Water pollution—audit guidelines

Audit of Water Pollution

Types of audit

a) Compliance audit: The scope of audit is restricted to checking compliance of the audit entity with respect to policies/laws/ rules/regulations framed by the Parliament/state legislature. With respect to water pollution, compliance audit would check whether the audited entity (can be a private entity, or an agency of the government) is complying with the policies/laws/rules/regulations relating to control of water pollution framed by the Ministry of Environment and Forests at the central level and Department of Environment at the state level.

b) Performance audit: The scope[1] could encompass the following:

- Audit of Government's monitoring of compliance with environmental laws: The main aim of such audit is to assess whether the government is monitoring compliance whether the entities required to follow the applicable water pollution control and prevention acts/rules are doing so or not.
- Audit of the performance of Government's environmental programs: The main aim of such audit is to offer an opinion on the performance of specific environmental programs/ projects/strategies already formulated and being implemented by the Government. Some of these programmes of the Ministry of Environment and Forests of the GOI are NRCP, NRCD etc.
- Audit of the environmental impact of other Government programs: The main aim of such audit is to offer an opinion on the environmental impact of other programs/projects formulated and implemented by other Ministries/ departments/agencies other than the Ministry/Department of Environment. For example, audit of the impact of mining, building roads/dams, military etc., on the pollution of water sources would fall under this category.
- Audit of Environmental Management Systems: The main aim of such audit is to offer an opinion on the implementation of Environmental Management Systems (EMS) of the audit entity and/or ISO 14001 Standards[2]. The absence of an EMS can also be a source of audit comments.
- Evaluation of environmental policies and programs: The main aim of such audit is to offer an opinion on the adequacy or lack of a policy framework governing control and prevention of water pollution. International best practices can be a source for such comparison. However, adaptability to local conditions should be considered before making such comparisons.

c) Financial audit: Some audit entities operate in sectors where environmental matters like water pollution may have material impact on their financial statements. In such

[1] As defined by INTOSAI

[2] International Standards Organisation has set specific guidelines for implementing EMS in organizations.

entities, impact of environment related issues requires to be adequately reported upon in the financial statements. The International Auditing Practices Committee (IPAC) had defined environmental matters in a financial audit and these as applicable to control of water pollution are:

- Initiatives to prevent/abate/remedy damage to the water sources. Such initiatives may be required by environmental laws and regulations or by contract, or they may be undertaken voluntarily.
- Consequences of violating environmental laws and regulations relating to prevention of water pollution.
- Consequences of environmental damage done to others or natural resources as a result of operation.
- Consequences of vicarious liability[3] imposed by law. An example could be the present owners being held liable for environmental damage caused by the previous owners by water pollution.

Based on these considerations, an audit opinion can be expressed on adequacy of compliance to the various national and adopted international financial regulations.

Audit process

Although every audit project is unique, the audit process is similar for most audit engagements and normally consists of three stages of planning for the audit, conducting field audit and audit reporting. This process is applicable for the audit of water pollution prevention also.

(a) Audit planning: audit planning is vital to the success of the audit undertaken. It is essential that the auditors spend adequate time in planning, as this will result in better identification of priority areas and potential problems and proper assignment of work. For conducting successful audit assignments, the auditor needs to know what has to be achieved (audit objectives), determine what procedures to be followed (audit methodology), and assign qualified staff for the conduct of audit (resource allocation).

(b) Gathering background information for environment audit: Some of the sources available for gathering background information about the audit entity are:

- Environmental policy of the audit entity.
- Annual report of the audit entity.
- Identification of major players in the control of water pollution.
- Identification of the applicable rules relating to water pollution.
- Administrative and financial delegation of powers of the audit entity.

[3] When one person is liable for the negligent actions of another person, even though the first person was not directly responsible for the damage.

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- Commitments given by the audit entity to the government planning agencies, in performance/outcome budgets.
- Media reports.
- Reports of independent evaluation agencies like Non Government Agencies (NGOs).
- Peer review reports**.**

(c) Setting audit scope: Audit scope will differ for each different kind of audit. For compliance audit, it will be restricted to checking compliance to applicable water pollution prevention acts/rules/laws. For performance audit, the scope could be evaluation of government policy/laws/programmes/strategies for the control of water pollution. Scope of performance audit could also be audit of government's programmes which pollute the water sources like mining, road-building, power plants etc. Audit scope in performance audit could also encompass audit of Environmental Management System (EMS) which has been put by an agency to reduce negative impacts of its operation. EMS with specific reference to control of sources of water pollution can also be examined as an audit issue. The scope of financial audit in relation to water pollution could be the to examine whether all costs relating to control of water pollution have been assessed accurately and disclosed in the financial statements.

(d) Setting audit objectives for environment audits: For compliance audit, audit objectives are derived from the various applicable water pollution control and prevention acts, rules and regulations. For performance audits, audit objectives need to be identified at the very beginning and can relate to areas like:

- Existence and adequacy of environment policies / laws /strategies relating to water pollution.
- Adequacy of data for evaluating impact on water pollution on environment.
- Identifications of risks caused by water pollution to health and environment.
- Allocation of responsibility amongst the various stakeholders involved in the control and prevention of water pollution.
- Adequacy of monitoring and evaluation of water pollution prevention and control laws.
- Adequacy of infrastructure and funding for prevention and control of water pollution.

For financial audit, audit objectives are derived from the respective applicable financial standards.

(e) Setting audit criteria for environment audits: Audit criteria help in assessing the performance of the entity with reference to certain laid down standards and performance benchmarks.

(i) Compliance audit: The purpose of the criteria for an audit of water pollution is to enable the auditor to establish whether the entity has conducted an activity, which has an impact

on the water pollution, in compliance with all applicable obligations defined in the water pollution control and prevention laws and rules. Sources of criteria could include:

- National laws – Acts of the legislature and any regulations, rules, orders etc., made under an Act and having the force of law. Those relating to water pollution are The Water (Prevention and Control of Pollution) Act, 1974, amended 1988, The Water (Prevention and Control of Pollution) Cess Act, 1977, amended 1992 and 2003, The Water (Prevention and Control of Pollution) Cess Rules, 1997 and The Water (Prevention and Control of Pollution) Rules, 1975
- International agreements – such as treaties with other jurisdictions and United Nations Conventions like Agenda 21 document of the World Commission on Sustainable Development of the United Nations Conference on Environment and Development, held in Rio in June 1992 and United Nations Environment Programme (UNEP) guidelines.
- Binding standards (including techniques, procedures, and qualitative criteria) issued by environmental monitoring/ regulatory agencies like CPCB/SPCB.
- Contracts.

(ii) Performance audit: The purpose of the criteria for performance audit on water pollution control and prevention is to enable the auditor to form an opinion on whether the entity has handled and managed to control and prevent water pollution in an effective, efficient and economical manner consistent with the applicable governmental policy/law/rules. Sources of criteria could include:

- Performance indicators of effectiveness, efficiency or economy that are prescribed by laws/rules on water pollution control and prevention, specified in the official governmental policy for the activity or otherwise mandatory on the entity.
- Generally accepted standards issued by a recognised body like United Nations Environment Programme, Agenda 21, other UN agencies.
- Performance indicators or measures used by similar entities or other entities engaged in control and prevention of water pollution.
- Academic literature on water pollution control and prevention.
- Outside experts working in the field of control and prevention of water pollution.

