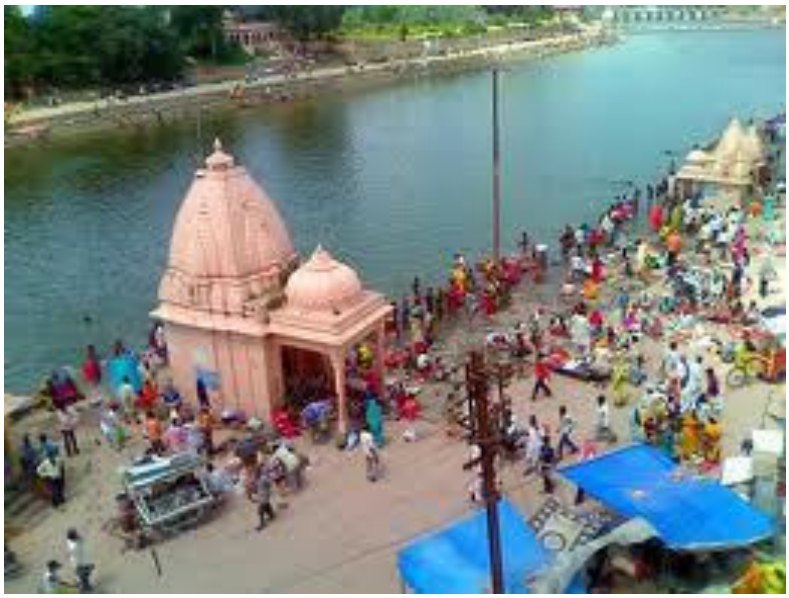
Performance Evaluation of Sewage Treatment Plants (STPs) in Madhya Pradesh (Constructed under NRCP)



Central Zonal Office
Central Pollution Control Board
Bhopal

Performance Evaluation of Sewage Treatment Plants in Madhya Pradesh (Constructed under NRCP)

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Executive summary

Rapidly increasing population, rising standards of living and exponential growth of industrialization and urbanization have exposed the water resources, in general, and rivers, in particular, to various forms of degradation. Various schemes are being implemented for meeting the water requirement of citizens, however sufficient infrastructure have not been designed to handle the waste water generated. This may be due to gap between water supply and waste water treatment facilities. Many Indian rivers, in several stretches, particularly during lean flows, have become unfit even for bathing and irrigation.

Realizing that the rivers of the country were in a serious state of degradation, a beginning towards their restoration was made by MoEF with the launching of the National River Conservation Programme. In NRCP scheme various components by interception and diversion of nallah, low cost sanitation, river front development, afforestation in catchment area and construction of Sewage Treatment Plants were under taken all over the country. The Parliamentary Standing Committee meeting held on 27th September 2011 has directed to carryout performance study of STPs funded by Ministry of Environment and Forest.

In compliance of directions of Head Office, CPCB, Zonal Office, Bhopal, has conducted a survey and study during 27th October to 5th November 2011 to assess the status of STPs located in jurisdiction of this office and funded by NRCP. Total 10 STP located in various city of the MP has been visited and waste water samples were also collected to assess the quality of the sewage which is being discharged in various rivers in different cities. The observation made during the visit as given below:

1. Inlet of the STPs at Indore (based on UASB) was found to be receiving lot of solid wastes including plastics, pouches etc. It is observed that mechanical screens installed in STPs/WSP are out of order, because of choking, rusting and poor maintenance.

2. At many places Municipal Corporation and PHED having dispute for O&M of STPs because of non-availability/shortage of fund and technical manpower.

3. Polishing ponds (STP at Indore) and Waste Stabilization Ponds (WSPs) are found accumulated with sludge and other inert materials like polythene, pouches etc. resulting in reduced capacity/detention time in the tank.

4. It is also observed that staff/engineers engaged in O&M of the STPs are frequently transferred so that their experience and know-how does not get transferred to their successors for O&M of the STPs.

5. At Burhanpur, infrastructure of STP is existed but not commissioned and found non-operational.

6. Treatment of sewage through Karnal Technology where sewage water is being diverted in Eucalyptus plantation is also not found satisfactory. In Vidisha sewage is being utilized partially and remaining part of sewage is being discharged in Betwa River. The scheme of Nagda, Chhapara and Keolari are found to be non-operational.

7. Lack of co-ordination between implementing agency and urban local bodies, allocation of funds for running of scheme and its O&M, trained manpower are root causes required to be addressed for rejuvenation of the scheme.

Performance Evaluation of Sewage Treatment Plants in Madhya Pradesh (Constructed under NRCP)

Introduction

Rapid urbanization and other allied activities are responsible for excess use of water and generation of huge quantity of sewage. Inadequate environmental infrastructure leads to discharge of partially treated and untreated sewage in to nearby water bodies of cities and towns. surface water gets unfit for human consumption and in some cases it is not fit for uses like irrigation, fish propagation, industrial purposes, recreational activities etc. due to discharge of untreated sewage.

This problem of water pollution is not only serious for the present day but, it is also getting worst day by day. Discharge of untreated sewage is also responsible for bacteriological contamination of drinking water sources which gives extra burden of disinfection on water filtration plants. The diseases commonly caused by contaminated water are typhoid, cholera, gastroenteritis, bacterial dysentery, hepatitis, poliomycitis, amoebic dysentery etc.

Discharge of untreated sewage is measure cause of pollution of surface & ground water. It affects plants and aquatic life of water bodies. In almost all cases the effect is damaging not only to individual species and populations, but also to the natural biological communities. Discharge of untreated sewage is single most important cause of pollution of surface & ground water since there is a large gap between generation and treatment of domestic wastewater in India.

The problem is not only of inadequate treatment capacity but also non-functioning of STP & lack of operation and maintenance of treatment plants. Several sewage treatment plants are established under centrally funded National River Action Plan (**NRCP**). However, their operation and

maintenance is generally not satisfactory. If massive investment is done on establishing there sewage treatment plants and non-functioning/inadequate O & M resulting in entire exercise futile.

The Parliamentary Standing Committee meeting held on 27th September 2011 to review the functioning of CPCB and SPCB it was directed that performance monitoring of CETPs and STPs funded by Ministry of Environment and Forest should be conducted. It was felt necessary to carry out study to evaluate their performance and identify main problems both technical and administrative to ensure proper functioning of these STPs.

Zonal office, Bhopal, has conducted a survey and study during 27th October to 5th November 2011 to assess the status of STPs located in jurisdiction of this office and funded by NRCP. The study includes individual plant visit, discussion with operating staff, evaluating technological aspects & management aspects to bring out the major cause of poor performance and root cause of the problems if any. The study was planned keeping following main objectives in focus:

- Questionnaire survey for technical details, review of operational status and identify major problems in the treatment plants in the Central zone established under NRCP.

- Visited all sewage treatment system in the central zone to get first-hand information.

- Discuss with the officials of PHED and urban local bodies and staff deployed for operation and management of STPs to understand the problems being faced.

- To evaluate the adequacy of the treatment plant and technology.

- To identify the major deficiencies in the treatment plant and remedial measures.

The jurisdiction of Zonal Office, Bhopal (Central Zone) comprises of three states namely, Chhattisgarh, Madhya Pradesh and Rajasthan. Under the NRCP scheme total 08 rivers and 11 cities of the Madhya Pradesh had been included in NRCP. As mentioned above various civil works with the help of local state government departments has been completed for diversion and treatment of sewage and all these assets created under NRCP were handed over to local body for further operation. The name of the cities and rivers which are considered under NRCP as given below in table no.1:

Table No.1 Details of river & city included in NRCP (MP)

Sl. No.	Name of the river	Town included under NRCP
01	Kshipra	Ujjain
02	Chambal	Nagda
03	Khan	Indore
04	Tapti	Burhanpur
05	Betwa	Bhopal
		Vidisha
06	Wainganga	Chhapara
		Keolari
07*	Narmada	Hoshangabad
08*	Beehar	Rewa
09*	Mandakini	Chitrakoot

*Work under progress

During this period, out of 15 no. of identified STPs as per the list provided by the Head office 10 STPs located in 08 towns in MP were visited for inspection and monitoring by the officials of the zonal office, Bhopal. The details of the visit performed are given in table no.2.

Table No.2 Details of monitoring and inspection of STPs

Sl. No.	Name of the official	Date of visit	River and city
01	Sh. P. Jagan	4 & 5 Nov. 2011	Khan river at Indore
02	Sh. Anil Rawat	4 Nov. 2011	Tapti river at Burhanpur
03	Dr. Y.K. Saxena	28 Oct. to 2 Nov. 2011	Betwa at Bhopal and Vidisha, Wainganga at Chhapara and Keolari
04	Dr. Anoop Chaturvedi	2 & 3 Nov.2011	Chambel at Nagda and Kshipra at Ujjain

The duly filled formats along with field observation were also provided in the report to assess the actual field condition at the time of visit. Though, in some of the cases, information received appears to be either incomplete or not as per requirement due to transfer/change of concern official and operator of the STPs. The status of O&M of individual STPs on the basis of their physical inspection, and information given at site by operating staff/officers, have been prepared and observations are given in Annexure no. 1 to 9.

Recommendations to improve performance and smooth operation of STPs, on the basis of monitoring of various STPs are also provided and it was observed at most of the location that treatment systems are not functioning properly and condition of plants is more or less same at all places. Status of the STPs at the time of visit was tabulated in the table no.3.

