CHAPTER 6 SECTORAL SITUATIONAL ANALYSIS

6.1 Transport

6.1.1 General

Transport, specifically traffic congestion, is one of the major urban issues in Kandy. There are many factors that aggravate traffic congestion, including (i) the concentration of public facilities in the city centre which generates much traffic, (ii) a limited road network in the mountainous area, (iii) traffic congestion in the town centre mixed with through-traffic on the trunk roads to Kandy and daily traffic inside the city, (iv) traffic bottlenecks at bridges, (v) limited areas designated for parking in the city, and (vi) inappropriate traffic management.

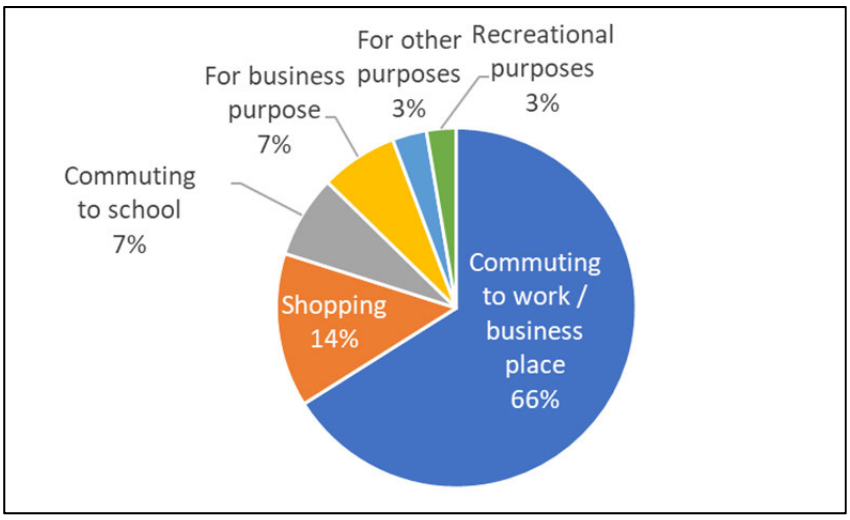
Various organisations such as Road Development Authority, Kandy Municipality Council, and Strategic Cities Development Project have conducted studies and implemented projects for the transport sector until recently. In this section, past and present transport plans and projects will be reviewed, and based on lessons learned and experiences, the transport sector's development orientation that will be in conjunction with regional and city levels will be proposed.

6.1.2 Travel Behaviour in the Heritage Area, Kandy

Based on the results of the interview survey, travel behaviour of 2,000 households in the Heritage Area is analysed, and this includes trip purpose, traffic distribution, and travel modes.

(1) Trip Purpose

The survey results show that the trip purpose of the largest share of respondents is commuting to place of work and business (66%). Meanwhile, some respondents commute to do shopping (14%), go to school (7%), and conduct or attend to business (7%). Hence it is effective to target commuting trips for transport plan and management.



Source: Household Interview Survey, The JICA Team

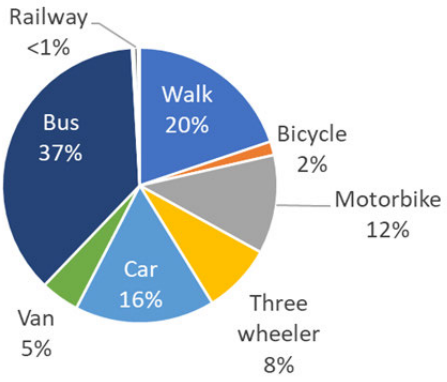
Figure 6.1.1 Trip Purposes in the Heritage Area

(2) Travel Modes

1) Modal Shares

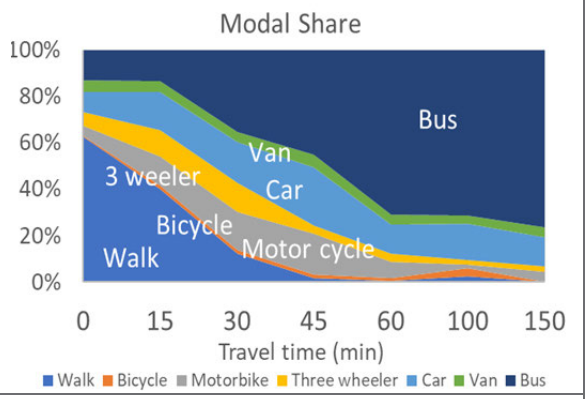
Travel mode for majority (37%) in the Heritage Area is bus, 20% simply walk, 16% travel by car, 12% ride their motorbikes, while the rest travel by other means. The modal share of railway is only 1%. The results reflect that the share of public transport (bus and three wheelers) is higher than that for private modes of transport (car and motorbike), and consequently traffic management focusing on public transport should be prioritised.

As for transport modes depending on travel time, most people walk if destination can be reached within 20 minutes, and prefer to ride in three wheelers and motorbikes for short trips. For longer trips, majority takes the bus.



Source: Household Interview Survey, The JICA Team

Figure 6.1.2 Modes of Transport in the Heritage Area



Source: Household Interview Survey, The JICA Team

Figure 6.1.3 Modes of Transport by Travel Time in the Heritage Area

2) Bus Operation

As for bus operation in the Heritage Area of Kandy, 80% are intra-provincial buses operated by the Central Province RPTA (Regional Passenger Transport Authority) and Sri Lanka Transport Board (SLTB), while 20% are inter-provincial buses operated by the National Transport Commission (NTC) and SLTB. These data just show that it is necessary to apply an effective transport policy focusing on intra-provincial bus services.

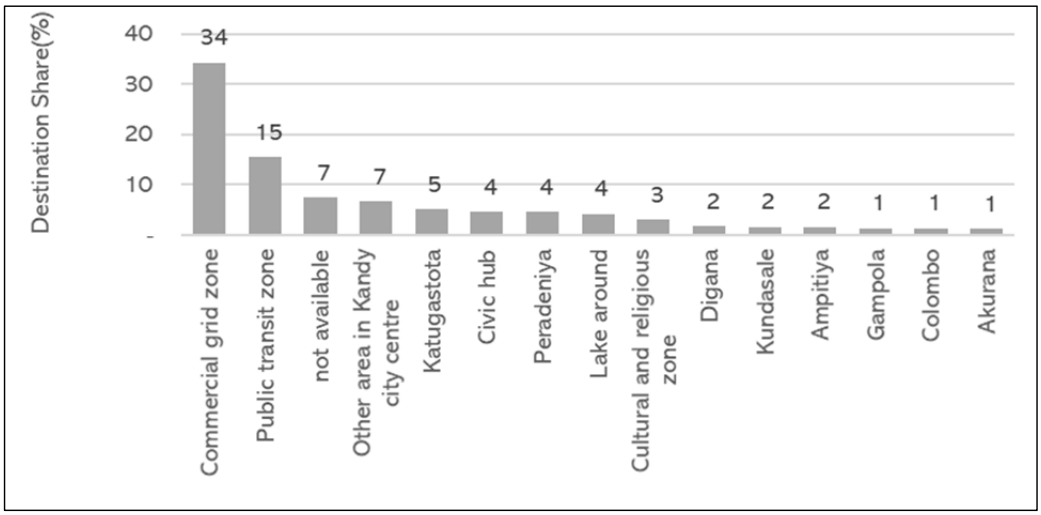
Table 6.1.1 Current Situation of Inter- and Intra- Bus Operation in Kandy

No.	Type of Route	Operator	No. of Routes	No. of Scheduled Buses	No. of Scheduled Departures from CBD	Share (%)
1	**Intra-Provincial**	RPTA	193	1,398	3,787	55
		SLTB*		841	1,686	24
	Subtotal			2,238	5,473	**79**
2	Inter-Provincial	NTC	66	700	700	10
		SLTB*	33 common +8 exclusive routes	719	719	11
	Subtotal		74	1,419	1,419	21
	Total			3,657	6,892	100

Note: CBD denotes Central Business District
Source: Public Transport and Traffic Management, SCDP Project Kandy, Sri Lanka, 2016

(3) Trip Distribution

Figure 6.1.4 shows that one-third of trips is accumulated in the Commercial Grid Zone. There are few trips to the cluster cities of Kundasale (5%), Peradeniya (4%), and Kundasale and Digana (4%).



Source: Household Interview Survey, The JICA Team

Figure 6.1.4 Trip Distribution of Vehicles in the Heritage Area

According to past transport study, Kandy's central business district (CBD) was the travel destination for 59.5% of all vehicles from outer districts and provinces. Consequently, with this trip distribution most of socio-economic activities are accumulated in Kandy CBD.

Trip Ends	Kandy CBD	KMC (excl. CBD)	Rest of Kandy District	Matale District	Nuwara Eliya District	Western Province	Southern Province	Northern Province	Eastern Province	North Western Province	North Central Province	Uva Province	Sabaragamuwa Province
Kandy **CBD**													
KMC **(excl. CBD)**	8.4	1.9											
Rest of Kandy District	43.1	20.8	10.2										
Matale District	1.5	0.6	0.9										
Nuwara Eliya District	1.2	0.3	0.9	0.2									
Western Province	1.3	0.3	1.0	0.3									
Southern Province	0.1		0.1										
Northern Province			0.1			0.1							
Eastern Province	0.1		0.1			0.2							
North Western Province	0.9	0.2	0.4		0.1	0.1							
North Central Province	0.6		0.1										
Uva Province	0.2	0.1	0.4			0.1				0.1			
Sabaragamuwa Province	2.1		0.3	0.2	0.2					0.3		0.1	
Trip Ends per Zone (%)	***59.5***	***24.2***	***14.4***	***0.7***	***0.3***	***0.5***	***0.0***	***0.0***	***0.0***	***0.4***	***0.0***	***0.1***	***0.0***

Source: Kandy City Transport Study, 2011

Figure 6.1.5 Trip Distribution of Vehicles from Outer Districts and Provinces

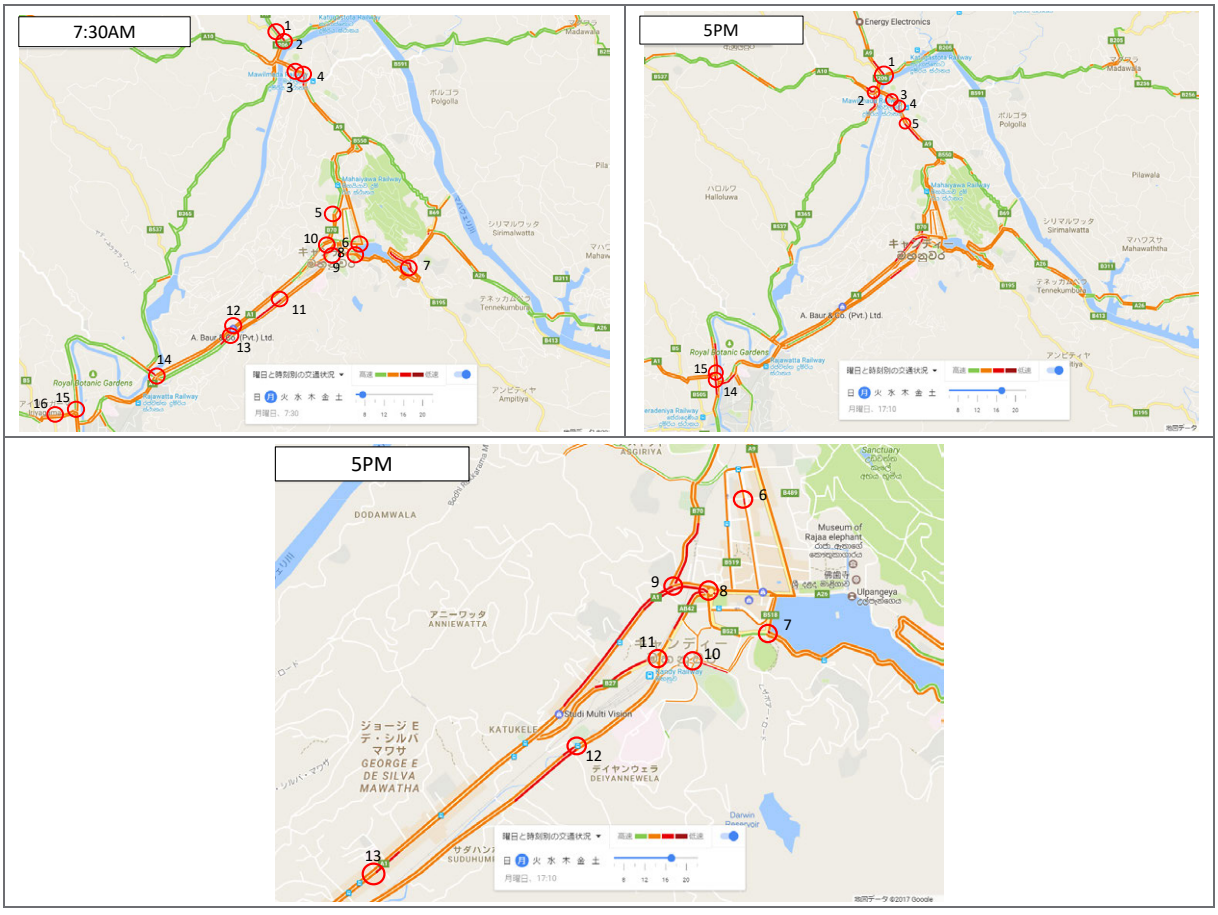
6.1.3 Current Transport Problems

(1) Concentration of Traffic in the Centre of Kandy

Kandy City is the centre of socio-economic activities in the Greater Kandy Area with relatively small town centres surrounding it. Concentration of businesses and industries can be found in few places, such as the automobile-related service industry of Katugastota and Akurana, or industrial estates in Digana. As such, the concentration of traffic in Kandy City is worsening, and traffic congestion due to commuting public, particularly in buses, is becoming chronic. The existing plans and projects proposed development of satellite cities and the improvement of roads between satellite cities to avoid traffic concentration in the centre of Kandy.

Figure 6.1.6 shows several identified traffic bottlenecks always occurring at peak hours. Most of these sites have the following common features which are thought to cause traffic congestion:

- Located at three-way intersections with narrow spaces
- Located near large-scale facilities (schools, hospitals)
- Located near bridges
- Located near bus stops
- Many pedestrians
- No bus bay installed on the road, etc.
- Insufficient capacity of bus terminals nearby, causing the congestion to extend to the surrounding intersections, making the situation worse



Source: The JICA Team

Figure 6.1.6 Traffic Bottlenecks around Kandy City

		
Narrow three-way junction	A bus stop without passing lane where cars behind cannot pass	Unsafe pedestrian crossing in front of a bus stop
		
A bus stop near the bridge obstructing cars behind	Bus terminals without pedestrian crossing	

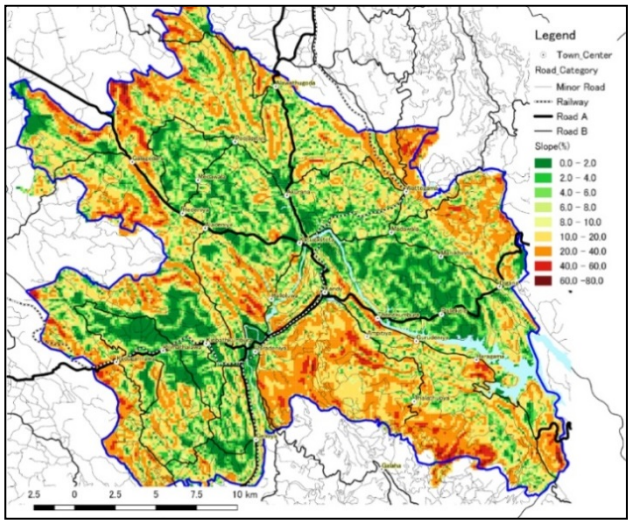
Source: The JICA Team

Figure 6.1.7 Traffic Bottlenecks

(2) Development Constraints due to Terrain

Figure 6.1.8 shows the slope condition of Greater Kandy's terrain. According to the Japanese Road Structure Order, the maximum slope at the design speed of 60 km/h is 5% on an ordinary road. But in the Kandy area, there are many sites with slope exceeding 5% and that the conservation area has been designated. As such, it is difficult to plan for new road development.

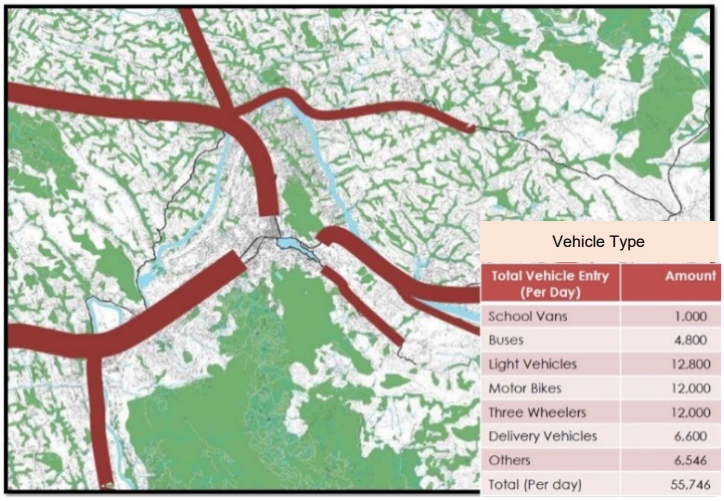
For these reasons, so as to accommodate traffic adequately, it is indispensable to reduce private vehicles on the road by promoting public transportation, establishing transportation services to promote the use of public transportation, enhancement of existing railway transport to support it, building multimodal hubs/park and ride facilities, and provide information management by ITS (intelligent transport system) and ICT (information, communication technology).



Source: The JICA Team

Figure 6.1.8 Topographic Map of Kandy

Of all the roads in the Greater Kandy Area, the three major roads accessing the centre of Kandy city center are the ones with many congestion points as seen in Figure 6.1.9. The current traffic volume is 55,746 cars/day while the estimated traffic capacity is 37,256 cars/day; thereby, travel time is 17 minutes from Peradeniya to the centre of Kandy. Assuming that the traffic volume is increased by 1.48 times to a total volume of 82,504 car/day based on the future demographics, the travel time is estimated as 72 minutes[1] for 4.5 km from Peradeniya (Gatambe junction) to the centre of Kandy. Because Kandy is situated in a mountainous area, it is difficult to develop new roads, making it difficult to disperse traffic. As such, a small increase in population might cause heavy traffic congestion.



Total Vehicle Entry (Per Day)	Amount
School Vans	1,000
Buses	4,800
Light Vehicles	12,800
Motor Bikes	12,000
Three Wheelers	12,000
Delivery Vehicles	6,600
Others	6,546
Total (Per day)	55,746

Source: Greater Kandy Master Plan, UDA

Figure 6.1.9 Traffic Volume around Kandy City

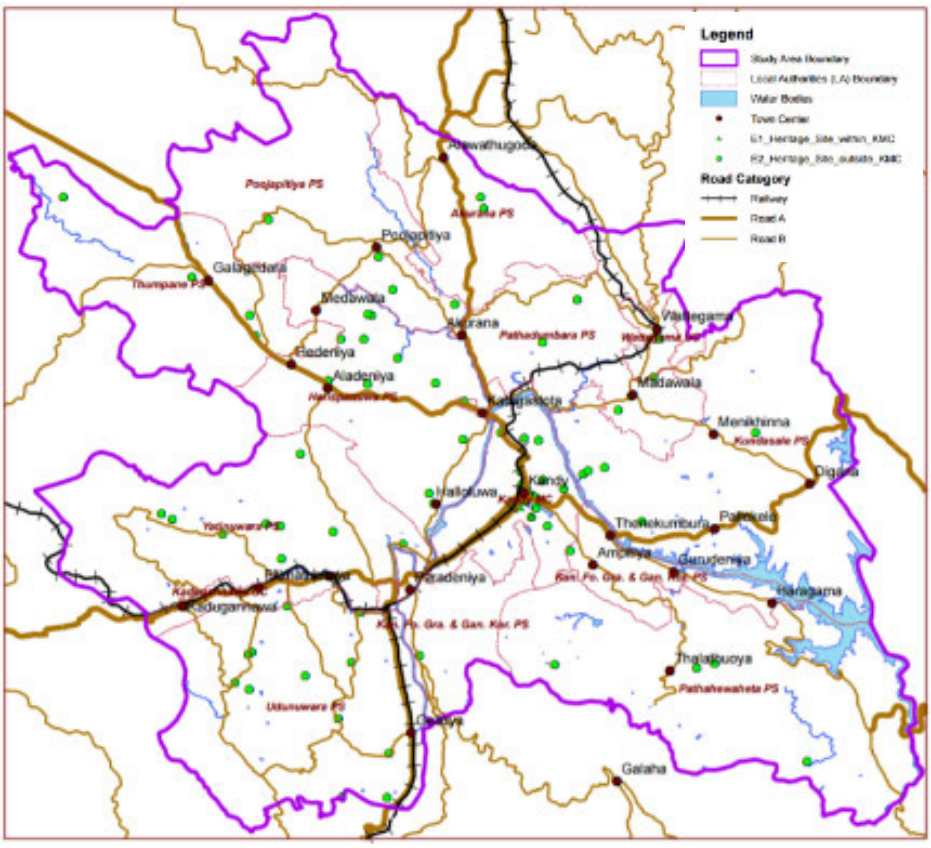
(3) Poor Transportation Network

As shown in Figure 6.1.10, there are many historic heritages scattered in the Greater Kandy Area. When considering utilisation of these resources for tourism promotion from the economic development point of view, improvement of access roads and measures to cope with tourism transportation are required.

In addition, integration of linkages to existing scattered industrial facilities around Kandy City, linkage with the highway project, and linkage with industries in neighbouring regions are important.

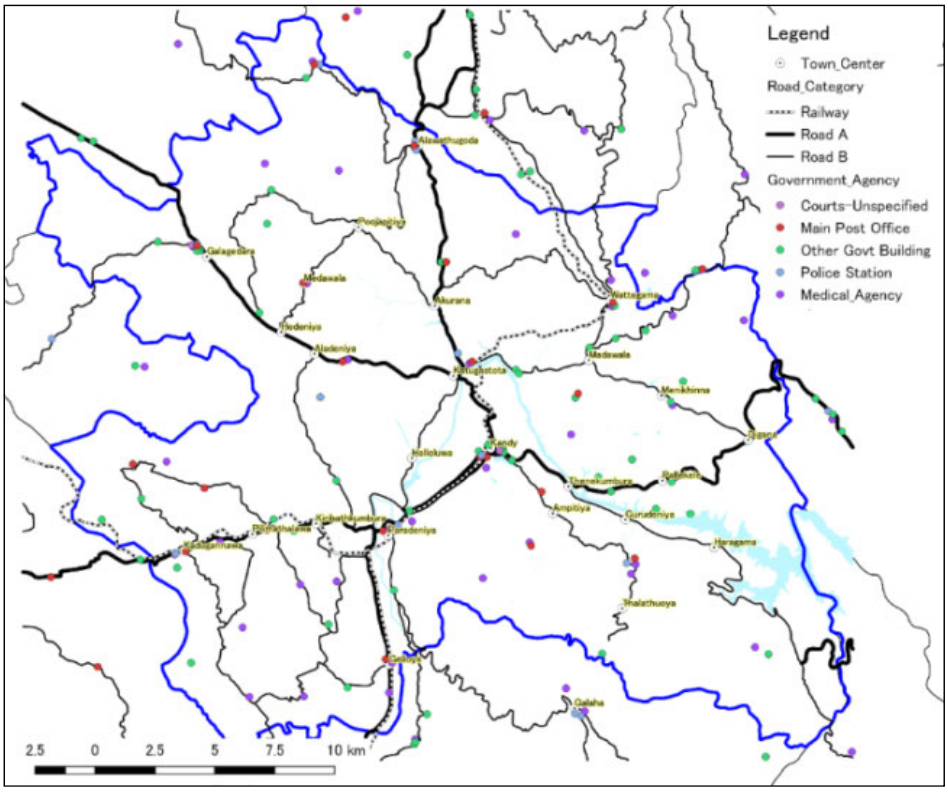
Figure 6.1.11 shows the location of the public facilities in the Greater Kandy Area at present. More facilities are expected to be developed for the future expansion of socio-economic activities (e.g. waste disposal sites, recycling facility, power generation facility, logistics facility, warehouses, hospitals, commercial facilities, and schools). To effectively utilise these facilities, it is necessary to improve their accessibility.

