWRRA, after due consideration of comments and suggestion received from various line departments, field officers, experts, non-government organizations, WUA beneficiaries, etc., has finalized the bulk water tariff for various water users for the period 2018-20.

8. Bulk water rates for agricultural irrigation

Determination of bulk water tariff for agricultural sector is very crucial task. Earlier, in the State of Maharashtra water rates were levied on the basis of area. But now water rates are levied on volumetric basis. Bulk water rates for flow irrigation, both for registered Water User Associations and for individual beneficiaries and for private lift irrigation schemes are given in the Table No.4.

Table 4. Bulk water rates for flow and lift irrigation (Paisa per Cum)

Sr. No.	Season	Flow Irrigation		Lift Irrigation
		WUA	Individual	Assured Water Supply
1	Rainy (Kharif)	3.38	4.50	3.88
2	Winter (Rabi)	6.75	9.00	7.31
3	Summer (H. W.)	10.13	13.50	10.97

Note: 100 Paise is equal to 1 Rupee (Indian currency)

(Source: Data compiled from MWRRA 2018 - Maharashtra Water Resources Regulatory Authority, Bulk Water Tariff Order No. 1/2018 dated January 11, 2018)

8-1. Relevant provisions for private lift irrigation schemes

Co-operative Societies registered under Co-operative Societies Act, 1960 and



Water User Association (WUA) registered under MMISF Act, 2005 will be entitled for 25% concession in the above rate.

In case of private lift irrigation schemes, the beneficiary should install the water meter on delivery pipeline at their own cost. In case registered private lift irrigation WUA, fails to install water meter / water meter is not working / water meter is tampered, the assessment will be done at the rate, 2 times applicable water rate for flow irrigation with quantity calculated as per actual irrigated area and standard duty.

8-2. Concessional provisions

Project affected farmers, having been allotted compensatory land in the command area, shall be entitled to get water at 75% of the applicable water rates. Further, if project affected farmer has resorted to lift Irrigation at his own cost 50% of the applicable rates shall be charged.

8-3. Incentives

Water cess should not be levied for the irrigation in the first year of irrigation (trial irrigation) of the project.

If the individual farmer takes metered water supply for modern irrigation system (micro-irrigation) then the rates applicable shall be 75% of the rates prescribed for individual farmer practicing flow irrigation.

If registered WUA takes the metered water supply for micro irrigation then the rates applicable shall be 75% of the rates prescribed for registered WUA practicing flow irrigation.

If water cess for a season is paid before commencement of that season (advance payment) then the water cess will be charged at 90% of the applicable water rate.

8-4. Penal provisions

Penalty at the rate of 10% per year will be charged for delayed payment/ part thereof beyond permissible time limit.

If water supplied for irrigation use is found to be used for industrial purpose without prior permission of WRD, then assessment will be done at 2 times the rate applicable for industrial use.

9. Bulk water rates for domestic water

The water source and Local Self-Government wise bulk water rates for the domestic water use are given in the Table No.5.



Table 5. Bulk water rates for domestic water use
(In rupees per cubic meter)

Sr. No.	Category	Source & Type of Supply	Standard Rates for Domestic Water Use		
			Gram panchayats	Urban Local Bodies	Municipal Corporations
1	Assured Water Supply	Water Supply from Reservoir	0.15	0.18	0.25
2	Regulated Water Supply with conveyance loss	River reach, canals & K. T. weirs	0.30	0.36	0.50
3	Partly Assured Water Supply	Water use through natural stream without any releases from up-stream	0.08	0.09	0.13
4	Own constructed storages by water user entity and is also maintained at its own cost	Water supply through own constructed dam by water user entity	0.02	0.03	0.04

(Source: Data compiled from MWRRRA 2018 - Maharashtra Water Resources Regulatory Authority, Bulk Water Tariff Order No. 1/2018 dated January 11, 2018)

9-1. Concessional provisions

In case, the drinking water source is a well, within 35 meters of nearest boundary of either side of canal and command area of canal, the rate of water supply will be 50% of rate mentioned in the Table 5.

9-2. Penal provisions

Water used without signing the agreement, will be charged at 2 times the applicable rate. If ULBs are found to be supplying water from its drinking water entitlement to industrial users / water sports without prior approval of WRD, such water use will be charged at 3 times the applicable industrial water rates retrospectively.

In absence of meter or if the meter found to be non-working, the sanctioned quantity of water or recent water use whichever is higher, shall be levied at 1.5 times the applicable rate. Late fee at 10% per annum shall be levied on arrears of water charges.

10. Bulk water rates for industrial use

The water source and water use wise bulk water rates for the Industrial water use are given in the Table 6.

**Table 6.** Bulk water rates for industrial use (In rupees per cubic meter)

Sr. No.	Category	Water Supply Type and Source	Water use as	
			Processing	Raw Material
1	Assured Water Supply	Water use from Reservoir	4.80	120.00
2	Regulated Water Supply with conveyance loss	Water use from regulated river reach below dam, canal / K.T. weirs with backup reservoir	9.60	240.00
3	Partly Assured Water Supply	Water use from exclusively from unregulated rivers without releases from any reservoir/ canal	2.40	60.00

Note 1- Industries using water as raw material means those manufacturing cold drinks, brewery, mineral water or of similar kind.

