Analysis Framework for the 2009 Maharashtra MWRRA Tariff Document
Vol I: The Chapters

1. Preface: Terms of Reference, brief history and brief outline.
4. Chap. 4: Recommendations of various national and state committees.
7. Chap. 7: The computation of O & M norms.
8. Chap. 8: Methodology for determining tariffs.
9. Appendices: List of contents of other volumes.
Vol II and Vol III

Vol. II

1. Annexure I, Chap. 1: Bulk-water and tariffs-Principles.
   ▶ Agricultural, Industrial and Domestic
4. Annexure III: Water recycling technologies
   ▶ Wastewater and Industrial water re-treatment
   ▶ Tariff mechanism.
5. Annexure IV and V: Non-agricultural and agricultural tariffs.

Vol. III: The tariff details.
Vol. III first

- pg. 7: Definitions: *Collection Efficiency, Culturable Command Area*
- pg. 9: Definition of O&M costs, does not include capital, depreciation and special repairs.
- pg. 10: Item 8. Norms for M&R set by WALMI.
- pg. 10: Item 10. Subsidies must be explicitly mentioned.
- pg. 11: Item 12. Apportionment of Costs to sectors on the basis of affordability, accessibility, Quantity and timeliness.

<table>
<thead>
<tr>
<th>Agriculture</th>
<th>Domestic</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>21 %</td>
<td>23 %</td>
<td>56 %</td>
</tr>
</tbody>
</table>

- pg. 12: Principles, *tariff will not exceed 3-5% of gross value for food crops and 8-10% for cash crops.*
- pg. 13: A **basic rate (BR)** for rabi. 80% for *kharif* and 120% for *hot season.* Serves as *numeraire and applicable to domestic and industry as well.*
Concessions and Incentives as multiple of BR

<table>
<thead>
<tr>
<th><strong>Agricultural Use</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Marginal farmers (0-1 ha.)</td>
<td>50%</td>
</tr>
<tr>
<td>Small farmer (1-2 h.a)</td>
<td>75%</td>
</tr>
<tr>
<td>Microirrigation</td>
<td>50 %</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Domestic Use</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Effluent/Sewage treatment</td>
<td>50 %</td>
</tr>
<tr>
<td>GP 40lpcd</td>
<td>75%</td>
</tr>
<tr>
<td>ULB 70lpcd</td>
<td>90%</td>
</tr>
<tr>
<td>&gt; 130 lpcd</td>
<td>125%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Industrial Use</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Water as raw material</td>
<td>500%</td>
</tr>
<tr>
<td>Agro industry</td>
<td>75%</td>
</tr>
<tr>
<td>Recyling reduction to 75%</td>
<td>80%</td>
</tr>
</tbody>
</table>
Efficiency

Bill Collection

- Improve collection efficiency in agriculture to 75%.
- Submit circle wise collection efficiency in prescribed format.

Irrigation system

- Attempt to achieve water use efficiency:

<table>
<thead>
<tr>
<th>Year</th>
<th>Target ha /Mm³</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010-11</td>
<td>120</td>
</tr>
<tr>
<td>2011-12</td>
<td>125</td>
</tr>
<tr>
<td>2012-13</td>
<td>130</td>
</tr>
</tbody>
</table>

- Maintain circle-wise data on irrigated area for rabi and hot weather.
The Actual Tariff Computation

- Separate computation sheets for Agriculture, Domestic and Industry.
- Across all sectors, a common multiplier for season.
- Within agriculture, separate for canal, private lift and GoM lift. Groundwater use seems to be missing.
- For agriculture, seems to be a circle-wise tariff.
- An efficiency of 120 Ha./Mm³ for minor and 96 Ha./Mm³ for Medium and Major is assumed.
- pg.20-22 seems to be a worksheet to calculate average volumetric tariff.

- Not clear that volume balance is achieved. In other words, if \( V \) calculated in item 6 actually equals water reserved for 120 ha.

- Classification of sources into A, B, C for domestic and industrial use. This depends on the point of withdrawal. List in decreasing order of BR is protected downstream, reservoir and unprotected downstream.

