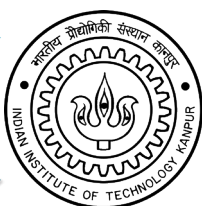




**National Mission for Clean Ganga [NMCG]
Ministry of Jal Shakti, Government of India**



Sewage Treatment Projects under Namami Gange Programme and the GRBMP Perspective



**Centre for Ganga River Basin Management and Studies
Indian Institute of Technology Kanpur**

JULY 2019

NATIONAL MISSION FOR CLEAN GANGA (NMCG)

NMCG is the implementation wing of National Ganga Council which was setup in October 2016 under the River Ganga Authority order 2016. Initially NMCG was registered as a society on 12th August 2011 under the Societies Registration Act 1860. It acted as implementation arm of National Ganga River Basin Authority (NGRBA) which was constituted under the provisions of the Environment (Protection) Act (EPA) 1986. NGRBA has since been dissolved with effect from the 7th October 2016, consequent to constitution of National Council for Rejuvenation, Protection and Management of River Ganga (referred to as National Ganga Council).

www.nmcg.in

CENTRE FOR GANGA RIVER BASIN MANAGEMENT AND STUDIES (cGanga)

cGanga is a think tank formed under the aegis of NMCG, and one of its stated objectives is to make India a world leader in river and water science. The Centre is headquartered at IIT Kanpur and has representation from most leading science and technological institutes of the country. cGanga's mandate is to serve as think-tank in implementation and dynamic evolution of Ganga River Basin Management Plan (GRBMP) prepared by the Consortium of 7 IITs. In addition to this it is also responsible for introducing new technologies, innovations and solutions into India.

www.cganga.org

ACKNOWLEDGEMENT

This document is a collective effort of a number of experts, institutions and organisations, in particular those who were instrumental in preparing the Ganga River Basin Management Plan which was submitted to the Government of India in 2015. Contributions to the photographs and images for this vision document by individuals are gratefully acknowledged.

SUGGESTED CITATION

GRBMP by cGanga and NMCG

CONTACTS

Centre for Ganga River Basin Management and Studies (cGanga)
Indian Institute of Technology Kanpur, Kanpur 208 016, Uttar Pradesh, India

or

National Mission for Clean Ganga (NMCG)
Major Dhyan Chand National Stadium, New Delhi 110 002, India

Sewage Treatment Projects under Namami Gange Programme and the GRBMP Perspective

Contents

	Preface	
01	Introduction	
02	Sustainable Wastewater Management in Ganga Basin: The GRBMP Perspective	
03	Recent Government Initiatives on Wastewater Management in the Ganga Basin	
04	Assessment of the Government's New STP Projects in Ganga Basin	
05	Conclusion	
06	Recommendations	
	References	



Preface

The Ganga River Basin Management Plan (GRBMP-2015) was submitted by IIT Consortium to the National Mission for Clean Ganga, Government of India in 2015. But due to paucity of information and other constraints, some of GRBMP's recommendations were broad strategic measures rather than detailed ready-to-implement actions. The Centre for Ganga River Basin Management and Studies ("cGanga") was therefore needed to provide state-of-the-art inputs to specific problems faced by the government and implementing agencies in River Ganga's rejuvenation as well as to assess continual developments in Ganga River Basin Management. A Memorandum of Agreement between the Ministry of Jal Shakti (formerly Ministry of Water Resources, River Development and Ganga Rejuvenation (MoWR, RD&RG), Government of India and IIT, Kanpur was thus signed in March 2016 to set up cGanga for "Continual Scientific Support in the Implementation and Dynamic Evolution of the Ganga River Basin Management Plan".

In keeping with the above goals, cGanga has been in constant interaction with NMCG and many government bodies to keep abreast of and evaluate the progress of various efforts in reviving and conserving River Ganga and her basin. This report is an attempt to broadly assess the effectiveness, long-term viability and performance of subsequent governmental initiatives in urban sewage management in the Ganga River Basin as seen through the lens of GRBMP recommendations on the subject. For this purpose, it was necessary to study the said governmental initiatives under the Namami Gange programme in a limited way, keeping in view the perspective and major recommendations of GRBMP-2015. This report presents the findings from this perspective, albeit with elaborations and additional explanations where needed, including a review of two of the first few Sewage Treatment Plants under Namami Gange Programme commenced under PPP Hybrid Annuity Mode (HAM) in 2017.

