

**CRITERIA FOR  
DETERMINATION OF  
BULK WATER TARIFF  
IN MAHARASHTRA  
(2013-16)**



**MAHARASHTRA WATER RESOURCES  
REGULATORY AUTHORITY**

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## **CRITERIA FOR DETERMINATION OF BULK WATER TARIFF IN MAHARASHTRA (2013-16)**

### **1. BACKGROUND**

- 1.1. The Maharashtra Water Resources Regulatory Authority (MWRRA) Act, 2005, (hereinafter referred to as the Act) was 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. The Act was brought into force by the State government by Gazette notification no. Committee-2005/ (72/05)/1/WRI dt. 8-6-2005. Subsequently, vide notification no. MWRRA. Selection 2005/78/05 dt. 12-8-2005 the MWRRA (hereinafter referred to as the Authority) was established to carry out the tasks specified in the Act.
- 1.2. One of the powers, duties and functions of the Authority (under Section 11 (d) of the Act) 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 & maintenance of water resources project.
- 1.3. Vide Section 11 (u) of the Act, the Authority is required to review and revise the water charges after every three years.
- 1.4. In pursuance of Section 11 (d), the Authority in June 2010, fixed the Criteria for Determination of Bulk Water Tariff at the State level for the three year period 2010-13, after following an extensive public consultation process including public hearing. Based on the Criteria, Water Resources Department (WRD) prepared the draft tariff proposal for volumetric bulk water tariff for the three categories of users viz. agriculture, domestic and industry and for area based rates for agriculture. After a technical scrutiny of the proposal with reference to its conformity with the Criteria and following such consultation with the stakeholders as considered necessary, the Authority finalised and issued on 30-5-2011 the volumetric bulk water tariff orders for the three categories of users. The Authority also approved the



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rates of water tariff of various crops for area based supply and the order for the same was issued by WRD on 29-6-2011. The two orders were effective from rabi 2010-11 to hot weather 2012-13.

- 1.5. As per Criterion No. 3 of the Criteria for 2010-13, the validity of these Criteria was till the end of the control period i.e. June 2013. The Criterion further stipulates that before taking up the review and revision of the bulk water tariff rates for the subsequent control periods (as per Section 11 (u) of the Act), the Authority shall take up the review and revision of the Criteria by following the procedure determined in the relevant Regulations.
- 1.6. On 10<sup>th</sup> May 2012, the WRD approved the Regulations for bulk water tariff fixation titled "MWRRA (Fixing Criteria and Issuance of Tariff Orders for Bulk Water) Regulations, 2010".

## 2. DEFINITIONS

a) '**Agricultural User**' means any Water User Association flow as well as for lift, where formed, at minor level, distributary level, canal level or project level, which is supplied bulk water for distribution among its members, or an individual farmer, where Water User Association has not been formed or where formed but not become operational, who is supplied water directly by the project authority, primarily for growing crops in flow as well as lift areas.

b) '**Applicable Rate**' means the rate as applicable depending on the source of supply / season etc. and is derived from the basic rate by applying the appropriate multiplication factor indicated in the Criteria.

c) '**Basic Rate**' for any category of user means the volumetric or area rate applicable for rabi season.

d) '**Bulk Water**' means any untreated water supplied by flow or lift to agricultural/ domestic/industrial users from reservoirs/canal systems constructed and operated by the WRD or Irrigation Development Corporation (IDC) or made available to these users by WRD / IDC by flow or lift from regulated rivers and their tributaries flowing in the State or from



natural water bodies or lakes. It also includes supplies drawn by water utilities / utilities / for its / their own use from dams / storages constructed and operated by them or obtained for its / their own use by flow or lift from natural water bodies or lakes through structures constructed and operated by them

e) '**Bulk Water Tariff**' means the tariff levied on bulk water users by the Water Resources Department on volumetric basis as per the tariff orders issued and in force on the date of levy.

f) '**Collection Efficiency**' in relation to any category of user means the ratio of revenue realized from that user to the tariff billed to that user in any water year, excluding arrears.

g) '**Control Period**' for the purposes of applicability of tariffs shall be three consecutive water years starting from 1st July 2013 to 30th June 2014, 1st July 2014 to 30th June 2015 and 1st July 2015 to 30th June 2016.

h) '**Culturable Command Area (CCA)**' means the area under an irrigation project which is cultivable and can get irrigation facility through the canal system.

i) '**Domestic User**' means any public body or organisation (Gram Panchayat, Nagar Palika, Municipal Corporation, Maharashtra Jeevan Pradhikaran, Maharashtra Industrial Development Corporation) to whom bulk water is made available by the WRD / IDC for distribution to domestic and other users, without treatment.

j) '**Water Scarcity / Distress**' - in a particular water resources project means a situation where actual water availability of live storage is less than 33% of design live storage of that project on 15<sup>th</sup> October

k) '**Drought**' means a period declared as 'Scarcity' by the State when soil moisture and rainfall are inadequate to support healthy crop growth during the crop growing season causing crop stress and wilting.



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- l) **'Energy Charges'** means the electricity supply charges levied on various category of bulk water users by the electricity distribution licensee for lifting of water.
- m) **'Hot Weather'** for purposes of water tariff means season from 1st March to 30<sup>th</sup> June or as notified by the State, except for Konkan, Marathwada & Vidarbha regions, where the season will be from 1<sup>st</sup> April to 30<sup>th</sup> June.
- n) **'Industrial User'** means any industry (including industrial development Corporations SEZ and cooperative industrial estates) to whom bulk water is made available by WRD / IDC for use as raw material or in process.
- o) **'kharif'** for purposes of water tariff means the season from 1<sup>st</sup> July to 14<sup>th</sup> October or as notified by the State, except in Konkan, Marathwada and Vidarbha where it will extend to 14<sup>th</sup> November.
- p) **'Major', 'Medium', 'Minor Irrigation Project'** means project with CCA greater than 10,000 ha, between 2,000 & 10,000 ha and less than 2,000 ha respectively
- q) **'Modern Irrigation Method'** means micro-irrigation (drip & sprinkler) or any other method specified by the Authority from time to time.
- r) **'Operation & Maintenance (O&M) Cost'** means the sum of establishment cost and the cost of repairs and maintenance (M&R) of the irrigation system of water resources projects worked out as per norms and keeping in view relevant GRs.
- s) **'Rabi'** for purposes of water tariff means the season from 15<sup>th</sup> October to 28<sup>th</sup> February or as notified by the State, except for Konkan, Marathwada & Vidarbha where the season will be reckoned from 15<sup>th</sup> November to 31<sup>st</sup> March.
- t) **'State'** means the State Government of Maharashtra
- u) **'Stakeholder'** means any bulk water user or Entitlement holder or any registered organisation representing officially the interests of either of them.



