

Environmental Assessment Report

Summary Initial Environmental Examination
Project Number: 32300
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India: Kerala Sustainable Urban Development Project

Prepared by Local Self Government (Urban) Department, Government of Kerala for the Asian Development Bank (ADB).

The summary initial environmental examination is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature.

SUMMARY INITIAL ENVIRONMENTAL EXAMINATION

A. Introduction

1. In compliance with the Asian Development Bank's (ADB's) environmental requirements, an initial environmental examination (IEE) was conducted for the Kerala Sustainable Urban Development Project (the Project) which covers the towns of Thiruvananthapuram, Kollam, Kochi, Thrissur and Kozhikode in Kerala, India. The Project is classified as category B in accordance with Asian Development Bank's (ADB) *Environmental Assessment Guidelines (2003)*. Project subcomponents to be financed by ADB showed no significant environmental impacts. Project activities that may have a marginal negative effect, and the main mitigation measures proposed are summarized here. Overall the project is expected to result in substantial environmental benefits. The objective of the project is to provide sustainable growth and poverty reduction through the provision of urban infrastructure services and the promotion of good urban governance to local bodies in Kerala. Copies of town IEEs and other environmental documents were provided to the Kerala State Pollution Control Board (KSPCB) for review and endorsement. In accordance with national law, clearance from KSPCB will be obtained for detailed design prior to starting works for individual components.

B. Description of Project Components

2. The main components to be financed by ADB include (i) Urban Infrastructure Improvement and Services Improvement; (ii) Urban Community Upgrading, comprising small-scale community infrastructure and services and livelihood promotion (iii) the Local Government Infrastructure Development and (iv) Support for Capacity Building and Project Management. The Urban Infrastructure Improvement component will comprise rehabilitation, improvement and expansion of urban water supply, sewerage and sanitation, urban drainage, solid waste management and urban roads and transportation services.

3. The water supply subcomponent will primarily include (i) improvements to the existing water treatment plants and replacement of existing transmission mains and pumping machinery in Kollam, (ii) rehabilitation of the trunk water transmission pipeline in Kochi, and replacement of existing transmission mains and pumping machinery in Thrissur, (iii) a leak detection program with rehabilitation of the existing distribution systems in Kochi, Kollam, and Thrissur. The Sewerage and Sanitation component will support the rehabilitation and expansion of sewerage networks and the construction of 5 new Fluidized Aerobic Bed-type sewage treatment plants in Thiruvananthapuram, Kollam, Kochi and Kozhikode. For low density areas in Kochi and Thrissur, septic tanks and desludging machinery will be provided. Sludge will be treated in Kochi, and dried in purpose built sludge drying beds and further composted in the case of Thrissur. In all 5 municipal corporations, drainage systems will be improved through rehabilitation of existing culverts and upgrading and/or construction of main and secondary drains.

4. In all municipal corporations but Thiruvananthapuram, it is proposed to enhance solid waste management efficiency, by (i) increasing collection (with the associated purchase of collection containers, transportation vehicles and refuse collectors and compactors) and (ii) increasing treatment and collection capacity (through rehabilitating and constructing sanitary landfill sites in proposed towns and composting facilities in Kochi and Kollam). Improved traffic management and road safety will be achieved through (i) rehabilitation and capacity

augmentation at critical roads and junctions, (ii) improved street lighting and pavements, and (iii) construction of pedestrian subways, underpasses and off street parking.

5. Component C of the Project will finance urban infrastructure and service improvements in the municipal corporations in Kerala. Local Self-Government (Urban) Department (LSGUD) will be in charge of providing technical guidance and supervision, implementation of the subcomponent and the compliance of ensuing subproject with ADB's environmental and social safeguards. LSGUD shall oversee project management for the Part C of the Project and will undertake the following activities (i) infrastructure investment; (ii) project development and implementation; and (iii) institutional development assistance. The sub-projects to be financed by the Part C of the Project will be primarily designed for rehabilitation and development of essential urban infrastructure facilities.

C. Description of the Environment

6. All 5 municipal corporations are located in the lowland geophysical division of Kerala, the coastal plain laying 0-7.5 meters above sea, which supports 26% of the State's population. The zone is characterized by marine landforms of beach ridges, beaches, swamps and lagoons. The coastal wetland areas support rain-fed and irrigated rice. Coastal dry-lands support coconut, tapioca, and cashew plantations. Reclaimed backwater areas are used for coconut plantations.