There are two inter-related aspects to the preparation of this report that needs mentioning. On the one hand, dedicated members of cGanga diligently capture, study and discuss various aspects of the problem. On the other hand, many discerning stakeholders and diverse other people interact with Team cGanga and contribute their views and inputs on the subject without any qualms. NMCG, too, shares available documents as well as other information where needed. This report is therefore very much the outcome of a cooperative effort of cGanga with the Ganga River Basin's stakeholders to draw from our collective wisdom and refine our ability to solve new challenges in restoration and conservation of Ganga River Basin. This collaborative dedication led to the insights and clarity of this report to a degree that extends well beyond its immediate purpose.

Dr Vinod Tare
Professor and Founder Head
Centre for Ganga River Basin Management and Studies [cGanga]
IIT Kanpur

1.Introduction

The Ganga River Basin is among the most water scarce basins of India. The per capita water availability in the basin was only 1039 m³/year in 2010 as compared to 1,588 m³/year for India as a whole as per CWC and CGWB figures. However, since the estimate of average surface water potential of the Ganga Basin has since been revised downwards by about 3% from 525.02 BCM to 509.52 BCM [CWC, 2017], the per capita water availability in 2010 would be significantly less than the estimated 1039 m³/year. On the other hand as per CWC's revised estimate in 2017, the average surface water availability in 2010 for India as a whole (1913.6 BCM) was much higher than the earlier estimate (1869.35 BCM). Thus, considering the revised 2017 estimates, in early 21st century the Ganga Basin is much more water-stressed than India as a whole.

Given India's rapidly increasing water demands, the above considerations imply acute water stresses in the Ganga basin (as also in some other river basins of the country) in the foreseeable future. This is particularly true if water consumption and usage continue to remain as inefficient and wasteful in future as at present. The issue has been extensively discussed in the country since a long time, yet it has remained a neglected area of action. The Ganga River Basin Management Plan-2015 had also underscored this problem (and its impact on the river ecosystem) along with specific recommendations for reversing this trend through suitable policy measures and governmental actions. However, these recommendations have not been visibly acted upon yet for reasons unknown. It is therefore time to re-visit the relevant recommendations in the light of recent governmental initiatives on municipal sewage management.

2. Sustainable Wastewater Management in Ganga Basin: The GRBMP Perspective

A central concern of GRBMP was the increasing shortage of water, particularly during the non-monsoon period of nearly 8 to 10 months, in the basin coupled with anthropogenic pollutant discharges, which together make the basin's waters woeful for both its ecology and human use. These two key issues of water shortage and water pollution have had many adverse consequences for the Ganga River Network and the basin as a whole. Corrective and restorative measures to counter these twin issues were, therefore, strongly advocated in GRBMP.

Some of the key measures suggested in Mission Aviral Dhara of GBRMP include realistic pricing of freshwater (exceeding the cost of sewage treatment up to tertiary levels), improving agricultural, industrial and municipal water use efficiencies, allotment of water entitlements and rights, and water-related policy changes involving decentralisation of power, empowerment of users and civil society, and unrestricted water-related data for all users. These recommendations were mainly focussed on addressing increasing water shortages in the basin, though they can help improve the basin's water environment in other ways too.

The issue of water pollution is addressed more directly in Mission Nirmal Dhara. In particular, with regard to municipal wastewater management, Mission Nirmal Dhara (MND) made specific recommendations keeping in mind the critical state of the basin's water environment. To cite:

- "Domestic sewage generated from all sources should be collected and transported in closed conduits for treatment followed by reuse/recycle. In cases where reuse/recycle is not possible, the treated sewage must be used for rejuvenation of surface water bodies and/or for irrigation."
- "As a prelude to conception and implementation of MND projects, all Class I towns of the NRGB must compulsorily prepare Urban River Management Plans (URMP). The URMPs should have all relevant data regarding the water availability, sewage generation, solid-waste disposal, sanitation conditions, drainage conditions, etc. prevalent in the town."
- "Towns like Uttarkashi, Shrinagar, Rishikesh, Haridwar (all in Uttarakhand), Garhmukteshwar, Mathura, Vrindawan, Agra, Moradabad, Lucknow, Kanpur, Allahabad, Varanasi (all in Uttar Pradesh), Indore, Ujjain, Dewas (all part of most polluted Kshipra Sub-Basin of NRGB in Madhya Pradesh), Patna, Bhagalpur (both in Bihar), Kolkata and Delhi NCR, are most suitable for preparing the initial URMPs."
- "Restoration of natural drains in Class I and Class II towns: Currently most natural drains ('nalas') carry untreated/partially treated domestic sewage and industrial effluent into the Ganga River System from all Class I and Class II towns in NRGB. This situation must be changed such that these nalas are recovered to drain storm water with minimal or no urban flooding, and during the non-monsoon season remain dry or carry only tertiary treated sewage. Ideally, all such nalas should become habitat for freshwater organisms."
- "Sewage treatment in Class I and Class II towns using ZLD system: Projects for renovation of existing sewage treatment plants (STPs) in Class I and Class II towns of the NRGB for tertiary level treatment of sewage are welcome. All new treatment plants constructed at sewer outfalls or other places must be designed for tertiary level treatment of sewage. The treated sewage cannot be discharged, either directly or indirectly, into the river. The plan for utilization of the treated sewage must be clearly specified in the project."
- "Reuse/recycling of treated sewage in Class I and Class II towns: Considering the goal that no discharge of treated sewage into rivers is allowed in Class I and Class II towns, projects must be conceived for reuse/recycling of tertiary treated sewage in Class I and Class II towns. Such reuse may be either for commercial, industrial or horticultural purposes that generate revenue stream for partially or fully meeting the expenditure on sewage treatment. Makeup water for industrial/commercial applications must invariably be tertiary treated sewage. To achieve this condition, the price of freshwater for such applications must be kept much higher than the cost of recycling industrial/commercial effluents. The objective is to make sewage treatment sustainable without continuous and substantial long term support from Central/State Government."

- “Use of treated sewage for restoration/creation of surface water bodies: In areas with limited opportunities of reuse of treated sewage projects for use of treated sewage for restoration/creation of surface water bodies is encouraged.”
- “Note on Sewage Management: Category A Recommendations: All STPs must be implemented in the public-private partnership (PPP) mode by specialized ‘service providers’ who are skilled in designing, building, operating and maintaining the created infrastructure. Various modes of financing such PPP ventures may be explored, including the design-build-finance-operate (DBFO) model, wherein the ‘service provider’ provides the initial investment (with or without viability-gap funding) and is assured of returns on the investment based on performance appraisal through the construction and operation/maintenance phases of the project.”

The above recommendations, re-iterated in different contexts in Mission Nirmal Dhara, emphasize clear action points to remediate the problem of water pollution in the basin caused by discharge of municipal sewage, viz.:

1. URMPs, i.e. comprehensive Urban River Management Plans, must be prepared for all Class 1 towns in the Ganga basin on a priority basis, identifying all municipal liquid and solid wastes generated in the town and planning their handling, treatment and disposal/reuse in a comprehensive and environmentally safe manner. URMPs and ensuing actions should also be then taken up for other towns.
2. Within the framework of these URMPs, complete sewage management projects must be designed for each town involving sewage collection, treatment and reuse, but with no disposal of treated or untreated sewage into rivers.
3. All sewage must be treated up to tertiary levels in order that they can be reused for various purposes such as industrial/ commercial uses, rejuvenation of surface water bodies, and irrigation use. The priority for reuse should be commercial sale of the treated water so that the cost of sewage treatment can be wholly (or at least partly) recovered.
4. The price of freshwater for industrial/ commercial uses must be well above the cost of wastewater treatment to ensure the saleability of the treated sewage.
5. Sewage Treatment Projects/ Plants (STPs) for the above purpose should be implemented in the Public-Private Partnership (PPP) mode by specialized “service providers” skilled in designing, building, operating and maintaining the STP infrastructure. Various modes of financing such PPP ventures may be explored, including the design-build-finance-operate (DBFO) model.

Two of the above five points are particularly noteworthy here. First, Mission Nirmal Dhara categorically disallows the disposal of all sewage – including treated sewage – into rivers. Thus the possibility of even partially treated sewage being occasionally disposed into rivers on some pretext gets ruled out. At the same time it will encourage the reuse of treated sewage water for human needs instead of abstracting equivalent fresh water from rivers, lakes or aquifers and thereby depleting them.