**3. CRITERIA FOR 2013-16**

**3.1. Guiding Principles :**

In preparing the Criteria, the Authority has kept in view the relevant provisions in the State Water Policy (2003), MWRRA Act 2005, Maharashtra Management of Irrigation Systems by Farmers Act, (2005) and comments / suggestions received on the Approach Paper on Criteria for Determination of Bulk Water Tariff, 2013-16, prepared and circulated by the Authority in March 2012.

3.2 The revision in the Criteria for 2013-16 has been done following the procedure laid down in "MWRRA (Fixing Criteria and Issuance of Tariff Orders for Bulk Water) Regulations, 2010"

The procedure laid down in the Regulation is

- (i) preparation of an Approach Paper, in English & Marathi, for public consultation
- (ii) Circulation of the paper to line departments in the State Government concerned Non-Governmental Organizations (NGOs) in the water sector, public utilities dealing with distribution of water and experts in the field of water. The Authority is also required to host the paper on its web site for inviting comments/suggestions from the beneficiary public and any association/group/forum/ corporate body/bulk water user. Besides the above actions, the Authority is also required to make copies of the paper available at all taluka headquarters (Irrigation sub division or Panchayat Samiti offices) with due publicity of this fact in one prominent district newspaper.
- (iii) Preparation and hosting on the web site of the Authority a list of common points in the suggestions / comments received on the paper.
- (iv) Preparation of a draft Criteria for determination of bulk water tariff and its circulation, hosting on web site.
- (v) Holding of public hearings at all Revenue Divisional headquarters of the State to ascertain the views of the beneficiary public on the draft Criteria



3.3. This draft Criteria has accordingly been prepared, after following the above procedure, for public consultation. Besides, announcement was also made on district radio stations and TV news about availability of the Approach Paper at talukas.

**4. APPLICABILITY OF THE CRITERIA**

4.1. Since the five Irrigation Development Corporations in the State are yet to be converted to River Basin Agencies i.e. as independent financial entities with basin based revenue sources, this Criteria also, like the earlier one, proposes an uniform tariff structure across the State applicable to all the River Basin Agencies.

**5. VALIDITY OF THE CRITERIA**

5.1. This Criteria is valid for the three year period June 2013 to 30<sup>th</sup> June 2016 and for such period thereafter as may be decided by the Authority. For any review and revision of the Criteria, the Authority shall follow the procedure determined in the relevant Regulations.

**6. PROCEDURE TO BE FOLLOWED FOR ISSUE OF TARIFF ORDER**

6.1. After the Criteria is finalized, the Authority will forward the same to WRD for preparation and submission within three months the draft bulk water tariff proposal for 2013-16.

6.2. The draft proposal shall contain volumetric rates for industry and domestic and both volumetric and area rates for agriculture to be derived adopting the procedure laid down in the Criteria and using the data presented in the Approach Paper.

6.3. On receipt of the draft tariff proposal from the WRD, the Authority shall undertake a technical scrutiny of the proposal with reference to its conformity with the Criteria and validity of the data and seek such clarification from WRD as considered necessary.

6.4. After the Authority is satisfied that the draft tariff proposal is in order and is ready for publication in such abridged form or manner as may be specified and WRD will be directed accordingly.





- 6.5. The Authority shall also direct WRD to make available copies of the proposal in all Irrigation Circle offices in the districts and sub divisional offices in the talukas or in Panchayat Samiti offices and host the proposal in WRD's web site for inviting comments / suggestions from the beneficiary public within a period of 30 days.
- 6.6. WRD shall compile all suggestions / comments received from the public and forward them to the Authority with WRD's views on each comment / suggestion.
- 6.7. The Authority shall within 60 (sixty) days of making available the tariff proposal in the talukas and considering all comments / suggestions received from the public, issue a tariff order for the volumetric rates of supply of bulk water to agriculture, domestic and industry effective from 1<sup>st</sup> July 2013 or such date as may be decided by the Authority. The tariff order for the area based rates for each crop in agriculture will be approved by the Authority for issue by WRD.
- 6.8. For applications for review of tariff orders, the procedure laid down in the relevant Regulations of the Authority shall be followed by stakeholders.

## **7 NORMS FOR MAINTENANCE & REPAIRS**

- 7.1. The State Government shall prescribe norms for the M&R of canal system, head works and appurtenant works which are adequate for their routine maintenance. The Authority, on scrutiny of the norms, may direct the State government to review and / or revise the norms if in its opinion; the norms are inadequate for proper upkeep of the assets created. The projection of funds required for M&R shall be as per these prescribed norms.

## **8. COST ELEMENTS TO BE CONSIDERED IN O&M COST**

- 8.1. The cost elements to be considered for annual O&M cost likely to be incurred shall include
  - (a) M&R works on the canal systems and head works of WRD / IDC project and also on allied infrastructure relevant to water supply to be incurred during the year



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(b) Project establishment cost comprising salaries of WRD / IDC employees deployed as per norms prescribed by the State Government in maintenance of irrigation projects including basic pay, dearness allowance, bonus, other allowances including travelling etc. as approved by the State government. Establishment cost will also include legal charges, auditor fees as related to water management.

### 8.2. O&M cost shall not include

- (a) all Capital costs of irrigation projects including depreciation, interest on loans, special repairs, cost of rehabilitation of dam and canal system
- (b) M&R cost of hydro power components
- (c) establishment cost of staff which is over and above the norms of the State government.
- (d) energy costs of Government operated lift irrigation schemes. Energy costs will be separately fixed by the State government as service tax for the State as a whole or recovered scheme wise.

8.3. The O&M cost of the mid-year of the control period 2013-16 i.e. 2014-15 will be considered for tariff estimation for the Control Period.

## 9. **NON TARIFF AND OTHER INCOME**

9.1. Non tariff income i.e. income from sale of tenders, scrap, royalty for hydro power, royalty from private dams pisciculture, recreation, tourism in reservoirs shall not be considered presently while assessing likely revenue from tariff.

## 10. **GOVERNMENT SUBSIDY**

10.1. The State government shall make the required budget provision for meeting the estimated O&M cost. Revenue gap, if any, between the estimated O&M cost and estimated tariff realization from tariff levied as per the tariff order, will be treated as State government subsidy.

