Observations on 'Approach Paper On Developing Regulations for Bulk Water Pricing In the State of Maharashtra' prepared by ABPS Infrastructure Advisory Pvt. Ltd.

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MWRRA has posted the above approach paper on its web site. After reading the same, I felt the need to convey my observations on the same to MWRRA, Mumbai, which had entrusted the work to ABPS Infra(termed as Agency henceforth). My detailed observations are the following:

1. The approach adopted in working out the proposed volumetric rates for the control period consists of the following steps:

a) Projection of M&R costs of irrigation projects to the years in the control period (2009-2010 to 2011-2012).
b) Projection of Establishment costs on M&R of projects to the years in the control period.
c) Total O&M cost, which is the sum pf projected costs in (a) and (b) above.
d) Projection of Water Consumption to the years in the control period.
e) Apportionment of Total O&M cost between 3 categories of water users, namely Industry, Domestic and Agriculture on the basis of certain relevant parameters duly weighted.
f) Then, Effective Volumetric rate for each user category in each year of the control period is calculated as the ratio of O&M cost apportioned (or revenue requirement) to the user category to Water Consumption by the user category during the relevant year.

2. The study can be considered to be mainly in 2 parts:

(i) Projections of costs and water consumption as made to the years in the control period,
& (ii) Apportionment of O&M costs between user categories.

2.1 **Projections made for O&M cost**:

2.1.1 O&M cost = M&R cost + Estt. Cost.

At the outset, it needs to be mentioned that, all the projections made in the report are based only on a set of figures supplied by MWRRA to the Agency for a 5 year period, spanning from 2002-03 to 2006-07, using Compounded Annual Growth Rate (CAGR) concept. **No other consideration has been made**.

The formula for calculating CAGR is the following:

$$CAGR = \{ Vtn / Vto) - 1 \qquad (1/(tn-to))$$

Here, Vtn is the last figure and Vto is the first figure in the set. If the set consists of 5 figures, (tn-to) is 4 (=5-1) . Thus only the last and first figures enter the calculation of CAGR. It is however necessary that, the in between figures in the set need to be consistent. However, the set of figures for both annual M&R costs and annual Estt. Costs do not satisfy this requirement for use of the above formula. The figures for some of the years in between are less than that for the first year in the set.

2.1.2 The Agency has tried to compare its projections based on CAGR with projections made by the Agency itself using recommendations made in two studies, one in 1988 and the other in the year 2007-08. The first was made By Jakhade committee appointed by GOI and the recent one was made by WALMI, Aurangabad..

After making projections based on study of 1988, the report mentions some reasons why the results obtained do not compare well with its own projections. It should have been obvious that, projecting some figures recommended in the year as far back as 1988 (not based on Maharashtra's experience alone) over a long period of 20 years, during which substantial changes have taken place, will not be meaningful.

WALMI has conducted a study for revision in M&R cost norms for Irrigation projects. It has considered these costs as incurred over a 10-year period and considering several relevant aspects proposed revised M&R cost norms which may be adopted replacing the norms last prescribed in the year 2002. It appears that, recommendations made in WALMI's study have been erroneously interpreted and considered. Thus it is considered that, M&R cost as per proposed revised norms is Rs. 221 crores for the year 2006-07 and projection has been made based thereon by compounding it at the rate of 6% per year. Now the M&Rcost estimate of Rs. 221 Crores pertains to the year 2007-08 (corresponding to the potential created by June 2006) and not 2006-07 as considered by the Agency. Secondly, WALMI has recommended an automatic increase at 10% per year in the recommended M&R cost norms; hence consideration of yearly increase of 6% as done by the Agency is not appropriate.

WALMI has selected some projects in consultation with MWRRA and WRD of GOM for its study. Hence WALMI's study is based on factual position of M&R costs of projects in Maharashtra. In this study, the relevant issue has been examined from various aspects and recommendations made thereupon. WALMI's study has been based on financial as well as technical considerations and also field visits to ascertain ground realities and get a feedback from project officers through discussions. **Hence it is felt that, projections of M&R costs based on WALMI study will be more realistic, if WALMI's recommendations are acceptable.**

As regards projections of Estt. Costs, a better approach can be to relate it to the Irrigation potential and also consider yearly increase in costs due to escalating prices.

2.1.3 An attempt is made below to project annual M&R costs to the control period based on WALMI study considering that,

(i) M&R costs in the year 2007-08 = Rs. 370.00 per Ha of CCA,

(ii) Increase in M&R costs at 10% per year.

