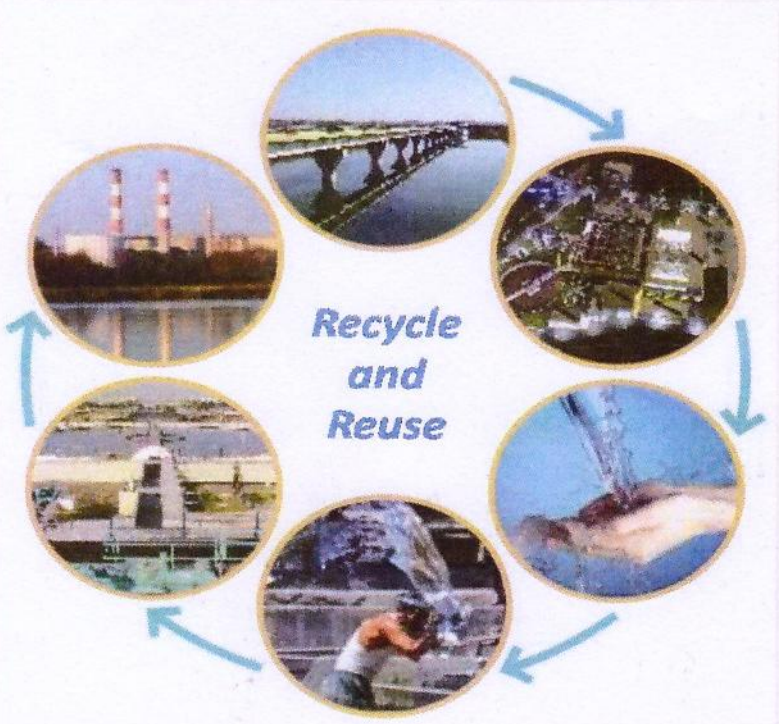
एक कदम स्वच्छता की ओर

Atal Mission for Rejuvenation and Urban Transformation

WASTE WATER RECYCLE & REUSE POLICY



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GOVERNMENT OF CHHATTISGARH

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1. PREAMBLE

1.1 Introduction

Chhattisgarh is urbanizing at on accelerated pace, as the urban population increased by 31.14% between 2001 and 2011 (on par with India's urban growth rate of 32.15%). As per Census 2011, around 23.24% (59 .37 lakh people) of Chhattisgarh total population lived in urban areas, and current growth trends indicate that this number is expected to grow exponentially in the upcoming years. The number of Urban Local Bodies (ULBs) increased from 75 in 2000, to 168 in 2015 with addition of 93 new ULBs or a 124% increase. It is incumbent on these ULBs to implement and manage urban services including safe sanitation, recycle and reuse of waste water, faecal sludge and septage management .

Further as per Census 2011, mere 9.1% urban Households in Chhattisgarh were connected with a piped sewage network, On the other hand, more than half the urban population (50.71%) relied on on-site sanitation systems such as Septic Tanks (48.6%), Pit latrines (1.15%) and other systems (0.96%) for collection of faecal sludge and wastewater. This clearly indicates that on-site sanitation far supersedes piped sewage system and is the primary sanitation system in Chhattisgarh. Chhattisgarh has an ambitious target of constructing 3.52 lakh toilets by 2017 in urban areas under SBM, and it is expected to eliminate the undignified practice of open defecation, it addresses only the first component of the sanitation value chain. The pertinent issue of proper collection, conveyance, treatment and disposal of the sewage is likely to remain unaddressed.

1.2 Recycling and Reuse of Sewage

Some of the global observations in the context of waste water recycled and reuse are given below.

- "No higher quality water should be used for a purpose that can tolerate a lower grade" UN Council Resolution-1958
- "Many of the wars this century were about oil, but those of the next century will be over water."- Ismail Serageldin, Vice President, World Bank-1995
- **Question**

  Technology is good for comfortable life; it is also blamed for environmental problems; How do you link Technology & Environmental Conservation?

  Answer

  Agrarian economy must reuse water safely.

- "Water should not be judged by its history, but by its quality." Dr. Lucas van Vuuren, one of the pioneers of the Windhoek water reclamation system.