## 11. **REVENUE GAP / SURPLUS**

11.1. At the end of each year in the control period, WRD shall furnish to the



Authority details of category wise and source wise water withdrawals, tariff levied, revenue realized, M&R requirement as per norms for irrigated & unirrigated potential, actual M&R costs, establishment cost and subsidy provided, if any. Arrears of tariff for previous years (levy & collection) shall not form part of assessment of revenue gap / surplus. Revenue earned from imposition of penalties and revenue foregone, if any, due to concessions will be separately shown.

**12. APPORTIONMENT OF COST**

12.1. The O&M cost as specified in Criterion 7.1 (a) & (b) of this Criteria shall be apportioned among each of the three category of users viz. agriculture, domestic and industry based on three fundamental parameters viz. (a) Affordability, (b) Accessibility and (c) Quantity & Timeliness (Q&T) of Supply. This will be done in three stages as discussed in Criterion 12.2 to 12.5 below.

12.2. Firstly a percentage weight shall be assigned to each of the three parameters which shall be common to all users. The values thus assigned shall be

<u>Parameter</u>	<u>Weightage assigned</u>
(i) Affordability	- 60%
(ii) Accessibility	- 20%
(iii) Q&T	- 20%

12.3. Secondly, a percentage weightage shall be assigned to each category of user for each of three parameters. The weightages thus assigned shall be

Parameter	Weightages Assigned			
	Agriculture	Domestic	Industry	Total
Affordability	12	10	78	100
Accessibility	30	25	45	100
Q & T	30	25	45	100

12.4. The Application of parameter weightage percentage (Criterion 12.2) to the above weights shall result in the following percent allocation of O&M cost to the three categories of users



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<b>Parameter</b>	<b>Agriculture</b>	<b>Domestic</b>	<b>Industry</b>
Affordability	$12 \times 0.6 = 7.2$	$10 \times 0.6 = 6$	$78 \times 0.6 = 46.8$
Accessibility	$30 \times 0.2 = 6$	$25 \times 0.2 = 5$	$45 \times 0.2 = 9$
Q&T	$30 \times 0.2 = 6$	$25 \times 0.2 = 5$	$45 \times 0.2 = 9$
	19.2	16	64.8
Say	19	16	65

- 12.5. The allocation of 19% to agriculture (in O&M cost) considers revenue from both canal flow areas and well irrigation areas in the command. Substantial recharge in these wells occurs from canal water seepage and infiltration. The contribution to revenue from wells was about 5% of the O&M cost till well irrigation was made free by the State government as a policy. Thus flow irrigation areas (area based and volumetric supply) share only about 14% of the O&M cost. The balance 5% has to be made good by State government subsidy.
- 12.6. The total O&M cost for the mid-year of the control period i.e. 2014-15, will be apportioned accordingly to the three categories of users to fix the basic rate. Losses / gains in revenue due to concessions / penalties will not be accounted for in fixation of basic rate but will be separately shown for as per Section 11 of the Criteria.

**13. PRINCIPLES & INCENTIVES / CONCESSIONS / DISINCENTIVES / PENALTIES TO BE ADOPTED IN TARIFF FIXATION**

**13.1. Agriculture**

**13.1.1. Principles**

- (i) The basic rate for each crop in area based tariff will be fixed for rabi season. While fixing the basic rate, it may be ensured that the tariff does not exceed 3% to 5% of the gross value of produce in case of food crops and



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8% to 10% of the gross value of crops in case of cash crops (sugarcane, banana, horticulture). For horticultural crops, the area based rate will not be more than 75% of the rate for sugarcane & banana from water use considerations. The concession at Criterion 13.1.2 (iv) will also apply for horticultural crops.

(ii) Where the crop nomenclature is the same in kharif and hot weather as in rabi (e.g. vegetables), 50% of the basic rate will be charged in kharif and 200% of basic rate in hot weather. For other crops which do not have common nomenclature and for two seasonal and perennials, Criterion 13.1.1. (i) will apply. However, the norm of 50% and 200% will be used to derive rates in kharif and hot weather season for two seasonal and perennials.

(iii) For reckoning the gross value of produce, the Minimum Support Price as fixed by the Govt. of India for the latest year for various crops will be considered along with irrigated yields of crops. Data to be adopted for these two parameters while working out the tariff for 2013-16 is already presented in the Approach Paper for Determination of Criteria for Bulk Water Tariff for 2013-16, prepared and circulated by the Authority in March 2012 for comments / suggestions of the stakeholders. This data is subject to revisions that may be done by the Authority based on suggestions received.

(iv) With a view to reduce the number of crop categories in area based tariff, grouping of crops under five heads will be done as under viz. kharif, rabi, two seasonal, hot weather and perennial.

<u>Kharif</u>	<u>Rabi</u>
a) Cereals and other crops	a) Vegetables
b) Groundnut	b) Wheat
c) Vegetables	c) Jowar, Onion, other rabi
d) Paddy	

<u>Two Seasonal</u>	<u>Hot Weather</u>	<u>Perennial</u>
a) Chilli, ginger, tur etc.	a) Vegetables	a) Sugarcane, banana
b) Cotton	b) Groundnut	b) Horticulture
	c) Paddy	



- (v) Volumetric rate for bulk water tariff for agriculture will be fixed following the procedure given in Annex I.
- (vi) Area based and bulk water tariff for private lift schemes will be worked out as given in **Annex 3**.
- (vii) Area based and bulk water tariff for government lift schemes will be worked out as given in **Annex 4**.
- (viii) No distinction will be made in tariff rates between normal and distress or drought period. However, the State may consider remission / waiver of water charges in period of distress or drought and provide required subsidy so that funds for O&M are not jeopardized.

### **13.1.2. Area Based Tariff for Crops**

#### **13.1.2.1. Concessions :**

- (i) for farmers with less than 2 ha holding, concessional tariff of 75% of basic rate will be levied
- (ii) for farmers with less than 4 ha holding in districts of Vidarbha included in the Prime Minister's package and in naxalite affected areas as declared by the State Government, concessional tariff of 50% of basic rate will be levied.  
**Note:** Concessions (i) & (ii) above are not applicable to farmers growing cash crops of sugarcane, banana and horticulture.
- (iii) for tribal farmers in projects implemented under tribal sub plan, no tariff shall be levied.
- (iv) For project affected persons, concessional tariff of 75% of basic rate for all crops will be levied
- (v) Since horticultural crops like mango, orange, grapes, chikkoo, tamarind, gooseberry (amla), coconut take time to yield, no area based tariff will be charged for these crops for the initial period specified below



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- (a) grapes - 2 / 3 years
- (b) orange/mosambi - 4 years
- (c) mango/chikkoo/tamarind/amla/coconut - 5 / 7 years

Note: Indicated initial period be got certified from the District Agriculture Officer.