7. The South-West monsoon provides heavy and reliable rainfall with an average annual rainfall of about 3,100 mm, and an average of 115 rainy days. The monthly mean value of relative humidity varies from 75-96% in the morning to 65-91% in the afternoon. Excessive rain during June to August causes frequent floods in the rivers and canals in the area, submerging low-lying areas. The western extent of Thiruvananthapuram and Kozhikode and the whole of Thrissur are on laterite soils. Erosion potential is high, since the soil is light textured and poorly to imperfectly drained. The remainder of Thiruvananthapuram and Kozhikode and Kollam are on coastal alluvium and riverine alluvium. Both are mildly acidic, deep profiled and very porous. They are also mildly to strongly saline. Kochi is on marine alluvial and acid saline soils.

8. Large groundwater resources exist in the coastal zone, including the Wakallai, Kollam and Vaikom deep aquifers. Surface water drainage is predominantly westward from the mountains. Rivers are monsoon fed and fast flowing. The annual runoff yield is 77,900 million m³; however, not all runoff is usable for water supply. Inland fisheries are made up of estuarine/backwater and freshwater fisheries. It is estimated that around 50,000 fisherman work full or part-time in these brackish waters. Kerala has 32 different mangrove species, although two species have disappeared over the last decades, and more are threatened. The mangrove ecosystems are biologically rich. Ashtamudi Lake and Sasthamkotta Lake in Kollam District and Vembanad Backwater in Alappuzha District have been included in the Ramsar List of protected wetlands. The Project will transform the existing dumpsite adjacent to the Ashtamudi Lake into a scientifically operated sanitary landfill site, preventing in this way leachate infiltration into the lake. For optimal and integrated system operability, the sewage treatment plant site has been located adjacent to the proposed sanitary landfill site in Kollam. Efficiency improvements in the water treatment scheme operated at Sasthamkotta Lake have been proposed.

D. Forecasting Environmental Impacts and Mitigation Measures

a. Location

9. Project construction will require resettlement in small sections in Kollam to establish the required underpass. This will affect six small shops. For this purpose, a comprehensive compensation program has been produced in conjunction with an entitlement matrix. They will ensure that involuntary resettlement addresses compensation to replace lost assets, livelihood and income, assistance for relocation to new sites with appropriate facilities, and services and assistance for rehabilitation to achieve the same level of well-being.

10. Project implementation will result in minor loss of on-site ecology and the conversion of small amounts of rural agricultural land, both associated with loss of trees and crops for construction of sewage treatment plants, composting facilities and landfill sites. Engineering design will be optimized by the contractor to ensure that environmental impacts to ecosystems are minimized. New and additional trees will be planted and landscaped buffer zones will be provided between sites, wetlands, and living areas, to act as physical and natural barriers. Protection of mangroves will be supported by prevention of any encroachment into backwater areas or wetlands.

11. In each individual instance, household sanitation design criteria will consider depth of the water table, well location, and well and pond quality. Maximum distance will be allowed between household and neighboring wells and septic tanks, ensuring maximum length for pollutant migration paths.

b. Design

12. In order to protect aquatic biodiversity and prevent water over extraction resulting from increased efficiency of treatment and mains distribution in Kollam, water extraction rates from Sasthamkotta Lake will be restricted to present rated levels. A study from the Centre of Earth Science Studies has shown existing maximum design rates of extraction and treatment to be sustainable with annual lake replenishment.

13. Sewerage overflow and bypassing hazards leading to contamination of the environment and flooding will be prevented through strict separation of sewerage and storm water systems. Sewage treatment plants will include buffer storage for emergency overflow and bypass flow. Selection of treatment technology and strict monitoring will ensure that consistent effluent discharge specifications¹ are met and hence protection of downstream receiving waters is guaranteed. In Kollam, effluent discharge to sea will take place to prevent potential localized impacts on brackish-water dependent ecosystems, which are characteristic of the Ashtamudi Lake.

14. Appropriate sludge management and disposal plans will consider (i) sludge disposal to be restricted to agricultural use or composting (to be maximized) and sanitary landfill facilities, (ii) provisions for on-site sludge drying and handling, (iv) periodic analysis for quality and heavy metal content, (v) locations and prohibitions on the disposal of surplus sludge.