(iii) Financial audit: The purpose of criteria for the environmental aspects of a financial audit is to enable the auditor to establish whether the reporting entity has appropriately recognised, valued and reported environmental costs, liabilities (including contingent liabilities) and assets. Sources of criteria could include:

- Mandatory standards issued by authoritative standard-setting bodies like IFCAI.
- Standards issued by some other recognised bodies like CPCB/SPCB.
- International standards issued by recognised bodies.
- Guidance issued by relevant professional bodies.
- Academic literature.

(f) Conducting field audits: The purpose of fieldwork is to accumulate sufficient, competent, relevant and useful evidence to reach a conclusion about the performance of the entity with regard to prevention and control of water pollution and to support audit comments and recommendations. Audit evidence is sufficient when it is factual and would convince an informed person to reach the same conclusion. Evidence is competent if it consistently produces the same outcomes. It is relevant when it is directly related to the audit comments, recommendations and conclusions. Conducting field audit consists of the following steps:

- Conducting an opening meeting with the audit entity in order to explain audit objectives, criteria and methodology to be followed by audit.
- Collecting audit evidence through questionnaires, interviews, document scrutiny, photographs, direct testing of samples collected by audit etc.
- Conducting a closing meeting with the audit entity in order to share the preliminary audit findings**.**

(g) Post audit: The audit report communicates the results of the audit work and is thus, one of the most important parts of the audit process. If written and communicated well, the report can act as a positive change agent prompting management to take corrective action. The steps taken during post audit are:

- Preparing a draft report after analyzing the audit evidence and drawing audit conclusions against each audit objective.
- Conducting an exit conference with the audit entity to discuss the draft report.
- Audit entity's responses to the draft report.

Final report takes into account the audit entity's responses to audit conclusions and suggests recommendations.

Major compliance audit issues in prevention and control of water pollution

Compliance audit is a major part of any audit exercise and can form the first step in evaluating whether the acts/rules framed by the government are being adequately complied with. The areas listed below could be checked during compliance audit:

- Monitoring of achievement of targets set for control of pollution.
- Utilization of funds for control of water pollution.
- Extent of implementation of obligations under the international accords to which the country is a member.
- Contracts, if any, awarded for setting up water pollution control infrastructure, the usual audit checks on contracts may be performed.
- Targets in the inspection of water pollution control and prevention measures as per law/rule and whether shortfalls in inspection exist.
- Gaps in requirement of manpower and men in position to implement water pollution control measures and acts/legislation.

- Regulations for the issuance of licenses for the various establishments, checklist of conditions to be satisfied before issue of these licenses and cases of omissions and lapses in compliance.
- Strategy for the funding of water pollution control and prevention programs, the sources, conditions, sanctions, releases, payments, expenditure, maintenance of accounts etc.
- Role played by the pollution control boards, local bodies, state Governments, Non Governmental Organisations (NGOs) in dealing with water pollution as defined in the law/act.
- System of imposing punishments for the failures and non adherence of the rules/ regulations. Imposition, collection, crediting and adequacy of penalties.
- Extent of dues for recovery, efficiency of the system of imposition and recovery of penalty.
- Inspection/checking of established infrastructure for water pollution control and prevention, facilities established for prevention of pollution.

Checklist for performance audit of prevention and control of water pollution

The following checklist can be used for the performance audit of the main water pollution control programme, that is, NRCD and NLCP. In addition, any of the themes listed in the checklist below can also be used to carry performance audit related to that particular theme.

Objective	Main question
Theme 1: Existence of database and identification of risks	
1. Whether database of the sources and quantum of pollution of rivers/lakes/water sources has been created and had the risks to the river and health been assessed by the central government for the control of pollution.	1.1 Whether all causes/sources of pollution to the rivers/lakes/ground water/water sources has been identified.
	1.2 Whether the contribution of each source of pollution had been quantified.
	1.3 Whether risks to the health as a result of pollution to rivers/lakes/ground water/water sources been identified.
	1.4 Whether risks to the environment as a result of pollution to rivers/lakes/ground water/water sources been identified.
Theme 2: Effective planning for the control of water pollution	
2. Whether planning for control of	2.1 Whether planning for the control of pollution was based on accurate/ recent/reliable data.

pollution was effective and took into account data and identification of risks.	
	2.2 Whether planning for the control of pollution was based on assessment of risk.
	2.3 Whether planning for the control of pollution was based on assessment of requirement/ availability of funds.
Theme 3: Clear allocation of responsibility and accountability	
3. Whether various agencies involved in the control of pollution had been allocated clear responsibility and accountability for planning, implementation and monitoring.	3.1 Whether there was allocation of responsibility and accountability to agencies for planning.
	3.2 Whether there was clear delineation of responsibility and accountability to agencies implementing the programs for the control of pollution.
	3.3 Whether there was clear delineation of agencies for monitoring including monitoring after infrastructure for the control of pollution were created.
	3.4 Whether there was clear delineation of regulatory agencies for measurement and setting of standards for the control of water pollution.
Theme 4: Effective implementation of measures to control water pollution	
4. Whether implementation of the program for the control of pollution resulted in the creation of the infrastructure envisaged under the program and were these functioning as envisaged.	4.1 Whether infrastructure for the control of pollution created under the program for the control of pollution as envisaged.
	4.2 Whether infrastructure created for the control of pollution being maintained as envisaged.
Theme 5: Monitoring	
5. Whether monitoring of implementation of the program for the	5.1 Whether effective monitoring program implementation took place to ensure that the program objectives were met.
	5.2 Whether the infrastructure created under the program for the

control of pollution took place effectively and whether monitoring was undertaken to ensure operation of the pollution control measures after they were created.	control of pollution was effectively monitored to ensure that it met set/designed performance parameters.
	5.3 Whether regular and effective monitoring of pollution levels of rivers/lakes/ground water/water sources took place.
Theme 6: Utilisation of funds	
6. Whether funds were utilized in an efficient and economic manner to further the aim of reducing pollution from the rivers/lakes/ ground water/water sources.	6.1 Whether funds allocated to the states under the program for the control of pollution were released timely to the implementing agencies/states.
	6.2 Whether the funds were utilised economically and efficiently by the states.
Theme 7: Impact analysis	
7. Whether the program for the control of pollution had succeeded in reducing pollution levels in rivers/lakes/ground water/water sources and restoring water quality.	7.1 Whether there was improvement in water quality as a result of implementation of the program for the control of pollution.
	7.2 Whether external evaluation of the program for the control of pollution was done.
	7.3 Whether performance of the infrastructure created for the control of water pollution was as per set/designed performance parameters.

Schemes/Programmes of Other Departments Relating to Water Pollution

Water management programmes are also implemented by other ministries like Ministry of Rural Development and Ministry of Water Resources. Some of these are:

- Accelerated Rural Water Supply Programme under Ministry of Rural Development
- Accelerated Irrigation Benefit Programme (AIBP) under Ministry of Water Resources
- Integrated Watershed Development Programme (IWDP) under Ministry of Rural Development
- Drought Prone Areas programme (DPAP) under Ministry of Rural Development
- Desert Development Programme (DDP) under Ministry of Rural Development

Annexure 4

Issue analysis

Theme 1 Inventory of water resources and assessment of quality of water		
Objectives	Sub-objectives	Audit questions
1.Whether an inventory and quality of water in rivers, lakes and groundwater has been adequately assessed in India?	1.1 Whether a detailed inventory (survey and list) of rivers, lakes and ground water resources been made by the center and each of the states?	1.1.1. Whether a survey to identify all the rivers, lakes, groundwater, runoff streams, ponds and tanks been conducted by each state and by MoEF/MoWR?
		1.1.2. Has the survey resulted in the states and MoEF preparing an exhaustive list of all the rivers in the country and have the rivers been classified as major or minor rivers?
		1.1.3. Has the survey resulted in the states and MoEF preparing an exhaustive list of all the lakes in the country and have the lakes been classified as major or minor lakes?
		1.1.4. Whether assessment of ground water resources has been made district wise by all states and by MoEF/MoWR?
		1.1.5. Have the states/MoEF identified keystone[1]species associated with each river and lake in the country?