Finally-Annex. 5, pg. 30

A cursory directive about asset management for systems without WUA (most) and cost-sharing directive for those with WUA.
1.1 Bulkwater and tariffs: description of costs and provisions, most of which have been ignored (e.g., return on investment, explicit subsidies).

1.2 Why tariffs: Four primary and two secondary objectives. Most of them are ignored.

1.3-1.5 Fixed cost, marginal cost and marginal opportunity costs. Mainly an argument on why something close to fixed costs with a separate efficiency and revenue objective (Two-part tariff) is most suitable.

Case Study: Brazil

- Abundance of fresh water: 1500 cu.m. per-capita for the arid areas. Compare with the Indian average of roughly 500 cu.m..
- River basin authorities with wide public participation.
- Pollution and Recycling costs clearly mentioned.
- Revenue aimed largely at capital generation.
- Tariffs negligible indicating low establishment costs.

Case Study: Melbourne Water

- Largely urban domestic and industrial use. Strict pollution norms.
- Costs include about 5% return on estimated capital costs.
- Rudimentary opportunity cost pricing and trading.
- Tariffs roughly Rs. 2-16 per cu.m. reflecting low project and establishment costs per cu.m.
Case Study: Cape Town water
- Largely urban domestic and industrial use.
- Massive investment for inter-basin transfer.
- Capital cost recovery regime.
- Graded household tariffs starting at Rs. 18/cu.m. (< 6 cu.m. per month).

Case Study: Urban China: Fixed fraction of capital costs absorbed into tariff. Beijing at Rs. 24 /cu.m. including about Rs. 5 each towards sewage and recovery of capital costs.

Case Studies: Chile and Harvey water (Aus.): Urban and semi-urban, partly opportunity costs and partly capital costs.

Case Studies: South Africa, Turkey Irrigation: Generally O&M, but Turkey has some capital costs. Non-govt. irrigation has to be registered.

Case Studies: Mexico: Extensive monitoring. O&M costs, monitoring and capital costs, in principle recoverable.
Vol. II continued

- **Annexure II and III**: Well-meaning but irrelevant stuff about Water Conservation and Recycling in the three sectors.
- **Annexure IV**: Non agricultural tariffs (per cu. m.).

<table>
<thead>
<tr>
<th>Use</th>
<th>Reservoir</th>
<th>Canal</th>
<th>River</th>
<th>Capital Paid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Ind.</td>
<td>19</td>
<td>48</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Industry</td>
<td>3.8</td>
<td>9.5</td>
<td>1.3</td>
<td>1.3</td>
</tr>
<tr>
<td>Domestic</td>
<td>0.17</td>
<td>0.66</td>
<td>0.15</td>
<td>0.15</td>
</tr>
</tbody>
</table>

- **Annexure V**: Current Agricultural tariffs. Basic variables:
  - **Season** Kharif (70%), Rabi (100%), Hot-weather (150%).
  - **Delivery Flow** (100%), Drip (66%).
  - **Source** Canal (100%), GoM lift (100%), private lift (50%), others.
  - **Crop** food, cash, fruit, perennial, seasonal, and more.

  Rabi prices below per Ha.

<table>
<thead>
<tr>
<th>Crop, non-Kh. Rice, Groundnut</th>
<th>724</th>
<th>Wheat</th>
<th>476</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per. Sugarcane, Banana</td>
<td>6297</td>
<td>Onion</td>
<td>2519</td>
</tr>
</tbody>
</table>
Vol. II Costs

- **Annexure VI**: M&R norms proposed by WALMI.
  - **Headworks**: Rs. 11000 per Mm3
  - **Canal works**: Rs. 380 per Ha. of actual irrigated area.
  - **Canal works**: Rs. 190 per Ha. of area in **Culturable Command area** but not irrigated.
  - **KT weirs**: Rs. 2300/1450 per sq.m. depending on existence of reservoir.
  - **Lift Irr. schemes and storage tanks**: as per actuals.