Table no.3: Status of the sewage treatment system established under NRCP

Sl. No.	Name of the river	City located at river bank	Treatment option	Treatment capacity	Status	Main issues
01	Khan	Indore	UASB	78 MLD	Operational	Fund problem, optimization required
			UASB	12 MLD	Operational	
02	Kshipra	Ujjain	Waste stabilization pond	52 MLD	Operational	Due to non-availability of the sufficient fund O&M of STPs and housekeeping not maintained properly.
			Karnal Technology	---	Operational	
03	Chambal	Nagda	Karnal Technology	----	Non-operational	Due to fund crisis and lack of coordination between Govt. dept. System not in operation.
04	Tapti	Burhanpur	Waste stabilization pond	06 MLD	Non-operational	Not in operation due to shortage of fund.
05	Betwa	Bhopal	Waste stabilization pond	08 MLD	Operational	Operational but proper maintenance required.
		Vidisha	Karnal Technology	----	Operational	Operational but proper maintenance required
06	Wainganga	Chhapara	Karnal Technology	1.2 MLD	Non operational	Not in operation due to shortage of fund.
		Keolari	Karnal Technology	0.75 MLD	Non operational	Not in operation due to shortage of fund.
07*	Beehar	Rewa	-	-	proposed	-
08*	Mandakini	Chitrakoot	-	-	proposed	-
09*	Narmada	Hoshangabad	-	-	proposed	-

General Observations and Recommendations:

1. At many places Municipal Corporation and PHED having dispute for O&M of STPs because of non-availability/shortage of fund and technical expertise. State Government may provide the required fund for maintenance, smooth operation and restarting of the scheme and treated water should be used for irrigation and construction purpose by the local body.

2. Inlet of the STPs based on UASB (Indore) was found to be receiving lot of solid wastes including plastics, pouches etc. which may cause obstruction in flow and wear and tear of pumps & machinery and also reduced efficiency of treatment plant. It is, generally, observed that mechanical screens installed in STPs/WSP are out of order, because of choking, rusting and poor maintenance.

3. Polishing ponds (in case of UASB process) and Waste Stabilization Ponds (WSPs) are mostly found accumulated with sludge and other inert materials like polythene, pouches etc. resulting in reduced capacity/detention time in the tank. This also affects the quality of treated effluent due to sludge flowing out with it. Sludge levels should be checked regularly followed by cleaning of deposited sludge time to time.

4. Single Oxidation pond provided in Bhopal for treatment of Panchsheel Nallah which is carrying sewage from new Bhopal area has also found to be filled with plastic and other solid waste.

5. It is also observed that staff/engineers engaged in O&M of the STPs are frequently transferred so that their experience and know-how does not get transferred to their successors for O&M of the STPs. The O&M staff/engineers should be deputed for sufficient time so that regular operation and maintenance could be ensured.

6. In Indore the result of analysis of treated sewage carried out through independent agencies are not being shared with the staff managing the O&M of the STPs. Therefore, suitable action/corrective measures are not being taken by operators in case of adverse results. In other STPs sampling and monitoring of treated effluent is not being done. Moreover, testing of effluent

for fecal coliform is not being done in most of the plants which is one of the most important indicators in abatement of pollution of rivers.

7. In case of treatment of sewage through Karnal Technology all the sewage water generated from town is being diverted for land application in Eucalyptus plantation through ridges and furrows system. Condition of the plantation area was not satisfactory and excess hydraulic loading of sewage is observed.

The study found that:

- Lack of coordination between the construction agency (PHED) and operating agencies (ULB).
- Sludge handing appeared to be most neglected area in STPs operation
- Biogas generated from UASB reactors or sludge digesters is not being collected & utilized for the designated purpose.
- Alternate power supply facility was not available in most of the plants.
- Fund constraint was the main factor for poor operation and maintenance of STPs.
- Lack of proper laboratories/analytical facility at site was another area that needs attention.
- In Indore and Ujjain area operation of the STPs was being looked after by contractors who deputed unqualified or less qualified staff at site, which was an important factor responsible for poor operation of STPs.

01. STP AT INDORE (MP) - 78 MLD

Background

a. PHED has constructed UASB based STP's of 78 MLD capacities at Kabit Khedi in Indore for treating entire city sewage under NRCP. Total cost of project was Rs. 36 Crores, which includes construction of two STPs along with sewer lines and intercepting weirs. 100% funding was done by NRCD. Both the plants are in the same compound and spread in 73 acres area.

b. The 78 MLD capacity Sewage Treatment Plants (STPs) located at Kabit Khedi Indore. The 78 MLD STP was designed, and commissioned in 2002 by M/s Enviro-Control Associate India Pvt. Ltd., Surat (Gujarat). The 12 MLD plant was designed, and commissioned in 2007 by M/s SMS Paryavaran Ltd., Rohini, New Delhi. The STPs were constructed by PHED.

c. Performance study of above STPs carried out by officials of Zonal Office, CPCB, Bhopal on 4th November 2011. The matter related to operation of STPs has been discussed and collected the information from MPPCB and PHED. At the time of visit the grab and composite samples from the sewage treatment plant were collected for performance evaluation. The collected samples are analyzed as per the standard methods in the Zonal Office Laboratory and the analysis results are given at **Table 4** for the 78 MLD.

d. The duly filled formats of STP details are enclosed at **Annexure-1** and the photographs taken during the visit.

e. The detailed inspection/ monitoring reports including STP wise observations and recommendations are as follows:

1. Sewage Collection

- Intercepting weirs at various places are constructed along the main I.D.A. Sewer lines of 300mm dia. to 1500mm dia. branch sewer lines along the nallah for collection of sewage from the city.

- Sewage sent to 78MLD STP through 1600mm dia main sewer lines lying on right & left bank of Khan River.

- The khan river flows through the city also carrying untreated sewage / effluent from nearby industrial areas. Both the STPs are located on the bank of Khan River and the treated sewage is also being discharged in to the same River.

2. Flow measuring system

- Huge quantity of flow was observed in the drain. Sewage interception structure constructed on the drain for collection of sewage in to the inlet well.

- About 50% of wastewater was found overflowing through weir in the drain and 50% taking in to the sump well for treatment.

- There was no arrangement to measure inlet and outlet flow. However rectangular weir and on line flow meter (not in operation) were provided at the outlet.

- The operator has informed that the flow has been calculated based on the pump running hours. During the visit two pump of 39 MLD lifting capacity each was in operation.

3. Power back up facility

- Two DG Sets of 500KVA each have been provided to cop-up the power in emergency for operating the main pumping station for lifting the sewage from receiving sump to STP inlet. DG sets were not operated during power cuts due to non supply of diesel by PHED.

- The plant has designed gas generation capacity of 56m^3/hr from UASB reactors. Gas holder of 336m^3 capacity installed and provision of power generation with dual fuel ratio of 60% gas and 40% diesel has been made but gas is not being collected from UASB reactor due to less strength in sewage.

- During discussion the operator of plant informed that the entire power demand could be met out from reactor gas only if operates as per design conditions.

4. Treatment facilities provided:

- The treatment system consisting of course & fine screen, grit chamber, UASB reactors, intermediate aeration and polishing ponds.

- M/s Adroit Associates, Indore is operating both the STPs. The operator told that about 20% of the effluent from Sanwner road and polo ground industrial areas is also mixing in sewage being taken by the STP for treatment.

- Six 240HP pumps were provided to lift the sewage from wet well to inlet chamber. During the visit two pump of 39MLD lifting capacity each were in operation and the average flow has been reported as 72MLD.

- Coarse, fine screens and grit chamber are installed but not being used effectively for removing floating materials and grit. Floating matter was observed in the collection well, grit chamber, effluent distribution chambers and polishing ponds. The coarse materials removed in screen chamber are

not collected properly and there was no arrangement for collecting and storing such material.

- Sophisticated and automated systems are installed for smooth functioning of STP at various components like screen chamber, UASB sludge removal system, gasholder and automatic gas burning system chlorination, but none of them were found in operation.

- Huge quantity of foam was observed in the aeration tank which was covering the entire aeration tank. It was told that the aerator operates for 3-4 hours in the morning and evening and kept shut for remaining time to control foam. Aeration tank is located very close to UASB reactor therefore effluent coming directly from anaerobic phase to aerobic phase, which may disturb the efficiency of process in aeration tank.

- Two polishing ponds were in operation with a retention period of one day and one and half day for pond –I & pond-II respectively. These ponds were cleaned once in two years.

- 900Kg capacity chlorine tonner is installed at outlet for disinfection of treated sewage. However, dosing was not being done at the time of inspection due to non-availability of chlorine. The operator has informed that PHE officials are not provided chlorine gas for disinfection.

- 22 number of sludge drying beds are constructed which were filled by sludge and 6 SDBs were overflowing. Sludge storage facility is not provided for storing the dried sludge.

- Laboratory facilities provided for daily analysis of operating parameters of STP. Presently BOD, COD, Alkalinity, TSS & pH were analyzed.

- Regional Office, MPPCB, Indore also collects the samples once in a month and the analysis report of September 2011 obtained from operator of plant is enclosed**.**

- The internal roads of STP are made pucca but poor plantation was observed in and around the STP premises.

- The inlet quality of sewage contain BOD-170 mg/l , TSS-653 mg/l, COD-322 mg/l, Phosphates-12.28 mg/l, Total Coliforms -$1.15x10^8$ no./100ml & Fecal Coliforms-$2.9x10^7$ no./100ml and values of treated sewage are BOD-38 mg/l, TSS-09 mg/l, COD-139mg/l, Phosphates-6.37mg/l, Total Coliforms -$2.0x10^8$ and Fecal Coliforms- $5.9x10^7$ no./100ml. The value of TKN at final outlet was observed below detectable limit.