[1] A keystone species is a species "so critical to an ecosystem that its removal could potentially destroy the entire system.

	1.2 Whether all contaminants which affect quality of ground water and surface water have been identified?	1.2.1 Have water quality testing agencies in the state and in the center have identified existing pollution levels in terms of chemical indicators (fecal coliform, total coliform, dissolved oxygen and biological oxygen demand) and biological indicators (like diversity of species of fishes and aquatic organisms, zooplankton etc) in rivers, lakes and ground water?	1.2.1.1. Have water quality testing agencies in the state/MoEF/MoWR identified existing pollution levels in terms of chemical indicators like fecal coliform, total coliform, dissolved oxygen and biological oxygen demand in all the rivers and lakes in the state?
			1.2.1.2. Have water quality testing agencies in the state/MoEF/MoWR identified existing pollution levels in terms arsenic, nitrate, iron, fluoride and salinity in ground water in all the districts of the state?
			1.2.1.3. Have water quality testing agencies in the state/MoEF/MoWR identified existing pollution levels in terms of biodiversity indicators like diversity of species of fishes and aquatic organisms, zooplankton etc., for all the rivers and all the lakes in the country?
		1.2.2 Whether water quality testing agencies in states and MoEF/MoWR have identified and quantified nutrients as one of the contaminants that affect quality of water in rivers, lakes and in ground water?	
		1.2.3 Whether water quality testing agencies in states and MoEF/MoWR have identified and quantified erosion and sedimentation as one of the contaminants that affect quality of water in rivers and lakes?	

		1.2.4 Whether water quality testing agencies in states and MoEF/MoWR have identified and quantified water temperature as one of the contaminants that affect quality of water in rivers and lakes?
		1.2.5 Whether water quality testing agencies in states and MoEF/MoWR have identified and quantified acidification as one of the contaminants that affect quality of water in rivers, lakes and in ground water?
		1.2.6 Whether water quality testing agencies in states and MoEF/MoWR have identified and quantified salinity as one of the contaminants that affect quality of water in rivers, lakes and in ground water?
		1.2.7 Whether water quality testing agencies in states and MoEF/MoWR have identified and quantified pathogenic organisms (bacteria, protozoa and viruses) as one of the contaminants that affect quality of water in rivers, lakes and in ground water?
		1.2.8 Whether water quality testing agencies in the states/MoEF/MoWR have identified and quantified human produced chemicals and other toxins as one of the contaminants that affect quality of water in rivers, lakes and in ground water?
		1.2.9 Whether water quality testing agencies in the states/MoEF/MoWR have identified and quantified introduced species and other biological disruptions as one of the contaminants that affect quality of water in rivers, lakes and in ground water?
	1.3 Have human activities that affect quality of water of rivers, lakes and ground water been identified?	1.3.1 Whether the effect of agriculture on quality of rivers, lakes and ground water has been assessed and quantified by the states and by MoEF?
		1.3.2 Whether the effect of industrial activities like paper mills, pharmaceutical industry, chemical plants, distilleries, tanneries, oil refineries, sugar factories etc., on quality of river, lake and ground water has been assessed and quantified by the states and MoEF?
		1.3.3 Whether the effect of mining on quality of river, lake and ground water has been quantified by the MoEF and the states?
		1.3.4 Whether the effect of water system infrastructure like dams and irrigation systems on quality of river, lake and ground water has been assessed by the MoEF and states?

		1.3.5 Has over-exploitation of ground water been identified as one of the causes of ground water pollution by the states and MoEF?
		1.3.6 Whether the effect of uncontrolled disposal of human waste on quality of river, lake and ground water has been quantified by MoEF and the states?

Theme 2
Identification and dissemination of risks of polluted water to biodiversity and human health

Objectives	Sub-objectives	Audit questions
2. Have the risks of polluted water to health of living organisms and the impact on environment been adequately assessed and have these risks been effectively disseminated to the impacted target groups?	2.1 Whether risks to environment/ biodiversity as a result of pollution of rivers, lakes and ground water been assessed by the center and the states?	2.1.1 If wetland are associated with any river/lakes, have the risks to the wetland from pollution of river water/lake water been assessed by the states/MoEF?
		2.1.2 Have the states and the center identified the major aquatic species, birds, plants and animals facing risks due to pollution of rivers and lakes?
	2.2 Whether risks to human health as a result of pollution of rivers, lakes and ground water have been assessed?	2.2.1 Whether risks to human health from water borne diseases and water based diseases as a result of pollution of rivers and lakes been assessed by the MoEF and states?
		2.2.2 Whether risks to human health from high concentration of nutrients as a result of pollution of rivers, lakes and ground water have been assessed by the MoEF/ states?
		2.2.3 Whether risks to human health from arsenic, zinc, iron, mercury, copper, chromium, cadmium, lead, persistent organic pollutants, like dioxins, furans and polychlorinated biphenyls as a result of pollution of rivers, lakes and ground water been assessed by states/MoEF ?
	2.3 Whether risks of polluted river, lake and ground water have been effectively disseminated among the public?	2.3.1 Whether there is any mechanism put in place by the states for regular reporting of impacts on health from drinking of polluted waters of rivers, lakes and ground water?

		2.3.2 Whether there is any mechanism put in place by the states for regular dissemination of health risks from polluted waters of rivers, lakes and ground water to the public?
		2.3.3 Whether there is any mechanism put in place by the states and MoEF for dissemination of health risks from polluted hotspots to the public?

Theme 3
Adequacy of policy, legislation, programmes and institutions to address water pollution

Objectives	Sub-objectives	Audit questions	Audit sub-questions
3. Have adequate policies, legislations and programmes been formulated and effective institutions been put into place for pollution prevention, treatment and restoration of polluted water in rivers, lakes and ground water?	3.1 Is there an adequate policy governing pollution prevention, treatment and restoration of polluted water in rivers, lakes and ground water?	3.1.1 Has a separate policy been formulated by MoEF addressing pollution of rivers, lakes and ground water in India?	3.1.1.1 Has prevention of polluted water in rivers, lakes and ground water been addressed in any policy by MoEF?
			3.1.1.2 Has treatment of polluted water in rivers, lakes and ground water been addressed in any policy by MoEF?
			3.1.1.3 Has restoration of polluted water in rivers, lakes and ground water been addressed in any policy by MoEF?
			3.1.1.4 Do existing policies like National Water Policy and National Environment Policy 2006 address pollution prevention, treatment and restoration of polluted water in rivers, lakes and ground water?
	3.2 Are there legislations/acts governing pollution prevention, treatment and restoration of polluted water in rivers, lakes and ground water?	3.2.1 Have legislations/acts been enacted by the center and the states which address pollution prevention of rivers, lakes and ground water?	
		3.2.2 Have legislations/acts been enacted by the center and the states which address ecological restoration of rivers, lakes and ground water?	