¹ The Kerala State Pollution Control Board effluent discharge specifications include Biological Oxygen Demand Levels to be less than 30 milligrams per liter (mg/L), Total Suspended Solids levels less than 50 mg/L and fecal coliforms to be less than 1000 in every 100 milliliters.

15. To prevent pond and well contamination from leach pits and community sanitation blocks, (i) the bottom surface of leach pits will be made of impervious material, (ii) a fine sand envelope will be provided around leach pits and (iii) septic tanks and dispersion trenches will be provided for community sanitation blocks.

16. Ground and surface water contamination prevention in sanitary landfill sites will be achieved through (i) strict operation of scientific landfill disposal facilities, (ii) design of land impervious cells as per the Municipal Solid Waste (Management and Handling) Rules 2000, (iii) design of an interception drainage network uphill of landfill to divert runoff water from encroaching on landfill area, (iv) drainage and pondage system to collect fugitive leachate and redirect away from natural drainage lines. No direct drainage to streams, rivers or backwaters to be permitted.

c. Construction

17. Soil erosion and associated damage to water and land quality resulting from silt run off during construction will be prevented through strict construction site management practices, which will include (i) minimizing site clearance and disturbance to adjoining vegetation and natural areas, (ii) protection of unstable soil surfaces from high velocity runoff through interception drains and temporary stabilization, (iii) management of open cuttings through stabilization and minimized exposure duration, (iv) location and transportation of construction materials and stockpiles to minimize nuisance and land erosion and impact on vegetation resulting from inadequate topsoil protection, (v) using siltation protection measures and sediment barriers at drainage points.

18. Noise and dust nuisance from preparation, construction and waste disposal activities will be minimized by the contractor through (i) implementation of a construction site management plan, (ii) operation scheduling, and (iii) water spraying and covering of open surfaces. The construction site management plan will also minimize road blocking. In the specific case of road construction/upgrading, dust curtains will be erected and maintained around (i) hot mix plants, crushers and reduce the levels of emissions, and (ii) flyovers and canal bridge construction sites. Delivery vehicles will be covered.

19. The local community, and particularly affected people, will be provided with timely information. Preplanning of working site and installation of barrier nets and warning signs will ensure minimal accident risk and nuisances. Temporary relocation of hawkers and vendors to suitable location may be necessary during rehabilitation of the road network.

20. Workers involved in excavation and removal of excess soil activities in drains/canals or the Thiruvananthapuram sewage treatment plant site which may be exposed to contact with contaminated deposits will be provided with adequate protective gear, and training on site dangers, which will include potential health effects from exposure to contaminated spoil. For large sites, a comprehensive operational health and safety plan will be prepared and implemented by the contractor.

21. Prevention against environmental contamination from indiscriminate disposal of silt/spoil material will be achieved (particularly with regards to drainage cleaning) through the formulation and implementation of a Silt/Spoil Handling and Disposal Plan addressing: (i) proper stockpiling of silt/spoil materials on site, (ii) identification of re-use opportunities, (iii) identification of optimal sites for disposal of unutilized silt/spoil, (iv) covering of disposal sites after completion of works, (v) adequate transportation of waste materials according to their

nature (toxic, flammables, dust generating) with pollution control, and (vi) regular maintenance of desilting and transportation equipment.

d. Operation

22. Based on adequate construction management practices, Occupational Health and Safety Plans will be modified/developed for major sites, including all sewage treatment plants and solid waste management sites. Health hazards and odor nuisances associated with transportation of sludge and septic tanks desludging will be minimized through the provision of adequate air tight equipment.

23. Since sanitary landfilling activities will be restricted to non-biodegradable waste, limited quantities of gases are expected to form as a result of decomposition. Minor odorous nuisance and health hazards for nearby communities may result from the nearby presence of composting plants. Mitigation measures proposed to minimize the negative impacts include: provision of a buffer zone, tree plantation and, if required, a proper gas control system in landfill sites.

24. It is also envisaged that the traffic load in the area approaching a new landfill site may increase due to movement of transfer vehicles, affecting the community, and causing nuisance and health risks. Mitigation measures will include (i) transportation of waste during low traffic times to minimize emissions in busy areas, (ii) provision of a Solid Waste Transport Management Plan and close coordination between municipalities and traffic police personnel for smooth execution, (iii) daily segregation, compacting, spreading and covering of incoming refuse and (iv) covering of all waste transportation vehicles.