However, if inter crop is taken during this maturity period, appropriate tariff for the inter-crop will be charged.

Further, irrespective of whether inter-crop is taken or not, after the expiry of the maturity period, full horticultural rate will be levied.

(vi) If extended rabi watering is taken for a kharif crop or in hot weather for a rabi crop, only relevant kharif / rabi rate will be charged for the extended watering.

(vii) for areas under old 'malguzari' tanks, the present practice shall continue.

(viii) for paddy areas under agreement in Vidarbha in both seasons, 50% applicable rate will be charged.

### 13.1.2.2. **Incentives**

(i) for adoption of modern irrigation methods 60% of applicable rate will be charged

Provided that for horticultural crops, this concession will become applicable only when full tariff is paid after the expiry of the relevant maturity period.

(ii) for advance payment before start of season, 5% rebate in tariff will be given.

### 13.1.3. **Disincentives / Penalty**

(i) Family size - for farmers having more than two children born after one year of enactment of the Act (i.e. one year after 8-6-2005 or after 8-6-2006), tariff at one and half times applicable rate will be charged in the light of the provisions in Section 12 (11) (a) & (b) of the Act.

(ii) Penalty at 1% levy per month or 12% per year will be charged for delayed payments beyond permissible limit.



#### **13.1.4. Volumetric Tariff for WUAs**

##### **13.1.4.1. Concessions**

(i) to encourage formation of WUAs and switch over to volumetric supply from area based supply, a concession of 25% in rate arrived at by adopting methodology laid down in Annex 1 of this Criteria will be given.

(ii) for WUAs extending area based concessions to their members which are linked to holding size (Criterion 13.1.2.1. (i) & (ii)) and also levying penalty linked to family size (Criterion 13.1.2.3 (i)), a further concession of 10% in volumetric rate will be given.

(iii) where WUAs are formed in paddy areas, the volumetric rate in kharif will be calculated considering kharif area based rate and a field water requirement of 2500 m<sup>3</sup>/ha. The actual rate will be 50% of the rate arrived at by above method. The rabi rate will be two times the kharif rate and the hot weather rate four times.

##### **13.1.5. Methodology for Calculation of Agricultural Tariff**

(i) As per Criterion 12.4 and 12.5., 14% of the O&M cost is allocable to agriculture and thus recoverable from tariff.

(ii) Crop wise area rates will be worked out as per Criterion 13.1.1. (i).

(iii) Volumetric rates for WUAs at minor level (for areas other than paddy) will be worked out as per Annex 1.

(iv) Volumetric rate for WUAs in paddy areas will be worked out as per Criterion 13.1.4.1. (iii)

(v) Rates for private and government lift schemes will be worked out as per Annex 3 and 4 respectively.

(vi) The aggregate revenue realized from area based irrigation, volumetric irrigation and lift schemes will be assessed and if it is more than the O&M allocation to irrigation, the rates will be revised downwards and if it is less than the O&M allocation, the rates will be revised upwards and the exercise





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repeated. The ceilings in tariff linked to gross value of produce (Criterion 13.1.1 (i)) will be kept in view. Only concessions linked to holding size will be considered for the exercise as it involves sizeable revenue and is also estimatable. Loss in revenue due to other concessions like micro irrigation adoption will not be considered at this stage of the tariff exercise as in any case the state will earn additional revenue from the saved water.

**13.2. Domestic**

**13.2.1. Principles**

(i) Basic rate will be linked to source of supply as categorized below

	<b><u>Category</u></b>	<b><u>Source of supply</u></b>	<b><u>Water rate</u></b>
a)	Assured water supply	Major/medium reservoir/storage tank without canal	Basic rate
b)	Regulated water supply with transmission loss	Regulated river portion below dam/KT weir with back up reservoir/tail race from hydro plant	Two times basic rate on quantum actually lifted.
c)	Partly assured water supply	Minor reservoir with canal/KT weir without back up reservoir/unregulated river without any KT weir or bandhara	50% of basic rate
d)	Infrastructure constructed by water user entity	Water user entity (Gram Panchayat/Nagar Palika/Municipal Corporation and such other utilities) has constructed dam/bandhara/KT weir at own cost	33% of basic rate
e)	Water user entity has shared proportionate cost of infrastructure	Water user entity (Gram Panchayat/Nagar Palika/Municipal Corporation and such other utilities/ has shared proportionate cost of dam/bandhara/KT weir	* See note below.

\*Note : 1) Transmission losses to be borne by water users. Evaporation losses at storage to be borne by WRD.

2) For past agreements on sharing in cost of infrastructure or where share cost of infrastructure is agreed to at planning stage in new projects or where weir / bandhara is constructed by entity below a dam to lift its share, the water rate will be 33% of basic rate. However, for water allocation to an entity from a completed dam, any payment in share cost will be treated only as advance water tariff to be adjusted against concessional



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water tariff of 33% basic rate, the number of years the concessional tariff will be operative will be calculated by NPV method with 10% rate of interest. On full adjustment of the advance tariff, the appropriate basic rate will become applicable.

- (ii) Basic rate will remain the same in kharif, rabi and hot weather
- (iii) While entering into agreement with Municipal Corporation / Nagar Palika, industrial use, including commercial use, will be separately identified and charged appropriate industrial rate.

### 13.2.2. Concessions

- (i) Tariff for rural and urban users will be different as under
  - a) Gram Panchayat - 75% of applicable rate
  - b) Nagar Palika - 90% of applicable rate
  - c) Municipal Corporation - 125% of applicable rate  
(A, B, C & D categories)

### 13.2.3. Incentives

- (i) In all new agreements to be entered into by Nagar Palika / Municipal Corporation from 2013 onwards till 2016, when this Criteria will apply, they will be permitted to recycle and reuse 20% or more of the sewage effluent treated as per MPCB norms for agricultural, industrial or commercial purposes, provided there is no prior commitments for irrigation or other purposes stipulated by WRD in the existing / new agreement. The Nagar Palika / Municipal Corporation may levy appropriate bulk water tariff for the treated sewage effluent for its sale to any other entity and utilize the revenue so earned for the upkeep of the sewage treatment plant (STP).