5. Recommendations:

1. The STP should obtain consent from MPPCB under Water Act so that its regular monitoring and inspection could be ensured.

2. The treated effluent should be reused and should not be discharged in to the Nallah.

3. Flow measuring devices should be installed at inlet and outlet of STP for measuring the flow.

4. Screen and grit chambers should be operated regularly and the collected waste shall be removed regularly from the chamber.

5. The polishing ponds should be cleaned at least once in year for removal of floating materials etc. to improve the quality of effluent.

6. Chlorine dose should be given for controlling coliforms in the effluents before discharging in to the khan river.

7. The UASB reactors gas should be collected for its designated use.

8. The SDBs constructed for drying of sludge should be maintained and sludge should be removed regularly and shall be used as manure.

9. Necessary measures should be taken for controlling the foam in the intermediate aeration tank.

10. DG set should be operated for running the plant during power failure.

Table No.04: Analysis Results of the 78 MLD STP at Kabit Khedi, Indore

Date of sampling: 04.11.2011

Sampling Location	Parameters					
	BOD	**TSS**	**COD**	**PO_4-P**	**TC**	**FC**
Inlet of STP from Kabit Khedi Nallah	170	653	322	12.28	$2.0x10^8$	$5.9x10^7$
UASB Inlet	98	136	207	7.66	-	-
UASB Out let	81	70	153	5.61	-	-
Polishing pond Outlet into Kabit Khedi Nallah (Final Discharge)	38	09	139	6.37	$1.15x10^8$	$2.9x10^7$
% Removal	**78**	**98**	**57**	**-**	**-**	**-**
Discharge Limits as per consent.	**30**	**100**	**250**	**-**	**-**	**-**

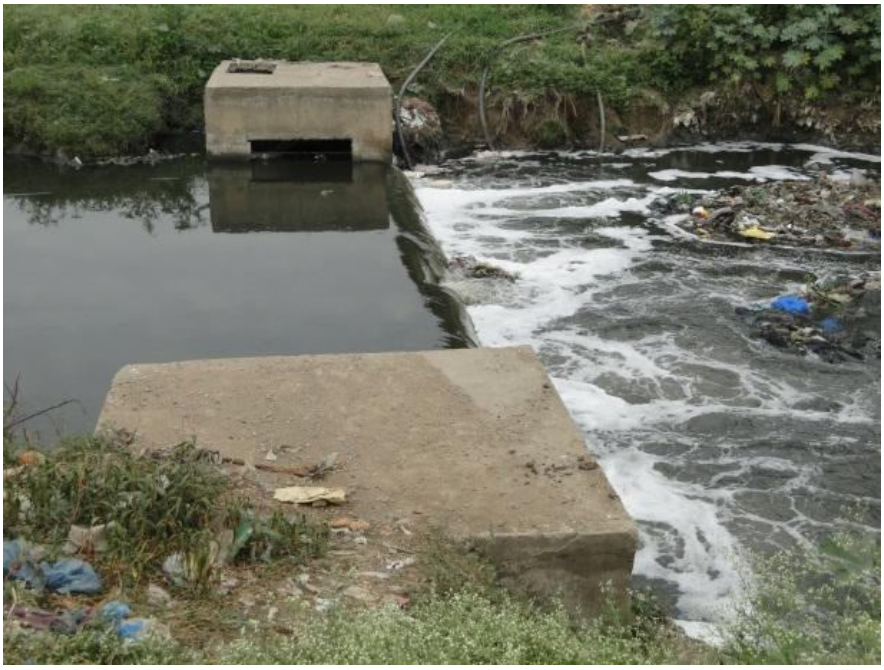
Note:

- All values are in mg/l except TC/FC.
- TC/FC analyzed by using membrane filtration method and all the values are reported very high because of no disinfection practiced, as a result the values are 'Too Numerous To Count'(TNTC) reported.

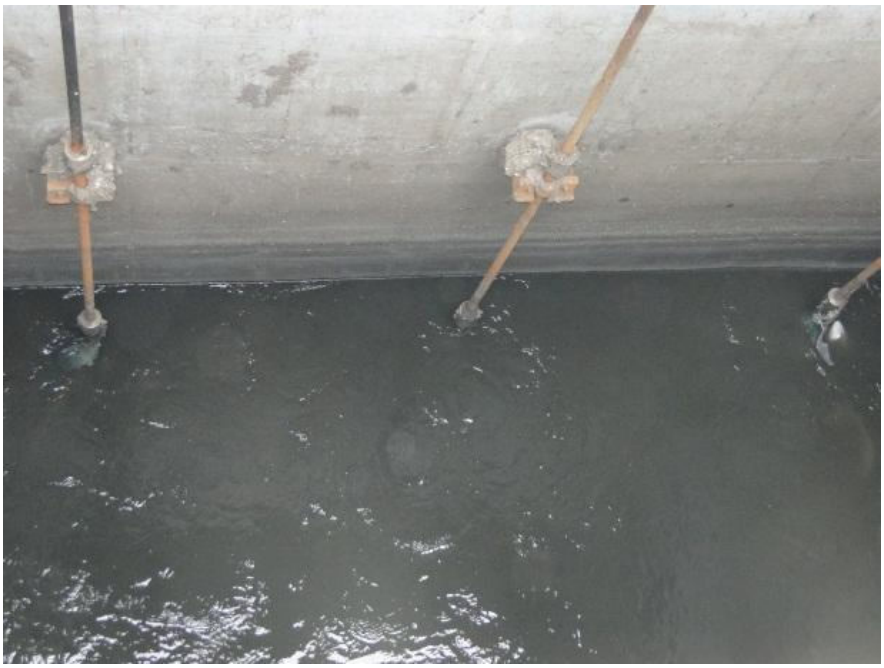
Performance Status:

The performance of STP (78 MLD) w.r.t. percentage removal of COD-57% and BOD-78% was observed. Removal of Suspended Solids (SS) was found as 98%. There is no removal of TC and FC because of disinfection unit was not working at the time of visit. Value of BOD slightly exceeding (38mg/l) the prescribe limits given for river discharge.