The projected M&R costs on above basis work out as below:

Sr. No.	Item	Unit	2009-10	2010-11	2011-12
1.	Irrigation potential	Lakh Ha	44	45	46
2.	CCA(=1.45xCCA)	Lakh Ha	63.8	65.25	66.70
3.	M&R cost per Ha	Rs. Per Ha	448	492.5	541.72
4.	M&R cost (=1x2x3)	Rs. Crores	286	321	361
5.	M&R cost (ABPS Infra)	Rs. Crores	275	325	396

2.1.4 Perusal of Estt. Costs for the 5 year period supplied by MWRRA reveals that, increase between the years 2003-04 & 2004-05 was 5.77%, that between 2004-05 & 2005-06 was 6.74% and that between 2005-06 & 2006-07 was 5.34%, average being about 6% per year. There is reduction between the first 2 years and hence this, not fitting in the general trend, is ignored. **Now Estt. Cost per Ha of irrigation potential in the year 2006-07 was Rs. 793 per Ha. Hence projecting this cost to years in the control period, based on increase of 6% every year and irrigation potential during a year, the Estt.costs work out as below:**

Sr. No.	Item	Unit	2009-10	2010-11	2011-12
1.	Irrigation potential	Lakh Ha	44	45	46
2.	Estt. Cost per Ha of irrigation potential	Rs. Per Ha	944.5	1001	1061
3.	Estt. Cost (= 1x2)	Rs. Crores	415	450	488
4.	Estt. Cost (ABPS Infra)	Rs. Crores	360	372	385

2.1.5 **Hence O&M cost (= M&R cost + Estt. Cost) during the control period works out to**:

Sr. No.	Item	Unit	2009-10	2010-11	2011-12
1.	O&M cost	Rs. Crores	700	770	850
2.	O&M cost (ABPS Infra)	Rs. Crores	635	697	781

It may be seen that, O&M cost as worked out here is higher than O&M cost worked out by ABPS Infra by about 10%.

2.2 **Projection of Water Consumption**:

ABPS Infra has assumed certain CAGR, namely 2%, to project water consumption figures for Industrial and Domestic use, as the figures available for these uses in the data set for 5 years show a decline, which was not considered as logical.

However, it is proposed here to make projections of water consumption for the three user categories by adopting a different approach as follows. Irrigation projects are planned and built primarily to provide irrigation facility for agriculture. In these projects, therefore, utilization of water for agricultural purpose is far higher than that for industrial and domestic purposes. Hence Total water consumption projection based on programme of creation of irrigation potential can be a more rational approach. The Total water consumption projections can then be split up between the three user categories.

Projection of Total Water Consumption based on the above approach works out as below:

Sr. No.	Item	Unit	2006-07	2009-10	20010-11	2011-12
1.	Irrigation Potential	Lakh Ha	41	44	45	46
2.	Total Water Consumption	Mcm	19,787	21,234	21,717	22,200
3.	Total Water (ABPS Infra)	Mcm	19,787	22,161	23,017	23,907

We see that, the projected consumption figures on the basis of the above approach are less than those of ABPS Infra by about 6%.

Distribution of water consumption between user categories in the year 2006-07 is seen to be as below:

(i) Industrial : 3.64%
(ii) Domestic : 13.06%
(iii) Agriculture : 83.3%

To estimate **user category wise water consumption during the control period**, above percentages are applied to the projected total water consumption figures worked out for the control period. These **work out as below**:

Sr. No. Item	Unit	2009-10	2010-11	2011-12
1. Total consumption	Mcm	21,234	21,717	22,200
2. Industrial use	Mcm	759	782	800
3. Domestic use	Mcm	2,775	2,835	2,900
4. Agriculture	Mcm	17,700	18,100	18,500

2.3 **Apportionment of O&M cost (or revenue requirement) between User Categories**:

An attempt has been made below to apportion O&M costs estimated for the control period on a more rational basis.

2.3.1 In the approach paper, the Agency has considered three principal parameters and assigned them some weightages (maximum weightage being kept at 5) and followed some steps to arrive at apportionment percentages to allocate O&M cost (or revenue requirement) to the three user categories. Some observations in this regard are as follows:

(a) **One of the parameters considered is 'quality of water supply'**. Considering that, quality requirement of water are higher for industrial and domestic use, the Agency has assigned higher weightage values for Industrial and Domestic than for agriculture. It is difficult to agree with this approach. This is because W.R.D. supplies only raw water to each of the user categories in 'as is where is' condition and hence quality of water supplied is the same irrespective of the user category. Each user may treat the water available from W.R.D. depending upon its own requirements to bring it to a certain quality. As far as W.R.D. is concerned, there being no difference in the quality of water supplied to the three user categories, considering 'quality of water supplied' as a parameter having bearing on apportionment of O&M costs incurred by W.R.D. is out of question. **Hence this parameter needs to be kept out of any consideration and so deleted.**

(b) In para 10.3.2 of the approach paper, it has been stated that, the approach of allocating revenue requirement (meaning O&M costs incurred) among users purely on the basis of water consumption is highly rigid as it does not take into account the three parameters selected by the Agency, namely 'quality of water, Reliability of supply and economic utilization of water supplied (that is paying capacity)'. The Agency has then chosen to consider the above-mentioned three parameters only, totally disregarding relative water consumption as a parameter.