### 13.2.4. Penalty / Disincentive

- (i) Additional requirement of Nagar Palikas, Municipal Corporations will have to be met by recycling, wherever possible. Such demands will be considered only after review of norms of supply, water audit and progress in setting up of STP.



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(ii) For reservation sought by an utility in the reservoir during water scarcity / distress period, full levy will be charged for the quantum reserved, irrespective of the actual drawal, after including attendant evaporation and transmission losses.

(iii) The following 23 class A,B,C & D category Municipal Corporations will be charged from June 2013 one and half times the applicable bulk water tariff as they have not complied with the stipulation laid down in Criterion 13.2.4 (iii) of the Criteria for 2010-13 requiring them to submit within two years of the issue of the bulk water tariff rates order on 30-5-2011, an implementation plan for setting up new / additional STPs of required capacity to treat the sewage generated to the required standards.

<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
1. Greater Mumbai	3. Pune	5. Thane	8. Kalyan-Dombivali
2. Navi Mumbai	4. Nagpur	6. Nashik	9. Ulhasnagar
		7. Pimpri – Chinchwad	10. Bhiwandi-Nizampur
			11. Mira – Bhayander
			12. Malegaon
			13. Sangli-Miraj-Kupwara
			14. Solapur
			15. Kolhapur
			16. Aurangabad
			17. Nanded – Waghla
			18. Amravati
			19. Jalgaon
			20. Ahmednagar
			21. Dhule
			22. Vasai-Virar
			23. Akola

Note : New category 'D' Municipal Corporations like Latur, Parbhani and Chandrapur will be required to submit the implementation plan for setting up new / additional STPs of required capacity to treat the sewage generated to required standards within two years of the issue of tariff orders for 2013-16.

### 13.2.5. Methodology for Calculation of Domestic Tariff

(i) As per Criterion 12.4, 16% of the O&M cost for 2014-15 is allocable to domestic.

(ii) This allocated cost will be first divided by the total projected water use



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for 2014-15 to arrive at an average rate.

(iii) The total projected use will be distributed among the sub-categories of domestic users viz. Gram Panchayat, Nagar Palika and Municipal Corporation and each sub-categories use again sub-divided among the various sources of supply (Criterion 13.2.1. (i)). The percentages used for above distribution will be average of past data.

(iv) The total revenue from the various sub-categories will be arrived at using the average volumetric rate to start with. Depending on whether this revenue is more or less than the O&M allocation, the exercise will be repeated with a lower or higher value of the average rate till both match and this rate will be the basic rate.

(v) Loss in revenue due to concessions and accrual due to penalties will not be considered in this rate fixation exercise.

### 13.3. Industrial

#### 13.3.1. Principles

(i) Basic rate will be linked to source of supply as categorized below and subject to the condition that the effluent will be treated to the required standards before its release into a natural water course or an irrigation canal.

	<b>Category</b>	<b>Source of supply</b>	<b>Water rate</b>
a)	Assured water supply	Major/medium reservoir/storage tank without canal	Basic rate
b)	Regulated water supply with transmission loss	Regulated river portion below dam/KT weir with back up reservoir/tail race from hydro plant	Two times basic rate on quantum actually lifted.
c)	Partly assured water supply	Minor reservoir with canal/KT weir without back up reservoir / unregulated river without any KT weir	50% of basic rate
d)	Water user entity has shared proportionate cost of infrastructure	Water user entity (process industry or industry using water as raw material) / has shared proportionate cost of dam/ bandhara/ KT weir	* See note below.



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e)	Infrastructure constructed by water user entity	Water user entity (process industry or industry using water as raw material) / has constructed dam/bandhara/KT weir at own cost and is also maintaining it.	33% of basic rate
f)	Water user entity allocated secondary treated sewage effluent of Nagar Palika or Municipal Corporation	Process industry allocated secondary treated sewage effluent of Nagar Palika or Municipal Corporation which the industry further treats (tertiary treatment) at own cost before its use.	25% of basic
g)	Water user entity allocated untreated sewage effluent of Nagar Palika or Municipal Corporation	Process industry allocated untreated sewage effluent of Nagar Palika or Municipal Corporation which the industry treats at own cost before its use.	Free of charge
<p>*Note :</p> <ol style="list-style-type: none"> <li>1) Transmission losses to be borne by water users. Evaporation losses at storage to be borne by WRD.</li> <li>2) For past agreements on sharing in cost of infrastructure or where share cost of infrastructure is agreed to at planning stage in new projects or where weir / bandhara is constructed by entity below a dam to lift its share, the water rate will be 33% of basic rate. However, for water allocation to an entity from a completed dam, any payment in share cost will be treated only as advance water tariff to be adjusted against concessional water tariff of 33% basic rate, the number of years the concessional tariff will be operative will be calculated by NPV method with 10% rate of interest. On full adjustment of the advance tariff, the appropriate basic rate will become applicable.</li> <li>3) When untreated sewage of Nagarpalika or Municipal Corporation is given to any water user entity (provided there is no prior commitment of down stream use) separate dedicated pipe line for collecting and conveying the untreated sewage has to be laid by user entity to avoid the inter-mixing of the sewage with water of natural stream.</li> </ol>			
(ii) basic rate will be applicable for rabi season. For kharif season, 50% of basic rate will be charged and for hot weather 150% of basic rate will be charged.			
(iii) the basic rate will be applicable to process industries i.e. industries using water for cooling (like thermal plants), washing and in process for manufacture of the intended good.			



(iv) for industries using water as raw material viz. mineral water, beverages, sugarcane process industries (for quantity used for producing ethanol, alcohol or for cogeneration) five times basic rate will be charged.

(v) while entering into agreement with industrial users, domestic use component will be separately identified and charged appropriate domestic rate.

### **13.3.2. Concessions**

(i) for agro industries (poultry, canning, sugarcane processing (except for production of alcohol and power generation), rice mills, vegetable oils, dairying, corn processing (except for production of alcohol), rice mills, vegetable oils), 75% of basic rate will be charged

(ii) rebate for recycling - if an industry reduces its demand to 75% by recycling (utilization reduced by a minimum of 25%), 75% of applicable rate will be charged for the reduced demand. Mechanism to be developed by WRD to verify the reduction.

(iii) zero discharge - if an industry adopts zero discharge technology and thus draws only upto 15% of its allocation to cover line loss, evaporation and process consumption, it will be charged only 25% of the applicable rate for the water drawn.

