# 2.11 Sri Lanka

## 1 | Country Information

**Table 2.11.1** Basic indicators

| | | |
|---|---|---|
| Land Area (km²) | | 62,705 (2019) |
| Total Population | | 21.8 million (2019) |
| GDP (current USD) | | 84 billion (2019) |
| GDP per capita (current USD) | | 3,852 (2019) |
| Average Precipitation (mm/year) | | 1,712 (2017) |
| Total Renewable Water Resources (km³) | | 52.8 (2017) |
| Total Annual Freshwater Withdrawals (billion m³) | | 13 (2005) |
| Annual Freshwater Withdrawals by Sector | Agriculture | 87.3% (2005) |
| | Industry | 6.4% (2005) |
| | Municipal (including domestic) | 6.2% (2005) |

(Source: CB 2019, FAO 2020)

**Figure 2.11.1** Kandy Lake in Kandy, Sri Lanka

## 2 | State of Water Resources

Sri Lanka is a tropical island country with an average annual rainfall of 900–5,000 mm (Figure 2.11.2), which provides 131,230 million m³ of freshwater annually. Zones in its southwest are the wettest, receiving over 2,000 mm/year, while northern (and some southeast) areas are considered dry zones with under 1,500 mm/year. There are 103 river basins, and the largest river is the 335 km Mahaweli River, covering an area of 10,448 km² (MENR and UNEP 2009). Rivers in the wet zones contribute over 50% of the runoff despite covering only about one third of the land area. There are over 3,400 wetlands, which include ancient irrigation reservoirs, recently constructed multipurpose reservoirs, tanks and lakes.

Groundwater resources in the country are estimated at 7,253 million m³ and represent the major source of water especially in rural areas, where around 72% of the rural population relies on it for domestic uses.

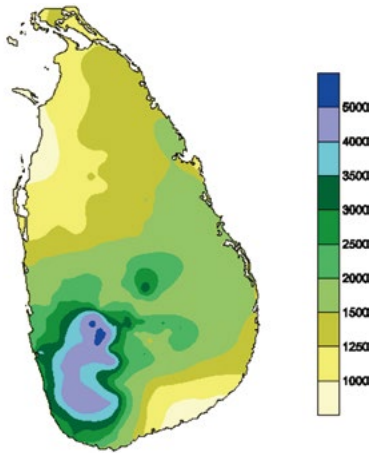


**Figure 2.11.2** Annual precipitation distribution (in mm) in Sri Lanka

## 3 | State of Ambient Water Quality

Pollution by domestic and industrial wastewater as well as leachate from garbage continues to be a problem for surface water and groundwater resources in Sri Lanka. Central wastewater treatment facilities cover less than 5% of the population, and commonly comprise onsite septic tanks among urban dwellings. High use of synthetic fertilizers on farms and resultant runoff and leaching of nutrients is another cause of nutrient pollution in the surface and groundwater.

### 3.1 Rivers

Water quality in main water courses is still within the limits of the ambient water quality standard. However, untreated or insufficiently treated wastewater in urban areas is the main cause of river pollution. For instance, the Kelani River, the second largest river basin in Sri Lanka, is one of the most polluted due to the rapid growth of industry and high population density along the river.

Illegal dumping of solid wastes into waterways is also a serious concern. Expansion of sand mining activities also affects the river water quality, such as with increased turbidity, decreased water flow and accelerated saltwater intrusion. Table 2.11.2 shows the recent state of water quality in certain rivers.

**Table 2.11.2** State of river water quality

| River | Year | BOD (mg/L) | COD (mg/L) | $NO_3^-$ (mg/L) | $PO_4^{3-}$ (mg/L) |
|---|---|---|---|---|---|
| Nilwala River | 2019 | 1 | 5.6 | 0.9 | <0.01 |
| Deduru oya | 2019 | 20.1 | 3.23 | 1.47 | <0.01 |
| | 2020 | 2.95 | 26.06 | 9.97 | <0.01 |
| Attanagalu oya | 2019 | 3.71 | 16.83 | <0.01 | <0.01 |
| Menik River | 2019 | 1.67 | 14.63 | 0.15 | <0.1 |
| | 2020 | 1.78 | 12.92 | 0.15 | <0.1 |
| Mahaweli River | 2020 | 5.0 | 7.75 | 0.03 | <0.01 |
| Malwathu oya | 2020 | 1.70 | 23.70 | 0.02 | 0.1 |
| Badulu oya | 2018 | 1.37 | 12.41 | 0.43 | <0.1 |
| | 2019 | 9 | 66.29 | 2.87 | <0.1 |
| | 2020 | 1.4 | 11.0 | 0.50 | <0.1 |
| Diyawanna oya | 2017 | 3.87 | 22.43 | 0.99 | <0.01 |
| | 2018 | 1.75 | 15.75 | 1.87 | <0.15 |
| | 2019 | 2.75 | 10.5 | 1.06 | 0.05 |