Secondly, the establishment and operation of STPs have been recommended in Public-Private Partnership (PPP) mode. While the reasons for this recommendation are not explained in detail, the additional recommendation to price freshwater above the cost of wastewater treatment to ensure saleability of the treated sewage indicates the need for PPP mode. Noting that at present, there exists no significant water market in the country (except for specialized products such as mineral water, packaged drinking water, and distilled water), the saleability of treated sewage can only be enhanced by the development of a water market. And, for this purpose, the Private Partners in PPP projects can play a significant role since it would be in the Private Partners' interests to augment their revenue and profits by ensuring the service quality needed for selling the treated water. And, thereby, as the treated sewage becomes easily saleable, the costs of setting up and running the STPs can be fully (or at least partly) recovered.

3. Recent Government Initiatives on Wastewater Management in the Ganga Basin

The Namami Gange Programme (with a budget outlay of Rs. 20,000 crore for five years from 2014-15 and covering 8 states, 47 towns and 12 rivers of the Ganga River Basin) of the Government of India is officially an Integrated Conservation Mission for National River Ganga with two (but evidently three) objectives, namely: effective abatement of pollution in national River Ganga, the river's conservation, and the river's rejuvenation [NMCG, 2018]. The programme ostensibly attempts to combine existing efforts with new plans and projects to meet the desired ends. Its implementation is stated to have been divided into Entry-Level Activities (for immediate visible impact), Medium-Term Activities (to be implemented within 5 years of time frame) and Long-Term Activities (to be implemented within 10 years). The topmost activity under Namami Gange is listed as "Enhancing Sewage Management Capacity". Relevant information about this activity is summarised below.

Out of a total of 63 sewage management projects under implementation in River Ganga's riparian States of Uttarakhand, Uttar Pradesh, Bihar, Jharkhand and West Bengal, 12 new projects were started in some of these states under the programme. As per a government press release, by October 2017, 2 new Sewage Treatment Plants based on Hybrid Annuity Mode (HAM) with PPP were awarded for Haridwar (68 MLD and 14 MLD STPs) and Varanasi (50 MLD STP) towns [PIB, 2017]. The press release also reported the Union Minister for Water Resources, River Development and Ganga Rejuvenation, Shri Nitin Gadkari's statement that, ***"the maintenance of the project will be the responsibility of the concessionaire, for which there will be performance based phased manner of payment. This would ensure continued performance of the sewage infrastructure assets created due to better accountability, ownership and optimal performance."***

As per the press release, the 50 MLD STP in Varanasi was awarded to a consortium led by Essel Infra Projects Ltd. at an estimated cost of Rs 153.16 crore. In Haridwar, HNB Engineers Private Ltd. won the contract for a total sewage treatment capacity of 82 MLD (68MLD in Jagjeetpur& 14MLD in Sarai) at an estimated cost of Rs 171.53 crore. The awarded projects are intended to ensure that untreated sewage does not flow into river Ganga, thus giving a boost to India's flagship Namami Gange program.

As per the same press release, a second set of STPs under HAM were also on the anvil. The upcoming projects which have already been sanctioned under HAM are STPs at Naini, Jhusi, and Phaphamau at Allahabad (72 MLD), STPs at Unnao, Shuklaganj, and Bithoor along with Kanpur (21.4 MLD), STPs at Digha and Kankarbagh in Bihar (150), STPs at Kolkata and Howrah (141 MLD) STPs at Farukhabad (30 MLD), STP at Bhagalpur (65 MLD). NMCG had also appointed strategic consultants for PPP design and transaction advisory support for integration of sewage treatment infrastructure in Kanpur, Allahabad, Patna and Kolkata. Moreover four STPs of 140 MLD are coming up in Patna at a total cost of Rs 738.14 crore.

As per a subsequent press release of January 2018 [PIB, 2018], NMCG had approved four more sewage management projects worth Rs. 283.28 crore (3 in West Bengal at an estimated cost of Rs 278.6 crore, and 1 in Uttarakhand at an estimated cost of Rs 4.68 crore), besides one project worth Rs 11.73 crore related to ghat improvement works in Varanasi. The West Bengal projects include one in Kamarhati and Baranagar Municipalities (60 MLD STP, de-silting of sewer lines etc.) at an estimated cost of Rs 172.10 crore under PPP-based Hybrid Annuity mode.