1.3 Overview of Current Practices in India

In India treated sewage is being used for a variety of applications such as (a) Farm Forestry, (b) Horticulture, (c) Toilet flushing, (d) Industrial use as in non-human contact cooling towers, (e) Fish culture and (f) Indirect and incidental uses. These are briefly mentioned hereunder.

a) The CMWSSB has been promoting the growth of farm forestry in Chennai from the 1980s and this helps to promote a micro climate in a city environment.

b) The Indian Agricultural Research Institute, Karnal has carried out research work on sewage farming and has recommended an irrigation method for sewage fed tree plantations.

c) The University of Agricultural Sciences, Dharwad, Karnataka has found that sewage could be used in producing vermicompost to be used for tree plantations provided its details with respect to composition of toxic substances are known.

d) Chandigarh is using treated sewage for horticulture needs of its green areas.

e) Delhi has put in place planned reuse of treated sewage for designated institutional centers.

f) The Government of Karnataka has issued an official directive to take all necessary steps to ensure that only tertiary treated sewage is used for non-potable purposes, like all gardening including parks, resorts and golf course. The Bangalore Water Supply and Sewerage Board will make all arrangements including construction of filling points, installation of vending machines at STP for supply of tertiary treated sewage in multiples of thousand litres and that non-compliance of the directions attracts penal provisions in accordance with section 15 and section 17 of the Environment (Protection) Act 1986.

g) In major metropolitan cities like Delhi, Mumbai, Bangalore and Chennai treated grey water is being used for toilet flushing in some of the major condominiums and high rise apartment complexes on a pilot scale. Care should be taken to ensure that Ultra

filtration membranes are used in the treatment process to safeguard against chances of waterborne diseases.

h) Secondary treated sewage is purchased and treated for use in cooling water makeup in the industrial sector from as early as 1991 in major industries like Madras Refineries, Madras Fertilizers, GMR Vasavi Power plant in Chennai as also in Rashtriya Chemicals and Fertilizers in Maharashtra and most recently in the Indira Gandhi International Airport in Delhi and Mumbai International Airport.

i) The UNDP conducted a detailed study in the 1970s and identified a sand basin on the coast of Bay of Bengal, where secondary treated sewage of the Chennai city can be infiltrated through percolation ponds and extracted for specific industrial use in the nearby petro-chemical complex. However, this project has not been implemented.

j) The Bengaluru city is facing a freshwater crisis and it has been considered to study a pilot model of the Singapore NEWater for indirect augmentation of water by advanced treatment of secondary facilities. At present, this project proposal is a statement of capability to formulate a technically feasible and financially viable project and of course the biggest challenge of going through and obtaining public acceptance is understandably a long drawn out process.

k) 130 mld of water reuse facility for power plant from Bhandewadi STP of Nagpur Municipal Corporation on 30 years of DBFOT with revenue of Rs. 15 core /year to NMC is one of the largest & revenue surplus model of water reuse.

1.4 Overview of Current Practices in the World

The use of treated sewage elsewhere in the world is listed herein.

a) Agriculture: It is used for irrigation in certain places in Africa, Israel, Mexico and Kuwait.

b) Farm Forestry: Treated sewage is used for watering urban forests, public gardens, trees, shrubs and grassed areas along roadways in certain places in Egypt, Abu Dhabi, Woodburn in Oregon USA. It is also used for timber plantation in Widebay Water Corporation in Queensland, Australia. It is used for alfalfa plantation in Albirch Palestine.

c) Horticulture: Certain places in Elpaso in Texas, Durbin Creek in Western California in USA.

d) Toilet flushing: Certain locations in Chiba Prefecture, Kobe City, and Fukuoka City and Tokyo Metropolitan in Japan.

e) Industrial and commercial: essentially used for cooling purposes in Sakaihama Treated Wastewater Supply Project, Japan, Bethlehem Steel mills, USA. Sewage reclaimed as high quality water is supplied to Mondi Paper Mill and SAPREF Refinery in Durban, South Africa. Landscape and golf course irrigation in Hawai,

f) Fish culture: It is used in fish hatcheries / fish ponds in Vietnam and in Bangladesh

g) Groundwater recharge: Orlando and Orange County Florida, Orange County California, Phoenix (Arizona), Santa Rosa (California) Recharge Project all in USA.

h) Indirect recharge of impoundments: Restoration of Meguro River in Japan, NEWater project in Singapore, Windhoek in Namibia, Berlin in Germany

i) Other uses: Coach cleaning, subway washing and water for building construction is being practised in Jungnang, Nanji, Tancheon, Seonam in Seoul and treated sewage sprinkled on the water retentive pavement that can store water inside paving material at Shiodome Land Readjustment District (Shio Site) in Tokyo and this reduces the surface temperature.