(Source: CEA 2021)

## 3.2 Lakes and Reservoirs

In general, the water quality of lakes and reservoirs is considered good. Table 2.11.3 summarises water quality status of select reservoirs.

**Table 2.11.3** Water quality of certain reservoirs

| Reservoir | Year | BOD (mg/L) | COD (mg/L) | $NO_3^-$ (mg/L) | $PO_4^{3-}$ (mg/L) |
|---|---|---|---|---|---|
| Kurunegala tank | 2019 | 7.43 | 25.06 | 1.10 | 0.03 |
| | 2020 | 3.10 | 29.7 | 1.40 | <0.01 |
| Gregory Lake | 2019 | 8.42 | 31.0 | 1.53 | 0.04 |
| Wennaruwa wewa | 2019 | 12.85 | 3.18 | 1.69 | 0.054 |
| Nuwara wewa | 2019 | 2.53 | 28.27 | NA | 0.06 |
| | 2020 | 5.81 | 18.91 | NA | 0.03 |
| Tissa wewa | 2019 | 3 | 35 | NA | 0.04 |
| | 2020 | 3.56 | 23.92 | NA | 0.02 |

(Source: CEA 2021)

## 3.3 Coastal Water

Water pollution in coastal water bodies has grown over the past few decades due to rapid development activities and human settlements both in and outside coastal areas, establishment of new industries and tourism. Over 60% of industrial establishments are located along Sri Lanka's coastal zone, such as coastal districts of Colombo and Gampaha. Organic pollution in coastal areas, such as Beruwala and Unawatuna areas, has led to high levels of BOD.

## 3.4 Groundwater

A common groundwater quality problem in the country is microbial contamination and nutrients (such as nitrate) caused by leachate from on-site sanitation systems such as pit latrines (Table 2.11.4). Excessive fertilizer use and untreated wastewater are other factors responsible for high nitrate levels in the groundwater. In coastal areas, salinity is a prominent issue and is caused by a combination of factors such as excessive groundwater use and sea waves encroaching inland.

**Table 2.11.4** Variation in groundwater quality across different areas (2014–2018)*

| Sampling area | TDS (mg/L) | E.coli (cfu/100 ml) | COD (mg/L) | TSS (mg/L) | $PO_4^{3-}$ (mg/L) | $NO_3^-$ (mg/L) |
|---|---|---|---|---|---|---|
| Farmland | 160–172 | 22–40 | 10–13 | 140–155 | 0.3–0.6 | 0.3–0.5 |
| Solid Waste Dumping Site | 270–296 | 10–790 | 12–20 | 13–93 | 0.2–0.5 | 3.1–6.2 |
| City | 80–105 | 4–608 | 16–20 | 6–58 | 0.2–0.4 | 0.3–7.4 |

*Based on research by University of Peradeniya & National Water Supply & Drainage Board (Source: CEA 2019)

Industry is another source of groundwater contamination in Sri Lanka. A study conducted under the WEPA Action Program found higher COD, Nitrate, and EC in groundwater samples collected nearby some industries.

# 4 | State of Wastewater Treatment

## Domestic wastewater

National sewerage coverage is limited to less than 3%, while the rest of the country relies on on-site sanitation such as septic tanks, Ventilated Improved Pit Latrines (VIPs), and unimproved sources (pit latrines and unknown types). There are ongoing and planned wastewater treatment projects to treat domestic wastewater in major cities or under certain housing schemes. Tables 2.11.5 and 2.11.6 show the state of existing wastewater treatment facilities.