78 MLD STP at Kabit Khedi Indore



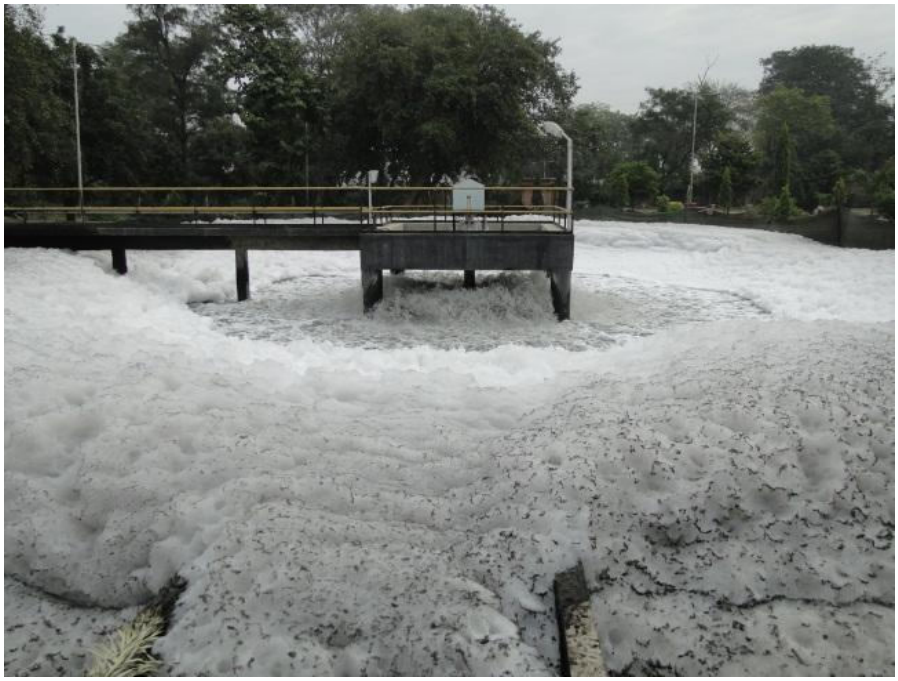
Inlet of STP



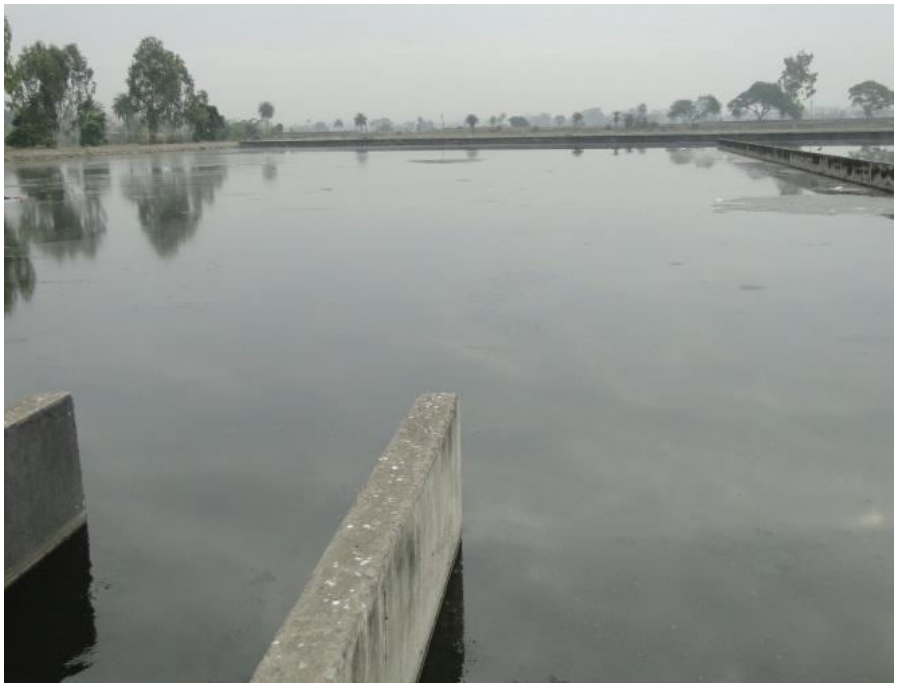
Sump well

UASB digester

Screen chamber of STP

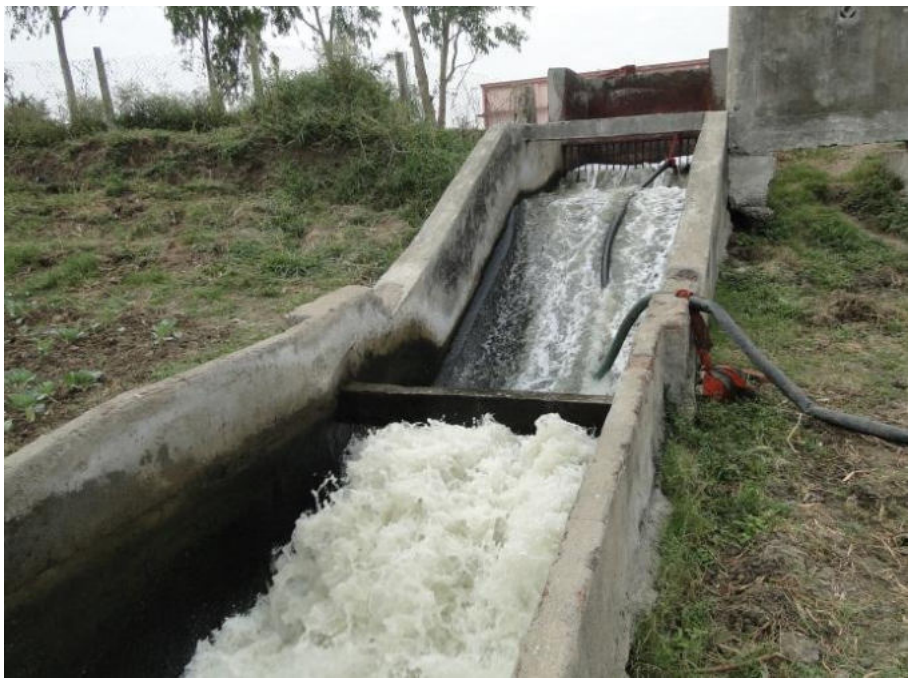


Foaming at aeration tank



Polishing pond

Sludge drying bed



Final outlet

02. STP AT INDORE (MP) - 12 MLD

Background

a. Pucca sewer line was not constructed on Bhamori Nallah by Nagar Nigam Indore. The raw sewage from Bhamori Nallah is being collected by 12MLD STP through gravity for treatment purpose.

b. 12 MLD STP was designed by M/s SMS Paryavaran Ltd., Rohini, and New Delhi and constructed by PHED. The plant was commissioned in 2007. The treatment system consisting of coarse & fine screen, grit chamber, UASB reactors, intermediate aeration and polishing ponds. M/s Adroit Associates, Indore was operating both the STP.

c. Online flow meters were installed at inlet and outlet of the STP and not found in operation. The flow has been calculated based on the pump running hours and two pumps were in operation at the time of inspection and the average flow reported to be 10.5MLD.

d. Gas from the UASB reactors was not being collected for using designated purpose. He also informed that experts from Japan have already visited both the STPs for evaluating the process to optimize the gas generation.

e. The Laboratory facilities existing at 78MLD plant are common for both the STPs. BOD, COD, Alkalinity, TSS & pH are being analyzed on daily basis. Regional Office, MPPCB, Indore officials are also collects the samples once in a month.

f. Chlorine gas dosing was not being done due to non-availability of chlorine i.e. PHED officials are not supplying the chlorine gas.

g. It was informed that all the electrical bills are being paid by the Nagar Nigam.

h. The treated water has not been recycled for plantation or construction activities and entire effluent is being discharged in to the river without any disinfection.

i. Sludge handling was very poor and requires two more sludge drying beds and shed for storing the dried sludge for use as manure.

- The inlet quality of sewage of 12 MLD plant contain BOD-198 mg/l , TSS-297 mg/l, COD-347 mg/l, Total Coliforms -$2.39x10^8$ no./100ml & Fecal Coliforms-$8.8x10^7$ no./100ml and values of treated sewage are BOD-39 mg/l, TSS-30 mg/l, COD-98 mg/l, Total Coliforms -$1.82x10^8$ and Fecal Coliforms-$6.7x10^7$ no./100ml. The value of TKN at final outlet was observed to be 23.75mg/l.

Recommendations:

1. The STP should obtain the consents from MPPCB.

2. Bhamori Nallah should be trained by concrete or connected through sewer lines for effective collection of sewage.

3. Proper weir should be constructed in the drain for diversion of wastewater in to the STP.

4. The STP should provide the DG set for the backup in case of power failure for running the plant without any interruption.

5. The treated water should be reused after disinfection.

6. The SDBs constructed for drying of sludge should be maintained and sludge should be stored under shed for using as manure.

Table No.05: Analysis Results of the 12 MLD STP at Kabit Khedi, Indore.

Date of sampling: 04.11.2011

Sampling Location	Parameters					
	BOD	**TSS**	**COD**	**PO_4**	**TC**	**FC**
Inlet in to STP from Kabit Khedi Nallah	198	297	347	10.53	$2.39x10^8$	$8.8x10^7$
UASB Inlet	169	258	288	11.46	-	-
UASB Out let	98	174	215	9.94	-	-
Polishing pond Outlet into Kabit Khedi Nallah (Final Discharge)	39	30	98	8.95	$1.82x10^8$	$6.7x10^7$
% Removal	**80**	**90**	**72**	**-**	-	**-**
Discharge Limits as per consent	**30**	**100**	**250**	**-**	**-**	**-**

Note: All values are in mg/L, except TC & FC. The TC/FC values are in no./100ml

Performance Status:

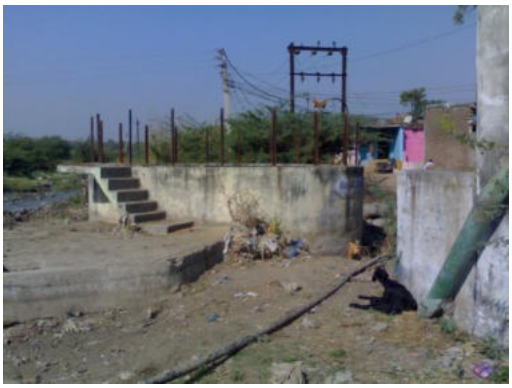
The performance of STP (78 MLD) w.r.t. percentage removal of COD-72% and BOD-80% was observed. Removal of Total Suspended Solids (TSS) was found to be 90%. Though there was no disinfection done but the TC & FC values are slightly decreased. The value of BOD is slightly exceeding (39mg/l) the prescribed limit given for discharge.

03. STP AT NAGDA (MP)

Background

a. Nagda is a city in Ujjain district in the state of Madhya Pradesh. It is an industrial town in the Malwa region of western Madhya Pradesh and is situated on the bank of Chambal River at 22°47'N 75°16'E coordinates. Total population of the city is approx 1.2 Lakh as per the census of 2011. Nagda also known as major industrial town having manufacturing unit of Viscous fibre, thermal power plant and chemical industries developed by M/s Grasim industries Ltd. It is a major railway junction on the Delhi-Mumbai route. Prior to being an industrial town, Nagda was a small village.

b. Under the NRCP project funded by MoEF for the prevention of major rivers from sewage pollution and other allied activity several works has been executed. In Nagda city several civil construction work for interception and diversion (I&D) of sewage has been completed to avoid the sewage mixing into river Chambal. For this purpose treatment plant based on Karnal Technology (KT) method has been constructed in 08 hector area at the bank of the river in downstream area. House hold sewage treated by the KT method in this process sewage water has been applied on land through ridge and furrows system for plantation of Eucalyptus trees, this tree having the highest transpiration rate so the water content of the sewage evaporated through plants leaves and organic matter remaining on land converted in to Humus and act as compost material, but weather condition like temperature and humidity directly affected the rate of treatment.



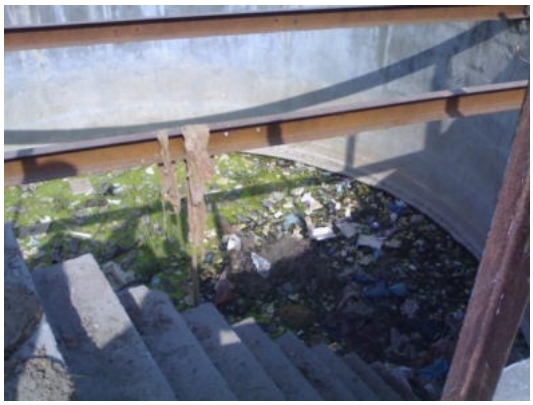
c. As per the direction of Head office, officials from Zonal office Bhopal and Sub Regional office of MPPCB, Nagda jointly visited the location

where the plantation has been done and I&D has been constructed and for assessment of latest status of the system which is funded under NRCP. Observation and information collected during the visit as given below:

01. In Nagda city most of the waste water flowing through two major drains one is Grasim nallah and another is Padli nallah. All the waste water generated from Chemical complex of Nagda were flowing in Grasim nallah and major quantity of the house hold sewage which is generated from nearby residential colony, town and Janmejay market were flowing in to the Padli nallah.