1.5 Need for State Waste Water Recycle and Reuse Policy

Chattisgarh being the mineral rich state has many core-sector industries like Steel plants, power plants and cement plants etc. These industries need huge quantum of water for their operations and maintenance and at present are using fresh water from perennial and ground water source and putting stress on these sources of water for potable requirement.

Therefore, it is imperative that urban authorities formulate effective policies and action plans for the planning and management of onsite water reuse policy

2. KEY OBJECTIVES

To overcome the shortage of water, for different purposes, use of potable water should mostly be for drinking purposes and re-use of water of a certain quality after proper treatment of water for non-drinking purposes and last but not the least scientifically disposal of the remaining waste water is the object behind formulating this policy.

(i) To achieve 100 percent sanitized cities

(ii) To improve water supply service focusing on customer satisfaction, coverage, frequency and reliability

(iii) Supply of potable water requires large amount of money but unfortunately it is used for non-drinking purposes.

(iv) Pure water is available in scarce quantity whether from ponds, tube wells etc and the shortage becomes acute during summer therefore reuse of treated sewage can provide incremental supply for non – potable applications and thus reduce need for augmenting supplies. In other words, water reuse promotes environmental sustainability by reducing burden on already stressed basin and aquifers and preventing their depletion.

(v) Sewage is disposed off unscientifically which leads to health hazards and pollutes ground water as well. Therefore water reuse results in lower volume of sewage discharge leading to reduction in environmental costs and health hazards.

(vi) Water reuse ensures resource conservation & preservation of sensitive eco-system and reducing pollutant loading.

All cities and towns of Chhattisgarh become totally sanitized, healthy and livable and ensure sustain good public health and environmental outcomes for all their citizens with a special focus on hygienic and affordable sewage facilities for the urban poor and women. All urban dwellers will have access to and use safe and hygienic sewage facilities and arrangements so that no one defecates in the open.

3. POLICY VISION

"Water Reuse is for co-existence of Domestic, Agriculture and Industrial sectors and for the growth of state and to avoid any conflict with each other for precious water resources".

3.1 Policy Goals

The primary aim of this policy is to ensure recycled and reuse of waste water as a central component in delivery of safe sanitation service in Chhattisgarh by creating a favourable environment for its effective implementation across all urban areas in a pragmatic, sustainable and participatory manner. The Policy will strive for:

- **Ensuring timely collection and treatment**

  Encouraging a shift towards scheduled desludging of septic tanks, pit latrines. etc. (periodically within 2 - 3 years) in all ULBs, while generating awareness and incentivizing households for the same. All collected faecal sludge should reach the treatment facility (without arbitrary and illegal disposal) and treated as per standards for safe disposal/reuse. Greater emphasis on technologies that consume very less power, use bio- logical processes should be given.

- **Ensuring optimum resource recovery**

  The treatment facility would maximize reuse of treated wastewater and sludge for various public and commercial purposes. This will contribute in-part towards cost recovery and even profit generation.

- **Greater Awareness and Active Participation**

  The residents would become active participants in the implementation and monitoring process, while all stakeholders would be sensitized and sufficiently made aware of the processes, procedures, components etc. of waste water recycle and reuse. Multiple channels (digital, broadcast, print, physical, etc.) for communication, learning and stakeholder engagement would be used.

- **Creating an enabling institutional and regulatory framework**

  The mandate, roles & responsibilities of all government departments and other stakeholders would be clearly defined and necessary steps taken for augmenting their capacities. Appropriate institutions, management and monitoring systems and standard procedures would be put in place at state and city level that incrementally strengthen waste water recycle and reuse operations in urban areas. The institutional framework would also enable an environment conducive for greater participation of private sector.