### **13.3.3. Penalties / Disincentives**

“Polluter pays” principle - Every industry is expected to treat effluent to desired standard before release into natural water course. As an initial step for curbing tendency of pollution, if effluent is not treated to required standard of MPCB, rate equal to twice the applicable rate will be charged. This will be in addition to any other action that MPCB may separately take.

### **13.3.4. Methodology for Calculation of Industrial Tariff**

(i) As per Criterion 12.4, 65% of the O&M cost for 2014-15 is allocable to industry.

(ii) This allocated cost will be divided by the industrial water use for 2014-15 to arrive at an average rate



(iii) The total projected use will be distributed among the two sub categories viz. process industries and industries using water as raw material. Each sub category use will be distributed among various sources of supply as at Criterion 13.3.1. (i). The percentages used for such distribution will be averages worked out on past data or may be reasonably estimated.

(iv) the total revenue realized using the average rate will be arrived from the estimated revenue from the various sub-categories and sources of supply. The average rate will be revised upwards or downwards till the O&M allocation and revenue generation figures match and this rate will be the basic rate.

(v) loss on revenue due to concessions and accrual due to penalties will not be considered at the stage of tariff fixation.

**13.4. Other Provisions (Common to domestic & industrial)**

(i) Penalty at 1% of levied tariff per month or 12% per year will be charged for delayed payments beyond permissible limit.

(ii) For future agreements, Criteria determined by the Authority for non-irrigation Entitlements will be followed.

(iii) any withdrawal beyond + 10% of prescribed quantity in agreement will be charged penal rate of 1.5 times applicable rate.

(iv) While entering into new agreement with WRD, non irrigation user entities will indicate the phasing planned for reaching the ultimate requirement. They will be levied tariff for the quantities indicated in the phasing subject to penalties at (iii) & (iv) above. A commitment charge of 5% of applicable tariff will be levied for the balance quantum viz. ultimate requirement minus requirement indicated in the phasing for the particular year.

WRD will be free to divert the balance quantity for that year to any category of user or any other user within the same category without conferring any entitlement right on the user for such use.



- (vi) Any withdrawal less than -10% of prescribed quantity in agreement will be charged penal rate of 1.5 times applicable rate for the total quantum of shortfall in withdrawal beyond -10%. Annex 2 gives the method of calculating commitment charge and penal tariff.

#### **14. Responsibilities of the Service Provider**

- 14.1. In the Criteria for 2010-13, certain responsibilities were devolved on the service provider, WRD, in **Annex 5 & 6** which are enclosed again. These related to
- (i) ensuring water to tail-end farmers
  - (ii) improvement in water use efficiency
  - (iii) asset management
  - (iv) assessment of transmission losses in canal system
- These responsibilities would continue to devolve on the service provider during 2013-16 also.
- 14.2. For the 236 irrigation projects being rehabilitated under MWSIP with World Bank assistance, work is expected to be completed by 2014. Equity in supplies between head and tail end WUAs is expected to be achieved in these projects thereafter. For other projects not covered under MWSIP, WRD, should starting 2012-13, include information on select major & medium projects in the Irrigation Status Report on irrigation intensities achieved in head, middle and tail reaches.
- 14.3. For improvement in water use efficiency in terms of area irrigated per unit of water ( $\text{ha}/\text{Mm}^3$ ), the Authority had in the Criteria for 2010-13 set targets of  $120 \text{ ha}/\text{Mm}^3$ ,  $125 \text{ ha}/\text{Mm}^3$  and  $130 \text{ ha}/\text{Mm}^3$  for 2010-11, 2011-12 and 2012-13 respectively. Although increasing trends are visible in the past few years, detailed analysis of data starting with 2010-11 is yet to be done. The Authority will decide on further targets after reviewing the performance from 2010 to 2013.
- 14.4. The Authority had in its Criteria for 2010-13 recommended that maintenance grants to WUAs be increased to 95% of the water charges deposited by the WUA. WRD should expedite issue of the required GR.





- 14.5. Since Upper Level Associations (Project Level, Canal Level, Distributary Level) have not been formed in most projects, the maintenance of the system above the minor will continue to vest with WRD. Where such Upper Level Associations have been formed and are receiving water on behalf of WUAs, they will be charged volumetric tariff as applicable at minor level only for all the WUAs in their jurisdiction. The Upper Level Associations will receive required budget grants from WRD for system maintenance above the minor as per WALMI norms for each level of association.
- 14.6. WRD has initiated measurement of transmission losses in identified canal systems. This work should be completed and results submitted to the Authority within a year. This should be a continuing activity of WRD.
- 14.7 WRD should also ensure that agro - meteorological stations are established at all major & medium project locations so that data like daily rainfall & evaporation losses are continuously observed. WRD should also periodically carry out sedimentation survey of major reservoirs to assess the loss in dead and live storages due reservoir sedimentation.



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**Annex 1.**

**(Para No. 13.1.1 (v))**

**Methodology for Working Out Volumetric Rate for Agriculture for  
 Minor Level WUA**

(Calculations to be done with 2014–15 projected data)

1. Assumption - Since system rehabilitation in most projects under Maharashtra Water Sector Improvement Project (MWSIP) will be completed by 2014-15, an overall efficiency of 0.48 is adopted with efficiency of 0.64 upto minor.
2. Let O&M cost allocation to irrigation be C
3. Let total volumetric drawal (at canal head) by irrigation be  $V_1$
4. Let total volumetric drawal by minor canal WUAs (at minor head) be  $V_2$
5. Volumetric drawal by WUAs at canal head.

$$= \frac{V_2}{0.64} = V_3$$

6. O&M cost allocable to WUAs  
 $= C \times \frac{V_3}{V_1} = C_1$

7. Unit rate of volumetric supply to WUA

$$= \frac{C_1}{V_3} = 0.64 \times \frac{C_1}{V_2}$$

Note: A concession of 25% in above rate will be considered.

8. This will be rate in rabi. Volumetric rate in kharif is proposed as 50% of this rate and rate in hot weather will be 200 %.

**Note:** The above method is for non-paddy areas. For paddy areas see Criterion 13.1.4.1 (iii).



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**Annex 2**  
**(Para 13.4. (v))**

**Implementation of Commitment Charges & Penal tariff Operate**

(Illustrative Example)

**Commitment Charge**

Suppose an utility has signed an agreement with WRD for 5 years for supply of 100 Mm<sup>3</sup> for non-irrigation purposes. It requires 100 only from year 4 and the requirement in first 3 years are say 50, 60 and 80. This phasing will be reflected in the agreement.