02. Padli nallah mix into the Grasim nallah near Juna Nagda and finally discharged into Chambal river in the downstream of the Nagda 100 meter from the Chambal barrage. Under the NRCP project major civil work for I&D of sewage has been completed by public health and engineering department (PHED) and all the assets transferred to local body for further operation and maintenance. But local body not accepted any asset created under this project so far because of many reasons.

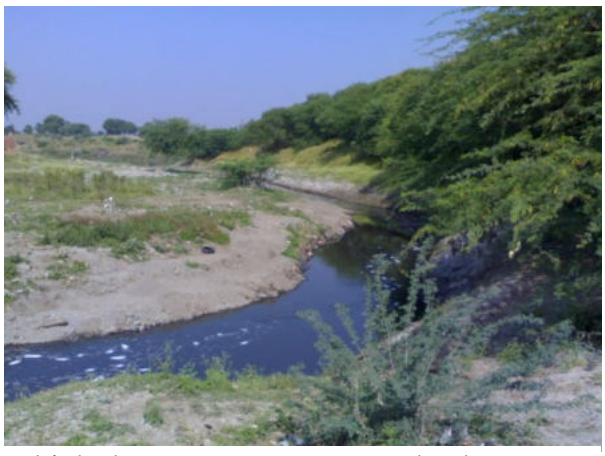
03. For the pumping of the sewage one sump well and pump house has been constructed before confluence point of Grasim nallah and Padli nallah at Juna Nagda. At the time of inspection it was observed that the condition of the sump well is very poor and lot of garbage and polythene was dumped inside of the sump well, connecting pipe of sewage nallah to sump well was also found damaged. Require infrastructure for pumping of the sewage was also not existed and pump house was also found in abandoned condition and presently it is used as a shelter home for street animals. Above conditions shows that these structures are not even used since its construction.



04. Pipe line of cast iron laying for sewage pumping upto KT plantation area was existed but found corrode and damaged at various point. Near Juna Nagda Eucalyptus plantation (KT) has been done in 08 hector area and approx. 13000 plants are planted for application of sewage water. For uniform distribution of sewage in ridge and furrows one storage tank with capacity of 80KL was also constructed but not found in operation and iron component of the tank was corroded. As per the discussion with local public and caretaker of the plantation area, it was found that the sewage was not applied on this site from last 5 to 6 years.

05. Growth of the Eucalyptus plants was found satisfactory because this site located at the bank of the river and average height of the plant was about 6 to 8 meter. Due to awareness in local public there is no illegal cutting of the trees. Some time in summer season minor fire hazard occurred because of dry leaves deposition it may damage the plantation.

06. During the discussion with different government agencies which are associated with NRCP project it was observed that because of non availability of the fund, shortage of manpower and weak coordination between the infrastructure development facility body (PHED) of sewage treatment and operation and maintenance body (Municipal corporation, Nagda) this scheme is failed to serve its purpose for which these assets are created. The system was not in operation since its commissioning and entire sewage was being discharged directly into the river Chambal without any treatment.



07. To assess the waste water quality and probable pollutants in the sewage, one set of sample for physico-chemical and bacteriological analysis has been collected and later analysed in laboratory of CPCB, ZO, Bhopal. The waste water sample collected from the Padli nallah before confluence of Grasim nallah near sump well Juna Nagda. Analysis

results show that values of BOD and Phosphate were found to be 59 and 7.31 mg/l respectively. Bacteriological results also indicated that the heavy contamination of Faecal and Total Coliform in the waste water, other parameters are mentioned in table No 01.

In this scheme several civil works has been executed for diversion of the sewage but due to lake of coordination between constructing body (PHED) and operating body (Municipal Corporation) and availability of fund, scheme is not functioning since beginning and entire sewage is being mixed in River Chambal without any treatment.

Following suggestion are made for the smooth operation of the scheme:

1. Municipal Corporation and PHED may sort-out the dispute at government level and start the scheme as soon as possible to prevent the direct discharge of sewage in to the River Chambal.

2. State Government may provide the required fund for maintenance, smooth operation and restarting of the scheme.

3. Treated water should be used for irrigation and construction purpose by the local body.

Table No.06: Analysis of wastewater sampled from Padli nallah, Nagda

Date of sampling 02.11.2011

Sl. No.	**Location**	**pH**	**TSS**	**Cond**	**COD**	**BOD**	**O&G**	**PO_4**	**NO_3**	**TC/** 100ml	**FC/** 100ml
1	Padli nallah near Juna Nagda	8.27	73	1890	92	59	BDL	7.31	3.16	TNTC	TNTC
Discharged limit for designated use (irrigation purpose).		5.5 to 9.0	200	--	-	100	-	-	-	10^4	10^4

Note: All the values in mg/L except Conductivity. Values of TC and FC were found 'Too Numerous To Count' (TNTC).

Performance Status:

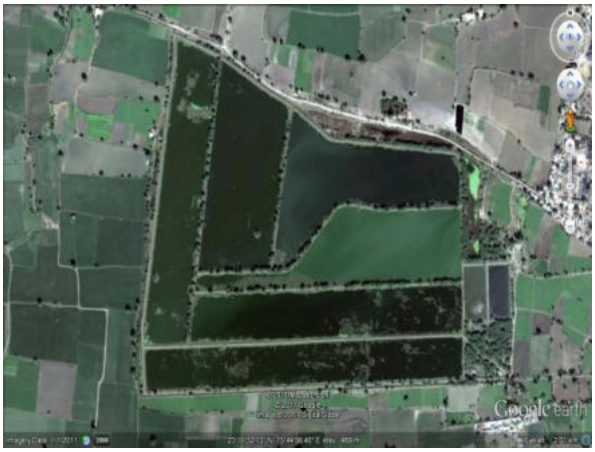
Performance could not be assessed because treatment system was not in operation since beginning and entire sewage is being discharged in to river Chambal without any treatment having BOD-59mg/l against discharge limit of 30mg/l.

04. STP AT UJJAIN (MP) - 52 MLD (WSP)

Background

a. Ujjain city of Madhya Pradesh state located on an unique geographical location from where tropic of Cancer passes. It is the Greenwich Mean Time of India for Hindu Panchang. The city located at the bank of river Kshipra, only river that travels straight from south to north. Kumbh Mela (Hindu Festival) every 12 years also celebrated at the same city. The city is a major agricultural and textile trade centre. Cotton ginning and milling, oilseed milling, hand weaving, and the manufacture of metal ware, tiles, hosiery, confectionery, strawboard, and batteries are important industries.

b. The city sewage and other domestic effluent generate in the various area of the city earlier mix in to the river Kshipra without any treatment, because city developed on both side of the river bank and natural slope towards the river so all the waste water reach to river through gravity. To prevent the river from the sewage pollution from day to day activity and during the Kumbha Mela and other festival celebrated on the bank of the river state government has taken several steps for treatment of wastewater. Waste Stabilization Pond (WSP) with the capacity of 52 MLD had been constructed near village Sadaval by PHED under NRCP. Another treatment system based on Karnal Technology (KT) has been developed near Ayurvedic collage at 3.72 hectare land in two parts. The sewage diverted into WSP and KT through interception and diversion structures.



Google photo of WSP, Ujjain

c. To assess the latest status of the sewage treatment system which is funded by NRCP and as per the direction of Head Office, officials from Zonal office Bhopal and Regional office of MPPCB, Ujjain jointly visited the location where the WSP has constructed and plantation has been done under KT method.

Observation and information collected during the visit as given below:

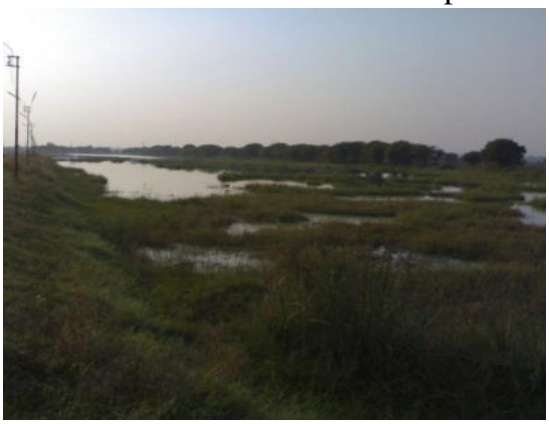
1. Under the NRCP project total 11 sewage nallah had been intercepted and diverted which were carrying the city sewage and polluting the river Kshipra. For this purpose city has been divide in to two zones. In first zone 05 major nallah has trapped which are receiving the sewage from Nanakheda, Alakhdham, Shastri Nagar, Hanuman Naka and Rajeev Ratna Nagar area and diverted to intermediate pumping station located at Manchaman Ganesh Mandir from where all the sewage water pumped to WSP located at Sadawal village for further treatment by 750mm pipe line.

2. In second zone 06 other sewage nallah were diverted to main pump house located at Somvawariya from where approx 12MLD sewage pumped to Sadawal village by 600mm pipe line but not on regular basis. Total length of the sewage line is approx 05Km.

3. **Waste Stabilization Method**: one WSP with the capacity of 52.74MLD has been constructed at Sadawal village located at Ujjain-Badnagar road at SH-18. Sewage water from Zone 01 and Zone 02 are pumped here for further treatment. Pumping station constructed under old sewerage system near Ramghat, Rudrasagar, Badnagar Bridge and Chakrateerth also pump the sewage water in the same WSP.