- **Innovation in service delivery and management**

  Improving service delivery, management and monitoring by introducing technological interventions such as I.T. enabled single window system, GIS / GPS aided planning and operations , custom MIS modules, etc. and greater emphasis on private participation in service delivery .

- **A strong partnership network**

  Multi-sector partnership of government agencies/ULBs with other public private organizations, groups and institutions for collaborating on knowledge improvement, fun ding , improved services, business opportunities, research and innovation, stakeholder

engagement, peer learning, etc. Formal and Informal platforms would be established for networking among various ULBs, service providers, associations, etc.

- **Expected Outcomes.**

  While the goals set out broad aspirations and intention of the policy, the expected outcomes are tangible end results if the goals are achieved.

  - New opportunities and avenues emerges where waste water is recycled and reused based on cost recovery and profit generating business models
  - Augmented capacities across institutions (State and city -level) that could possibly be replicated in other sectors

3.2 Strategic Policy Actions

3.2.1 IEC & Stakeholder Engagement

A rigorous awareness campaign should be undertaken to educate various stakeholders about different benefits of waste water recycle and reuse. ULBs can be tasked with spreading awareness among residents about govt. schemes, scheduled desludging, various incentives, good sanitation practices and monitoring of waste water recycle and reuse operations. This would be done with the involvement of ward councilors, community leaders, local registered groups, etc. State government can identify institutions and agencies to undertake awareness and communication operations at state and ULB level. Multiple channels may be used for the same - such as media (social, print, broad cast, etc.), advertising, flyers/ brochures/ booklets, workshops, road shows, rallies, announcements, meetings, etc.

- **Public education**

  Education is the key to overcoming public fears about a reuse system, particularly fears that relate to public health and water quality. A broad, in-depth public relations programme and a demonstration project are especially helpful when the reuse project is the first of its kind in the state.

3.2.2 Institutional and Regulatory Framework

A dedicated waste water recycle and reuse cell & committee can be set-up within UADD, Govt. of Chhattisgarh and further State - level waste water recycle and reuse rules and guidelines would be formulated that will include Standard Operating Procedures and training material for ULBs, Manuals for service providers, models drawings/DPRs/Bid

Documents, model waste water recycle and reuse rules for ULBs, technological options, etc. All informal waste water recycle and reuse operations would be formalized via appropriate channels, such as licensing by ULBs, formal trainings, access to formal finance, etc. Roles of various stakeholders including State government departments, ULBs, residents, service providers and private sector partners shall be clearly defined for reducing ambiguities and overlap of functions.

- **LEGAL ISSUES**

  The legal rights over the sale and revenue issues of reclaimed water are an emerging issue and that will be addressed separately by state government. However, ULB has right to reuse, recycle & resale the effluents, sewage, septage water to the end users (within or outside the city limits).

3.2.3 Legislation and Guidance Documents

The Government Sewage and Waste water Policy should be read in accordance with the most current versions of the following Legislation and document:

(i) Latest Manual on Sewerage and Sewage Treatment Systems, 2013
(ii) Environmental (Protection) Act, 1986
(iii) The Environment (Protection) rules,1986
(iv) The water (Prevention and control of pollution) Act,1974
(v) The water (Prevention and control of pollution) cess, Act,1974
(vi) The water (Prevention and control of pollution) Amended rules, 2011
(vii) The water (Prevention and control of pollution) cess rules, 1978
(viii) The water (Prevention and control of pollution) Rules, 1975
(ix) National Urban Sanitation Policy 2008
(x) National Water Policy 2012
(xi) Chhattisgarh Municipalities Act
(xii) Quality standards suggested by Central Pollution Control Board and Chhattisgarh State Pollution Control Board.
(xiii) Standards set by Bureau of Indian Standards (BIS)
(xiv) Effluent Quality guidelines for health protection measures in aquaculture use of waste water
(xv) Quality guidelines for health protection in using human wastes for aquaculture.
(xvi) Service Level Benchmarks Fixed By Ministry of Urban Development

3.2.4 Partnership Building

A strong network of partners in various sectors and of various backgrounds would be established, including renowned specialists/ experts, Corporates, Research/Academic Institutions , Civil Societies/ NGOs, private service providers, Donor agencies, Bilateral/ Multilateral agencies, etc. for bolstering capacities and knowledge in the sector. There is an increased need to encourage greater private participation in service delivery and financing of waste water recycle and reuse activities by creating an enabling regulatory environment and creating opportunities.