In my opinion, non-inclusion of 'relative water consumption' by user categories as a parameter in allocating revenue requirement between user categories is a serious lapse in the proposal. When 80% of water is used for agriculture and mere

20% is used for other categories , allocation of 'revenue requirement' without considering consumption by the user categories is basically wrong.

It needs to be further added that, W.R.D.'s policy is that, when an Industry/Municipal Corporation requests W.R.D. for permanent allocation/reservation of certain quantum of water in project planning for its use, that Industry/Municipal Corporation has to share cost of the relevant project infrastructure components in proportion to its water demand. Thus quantum of water consumption decides portion of Capital cost to be shared by the Industry/Municipal Corporation. Same principle obviously needs to be applied to sharing of cost on O&M of the project as well.

Hence consideration of relative water consumption as a parameter in deciding O&M cost to be shared by each consumer category being a basic requirement, the same is proposed for inclusion.

(c) **It is thus suggested that, the following 3 parameters be considered in arriving at apportionment of revenue requirement between users:**

(i) Relative water consumption by the user category,
(ii) Reliability,
& (iii) Economic utilization of water (or paying capacity)

(d) As regards paying capacity, the following approach can be considered.

Paying capacity of Industries is undoubtedly highest among the three consumer categories and hence should carry a weightage of 5, which is maximum.

As regards agriculture, the practice has been to charge for water supply for irrigation on area basis. We are, however, now considering water tariff for volumetric water supply for irrigation on the premise that, the farmer will use the water supplied most efficiently to achieve maximum productivity per unit of water consumed thereby generating higher income. Hence in line with this thinking, it shall be quite reasonable to consider that, paying capacity of farmers will be higher due to more efficient and hence economic use of water than in the past. In fact, this is seen to be actually happening on the ground. Therefore with volumetric supply, which is governed by a specific agreement between Govt. and the farmers, the weightage to be given to agriculture will have to be somewhat higher than 2.5 (out of a maximum of 5).

As regards domestic water supply, it is meant to meet basic needs of human and animal race, both in villages and urban centers alike, namely drinking and cleanliness, both governing health. As the very purpose of domestic water supply is to sustain life in good health, weightage factor to be considered for economic use in case of Domestic use needs to be kept the least among all user categories, as it covers everyone in society.

2.3.2 **Weightages and allocation percentages based upon the above reasoning can be as below:**

Particulars	Weightages for Parameters			Average Weightage	Equivalent Weightage
(a)	(b)	(c)	(d)	(e)=(b+c+d)/3	(f)=e / Total(e)
Category	Relative Water Consumption	Reliability	Economic Use		
Industry	0.18 (= 5 x 0.036)	5	5	3.39	0.38 (or 38%)
Domestic	0.65 (= 5 x 0.13)	5	2	2.55	0.28 (or 28%)
Agriculture	4.17 (= 5 x 0.833)	2	3	3.06	0.34 (or 34%)

Reasoning for weightages mentioned in the above table are as follows:

(i) Weightages for Relative Water Consumption are calculated in the table itself. These are based on relative water use in the three user categories and considering that maximum weightage is pitched at 5.

(ii) Industries deserve weightage of 5 for Reliability and Economic use as discussed earlier.

(iii) For domestic supply, whereas Reliability weightage has got to be 5 in the light of present Govt. policy, that for economic use can be pitched reasonably at 2 for reasons given earlier.

(iv) For agriculture, weightages as proposed for Reliability and Economic use in the context of volumetric water supply can be considered as reasonable.