**Table 2.11.5** Existing wastewater treatment facilities in major cities

| Sewerage System | Treatment Capacity ($m^3$/day) | Beneficiaries |
|---|---|---|
| Colombo (CMC) | Sea outfall | 331,500 |
| Dehiwala/Mt. Laviniya | CMC sea outfall | 65,000 |
| Kolonnawa | CMC sea outfall | 60,000 |
| Kataragama | 3,000 | 20,000 |
| Hikkaduwa | 1,040 | 500 + Commercial (60 Nos.) |
| Rathmalana | 17,000 | 20,000 |
| Ja Ela | 7,500 | 10,500 |
| Kurunegala | 4,500 | 43,000 |
| Kandy | 14,000 | 55,000 + 150,000 (floating) |

(Source: CEA 2021)

**Table 2.11.6** Wastewater treatment in major housing schemes

| Housing Scheme | No. of Connections | Treatment capacity ($m^3/d$) | Beneficiaries |
|---|---|---|---|
| Mattegoda | 1,154 | 600 | 4,850 |
| Jayawadanagama | 669 | NA | 2,810 |
| Maddumagewatta | 315 | NA | 1,320 |
| Raddolugama | 2,045 | 6,000 | 8,590 |
| Kuruminiyawatta | 202 | NA | 850 |
| Royal Park | 249 | NA | 1,045 |
| Hantana | 394 | 550 | 1,650 |

(Source: CEA 2021)

### Industrial wastewater

In Sri Lanka industries are categorised into three broad groups, namely Type A, B and C by the Central Environment Authority (CEA) depending upon the severity of pollution potential and to guide the siting of such industries. A total of 15,404 highly polluting industry units (Type A), 10,631 medium polluting industrial units (Type B) and 26,622 low polluting industrial units (Type C) operate within Sri Lanka. Most industrial zones have own wastewater treatment systems for treating wastewater from factories operating within their boundaries. There is little or no data on the state of wastewater generation and treatment from small and medium-sized industries. Table 2.11.7 shows the state of wastewater treatment in some export processing zones.

**Table 2.11.7** Wastewater treatment in certain export processing zones

| Export Processing Zone | Treatment capacity ($m^3/d$) |
|---|---|
| Biyagama | 21,000 |
| Seetawaka | 9,900 |
| Koggala | 675 |
| Katunayaka | 3,000 |
| Mirigama | 400 |
| Wathupitiwala | 900 |
| Polgahawela | 450 |
| Mawathagama | 500 |
| Horana | 1,000 |
| Malwatta | 450 |

(Source: CEA 2021)

According to the National Water Supply and Drainage Board Law, No. 02 of 1974, different tariff structures apply for domestic and industrial sewer services based on total amounts of water consumption from all water supply sources for each billing month. The domestic sewer service provided for commercial purpose charges a flat rate of 40 LKR per cubic meter, while for residential purpose the tariff rate varies according to water consumption. For residential purpose, an additional service charge of 200 LKR also applies. For industrial purpose, a flat rate of 65 LKR per cubic meter applies.

## 5 | Frameworks for Water Environmental Management

The Constitution of Sri Lanka states that protection, preservation, and improvement of the environment for the benefit of the community is the responsibility of the state (Article 27/14) and that every person in the country has a duty to “protect nature and conserve its riches” (Article28). Surface water resources – rivers, streams and lakes – are controlled by the government, under the Crown Lands Ordinance and the Constitution. Vistas of Prosperity & Splendour" Manifesto of President Gotabaya Rajapakse Among ten (10) key policies addressed in the manifesto of the President Gotabaya Rajapakse, the 8th chapter describes about the Sustainable Environmental policy to strengthen and protect the forest cover, rivers, streams and wildlife. The Haritha Lanka Program, approved in June 2008, is the current basic national policy document for environmental conservation, and aims to promote sound environmental management in Sri Lanka by balancing the needs of social and economic development and environmental integrity. The “National Action Plan for Haritha Lanka Program” was prepared in the same year, based on the above program, and includes steps to be implemented during 2009–2016 under the supervision of the National Council for Sustainable Development (NCSD). The plan’s proposed strategies and actions represent a concerted effort of all relevant ministries and stakeholder institutions. As regards environment pollution control, the CEA prepares five-year action plans.

### 5.1 Legislation

The National Environmental Act (NEA) No. 47 of 1980 (amended as Act No. 53 of 2000) forms the basis of the country’s law, and aims “for the protection, management and enhancement of the environment, for the regulation, maintenance and control of the quality of the environment; for the prevention, abatement and control of pollution”. According to the act, discharges, deposits or emission of waste into the environment cannot be carried out without a license and must comply with standards and criteria prescribed. Other acts and ordinances related to water environmental management are illustrated in Figure 2.11.3.