It is evident from the above that a host of new STPs (and other sewage infrastructural works) have been initiated recently to alleviate the problem of sewage pollution of the Ganga River Network over the long term. What is not evident, though, is to what extent this problem will be alleviated and to what extent it will remain if these projects are satisfactorily executed. It is also not evident how much budgetary support will be needed to maintain these projects in operation in future. This point is of critical importance in view of the government's limited financial resources and competing demands on such resources over the long term.

4. Assessment of the Government's New STP Projects in Ganga Basin

As noted in the previous section, the setting up of several new STPs with provision of tertiary sewage treatment based on Hybrid PPP model was initiated by the government in recent months for urban sewage management in the Ganga basin. While the locations, sizes and treatment capacities of the STPs are different from one another, they are similar in their technical objectives and financial-

management structure. It is instructive, therefore, to study any one or two of them from the perspective of GRBMP – specifically MND – recommendations to assess their main points of departure, and evaluate the importance of these differences. Towards this end, the first two such STP projects – namely, the Jagjeetpur and Sarai STPs at Haridwar and the STP at Varanasi – are considered here.

The Jagjeetpur (68 MLD) and Sarai (14MLD) STPs in Haridwar were contracted to a specialized private agency for turnkey construction/ erection, trial run and subsequent O&M (operation& maintenance)for 15 years for project capital costs (CAPEX) of Rs. 993,000,000/- and Rs. 414,000,000/- respectively, totaling Rs 140.7 crore [UKPJN, 2017]. Likewise, the Varanasi STP (50 MLD) in Varanasi was contracted to another private agency for turnkey construction/ erection, trial run and subsequent O&M for 15 years for project capital cost of Rs.1,020,000,000/- i.e. Rs.102 crore [UPJN, 2017]. Both STPs are mandated to treat the incoming sewage up to tertiary levels (vide Table 1 below), thereby aiming for safe and reusable water quality.

Table 1: Required Treated Effluent Parameters [UPJN, 2017]

Parameter	Unit	Value
pH	-	6.5–9.0
BOD ₅	mg/L	≤ 10
TSS	mg/L	≤ 10
TN	mg/L	≤ 10
NH ₄ -N	mg/L	≤ 5
COD	mg/L	≤ 50
TP	mg/L	≤ 2
Fecal Coliform	MPN/100 mL	≤ 100

A brief reading of the Contract Agreements indicates some apparent shortcomings in them. For instance, the Concessionaire (Private Partner) is not required to adhere to any particular treated water quality if the incoming raw sewage is not within the contracted parameters (see Table 2). This implies that, since it is possible that the raw sewage characteristics are not within the specified ranges at all times, the Concessionaire would not be liable to treat the sewage at all under such circumstances even as his O&M revenues come in undiminished. And such occurrences may not be rare. In the rainy season, for instance, sewage does get mixed with storm water quite often, resulting in low BOD concentrations –even less than the stated lower limit of 80 mg/l.

Table 2: Raw Influent Parameter Range for which Concessionaire is not responsible to meet Treated Effluent Requirements [UPJN, 2017].

Parameter	Unit	Value
pH	-	> 8.5
BOD ₅	mg/L	< 80 & > 230
COD	mg/L	> 450
TSS	mg/L	> 500
TN	mg/L	> 45
Total Phosphorus	mg/L	> 7

Another apparent shortcoming in the Contract is that, while the Concessionaire is required to transport the treated effluent to discharge points to be specified by Jal Nigam outside the STPs, the Contract also assigns “all rights and interests in the treated effluent” to the Concessionaire during the entire O&M period. Does this mean that the Concessionaire can exercise at his own discretion either his rights or his responsibility in handling and disposing the treated effluent during the O&M period?

The above points illustrate some likely defects in the Contracts, but what is of immediate concern here are the major differences in the Contracts from GRBMP recommendations. Three main points of departure were found for the above projects from MND recommendations. First, no URMP (Urban River Management Plan, as recommended in MND, GRBMP) for Haridwar or Varanasi towns seems to have been prepared by any agency or referred to in the contract. The contracted STPs, therefore, are not part of any comprehensive plan for river pollution control or waste management abatement for these towns. On the contrary, they are two specific ventures that one can only hope will significantly abate Ganga pollution caused by these townships.