[1] For calculating travel time, BPR function is adopted to estimate by the equation Time = 8x(1+0.15x(82504/37256)5)=71.9 (minutes).



Source: The JICA Team

Figure 6.1.10 Historic Heritages and Road Network in Greater Kandy

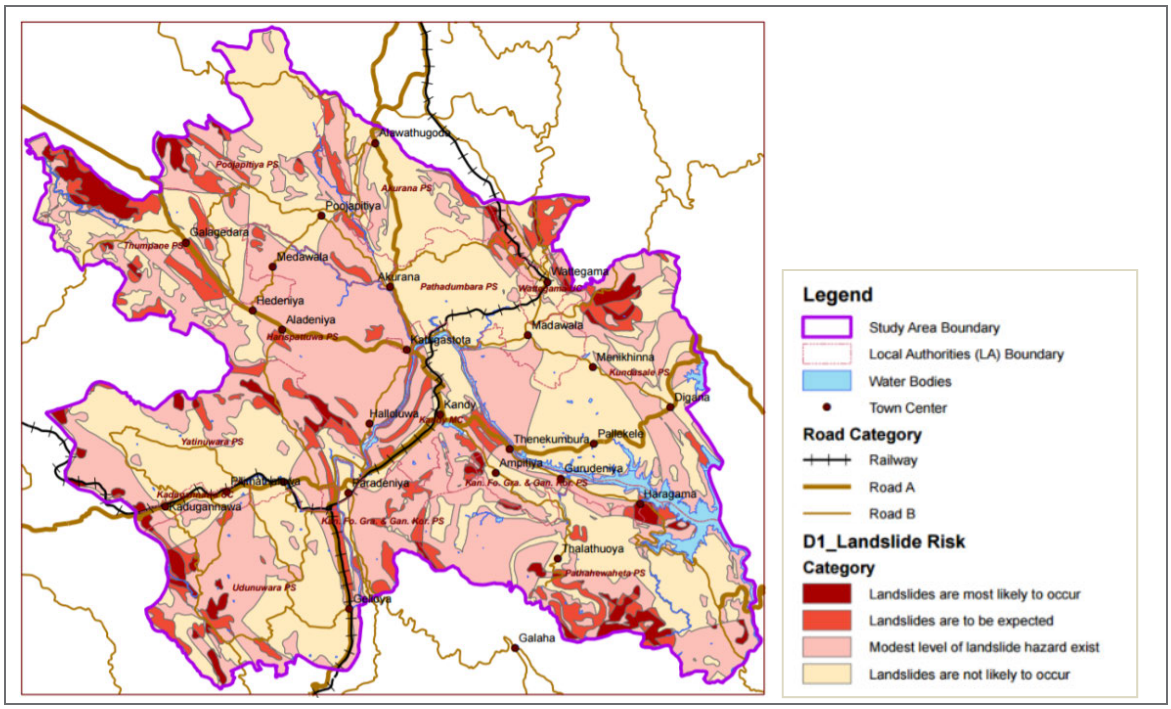


Source: The JICA Team

Figure 6.1.11 Public Facilities and Road Network

(4) Disaster Risk

Figure 6.1.12 shows the NBRO's landslide risk categorisation of various sites in Greater Kandy Area. Since the place is mountainous, landslides commonly occur in various places. Hence there is the possibility that the transport function could be disrupted due to a disaster. Accordingly, it is necessary to cope with countermeasures for disasters to secure the safety and stability of traffic in the mountainous areas, and also to establish an information management system.



Source: The JICA Team

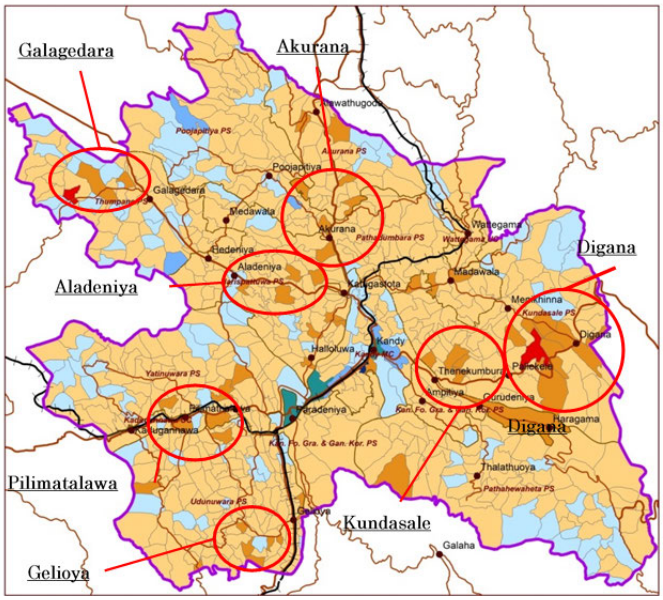
Figure 6.1.12 Landslide Risk Categorisation in Greater Kandy Area

(5) Stagnation of Pollutants due to Geography

Kandy City's centre is located in a basin surrounded by mountains. As such, air pollutants or particulate matters caused by traffic emissions are likely to stagnate. Accordingly, introduction of environmentally friendly measures like use of CNG (compressed natural gas) buses and electric three-wheelers could be considered to lessen pollutant emissions.

(6) Traffic Congestion that could be Aggravated by Population Increase

Based on the population census from 2001 to 2012, average population growth rate in Greater Kandy Area is 0.78% per annum, and at this rate this could become 1.17% in 20 years. However, looking at partial areas in the Greater Kandy Area, population growth patterns differ. Populations in some towns in the suburban areas increase, while those in the rural area and central area of the city centre decrease. Therefore, traffic congestion could be aggravated only in areas where population is projected to increase. Rate of population increase makes a big difference because an area with a 2% population increase will hold 1.48 times of current population in 20 years; the area with 3% population increase, 1.81 times; and the area with 4%, 2.19 times. Given this situation, there is a possibility that traffic congestion in certain areas will aggravate in case their populations keep on increasing in the long term.

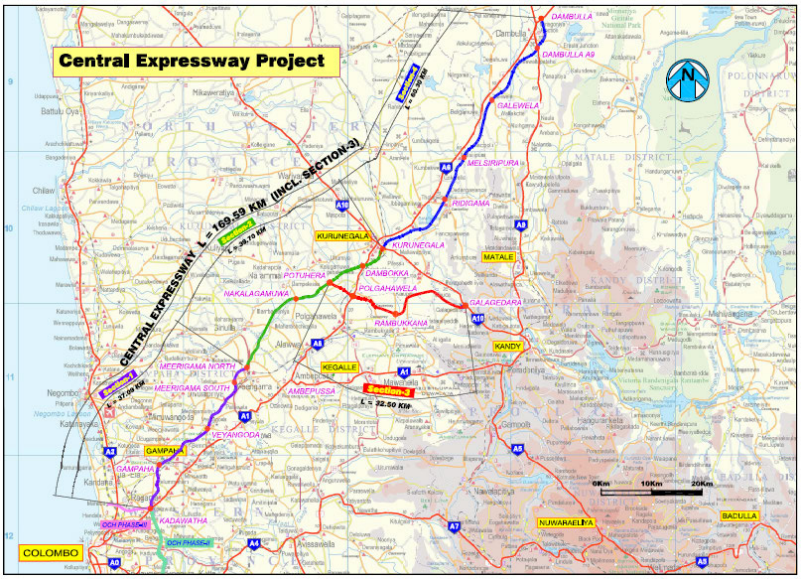


Source: Department of Census Statistics, Census 2001 & 2012

Figure 6.1.13 Annual Average Growth Rate of Population in the Greater Kandy Area (2001-12)

(7) Impact of Expressway Construction

The centre of Kandy is connected to the west and north by access roads. Average daily traffic volume of Colombo-Kandy route is 14,334 vehicles/day. A road from the west can reach Kandy City faster, and many travellers take this west route. However, after the completion of the expressway from Colombo, access from the north will be faster and predominant. Accordingly, it is expected that the pattern of usage of the two routes will greatly change. In addition, because travellers can reach Kandy City faster from Colombo, they will have less stops between Colombo and Kandy. This might cause cities located between Kandy and Colombo to decline. As a result, as population tend to concentrate in existing large cities, there is a possibility that it will concentration in large cities or settlements like Kandy city, which is so-called *straw effect* in the transportation sector.



Source: RDA

Figure 6.1.14 Expressway Plan in the Greater Kandy

(8) Lack of Enforcement of Obligatory Installation of Parking Spaces

There is a regulation for obligatory parking installation. According to interviews conducted with relevant organisations, however, legal enforcement is not strict such that violations in construction activities persist, resulting to buildings without parking spaces; or buildings without parking lots are given permits upon application of change in building use after construction.

Ineffective monitoring of such violations has resulted in the overall worsening parking shortage. There is a concern that development of parking spaces in the city could induces more private traffic; at the same time, it is necessary to strengthen parking regulations.

(9) Lack of Study on Transportation Assessment

In Kandy, traffic control is discussed as part of traffic management among the relevant agencies after the annual budget is confirmed. There are two departments involved in traffic management: (a) the Traffic Management Committee of Kandy Traffic Police that discusses present transport issues with relevant stakeholders, such as UDA, KMC, PRDA, etc.; (b) the Traffic Planning Unit of Traffic Police that formulates the traffic management plan. According to interviews, both departments tend to make judgments lacking in objective analysis. Thus, it is necessary to evaluate traffic problems based on quantitative analysis and strengthen traffic assessments that can be discussed in a cross-sectorial manner.

6.1.4 Summary of Issues

Based on the above-cited issues, measures for transport improvement are proposed in Table 6.1.2

Table 6.1.2 Issues and Proposed Measures for Transport Improvement in Greater Kandy

Issue	Proposed Measures
Economic activities are highly centered in Kandy, resulting to worsening traffic congestion in the city's centre	• Urban development in the suburban areas and tourism development (urban cluster) • Traffic bottleneck countermeasures • Bus facility improvements • Fundamental improvement of bus terminals • Ring road construction for Kandy City satellite towns (the cluster cities and suburban areas)
Development constraints due to terrain	• Enhancement of public transportation use • Strengthening of railway utilisation and capacity • Construction of multimodal hub with park-and-ride facilities • Development of transport facilities in Kandy City and satellite towns, overcoming development constraints
Fragile transportation network	• Accessibility enhancements to major facilities and heritage sites • Tourist traffic measures • Industrial cooperation of Colombo - Kandy highway projects by strengthening cooperation with other urban areas
Disaster risk	• Traffic safety programmes for the mountainous area • Establishment of information management system
Environmental pollution caused by traffic emissions	• Measures to reduce pollutants in the environment (introduction of CNG buses, electric three-wheelers, solar panels, and power plants that utilize renewable energy.) • Land development for transport facilities, integrating forest conservation
Serious traffic congestion due to population dynamics	• Easing traffic congestion and review of plans at the zone of high population growth rate
Traffic congestion due to construction of expressway	• Review of plans considering the impact of expressway construction
Lacking in parking obligation management	• Strengthening the monitoring of obligatory parking lot installation • Implementation of on-street parking regulations
Lack of study on transportation assessment	• Introduction of a transportation assessment
Lack of transportation planning at Greater Kandy level	• Transportation planning from the point of view of the three spatial levels: Greater Kandy, the towns that surround Kandy, and the areas inside Kandy

Source: The JICA team

To address the above-mentioned problems, existing plans and projects are paying attention to traffic congestion control in Kandy city. In the Greater Kandy Area, only Kandy city has large economic activities that tend to develop only within the city, leading to concentration of traffic in the area. In an effort to avoid concentration of traffic in the city of Kandy, the limit to how much improvement can be made in the area should be prioritised.

For this reason, improvements in the surrounding cluster cities and the Greater Kandy Area incorporating urban planning will (i) promote the development of other economic sectors such as tourism and industry throughout the Greater Kandy area while promoting the creation and development of the economic characteristics of each city, and (ii) avoid concentration of traffic in the city of Kandy by developing surrounding independent cities.

6.2 Water Supply, Sewage, and Drainage

6.2.1 Water supply

(1) Current Water Supply System in Greater Kandy Area

There are 13 LAs and 10 DSDs in the Greater Kandy Area. There are five (5) water supply authorities within the Greater Kandy area as follows:

- National Water Supply and Drainage Board (NWSDB)
- Kandy Municipal Council (KMC)
- Urban Councils
- Pradeshiya Sabha
- Community Water Department

In 2016, the total population in the service area was around 855,000 and the served population was 647,700 or 76%. Per capita water consumption was 155 liters/capita/day, which shows higher value. Nonrevenue water (NRW) ratio was 23% and this value was smaller compared to figures of neighbouring countries.

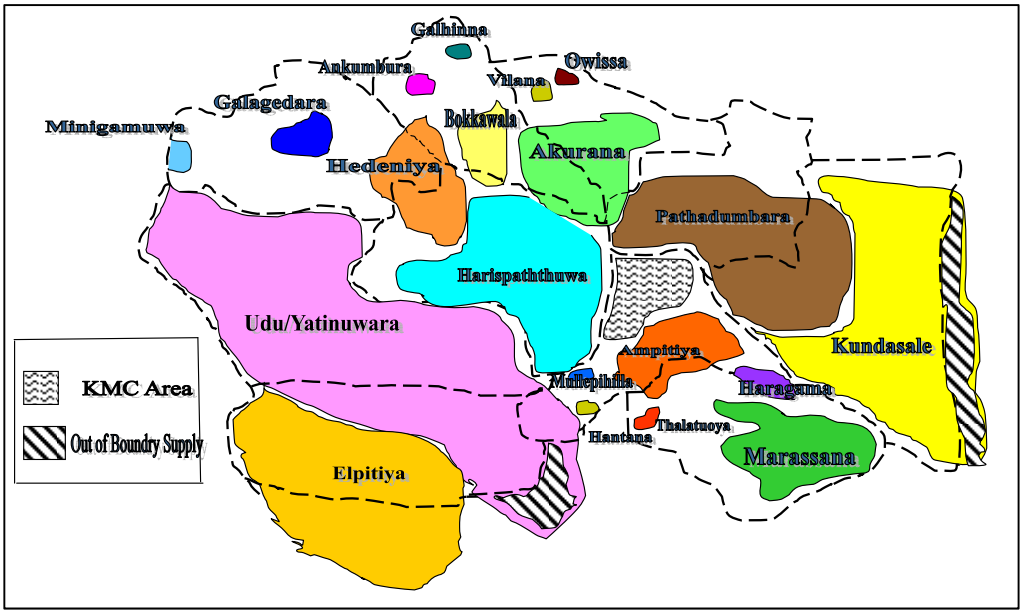
Current water supply schemes, water sources, water supply facilities, and other information related to water supply system (WSS) in The Greater Kandy area, with the exception of Kandy Municipal Council, are shown in in Table 6.2.1.

Table 6.2.1 Overview of Water Supply System in Greater Kandy

Items	Amount
Existing Water Supply Schemes	12
No. of Water Treatment Plants (WTPs)	22
(Chlorination only: 6 WTPs; Partial treatment: 7 WTPs; Full treatment: 9 WTPs)	
No. of Deep Wells	7
No. of Springs	3
No. of Pumping Stations	56
(Raw water transmission P/S: 23; Transmission P/S: 33)	
No. of Reservoirs	95
Raw Water Transmission Pipeline	50 km
Transmission Pipeline	200 km
Distribution Pipeline	1,900 km
Population in the Service Area	855,250
Served Population	647,713
Percentage of Served Population	76 %
No. of House Connections	165,600
Water Production	129,820 m^3/day
(Surface water: 127,550 m^3/day; Deep well: 1,920 m^3/day; Spring: 350 m^3/day; Bulk water: 938 m^3/day)	
Amount of Water Consumption per Day	100,309 m^3/day
Per Capita Water Consumption	155 litres/capita/day
NRW (Nonrevenue Water)	23.0%
No. of Water Supply and WSS) Staff	248
Subsidy from the Local and Central Government	None

Source: NWSDB

Area served by water supply authorities and existing schemes in the Greater Kandy area are shown in Figure 6.2.1.



Source: NWSDB

Figure 6.2.1 Existing Water Supply Schemes in the Great Kandy Area

Table 6.2.2 shows the average production amount (m^3/day), average consumption amount (m^3/day), NRW, and served population in each water supply scheme. As shown in the Table, there are 12 water supply schemes in the Greater Kandy area.

Table 6.2.2 Overview of Existing Water Supply Schemes in the Greater Kandy Area

No.	Water Supply Scheme	Sub-schemes	Water Source	Average production amount in 2016 (m^3/day)	Average consumption in 2016 (m^3/day)	NRW (%)	Served population (Dec. 2016)
1	Akurana	Akurana, Vilaana, Owissa	WTP, Deep well	10,621	6,920	35	61,319
2	Ampitiya	Mullepihilla, Ampitiya, Thalatuoya	Spring, Deep well, KMC	4,120	3,240	21	30,042
3	Ankumbra	Ankumbura, Galhinna	Surface water, Deep well	268	224	16	3,885
4	Galagedara	Galagelada, Minigamuwa	Surface water, Springs	1,225	1.030	16	7,686
5	Hantana	Hantana	Surface water, KMC	579	370	36	2,368
6	Harispaththuwa	Harispaththuwa, Rajapihilla	WTP, Deep well	10,988	8,317	24	63,974
7	Kundasale	Kundasare, Haragama /Thennekumbura	Surface water	27,494	21,460	19	144,020
8	Marassana	Marassana	Surface water	3,139	2,055	35	19,931
9	Pathadumbara	Pathadumbara	Surface water, WTP	11,037	8,894	19	68,982
10	Poojapitiya	Bolagala, Bokkawela	Springs, Deep well, WTP	2,943	2,497	15	24,989
11	Udu/Yatinuwara	Nillambe, Udunuwara	Surface water	37,358	25,788	31	206,160
12	Gampola	Eipitiya	Surface water	2,100	1,575	25	12,557
13	University-Bulk			4,357	4,357		1,800
14	All schemes-Bulk			938	938		
15	KMC-Bulk			12,644	12,644		
16	Total			129,816	100,309	23	647,713

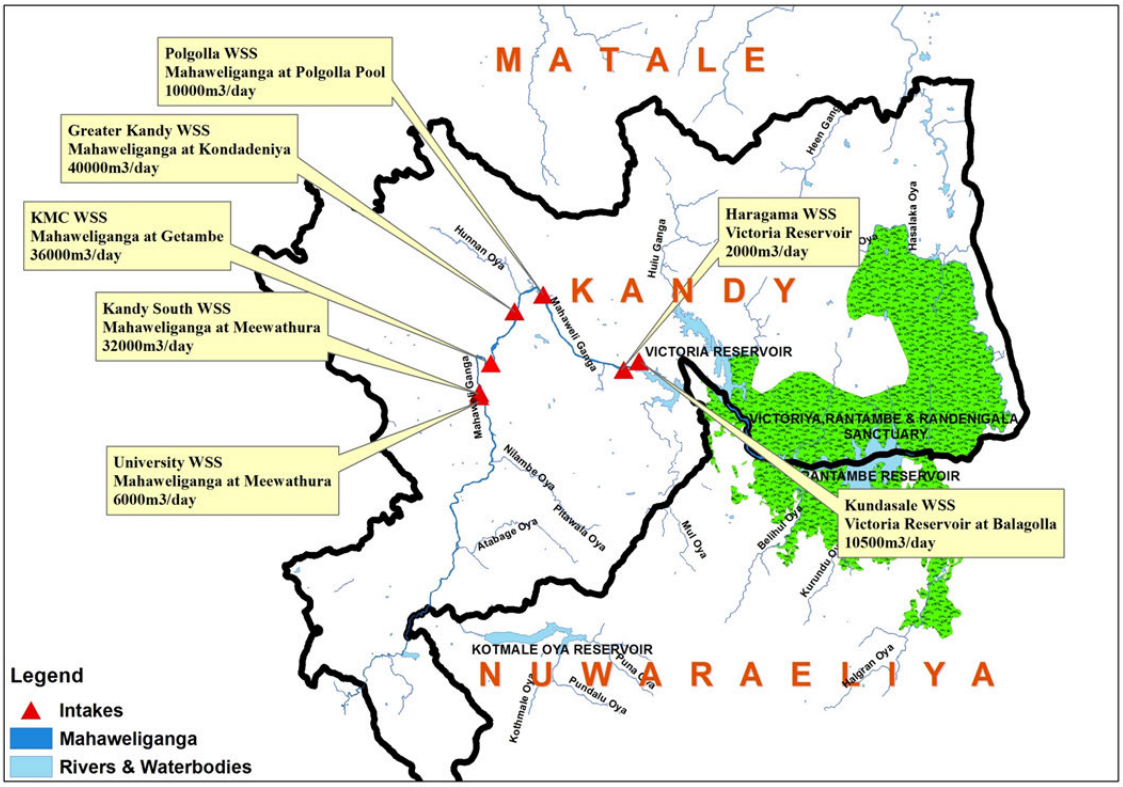
Source: NWSBD

Note: WTP refers to Katugastota Water Treatment Plant which was constructed by the Greater Kandy Water Supply Project with funds from JICA.

(2) Location of Main Water Intakes for WTPs in the Greater Kandy area

There are nine (9) water treatment plants (WTPs) in the Greater Kandy area, namely: Greater Kandy WTP, Arattana WTP, Balagolla WTP, Marassana WTP, Polgolla WTP, Nilambe WTP, Kandy South WTP, University WTP, and Elipitia WTP. Main water source is Mahaweli River.

Locations of main water intakes for the above WTPs are shown in Figure 6.2.2.



Source: NWSDB

Figure 6.2.2 Locations of Main Water Intakes in the Greater Kandy Area

(3) Two (2) New Water Treatment Plants Construction Projects

Two new water treatment construction projects were implemented in 2007 and 2010 in order to supply water to the middle and southern parts of the Greater Kandy area which both suffered from water shortage.

Greater Kandy Water Supply Project (GKWSP) has treatment capacity of 115,000 m^3/day; and the other, Kandy South Water Supply Project (KSWSP) has treatment capacity of 35,000 m^3/day.

1) Greater Kandy Water Supply Project (GKWSP)

The Greater Kandy Water Supply Project, funded by Japanese ODA (JICA), was proposed as a measure to solve the acute drinking water shortage in Pathadumbara, Gangawatta Korale, Akurana, Pujapitiya, and Harispattuwa PS areas. The water treatment plant of GKWSP, i.e. Greater Kandy Water Treatment Plant (GKWTP), started operation on 8th of July 2007. Earlier to this, the water needs of the areas was fulfilled by 21 small water supply schemes that were operating with minimum facilities and shallow tube wells with unsatisfactory water quality. The current GKWTP project was designed to produce 115,000 m^3/day upon completion of phase 3. At present, it is capable of producing 57,000 m^3/day.

The water source is surface water from the Mahaweli River, and the water intake is located at Gohagoda near the solid waste dumping site. The population served by this water supply system is approximately 400,000.

The water treatment process consists of some main units as follows: Raw water extraction (Intake) – Mixing chamber (PAC and pre-chlorine) – Flocculation – Sedimentation (rectangular) – Rapid sand filter – Clear well (gas chlorine disinfection) – High lift pumping station.

The sludge generated from the treatment process is disposed of in a sludge drying bed. The photos of GKWTP are shown in Figure 6.2.3.

		
Water Intake at Gohagoda (Mahaweli River)	Water Treatment Plant at Katugastota	Administration Building

Source: The JICA Team

Figure 6.2.3 Greater Kandy Water Treatment Plant

2) Kandy South Water Treatment Plant Project

The Kandy South Water Treatment Plant (KSWTP) was commissioned on 29th of January 2010. The main function of this plant is to treat raw water extracted from the Mahaweli River and supply the treated water to 15 reservoirs located in South Kandy Area. This plant was designed to produce 35,000 m^3/day of drinking water complying with Sri Lanka Standards. It will serve 250,000 consumers before the design target of year of 2030. Current water production is 28,000 m^3/day.

The water treatment process at KSWTP includes the following: Raw water extraction – Aerator – Rapid mixing – Flocculation and Sedimentation by pulsator clarifier – Rapid sand filters – Disinfection – Clear water tank – High lift pumping station - Distribution network.