(Source: Data compiled from MWRRA 2018 - Maharashtra Water Resources Regulatory Authority, Bulk Water Tariff Order No. 1/2018 dated January 11, 2018.)

10-1. Concessional provisions

75% of the applicable rates are provided for Agro-Industries like poultry, Rice Mill, Dairy, Corn processing, Vegetable Ghee etc. However, this concession will not be applicable for industries manufacturing alcohol / ethanol from sugarcane or corn as well as for winery, breweries.

Standard rates for industrial water use from wells within command area of canal and wells within 35 meters on either side of nearest edge of canal will be 50% of applicable rates.

10-2. Incentives

If any industry reduces its requirement by recycling (reducing its net demand of water up to minimum 75% or less than that), it shall be charged at 75% of applicable rate.

Industries are entitled to use treated effluent provided such use is by way of conveyance through closed pipe from treatment plant (without discharging it into river/nalla). If such water is supplied for irrigating farms, its rates shall not be more than 60% of rates specified for irrigation by freshwater.

10-3. Penal provisions

Action shall be taken against those industries which are not treating effluent to specified norms. Such industries will be charged at higher rate which shall be twice that of standard industrial rate. Maharashtra Industrial Development Corporation (MIDC) shall be responsible for collecting the penal water charges. MIDC shall pass on the water charges so collected to WRD. If Maharashtra Pollution Control Board (MPCB) issues orders to stop the water



supply of such industries, MIDC shall discontinue water supply to such industries.

- Water use without installation of meters shall be charged at twice the applicable rate.
- Metered water use within the allocated quota sanctioned limits and installing meter without entering into agreement, shall be billed at twice the applicable rates.
- Water use without sanction/agreement and without installing meter, shall be billed at 2.5 times applicable rates.
- Late fee at 10% per annum shall be levied on arrears of water charges.

11. Conclusions

Water is a critical resource which needs to be managed with long term perspective. Freshwater resource is limited. Further, in order to avoid conflict of interests arising among various water user groups, freshwater demands of various user groups will have to be managed within their sectoral allocations. Thus, it may not be possible in near future to cope up with ever expanding water demand of growing population and industry with present supply norms. Hence, it is essential to implement the proper strategies with immediate effect to reduce freshwater consumption to cope up with reduced supply norms in future. The fundamental role of water pricing is to allocate the scarce water resource among competing uses and users. It also helps to regulate the proper use of water and improving water use efficiency. In view this authority has developed bulk water tariff (BWT) system in Maharashtra on the basis of important parameters such as affordability, accessibility, timelines and impact on water quality by assigning proper weightages. Transparency and consultations with the stakeholders for seeking their views and experiences was the integral part of the entire process of bulk water tariff system. In order to meet equity, efficiency and economic principles, bulk water rates are based on volumetric. For enhancing water use efficiency in agriculture, 25 percent concessions in water rates are given for adoption of micro irrigation. For promoting participatory irrigation water management, 25 percent concessions in water rates are given to WUAs. For promoting recycling and reuse of water, 25 percent concessions in water rates are given to users who reduce fresh ater consumption to 75 Percent of entitlement by way of recycling. 25 per cent concessions in water rates are given for agro-based industries. In order to bring discipline and responsibilities in the water sector, the authority has made



several penal and ancillary provisions in the water tariff system. Such as, penalty at the rate of 10% per year for delayed payment, water used without signing the agreement, will be charged at 2 times the applicable rate, absence of meter or if the meter found to be non-working shall be levied at 1.5 times the applicable rate. Water use without sanction/agreement and without installing meter, shall be billed at 2.5 times applicable rates. The Authority, through consultations with stakeholders and experts had evolved the criteria for sharing of estimated O & M costs among the three main water use sectors as agriculture (19%), domestic (22%) and industry (59%). However, sectoral allocations of water resource among these sectors are respectively domestic (15%), industry (10%) and agriculture (75%).



References

- ISWP (2018). *Integrated State Water Plan for Maharashtra*. Vol. I, II & III. Water Resources Department, Government of Maharashtra Mumbai, (M.S), India.
- MWIC (1999). *Report of Maharashtra Water and Irrigation Commission*. Government of Maharashtra, Mumbai (M.S), India
- MWRRA (2005). *Maharashtra Water Resources Regulatory Authority*. Act (Amendments 2011 and 2016) M.S., India
- MWRRA (2009). *Approach Paper on Preparation of Criteria for Bulk Water Pricing in the State of Maharashtra*. Vol. I, II & III. Maharashtra Water Resources Regulatory Authority, Mumbai (M.S), India
- MWRRA (2012). *Criteria for Distribution of Entitlement by River Basin Agencies for Domestic and Industrial uses*. Maharashtra Water Resources Regulatory Authority, Mumbai (M.S), India.
- MWRRA (2014). *Final Criteria for Determination of Bulk Water Tariff in Maharashtra (2013-16)*. Maharashtra Water Resources Regulatory Authority, Mumbai (M.S), India.
- MWRRA (2017). *Criteria for Distribution of Surface Water Entitlement by River Basin Agencies for Domestic and Industrial use*. Maharashtra Water Resources Regulatory Authority, Mumbai (M.S), India, Order dated September 22, 2017 and December 27, 2017.
- MWRRA (2018). *Maharashtra Water Resources Regulatory Authority*. Mumbai (M.S), India, Bulk Water Tariff Order No.1/2018 dated January 11, 2018.