- Adjustments for age of project, hilly regions and black cotton soils.
- WALMI norms based on actual expenditure of select projects and not on *amounts demanded by the department*.
- Exact data (Annexure 2 forms, pg. 68, WALMI.pdf) from projects surveyed not available in report.
- **Is CCA the same as Developed Command Area (pg. 26, Vol. 1)?**
- **Annexure VII**: Net M&R costs: **Rs. 221 crores** or Rs. 370/ Ha. of CCA. KT and Lift schemes not counted, deemed too small?

- **Finally**, a report of field visits to various projects and consumer types.
Vol. I

- **Preface**: 13 points, broad overview.
  - To fix tariff towards O&M, explicitize subsidies and cross-subsidies and to review every three years.
  - Most industrial and domestic volumetric, only 10% of agricultural is so.
  - Arguing the three attributes of affordability, accessibility, quality and timeliness.
  - Comments on the high establishment costs, hopes WUAs will reduce costs.
  - Comments on low water use efficiency in the agricultural sector.

- **Chapter 1**: outline of the report.
- **Chapter 2**: The bulkwater system.
  - Total 18157 Mcu.m., of which 3700 to domestic, 630 to industry and 18100 to agriculture.
  - Net command area developed is 43 L.Ha of which 32 through major and medium and 11 through minor schemes. **Utilized is only 28.**
  - The institutional framework.
  - rules concerning WUAs and MIDC.
  - Tariff levied: 328 crores from industry, 172 from domestic and 113 from agriculture.
  - **Collection only 36 crores from agriculture.**
  - All the same, collections roughly match O&M.
Chap. 2, 3 and 4

2.5.8: the difficulty of investments in O&M. *Yet past expenditure is the basis for estimating future O&M.*

O&M costs roughly Rs. 0.3-0.4 per cu.m.


Chapter 4: Recommendations of past committees.

NCAER 1959.
- Social and economic benefits.
- *Tariffs not on cost but on benefit to farmer!*
- Tariffs must cover debt charges.

Barve Committee 1962. Much of what is now the format.
- Tariffs to amount to 6-12% of crop price.
- Tariffs must cover depreciation.


Vaidynathan Committee 1992. The modern perspective: subsidies, financial well-being, cost recovery etc
Chapter 4 cont., Chapter 5

- **Chitale Commission, 1999.** Exhaustive study of Maharashtra. circle.
  - Brought O&M and tariff parity
  - Pointed out M&R vicious circle.
  - Stressed on capital investments/recovery for non-irrigation use.
  - Pointed out that private lift irrigation farmers were ready to pay 3-10 times canal flow charges.
  - Wells within command area to be charged. Adjoining areas to be charged after investigation.

- **Chapter 5: Legal framework.**

- **Tariff provisions in MWRRA:**
  - O&M recovery, promote and fix efficient use, determine cross-subsidies, and finally review.

- **Provisions in MMISF, 2005.**
  - Lots on WUA.
  - Confusion from MIA, 1976: **wells outside 35m limit excused, but non-irrigated lands to pay!**
  - However 2009 GR allows all well-irrigated lands to be tariff-free.

- **National Water Policy (5.6.1):** **rates directly linked to QoS.**
Chapters 6, 7 and 8

- **Chapter 6:** Present tariffs. State-wise comparison.
- **Chapter 7:** O&M norms. Estimating M&R and establishment.
  - The WALMI methodology: selected projects.
  - *difficult to correlate demand, actual expenditure with irrigation system performance!*
  - norms < expenditure < grants < demands
  - *projected M&R roughly in line with past expenditure/demand.
  - Establishment costs Rs. 325 crores of a total bill of Rs. 490 crores, way above Jakhade committee norms.
  - Cost per Ha. of Rs. 787.
- **Chapter 8:** Setting tariffs—the three attributes.
- Current irrigation costs 0-6 % of APMC rates for non-cash/non horticulture crops.
- Apportionment of costs and setting of tariffs.
- **Section 8.18:** Responsibilities.
  - Improving collection efficiency, tail-to-head water access.
  - Water use efficiency: 120-130 Ha. per Mm3, in 3 years!