The sludge generated from the treatment process is disposed of in a sludge drying bed. The photos are shown in Figure 6.2.4.

		
Water Intake (Mahaweli River)	Flocculation and Sedimentation	Sludge Drying Bed

Source: The JICA Team

Figure 6.2.4 Kandy South Water Treatment Plant

(4) Two (2) Future Additional Water Supply Projects in the Greater Kandy Area

NWSDB has two forthcoming water supply projects, to be funded by India and China, for the Greater Kandy Area. These projects aim to expand the service area, supply the treated water to the unserved area, improve water quality and quantity, and improve the existing water supply system. One of the projects is the Kandy North Pathadumbara Integrated Water Supply Project, and the other is the Kundasale-Haragama Water Supply Project.

1) Kandy North Pathadumbara Integrated Water Supply Project (KNPIWSP)

Objectives of this project is to expand the service area and to supply water sufficiently to the following areas:

- Pathadumara and Northern Part of Kandy District:

Harispattuwa, Pujapitiya, Pathadumbara, Akurana, Gangawatta Korale, and Thumpane DSDs

- Total covered area : 318 km^2
- Population served in year 2035 : 450,000
- New consumers : 105,000
- Total supply volume : 90,000 m^3/day

The same water intake of GKWSP will be used for KNPIWSP but additional pumps and new raw water transmission pipeline will be installed. Water treatment plant for KNIPWSP will be used to expand the existing water treatment plant of GKWTP located at Katugastota.

2) Kundadale-Haragama Water Supply Project (KHWSP)

Objectives of this project are as follows:

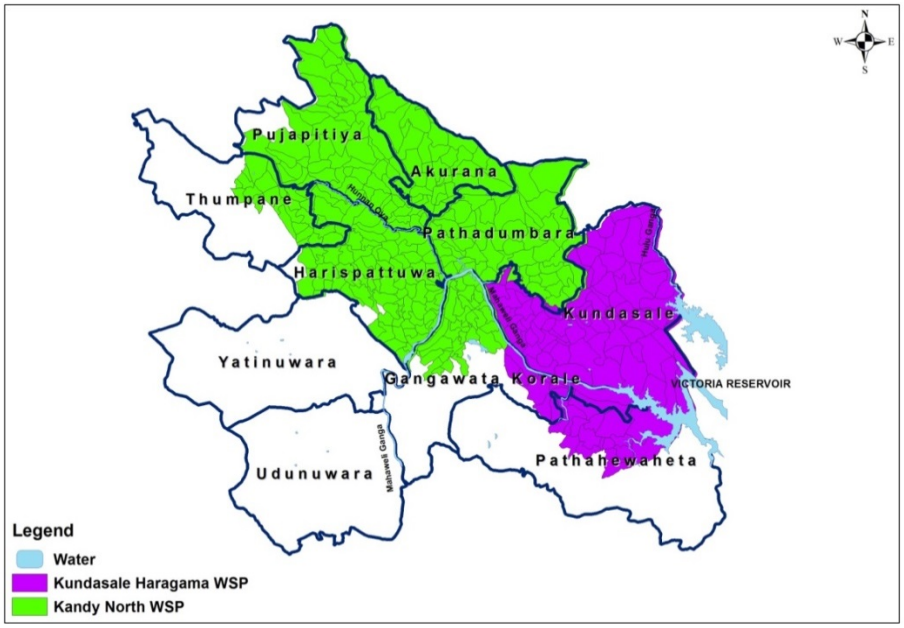
- Improve water quantity and quality, and expand the service areas of existing water supply schemes and include some new areas in the six (6) divisional secretary divisions: Kundasale, Gangawatta Korale, Pathaheweheta, Panwila, and Medadumbara
- Water supply proposal includes improvement of existing system and expansion of water supply coverage of Kundasale-Haragama project area
- Provide water supply facility to rural water supply and catchment protection programme

Project overview is as follows:

- Projected population served : 330,000 in year 2038
- Approximate project area : 160 km^2
- Total maximum demand : 79,600 m^3/day

A new water intake for KHWSP will be constructed within the vicinity of the existing water intake, and the water source, just like GKWSP, is the Mahaweli River. An additional raw water transmission pipeline will be installed to a new water treatment plant located at Katugastota, the same location as GKWSP. A new water treatment plant will be constructed in the same location of GKWSP facility.

The newly served areas of both projects are shown in Figure 6.2.5.



Source: NWSDB

Figure 6.2.5 Newly Served Areas of KNPIWSP and KHWSP

(5) Water Supply System in KMC

Water supply system in KMC was established in 1966. Water source is surface water of the Mahaweli River. In 1992, the water treatment plant was rehabilitated through funds from JICA, and the water treatment capacity was improved to 7.5 million gallons (equivalent to 28,400 m^3/day) from 5 million gallons (equivalent to 19,000 m^3/day) per day. An overview of the water treatment plant is as follows:

Table 6.2.3 Water Treatment Plant of KMC

Item	Description
Operation date	1966 (Funded by France)
Water source	Surface water (Mahaweli River)
Location of water intake	Gatambe
WTP capacity	5 million gallons (19,000 m^3/day)
Rehabilitation completion date	1992 (Funded by Japanese ODA loan, JICA)
WTP capacity	7.5 million gallons (28,400 m^3/day)
Current water production	36,000 m^3/day
Bulk water supply	10,100 m^3/day from NWSDB
Total water production	46,100 m^3/day
Population in Kandy area	102,459, Tourist and others; 150,000 as of March 2012
Population served	Almost 100%
No. of service connections	32,407
Billed authorised consumption	26,823 m^3/day
NRW (Non-revenue water)	42%
Per capita water consumption	210 litres/capita/day

Source: KMC

Water supply facilities, including the intake tower at Gatambe in the Mahaweli River in KMC area, are shown in Figure 6.2.6.

		
Water Intake (Mahaweli River)	Flocculation and Sedimentation	Distribution Pump Room

Source: The JICA Team

Figure 6.2.6 Water Treatment Plants in KMC

(6) Future Water Demand in 2035

Future water demand in 2035 can be estimated based on the current conditions. Current population served ratio is 76%, per capita water consumption is 155 litres/capita/day and NRW ratio is 23%.

Based on the above conditions, future ratio of population served, per capita water consumption, and NRW ratio should be forecasted and assumed. The future value of the population served ratio, per capita water consumption, and NRW ratio are assumed as follows:

- Population served ratio in 2035 : 90%
- Per capita water consumption in 2035 : 180 litres/capita/day
- NRW ratio in 2035 : 25%

Population in 2035 is estimated in Chapter 7, and that is 1,059,000. Therefore, the future water demand in 2035 is 211,200 m^3/day shown in Table 6.2.4.

Table 6.2.4 Future Water Demand in 2035

No.	Item	Year 2016	Year 2035	Remarks
1	Population	855,250	1,059,000	Estimation
2	Population served ratio (%)	75.7 %	90 %	Assumption
3	No. of served population	647,700	956,700	1 x 2
4	Per capita water consumption (litres/ capita/day)	155	180	Assumption
5	NRW ratio (%)	23%	25%	Assumption
6	Required water production amount (m^3/day)		229,608	3 x 4/100 /(1-5/100)
7	Future water demand (m^3/day)		230,000	=6

Source: The JICA Team

(7) Required Additional Water Supply System Development Project

Future water demand in 2035 is estimated at 230,000 m^3/day (see Table 6.2.4). On the other hand, current water production amount is 129,820 m^3/day. Meanwhile, water production amount to be supplied by the two planned water development projects is set at 175,600 m^3/day (96,000 m^3/day to come from KNPIWSP, and 79,600 m^3/day from KHWSP).

Based on the situation mentioned above, the total production amount (including the estimated amounts from the two planned projects) becomes 305,420 m^3/day. This water production amount is larger than the future water demand in 2035 (230,000 m^3/day). So, it can be concluded that the additional water supply development project is not required until 2035.

(8) Issues on Water Supply

1) Issues on Water Supply System in the Greater Kandy Area

Based on the present condition and future water supply expansion projects according to NWSDB, issues on water supply systems in the Greater Kandy Area are as follows:

- Lack of funds
- High investment required for distribution system in low-density area and high operation cost because supplied areas are mostly hilly areas
- Pollution of water bodies
- Imbalance between income and production cost
- Tariff can cover only 30% of production cost
- NRW is still high

2) Issues on Water Supply System in KMC

Issues on water supply system in KMC are as follows:

- Insufficient water supply due to topographical and technical issues. Large areas do not have 24 hours water supply.
- Water production and distribution system is very old, around 60 years old.
- Water quality issues due to the old plants, turbidity, colour, and so on
- There are few spare parts to be used. Most spare parts cannot be used.
- High NRW component and loss of water that translate to loss of income
- Low rate tariff structure, not covering the capital cost
- Insufficient staff and vehicles. The staff need training and capacity building.
- KMC needs an additional WTP. Because KMC purchases water from NWSDB (bulk water) with a volume of around 12,000 m^3/day.
- Lack of proper management system

3) Water Rights for Utilising the Surface Water of the Mahaweli River

Main water source of the water supply systems in The Greater Kandy area is the Mahaweli River. Currently, total utilised amount of water from the Mahaweli River is around 100,000 m^3/day. After completion of the two new water supply projects, additional amount of 170,000 m^3/day will be required from Mahaweli River. In case of utilising a huge volume of surface water from said river in the future, water rights should be obtained from the River Management Authority.

However, until now there is no proper water rights system established by law in Sri Lanka. Traditionally, all kinds of water users are allowed to get the water they need through various means. Individuals apply to NWSDB to get their water connections and pay the service cost to said agency based on monthly usage. Major irrigation schemes, hydropower plants, and large bulk water users get their water supply quota from the Mahaweli Authority of Sri Lanka (MASL).

The objective of water right/allocation policy is to promote an efficient and wise use of available water resources of Sri Lanka through securement and orderly allocation of water, equitable access to water by all users, preservation of water supply for environmental and social/cultural priorities, and voluntary transfer to higher-value uses.

6.2.2 Sewerage

(1) Kandy City Wastewater Management Project (KCWMP)

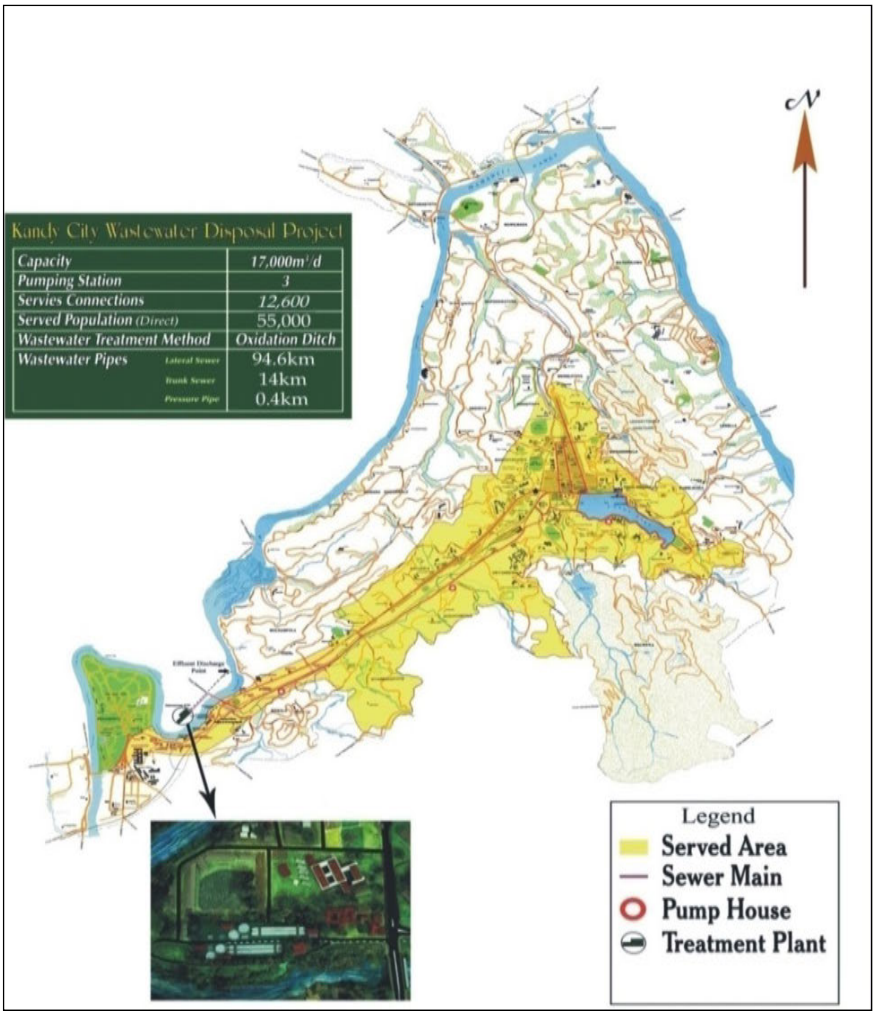
The Government of the Democratic Socialist Republic of Sri Lanka has received an Overseas Development Assistance (ODA) loan from JICA, in the amount of 14,087 million JPY for the cost of Kandy City Wastewater Management Project (KCWMP) bearing Loan Agreement No: SL-P99 Dated 26th March 2010.

Construction of KCWMP started on 26th of November 2013, first with the construction of the sewer collection system in the contract amount of 3,698 million JPY and it will be completed on 31st of October 2018. Construction of the wastewater treatment plant started on 3rd of March 2015 with a contract amount of 3,037 Million JPY and it will be completed on 2nd of December 2018, almost the same date as the sewer collection project.

The service area is 773 ha of land, and the resident population was 102,459 in 2012, and additionally the daily migrant population was approximately 150,000. The collected wastewater will be processed at a treatment plant at Gonnoruwa with ae capacity of 14,000 m^3/day. The main pumping station will be constructed at Gatambe while the solid sludge disposal area will be at Gohagoda. All of which will be significant new constructions.

- Wastewater treatment plant : Treatment capacity 14,000 m^3/day
- Treatment method : Oxidation ditch process
- Location : Gonnoruwa
- Other facilities : Main sewage pumpingsStation, sludge drying bed
- Treated water discharge point : Mahaweli River; Upstream from the water intake of KMC Water Treatment Plant
- Sewer collection system:
  - Trunk Sewer : L=9.1 km,
  - Branch Sewer : L=76.8 km
  - Service Sewer : L=146.2 km
  - Force main : L=3.2 km
  - No. of manholes : N=2,790

Served areas and sewerage facilities of KCWMP are shown in Figure 6.2.7.



Source: NWSDB

Figure 6.2.7 Served Areas and Sewerage Facilities of KCWMP

Figure 6.2.8 shows the KMC's Wastewater Treatment Plant under construction to be completed by the end of 2018.

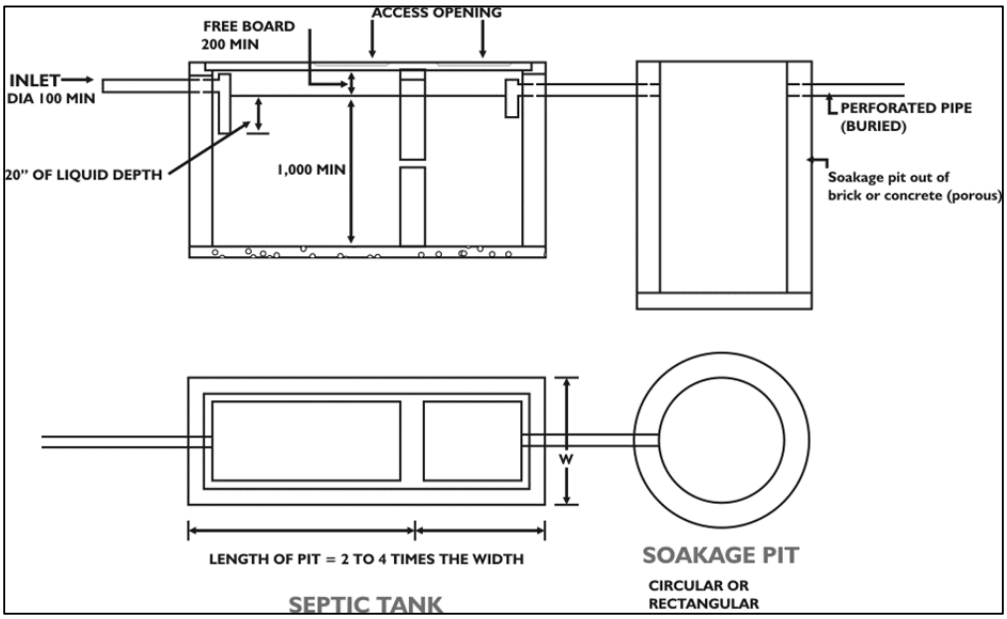
		
Oxidation Ditch (1): Under Construction	Oxidation Ditch (2): Under Construction	Final Settling Tank: Under Construction

Source: The JICA Team

Figure 6.2.8 KMC's Wastewater Treatment Plant

(2) Sewerage and Sanitation System

There is no proper wastewater treatment plant except the one in KMC in the Greater Kandy Area. An on-site treatment system by septic tank is the most common treatment system in the Greater Kandy Area. The standard structure of the septic tank in Sri Lanka is shown in Figure 6.2.9.



Source: NWSDB

Figure 6.2.9 Standard Structure of Septic Tank

Based on the above figure, this type of septic tank is called an "unlined septic tank" and it is very easy to precipitate the wastewater to the ground from the bottom of the soakage pit.

According to interviews with the Local Authorities (LAs), the sludge in the septic tank is removed every five (5) years; but most LAs have no sludge treatment plant. It means that the unlined septic tank system could have been causing contamination of the groundwater.

(3) Issues on the Sewerage System in the Greater Kandy Area

The on-going Kandy City Wastewater Management Project (KCWMP) can improve environmental conditions, specifically the quality of water bodies like Kandy Lake and Meda Creek in KMC area. However, outside of KMC in the Greater Kandy Area no sewerage system has been established. Therefore, the following issues persist in the Greater Kandy Area:

- On-site treatment system by septic tanks could have been causing contamination of the ground water
- Contamination of the groundwater causes water-borne infectious disease
- There is no sludge treatment plant in the Greater Kandy Area.
- A private sludge removal company could easily discharge sludge into the river or field, which has negative effect on the environment.
- The frequency of sludge removal at each household is only once every five (5) years.

6.2.3 Drainage System in the KMC Area

(1) Existing Drainage System in Kandy Municipality Council

Inundation analysis of Kandy's drainage system is one of the projects conducted by SCDP (Strategic Cities Development Project). There are three principal drains in KMC area conveying the storm water from each of the valleys: (a) Yatinuwara tunnel drain, (b) Meda Ela tunnel drain, and (c) Bogambara Outfall tunnel drain. They eventually discharge the storm water into the main Meda Ela Drain that conveys the storm water to the Mahaweli River at Getambe.

Flooding area in the past is located upstream of Yatinuwara tunnel drain in KMC area.

Based on the results of a hydraulic model study, Yatinuwara drain will be flooded by applying five (5) year return period and Meda Ela will be flooded by applying ten (10) year return period. Bogambara drain will not be flooded even applying ten (10) year return period. After improving the drain of Yatinuwara, Meda Ela will not be flooded. Therefore, improvement of the drainage system in KMC area is required in order to mitigate flooding.

Current Meda Ela situation is shown in Figure 6.2.10.

		
Downstream of Meda Ela at Low land area	Meda Ela at Sharp Turn and Narrow Space	Under Construction of SCDP at Middle Part of Meda Ela

Source: The JICA Team

Figure 6.2.10 Current Meda Ela (Creek) Situation

(2) Existing Creek/Drain Conditions in Akurana

Most of the Greater Kandy Area is hilly. Therefore, many of its existing drains have a steep inclination so that flow velocity in the drain is very fast and the drain can carry a great deal of storm water. However, if there are many obstructions like those shown in the figures, such as foundation pile and weeds/garbage in the drain, flood will occur easily.

It is said that sometimes inundation occurs at Akurana. It is because of the obstructions in the drain. Current actual Pinga Oya situation and the drain along the road are shown in Figure 6.2.11

		
Clogging the drain by garbage	Foundation pile in the creek	Weedy creek

Source: The JICA Team

Figure 6.2.11 Current Drain and Creek Condition at Akurana

(3) Issues on Drainage System in the Greater Kandy Area

Many obstructions like garbage, weeds, and foundation piles in the creek occur in the Greater Kandy Area. These obstructions should be removed and the drain should be kept clean in order to mitigate the inundation.

Issues concerning the drainage system in the Greater Kandy Area are as follows:

- The drain and drain pipe are clogged with dirt and garbage
- Illegal construction in the creek
- Improper cross section of the drain
- Improper alignment (sharp changes in alignment) of the drain
- Appropriate operation/maintenance is required for the existing drains and creeks

6.3 Solid Waste Management

6.3.1 Waste Generation and Waste Flow

(1) Waste Generation in Sri Lanka

The current total waste generation amount in Sri Lanka is approximately 8,000 tons/day as shown in Table 6.3.1.

Table 6.3.1 Waste Composition in Sri Lanka

Biodegradable Wastes	Recyclable Wastes	Other Wastes	Total
120 tons/day	180 tons/day	7,700 tons/day	8,000 tons/day
1.5%	2.3%	96.2%	100.0%

Source: CEA

According to CEA, most of the collected wastes in Sri Lanka are disposed of in open dumps and only 1.5% of total generated wastes are being recycled, while 2.3% recyclable wastes are being composted.

(2) Greater Kandy Area

1) Waste Generation

The quantitative data of generated wastes in the Greater Kandy Area is limited; and only five LAs (Kandy MC, Kadugannawa UC, Harisaaththuwa PS, Gangawatta Korale PS, and Pathhewaheta PS) measure their waste generation as shown in Table 6.3.2.

Table 6.3.2 Waste Generation by Local Authorities

Local Authority	Area (km^2)	Population	Number of Households	Unit Waste Generation Rate (kg/day/capita)	Waste Generation Amount (ton/day)
Kandy MC	24.28	106,458	24,084	0.35	150
Kadugannawa UC	5.28	13,186	3,163	0.16	2
Wattegama UC	2.59	7,843	3,941	unknown	3
Akurana PS	31.92	75,805	15,117	unknown	7
Harisaaththuwa PS	59.04	98,609	27,540	0.153	15
Pujapitiya PS	54	66,853	16,228	unknown	7
Thumpane PS	109.4	74,280	No data	unknown	3
Gangawatta Korale PS	34.4	70,469	16,562	3-10	8
Pathadumbara PS	45.5	97,682	24,672	unknown	5
Pathhewaheta PS	unknown	unknown	unknown	0.6	4- 5
Udunuwara PS	65.8	121,360	30,958	unknown	6
Kundasale PS	85.8	134,145	69,089	unknown	25
Yatinuwara PS	70	117,444	31,567	unknown	4 - 5

Source: The JICA Team's Survey Result, June 2017

2) Collection and Transportation

Common methods of waste collection in the Greater Kandy Area are shown in Table 6.3.3. In most of the 13 LAs, generated wastes are segregated at the household level. In principle, the wastes are collected almost daily, or 5 to 6 days a week by door-to-door collection. However, even with such frequency it is often observed that people dump their wastes along road sides in urban areas.

Table 6.3.3 Waste Collection Methods by Local Authorities

Local Authority	Segregation	Frequency	Collection Method
			Door to Door
Kandy MC	yes	daily based on area /waste type	yes
Kadugannawa UC	yes	daily	yes
Wattegama UC	yes	daily	yes
Akurana PS	unknown	6 days/week	
Haris Paththuwa PS	yes	6 days/week	yes
Pujapitiya PS	unknown		
Thumpane PS	yes	5 days/week	yes
Gangawatta Korale PS	yes	daily	
Pathadumbara PS	yes	daily	yes
Pathhewaheta PS	yes	6 days/week	yes
Udunuwara PS	yes	6 days/week	yes
Kundasale PS	yes	daily	yes
Yatinuwara PS	yes	daily	yes

Source: The JICA Team's Survey Result, June 2017

Table 6.3.4 shows the types of waste collection vehicles which the LAs commonly use. As illustrated, only four LAs out of 13 use compaction vehicles and the most common waste collection vehicles are tractors with uncovered trailer. This type of waste collection vehicle is problematic especially in tourist areas because the wastes in most trailers overflow and some of these are blown by the wind and scattered along the road sides. Furthermore, wastes also generate odours and leachate.