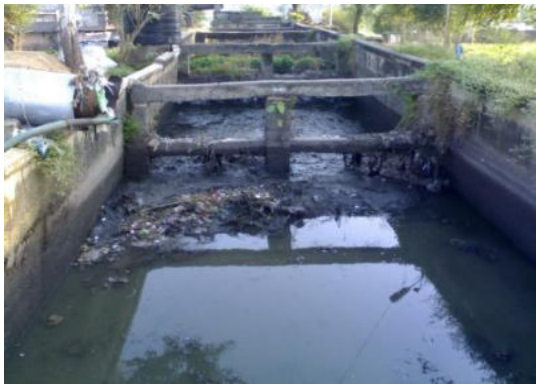
4. WSP in Ujjain consists of anaerobic ponds (2 Nos.) followed by facultative ponds (2 Nos.) and maturation pond (04 Nos.). In first stage of sewage treatment the inert material and silt were removed from sewage by screening and grit removal chamber. If it will not removed then silt deposition and chocking problems decrease the treatment capacity of WSP drastically. Excess silt reduces the active

depth of the WSP and also reduces the reaction time of treatment. Pre treated sewage water goes in to WSP where the decomposition of the organic waste takes place and organic load in the form of BOD has been decreased, basically anaerobic lagoon process is most suitable process for removal of carbonaceous BOD and nitrogenous compounds. Then sewage enters into the facultative pond were microorganism can function in the presence and absence of the molecular Oxygen and reduced the organic load, finally sewage reaches in maturation pond were nitrification takes place and sewage quality improved. Now treated water can be used for irrigation purpose.



Waste stabilization pond at Sadawal village, Ujjain

5. At the time of inspection it was observed that the condition of the screening chamber was not in good shape and due to deposition of polythenes it was choked. Because of the poor housekeeping of the grit chamber, excess quantity of silt was deposited which further reduces the removal capacity of the silt.



Screen chamber of WSP

6. Anaerobic ponds were also not in good condition because of high growth of hyacinth and other shrubs and the purpose of the anaerobic pond has defeated. More quantity of the sludge in anaerobic pond and uncontrolled growth of water plants also reduced the treatment capacity of the WSP.

7. Similar condition was observed in facultative and maturation pond because of negligence and poor housekeeping. It was also observed that at some places partition wall between facultative pond and maturation pond was damaged.

8. As per the discussion held with concern NRCP departments it was concluded because of shortage of the fund for regular O&M and skilled manpower this facility is not being operated to serve the purpose for which it has been made. Municipal Corporation have no additional fund for regular operation of the pump and repairing of the damaged pipe line which are used for pumping the sewage from the intermediate and main pumping station.

9. **Karnal Technology method**: under the interception and diversion of sewage Indra Nagar and Bharivgarh nallah also trapped separately and sewage pump with the capacity of 6.5 and 7.5 HP has been installed for pumping the sewage for Eucalyptus plantation area. For KT approx 8000 plants has been grown on 4 hectare land behind Ayurvedic collage Ujjain.

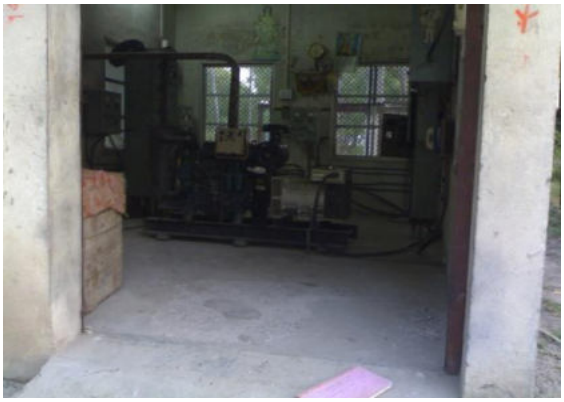
Plantation under Karnal technology

10. Regularly 4 to 5 hours sewage pumped to the plantation for land application, at the time of inspection it was observed that the excess quantity of sewage being bypassed to the river Kshipra without any treatment near Mangalwara Ghat. In plantation area water logging was observed and few trees were noticed fall down due to marshy land.

11. Two DG sets with submersible pump are available and logbook is also being maintained. It seems that partial treatment of the sewage is being done but at the time of the peak flow only 20 to 30 percent

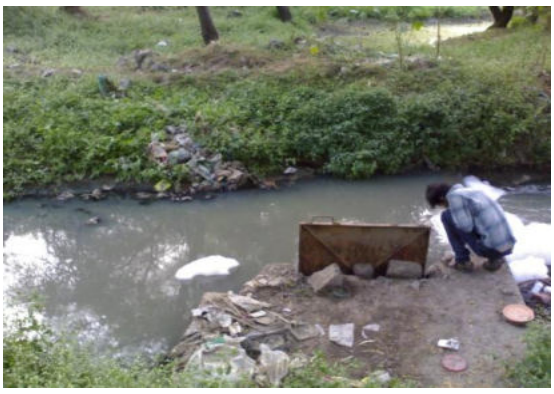
of the sewage can be diverted for land application purpose and remaining sewage discharges in the river without any treatment.

12. In Ujjain city all the works executed by PHED including O&M of pumping station with the coordination of Ujjain Municipal corporation. Due to shortage of the fund scheme is not working at full capacity. Some of the pump house are closed because of the none payment of electricity bill since long time. Even care taker of the pumping station and WSP area are not getting salaries from several months. Major maintenance work of the pump house, DG sets and other process equipments has not been started so far. In rainy season from 30th June to 15th October operation the pumping activities kept suspended.



Pump house for sewage pumping at KT plant

13. To assess the wastewater quality and probable pollutants in the sewage, one set of sample for physico-chemical and bacteriological analysis has been collected from inlet and outlet of the WSP, Sadawal and later analysed in own laboratory of CPCB, ZO, Bhopal. The wastewater sample behind Ayurvedic collage drain was also collected. Analysis results shows that values of BOD at inlet and outlet of WSP is found 74mg/l and 48mg/l with removal of 35%. Phosphate at inlet and outlet is found 15.1mg/l and 10.3mg/l with removal 35% Bacteriological results also indicated heavy contamination of Faecal



Bypass drain near KT project

and total Coliform in the wastewater, other parameters are mentioned in table No 01.

The scheme is being operated by the PHED with coordination of Municipal Corporation, Ujjain but due to shortage of the fund and skilled manpower system is not functioning upto the mark. Only partial treatment of the sewage is being done by waste stabilization pond and Karnal Technology methods.

Based on the monitoring and inspections following recommendations are made:

1. State Government may provide the required fund for proper functioning of the scheme.

2. Proper coordination is required between different governments agencies involved in the scheme at various levels for smooth functioning.

3. 03 Extra efforts should be made by Municipal Corporation for operation and maintenance of the treatment system to prevent the River Kshipra from pollution.

4. Treated water should be used for gardening and construction purpose by the ULB to reduce the demand of fresh water.

Table No.07: Analysis of wastewater samples from Ujjain

Date of sampling 02.11.2011

Sl. No.	Location	pH	TSS	Cond	COD	BOD	O&G	PO_4	NO_3	TC/ 100ml	FC/ 100ml
01	WSP inlet	7.91	67	1480	140	74	BDL	15.1	6.1	TNTC	TNTC
02	WSP outlet	7.48	69	1195	75	48	BDL	10.3	4.0	TNTC	TNTC
03	Bypass drain near KT Ayurvedic College.	7.36	81	1093	79	50	BDL	9.4	5.2	TNTC	TNTC
Discharged limit for designated use (irrigation purpose).		5.5 to 9.0	200	--	-	100	--	--	--	10^4	10^4

Note: All the values in mg/L except Conductivity. Values of TC and FC were found 'Too Numerous To Count' (TNTC).

Performance Status:

The Performance of WSP (52 MLD) w.r.t. percentage removal of COD-47% and BOD-35% was observed. There is no removal of TC and FC in treated water. The values of COD and BOD were exceeding the prescribed limits of the irrigation/land application.

05. STP AT BURHANPUR (MP)

Background

a. Burhanpur is a small and historical city in Madhya Pradesh it is located in the southern part of state on the bank of Tapti River. Domestic wastewater of city is a major source of water pollution in the Tapti River. The Tapti River conservation scheme under NRCP divided in to two parts i.e. Interception & Diversion and Collection & treatment of domestic wastewater.

b. This scheme was launched for taping of sewage from seven nallahs and sending to Boharda road, for oxidation ponds. Burhanpur is very old and congested city hence the networking of sewage lines was a very big challenge for the diversion of sewage. To complete the work of sewage diversion and treatment full scheme had been divided into three parts. Under the collection system of the sewage major three nallah divided in three zones. In first zone Nagjhiri nallah trapped and diverted to Panda Nallah, in second zone Rajghat nallah trapped and diverted to Panda Nallah. Panda Nallah ultimately reach to the oxidation pond which was constructed near Macro Vision School. The following works have been completed by the PHED:

Unused Oxidation Pond

Observation and information collected during the visit as given below:

1. **Nagjhiri Zone:** sump well construction has been completed and 03 non-clog pumps with the capacity of 10 HP each have been commissioned but due to non-availability of the O&M fund, pumps were not in operation.

Pumps not being used

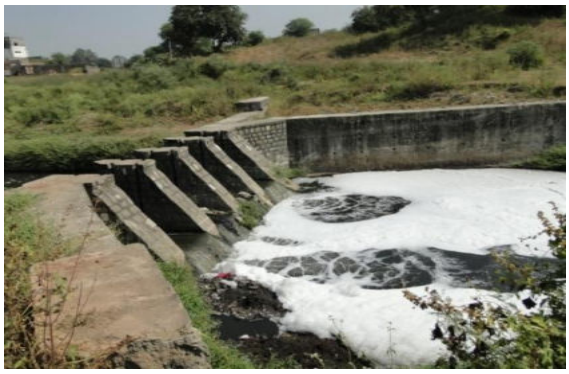
2. **Rajghat Zone:** Sump well construction has been completed and 03 non-clog pumps with the capacity of 10 HP each have been commissioned but due to non-availability of the O&M fund pumps were not in operation.