	3.3 Have programmes for pollution prevention, treatment and restoration of polluted water in rivers, lakes and ground water have been introduced?	3.3.1 Whether programmes have been framed by the states and center for pollution prevention of rivers, lakes and ground water?	3.3.1.1 Whether programmes have been framed by the states and MoEF relating to source water protection for rivers/lakes/ground water?
			3.3.1.2 Whether programmes have been framed by states and MoEF for pollution prevention of rivers/lakes/ground water by industries by means of programmes for reducing/eliminating use of harmful solvents in the industrial processes, reducing the use of toxic chemicals in processes, reducing the overall water use in industrial processes and closing the water cycle within industries and eliminating waste water discharge?
			3.3.1.3 Have programmes been framed by the states and MoEF for tackling agricultural non point source pollution of rivers/lakes/ground water by measures like promoting the use of organic manure, crop rotation, mulching, composting, cover cropping, banning use of synthetic pesticides and fertilizers, integrated pest management, use of drip irrigation, contour farming and terracing?
		3.3.2 Whether programmes have been framed by the states and center for treatment of polluted waters of rivers, lakes and ground water?	
		3.3.3 Whether programmes have been framed by the states and center for ecological restoration of polluted rivers, lakes and ground water?	
	3.4 Has a nodal agency for issues relating to water pollution been identified at central and state level?	3.4.1 Has the MoEF been assigned the responsibility of being the nodal body for all issues relating to water pollution?	

		3.4.2 Have the state governments assigned responsibility to any department for water pollution issues?	
		3.4.3 Whether National Water Assessment Authority (NWAA) was setup at the central level?	3.4.3.1 Did regular and periodic meetings take place?
			3.4.3.2 Has it taken any steps for issuing directions and taking measures for investigations and research?
			3.4.3.3 Has it established and recognized any environmental laboratories and institutes?
			3.4.3.4 Has it collected and disseminated information and prepared manuals, codes or guides relating to the prevention, control and abatement of water pollution.
		3.4.4 Whether all the states have constituted Water Quality Review Committee (WQRC)?	3.4.4.1 Did regular and periodic meetings of WQRC take place?
			3.4.4.2 Did WQRC generate reliable water quality data?
			3.4.4.3 Did WQRC serve to facilitate activities for prevention and control of pollution of water bodies?
			3.4.4.4 Did WQRC take any steps to improve co-ordination between central and state agencies
	3.5 Whether agencies have been clearly identified for implementing and monitoring programmes for the prevention and control of surface water and ground water pollution?	3.5.1 Whether any nodal body at the state and central level has been allocated responsibility for overall implementation of programmes for the control of pollution of rivers, lakes and ground water?	

		3.5.2 Whether any nodal body at the state/MoEF and central level has been allocated responsibility for monitoring the levels of pollution of rivers, lakes and ground water?
	3.6 Have regulatory bodies been setup to fix water quality standards for ground water and surface water?	3.6.1 Whether regulatory bodies have been setup by MoEF to fix water quality standards for rivers?
		3.6.2 Whether regulatory bodies been setup by MoEF to fix water quality standards for lakes?
		3.6.3 Whether regulatory bodies been setup by MoEF to fix water quality standards for ground water?

Theme 4
Planning, implementation and monitoring of programmes addressing water pollution

Objectives	Sub-objectives	Audit questions	Audit sub-questions
4. Whether programmes for pollution prevention, treatment and restoration of polluted water in rivers, lakes and ground water have been planned, implemented and monitored efficiently and effectively?	4.1 Whether planning for the control of river pollution took place at a river basin level by MoEF and has MoEF adopted the principles of Integrated Water Resources Management?	4.1.1 Did the MoEF establish a long-term vision for each river basin with the involvement of all major stakeholders?	
		4.1.2 Did the MoEF endeavor for integration of policies, decisions and costs across sectoral interests relating to pollution such as industry, agriculture, urban development, navigation, fisheries management and conservation, including through poverty reduction strategies for each river basin?	
		4.1.3 Did the MoEF engage in strategic decision-making at the river basin scale which guided actions at sub-basin or local levels?	
		4.1.4 Did MoEF ensure active participation by all relevant stakeholders in well-informed and transparent planning and decision-making?	
		4.1.5 Did the MoEF ensure adequate investment by governments, private sector and civil society organisations in capacity building for river basin planning and participation processes?	
		4.1.6 Did MoEF build a solid foundation of knowledge of the river basin and the natural and socio-economic forces that influence it?	

	4.2 Whether planning for the control of lake pollution took place at a basin level and adopted the principles of Integrated Lake Resources Management?	4.2.1 Has MoEF adopted a basin approach while implementing programmes for removing pollution from lakes?	
		4.2.2 Did MoEF take into consideration both technological and non-technological interventions for removing pollution from lakes?	
		4.2.3 Did the MoEF ensure stakeholder involvement in the programme for removal of pollution from lakes?	
		4.2.4 Did the MoEF ensure long term commitment from different agencies like funding agencies, implementing agencies, monitoring agencies etc., involved in removal of pollution from lakes?	
		4.2.5 Did the MoEF engage in regular and sustained monitoring of the health of the lake basin?	
	4.3 Whether planning for current programmes for control of pollution of ground water and surface water was based on accurate/ recent/reliable pollution related data?	4.3.1 Whether planning by MoEF for current programme for control of pollution of rivers, National River Conservation Plan (NRCP) was based on accurate/ recent/reliable pollution related data?	4.3.1.1 Before initiation of NRCP, did MoEF conduct a survey to identify the most polluted rivers and stretches of rivers across the country?
			4.3.1.2 Before initiation of NRCP, did MoEF quantify pollution caused by sewage to all the rivers by all the towns/cities situated on banks of rivers?

			4.3.1.3 Before initiation of NRCP, did MoEF conduct any survey to quantify pollution caused by small, medium and large industries to all the rivers?
			4.3.1.4 Before initiation of NRCP, did MoEF conduct any survey to quantify pollution from distilleries, mines, oil refineries, tanneries, paper and pulp industries, sugar factories and other pollution causing industries to all the rivers across the country?
			4.3.1.5 Before initiation of NRCP, did MoEF conduct any survey to quantify pollution from agriculture runoff, pesticides and insecticides sprayed on crops to all the rivers across the country?
			4.3.1.6 Did the survey by MoEF finally lead MoEF to prepare a list of the most polluted rivers/river stretches in the country?
			4.3.1.7 Did MoEF select rivers for implementation of NRCP based only on the total pollution load?
			4.3.1.8 If all the cities and towns causing pollution to the river selected under NRCP and lying on its banks were not selected, were towns/cities that were causing more pollution given priority by MoEF?
			4.3.1.9 Did coastal towns get special attention by MoEF and was prioritization of coastal towns for selection done based on existence of mangroves, promotion of eco-tourism, cultural and religious importance of the place etc?

		4.3.2 Whether planning for current programmes for control of pollution of lakes, National Lake Conservation Plan (NLCP) by MoEF was based on accurate/ recent/reliable pollution related data?	4.3.2.1 Before initiation of NLCP, did MoEF conduct any survey to identify the most polluted lakes across the country?
			4.3.2.2 Before initiation of NRCP, did the states identify the most polluted lakes across the state?
			4.3.2.3 Before initiation of NLCP, did MoEF conduct any survey to quantify pollution caused by sewage to all the lakes by all the towns/cities situated on banks of rivers?
			4.3.2.4 Before initiation of NLCP, did MoEF conduct any survey to quantify pollution caused by small, medium and large industries to all the lakes?
			4.3.2.5 Before initiation of NLCP, did MoEF conduct any survey to quantify pollution from distilleries, mines, oil refineries, paper and pulp industries, sugar factories and other pollution causing industries to all the lakes across the country?
			4.3.2.6 Before initiation of NLCP, did MoEF conduct any survey to quantify pollution from agriculture runoff, pesticides and insecticides sprayed on crops to all the lakes?
			4.3.2.7 Did the survey by MoEF finally lead to MoEF preparing a list of the most polluted lakes in the country?