The tariff will be levied as under

1. Year one 50 x applicable rate + commitment charge on balance 50 at 5% of applicable rate.
2. Year two 60 x applicable rate + commitment charge on balance 40 of 5% of applicable rate.
3. Year three 80 x applicable rate + commitment charge on balance 20 of 5% of applicable rate.
4. Years four and five 100 x applicable rate

**Penalty**

However, if the quantum indicated in phasing are not actually drawn and deviation is more than  $\pm 10\%$ , penal charges will be levied at 1.5 times. This operates as under

- (i) Suppose in first year, against 50, 60 is drawn. This is more than the permissible + 10% variation as only variation upto 55 was allowed. The tariff will be as under  
50 x applicable rate + 10 x 1.5 times applicable rate + 40 x commitment charge of 5% of applicable rate.
- (ii) Suppose in second year, against 60, only 50 was drawn. This is less by 10 while permissible is only - 10% or 6 less i.e. upto 54 could be drawn without penalty. Penalty is levied on less drawal also as project is left with 10 unutilized allocation. Tariff will be as under :  
50 x applicable rate + 10 x 1.5 times applicable rate + 40 x commitment charges at 5% of applicable rate.



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**Annex 3**  
**(Para 13.1.1 (vi))**

**Procedure for Area Based & Bulk Water Tariff for Private Lift Schemes**

- (i) Rates for sugarcane, banana, horticulture will be worked out as under
- (ii) Rate will be linked to source of supply. The following is the categorization for source of supply.

Category	Source of Supply	Rate
a) Assured water supply	Major/medium reservoir/canal lift for major & medium projects /storage tank without canal	Basic
b) Regulated water supply with transmission loss	Regulated river portion below dam/KT weir with back up reservoir/tail race from hydro plant	0.75 times basic rate
c) Partly assured water supply	Minor reservoir with canal/KT weir without back up reservoir/ unregulated river without any KT weir or bandhara	0.5 times basic rate
d) Infrastructure constructed by WUA or shared in proportionate cost	WUA/lift owner has constructed or shared in proportionate cost of dam/bandhara/KT weir.	0.33% times basic rate

Note : Transmission losses are to be borne by service provider.

- (iii) a concession of 35% will be given for investment made by the private lift owner on infrastructure like motor, pump, pipelines
- (iv) the annual energy charges will be taken as Rs. 1670/ha for a 5 HP pump.
- (v) the annual O&M cost incurred by the private lift owner on maintenance of motor, pump, pipe lines will be taken as Rs. 1000 / ha.
- (vi) the basic rate for sugarcane & banana will be derived from following formula.
- $$\text{Basic rate Rs./ha (rounded off to nearest Rs. 10)} = \frac{0.65 (\text{flow rate for sugarcane, banana}) - 1670 - 1000}{\text{flow rate for sugarcane, banana}}$$
- (vii) flow rate for horticulture will be 75% of rate for sugarcane & banana.
- (viii) for adoption of modern methods of irrigation like drip & sprinkler, a concession of 40% will be given on applicable tariff.
- (ix) for other crops in kharif, rabi & hot weather, the rates for 2010-13 will be increased by 10%, rounded off to nearest Rs. 10.

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- (x) Where private lift operators (individual or Association) lift water on a measured volumetric basis, the basic rate for volumetric supply will be the same as the rate for volumetric supply to WUA at minor level arrived at in Annex-1.





**Annex 4**  
**(Para 13.1.1. (vii))**

**Procedure for Area Based and Bulk Water Tariff for Govt. Lift Schemes**

- (i) The charges for Government operated lift schemes comprise two parts viz. a crop wise area based flow water charge, plus energy charges.
- (ii) Crop wise water rates payable by beneficiaries will be the same as the crop wise area based rates fixed for flow areas.
- (iii) State government may recover the energy charges from the beneficiaries either as a service tax fixed uniformly for the State as a whole for each crop, separately for lifts upto 60 m and lifts above 60 m, or recover energy charges, scheme wise, based on actual consumption.
- (iv) State government may extend such subsidy to Government operated lift Irrigation schemes as it deems necessary.
- (v) Where a WUA at minor level has been formed in a government operated lift irrigation scheme and they receive volumetric supply by flow after lifting, they will be charged the same volumetric rate applicable to WUAs in flow areas together with the actual energy charges applicable to the WUA recoverable as per procedure to be decided by WRD for the scheme.



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**Annex-5**  
**(Para 14.1)**

**Responsibilities of the Service Provider (WRD) in Relation to Water Tariff**

**1) Improvement in Collection Efficiency**

The issue of collection efficiency of water tariff has been discussed in Chapter 2. The collection efficiency for industry is in the range of 90% while for drinking water it is in the range of 60% to 70%. The collection efficiency for irrigation has however remained very low in the range of 25% to 46%. Maharashtra Irrigation Act 1976 vide Section 88 (2) has stringent provision for recovery of water tariff as arrears of land revenue. The criteria now developed has provision for incentives for advance or timely payments by users. Efforts need to be made to improve collection efficiency of irrigation water tariff to atleast 75% in the next 3 years. To enable the Authority to monitor this closely, Circle wise information may be submitted annually for each irrigation project, the agricultural tariff levied and tariff realized both current and arrears, separately.

**2) Ensuring water to tail end farmers**

As per Section 12 (7) of the MWRRA Act, the Authority is to ensure that the principle of 'tail to head' irrigation is implemented by the River Basin Agency. As per Section 18 of the MMISF Act Rules, it is the responsibility of the Canal Officer to monitor and ensure that every member of the Water User Association receives the quantum of water as per applicable water entitlement. The issue of equity and timeliness of supplies was stressed by the stake holders during public consultation. Since about 90% of the irrigated area in the State still is supplied water on area basis, a special responsibility devolves on the Department to ensure equity and timeliness in supplies to individual farmers. The percentage of area irrigated in head, middle and tail areas of canal command should nearly be the same. The information on this issue shall be included in Irrigation Status Report to be published every year. To enable the Authority to monitor this closely, Circle wise information may be submitted to it at the end of each season for each major & medium project, giving the percentage of area irrigated in the head, middle and tail reach of each project. In volumetric supply to WUA, the Department has to ensure that the supplies out of the Applicable Entitlement are made as demanded by WUA in each rotation.