Table 6.3.4 Types of Waste Collection Vehicles by Local Authorities

Local Authority	Compaction Vehicle	Track	Tractor with Trailer	Three-wheeler Car	Crew Cab
Kandy MC	✔		✔	✔	
Kadugannawa UC			1		1
Wattegama UC			1		
Akurana PS			1		
Haris Paththuwa PS	1		1		
Pujapitiya PS					
Thumpane PS	3	1	2		
Gangawatta Korale PS			2		
Pathadumbara PS			1		
Pathhewaheta PS			2		
Udunuwara PS					
Kundasale PS	✔	✔	✔		
Yatinuwara PS			1		

Source: The JICA Team's Survey Result, June 2017

	
Tractor with Trailer Type Waste Collection Vehicle	Compaction Type Waste Collection Vehicle
	
Three-wheel Type Waste Collection Vehicle	Track Type Waste Collection Vehicle

Source: The JICA Team

Figure 6.3.1 Types of Waste Collection Vehicles

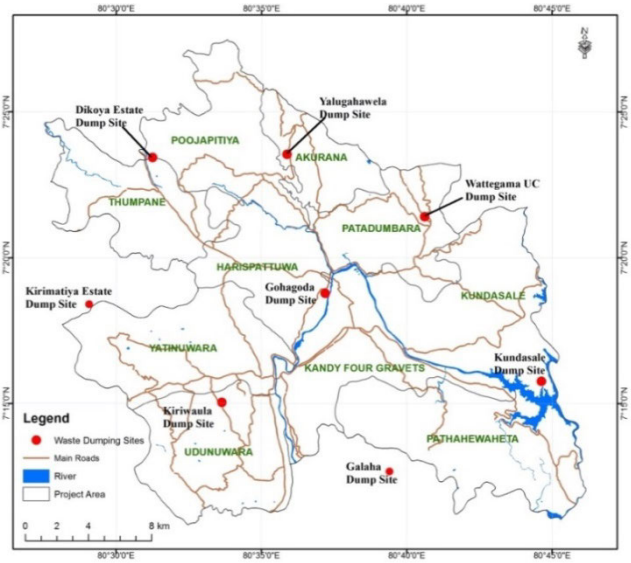
3) Intermediate Treatment

Composting is a popular method in this area of wherein composting plants are mostly within the vicinity of the disposal sites. However, facilities for recycling other wastes such as plastic, PET bottles, and metals are lacking. It can be said that the recycling industry in this area is not yet developed.

4) Waste Disposal

In the Greater Kandy area, there are seven open dump sites which are shown in Figure 6.3.2. the Greater Kandy Area

Table 6.3.5 are the outlines of the seven disposal sites.



Source: Korea Exim Bank, The Feasibility Study for the Construction of Solid Waste Disposal Facilities in Sri Lanka

Figure 6.3.2 Locations of Waste Disposal Sites in the Greater Kandy Area

Table 6.3.5 Overview of Disposal Sites in the Greater Kandy Area, 2013

Local Authority	Dumping Area	Area of Land	Daily Tonnage	Description of Dump	Period of Operation	Remarks
Kandy MC	Gohagoda dump site	10 acres (4 ha)	80 tons	Very big dump	10 years	
Kadugannawa UC	Private land in Mawanella. Dumping into pits	Large area	2 tons	60 tons	1 month	No permanent place to dump
Akurana PS	Land at Yalugahawela in Pujapitiya PS bought by Akurana PS	5 acres (2 ha)	4-5 tons	Big dump	10 years	Pujapitiya PS also dump 2 tons/day
Harispattuwa PS	Gohagoda dump site of Kandy MC	10 acres (4 ha)	3-4 tons	Very big dump	-	
Gangawata Korale PS	Reserved land of Mahaweli Authority in Gonawatte area	2 acres	2 tons	Big dump	20 years	Site is very near to the river
Udunuwara PS	Land in Kiriwaula area belongs to Divisional Secretariat	2 acres (0.8 ha)	3 tons	-	12 years	Steep area
Kundasale PS	Compost site of PS	5 acres (2 ha)	8-10 tons	1,500 tons	8 months	
Total		34 acres (13.6 ha)	129-133 tons			

Source: Korea Exim Bank, The Feasibility Study for the Construction of Solid Waste Disposal Facilities in Sri Lanka

6.3.2 Institutional and Regulatory Framework

The National Policy on Solid Waste Management was formulated in 2007 by the Ministry of the Environment and Natural Resources based on the Constitution and the National Environmental Policy of Sri Lanka. It aims to reduce environmental, social, and economic problems associated with waste disposal practices, building upon the guiding principle that "polluter pays".

The objectives of this national policy are the following:

- To ensure environmental accountability and social responsibility of all waste generators, waste managers, and service providers
- To actively involve individuals and all institutions in integrated and environmentally sound solid waste management practices
- To maximise resource recovery with a view to minimise the amount of waste for disposal
- To minimise adverse environmental impacts due to waste disposal to ensure health and well-being of the people and the ecosystems

shows the Statement of National Policy on Solid Waste Management in Sri Lanka describing the aspects related to waste management, capacity building and research and development, institutional arrangement, financial, and legal mechanisms.

Table 6.3.6 The Statement of National Policy on Solid Waste Management

Waste Management	1) Solid waste will be managed in accordance with the 3R principle with special emphasis on waste preventive approaches. 2) Land-filling will be limited to non-recyclable, non-compostable, and inert materials generated through waste treatment processes. 3) Development and implementation of sub-sectorial policies in line with the National Policy shall be made mandatory. 4) Importation of all types of post-consumer waste will be prohibited. 5) Institutional strengthening and capacity building needs of stakeholders with special emphasis on Local Authorities will be addressed to promote effective waste management. 6) Hazardous Biomedical / Healthcare wastes will be managed so as to prevent environmental contamination and to minimise the risks to public and ecosystems. 7) Institutional mechanisms will be established to prevent hazardous biomedical /healthcare wastes entering into the municipal waste streams. 8) Public safety will be ensured through appropriate liability and compensation mechanisms. 9) Regular monitoring and evaluation systems will be established to ensure system improvements. 10) Annual performance reporting and effective monitoring mechanisms will be set in place at LA level.
Capacity Building and Research and Development	1) Awareness, education, training, and capacity building on integrated waste management will be promoted at all levels 2) Research and development will be encouraged and promoted at appropriate levels 3) Best Available Technologies (BAT) and Best Environmental Practices (BEP) will be transferred to all sectors, including the informal sector.
Institutional Arrangement	1) Responsible public-private and community partnerships will be promoted at appropriate levels for service provision while recognising that the SWM stays with local authorities as defined by the respective laws in the present context. 2) Social and corporate responsibility and accountability towards solid waste management will be ensured. 3) Institutional framework for sound waste management will be strengthened through improved inter agency coordination and empowerment of civil society groups
Financial Mechanisms	1) Sustainable financial mechanisms shall be made mandatory to ensure the sustainability of solid waste management programmes. 2) LAs shall ensure self-financing for waste management by effective revenue generation mechanisms. 3) Appropriate financial incentive schemes will be explored and established to promote waste management. 4) Carbon financing as provided by Kyoto Protocol will be promoted as an incentive for promoting waste management practices in line with the existing Clean Development Mechanism Policy.
Legal Mechanisms	1) Existing regulatory mechanisms will be strengthened through appropriate legal reforms. 2) Effective law enforcement will be ensured as means of maintaining the accountability of stakeholders. 3) Basel Convention commitments on transboundary movement of waste will be honoured to fulfil Sri Lanka's obligations

Source: National Policy on Solid Waste Management in Sri Lanka

Furthermore, based on the National Environmental Act of 1980, the National Environmental (Municipal Solid Waste Management) Regulation, No. 1, was established in 2009 in the Greater Kandy Area. The following are the highlights of this regulation:

- No person shall (a) dump municipal solid waste along the sides of any national highway, (b) dump solid waste at any place other than places designated for such purpose by the relevant local authority or any person or body of persons authorised by them in that behalf.
- Any person contravening the provisions of this regulation shall be guilty of an offence punishable under Section 31 of the Act.
- No person shall collect or cause to be collected any municipal solid waste from any designated place along the national highway, other than during the hours of 6.00 p.m. to 6.00 a.m.

- Provided that the collection of domestic waste may be carried out by any person or body of persons authorised in that behalf, from the respective households, during the hours of 6.00 a.m. to 6.00 p.m.

The Central Environmental Authority (CEA) formulated the Technical Guidelines on Solid Waste Management in Sri Lanka. According to an interview survey, most of the LAs use these guidelines, consisting of the following sections:

- Target Solid Waste
- General Guidelines
- Waste collection
- Transfer Stations
- Materials Recovery Facility
- Incineration Facility
- Composting Facility
- Anaerobic Digestion / Biogas Production Facility
- Landfill Facility

In the guidelines, municipal wastes are defined as follows:

- Domestic waste (exclusive of sewage and hazardous waste)
- Commercial waste (market waste)
- Institutional wastes or those from schools, hospitals (nonclinical), public offices, etc.
- Street sweeping and beach cleansing waste
- Garden waste (tree cuttings and grass cutting wastes)
- Wastes collected from drains and water courses in urban areas

6.3.3 Findings on Solid Waste Management Problems

Based on the results of the secondary data review, field reconnaissance survey, and interviews, the solid waste management problems in the project area can be summarised based on institutional, technical, and social aspects as shown in Table 6.3.7. These problems are further illustrated in Figure 6.3.3 below:

Table 6.3.7 Solid Waste Management Problems

Institutional Aspect		Related Regulations Do Not Fit with the Existing Situation
Technical Aspect	Waste Generation	• Huge amount of waste is generated. • Waste segregation at source is limited.
	Collection and Transportation	• Number of waste collection vehicles which are old is inadequate. • Tractor-type waste collection vehicles cause problems in tourist areas because of overflowing and scattering of wastes on the road, leaking leachate, and stinking odour. • Waste collection stations on the road sides attract flies and generate stinking odour and leachate.
	Intermediate Treatment	• Composting is already being practised in this area, but recycling is limited.
	Disposal	• It is possible that the existing disposal sites generate environmental problems, because all of these are categorised as open dumping. • Amount of waste at the disposal sites is not clear, so it is difficult to calculate the lifespan of the disposal site. • The current disposal method creates negative impacts on health and environment, and there is no immediate plan for the closure of the dumping sites.
Social Aspect		• Community involvement in solid waste management is limited; only LAs shoulder responsibility.

Source: The JICA team

	
Wastes scattered on the road side	Wastes dumped in body of water
	
Leaking leachate generating odour and attract flies	Open dumping
	
Steep slope of garbage mountain	Open dumping and no management of disposal site
	
Scattered wastes and leachate contaminating a water body	Scattering of wastes showing lack of proper management of disposal site

Source: The JICA team

Figure 6.3.3 Solid Waste Management Problems

6.3.4 Issues on Solid Waste Management in the Greater Kandy Area

Table 6.3.8 shows solid waste management problem elements and issues to be tackled in the Greater Kandy Area.

Table 6.3.8 Issues on Solid Waste Management

Problem Elements		Issues
Institutional Aspect		• Definition by LAs of collected wastes should be clarified. • Establishment of Greater Kandy Solid Waste Management Committee in order to have an integrated promotion of solid waste management in 13 LAs. • Waste collection fee should be revised and promoted to encourage people's acceptability
Technical Aspect	Waste Generation	• Promotion of 4R (Reduce, Re-use, Recycle, and Refuse). • Reduced amount of waste generated at household level. • Promotion of waste segregation at household level. • Harmful waste should be separated from other types of waste.
	Collection and Transportation	• Conversion of tractor-type to compaction-type collection vehicles for hygienic reasons. • Set up adequate waste bins in strategic places and avoid waste collection stations at roadsides. • Promote safety of collection crews by providing them with appropriate shoes, uniforms, and gloves and enhance sanitation of collection trucks and crew.
	Intermediate Treatment	• Segregation of recyclable wastes at each stage, including generation at source, collection/transportation, and disposal. • Promote recycling not only for compost but also for other types of recyclable wastes. • Recycling industry should be introduced.
	Disposal	• Improve existing disposal sites on a step-by-step approach. • Determine the lifespan of existing disposal sites and promote their extension by proper management. • The disposal sites should be managed based on quantitative data. • Regional disposal sites should be promoted.
Social Aspect		• Community solid waste management should be established. • People's cooperation on solid waste management should be promoted.

Source: The JICA Team

6.4 Social Infrastructure

6.4.1 Educational Facilities

The education system of Sri Lanka is described below and Table 6.4.1 gives the types of schools.

- Primary education : Grades 1-5
- Junior secondary : Grades 6-9 (compulsory)
- Senior secondary : Grades 10-11
- Collegiate : Grades 12-13

Table 6.4.1 Types of Schools

Type of School	Grade	Description
National School	1-13	・ Type 1AB and/or Type 1C schools
Provincial School – Type 1AB	1-13	・ Advanced Level Science Stream only ・ Advanced Level Science and Non- ・ Science Streams
Provincial School – Type 1C	1-13	・ Advanced Level Non-Science Stream only
Provincial School – Type 2	1-11	
Provincial School – Type 3	1-8 or 1-5	

Source: Ministry of Education

In the Greater Kandy Area, there are a total of 342 schools. Many national schools and type 1AB schools – a total of which is 58 – are located in Gangawatta Korale DSD. In the said DSD, access to higher education is easier than in other DSDs. For primary and secondary education, the school facilities are distributed in all DSDs.

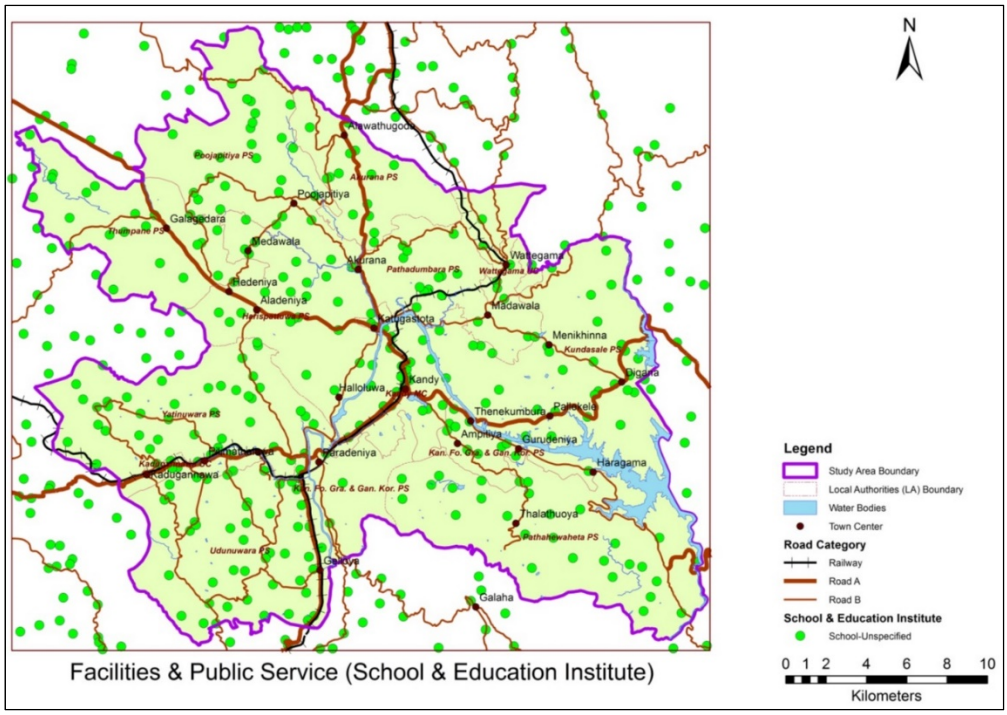
Table 6.4.2 shows the number of schools according to the DSDs. The table only shows public schools. It is noted that the private schools, which are often called international schools, are located within KMC.

Figure 6.4.1 shows the location of public educational facilities. Although the types of schools are unknown from the date source by Department of Survey in 2001, schools having grades 1 to 5 are equally distributed geographically and cover the whole Greater Kandy Area.

Table 6.4.2 Number of Schools and Students in Greater Kandy Area

DS Division	National Schools		Provincial Schools								Total No. of Schools of DSD	Total No. of Students of DSD
			Grade 1AB Schools		Grade 1C Schools		Grade 2 Schools		Grade 3 Schools			
	No. of Schools	No. of Students	No. of Schools	No. of Students	No. of Schools	No. of Students	No. of Schools	No. of Students	No. of Schools	No. of Students		
Thumpane	2	1,741	1	617	6	1,856	2	111	8	1,492	19	5,817
Pujapitiya	3	2,611	1	812	7	2,726	10	1,139	10	2,531	31	9,819
Akurana	3	4,257	1	1,663	5	1,418	11	3,159	7	2,194	27	12,691
Pathadumabara	1	1,957	2	3,724	11	7,442	7	1,494	6	1,891	27	16,508
Kundasale	2	1,908	1	1,742	13	5,924	15	3,619	5	2,558	36	15,751
Gangawata Korale	7	25,725	12	29,958	15	12,254	20	2,917	4	1,089	58	71,943
Harispaththuwa	1	4,025	NA	NA	9	3,836	7	1,046	8	2,751	25	11,658
Yatinuwara	2	1,903	4	5,289	8	3,960	14	2,170	13	3,935	41	17,257
Udunuwara	2	1,741	1	1,261	15	5,978	17	2,342	12	2,512	47	13,834
Pathahewaheta	2	1,334	1	1,452	6	2,489	14	1,997	8	2,018	31	9,290
TOTAL	25	47,202	24	46,518	95	47,883	117	19,994	81	22,971	342	184,568

Source: Kandy District Statistic Handbook- 2015



Source: Department of Survey 2001

Figure 6.4.1 Locations of Educational Facilities in the Greater Kandy Area

6.4.2 Health Facilities

In the Greater Kandy Area, there are 2 teaching hospitals in Kandy and Peradeniya within Gangawatta Korale DSD, and they provide over 3,000 beds. In each DSD, at least one District Hospital is located, providing medical services; and total 950 beds are available in the category of district hospital. In addition, central dispensaries and Ayurwedic hospitals are also available in the District.

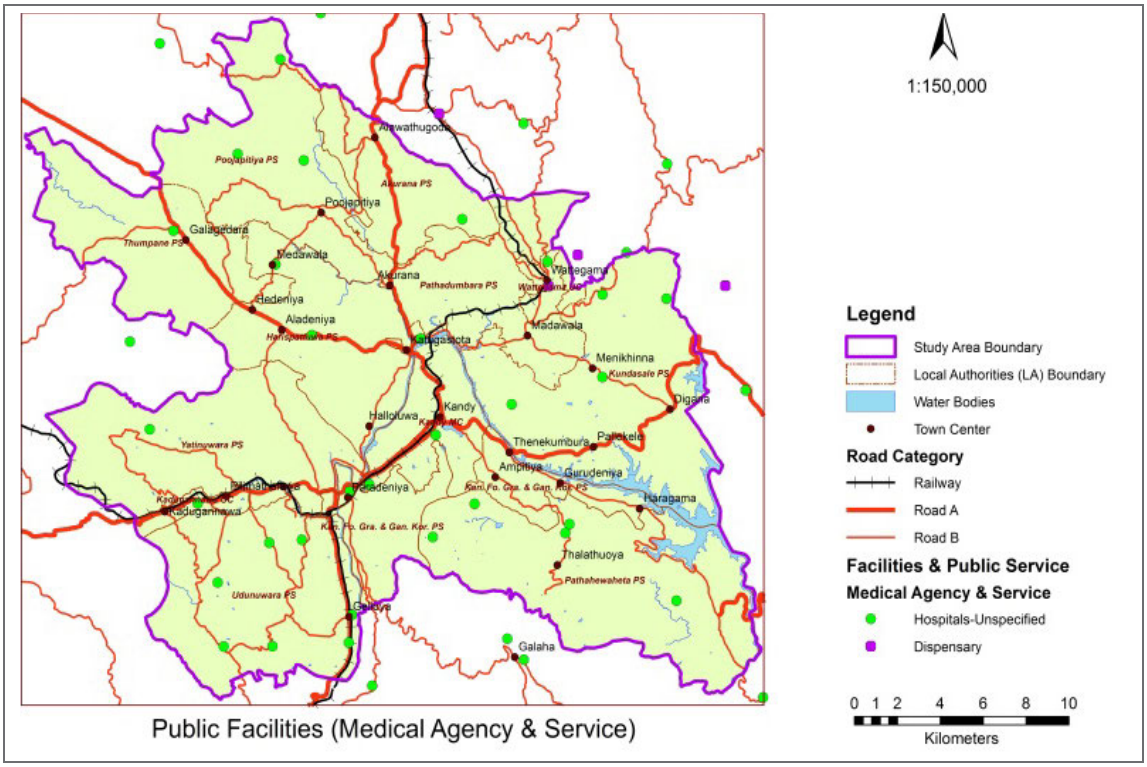
Table 6.4.3 Number of Hospitals and Beds

DS Division	Teaching Hospital		District Hospital		Base Hospital		Rural Hospital		Central Dispensaries	Ayurwedic Hospitals/Centres
	No. of Hospitals	No. of Beds	No. of Hospitals	No. of Beds	No. of Hospitals	No. of Beds	No. of Hospitals	No. of Beds		
Thumpane	-	-	1	67	-	-	-	-	1	1
Pujapitiya	-	-	1	63	-	-	1	44	4	2
Akurana	-	-	1	81	-	-	-	-	4	1
Pathadumabara	-	-	2	77	-	-	-	-	2	1
Kundasale	-	-	4	152	-	-	-	-	1	3
Gangawata Korale	2	3,226	1	63	1*	15		-	2	-
Harispaththuwa	-	-	2	92	-	-	-	-	1	1
Yatinuwara	-	-	3	116	-	-	-	-	3	-
Udunuwara	-	-	5	163	-	-	-	-	2	1
Pathahewaheta	-	-	2	76	-	-	-	-	2	1
TOTAL	2	3,226	22	950	1	15	1	44	22	11

Note: * Prison Hospital

Source: Kandy District Statistic Handbook- 2015

Figure 6.4.2 shows the locations of health facilities. However, the data do not reflect their classifications, and provide only figures for government hospitals. There is the issue of lack of capacity in meeting the healthcare needs of people in high-density places, such as Kandy Municipal Council area.



Source: Department of Survey 2001

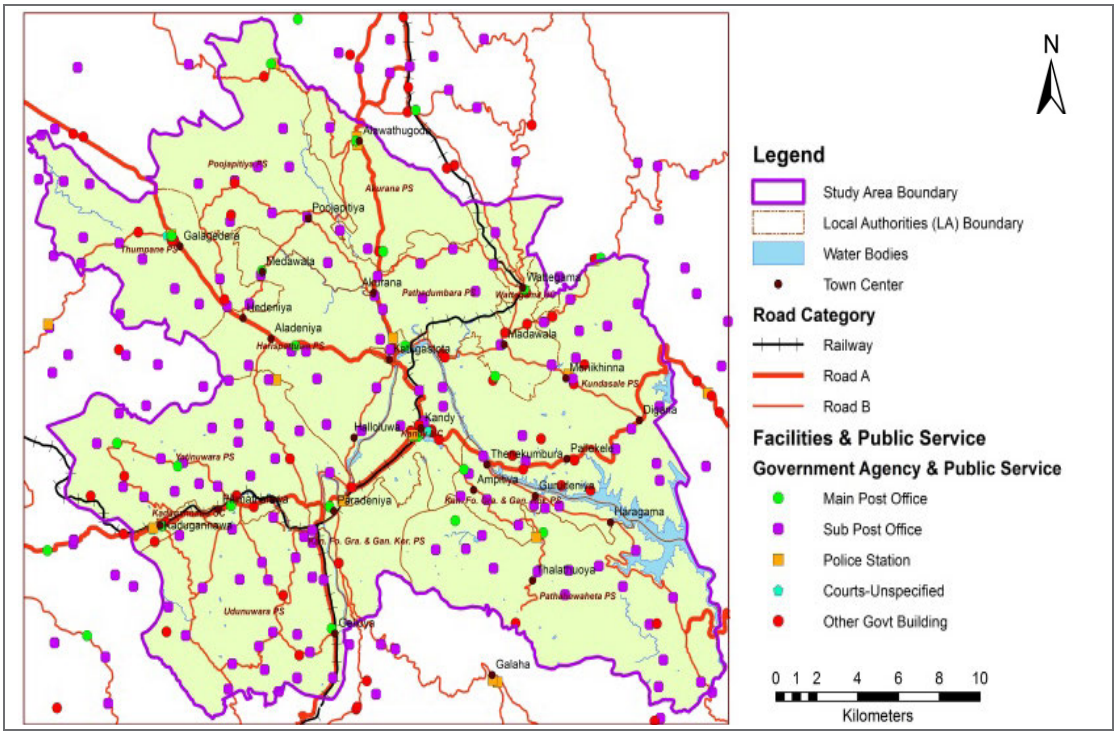
Figure 6.4.2 Locations of Health Facilities in the Greater Kandy Area

6.4.3 Government Agencies and Public Services

Government agencies and public services in the Greater Kandy Area, such as main post office, police station, courts, and government buildings are distributed across KMC.