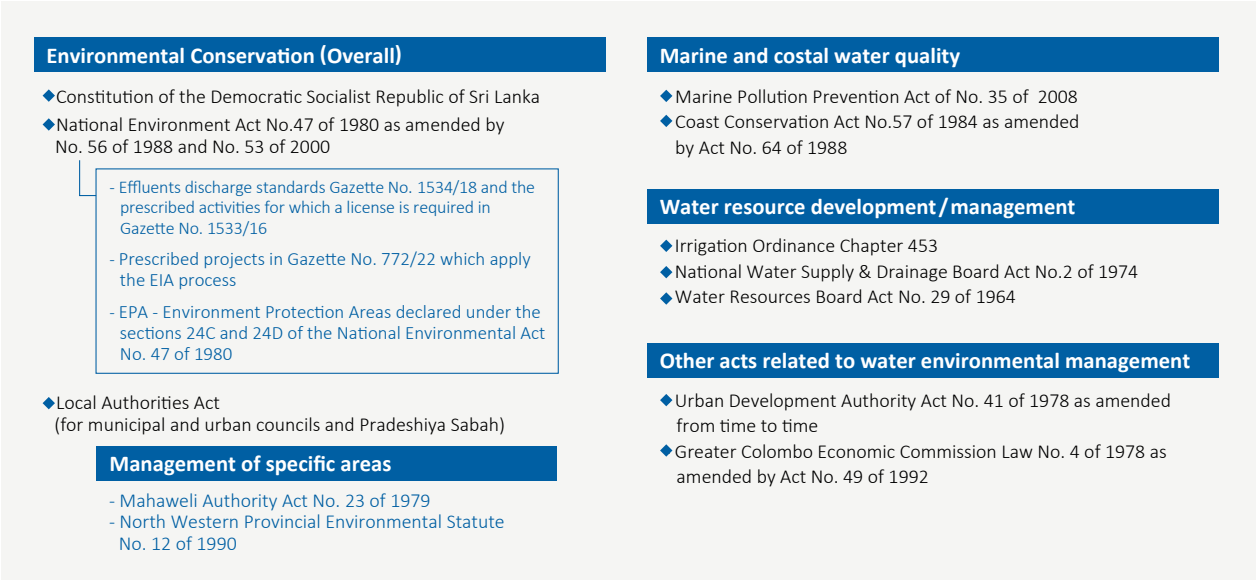


**Figure 2.11.3** Laws and regulations related to water environmental management (Source: created based on information from CEA)

## 5.2 Institutional Arrangement

Different governmental agencies control different areas of water environment management in Sri Lanka, as summarized in Table 2.11.8. The Ministry of Environment, established in 2001, is the national authority for formulating policies and guidelines for conservation of the environment and natural resources. Under the ministry, the CEA is responsible for implementation of policies and regulations pertaining to environmental pollution control and management. The CEA was established in 1981 as the authority with regulatory powers to control, manage and enhance the environment.

Marine Environment Protection Authority (MEPA) has the regulatory powers over the marine pollution prevention and other governmental organizations that are related to construction, engineering services, housing and common amenities such as the Condominium Management Authority, National Housing Development Authority, and the Board of Investment (BOI) of Sri Lanka are indirectly related to water environment as their activities significantly affect the condition of water quality. Local governments are also playing an important role in water environmental management in regulating low-impact industries and activities prescribed by orders issued under the NEA. Public health inspectors at the local level control on-site sanitation systems such as pit latrines and septic tanks.

**Table 2.11.8** Key agencies involved in the management of water environment

| Name of the agency | Mandates of the agency |
|---|---|
| Ministry of Environment (MOE) | Overall management of the environment and natural resources of the country. Formulating key policies, strategies, and guidelines for environmental management. |
| Central Environmental Authority | Overall responsibility for protecting the environment including water environment |
| Water Resources Board | Scientific characterization, mapping, and preparation of comprehensive and integrated plans for the conservation, utilization, control, and development of groundwater resources. |
| National Water Supply & Drainage Board | Operational development and installation of public and private water supply schemes based on groundwater and coordinate sewerage systems. |
| Department of Irrigation | Regulation and control of inland waters |
| Mahaweli Authority | Maintenance of Mahaweli River and its reservoirs for development of lands for agriculture. |
| Coast Conservation & Coastal Resources Management Department | Conservation of the coastal zone and management of its resources. |
| Marine Environment Protection Authority (MEPA) | Protection of the marine environment from ship- and shore-based maritime related activities. |