**3) Improvement in Water Use Efficiency**

While at the project planning stage, an overall efficiency of 47% to 50% is assumed, in actual practice, the efficiencies obtaining on the ground are 25 to 35% implying that significant quantum of the released water is lost in seepage and as application losses in the field. Improvement in water use efficiency not only improves productivity but also more area can be irrigated with saved water. This will lead to more



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revenue collection from irrigation sub sector and can justify reduction in tariff rates for agriculture at time of review and revision of tariff.

From the water audit reports published annually by WRD, it is seen that the average water use efficiency for the projects in the state in terms of area irrigated in ha per  $Mm^3$  of water drawn has increased from 94 to 110. This trend should be maintained and the WRD should aim to achieve the following targets in the 3 years.

<u>Year</u>	<u>Target ha/<math>Mm^3</math></u>
2010-11	120
2011-12	125
2012-13	130

While submitting tariff proposals in future, WRD should report progress in above with reasons for shortfall, if any, and remedial steps proposed. To enable the Authority to monitor this closely, Circle wise annual information may be submitted for each of the irrigation project (major & medium), the season wise area irrigated per  $Mm^3$  of stored water.

#### 4) **Asset Management**

##### (a) **For systems not handed over to WUA**

WRD should assess the annual requirement of funds for works component of maintenance based on approved norms for irrigated areas and un-irrigated areas and requirement for other ancillary components (dam, outlets & gates etc.) and project this in their budget requirement along with requirement for special repairs separately. On allocation of budget, WRD & field SEs should ensure funds are not allocated in an adhoc manner but to each project as per maintenance requirement depending on norms, irrigated area and un-irrigated area. Utilization of funds for maintenance should be done by field officers after prioritizing the works from safety considerations.

##### (b) **For systems handed over to WUA**

The MMISF Act 2005 envisages that once minor level WUAs are formed, the system below the minor will be handed over to the WUA for operation & maintenance. Volumetric supply as per Entitlement will be done by WRD to the WUA at the minor head and volumetric rate charged. The Act further envisaged that WUA may levy water rates from its members as may be approved by the General Body of the WUA.

WALMI in their study on O&M have recommended a maintenance a grant of Rs. 380/ha of irrigated area and Rs. 190/ha for balance CCA. The distribution of this grant has been apportioned by WALMI as 40% for main & branch canal, 25% for distributaries and 35% for minor.



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Vide GR dated 23-7-2001, WRD has conveyed norms for sanction of grants to WUA for maintenance. After recovering water charges from the members and depositing it with the government, WUA is entitled to receive maintenance grants (excluding cess) as per percentages in table below

### Share of WUA in grant

Project	Functional Association Minor level WUA	Upper level association			Total
		Distributary level WUA	Canal level WUA	Project level WUA	
Minor	75%	-	-	-	75%
Medium	50%	15%	10%	3%	78%
Major	50%	20%	20%	3%	93%

The above norms were checked by the Authority for the adequacy to meet the M&R norms recommended by WALMI for irrigated and un-irrigated areas. It is seen that at least 95% of the water charges deposited by WUA at minor level need to be ploughed back to the WUA for proper maintenance against 75% decided in the GR for minor projects and 50% for major and medium. Otherwise it is apprehended that the systems will gradually deteriorate with impact on equity and productivity. The balance 5% could be retained by State government as a royalty charge. However there is need for WRD to develop a mechanism to ensure that

- Water charges as due are first collected from members by WUA as per provisions in the MMISF Act 2005.
- 95% of above amount collected by WUA, less cess, is returned immediately to the WUA to be utilized for maintenance of system handed over to WUA. A certificate to this effect is required to be kept on record, signed jointly by WUA and WRD official in-charge.

WRD will have to continue maintaining the system above minor till higher level associations are formed. Thereafter the required maintenance funds for main canal, branch canal and distributary as per norms are to be provided as grants to these upper level associations as water charges collected are almost fully to be given back to minor level associations. Grants given by WRD to maintain main canal, branch canals and distributaries should be properly utilized by concerned upper level association and should be verified / cross checked by WRD officials and certified accordingly. Such certificates will be a pre-requisite for further releases.



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Dams and appurtenant works should however be continued to be maintained by WRD by making required budget provision as per norms even after higher level associations have been formed.



**Annex-6**  
**(Para 14.1)**

**Assessment of Transit Losses in Canal Systems**

1. Assessment of transit losses both for non-irrigation and irrigation uses in the State has an important linkage to improvement in overall water use efficiency and water tariff both at bulk and retail levels. In irrigation, transit losses due to seepage in canals, leakages in gates, thefts and pilferages, reduces the area that can be potentially irrigated in a project and also reduces the reliability of supply, both in respect of timeliness and quantity especially to the tail enders. In domestic supply, unaccounted for water comprising transit losses and pilferages reduces not only the potential revenue from retail tariff to water utilities but also the per capita availability to consumers forcing them to supplement the supply from private sources at an exorbitant cost.
2. For a proper assessment of Transit losses in Canal Systems, WRD should give due importance to precise measuring and accurate accounting of water. For agricultural withdrawals, WRD should install suitable measuring devices in the open channels starting from head regulator of main canal, branch canal, distributaries and minors. These devices should be properly installed and calibrated. Concerned project authorities should periodically note the readings at these devices work out the discharge from the relevant rating curves and assess the transit losses in the reaches between the measuring devices. A project wise study on the transit losses in each major and medium irrigation project in the State, in each season, should be carried out by the SE in charge of the project. For minor irrigation projects, a few projects in each district may be taken. The WRD should within 3 months evolve standard format for working out transit losses for guidance of field staff. The study should form a part of the Irrigation Status Report as a separate chapter.
3. To enable WUAs to supply water equitably to all farmers, measuring devices like V – notches should be installed in field channels.
4. While field SEs would be responsible for installation of measuring devices, the organisation under Chief Engineer, Maharashtra Water Resources Development Centre / WALMI, Aurangabad and MERI Nashik should be entrusted by WRD with the additional responsibility of calibration, periodical inspection and checking of



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performance of measuring devices for irrigation and non irrigation uses in the State. The organisation under this Chief Engineer should be suitably strengthened to carry out this responsibility by Government within 6 months. Detailed guidelines need to be issued by WRD for this purpose within 3 months. The Chief Engineer should submit a yearly report on the activities of his organisation in this respect to the Authority.

5. Industrial and domestic bulk users should install standard meters which are properly calibrated to handle a wide variation in discharge at their supply points. Such meters should also be installed at effluent discharge points to account for water returned by these units after treatment.