Government agencies such as Agrarian Service Centre, Divisional Council Office, Town Hall, power house, Water Board, Telecommunication Centre, etc. are located mainly along the railway and main road network along Kadugannawa-Peradeniya-Kandy. It is also noted that Kundasale area has some government offices, such as provincial authority and the Mahaweli Authority.

Sub-post offices are equally distributed in the study area.

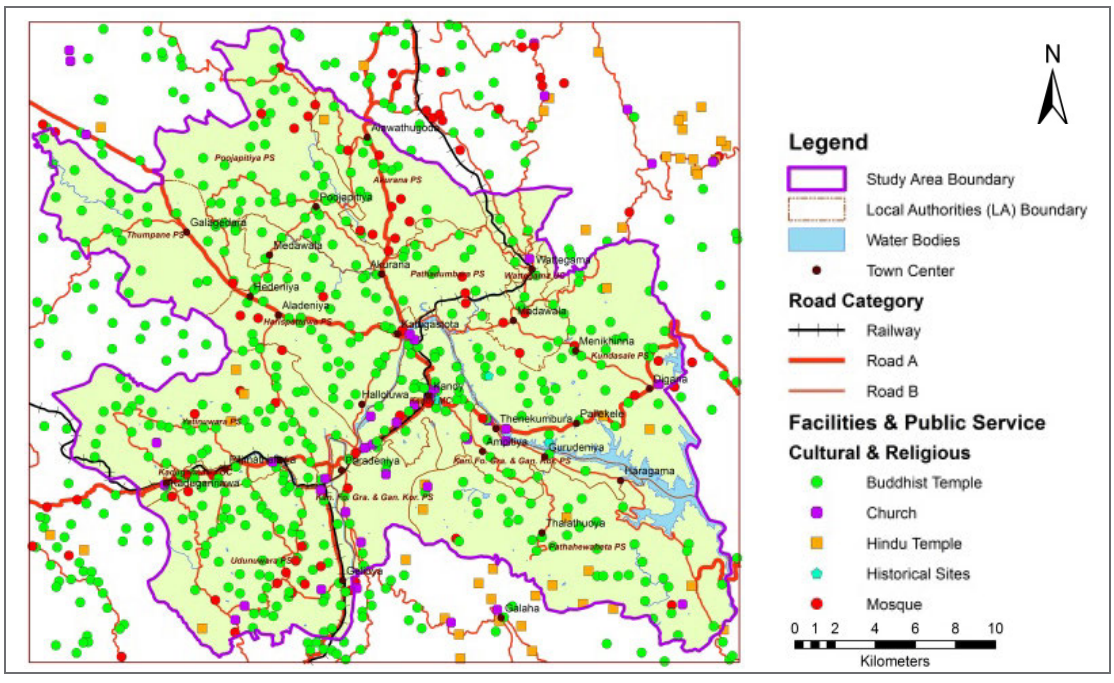


Source: Department of Survey 2001

Figure 6.4.3 Locations of Government Agencies and Public Services

6.4.4 Cultural and Religious Buildings

Cultural and religious buildings that are accessible from the main and smaller roads are distributed throughout the town and rural area. Most religious buildings are Buddhist temples, followed by mosques, Hindu temples, and Christian churches.



Source: Department of Survey 2001

Figure 6.4.4 Locations of Religious Facilities

6.5 Environment

6.5.1 Natural Resources and Environment

(1) Natural Environment

1) Legal Framework

Natural resource conservation policy is stipulated by the National Forest Policy of 1995 and Forest Law of 2009 for forest protection, and by the National Policy on Wildlife Conservation of 1990 for wildlife conservation.

2) Forest Law

All the forest areas are to be managed in a sustainable manner in order to ensure the continued existence of important ecosystems and flow of forest products and services. There are adequate provisions for collaborative management of protected areas and for benefit sharing. The three main objectives of the National Forest Policy are:

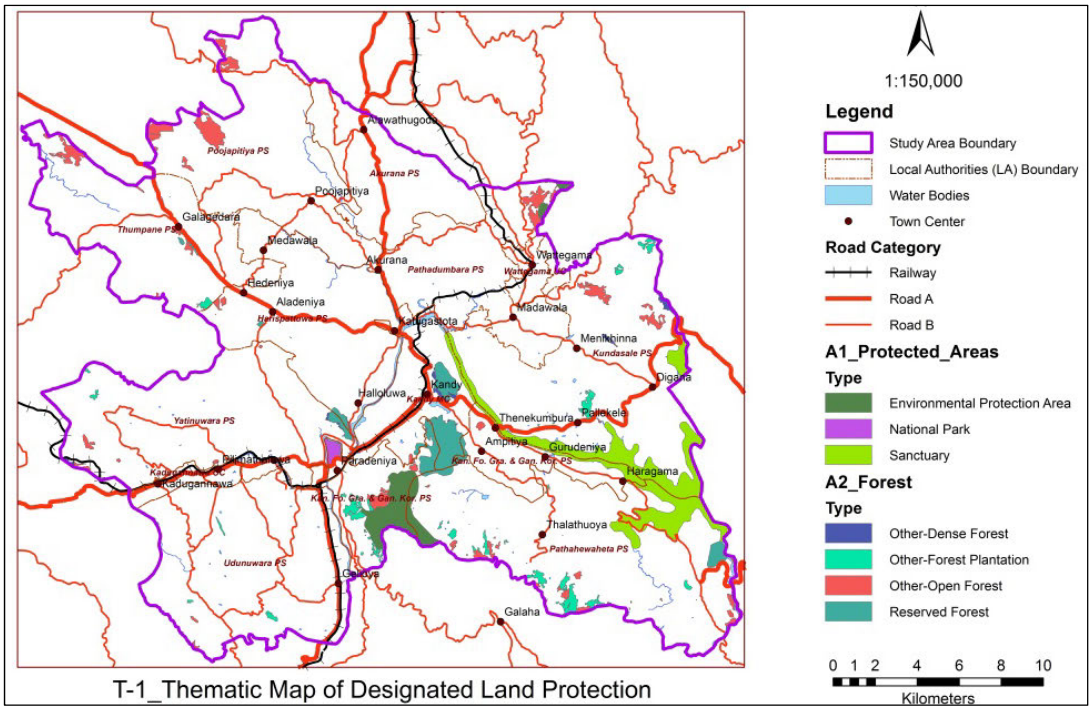
- To conserve forests for posterity, with particular regard to biodiversity, soils, water, and historical, cultural, religious, and aesthetic values
- To increase the tree cover and productivity of the forests to meet the needs of present and future generations for forest products and services
- To enhance the contribution of forestry to the welfare of the rural population, and strengthen the national economy, with special attention paid to equity in economic development

3) Wildlife Conservation Act

The objectives of this National Policy are:

- To conserve wildlife resources through protection, research, education, sustainable use, and benefit sharing for the benefit of present and future generations
- To maintain ecological processes and life-sustaining systems, with particular regard to primary production, hydrological balance, nutrient cycles, and prevention of erosion, siltation, drought, and flood
- To manage all components of genetic diversity as resources to improve crop plants and farm animals, and to develop in a fair and equitable manner new products and processes through bio-prospecting
- To ensure sustainable use and equitable sharing of benefits arising from the direct and indirect use of wildlife resources and ecosystems
- To conserve native and endemic species and their habitats so as to maintain the overall species richness and ecological integrity of the country
- To encourage the development of biological repositories for the purposes of conservation education and science
- To encourage the private sector and communities to join as full partners in all aspects of the wildlife-conservation process

Figure 6.5.1 delineates designated lands for natural resource protection.



Source: The JICA team

Figure 6.5.1 Designated Land Protection Areas in Greater Kandy

There is only one sanctuary designated by the Department of Wildlife Conservation (DOWC) and it is located along the Mahaweli River. This area is a part of Victoria Randenigala Rantembe Sanctuary. The main area is situated between the Knuckles Mountain Range and the Central Mountains of Kandy. Its size is approximately 42 thousand hectares.

The other sanctuary, a reserved forest designated by the Department of Forest (DOF), is Udawatta Kele Forest (Sanctuary). It is behind the Temple of the Tooth Relic. It is famous as a historic forest reserve on a hill-ridge in the city of Kandy. The area is approximately 100 hectares (257 acres) and it is famous for its extensive avifauna. It also benefits from a great variety of plant species, especially lianas, shrubs, and small trees. About as Layard's parakeet (*Psittacula calthropae*) and yellow-80 bird species have been recorded in this sanctuary, including endemic bird species such fronted barbet (*Megalaima flavifrons*)[2].

There is another protected area designated by the CEA, named Hanthana Mountain Range lying south-west of Kandy City and East of Peradeniya. This was declared protected in 2010 for purposes of sustainable development in this area. There is remaining forest as well as traditional tea plantations being operated. However, recent land encroachment for housing development has taken place and this aggravated the natural conditions in the area.

Source: www.milestothewild.com

Figure 6.5.2 Layard's parakeet (Psittacula calthropae)

Source: the JICA Team

Figure 6.5.3 A Tea Plantation in Hanthana Mountain Range

[2] IUCN directory of South Asian protected areas, 1990

6.5.2 Pollution

(1) Water Pollution

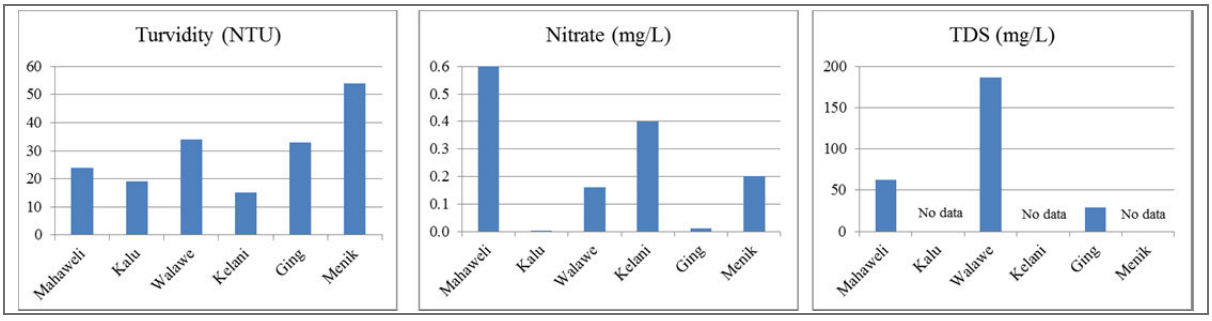
It has been reported that the water of the Mahaweli River has been polluted by direct discharge of non-treated wastewater and illegal disposal of waste from illegal occupants along the river side. However the situation has not been clarified due to shortage of systematic water quality monitoring systems. Industrial development has just recently been progressing in the Greater Kandy Area; that is why toxic/hazardous pollution such as by heavy metal may not have been actualized yet. On the other hand recent urbanization and population increase will accelerate domestic water pollution in the nearby river side.

Table 6.5.1 Water Quality in Major Rivers in Sri Lanka

Parameter \ River	Mahaweli	Kalu	Walawe	Kelani	Ging	Menik	Reference (Japanese Standard)
pH	6.90	6.20	7.10	6.10	6.30	7.00	6.5 – 8.5[1)]
Turbidity (NTU)	24	19	34	15	33	54	-
EC (uS/m)	122	65	326	57	38	536	-
Chloride	20	8	31	9	17	37	200[2)]
Nitrate (mg/L)	0.6	0.002	0.16	0.4	0.01	0.2	10 [3)]
Total Alkalinity (mg/L)	41	28	129	18	19	203	300 [2)]
COD (mg/L)	-	27	14	13		17	< 3 [4)]
BOD (mg/L)	-	-	1.19	252	0.11	0.80	< 2 [1)]
Total Hardness (mg/L)	52.7	-	136	24.1	18.2	157	300 [2)]
TDS (mg/L)	62.5	-	187	-	28.7	-	200 [2)]

Notes:
1) Category A for river water: raw water for general treatment system, fishery use, bathing
2) Drinking water standard
3) As amount of nitrate and nitrite
4) Category A for inland water: raw water for general treatment system, fishery use, bathing
5) There are no water quality standards in Sri Lanka.

Source: S.D.L.M.Welagedara, et al, Comparison of Water Quality Status of Major Rivers in Sri Lanka, 2014



Source: S.D.L.M.Welagedara, et al, Comparison of Water Quality Status of Major Rivers in Sri Lanka, 2014

Figure 6.5.4 Water Quality of Major Rivers in Sri Lanka

(2) Air Pollution

Kandy City is in a low lying land at the bottom of a basin surrounded mainly by Hantana Hunnasgiriya mountain ranges, and Bahirawa, Kurusa and Darmaraja mountains. Therefore, the geographical characteristics of the Kandy City also play a major role in the high rate of air pollution.

Since a continual ambient air quality monitoring network has not been properly set in Kandy District; the mechanism of air pollution in Kandy has not been clarified. While some academic research resulted certain pollution especially along/near roads, bus stops, and in the

commercial areas, etc. In addition, recently, more citizens have complained about air pollution in those areas.

As indicated in the following table, a 24-hour average of air quality satisfies the national standard level.

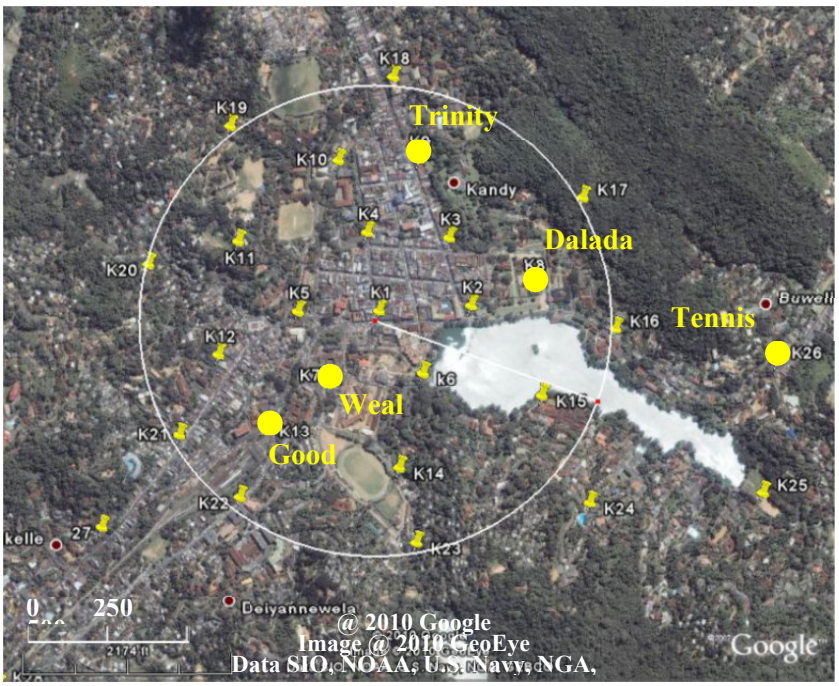
Table 6.5.2 Air Quality in Kandy City

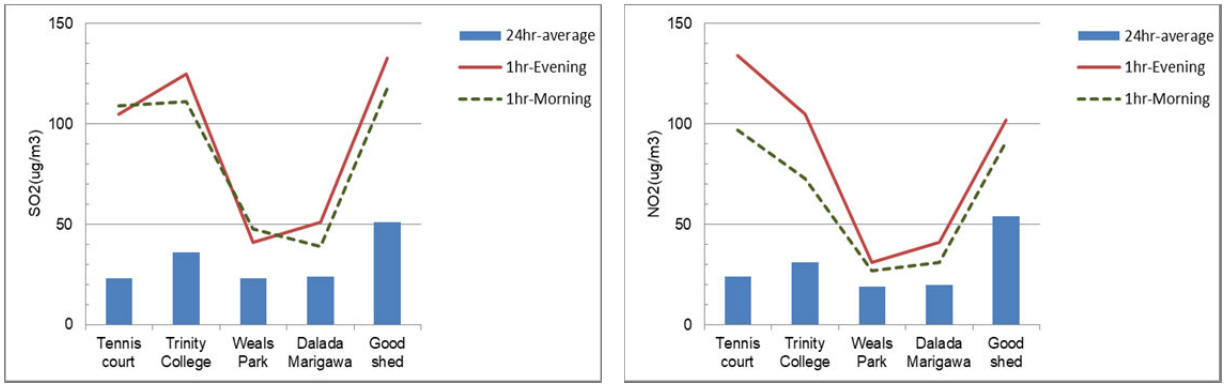
Location / Parameters	Tennis court	Trinity college	Weal park	Dalada Maligawa	Good shed	Sri Lankan Standard [2]
NO_2 (ug/m^3)	23	36	23	24	51	100
SO_2 (ug/m^3)	24	31	19	20	54	80
PM10 (ug/m^3)	56	65	30	42	89	300 [3]

Notes:
1) 24-hours value
2) CEB Long Term Generation Expansion Plan 2003-2017
3) as SPM

Source: H.D.S. Premasiri, et al, Population Exposure Risk Assessment to Air Pollution in Kandy City Area, 2012

On the other hand, the figures below indicate higher air pollution occurs in rush hour especially in evening. It would be caused by increased traffic volume population.





Source: H.D.S. Premasiri, et al, Population Exposure Risk Assessment to Air Pollution in Kandy City Area, 2012

Figure 6.5.5 Air Quality in Kandy City

6.5.3 Environmental Issues

Based on the evaluation of the natural environmental condition, significant environmental issues and their possible solutions are summarized in Table 6.5.3.

Table 6.5.3 Environmental Issues and Possible Solutions

Environmental Issues	Possible Solution
Land encroachment of river watershed, forest, agricultural land, mountainous area may cause: • Degradation of natural resources (forest, etc.) • Acceleration of disaster risk (land slide, flash flood, etc.)	• Proper land use planning based on the environmental zoning • Strengthening legal framework related to building permission • Public awareness
Deforestation could affect: • Degradation / change of bio-diversity • Acceleration of disaster risk (land slide, flash flood, etc.)	• Tree - plantation • Proper land use planning based on the environmental zoning • Strengthening legal framework related to forest conservation • Public awareness
Water pollution caused by industrial activities, domestic use, leachate from disposal site, etc. could trigger: • Degradation of natural resources (water, vegetation, wild life, etc.) • Human health disturbance (disease, etc.) • Degradation of living environment • Soil contamination • Underground water pollution	• Development of sewer system • Introduction of treatment tanks (septic tanks) • Conservation of water supply area • Secure water buffer zone • Comply with EPL (Environmental Protection License) in industrial sector • Monitoring of water quality • Public awareness
Air pollution mainly caused by traffic may cause: • Degradation of natural resources (water, vegetation, wild life, etc.) • Human health disturbance (respiratory system disorder, etc.) • Degradation of living environment	• Modal shift to public transportation system • Introduction of low emission vehicles • Road network improvement to mitigate traffic congestion • Strengthening legal framework related to enforcement of compliance on the air quality standards • Monitoring of ambient air quality

Source: The JICA Team

6.6 Disaster Prevention

6.6.1 Framework of Disaster Prevention

(1) Conceptual Frame

Disasters are phenomena resulting in loss of life and/or property along with environmental damage as well as a halt in social and economic activities following the effects of the aforementioned hazards on residential areas. Another way to define disasters is using an emergency/disaster cycle model. Activities constituting this cycle are divided into four phases, which require organisation and preparation. These phases, known as integrated disaster and emergency management, are as follows:

Mitigation – Mitigation is defined as a sustainable action executed with the aim of reducing and/or eliminating long-term risk to life and property due to a hazard. Mitigation, which also can be defined as prevention, provides a chance for reducing exposure to hazard risk over the long term. The goal in mitigation is to save lives and reduce the damage to property. Mitigation should be cost effective and environmentally friendly. This will reduce the large cost that will have to be reimbursed by property owners or each level of the state. Land use planning, adoption and execution of construction regulations, physical measures and residences in safe areas and transfer to safe areas are examples of mitigation activities.

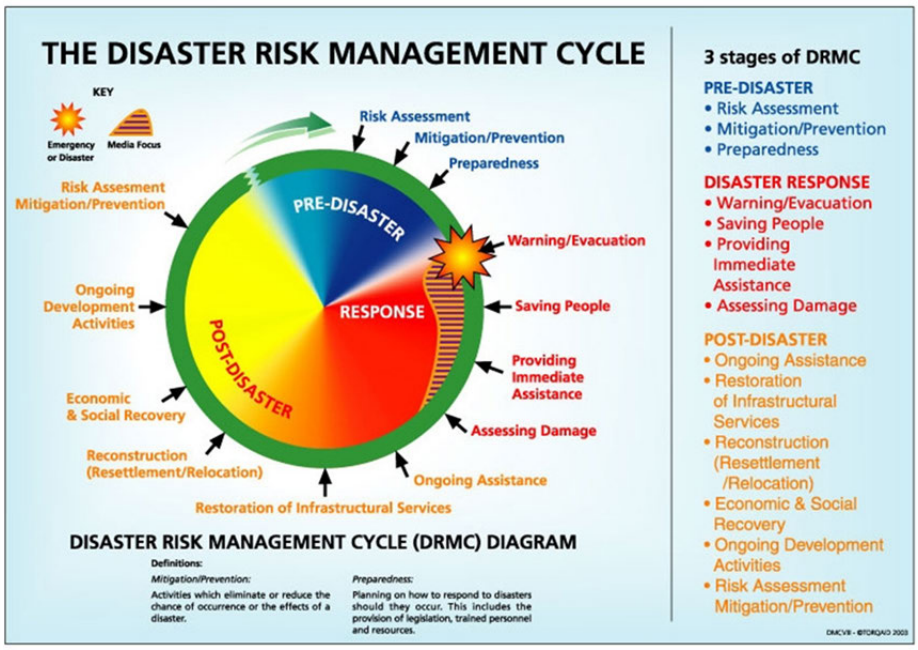
Preparedness: Since reduction of all damage due to disasters is impossible, the phase of being prepared functions like a security policy. Even if mitigation activities are implemented, occurrence of disasters necessitates the phase of preparedness. This phase covers planning and addressing the provision of the most effective and fruitful responses and determination of response principles to minimize the damage. Stocking supplies, awareness raising training, investigation of places for protection from hazards and forecast and early warning systems are examples of preparedness.

Response: This is the first phase after a disaster occurrence. The aim of response activities is provision of emergency aid including search and rescue, shelter and medical care to disaster victims. Additionally, prevention and/or reduction of the possibility and intensity of secondary damages to affected areas will contribute to recovery activities such as damage identification which will be carried out in the following phases.

Post Disaster: These include all activities addressing the recovery of all systems after the disaster in the emergency period. These activities can be divided into short- and long-term activities. While short-term activities aim at getting all vital systems working on a minimum operating level (restoration of the damaged water supply network or highways, for example), long-term activities aim to rehabilitate all the functions of the society permanently. Long-term recovery activities can continue for a few years after the disaster.

Experience shows that these phases are in relation to each other in a cyclical manner rather than a linear one. All activities and experiences come back to the mitigation phase separately and collectively. Hence, pre-disaster countermeasures under mitigation/preparedness will be formulated in this project, indicating how to prevent and reduce the potential emergency situations.