3.2.5 Funding and Financing

New and Innovative modalities for financing waste water recycle and reuse would be explored, which may include - PPP, CSR funds, Guarantee funds, Donor grants, Water and Sanitation Pool Fund (WSPF) etc. Greater emphasis would be given to waste water recycle and reuse models that ensure cost recovery and profit generation, especially through reuse of treated end product (waste water and sludge). ULBs would be empowered to collect service charges, tipping fees, sanitation taxes, etc. in order to maintain a steady revenue stream for O&M of waste water recycle and reuse assets and services. Synergy would be ensured between funds and goals of various Central government programs such as AMRUT, SBM, Smart Cities, etc.

3.2.6 Implementation Support and Service Delivery

State government will play a facilitating role in implementing of waste water recycle and reuse at state and city level. Necessary support will be given to ULBs for timely preparation and implementation of city level waste water recycle and reuse plans, strategy and rules. A system of incentives and penalties may be devised to encourage greater participation among residents, compliance by service providers and better performance of ULBs.

3.2.7 Monitoring and Evaluation

The state will evaluate waste water recycle and reuse operations at city level through dedicated service level benchmarks for all ULBs. A performance based system of incentives and penalties may be devised for rewarding high performing ULBs and encouraging ULBs with poor performance to improve. Local Communities and Registered Groups would be

involved in monitoring and compliance of waste water recycle and reuse operations, with encouragement by the ward councilors.

3.2.8 Capacity Building and Training

Capacity assessment should be carried out across state government departments and ULBs, and necessary measures to be taken to fill the gaps. External agencies would be engaged and proper modules would be prepared for training government officials, service providers, ULBs, etc. on relevant waste water recycle and reuse practices, technologies, operating procedures, techniques, financial assessment, etc.

4. Annexure

4.1 Regulatory Framework

The existing national and state level framework in terms of legislation, policy, programs, standards, guidelines etc. has been presented below. This provides a brief background on the current regulatory regime, important considerations and priorities, setting a context for this policy.

Legislations	Brief
Environment (Protection) Act, 1986 and the Water (prevention and Control of Pollution) Act, 1974	This Act, applies in principle to every establishment, agency, or individual discharging any pollutant into the environment. 'Pollutant' includes treated or untreated sewage. It provides a framework for control of effluent, wastewater and septage discharge.
74th Constitutional Amendment Act, 1992	Responsibility for the planning and delivery of urban services, including sanitation, lies with urban local bodies under local municipal laws and the 74th Constitutional Amendment Act, 1992
Municipal Solid Waste (MSW) Rules, 2016	Disposal and treatment of faecal sludge and septage, before or after processing, at landfills and for use as compost; and final and safe disposal of post-processed residual faecal sludge and septage to prevent contamination of ground water, surface water and ambient air;
The Employment of Manual Scavengers and Construction of Dry Latrines (Prohibition) Act, 1993	Ban on dry latrines, i.e., latrines with no water-seal or flushing mechanism, and the employment of persons for manually carrying human excreta.
Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013	It intends to empower "District level survey committee" & "State level Survey committee" towards the complete abolition of manual scavenging without certain obligations. "Hazardous cleaning" in relation to sewers and septic tanks is banned and that manual cleaning of sewers and septic tanks, if necessary, may be carried out only in very controlled situation, with adequate safety precautions, and in accordance with specific rules and protocols for the purpose.

Policies, Mission & Guidelines	Brief
National Urban Sanitation Policy, 2008	It intends to make all Indian cities and towns become totally sanitized, healthy and livable and ensure and sustain good public health and environmental outcomes for all their citizens with a special focus on hygienic and affordable sanitation facilities for the urban poor and women.
Chhattisgarh Environment Policy	Encouraging optimal use and recycling of wastewater; Use of bio-fertiliser for organic farming, generating fuel from biomass; Decentralizing the monitoring of environmental compliance by empowering local governments and communities;
Guidelines for Swachh Bharat Mission (Urban), 2014	It intends to eliminate open defecation, eradication of Manual Scavenging and to effect behavioural change regarding healthy sanitation practices in Urban areas.
National Mission on Sustainable Habitat (NMSH), 2010	National Mission on Sustainable Habitat (MNSH) is a component of action plan for climate change, focus on waste recycling.
Atal Mission for Rejuvenation and Urban Transformation	Improving basic services (water supply, sewerage & septage, urban transport) in cities through reforms in urban governance, augmentation of basic infrastructure and establishing a sound institutional framework for effective delivery, through an incremental approach.