3. **Effective Volumetric Supply Rates**:

3.1 Figures of percentages given in the last column of the Table in the last paragraph represent percentage allocations for deciding revenue requirements for different user categories. **On the basis of these allocation percentages, Effective Volumetric Water Supply Rates are worked out in the Table below:**

Particulars	Unit	Year 2009-10	Year 2010-11	Year 2011-12
O&M cost	Rs. Crores	700	770	850
Revenue to Be realized	Rs. Crores	700	770	850
Industries	@ 38%	266	293	323
Domestic	@ 28%	196	216	238
Agriculture	@ 34%	238	261	289
Water Consumption	Mcm			
Industries		759	782	800
Domestic		2,775	2,835	2,900
Agriculture		17,700	18,100	18,500
Effective Volumetric Rate	Rs./1000cum			
Industries		3,505 (4,033)	3,747 (4,342)	4,038 (4,767)
Domestic		706 (648)	762 (698)	821 (766)
Agriculture		134 (82)	144 (86)	156 (92)

Note: The figures in brackets are those worked out by ABPS Infra..

We see from the above Table that, as a result of major changes in approach as suggested in this note for selecting parameters and weighting them, the percentage allocations have undergone substantial change, except in case of Domestic user category. Thus, whereas allocation percentage for agriculture has gone up from 24% to 34% in comparison with the one worked out by the Agency, that for Industries has gone down from 48% to 38%. In case of Domestic user category, the allocation percentage has remained unchanged.

This is to be expected as these changes in percentage allocations are the effect of including 'Relative Water Consumption' as an important basic parameter and providing weightage to it on the basis of relative water consumption percentages. As water consumption for agriculture is many many times higher than consumptions for other uses, it is to be expected that, major portion of O&M cost will have to be justifiably borne by the agriculture category, the principal beneficiary of irrigation projects. In spite of this, however, due to higher priority being assigned to Domestic and Industrial use and paying capacity (Economic use of water) of Industries being much higher than other users, Industries percentage allocation has finally worked out higher than that for Domestic and agriculture, although its relative water consumption happens to be 3.64% only as compared to 13.06% for Domestic and 83.3% for agriculture . This is fair enough.

As mentioned earlier, projections of cost and water use into the control period as suggested in this note differ from those of the Agency. Thus whereas O&M costs work out higher than those worked out by Agency by 10%, water use s work out less than those worked out by the Agency by 6%. Differences in Effective Volumetric Rates worked out in this note and worked out by the Agency are also a result of these differences.

3.2 It needs to be mentioned here that, in para 3.1 above, Relative Water Consumption has in effect been applied on the O&M cost of the project as a whole. It's possible that, the Industries are allowed to lift water for their use directly from the reservoir itself. In such a case, application of this particular parameter as above will not be appropriate. It will be applicable only on O&M cost on Head work component of the project and if this is considered, then the percentage allocation for Industries in respect of the project will naturally get reduced and that for agriculture will get increased. This is a matter of further detailing.

However what is presented above can be considered as a reasonable overall approach .

4. MWRRA is requested that, the above observations may please be duly considered while finalizing the Approach Report.

5. **Fixing pollution control responsibility on Industries and Municipal Corporations**:

As regards 'polluter to pay' principle, the Agency has stated that, MWRRA can not penalize the offender, as MWRRA Act does not empower it to do so and that, MWRRA will have to coordinate on this account suitably with MPCB, which has the responsibility of preventing pollution in the State of Maharashtra. In this respect, I think that, it should be possible for WRD of GOM to include conditions under which water use application made by the Industry/Municipal Corporation is sanctioned, one of the conditions being regarding the quality of the effluent, which the applicant will have to ensure by necessary treatment, before it finds its way back in natural streams. It should be made incumbent on

the applicant to submit test reports of the effluent quality from a Testing Laboratory of repute (to be specified by WRD) at least once a month. If it is seen that, the effluent is not of the specified quality, then the sanction should be liable to be withdrawn, the shared capital cost being forfeited to W.R.D. The supply sanction can be revived after the applicant convinces WRD about satisfactory performance of effluent treatment facilities.

6. Inclusion of Royalty charges in Water tariff:

The Effective Volumetric Water Rates worked out in para 4.1 above are based on recovery of O&M cos only. However, it is necessary that, royalty charges are also included in Volumetric Water tariff. Hence the water tariffs worked out in para 4.1 above need to be increased to that extent. It is seen that, royalty charge of Rs. 23.80 per 1000 cum is levied by WRD for water supplied on volumetric basis to water users who have the reservoir constructed at their own expense (Table 4 on page 139 of Approach paper). It is also seen from information given in para 3.0 on the same page that, this rate was prescribed in G.R. No. Water Rates 1001/(5/2001)-IM(Policy) dated 13/09/2001, the rate being applicable from 01/07/2003. Hence, while finalizing the Approach paper, MWRRA needs to include this requirement, suggesting in addition that, royalty charges to be added during the control period may be decided by WRD and included in the tariff structure as proposed.