			4.3.2.8 Was a lake selected for NRCP by MoEF based on the total pollution load only?
			4.3.2.9 Did coastal towns get special attention by MoEF and was prioritization of coastal towns for selection done based on existence of mangroves, promotion of eco-tourism, cultural and religious importance of the place etc?
			4.3.2.10 Did the states undertake any programme for cleaning up lake water apart from the lakes selected under NLCP?
		4.3.3 Whether planning for current programmes for control of pollution of ground water by MoWR/states was based on accurate/ recent/reliable pollution related data?	4.3.3.1 Whether the state conducted tests of ground water all over the state to identify contaminants like arsenic, nitrate, salinity, acidification, presence of pathogens and fluoride?
			4.3.3.2 Did the state identify the major causes of pollution of ground water like industries, untreated sewage, agricultural runoffs, pollution from pesticides and accidental spill off from industries?
	4.4 Was planning for NRCP/NLCP integrated so that removal of entire pollution from the rivers and lakes identified as polluted could be addressed both in the short term and in the long term?	4.4.1 Were specific activities identified under NRCP by MoEF to tackle different sources of pollution of rivers?	4.4.1.1 Did the projects sanctioned for selected towns target the reduction of pollution from sewage?

			4.4.1.2 Did the projects sanctioned for selected towns the reduction of pollution from small, medium and large industries?
			4.4.1.3 Did the projects sanctioned for selected towns target the reduction of pollution from agriculture like fertilizer and pesticide runoff, nutrient overloading etc?
			4.4.1.4 Did the projects sanctioned for selected towns target the reduction of pollution from highly polluting industries like distilleries, leather tanneries?
		4.4.2 Were specific activities identified under NLCP by MoEF to tackle different sources of pollution of lakes?	4.4.2.1 Were specific projects identified by MoEF that would target the reduction of pollution from sewage?
			4.4.2.2 Were specific projects identified by MoEF that would target the reduction of pollution from small, medium and large industries?
			4.4.2.3 Were specific projects identified by MoEF that would target the reduction of pollution from agriculture like fertilizer and pesticide runoff, nutrient overloading etc?
			4.4.2.4 Were specific projects identified by MoEF that would target the reduction of pollution from highly polluting industries like distilleries, leather tanneries?

		4.4.3 Were specific activities identified under the programme for reduction of pollution of ground water pollution reduction by the states to tackle the major source of pollution of ground water?	4.4.3.1 Did the programme identify specific activities to reduce the source of contamination like closure of industry, treatment plant for industrial effluent, treatment plant for municipal waste water, closure of dumping site/landfill, reduction in use of pesticides/fertilizers and over-exploitation of ground water?
			4.4.3.2 Did the programme identify specific activities to treat the ground water before its use as a source of drinking water?
		4.4.4 Were specific activities identified under NLCP by MoEF to address ecological restoration of lakes?	4.4.4.1 Did the sanctioned projects also included projects for in-situ measures of lake cleaning like desilting, deweeding, bioremediation, aeration, nutrient reduction etc.?
			4.4.4.2 Whether programmes for the catchment area treatment include afforestation, silt traps, storm water drainage?
			4.4.4.3 Whether programmes for strengthening of bund, lake fencing, and shoreline development have been carried out?
			4.4.4.4 Has a lake boundary been identified by the State Government/Local administration through a government order?
			4.4.4.5 Has the Local administration/local body taken necessary steps to ensure removal of encroachments if any in the lake submergence area/lake boundary? Was commitment to this effect been furnished by the concerned state authorities before the consideration of the proposal?

			4.4.4.6 Has the project proponent considered notifying "Bioconservation zone" around the water body for better safeguard of the lake surroundings from the growing pollution potential and the encroachments?
		4.4.5 Did MoEF coordinate with other GOI ministries/ departments so that the health of the river could be addressed holistically during implementation of NRCP?	4.4.5.1 Was the matter of ensuring minimum flow in rivers taken up with the Ministry of Water Resources?
			4.4.5.2 Was a policy or regulatory framework for riparian & floodplain areas for rivers proposed by MoEF to the Ministry of Agriculture to contain pollution from agriculture?
		4.4.6 Was NRCP planned by MoEF to address increase in population and pollution of rivers in the near future?	4.4.6.1 Was NRCP planned by MoEF to address the reduction of full pollution load of selected lakes, as calculated currently?
			4.4.6.2 Was NRCP planned by MoEF to take into account the increase in population in the coming years?
			4.4.6.3 Was NRCP planned by MoEF to take into account the increase in pollution from all the sources in the coming years?
		4.4.7 Was NLCP planned by MoEF so that it could also address increase in population and pollution of lakes in the near future?	4.4.7.1 Was NLCP planned by MoEF to address the reduction of full pollution load of selected lakes, as calculated currently?

			4.4.7.2 Was NLCP planned by MoEF to take into account the increase in population in the coming years?
			4.4.7.3 Was NRCP planned by MoEF to take into account the increase in pollution from all the sources in the coming years?
	4.5 Whether planning for current programmes for control of pollution of rivers, lakes and ground water was based on assessment of requirement/ availability of funds?	4.5.1 Was an assessment made by MoEF regarding the requirement of funds for NRCP?	
		4.5.2 Was an assessment made by MoEF regarding the requirement of funds for NLCP?	
		4.5.3 Was an assessment made by the states regarding the requirement of funds for treatment of polluted ground water?	
	4.6 Did selection of specific projects for implementation under NRCP and NLCP take place as envisaged?	4.6.1 Did the DPRs submitted by the states under NRCP and NLCP help MoEF in selection of projects to be taken up under NRCP/NLCP?	4.6.1.1 Did MoEF ensure that the DPR prepared by the states only after exhaustive investigation and survey?
			4.6.1.2 Did MoEF send the DPR to experts for evaluation and were the comments of the experts taken into account while sanctioning the project?
			4.6.1.3 Did MoEF ensure that the DPRs met all the specified criteria?

			4.6.1.4 Were only DPRs for those projects approved by MoEF which met the specified criteria?
		4.6.2 Have the DPRs for NRCP and NLCP been evaluated and projects sanctioned by MoEF as per the prescribed guidelines?	4.6.2.1 Has any time limit fixed for preparation and submission of DPR by the states to MoEF and its approval by MoEF?
			4.6.2.2 Were the DPRs sent by the states within the prescribed time limit?
			4.6.2.3 Did the DPRs submitted by the state to MoEF need any revision and did delays happen due to need for revision?
		4.6.3 Did the DPR for projects under NRCP/NLCP sent by the states contain accurate cost estimates?	4.6.3.1 Were the detailed cost estimates prepared by the states, based on comprehensive survey and investigation, data collection and design criteria for the subheads specified by NRCD?
			4.6.3.2 Was it ensured by MoEF/states that there was no duplication of the projects under NRCP/NLCP and JNNURM/UID-SSMT?
	4.7 Whether planning for the control of pollution of ground water was based on selection of appropriate technology?	4.7.1 Whether planning for the control of pollution of ground water was based on selection of appropriate technology by the states?	4.7.1.1 Was specific technology/method identified for reduction of contaminants in ground water?
			4.7.1.2 Was this technology adopted by states after appropriate study which proved its efficacy?
			4.7.1.3 Was this technology adopted by states after cost benefit analysis?