Standards, Manuals & Advisories	Brief
National Building Code of India (NBC), 1983 & 2005	Code governs the design, installation and maintenance of toilets, septic tanks, and sewers. It gives an overview of size of drainage, sewerage including design of septic tanks, sewers, toilets, and other sanitation devices. The NBC also suggests that use of septic tanks without follow-up treatment is not permitted
Manual on Sewerage and Sewage Treatment, CPHEEO in collaboration with JICA, 2013	Guidelines for – design, planning and providing advice on the selection of technology options for urban sanitation (for on-site, off-site sanitation and both decentralized & centralized treatment options); Operation and Maintenance of sanitation systems & resource mobilization; management, administration, project delivery, etc.
Advisory on Septage Management in Indian Cities, MoUD, 2013	Outlines the contents and steps of developing a septage management sub-plan (SMP) as a part of the city sanitation plans (CSP) being prepared and implemented by cities which supplement the NUSP Septage here refers not only faecal sludge from septic tanks but also from pit latrines and on-site toilets.
Primer on Faecal Sludge and Septage Management, MoUD, 2016	Supplementary document to the Advisory on septage Management in Indian Cities, 2013. Stresses the need for State-wide operative guidelines, City level toolkits, operational manual, management/ financing/ operating WWRR, and WWRR plan for the city.

The policy document tries to build upon the existing legislative, policy and regulatory framework, and amalgamates it into a single cohesive document, that would guide Waste Water Recycle and Reuse implementation in the urban areas of Chhattisgarh.

4.2 Role of Stakeholders

Agency	Roles and Responsibilities
Urban Development Department	• Overall supervision and coordination of Waste Water Recycle and Reuse (WWRR) operations in Chhattigarh. • Formulating a roadmap for realisation of the State WWRR Policy
State Urban Development Agency	• Nodal Agency for managing WWRR operations for Chhattisgarh • Responsible for preparation of the State WWRR Guidelines, Standard Operating Procedures, User Manuals, Model WWRR rules for ULBs, drafting state acts and policies related to urban sanitation and WWRR, etc. • Coordinating networking among various stakeholders • Responsible for building partnership
Chhattisgarh Environment Conservation Board	• Enforce compliance of the relevant environmental laws and rules for WWRR through inspections, environmental monitoring, etc. • Address grievance related to environmental hazards due to WWRR operations • Assist in formulation of relevant advisories, guidelines, manuals, etc. to ensure environmental compliance for WWRR operations.
Social Welfare Department	• Ensuring compliance of provisions under the "The prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013"
Other State Government Departments	• Sufficiently incorporating the provision of this policy in their projects, schemes, programs, policies, plans, guidelines, activities, etc. • Provide necessary sectoral inputs towards State WWRR strategy, rules, acts guidelines, etc.

Agency	Roles and Responsibilities
Service Providers- Masons, Designers	• Acquire requisite skills through training and capacity building to design and construct quality WWRR as per ISO norms
Private Sector	• Active participation in service delivery of WWRR at state and city level
Financial Institutions	• Possible source of finances for creation of community or city level assets, treatment plants, transfer stations, etc.
Multilateral, Bilateral and other International Institutions	• Integrate provision of WWRR Policy into the programs, projects and activities
Academic, Research and Civil Society organisations	• Undertake primary research to further safe and sustainable WWRR • Develop models for safe and sustainable delivery of WWRR services to all • Support implementation of WWRR activities at ground level • Raise awareness and sensitization on the importance of WWRR among the general population • Provide monitoring support to the ULB on any unsafe practices that impact effective WWRR • Set up regular interaction with the ULB to discuss operational issues and be part of the solution.