3. **Panda Road Zone:** All the collection lines are connected to the oxidation pond and necessary pumps and pipes were available for sewage pumping but at the time of visit pumps were found non-operational due to shortage of funds.

4. The sanctioned cost of scheme was Rs.289 Lakh but on the Rs.238.28 Lakh received for necessary works. This scheme is still not taken over by Burhanpur Nagar Nigam. Therefore it is not operational. Hence it is necessary to transfer the scheme to Burhanpur Nagar Nigam for treatment along with necessary financial support. As per PHE official Burhanpur Nagar Nigam is ready to take-over the scheme with certain terms & condition.

Inlet Channel of Oxidation Pond

6. At the time of inspection on 03.11.2011 treatment system was not operational. Sump well-cum-pump house was also found dry and Sewage pipelines found damaged between sump-well & oxidation pond. The untreated Sewage is mixing directly in the Tapti River.



Bypass sewage

7. Consent from MPPCB not obtained for running of scheme. No fencing / boundary wall and sign board provided at the site of treatment plant. It is concluded that NRCP project has been constructed by the PHED in coordination with Municipal Corporation, Burhanpur but due to lack of the funds, system is not functioning. Municipal Corporation and PHED may sort-out the dispute at government level and seek funds from State Government for restarting and further O & M of the scheme to prevent the direct discharge of sewage in to the River Tapti.

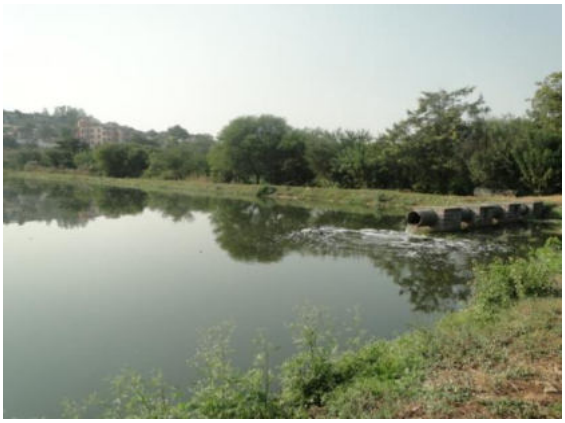
Performance Status:

Performance could not be assessed because the sewage has not been taken for treatment system and some construction work still not completed, entire sewage is being discharged in to River Tapti without any treatment.

06. STP AT BHOPAL (MP) - 8MLD

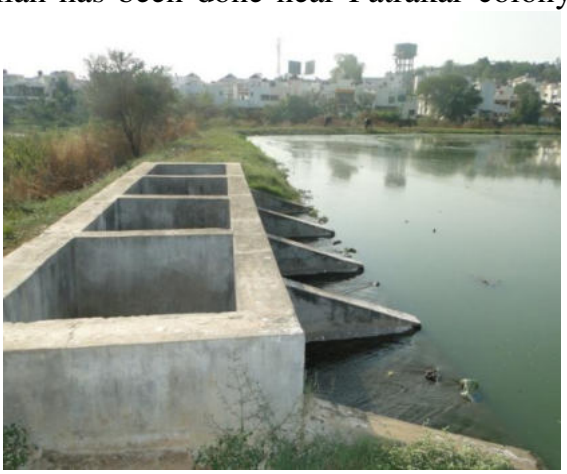
Background

a. Bhopal city is the capital of Madhya Pradesh and the sewage of new Bhopal area is flowing into Panchsheel Nallah and joins Shahpura Lake. The overflow from the Shahpura Lake leads to river Kaliasote, which ultimately joins River Betwa near Bhojpur. Hence River Betwa has been polluted by Panchsheel Nallah. Therefore it was included in the scheme of Betwa River Conservation through interception and Diversion of Nallah and treatment through waste stabilization pond/Oxidation pond.



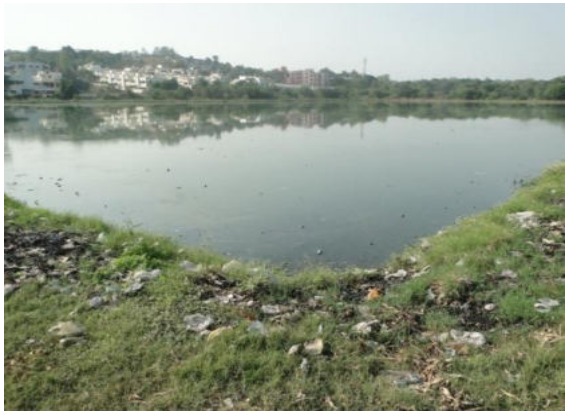
Inlet of Oxidation Pond

b. Interception of Panchsheel Nallah has been done near Patrakar colony and diverted it through sewer line and the sewage has been conveyed to upstream of Shahpura Lake where the sewage comes in to stabilization pond through gravity. The size of a stabilization pond is 255mts x 140mts and the retention time of the pond is about 5 days.



Outlet Channel

c. The treatment scheme has been constructed and operated by PHED Sub-Division No.8 of Bhopal. The STP consisting of oxidation pond with treatment capacity of 8 MLD. The treatment scheme was in operational at the time of visit on 29.10.2011.



View of Oxidation Pond

Observation and information collected during the visit as given below:

1. Cleaning of the pond has not done since its commission. Lot of plastic/polythene material, thermocol etc. has been removed manually from stabilization pond and stored near the site for disposal along with MSW.

2. There was no log book maintained for the flow and O & M details. There was no laboratory facility available for analysis of treated sewage before discharge in to Shahpura Lake.

3. The operator has not obtained the Consent under water Act from Madhya Pradesh pollution Control Board.

- The quality of raw sewage contains pH-7.48, Cond-1045µs/cm, PO_4-P-0.024mg/l, NO_3-N-0.024mg/l, TSS-58mg/l, COD-157mg/l and BOD-102 mg/l. The Outlet values of pH-7.90, Cond-990µs/cm, PO_4-p-2.26mg/l, NO_3-N-022mg/l, TSS-25mg/l, COD-82mg/l and BOD-64mg/l. The value of TKN at final outlet was observed 2.14 mg/L.

Table no.08: Analysis of wastewater samples from Oxidation Pond, Bhopal
Date of sampling 29.10.2011

Location	pH	PO_4-P	NO_3-N	TSS	COD	BOD
STP In late	7.48	4.00	0.024	58	157	102
STP Outlet	7.90	2.26	0.022	25	82	64
Discharge Limits	5.5 to 9.0	-	-	100	250	30

Note: All values are in mg/L, except pH.

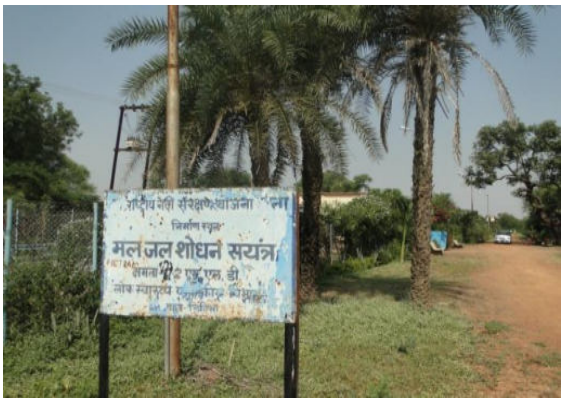
Performance Status:

The Performance of oxidation pond (8MLD) w.r.t. percentage removal of COD-47% and BOD-37% was observed. Removal of TSS was observed to be 57%. Value of BOD found to be exceeded (64mg/l) as compare to prescribed limit for discharge.

07. STP AT VIDISHA (MP) - 7.2 MLD

Background

a. Vidisha Town is located in the bank of River Betwa having historical & religious importance. The wastewater generated from house hold and commercial activities are the main sources of water pollution in Vidisha town. Due to gradient of the city all the wastewater leads to River Betwa. To prevent the water pollution several interception and diversion (I&D) works were made by PHED under NRCP for control of water pollution in the Betwa River. About 7.2MLD wastewater diversion works have been made for utilization of the sewage through Eucalyptus plantation by using Karnal Technology.



b. Under this scheme various works like interception & diversion, inlet & screen chamber, grit chamber, sump well, pump house, pump sets, bypass line, distribution tank, plantation and field application are included. The scheme was commissioned by PHE Department and handed over to Nagar Palika Parishad, Vidisha for operation and maintenance.

Inlet of plantation

Observation and information collected during the visit as given below:

1. At the time of visit on 28.10.2011, the treatment system (KT method) was found operation and sewage was applying on land. The channel carrying sewage to KT plantation was found blocked with silt deposition.

2. Eucalyptus plantation has been done in 6.66 hectares area with 25 blocks of 50mx50m size having 544 trees in each block and the total number of plants are 13600. It was informed that the sewage application is not done in rainy season i.e. June to September. At the time of visit untreated sewage was bypassing in to Betwa River.

View of Plantation

3. The operator has not obtained consent from Madhya Pradesh Pollution Control Board.

4. Six pumps were available with a capacity of 20HP each for pumping of the sewage to KT plantation. One 160 KVA DG has been provided in room for operating the pumps during power failure.