			4.7.1.4 Was this technology suited to the local conditions?
	4.8 Did the implementation of NRCP/NLCP at central and state level take place as envisaged?	4.8.1 Were all the norms laid down for implementation of projects sanctioned under NRCP/NLCP followed by the states for execution of the projects?	4.8.1.1 Were CPHEEO/CPWD/ISS/local PWD specifications, which ever applicable, followed by the implementing agencies for the construction of works?
			4.8.1.2 Were norms of financial prudence and GFR/state laws/CVC guidelines followed by the implementing agencies for tendering and awarding contracts?
			4.8.1.3 Was human resources development by means of training and capacity building undertaken by the states/implementing agencies as prescribed in the DPR?
			4.8.1.4 Did the state government provide adequate staff for project implementation at the level of the state/implementing agency?
			4.8.1.5 Did the state government launch the public participation program of National Green Volunteers in the states?
		4.8.2 Were all the norms laid down for implementation of projects sanctioned for reduction of pollution of ground water followed by the states for execution of the programme?	4.8.2.1 Did implementation of projects by the implementing agency take place exactly according to performance parameters specified in the project document?

			4.8.2.2 Were CPHEEO/CPWD/ISS/local PWD specifications, which ever applicable, followed by the implementing agencies for the construction of works?
			4.8.2.3 Were norms of financial prudence and GFR/state laws/CVC guidelines followed by the implementing agencies for tendering and awarding contracts?
			4.8.2.4 Was manpower mobilization, training and capacity building undertaken by states/implementing agencies?
			4.8.2.5 Did training of staff for project implementation take place by the state and implementing agency?
			4.8.2.6 Did the state government provide adequate staff for project implementation at the level of the state/implementing agency?
		4.8.3 Did all the projects sanctioned by MoEF under NRCP/NLCP meet the operational and financial targets?	4.8.3.1 Did the implementing agencies submit progress reports to the state government/MoEF?
			4.8.3.2 Were completion reports evaluated by experts of MoEF?
			4.8.3.3 Did the implementing agency/state/MoEF assess the performance of the project, after it was completed on the basis of set targets/actual performance?

			4.8.3.4 Did the state government assess whether the projects were performing according to the performance benchmarks set out in the DPR, after a year?
			4.8.3.5 Did the state government assess whether the projects were performing according to performance benchmarks set out in the DPR, after of five years?
			4.8.3.6 Did the state government assess whether the projects were performing according to the performance benchmarks set out in the DPR, after ten years?
		4.8.4 Did the programme sanctioned for reduction of pollution of ground water by the state meet operational and financial targets?	4.8.4.1 Were there cases of time and cost overruns in the implementation of the project by the implementing agencies?
			4.8.4.2 Did the implementing agencies submit progress reports to the state government?
			4.8.4.3 Was the completion report submitted by implementing agency immediately after completion of the project?
			4.8.4.4 Were completion reports evaluated by experts of MoWR?
			4.8.4.5 Did the implementing agency/state/MoEF assess the performance of the project, after it was completed on the basis of set targets/actual performance?

			4.8.4.6 Were the deliverables under the programme, once completed, tested by the implementing agency and the state to assess whether they met the operational parameters defined in the programme objectives?
			4.8.4.7 Did the state government assess whether the deliverables under the programme were performing according to performance were benchmarks set out for it after a gap of one year?
			4.8.4.8 Did the state government assess whether the deliverables under the programme were performing according to performance benchmarks set out for after five years?
			4.8.4.9Did the state government assess whether the deliverables under the programme were performing according to performance benchmarks set out for it after ten years?
		4.8.5 Were the facilities created under NRCP for the control of pollution river water working as envisaged?	4.8.5.1 Was regular inspection of the facilities set up under GAP I, GAP II and NRCP taking place by the state/MoEF?
			4.8.5.2 Was any follow up action taken up by the states/MoEF on these inspection reports?
			4.8.5.3 Did the states/MoEF assess whether installed capacity of various facilities fully utilized?

			4.8.5.4 Were the created assets not able to perform as envisaged due to infrastructural problems like shortage of electricity, overloading/under loading of facilities and did the state government/implementing agency take any action to address these issues?
		4.8.6 Were the facilities created under NLCP for the control of pollution of lakes working as envisaged?	4.8.6.1 Was regular inspection of the facilities set up under NLCP taking place by the state/MoEF?
			4.8.6.2 Was any follow up action taken up by the states/MoEF on these inspection reports?
			4.8.6.3 Did the states/MoEF assess whether installed capacity of various facilities fully utilized?
			4.8.6.4 Were the created assets not able to perform as envisaged due to infrastructural problems like shortage of electricity, overloading/under loading of facilities and did the state government/implementing agency take any action to address these issues?
		4.8.7 Were the facilities created for the control of pollution of Ground water working as envisaged?	4.8.7.1 Was regular inspection of the facilities set up taking place by the state/implementing agency?
			4.8.7.2 Was any follow up action taken up by the states/implementing agency on these inspection reports?
			4.8.7.3 Did the states/implementing agencies assess whether installed capacity of various facilities fully utilized?

			4.8.7.4 Were the created assets not able to perform as envisaged due to infrastructural problems like shortage of electricity, overloading/under loading of facilities and did the state government/implementing agency take any action to address these issues?
	4.9 Was resource mobilization by the states taking place as envisaged?	4.9.1 Was resource mobilization by the states taking place as envisaged under NRCP/NLCP?	4.9.1.1 Did resource mobilization by the states undertaken occur from sources prescribed by NRCD?
			4.9.1.2 Did the state government delegate necessary powers to local bodies under the 74th amendment for generation of revenue through user charges, property tax etc.?
			4.9.1.3 Was the resource mobilized by the states used for O&M of the assets created?
	4.10 Were the assets for the control of pollution of ground water and surface water being maintained as envisaged?	4.10.1 Did the state government put in place a system for regular O&M of facilities created under NRCP/NLCP?	4.10.1.1 Was the responsibility for O&M of each asset created under NRCP allocated by the state to a body/agency at the state level?
			4.10.1.2 Was a schedule evolved by the state government/implementing agency for regular O&M of all the facilities was it adhered to by the implementing agency?
			4.10.1.3 If resource was not mobilized for O&M, was the state government meeting regular expenditure on O&M of the assets?

			4.10.1.4 Did preventive maintenance and periodic cleaning take place of the assets created take place by the state government/implementing agency?
			4.10.1.5 Did the state government provide sufficient and trained staff for undertaking regular O&M activities?
		4.10.2 Did the state government put in place a system for regular O&M of facilities created under the programme for reduction of pollution of ground water?	4.10.2.1 Was the responsibility for O&M of each asset created under the programme for reduction of pollution of ground water allocated to a body/agency at the state level by the state government?
			4.10.2.2 Was a schedule evolved by the state government/implementing agency for regular O&M of all the facilities was it adhered to by the implementing agency?
			4.10.2.3 If resource was not mobilized for O&M, was the state government meeting regular expenditure on O&M of the assets?
			4.10.2.4 Did preventive maintenance and periodic cleaning take place of the assets created take place by the state government/implementing agency?
			4.10.2.5 Did the state government provide sufficient and trained staff for undertaking regular O&M activities?

	4.11 Whether effective monitoring of implementation of ground water and surface water pollution control took place under NRCP/NLCP/ground water programmes to ensure that the programme objectives of NRCP/NLCP were met?	4.11.1 Was a system of monitoring of projects undertaken under NRCP established by MoEF?	4.11.1.1 Was there any reporting system prescribed by MoEF for the financial and physical progress of implementation of various activities both at the central and the state level?
			4.11.1.2 Were the prescribed reports/ returns submitted by implementing agencies to the state government and the MoEF?
			4.11.1.3 Was any programme for monitoring the improvements in the water body and the environment of the town developed and assigned to a well-equipped laboratory in a University or the SPCB by MoEF?
			4.11.1.4 Was Citizen's Monitoring Committee constituted by the state government in each town to review the progress and provide inputs for public participation and involvement?
			4.11.1.5 Was Water Quality Assessment Authority constituted and did it meet regularly?
		4.11.2 Was effective monitoring of NRCP done by the state?	4.11.2.1 Was regular monitoring of the water body and the environment done by Water Quality Monitoring Committee/any laboratory/SPCB?
			4.11.2.2 Was monthly review of progress conducted at the Chief Executive level of the nodal implementing agency?