The second important point of departure of the above projects from MND is that, while the sewage is to be treated up to tertiary levels, there is no provision for selling the treated sewage water to any industry or commercial establishment or any other consumer. In effect, the entire cost of setting up and running the STPs has to be borne by the government for the entire lifetime of the STPs. Thus the purpose of adopting the “Hybrid PPP” model for these projects is unclear. In effect, these projects seem to be essentially long-term (15-year) Turnkey or EPC Contracts with the provision of deferred CAPEX payments.

The third important point of departure of the above projects from MND is that, as against the MND recommendation that no sewage (even after treatment) should be discharged directly into rivers, the above projects indicate this to be the sole mode of disposing the treated sewage. Since there have been frequent reports/ allegations in the past of STPs discharging inadequately treated sewage into

ivers, the question arises how this possible malpractice (or accidental occurrences) will be avoided in the above project without round-the-clock monitoring of the effluent being discharged? This point is important particularly because the impact of discharging inadequately treated sewage into a river may not be readily obvious from the state of the river itself. Since only government institutions will be involved in both the running and the monitoring of the project, it is possible that the expenses to be incurred for the high level of treatment (up to tertiary level) may be misused in the absence of independently verifiable results and without achieving the desired quality of the river water.

5. Conclusion

A flurry of Sewage Treatment Plants (STPs) have commenced in major water-polluting towns of the Ganga River Basin in recent times under the Central Government's flagship Namami Gange programme to alleviate anthropogenic pollution in the Ganga River Network. While many of these STPs are intended to meet the treatment standards recommended in GRBMP, the planning and modus operandi of the projects are such that they deviate extensively from the goals and recommendations of GRBMP. First, in the absence of URMPs (Urban River Management Plans), the projects are conceived and designed as stand-alone projects whose overall role in urban impacts on the riverine environment is uncertain.

Secondly, though the projects are said to be in Hybrid PPP mode, they seem to be effectively regular work contracts (of long-term nature), since the contracted private party ("Concessionaire") is only required to fulfill the requirements defined by the purchaser ("Government") and has no incentive for providing better goods or services. This is unlike many other infrastructural projects such as roads and ports, where the Private Partner can generate higher revenue by providing better product and/ or service to consumers. This also means that revenue generation to cover at least a significant part of the expenditure on the STPs is not possible, hence the central government will be saddled with all expenses of maintaining and running them throughout their lifespan. While the government can certainly fund a few such projects permanently, it is questionable if adequate funds to the tune of about 2 lakhs of crore rupees annually (as estimated in GRBMP) can be allocated on a permanent basis for keeping the Ganga River System free of urban sewage pollution.

Overall the above STP projects seem to be like many other government projects in environmental management where both the goals and ends are hazy. As noted by Joshi [2018], "It is time to look critically at how India's environmental programmes are designed and implemented. The system is currently extraordinarily top-heavy. ... There is almost no mention of civil society or citizen participation, particularly for monitoring and sustainability of the operations. This is surprising considering so many other types of development policy are increasingly participatory and decentralized." It would not be surprising, therefore, if the above projects of Namami Gange turn out to be self-serving government activities whose ends are opaque to the real consumers of the Ganga river environment – the civil society – rather than a means for citizens to achieve justifiable benefits from them.

6. Recommendations

The upcoming Sewage Treatment Plants in Hybrid PPP mode under Namami Gange deviate from GRBMP recommendations in several ways with evidently undesirable consequences. There also seem to be other lacunae in the projects that should be avoided. To overcome their negative impacts as much as possible, the following actions are suggested:

1. URMPs (Urban River Management Plans) should be immediately prepared for all towns and cities where new STPs are being established. Even though such URMPs may be considered as retrospective action, they would help plan and execute other much-needed remedial river-focused actions for such towns while taking into consideration the improvements achieved (or likely to be achieved) by the new STPs.
2. The 15-year O&M period of the STPs will involve a huge running expenditure in the absence of a water market and/or efforts to sell the treated water. A partial recovery of such expenses may still be possible by the government through some innovative business approach, especially in regions where commercial/ industrial water needs are acute. This aspect should be explored.
3. Since the provision of recovering significant expense through the selling of treated water is not covered in the projects at present, provision for these expenses over the entire 15-year period must be secured. Else, if, after commissioning the STPs, finances for running the STPs are temporarily unavailable at some future date, not only will the functioning of the STPs be in jeopardy and Private Partners seek heavy compensations from the government, the assets (STPs) created may themselves be subject to ownership dispute on account of the given Contracts. Moreover, it is unreasonable to pass on the liability of running the STPs planned by the present government to future central governments even though water is a State subject. It is, therefore, necessary to make financial provisions in Namami Gange for the entire 15-year O&M period and not just the STP construction phase. However, since the exact price escalations cannot be predicted in advance, only approximate provisions can be made considering a period of about 2 years for construction before the O&M period begins, i.e. annual price escalations for 2 to 17 years from the Year of Contract may be considered.
4. Provision for independent monitoring of these projects is essential since the projects do not store the treated water for public inspection/ scrutiny of the quality of water being discharged into the river. Independent verification in this case is bound to be cumbersome and expensive. Hence, it is suggested that significantly large rewards (of the order of say 10-25 % of the Annual O&M costs) be announced for any individual or institution that finds shortcomings in the results.
5. Finally, it is suggested that for all future STP Projects covering lengthy O&M periods, the project goals and rationale should be clearly stated insofar as deviations from GRBMP recommendations are concerned. This would minimize the possibility of overlooking basic shortcomings in the Projects. It is also recommended that Land Costs are also included in the evaluation of Bids for the projects since the land occupied by an STP is also a valuable economic resource that can generate revenue in many ways.

References

1. Anonymous [undated] – a, “Development of Sewage Treatment Plants at Haridwar, Uttarakhand, on PPP Mode – Financial Proposal Evaluation Report”, Document availed from NMCG, New Delhi in January, 2019.
2. Anonymous [undated]– b, “Development of 50 MLD Sewage Treatment Plant at Varanasi, Uttar Pradesh, on PPP Mode – Financial Proposal Evaluation Report”, Document availed from NMCG, New Delhi in January, 2019.
3. CWC [2017], “Reassessment of Water Availability in India Using Space Inputs”, Basin Planning and Management Organisation, Central Water Commission, New Delhi.
4. IITC [2015], “Ganga River Basin Management Plan: Mission 2 – Nirmal Dhara”.
5. IITC [2015], “Ganga River Basin Management Plan: Mission 1 – Aviral Dhara”.
6. Joshi, S [2018], “Namami Gange: Cleaning an Unholy Mess,” Hindu Business Line, 27th March 2018. [<https://www.thehindubusinessline.com/opinion/namami-gange-cleaning-an-unholy-mess/article23366547.ece>, accessed 04-06-18]
7. NMCG [2018], “Namami Gange Programme,” National Mission for Clean Ganga, MoWRRD&GR, GoI [<http://nmcg.nic.in/NamamiGanga.aspx>, Accessed May 02, 2018].
8. PIB [2017], “India’s first Sewage Treatment Plant under Hybrid Annuity Mode to come up in Haridwar and Varanasi,” Press Information Bureau, Govt. of India, Ministry of Water Resources, 11-October-2017 [<http://pib.nic.in/newsite/PrintRelease.aspx?relid=171600>, accessed April 27, 2018]
9. PIB [2018], “Namami Gange projects worth Rs. 295 crore approved by NMCG,” Press Information Bureau, Govt. of India, Ministry of Water Resources, 04-January-2018 [<http://pib.nic.in/newsite/PrintRelease.aspx?relid=175320>, accessed April 27, 2018]
10. UKPJN [2017], “Untitled Document (Presumed Title: Contract Agreement Uttarakhand Pey Jal Nigam, National Mission for Clean Ganga, and HNB Engineers Pvt. Ltd.”, October 2017.
11. UPJN [2017], “Untitled Document (Presumed Title: Contract Agreement between Uttar Pradesh Jal Nigam, National Mission for Clean Ganga, and Varanasi STP Project Pvt. Ltd.”, October 2017.



Centre for Ganga River Basin Management and Studies
Indian Institute of Technology Kanpur

© cGanga and NMCG 2019