In this project, contents pertaining to the pre-disaster phase are included. Furthermore, for the recovery phase, contents are presented in terms of pre-disaster measures. Hence, pre-disaster countermeasures under mitigation/preparedness will be formulated in this project, indicating how to prevent and reduce the potential emergency situations. As for countermeasures for the “Response Plan”, only those related to mitigation measures shall be covered in this project.



Source: DMC

Figure 6.6.1 Disaster Risk Management Cycle

(2) Mitigation Plan in Disaster Management

When the disaster prone conditions, sociological and economical structure of the country are taken into consideration, it can be clearly seen from past data that susceptibility to disasters is very high. However, it is an unavoidable necessity to conduct risk management with the aim of mitigation, therefore making sure the damages caused by disaster are no longer inevitable. Disaster management structure and approach in Sri Lanka has evolved to this step and the exact same point has been stressed over the last 20 years in the international arena.

Plans defining the roles, responsibilities and objectives with the aim of rendering a society ready for disaster should be developed in the District Disaster Management Plan. The main target in the disaster prevention is to create sustainable, self-sufficient, disaster resilient residences. The Mitigation Plan in the Disaster Management Plan includes estimation of effects that a natural disaster can generate on an urban (constructed) environment and generating plans for reduction of these effects. Through identification of disaster hazards and risks and usage of strategic planning methods, a Mitigation Plan is developed.

The Mitigation Plan sets the road map for creating resilience against disaster risks before the disasters occur. The basic approach is determining and implementing all premeasures collectively and increasing the society's resiliency. Plans should be prepared and executed so as to minimize the residual damage that is left after a disaster and reducing the susceptibility of the society and the living environment to the damage that cannot be avoided are the main objectives.

6.6.2 Current Situation Regarding Disaster Prevention

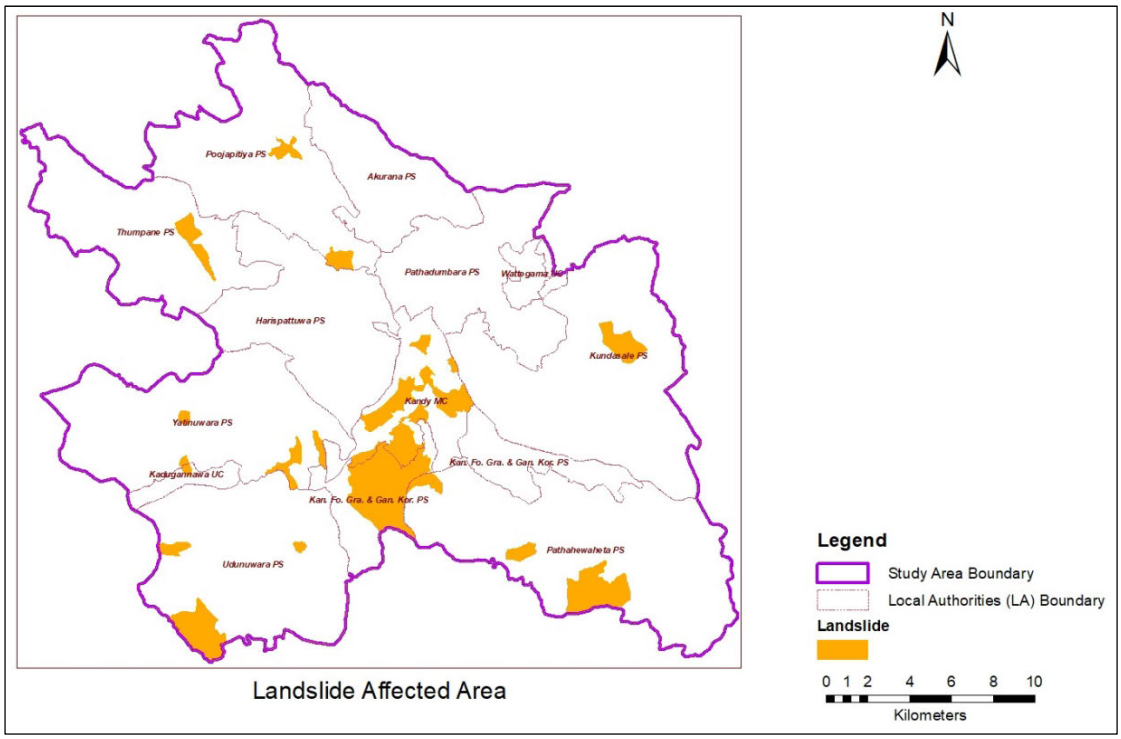
(1) Susceptibility to Disasters

Major disasters that affect people in Kandy district are landslide, floods, drought, rock failures, thunder storms, wild elephant attacks, epidemics, lightning, forest fires and damage by wild animals such as monkeys, according to the DMC Kandy.

In this project, the natural disasters such as landslide and flood, and fire incidents are focused because these disasters occur frequently and are thought crucial according to the interviews and consultations with the disaster management related organizations and the stakeholders meeting.

1) Landslides

Landslides occurred in the project area as shown in the following figure and table.



Source: DMC Kandy

Figure 6.6.2 Landslide Affected Area

Table 6.6.1 List of Landslide Occurrences

Year	Occurrences	Deaths	Injured	Houses Destroyed	Houses Damaged	Evacuated
2007	34	1	0	3	27	0
2008	43	1	4	2	37	34
2009	30	0	7	6	29	3
2010	35	1	0	7	28	10
2011	1	0	0	0	6	0
2012	3	0	0	0	12	0
2013	6	0	3	5	47	0
2014	1	1	1	0	0	0
Total	153	4	14	23	186	47

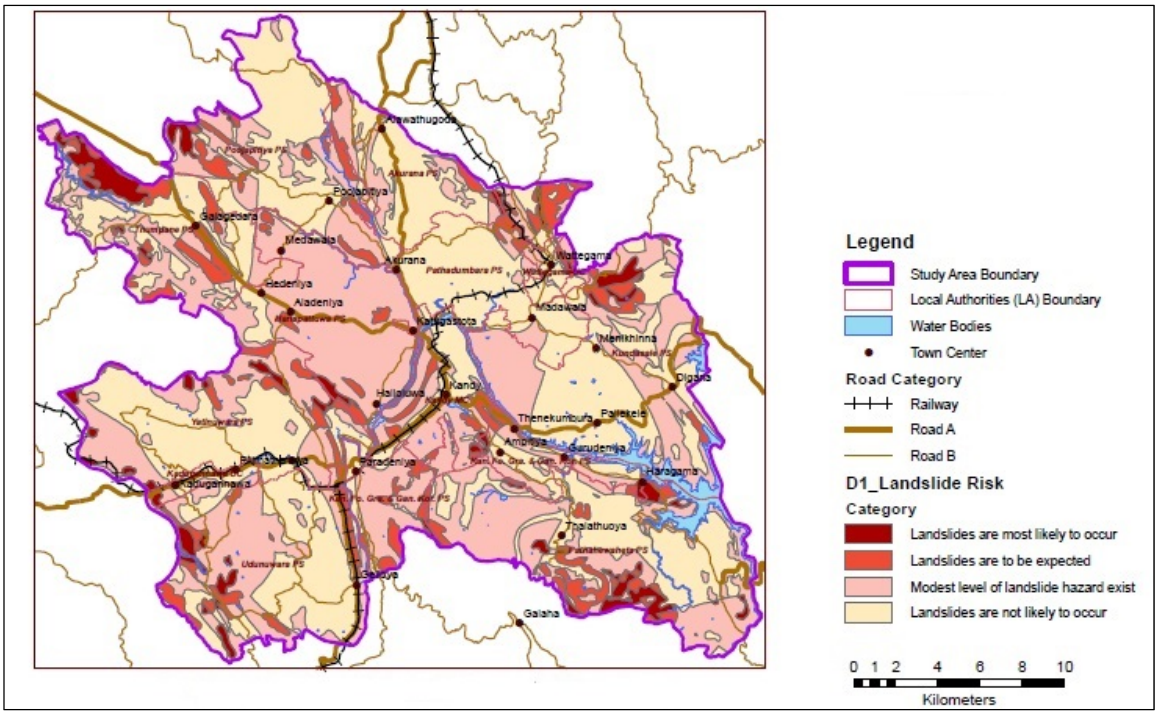
Source: DMC

Table 6.6.2 List of Landslide affected GND

DSD	GND
Gangawata Korale	Boowelikada
	Thalwatte
	Aruppola East
	Aniwatte West
	Aniwatte East
	Asgiriya
	Bahirawakanda
	Mahaiyawa
	Heeressagala
	Udabowala
	Bowala
	Ogastawatte
	Bowalawatte
	Uda Peradeniya
	Deiyannewela
	Bogambara
	Suduhumpola East
	Suduhumpola West
	Nittawela
Yatinuwara	Kendakaduwa
	Munvathugoda
	Kiribathkumbura
Kundasale	Deliwalathenna
Pathahewaheta	Udawelawatte Colony
	Medagama Udagama
	Bavulana
	Moragolla
Galagedara	Kopiwatte
	Kandekumbura

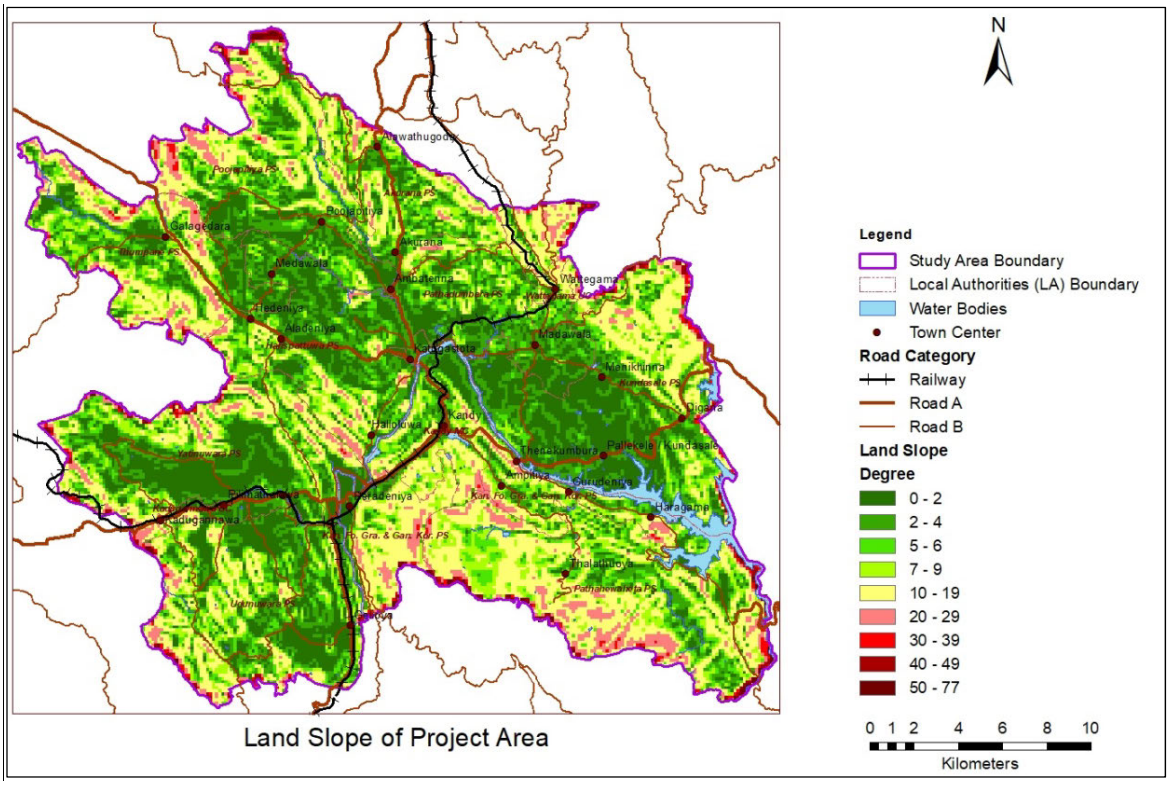
Source: DMC Kandy

Hazardous areas are shown in the landslide hazard map. Site level investigation is to be conducted in affected areas by NBRO, but assessment and continuous monitoring has not been done so far because of a lack of technical staff and budget allocation.



Source: The JICA Team based on NBRO's data

Figure 6.6.3 Hazard Map of Project Area



Source: The JICA Team based on NBRO's data

Figure 6.6.4 Land Slope of Project Area

2) Floods

Floods that have occurred in the project area are shown in Table 6.6.3 and Table 6.6.4.

Table 6.6.3 List of Flood Occurrence

Year	Occurrences	Deaths	Injured	Houses Destroyed	Houses Damaged	Evacuated
2007	34	1	0	3	27	0
2008	43	1	4	1	39	34
2009	31	0	7	7	30	3
2010	39	1	0	7	28	10
2011	10	1	3	25	102	0
2012	12	1	0	38	351	0
2013	10	0	3	5	62	0
2014	6	2	10	6	41	0
Total	188	8	27	92	6816	47

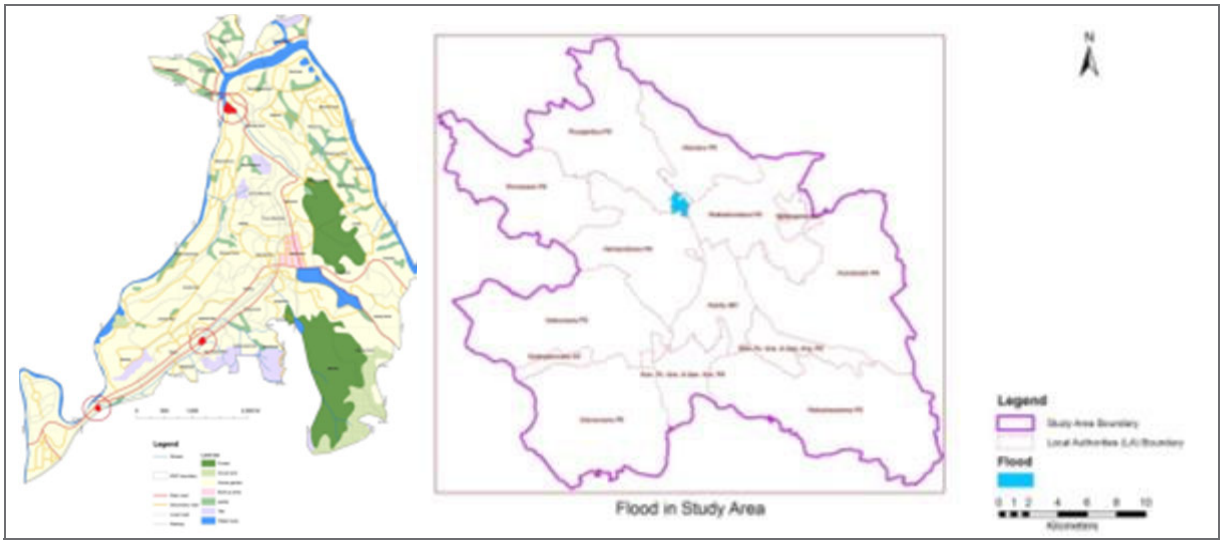
Source: DMC

Table 6.6.4 List of Flood Affected GND

Disaster	DSD	GND
Flood	Yatinuwara	Kotabogoda
	Poojapitiya	Kahawatte South
		Mullegama
	Akurana	

Source: DMC Kandy

Hazardous areas are shown in the flood record map.



Source: The JICA Team, DMC Kandy

Figure 6.6.5 Inundation Sites and Flood Affected Areas

Akurana lies in a flood-prone area along the Pinga Oya River. Along the Pinga Oya River, there were illegal buildings found, which block the river and reduce the drain flow capacity of the river.

Source: The JICA Team

Figure 6.6.6 Illegal Buildings Blocking the River and Scene of Flooding, Akurana

3) Fire

In 2016, fire incidents occurred in eight buildings in the grid, thirty-six incidents in the project area out of 115 total deployments in Kandy District.

Table 6.6.5 List of the Number of Fire Incidents

Type-location	District		Project area		KMC		Grid city	
	2015	2016	2015	2016	2015	2016	2015	2016
Building	21	34	19	32	12	22	2	8
Forest	12	75	12	72	7	37	0	3
Vehicle	4	6	5	6	3	5	0	1
Total	37	115	36	110	22	64	2	12

Source: Fire Department, KMC

Source: Fire Department, KMC

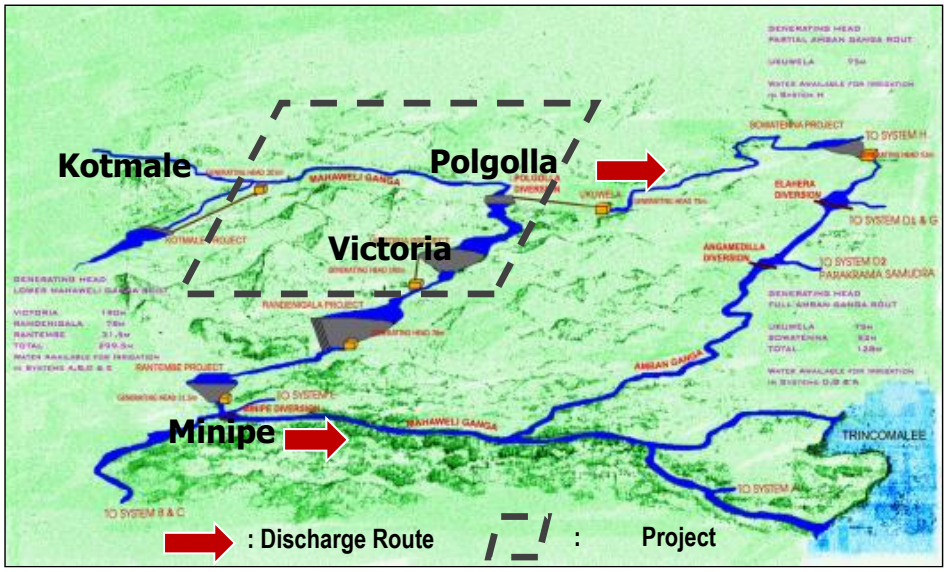
Figure 6.6.7 A Fire Incident in Grid City (2015)

(2) Structural and Non-Structural Measures Related to Disaster Prevention

1) Management of Mahaweli River System

The Catchment area of the Mahaweli River in the project area has been managed with the control of the spillway gate of Katmale Dam while Polgolla Diversion Dam at 440.47 m (MSL) and Victoria Dam of the lower stream have controlled the water level by the spillway. Before the construction of Katamale Dam, floods sometimes occurred in the lower stream area, but no flood has occurred since the construction.

The height of the water level is monitored in each site, but centralized management of the dam water level is desired in terms of real time water level regulation.



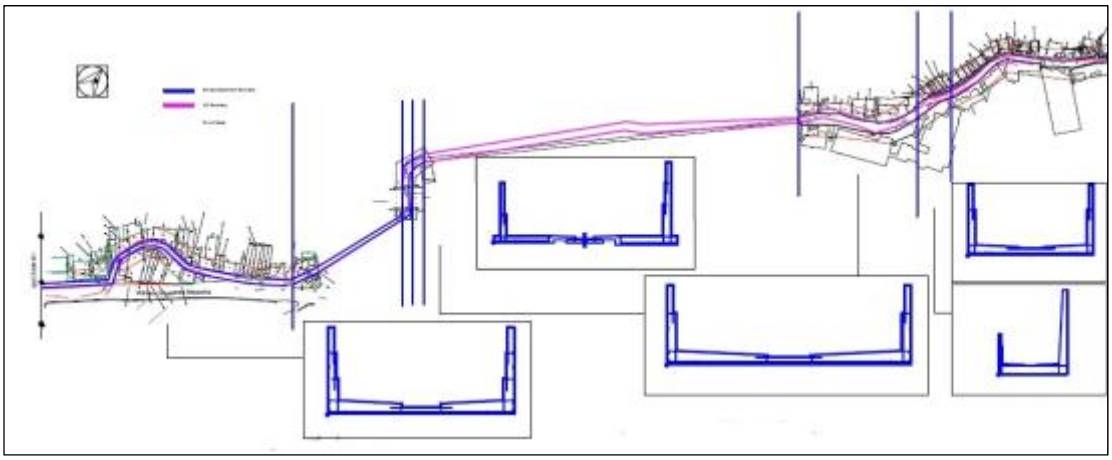
Source: Mahaweli Authority

Figure 6.6.8 River Management System of a Part of Mahaweli River

The Mahaweli Authority of Sri Lanka formulated the Emergency Action Plan defining responsibilities and provides specific procedures designed to identify unusual conditions that may endanger dams and mitigative actions in the lower stream area to be taken in the event of potential failure of the Kotmale dam.

2) Drainage and Flood Control

Expansion of the runoff with introduction of drainage improvement in Meda Ela was conducted by SCDP.



Source: SCDP

Figure 6.6.9 Rehabilitation of Meda Ela, KMC

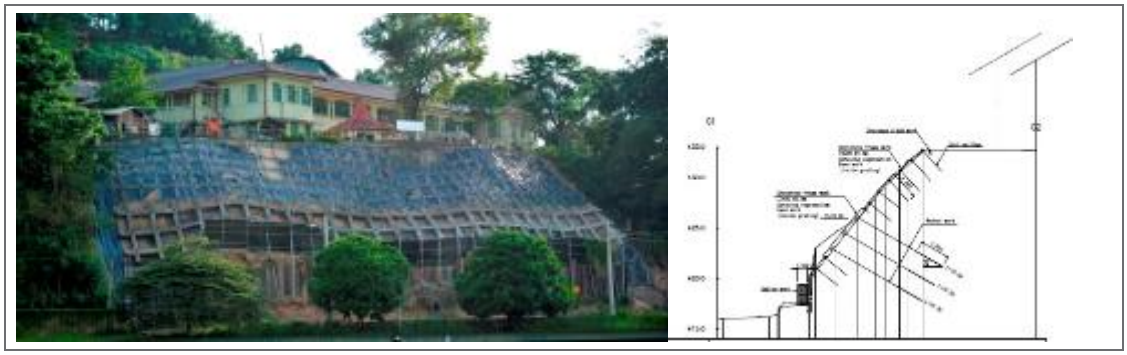
3) Countermeasures for Landslide, Rock fall and Slope Failure

Earth barriers were constructed at the base of some slopes in Peradeniya to cope with the slope failures that occurred due to the heavy rainfall from 09th -11th November 2006.

Source: The JICA Team

Figure 6.6.10 Good Practice by NBRO in Peradeniya

Frame structure with anchor works is being implemented to cope with slope erosion of Kandy Nursing School using JICA support.



Source: The JICA Team, Nittoku Construction

Figure 6.6.11 Example of Countermeasures: School of Nursing, Kandy

4) Fire Protection, Fighting and Rescue

As for the capacity of fire protection and rescue works, there are two fire brigade units in KMC with 31 personnel for 24 hours a day availability. There is no regular training program and facilities for fire fighters at this moment.

Suduhumpola Unit is equipped with some communication tools, which however are hardly working; and Central Market has no radio equipment.

Table 6.6.6 List of the Facilities of Fire Brigade Units

Facilities	Central Market Unit	Suduhumpola Unit
Ambulance	3	1
Rescue Car	-	1
Water Tank Car	2	1
Ladder Vehicle	1	1
Pick up	1	-

Source: Fire Department, KMC

Suduhumpola Unit

Suduhumpola Unit

Source: The JICA team

Figure 6.6.12 Photo of Fire Brigade Units

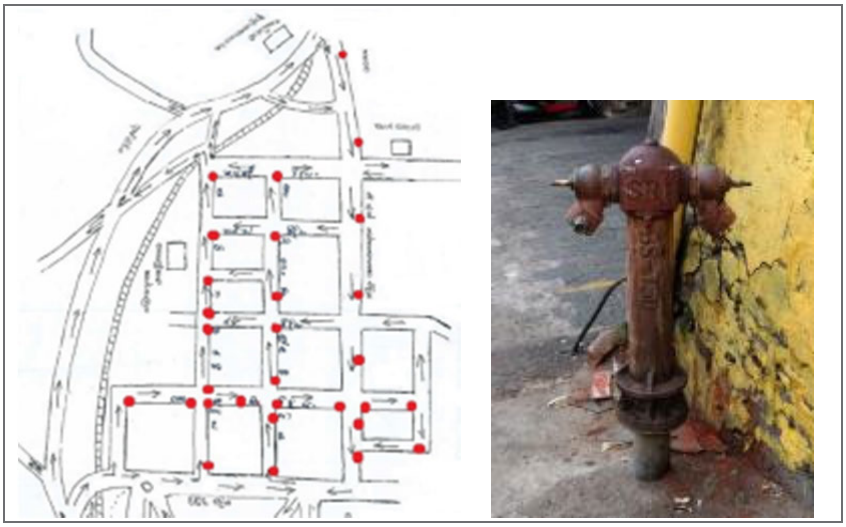
Suduhumpola Unit

Central Market Unit

Source: The JICA Team

Figure 6.6.13 Command Systems of the Fire Brigade Units

There are 225 Fire Hydrants in KMC, but 50 out of these are not operational. In the Grid City, there are 32 Fire Hydrant installed along the grid roads as shown below.