(Source: created based on information from CEA)

## 5.3 Ambient Water Quality Standards

### Ambient water quality standards

Table 2.11.9 shows the ambient water quality standards (AWQS) under the National Environmental (Ambient Water Quality) Regulations, No. 01 of 2019. According to this standard, no person shall discharge, deposit or

**Table 2.11.9** Sri Lanka's Ambient Water Quality Standards (2019)

| | No. | Parameter | Unit | Category A | Category B | Category C | Category D | Category E | Category F |
|---|---|---|---|---|---|---|---|---|---|
| General | 1 | Colour | Pt mg/L, max | 20 | - | - | 100 | - | - |
| | 2 | Electrical Conductivity | µS/cm, max | - | - | - | - | 700 | - |
| | 3 | Turbidty | NTU, max | 5 | - | - | - | - | - |
| | 4 | TSS | mg/L, max | 25 | - | 40 | 1,500 | 2,100 | - |
| | 5 | Total Hardness (as $CaCO_3$) | mg/L | 250 des 600 max | - | - | - | - | - |
| | 6 | pH | - | 6.0–8.5 | 6.0–9.0 | 6.0–8.5 | 6.0–9.0 | 6.0–8.5 | 5.5–9.0 |
| | 7 | DO at 25°C | mg/L, minimum | 6 | 5 | 5 | 4 | 3 | 3 |
| | 8 | $BOD_5$ at 20°C | mg/L, max | 3 | 4 | 4 | 5 | 12 | 15 |
| | 9 | COD | mg/L, max | 10 | 10 | 15 | 30 | - | 40 |
| Nutrient | 10 | $NO_3$-N | mg/L, max | 10 | 10 | 10 | 10 | - | 10 |
| | 11 | $NH_3$-N pH < 7.5 | mg/L, max | - | - | 0.94 | - | - | 9.1 |
| | | 7.5 ≤ pH < 8.5 | | - | - | 0.59 | - | - | 4.9 |
| | | 8.5 ≤ pH | | - | - | 0.22 | - | - | 1.6 |
| | 12 | $PO_4$-P | mg/L, max | 0.7 | 0.7 | 0.4 | 0.7 | - | - |
| Other | 13 | Chloride (Cl) | mg/L, max | 250 | - | - | 250 | 600 | - |
| | 14 | CN | mg/L, max | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| | 15 | F | mg/L, max | 1.5 | - | - | 1.5 | - | - |
| | 16 | $SO_4^{2-}$ | mg/L, max | 250 | - | - | 250 | 1,000 | - |
| Metal | 17 | Cd, total | µg/L, max | 5 | - | 5 | 5 | - | 5 |
| | 18 | Cr, total | µg/L, max | 50 | - | 20 | 50 | - | 50 |
| | 19 | Cu, total | µg/L, max | - | - | 100 | - | - | 100 |
| | 20 | Fe, total | µg/L | 300 des 1,000 max | - | - | 2,000 | - | - |
| | 21 | Pb, total Hardness < 120 | µg/L, max | 50 | - | 2 | 50 | - | - |
| | | 120 ≤ Hardness < 180 | | | | 3 | | | |
| | | 180 ≤ Hardness | | | | 4 | | | |
| | 22 | Mn, total | µg/L, max | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| | 23 | Hg, total | µg/L, max | 1 | 1 | 1 | 1 | 2 | 2 |
| | 24 | Ni, total | µg/L, max | 70 | 100 | 100 | 100 | 200 | 100 |
| | 25 | Se, total | µg/L, max | 10 | 10 | 5 | 10 | - | - |
| | 26 | Zn, total | µg/L, max | 1,000 | - | 1,000 | 1,000 | 2,000 | 24,000 |
| | 27 | B, total | µg/L, max | - | - | - | - | 500 | - |
| | 28 | As, total | µg/L, max | 50 | 50 | 50 | 50 | 50 | 50 |
| | 29 | Al, total | µg/L, max | 200 | - | - | - | 5,000 | 5,000 |
| Organic Micro Pollutant | 30 | Phenolic compounds | µg/L, max | 2 | 5 | 2 | 5 | 5 | 5 |
| | 31 | Oil/Grease | µg/L, max | 100 | - | 100 | 100 | - | 300 |
| | 32 | Anionic surfactants as MBAS | µg/L, max | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| | 33 | MCPA | µg/L, max | 2 | - | - | 20 | - | - |
| | 34 | Pendimethalin | µg/L, max | 2 | - | - | 20 | - | - |
| Microbes | 35 | Total Coliform | MPN/100ml, max | 10,000 | 10,000 | - | 10,000 | - | - |
| | 36 | Fecal Coliform | MPN/100ml | 500 des 1,000 max | 500 des 1,000 max | - | - | - | - |