25. The presence of silt and/or solid waste in drains may obstruct the flow, leading to flooding and further causing environmental pollution in areas along the drains. Budget and specific arrangements for cleaning and desilting must be provided by the municipalities.

26. Upgrading of roads may lead to an increased number of vehicles traveling on Kerala's roads, however higher vehicle speeds and improved roads and traffic management are expected to offset short term negative impacts.

E. Environmental Monitoring Plan and Institutional Requirements

27. Technical and institutional mitigation measures will be incorporated in the detailed design of the project. Measures of a planning, functional, institutional and procedural character will be included in tender documents and in the Occupational Health and Safety and the Traffic Plans. Mitigation measures related to the construction works will be stated in the contract with the Contractor. The Project Management Unit (PMU) and Project Implementation Units (PIUs) in each of the 5 corporations will be responsible for ensuring that the above have been included. The PMU and PIUs, will be responsible for monitoring and enforcement during construction. An environmental engineer will be engaged under the Project to facilitate, supervise and monitor environmental requirements described in the IEEs. During the operational phase, the municipal authorities will be responsible for implementing environmental measures in the sector of water, municipal engineering and roads. The Kerala State Pollution Control Board will be responsible at State level for overseeing overall environmental compliance and environmental monitoring. During its review missions, ADB will also assess environmental compliance in the different towns.

28. Comprehensive Environmental Monitoring Plans have been developed for each subcomponent of all project towns and are reflected in the individual IEEs. Environmental Management Plans (See Volume 5, PPTA:4106-IND Kelara Sustainable Urban Development Project) for (i) Sewerage and Sewage Treatment Plant components and (ii) Sanitary Landfill Sites have been developed and will be implemented as an integral part of the Project.

F. Environmental Safeguards Framework

29. An environmental safeguards framework proposing review procedures has been produced to help guide environmental screening and subproject design under Part C of the Project, ensuring compliance with the environmental assessment requirements of the Government and ADB. No subprojects will be implemented inside, in the buffer zone or in the immediate vicinity of designated protected areas. Activities with significant impact on ecosystems, such as land reclamation, will be limited. Therefore, subprojects are unlikely to have environmentally significant. All subprojects will be subject to screening for environmental impacts, which will determine whether an IEE or an Environmental Impact Assessment are necessary. Preliminary subproject screening indicated that most municipalities envisage using this fund for sanitation and sewage treatment initiatives, solid waste management activities, road and traffic improvement or public infrastructure and services such as development of parks or fruit markets.

G. Public Consultation and Disclosure

30. Formal and informal consultation exercises were undertaken during Project Preparatory Technical Assistance (PPTA) preparation. Environmental safeguard requirements and impact mitigation measures contained in the IEEs were presented to the 5 municipal corporations in January 2005. The meetings were attended by civil society representatives, NGOs, municipal authority and Government representatives. The consultation meetings provided clarifications on the design of project proposals as well as mitigation measures. In addition, issues and concerns highlighted by the participants as part of the discussions included (i) the need to extend sewage schemes to the entire of the corporation areas in a near future, (ii) the need to restrict water abstraction from the Sasthamkottah Lake to sustainable levels,² (iii) solid waste management technology should be suited to the local area, consultations with the Agricultural University would assist this objective, (iv) reiterations on the need to ensure that adequate implementation arrangements must be made to ensure that mitigation measures are executed.

H. Findings, Recommendations and Conclusions

31. Environmental screening processes were carried out in all 5 concerned municipal corporations. Positive environmental impacts resulting from improved sanitation, wastewater treatment and solid waste disposal and management and reduced water losses have been highlighted. Mitigation measures and an environmental monitoring plan have been formulated to minimize minor negative environmental impacts. The Project is considered not

² The Center for Earth Science Studies, after detailed examination recommended that 60 MLD water can be drawn without adverse impact to the lake ecosystem. The proposed rehabilitation and improvement works will only be concerned with provision of adequate metering and restoring treatment capacity for extraction rates below this value.

to have significant environmental impacts and therefore classification B to be appropriate. Therefore, there is no need for a full Environmental Impact Assessment.