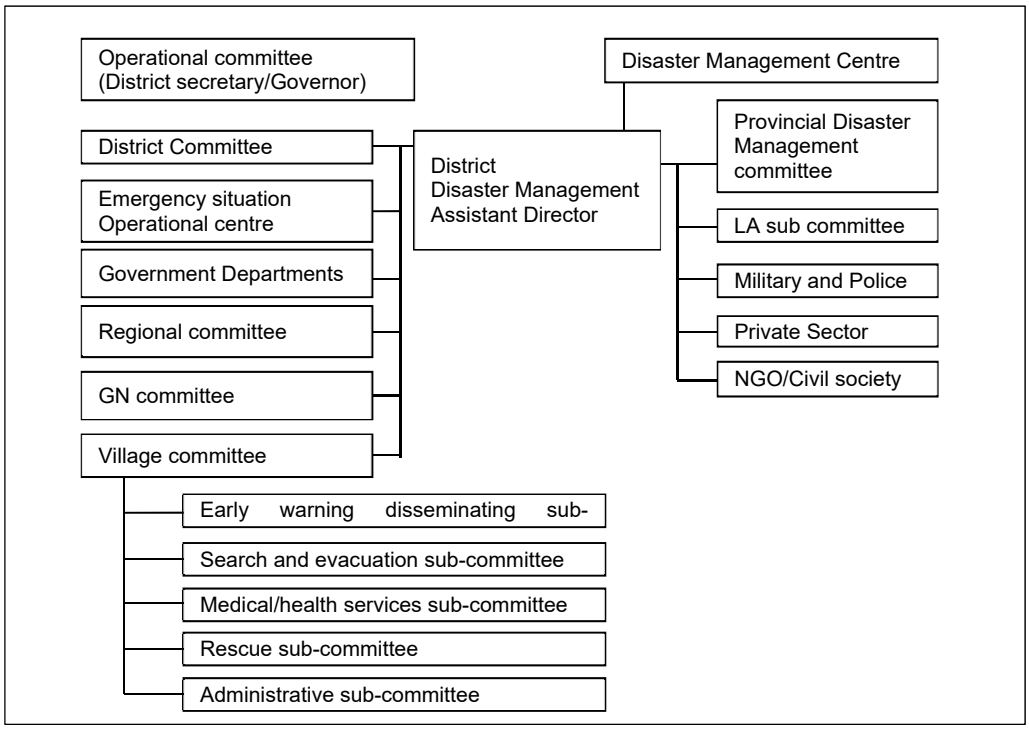


Source: Fire Department, KMC and Revised by the JICA Team

Figure 6.6.14 Location of Fire Hydrants in the Grid

5) Warning Systems

DMC has a route to disseminate warnings to relevant organizations and communities. Each community disseminates the information to its own committees by mobile phone.



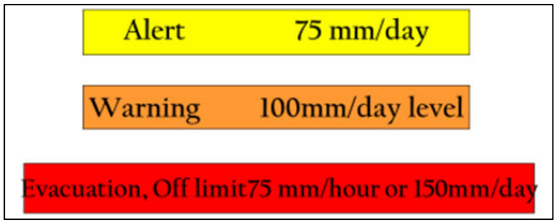
Source: DMC Kandy

Figure 6.6.15 Early Warning System

Source: DMC Kandy

Figure 6.6.16 Early Warning Addressing System

The standard threshold limits of rainfall are stipulated as follows:



Source: DMC Kandy

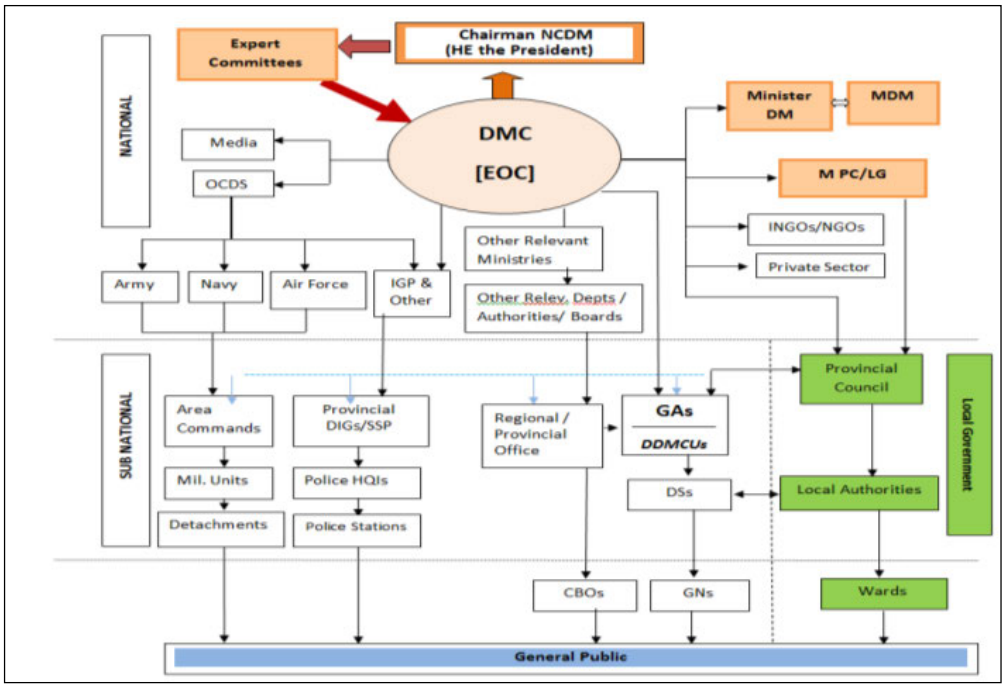
Figure 6.6.17 Criteria of Warning by Rainfall Intensity

6) Temporary Settlement

Each village committee selects temporary safe locations depending on the affected population. Therefore, temporary locations change from time to time.

7) Coordination

In the emergency response stage, coordination between organizations is to be conducted by DMC.



Source: DMC

Figure 6.6.18 Emergency Response System

8) Coordination of Voluntary Work

DMC Kandy organizes training programs for local people in charge of voluntary activities.

(3) Legal Framework

1) Legal Basis of Disaster Management

Sri Lanka Disaster Management Act was passed in Parliament No. 13 of 2005 for the establishment of a legal disaster risk management system by the Government of Sri Lanka in May 2005. The Act established the Disaster Management Charter, the leading institution for the management of the establishment of the National Committee of Disaster Risk and Disaster Management with the Chairmanship of his Excellency the President.

The Disaster Management Centre of the Ministry of Disaster Management and Human Rights was established in January 2006.

2) Fire and Rescue

Fire and Rescue by Law 2002 stipulates a design code, facilities and building materials for fire protection. The Chief officer of the Fire Brigade issues the following requirements to provide certification for the buildings used as a factory, shop, office or hospital.

a) adequate fire escapes and exits within safe travel distance
b) efficient and sufficient fire service, this means an arrangement for the organization to be able to fight a fire on its own

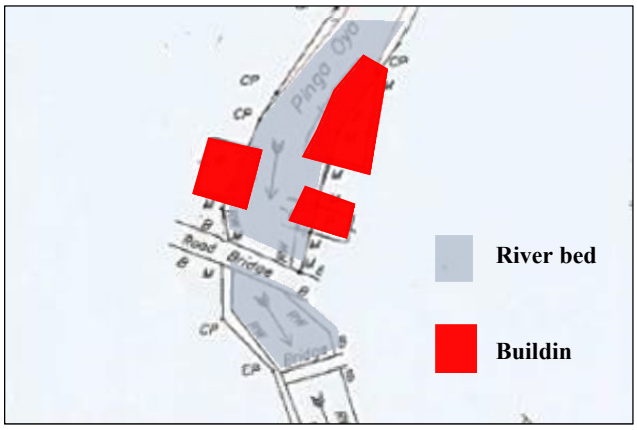
c) efficient arrangement for warning the occupants
d) fire resistivity of the building
e) general fire precautions

In addition to these requirements, all buildings other than those used for residential purposes shall be constructed with the fire resistance time such as one hour, two hours or four hours, and with clearance distance such as 3 meters or 4 meters.

3) Development Plan for Urban Development Area of Kandy

(a) Reservations for Water ways

Reservations in meters from the edge of the High Water Level of the stream are stipulated as 3.0 meters to 6.0 meters by stream while Mahaweli River, Pusil River and Pinga River are to be 20 meters. However, the regulation is not adequately complied at this moment, as seen in Akurana. In Akurana, many buildings are constructed in the river bed as shown in Figure 6.6.19, so that the capacity of run off of the river was reduced, which causes inundation almost every year.



Source: The JICA Team

Figure 6.6.19 Situation of Housing Built in the River Bed in Akurana

(b) Land slope consideration

Land lot size is to be considered according to slope angle as in the following table.

Table 6.6.7 Lot Size and Width According to Slope Angle

Slope (degree)	Minimum lot size (sqm.)	Minimum width of lots (m)
0^0 - 10^0	150	06
11^0 - 12^0	180	06
13^0 - 14^0	200	06
15^0 - 17^0	250	08
18^0 - 20^0	300	08
21^0 - 23^0	370	08
24^0 - 27^0	450	12
28^0 - 30^0	500	12
31^0 - 45^0	760	20
Over 45^0	No development allowed	

Source: Practice manual for planning committee officers, UDA

(c) Sendai Framework

With lessons learned from the disaster experiences, The Sendai Framework for Disaster Risk Reduction 2015-2030 (Sendai Framework) was adopted as the first major agreement of the post-2015 development agenda, with seven targets and four priorities for action in Sendai, Japan 2015.

The Sendai Framework is a 15-year, voluntary, non-binding agreement which recognizes that the State has the primary role to reduce disaster risk but that responsibility should be shared with other stakeholders including local government, the private sector and other stakeholders.

Table 6.6.8 Sendai Framework for Disaster Risk Reduction

Priority for Action of SFDRR

Priority 1: Understanding disaster risk
Priority 2: Strengthening disaster risk governance to manage disaster risk
Priority 3: Investing in disaster risk reduction for resilience
Priority 4: Enhancing disaster preparedness for effective response and "Build Back Better" in recovery, rehabilitation and reconstruction

The Seven Global Targets

1. Substantially reduce global disaster mortality by 2030, aiming to lower the average per 100,000 global mortality rate in the decade 2020–2030 compared to the period 2005–2015;
2. Substantially reduce the number of affected people globally by 2030, aiming to lower the average global figure per 100,000 in the decade 2020–2030 compared to the period 2005–2015;
3. Reduce direct disaster economic loss in relation to global gross domestic product (GDP) by 2030;
4. Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030;
5. Substantially increase the number of countries with national and local disaster risk reduction strategies by 2020;
6. Substantially enhance international cooperation for developing countries through adequate and sustainable support to complement their national actions for implementation of the present Framework by 2030; and
7. Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to people by 2030.

Source: United Nations International Strategy for Disaster Risk Reduction

(d) Disaster Management Setup

- Disaster Management Plan

In Kandy District, Disaster Management Planning is conducted by the Disaster Management Centre of Kandy (DMC Kandy). The Management plan is planned to comprise the following chapters, but it is still being drafted.

Chapter1: Introduction
Chapter2: Disaster prevention and damage mitigation plan
Chapter3: Disaster preparedness and reaction plan
Chapter4: Rehabilitation and reconstruction plan after disasters

According to DMC Kandy, the reasons that the plan is still in the draft stage is the lack of data and technical assistance for risk analysis.

6.6.3 Issues Regarding Disaster Prevention

Issues show the need for a district disaster mitigation plan regarding objectives, strategies and activities based on disaster history, vulnerability and record of countermeasures implemented in the project area.

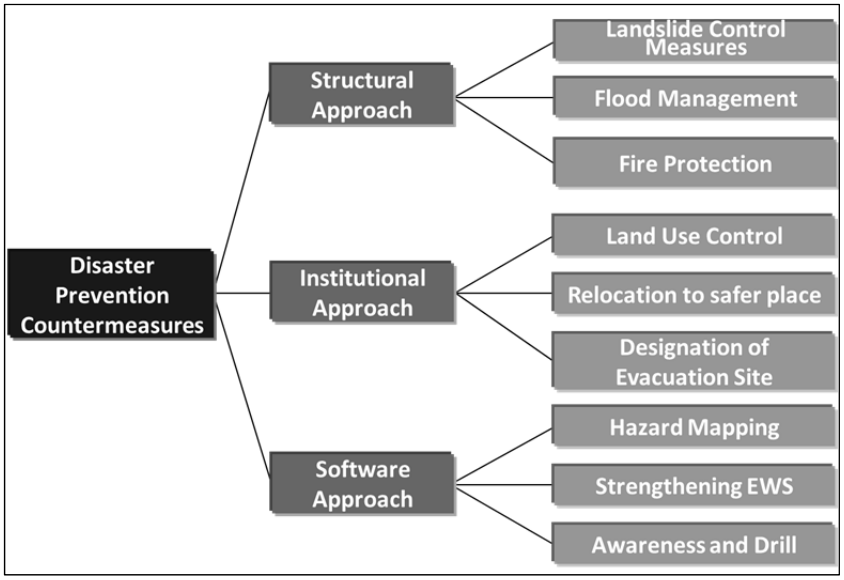
Reviewing the findings and issues by the target field, recommended solutions will be formulated.

Table 6.6.9 Issues and Recommendations

Findings/Issues		Recommended Solution
Landslide	・ Landslides occurred in the areas with slopes more than 20 degrees. ・ No assessment or monitoring have been done. ・ Heavy rainfall tends to induce landslides.	・ Landslide Control Measures shall be implemented in high risk sites. → SM ・ Monitoring of risky sites should be done after site level assessment inexpensively. → Non-SM ・ Land Use restriction of risky area should be introduced In an acceptable manner. → IM ・ Application of building permission based on landslide disaster risk assessment. → IM
Flood	・ Lack of hazard mapping for flooding ・ Promotion of drainage system as Flood Management with total assessment ・ Construction restrictions along rivers do not work effectively. ・ Need for effective dam water level monitoring system	・ Update of the City Drainage Infrastructure Master Plan with consideration of disaster aspect. → SM ・ Promotion of expansion of the runoff of a river in flood disaster prone areas. → SM ・ Application of building permission in hazardous areas. → IM ・ Development of a centre for dam water regulation. → SM
Fire	・ Lack of capacity for fire protection	・ Enhancement of fire extinguishing activities ・ Maintaining of fire extinguishing facilities → SM
Land Use	・ Lack of Land Use Control in the disaster prone areas	・ Redesign the Land Use Plan with consideration of disaster aspect → IM ・ Consultation regarding zoning in hazardous areas and regulating land use. →IM
Relocation	・ Strengthening of Community Disaster Risk Management and Resilient Disaster Management System.	・ Determination of relocation site as safer place ・ Introduction of a relocation program to avoid serious situation of landslide disaster. → IM
Evacuation	・ Designation of Evacuation Site ・ Introduction of management of evacuation activities ・ Conducting evacuation training	・ Designation and maintenance of evacuation site ・ Setting up evacuation routes, temporary shelters, and clean water facilities and infrastructure and sanitation/ toilets. → IM ・ Conduct of evacuation training for the residents and owner. → Non-SM
Hazard Identification	・ Except for landslides, Hazard Maps of disasters have not been prepared so far.	・ Update/renew the Regional Disaster Data and Information periodically in accordance with the record of disaster Incidents. ・ To identify hazardous area based on site level assessment. → Non-SM
EWS (Early Warning System)	・ Strengthening EWS	・ Promotion of dissemination of effective information of disaster indication. → Non-SM
Awareness	・ Need to enhance the partnership to support self-reliance and sustainability for the implementation of disaster management. ・ Need for community empowerment based on locality, and sharing process between actors by promoting self-sufficiency.	・ Conducting regional disaster research, education and training for the community. ・ Conducting disaster prevention training involving interested organizations. ・ To develop disaster related curriculum for formal education in Elementary School, Junior High School and High School. → Non-SM

Findings/Issues		Recommended Solution
Planning in Pre Disaster	・ Strengthening capacity of DMC. ・ Strengthening of Community Disaster Risk Reduction & Resilient Disaster Management System of Municipality	・ Ensuring appropriate human resources ・ Procurement of tools and equipment for regional preparedness ・ To develop the mechanisms of monitoring, evaluation, and periodical updates of Disaster Management Plan → Non-SM

Note: SM : Structural Measures IM : Institutional Measures, Non- SM :Non-structural Measures
Source: The JICA Team



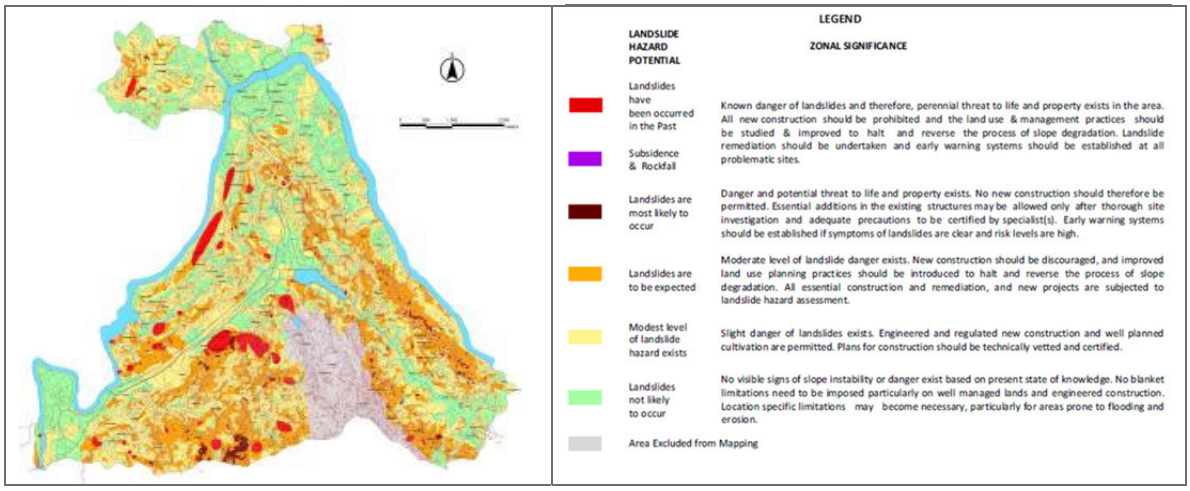
Source: The JICA Team

Figure 6.6.20 Tree of Issues Regarding Disaster Prevention

Reference 1: Identification of Landslide Risk

(1) Landslide Risk Assessment

- Determine landslide types and occurrence mechanisms, potential, site surveys and creating database.
- Landslide disaster history.
- Landslide risk in the wider area.
- Map of landslide occurrence potential
- Characteristics of high landslide risk areas



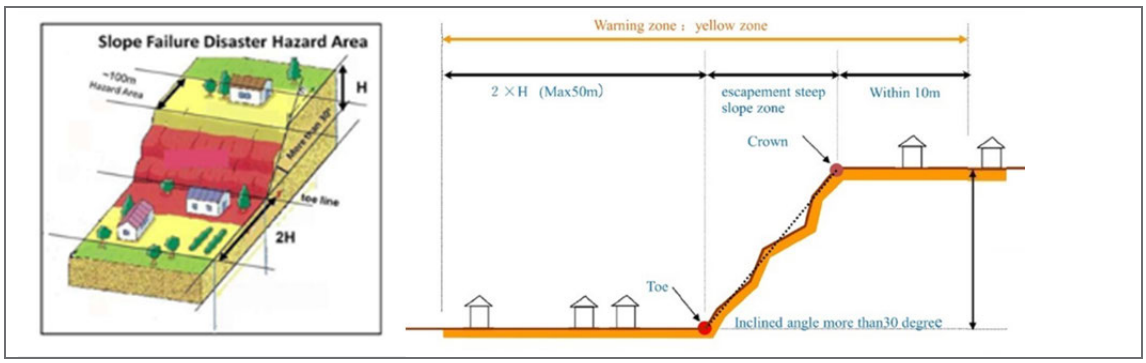
Source : NBRO

Figure 6.6.21 Landslide Susceptibility Map (1/10,000, NBRO)

(2) Landslide Risk Assessment Output

i) Steep Slope

- Identification of the locations and areas of steep slopes.
- Impact zone for each area near to steep slope.
- Steep Slope risk assessment (Human and Structural Risks)
- Setting up the yellow zone
- Listing of each site.
- Countermeasures and their necessity (through the perspective of structural and non-structural measures)
- Preparing evacuation maps (similar to the Japanese Hazard Map)



Source : Ministry of Land, Infrastructure, Transport and Tourism (MLIT), Japan and the JICA Team

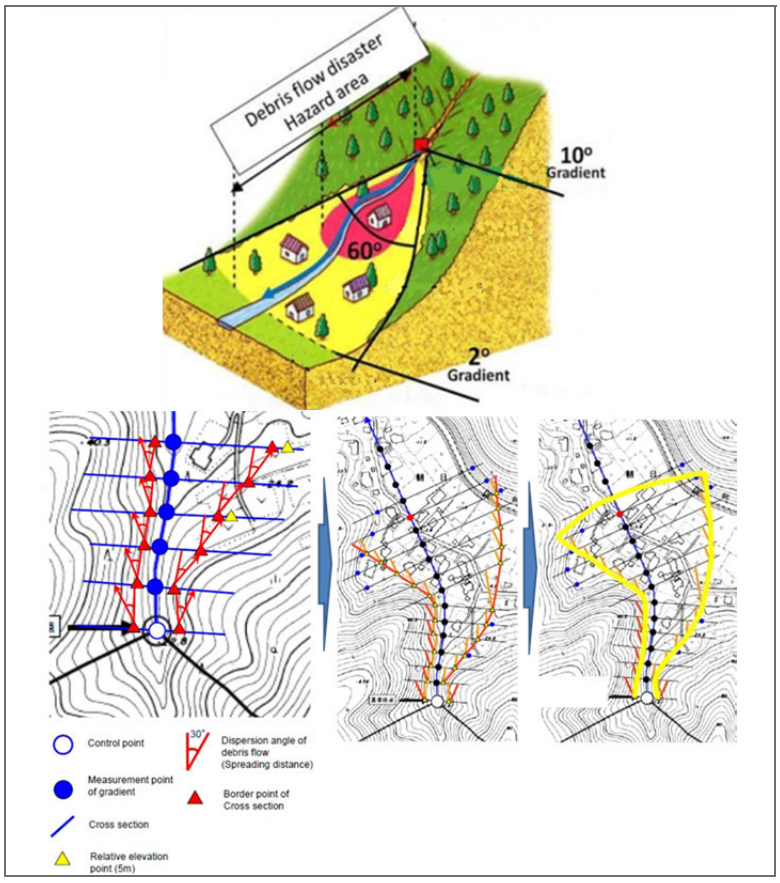
Figure 6.6.22 Setting Up Yellow Zone for Steep Slope

Source: The JICA Team

Figure 6.6.23 Sample Hazard Map

ii) Debris Flow

- The location and area of each debris flow prone area.
- Impact zone for each prone area and damage prediction from the impact.
- Debris Flow risk assessment (Human and Structural Risks)
- Setting up the yellow zone
- Listing of each prone area.
- Preparing evacuation map



Source : MLIT, Japan and the JICA Team

Figure 6.6.24 Setting Up Yellow Zone for Debris Flow

Source: The JICA Team

Figure 6.6.25 Sample Hazard Map of Debris Flow

iii) Landslide Risk Assessment Output in the Wider Area

- The location and area of each landslide.
- Impact zone for each landslide and damage prediction from the impact.
- Landslide risk assessment (Human and Structural Risks)
- Listing of each landslide
- Landslide counter measures and their necessity (through the perspectives of structural and non-structural measures)
- Landslide zone evacuation map (similar to the Japanese Hazard Map)
- Damage estimation : lifelines, roads, railroads, other public spaces, residences
- Preparing landslide evacuation map

(3) Content Reflected in District Mitigation Plan

Countermeasures shall be prepared according to the following perspectives based on the information acquired from the landslide risk assessment.