			4.11.2.3 Was periodical review conducted by the Divisional Project Monitoring Cells?
			4.11.2.4 Was periodical review of progress conducted by a State Steering Committee chaired by the concerned Chief Secretaries?
			4.11.2.5 Was periodical review conducted by a High Powered Committee under the Chairmanship of Chief Minister?
			4.11.2.6 Was action taken on the inspections by the various levels of officers?
		4.11.3 Was adequate monitoring of NRCP done at the central level?	4.11.3.1 Were NRCD officials/ Project Director conducting regular review including frequent site visits?
			4.11.3.2 Was quarterly review of progress conducted by a Steering Committee headed by Secretary MoEF, Chief Secretaries of the concerned states and experts in public health engineering and other related areas?
			4.11.3.3 Was quarterly review of progress of scientific and technical aspects of the programme as well as the impact of works on the river water quality conducted by a Monitoring Committee headed by Member Environment, Planning Commission?
			4.11.3.4 Was quarterly review conducted by a Standing Committee headed by the Union Minister of Environment & Forests
			4.11.3.5 Was six monthly review of progress conducted by the National River Conservation Authority (NRCA) headed by Prime Minister

			4.11.3.6Was follow up action taken on the monitoring reports?
		4.11.4 Was a system of monitoring of projects undertaken under NLCP established by MoEF?	4.11.4.1 Was there any reporting system prescribed by MoEF for the financial and physical progress of implementation of various activities both at the central and the state level?
			4.11.4.2 Were the prescribed reports/ returns submitted by implementing agencies to the state government and the MoEF?
			4.11.4.3 Was the Inter-Departmental coordination committee constituted at by the state at the State Level to ensure effective monitoring of the programme?
			4.11.4.4 Was a steering Committee constituted by the state at the district level to ensure effective monitoring of the programme?
			4.11.4.5 Was a Lake specific Monitoring Committee constituted at the local level by the state government to ensure effective monitoring of the programme?
			4.11.4.6 Was a water quality monitoring plan prepared by the state government? If yes, did it include sampling and analysis of lake waster as per standard methods?
			4.11.4.7 Was an independent agency (having a laboratory accredited by MoEF or National accreditation Board for Testing and Calibration of Laboratories {NABL}) appointed by the Lake Development Authority of the state/implementing agency to make the water quality monitoring plan?

			4.11.4.8 Was a total Pesticides monitoring included by Lake Development Authority of the state/implementing agency in case there was a known source of industrial pollution to the lake or agricultural run-off from the lake catchment?
			4.11.4.9 Was a conservation plan prepared by Lake Development Authority of the state/implementing agency .to ensure that the water quality after implementation of the project was restored to the criteria for Designated Best Use classification for B class waters?
		4.11.5 Was a system of monitoring programme for reduction of pollution of ground water established by the state?	4.11.5.1 Was regular monitoring of the ground water and the environment done by Water Quality Monitoring Committee/any laboratory/SPCB?
			4.11.5.2 Was monthly review of progress conducted at the Chief Executive level of the nodal implementing agency?
			4.11.5.3 Was action taken on the inspections by the various levels of officers?
			4.11.5.4 Did regular sampling and testing of ground water take place by the state government to check its quality after implementation of the programme for reduction of ground water pollution?
	4.12 Whether the Common Effluent Treatment Plant scheme (CETP scheme) of MoEF was implemented as envisaged?	4.12.1 Was financial assistance to small scale industrial units provided by MoEF as per the defined criteria?	

		4.12.2 Did MoEF monitor whether the CETPs were constructed as per approved cost, time and design?
		4.12.3 Did MoEF monitor the performance parameters of the CETPs constructed to verify that treatment of pollution was taking place as per defined criteria?
	4.13 To assess whether MoEF has a mechanism to monitor and enforce compliance to effluent standards introduced by CPCB?	4.13.1 Whether CPCB/SPCB had a list of industries emitting the defined effluents, with their locations?
		4.13.2 Has CPCB/SPCB quantified the amount of effluents being generated and treated?
		4.13.3 Did MoEF/CPCB draw up a schedule of inspection of such industries?
		4.13.4 Were regular and timely testing of effluents done by CPCB/SPCB to monitor compliance to effluent standards?
		4.13.5 Whether action was taken on industries by MoEF which were not meeting the effluent standards?

Theme 5 Sustainability of monitoring measures to address water pollution			
Objectives	**Sub-objectives**	**Audit questions**	**Audit sub-questions**
5. Have adequate mechanisms been put in place by the government to sustain measures to tackle water pollution?	5.1 Have increased monitoring and data collection mechanisms to track pollution in surface water and ground water been put in place to evaluate effectiveness?	5.1.1 Is MoEF monitoring key water quality parameters and ecosystem indicators to track effectiveness of measures to combat water pollution?	5.1.1.1 Have watershed indicators been developed by MoEF for the major watersheds in India?
			5.1.1.2Have biological indicators been identified for each river and lake by MoEF?
			5.1.1.3 Have chemical and biological indicators defined by MoEF/MoWR for ground water?
			5.1.1.4 Whether Index of Biotic Integrity (IBI)[2] been developed by the states/MoEF for all the rivers/lakes in India?
			5.1.1.5 Whether Ground water quality indicators have been developed for ground water in India?
	5.2 Is reliable and verifiable data being collected to track surface water and ground water pollution?	5.2.1 Is water quality monitoring taking place regularly and effectively?	5.2.1.1 Have water monitoring stations established for each river and lake in India by MoEF?
			5.2.1.2 Are all water quality monitoring stations either classified by MoEF as baseline, trend or flux stations?

[2] IBI is a synthesis of diverse biological information which numerically depicts associations between human influence and biological attributes. It is composed of several biological attributes or 'metrics' that are sensitive to changes in biological integrity caused by human activities.

			5.2.1.3 Is the frequency of sampling of baseline stations by MoEF at least once a year?
			5.2.1.4 Is the frequency of sampling of trend stations by MoEF at least four times every year?
			5.2.1.5 Is the frequency of sampling of trend cum surveillance stations by MoEF at least four times every year?
			5.2.1.6 Are samples for testing of ground water quality collected by MoEF/MoWR only from dug out wells, tube wells and piezometers?
			5.2.1.7 Did MoEF ensure that laboratories are testing ground water samples regularly and as per procedure for compliance to quality standards?
			5.2.1.8 Is field staff trained by MoEF/MoWR at regular intervals to refresh and upgrade their skills?
		5.2.2 Have MoEF improved monitoring technology such as measuring water quality in real time and expanding the number and types of indicators that are monitored?	5.2.2.1 Is real time monitoring by MoEF taking place?
			5.2.2.2 Has MoEF regularly updated the number and quality of indicators being monitored over the years?
			5.2.2.3 Has MoEF ensured that the indicators are in consonance with international/UN standards?
		5.2.3 Have the links between water quality and water quantity been evaluated by MoWR/MoEF?	