Note: 'des' means desirable and 'max' means maximum

(Source: Government of Sri Lanka 2019)

emit any pollutant into inland surface waters exceeding AWQS. There are six categories under AWQS, classified by suitability for different uses/purposes:

1. Category A: water sources requiring simple treatment for drinking
2. Category B: water sources suitable for bathing and contact recreation
3. Category C: water sources suitable for aquatic life
4. Category D: water sources that require general treatment process for drinking
5. Category E: water sources suitable for irrigation and agricultural activities
6. Category F: water sources of minimum quality outside of categories A to E

### Water quality monitoring framework

The CEA is authorized to conduct water quality monitoring, which is carried out by environmental pollution control unit and water quality monitoring laboratory. The CEA possesses a main laboratory at the Head Office and 9 Provincial and District laboratories and private laboratories are also registered once in two years to cater the environmental monitoring needs. The National Water Supply and Drainage Board (NWSDB) conducts water quality monitoring at water intake points for drinking water purification – in total 340, including 70 groundwater intake points. CEA conducts regular water quality monitoring in 12 main water bodies, with additional or random monitoring in other areas conducted on an as-needed basis, and has ambient water quality monitoring projects for different river basins, as shown in Table 2.11.10. The first water sampling took place in the Kelani River, which is a major source of water supply, in 2013. Online water quality monitoring commenced in 2017. In the same year, monitoring expanded to 16 water bodies (rivers, tanks, reservoirs), and in 2020 is now conducted on a comprehensive basis.

**Table 2.11.10** Water quality monitoring in major water bodies

| Water body | Monitoring points | Frequency | Parameters |
|---|---|---|---|
| Kelani River | 17 | Once a month | BOD, COD, TSS, pH, Coliform, Phosphate, Nitrate, Heavy metals |
| Mahaweli River | 12 | Once a month | |
| Dadugam Oya | 12 | Once a month | |
| Benthota River | 12 | Once a month | |
| Mahaoya | 12 | Once a month | |
| Kandy Lake | 10 | Every three months | |
| Kurunegala Tank | 12 | Once a month | |
| Gregory Lake Nuwara Eliya | 12 | Once a month | |
| Nuwara Wewa Anuradhapura | 12 | Once a month | |

(Source: CEA 2019)

The Sri Lanka Land Reclamation & Development Agency carries out canal water quality monitoring in the Colombo area at 23 locations, while agencies such as the Water Resources Board and International Water Management Institute are also involved in groundwater monitoring.

## 5.4 Effluent Standards

### Effluent discharge standards

The standards for discharge of wastewater into the environment were published in Gazette Notification No. 1534/18, dated 01/02/2008, and termed as the National Environmental (Protection & Quality) Regulations No. 01 of 2008 Wastewater Discharge Standards. Proposed effluent discharge standards are based on the point of discharge and the type of effluent identified by the Environmental Pollution Control Unit of EPC Division. Tolerance limits and values exist for industrial and domestic wastewater as well as effluent based on the mode of discharge into coastal or marine waters, inland surface water, land for irrigation purpose and so on. Further, specific tolerance limits and values are prescribed for activities related to rubber manufacturing, processing or modifying industries, textile and apparel sector industries, tanning industries and public sewer systems. In the proposed regulation sea out falls (long & short) and near shore, more stringent standards can be imposed if possible regarding the need to protect the water environment from hazardous waste landfills.

### Effluent inspection procedure

In principle, effluent quality is self-monitored by the discharging industry concerned or laboratory assigned by the CEA. Effluent quality reports may be submitted at least once a year, to the actual monitoring body concerned decided by the CEA. Industries also submit effluent quality reports from third party laboratories recognized by the CEA. However, not all industries have monitoring facilities and the CEA occasionally monitors/ inspects effluents discharged from such biannually or annually, as well as investigates suspected cases of non-compliance such as those based on complaints received from the general public.