5. Logbooks were made available at site for inspection i.e. DG set, pumps log book, silt removal etc. No laboratory facility available. Official staff quarter and security guard room constructed in the premises of project site. Provided wire fencing and entrance gate at the STP.

- The inlet sewage contains pH-7.65, Cond-197µs/cm, PO_4-P-4.46mg/l, NO_3-N-0.017mg/l, TSS-225mg/l, COD -200mg/l and BOD-138mg/l. The wastewater collected from the KT plantation area contains pH- 7.62, Cond-183µs/cm, PO_4-P-4.69mg/l, NO_3-N-0.110mg/l, TSS-165mg/l, COD-195mg/l and BOD-103mg/l. Sample also collected from the bypass and the

sewage contains pH-7.78, Cond-188µs/cm, PO_4-P-4.39mg/l, NO_3-N-0.020mg/l, TSS-213mg/l, COD-263mg/l and BOD-157mg/l. The value of TKN at by pass sewage was observed 21.1 mg/L.

Nagar Palika Parishad Vidisha should operate the system efficiently to stop by-passing the untreated sewage in to River Betwa. Sufficient funds should be allocated for O & M of the scheme.

Table no.09: Analysis of wastewater samples from Plantation area (KT), Vidisha

Date of sampling 28.10.2011

Location	**pH**	**PO_4-P**	**No_3-N**	**TSS**	**COD**	**BOD**
sewage water use for plantation	7.62	4.69	0.110	165	195	103
Bypass	7.78	4.39	0.020	213	263	157
Land application limit	5.5 to 9.0	-	-	200	-	100

Note: All values are in mg/L, except pH.

Performance Status:

The Performance of treatment system (Karnal Technology) (7.2MLD) w.r.t. wastewater application/utilization was around 20% to 30% of sewage generation on the basis of visual observation. Remaining part of sewage is being discharge to River Betwa.

08. STP AT CHHAPARA (MP) – 1.2MLD

Background

a. Chhapara town is located on the Northern part of Mahakoushal area and it is a main commercial centre of Seoni district. The domestic wastewater of town is being directly discharged in to the River Wainganga through Basti Nallah and Chamari Nallah. To prevent the pollution interception and diversion followed by Karnal Technology launched under NRCP. The interception and diversion works includes construction of Pick-up weirs, Sewer line, Manhole, Sump-well cum pump house, pumping main and sewage treatment.

b. The Basti nallah and Chamari nallah has been intercepted with small pick-up weirs with an arrangement to bypass excess flow during rain. The sewage flow shall be diverted to sump wells through sewer line by gravity.

c. The wastewater from Basti Nalla and Chamari Nallah has been diverted to sump well-I and sump well-II respectively through sewer line.

d. Manholes were provided for giving access to the sewer for inspection, cleaning, repairs and maintenance.

e. The RCC sump well cum pump house has been constructed near right bank of Chamari Nallah and left bank of Basti Nallah for collection of sewage. Also provided different sizes of pumping main at different places.

f. Karnal Technology used for treatment of sewage through plantation of Eucalyptus trees. Total volume of sewage generation from Chhapara Town is 1.20 MLD which is being discharged in to the Nallah. The treatment arrangements are established out of Chhapara Town.

Observation and information collected during the visit as given below:

1. At the time of visit on 01.11.2011, the STP (Karnal Technology) was found non-operative.

2. There is no any consent issued from Madhya Pradesh pollution Control Board.

3. The scheme of Chhapara town is implemented by P.H.E. Department and it is based on Karnal Technology for the treatment of waste water which is generated from the town.

4. Sump well cum pump house no. I & II were also found non-operative and sewage carrying lines were found damaged at many places.

5. The scheme is taken over by Madhya Pradesh Rajya Beej Evam Farm Vikas Nigam, Chhapara to cater the water demand in their farms. The scheme found inactive due to non-availability of technical staff. As discussed with the official of the Beej Nigam they are ready to operate the system if the damaged lines will be repaired by implementing agency.

6. The sewage of Basti Nalla and Chamari Nalla found overflowing through pick-up weirs and discharging in to the river Wainganga.

7. Huge quantity of silt found deposited in pick-up weirs.

8. Only 150 Eucalyptus plants are seen on 2.0 hectare land allocated to KT.

9. Sewage pipe line found damaged between sump well-cum-pump house &land application area (plantation area).

On the basis of field observation the following suggestion are made for the smooth operation of the scheme:

01. Madhya Pradesh Rajya Beej Evam Farm Vikas Nigam may sort-out the problems at government level and starts the scheme as soon as possible to prevent the direct discharge of sewage in to the River Wainganga.

02. State Government may provide the required fund for maintenance, smooth operation and restarting of the scheme.

03. Skilled operators should be deployed for operation of scheme.

Performance Status:

Performance could not be assessed because the treatment system (Karnal Technology) was not in operation and entire sewage is being discharged in to River Wainganga without any treatment.

09. STP AT KEOLARI (MP) - 0.75MLD

Background

a. Keolari town is one of the most ancient town situated on the fork at river Wainganga. Three nallahs i.e. Moti nallah, Durgachowk nallah, Khermai nallah are flowing through the mid of the town and carrying the domestic wastewater which is generated from Keolari town & discharge into river Wainganga causing water pollution.

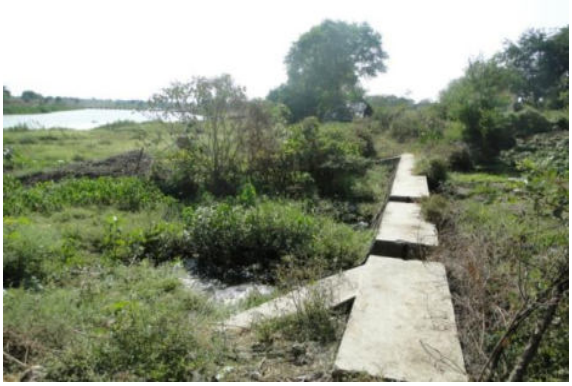
b. The sewage treatment scheme (Karnal Technology) was installed by P.H.E. department for abatement of pollution of Wainganga river and handed over to Gram Panchayat Keolari after completion.

c. Pollution abetments scheme of Wainganga river in Keolari town consist various components as given below:-

Observation and information collected during the visit as given below:

1. **Interception & Diversion:-** Pickup weirs at Khermai nallah, Moti nallah and Durgachowk nallah with bypass arrangement for excess flow during rains have been constructed.

2. **Sewer Line:-** The wastewater of all the three nallah is diverted to sump well through sewer line. The wastewater from Khermai nallah was diverted to sump well via Durgachowk nallah. The wastewater of Moti nallah was also diverted to sump well through sewer line. Manholes are provided for giving access into the sewer line for inspection,



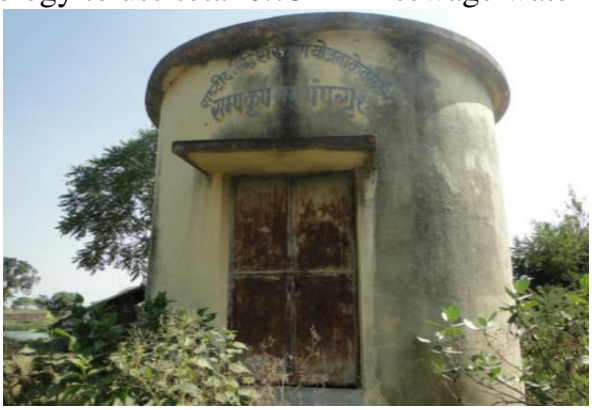
Pick-up Weirs

cleaning, repairs and maintenance.

3. **Sump-well-cum-Pump House:** R.C.C. sump well cum pump house is constructed near right bank of Durgachowk nallah for collection of sewage and to accommodate the pumps and electrical equipments.

4. **Pumping Main:-** C.I. pipe line to convey sewage from sump well to treatment site.

5. **Sewage Treatment**:- The sewage treatment arrangement of Keolari town is based on Karnal technology to use total 0.75MLD sewage water for Eucalyptus plantation. Around 5 acres area has been developed for land application of sewage. At the time of inspection the scheme found non-operational and entire sewage found discharging directly in to Wainganga River through Sagar River and various intermediate channels and nallah.



Sump-Well

At the time of inspection on 01.11.2011 the following observation are recorded:

1. The pollution abatement scheme had been transferred to Gram Panchayat of Keolari town about 8 years back.

2. There is no consent issued by Madhya Pradesh Pollution Control Board.

3. As per the information given by Shri Mohan Marabi, Sarpanch, Gram Panchayat of Keolari the STP (land application of sewage through KT) is not being operated since last 8 years.

4. There are only 107 trees of Eucalyptus in 5 acres plantation area.

5. Silt deposition was observed in furrows of the plantation area.

6. The pumps are found non-operational at the time of inspection further more there is no alternate power supply for pumping facility.

7. Log book were not maintain because system was not in operation since beginning.

8. Presently all three nallahs i.e. Khermai, Moti & Durgachowk nallah are being discharged in Sagar River which ultimately leads to Wainganga River.

View of Plantation

On the basis of field observation the following suggestion are made for the smooth operation of the scheme:

01. Gram Panchayat may sort-out the problems at government level and starts the scheme as soon as possible to prevent the direct discharge of sewage in to the River Wainganga.

02. State Government may provide the required fund for maintenance, smooth operation and restarting of the scheme.

03. Treated water should be used for irrigation and other outdoor purpose by the Gram Panchayat by the help of local peoples.

Performance Status:

Performance could not be assessed because the treatment system (Karnal Technology) was not in operation and entire sewage is being discharged in to River Wainganga without any treatment.