	5.3 Have institutional mechanisms been put in place to sustain measures to prevent and control pollution of surface water and ground water?	5.3.1 Has the MoEF/MoWR promoted policies that take integrated approaches to water management?
		5.3.2 Has the MoEF developed water quality goals and corresponding parameters for each water body?
		5.3.3 Has the MoEF established enforceable water quality standards that protect human and ecosystem health?
		5.3.4 Has the MoEF set standards for agricultural practices and runoff pollutant levels and are these being monitored?
		5.3.5 Has the MoEF/MoWR established polluter pays and beneficiary pays principles in laws governing water pollution in India?
		5.3.6 Has MoEF/MoWR introduced the concept of water budgeting for each river and lake?

Theme 6
Managing funds for controlling water pollution

Objectives	Sub-objectives	Audit questions	Audit sub-questions
6. Whether funds were utlised in an efficient and economic manner to further the aim of reduction of water pollution?	6.1 Whether funds allocated to the states under programmes for the control of pollution of ground water and surface water were utilised to achieve the aim of reduction of pollution of surface water and ground water?	6.1.1 Was the funding pattern for projects sanctioned under NRCP as per the approved norms?	6.1.1.1 Did NRCD/GOI bear up to 70 per cent of the project cost?
			6.1.1.2 Did the states and the local bodies bear 30 per cent of the project cost?
			6.1.1.3 Was share of 10 per cent of the cost mobilized from the beneficiaries and stakeholders by means of additional development charges, waster and sewage cess; fair assessment, levy and recovery of property taxes; house connection charges; contribution from development funds of MPs/MLAs; fine on polluters; taxes from pilgrims/tourists/floating population visiting the town; donation from industry, business associations, voluntary agencies or any other mode by the state govt?
			6.1.1.4 Were funds raised by the local bodies/ states from agencies like HUDCO to contribute their share?
			6.1.1.5 In case of delays like wrong design or estimation, omission of terms, inflation etc which leads to cost overruns, was the extra expenditure met out of state funds?

			6.1.1.6 Were the cost estimates based on current local schedule of rates for standard items of works and market rates for propriety equipment?
			6.1.1.7 Was a provision of only 8 per cent allowed for project preparation, contingency, supervision etc on base cost estimate?
			6.1.1.8 In cases where centage was higher than 8 per cent, did the state government provide the balance?
			6.1.1.9 Were only costs of sewage conveyance from trunk sewer to STP, construction of STP, disposal of treated effluent and its utilization funded by the GOI and rest of the other components of sewerage infrastructure funded by the states?
			Were any expenditure incurred by the states before approval of DPR?
		6.1.2 Was the funding pattern for projects sanctioned under NLCP as per the approved norms?	6.1.2.1 Did NRCD/GOI bear up to 70 per cent of the project cost?
			6.1.2.2 Did the states and the local bodies bear 30 per cent of the project cost?
			6.1.2.3 Was share of 10 per cent of the cost mobilized from the beneficiaries and stakeholders by means of additional development charges, waster and sewage cess; fair assessment, levy and recovery of property taxes; house connection charges; contribution from development funds of MPs/MLAs; fine on polluters; taxes from pilgrims/tourists/floating population visiting the town; donation from industry, business associations, voluntary agencies or any other mode by the state govt?

			6.1.2.4 Were funds raised by the local bodies/ states from agencies like HUDCO to contribute their share?
			6.1.2.5 In case of delays like wrong design or estimation, omission of terms, inflation etc which leads to cost overruns, was the expenditure limited to the amount initially agreed to in the administrative approval and expenditure sanction order?
		6.1.3 Were funds utilised economically and efficiently by the agencies implementing the programme for reduction of pollution of ground water?	6.1.3.1 Were there cost and time overruns?
	6.2 Whether funds allocated to the states under programmes for the control of pollution of ground water and surface water were released timely to the implementing agencies/states?	6.2.1 Whether funds were released on time for projects undertaken under NRCP/NLCP?	6.2.1.1 Have milestones prescribed by MoEF for release of funds by NRCD/ State Government
			6.2.1.2 Did NRCD release its share immediately on completion of the prescribed milestone?
			6.2.1.3 Have State Government, local bodies and public released their matching share in time?
		6.2.2 Whether funds were released timely by the state government for the programme for reduction of pollution of ground water?	
		6.2.3 Was any financial assistance received for projects under NRCP from sources other than union and state government?	6.2.3.1 Were grants received from external funding agencies like World Bank, Japan Bank for International Cooperation etc?

			6.2.3.2 Were the conditions of loan/ grant fulfilled and expenditure incurred as per the norms/ rules by the state government/implementing agencies?
		6.2.4 Was any financial assistance received for projects under NLCP from sources other than union and state government?	6.2.4.1 Were grants received from external funding agencies like World Bank, Japan Bank for International Cooperation etc?
			6.2.4.2 Were the conditions of loan/ grant fulfilled and expenditure incurred as per the norms/ rules by the state government/implementing agencies?
	6.3 Whether release of funds was linked to quality of expenditure like monitoring reports, submission of UCs, performance benchmarks etc?	6.3.1 Were the funds sanctioned for projects under NRCP/NLCP utilised only for the intended purpose?	6.3.1.1 Were Statements of Expenditure and Utilisation Certificates furnished regularly by the implementing agency to the state government/MoEF?
			6.3.1.2 Were funds used for the intended purpose by the state government/implementing agency and not kept idle, diverted or misappropriated?
		6.3.2 Were the funds sanctioned for the programme for the reduction of pollution of ground water utilised only for the intended purpose?	6.3.2.1 Were Statements of Expenditure and Utilisation Certificates furnished regularly to the state government by the implementing agency?
			6.3.2.2 Were funds used for the intended purpose by the state government/implementing agency and not kept idle, diverted or misappropriated?

Theme 7
Impact of measures to control water pollution

Objectives	Sub-objectives	Audit questions	Audit sub-questions
7. Whether programmes for the control of pollution had succeeded in reducing pollution levels in ground water and surface water and restoring water quality?	7.1 Whether there was improvement in water quality of ground water/rives/lakes as a result of implementation of programmes for the control of water pollution?	7.1.1 Was there measurable improvement in trophic[3] status of lakes and rivers?	7.1.1.1 Did the states assess whether there was a measurable improvement in trophic status of rivers selected under NRCP?
			7.1.1.2 Did the the states assess whether there was a measurable improvement in trophic status of lakes taken up under NLCP?
		7.1.2 Did MoEF assess whether there was measureable improvement in ecological or biological indices of lakes, rivers and ground water?	
		7.1.3 Did MoEF assess whether there was measureable improvement in chemical, parameters of lakes, rivers and ground water?	
		7.1.4 Did MoEF assess whether there was demonstrable reduction of persistent organic pollutants (POPs) in the food chain?	
		7.1.5 Did MoEF assess whether there was improved hydrologic balance[4] due to increases in the number of hectares of trees as a result of reforestation programs?	
		7.1.6 Did MoEF assess the recovery of keystone species associated with lakes/rivers?	
	7.2 Whether external evaluation of programmes for the control of water pollution was done?	7.2.1 Was any comprehensive evaluation of NRCP undertaken by independent agencies appointed by the state government?	

[3] Trophic state is a measure of biological productivity of lakes/rivers, which simply is a measure of how many plants and animals are in the lake/river.
[4] An accounting of the inflow to, outflow from, and storage in a hydrologic unit such as a drainage basin, aquifer, soil zone, lake or reservoir.

		7.2.2 Was any comprehensive evaluation of NLCP undertaken by independent agencies appointed by MoEF?
		7.2.3 Was there comprehensive evaluation of ground water pollution reduction programmes by the state government/MoWR?