### Measures against non-compliance

There are several enforcement instruments for water environment, such as Environmental Impact Assessment (EIA), Environmental Protection Licensing (EPL), Scheduled Waste Management License (SWML), Environmental Protected Areas, Directives to Local

Government Authority on Solid Waste Management, Environmental Recommendations (ER). The EPL scheme, which started in 1990, is required for all entities in the country that discharge wastes into the environment, as prescribed by a regulation published under the NEA, and licenses vary according to the pollution potential of an industry (Type A, B and C). Additional enforcement arrangements are made by other agencies, such as the Water Resource Board, which grants approval for groundwater withdrawals for commercial uses, MEPA, which requires discharge permits for discharging wastewater to the sea, and Mahweli Authority, which protects reservoirs coming under their purview.

Non-compliance or violation results in suspension or cancellation of licences and filing of cases, as well as minimum fines of 10,000 LKR, imprisonment or both, as determined by the NEA.

## 6 | Recent Developments in Water Environmental Management

In 2020, a comprehensive river water monitoring program was started to strengthen the ongoing river monitoring program. It is being implemented along 25 main rivers at monitoring points determined based on physical factors and pollution sources. Monitoring is to be carried out by central and provincial labs of the CEA. Further, to avoid duplicity, NWSD will share water quality data from its intake points. This overall monitoring process is to form the basis of the master plan for river monitoring. After analysis of the data, monitoring will be further strengthened to cover industries and implement pollution control measures.

In 2020, implementation of a program to protect the Kelani River was initiated. The river is nationally important as a water resource supporting fisheries, hydro-electricity generation, sand mining, and main water supply source for Colombo. Around 10,000 industrial activities are located along the river. Pollution in upstream areas results from agricultural run-off from tea plantations, whereas downstream areas are affected by high contamination due to urban run-off, industrial discharge, and leachates of haphazardly disposed solid waste. The program aims to maintain and improve water quality by undertaking server activities planned for the short, medium and long term. In the short term (early 2020), it plans to conduct GIS mapping, locate and identify pollution sources, monitor industrial activities through a monitoring team, and carry out water quality monitoring (including establishing online monitoring stations) and awareness programs. In the medium term (by 2020), activities are to include investigation of industrial and domestic waste dumping, analysis of waste loads, initiation of legal action against unauthorized industries, and implementation of the second phase of online monitoring. After 2020, the program plans to install CCTV linked to CEA to observe effluent discharge from large industries, continue establishing online monitoring stations, and develop a comprehensive database to analyse trends in water quality.

Surakimu Ganga National Environmental Programme was started in 2021, as a national river protection programme based on the Sustainable Environmental Management which emphasized in the 8th chapter of the manifesto “A vision for a Resurgent, Prosperous Country” released by the Hon President of Sri Lanka. The ministry of Environment, the CEA and stakeholder agencies including local government are working together in this programme to protect the 103 riverine systems in Sri Lanka. The ultimate goal is to control water pollution, restore, manage eco system functions and get the maximum beneficial use from such rivers.

The programme is implemented through inter-ministerial coordinating committee, District Committees and Divisional Committees island wide. Initially 27 perennial rivers were selected for thorough investigation of issues and to take remedial measures to overcome the river water pollution. The ongoing water quality monitoring programmes and other actions taken so far by the stakeholder agencies will be coordinated and networked through “Surakimu Ganga” programme.

In the proposed NEA amendments new regulations on environmental damage compensation, introduction of the polluter pays principle, legalization of environmental clearance, and control over groundwater pollution are included.

## 7 | Challenges and Future Plans

The lack of proper institutional coordination is a major challenge since water sector management is divided into several sections under different ministries or agencies. Similarly, different sections of water management are spread across several laws and regulations, meaning compliance monitoring and enforcement thereof remain an ongoing challenge. There is also a need for considerable improvement as regards resources allocation from the national budget, such as for hiring staff for field monitoring and inspection and laboratory analysis. The lack of baseline data as well as

limited sharing of available data are further barriers to improvements in water environmental governance. The lack of financial and technical resources often hampers regular monitoring as well as the establishment of new monitoring stations. Failure to self-report by industry is another prominent challenge as some industries lack the resources and capacity to monitor and report their compliances. Industries, in particular SMEs, lack the financial resources such as for treating wastewater. Further, the high costs of construction and operation of centralized WWTP as well as public resentment and protests over WWTP establishment remain as challenges for wastewater treatment in cities.