- Incorporating the result of the assessment into the plan.
- Installation of monitoring and early warning information distribution systems.
- Implementation of countermeasures for high landslide risk areas.
- Preparing evacuation map and implementation of training program.

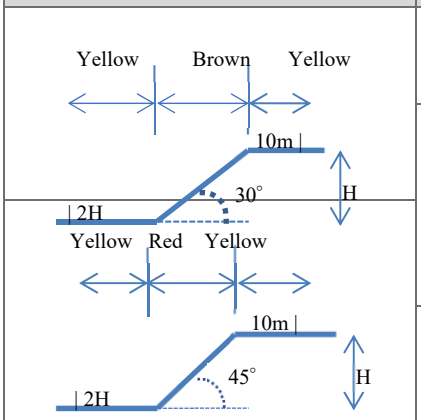
Reference 2: The Principles of Countermeasures to Control Land Development in Steep Slope Area

(1) Steep Slope Area

i) Setting up the Yellow zone and Red Zone

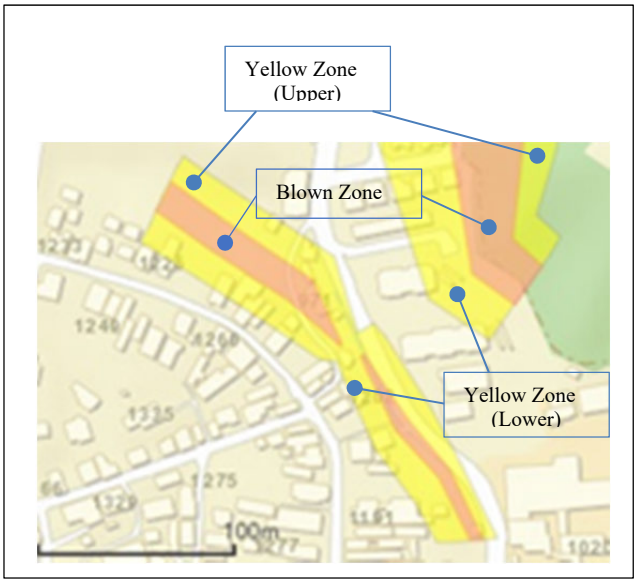
The conditions that must be met for issuance of building permission according to the location of site in the zone are shown in the following table.

Table 6.6.10 Proposed Conditions for issuance of Building Permission

Steep Slope Area	On the slope	Upper and Lower of Slope	
		10m of upper end	2H on lower end (50m if 2H exceeds 50m)
	**< 30°**: Yellow Zone Requirements for prevention of ground deformation		Requirement for rock barrier fencing as necessary
	30°≦Angle < 45°: Brown Zone Mandatory countermeasures for prevention of ground deformation	Strict requirements for prevention of ground deformation	Strict requirement for retaining walls, gabion walls or check fences with drainage
	45°≦ : Red Zone Development Prohibited		Strict requirement for massive concrete retaining walls with drainage

Source: The JICA Team

ii) Case Study of Zoning



Source: The JICA team

Figure 6.6.26 Example of the zoning

※A case study will be conducted in steep slope sites in hilly areas near Kandy City

6.7 Regional Economic Development

6.7.1 General Economic Sector Condition

This chapter discusses regional economy in the province/district level and at DSD level.

(1) Agriculture Sector

As shown in Table 6.7.1, the extent under agriculture in Kandy District is the largest portion in agriculture[3]. There are a lot of small holdings in agriculture; however, 46% of small holdings with 40 perches (0.25 acre=1,000m^2) or less occupy only 8% of the total extent, and these holdings mainly use land for home consumption.

Table 6.7.1 Total Extent under Agriculture, Tea, Rubber and Coconut in Kandy District

	Small holding sector		Estate sector*		Total	
	No. of holding	Extent (Acres)	No. of holding	Extent (Acres)	No. of holding	Extent (Acres)
Agriculture	193,525	163,382	323	70,421	193,848	233,803
Tea	18,667	55,842	235	37,041	18,667	55,842
Rubber	1,632	2,540	18	500	1,650	3,040
Coconut	-	17,848	-	1,643	-	19,492

* 20 Acres and above
Source: Census of Agriculture 2002, Department of Census and Statistics

Table 6.7.2 shows the production of paddy, tea, rubber, pepper, cashew and beetle in the Greater Kandy Area is much smaller than other DSDs in Kandy District. However, the production of coconut in Kundasale DSD and Pathahewaheta DSD is similar or more than other DSDs in the Greater Kandy Area. Poojapitiya DSD also has more production of cinnamon, coffee, cloves and areca nut than in other DSDs in the Greater Kandy Area.

However, the team was informed that the calculation of the extent might not reflect the actual land usage for each crop because several crops cultivated in the same field were counted as the extent for each crop.

Table 6.7.3 shows the extent, average yield and production of paddy by season in Kandy District. For paddy production, around 50,000 tonnes of paddies were harvested in 2017. Average yield in Kandy District is 1,257 - 2,081 kg per acre in 2016/17 Maha season and 1,036 - 2,029 kg per acre in 2017 Yala season. Both average yields are almost as same as the average yield in Sri Lanka.

According to Nipuna Rice Products (pvt) Ltd, Sri Lanka's annual per capita rice consumption is close to 100 kg. Therefore, 50,000 tonnes of annual paddy rice production in Kandy District is not enough to feed over 1 million Kandy residents, so rice shall be procured from other districts.

[3] According to Census of Agriculture 2002, there are 4 categories such as agriculture, tea, rubber and coconut.

Table 6.7.2 Paddy and Highland Crop Statistics by Divisional Level – 2016

(Acre)

	Paddy	Tea	Rubber	Coconut	Cinna-mon	Coffee	Pepper	Cashew	Cloves	Beetle	Areca nut	Papaw	Pine-apple	Total
Akurana	576.7	806.8	3.0	663.0	12.1	128.5	371.4	0.0	192.2	0.0	176.2	26.7	0.0	2,956.6
Gangawatta Korale	229.6	1,556.0	50.9	1,604.2	4.4	57.6	142.3	0.0	25.7	0.0	53.4	24.7	0.0	3,748.8
Harispaththuwa	1,478.2	502.6	28.2	1,418.8	0.0	246.4	693.4	5.7	533.2	9.6	352.1	60.8	0.0	5,329.0
Kundasale	1,609.4	808.3	6.7	2,185.1	7.7	266.6	1,218.5	77.8	433.4	16.1	780.1	64.5	2.2	7,476.3
Pathadumbara	1,365.0	106.3	7.2	1,552.0	8.9	264.1	572.3	0.0	421.8	6.7	316.0	51.6	2.0	4,673.9
Pathahewaheta	1,855.5	456.4	1.0	2,012.9	47.9	300.0	1,315.3	0.0	148.0	0.0	196.2	115.1	0.0	6,448.3
Pujapitiya	1,495.4	1,548.1	41.8	1,165.1	132.7	505.8	1,174.7	4.0	1,108.5	20.8	761.6	52.6	0.0	8,011.0
Thumpane	1,410.0	153.9	1,165.8	2,256.8	25.5	310.9	913.0	22.7	658.0	13.3	452.9	48.9	13.3	7,445.1
Udunuwara	2,091.2	1,820.4	16.1	1,757.1	0.0	264.6	1,064.3	0.0	621.7	0.0	408.2	134.9	0.0	8,178.5
Yatinuwara	1,878.9	3,130.8	1,349.7	1,787.5	0.0	285.6	688.4	0.0	536.7	11.9	323.2	38.3	0.0	10,031.0
Greater Kandy	13,989.9	10,889.6	2,670.4	16,402.5	239.2	2,630.1	8,153.6	110.2	4,679.2	78.4	3,819.9	618.1	17.5	64,298.5
Outside Greater Kandy	25,870.8	41,701.2	2,901.5	10,560.1	164.8	1,998.3	9,991.4	404.5	3,323.6	95.8	2,925.4	400.2	37.6	100,375.4
Kandy District	39,860.7	52,590.8	5,571.9	26,962.6	404.0	4,628.4	18,145.0	514.7	8,002.8	174.2	6,745.3	1,018.3	55.1	164,673.9

Remark: Original data is available in hectare.

Source: District Statistical Handbook Kandy 2017, Department of Census and Statistics

Table 6.7.3 Extent, Average Yield and Production of Paddy by Season in Kandy District

Season	Type of cultivation	Gross Harvested extent (Acres)	Average yield (Kg per Acre)	Total Production (Tonne)
2016/17 Maha	Major schemes	8,737	2,081	28,730
	Minor schemes	8,747	1,641	
	Rainfed	3,024	1,257	
	Average	-	1,771	
	Total	20,508	-	
2017 Yala	Major schemes	9,008	2,029	20,468
	Minor schemes	4,801	1,248	
	Rainfed	1,559	1,036	
	Average	-	1,684	
	Total	15,368	-	

Note: Original data of average yield is available in kg per hectare.
Source: Paddy statistics, Department of Census and Statistics
http://www.statistics.gov.lk/agriculture/Paddy%20Statistics/PaddyStats.htm (cited 2018/8/13)

The JICA Team estimated production value of paddy, tea and coconut in Kandy District from the statistical data. As a result, the production value of paddy, tea and coconut are 1,295 – 1,743 million Rs., 8,938 million Rs.,and 91 million Rs., respectively. These figures may be underestimated when compared with 31,203 Million Rs. in 2016, which is the estimated GRDP for agricultural sector in Kandy District as shown on Table 4.4.6. However, it can be seen that tea production in Kandy District still contributes as the largest part of agriculture production.

Table 6.7.4 Estimated Production Value of Paddy, Tea and Coconut in Kandy District

Type	Price	Quantity	Production value (Million Rs)	Source
Paddy1 (Maha)	45,281 Rs/Acre	16,217 Acres	734	Price: Cost in 2000 from "The cost of production of rice in Kegalle and Kurunegala Districts of Sri Lanka" M.M.M.Aheeyar et al., 2005 and CPI from World Bank Quantity: Paddy Statistics
Paddy1 (Yala)	46,140 Rs/Acre	12,153 Acres	561	
Paddy1 Total			**1,295**	
Paddy2 (Maha)	35.44 Rs/Kg	28,729,818 Kg	1,018	Price: ProduceRsrice in 2016 Quantity: Paddy Statistics
Paddy2 (Yala)	35.44 Rs/Kg	20,464,515 Kg	725	
Paddy2 Total			**1,743**	
Tea	273.23 Rs/Kg	32,714,023 Kg	**8,938**	Price: Cost of green leaf in 2014/15 from "Cost of Production by Component" Quantity: District wise Tea Production from "Sri Lanka Tea Board Annual Report 2015"
Coconut	16.3881 Rs/Nut	5,553,014 Nuts	**91**	Price: in 2014/15 from "Cost of Production by Component" Quantity: Total King Coconut Trees from Coconut Research Institute and number of nuts per tree in Effect of Frequency of harvesting on number of nuts per tree from "The Impact of Harvesting Coconuts at Monthly Intervals", D T Mathes and J M N Marikkar"

Source: The JICA Team

Besides land limitation, there are other issues on how to increase crop production in the Greater Kandy Area. One of the most serious issues is damage to the crops caused by birds and small animals. At present, there is no effective way to mitigate such damage; however, recent technology such as drones, AI (Artificial Intelligence) and IoT (Internet of Things) may be helpful in getting rid of crop-eating pests without killing them.

(2) Industry

1) Province and District Level

Table 6.7.5 shows the principal indicators of industrial activity classified by industry division in Central Province. The industries which indicate the highest value of output are manufacturing of food products and manufacturing of wearing apparel. Both industries account for 56% and 31% of total value of output in the industry sector of the province, respectively. Moreover, persons engaged in two (2) industries also occupy 76% of the total number in the province.

As shown on Table 6.7.5 for manufacturing of food products in the province, the value added after deducting value of intermediate consumptions is only 13% of the value of output, while the value added for manufacturing of food products in the country is 35% of the value of output. On the other hand, the average number of persons engaged per establishment for the manufacturing of food products in the province is 120 persons, while it is 71 persons in the country. Therefore, the size of the establishment is much larger than the country's average, while 13.2% of the value added to the value of output and 45,390 thousand Rp. of the value added per establishment is much lower than the country's average.

Table 6.7.5 Principal Indicators of Industrial Activity Classified by Industry Division in Central Province - 2014

Province & Industry Division	No.of Establi-shments	Persons engaged (No)	Value of Output (Mil. Rs.)	Value of Intermediate Consumptions (Mil. Rs.)	Value added (Million Rs.)		Value added peRserson engaged (Rs.)
08 Other mining and quarrying	643	8,287	11,589	6,202	5,387	7.7%	650,056
10 Manufacture of food products	460	55,298	158,133	137,254	20,879	29.8%	377,581
11 Manufacture of beverages	14	177	115	103	11	0.0%	66,265
12 Manufactures of tobacco products	19	306	718	165	553	0.8%	1,807,646
13 Manufacture of textiles	195	1,440	2,155	1,362	792	1.1%	550,572
14 Manufacture of wearing apparel	260	44,660	87,194	52,116	35,078	50.0%	785,454
15 Manufacture of leather and related products	32	229	88	60	28	0.0%	124,163
16 Manufacture of wood and of wood products and cork, except furniture; manufacture of articles of straw and plaiting materials	189	2,200	468	288	180	0.3%	81,840
17 Manufacture of paper and paper products	11	221	355	201	153	0.2%	695,525
18 Printing and reproduction of recorded media	34	491	479	194	285	0.4%	580,933
20 Manufacture of chemicals and chemical products	65	7,409	7,658	5,282	2,375	3.4%	320,768
21 Manufacture of basic pharmaceutical products and pharmaceutical preparations	9	295	1,087	479	608	0.9%	2,063,135
22 Manufacture of rubber and plastic products	6	84	131	83	48	0.1%	571,777
23 Manufacture of other non-metallic mineral products	250	2,487	2,859	1,893	965	1.4%	388,390
25 Manufacture of fabricated metal products (except machinery and equipment)	30	875	751	322	429	0.6%	490,436
27 Manufacture of electrical equipment	2	61	41	27	13	0.0%	224,453
28 Manufacture or machinery and equipment n.e.c.	7	1,956	2,568	2,298	269	0.4%	137,826
29 Manufacture of motor vehicles, trailers and semi-trailers	6	124	112	79	32	0.0%	260,265
31 Manufacture of furniture	44	1,142	1,096	581	1,324	1.9%	1,159,454
32 Other manufacturing	9	2,181	1,635	1,349	286	0.4%	131,141
33 Repair and installation of machinery and equipment	2	17	22	19	2	0.0%	142,953
35 Electricity, gas steam, and air conditioning supply	3	30	432	24	407	0.6%	13,594,806
36 Water collection, treatment and supply	18	99	11	7	4	0.0%	42,294
38 Waste collection, treatment and disposal activities materials recovery	3	19	17	9	7	0.0%	410,544
Group Total	**2,310**	**132,085**	**280,535**	**210,410**	**70,125**	**100.0%**	**530,912**

Note: There is no establishment in 19 Manufacture of coke and refined petroleum products, 24 Manufacture of basic metals and 30 Manufacture of other transport equipment.

Source: Annual Survey of Industries Final Report 2015 Department of Census and Statistics

The reasons of lower value added for manufacturing of food products in the province may be due to the following reasons: (i) less complicated food processing, e.g. manufacturing of semi-processed foods for further processing in the other province; (ii) manufacturers mostly produce products to the local market for daily consumption which profit only a small amount of value added; and (iii) lower recognition of the brand of manufacturers in the province.

For manufacturing of wearing apparel, the average number of persons engaged per establishment is 172 persons, and value added per establishment is 134,917 Thousand Rs. These figures are higher than the country's averages; however, the value added to value of output in the province is at 40.2% which is slightly lower than the country's average. Although this industry contributes a large value added to the country, there may still be a room to increase more value-added revenue.

Table 6.7.6 Manufacture of Food Products and Wearing Apparel in Central Province and Sri Lanka

Industry Division	Area	No. of establish-ment	Ave. persons engaged/ Establish-ment	(A) Value of Output (Mil Rs.)	(B) Value added (Mil Rs.)	(B) / (A)	(B) / Establish-ment (Thousand Rs.)
Manufacture of food products	Central Province	460	120	158,133	20,879	13.2%	45,390
	Country	2,971	71	1,159,127	409,845	35.4%	137,949
Manufacture of wearing apparel	Central Provi nce	260	172	87,194	35,078	40.2%	134,917
	Country	3,514	138	958,907	409,576	42.7%	116,556

Source: The JICA Team, calculations based on Annual Survey of Industries Final Report 2015 Department of Census and Statistics

2) District Level

Needless to say, Kandy district is the most industrialised district in Central Province, and more than a half of value added in the province is contributed by this district. However, statistics for value added by industry division are not available at the district level.

Table 6.7.7 Number of Manufacturing Industries by DSD and Nature of Industry 2016

	District	No. of Establi-shments	Persons engaged (No.)	Value of Output (Mil Rs.)	Value of Intermediate Consumptions (Mil Rs.)	Value added (Mil Rs.)
Formal Sector in 2014	**Kandy**	**1,210**	**77,356**	**126,631**	**83,943**	**42,688**
	Matale	182	16,417	36,103	24,965	11,137
	Nuwara Eliya	252	29,877	105,749	95,257	10,492
	Central Province	**1,644**	**123,650**	**268,485**	**204,166**	**64,318**
Informal Sector in 2013/14	**Kandy**	14,264	33,414	16,181	5,571	10,609
	Matale	7,103	15,390	6,918	2,799	4,119
	Nuwara Eliya	3,539	6,021	2,753	1,130	1,622
	Central Province	**24,906**	**54,825**	**25,819**	**9,557**	**16,262**

Note: Value of Output, Value of Intermediate Consumptions and Value Added for informal sector are calculated by multiplying such figure and rate of person engaged in the industry sector to the total sectors (industry, trade and service), since there are no information on such figures for each sector.

Source: Annual Survey of Industries Final Report 2015 and Economic Census 2013/14 Final Report on Informal Non Agricultural Activities, Department of Census and Statistics

3) DSD level

As discussed in the previous paragraph, manufacturing of food products and wearing apparel have a large number of industries in Kandy District. This is particularly true for Kundasale DSD – where Kandy Industrial Park and Pallekele Industrial Estate are located – which has 1,377 industries including 376 Food, beverages and tobacco industry, and 440 textile, wearing, apparel and leather industry. Udunuwara DSD has 1,276 industries such as 465 food, beverages and tobacco industry and 314 wood production and furniture industry. Harispapaththuwa, Gangawatta Korale and Pathadumbara DSDs also have over 900 industries.

For total number in the Greater Kandy Area, wood production and furniture industry ranks 3rd place in terms of the number of industries. However, as shown in Table 6.7.8, this industry occupies only 0.3% of the value added. This means there may be many other micro and small industries, including handicraft workshops, in the Greater Kandy Area.

Table 6.7.8 No of Manufacturing Industries by DSD and Nature of Industry 2015

DSD	Mining and Quarry-ing	Food, beverages and tobacco	Textile, wearing apparel and leather	Wood production and furniture	Paper products and printing	Chemicals, petroleum, rubber and plastic	Non-metallic mineral products	Basic metal industries, metal products	Other manufac-turing industries	Water works and supply	Total
Akurana	12	171	183	129	22	1	22	9	9	-	558
Gangawatta Korale	9	155	450	74	119	1	52	36	13	-	909
Harispaththuwa	35	181	342	226	36	-	59	57	25	7	968
Kundasale	57	376	440	268	58	10	119	28	21	-	1,377
Pathadumbara	8	164	271	164	20	-	285	29	17	3	961
Pathahewaheta	15	155	147	124	13	-	36	4	8	8	510
Poojapitiya	3	191	221	150	20	-	26	11	15	16	653
Thumpane	6	113	96	53	11	-	21	15	12	4	218
Udunuwara	35	465	251	314	40	2	137	17	14	1	1,276
Yatinuwara	8	208	171	173	19	2	76	21	21	-	699
Greater Kandy	**188**	**2,066**	**2,572**	**1,675**	**358**	**16**	**833**	**227**	**155**	**39**	**8,129**
Outside Greater Kandy	**378**	**1,528**	**1,173**	**858**	**140**	**4**	**502**	**91**	**79**	**51**	**4,804**
Kandy District	**566**	**3,594**	**3,745**	**2,533**	**498**	**20**	**1,335**	**318**	**234**	**90**	**12,933**

Source: District Statistical Handbook Kandy 2016, Department of Census and Statistics

(3) Trade and Services

Table 6.7.9 illustrates the principal indicators of trade and services activities for the formal sector in the country. However, there are no official statistics for construction, trade & services sector divided into provincial/district level from the national level.

Table 6.7.9 Principal Indicators of Trade and Services Activities by Economic Section - 2013 in Sri Lanka

Economic Section	No.of Establish-ments	Persons engaged (No.)	Value of output (Million Rp.)	Value of Intermediate consumption (Million Rp.)	Value added (Million Rp.)	
Wholesale and retail trade; repair of motor vehicles and motorcycles	7,443	168,320	606,659	129,273	477,385	32.2%
Transportation and storage	643	105,978	357,464	141,024	216,439	14.6%
Accommodation and food service activities	3,873	70,196	112,298	50,402	61,895	4.2%
Information and communication	378	35,270	183,897	76,750	107,146	7.2%
Financial and insurance activities	2,257	131,831	469,126	139,062	330,063	22.3%
Real estate activities	136	3,365	21,619	4,924	16,695	1.1%
Professional, scientific and	834	37,845	148,336	47,000	101,335	6.8%

Economic Section	No.of Establish-ments	Persons engaged (No.)	Value of output (Million Rp.)	Value of Intermediate consumption (Million Rp.)	Value added (Million Rp.)	
technical activities						
Administrative and support service activities	693	92,457	162,335	49,496	112,838	7.6%
Education	1,424	48,927	42,830	17,044	25,785	1.7%
Human health and social work activities	429	27,833	44,997	21,601	23,396	1.6%
Art, entertainment and recreation	44	4,036	4,553	1,309	3,244	0.2%
Other service activities	524	11,642	8,862	3,024	5,837	0.4%
Total	**18,678**	**737,700**	**2,162,980**	**680,916**	**1,482,064**	**100.0%**

Source: Economic Census - 2013/14 Final Report on Construction, Trade & Services (Formal Sector) Department of Census and Statistics

Table 6.7.10 illustrates the principal indicators of some service activities in the country in which the Greater Kandy Area has potential for development such as tourism, ICT, education and healthcare. This table includes both formal and informal sectors. The number of establishments and persons engaged for the informal sector exceeds that of the formal sector, except persons engaged for accommodation. Value added for the informal food and beverage service activities also exceeds value added for the formal food and beverage service activities, and value added for informal land transport and transport via pipelines is similar to value added for formal land transport and transport via pipelines.

For trade, District Statistical Handbook can be utilised as shown in Table 6.7.11. Based to the table, 19,709 commercial places are registered in the Greater Kandy Area in 2015. Around 32% of places are located in Gangawatta Korale DSD and 16% of places are located in Pathadumbara DSD.

Retail shops show the largest ratio with 29% of the registered commercial places, followed by restaurant and canteen with 9%. Four categories including the two aforementioned industries; textile and footwear; and meat, fish and vegetables, account for more than 50% of commercial places in the Greater Kandy area.

Table 6.7.10 Principal Indicators of Trade and Services Activities by Economic Division in Sri Lanka - 2013

Economic Section	Economic division	Type	No. of Establish ments	Persons engaged (No.)	Value of output (Million Rs.)	Value of Intermediate consumption (Million Rs.)	Value added (Million Rs.)	Value added per establishment (Rs.)	Value added peRserson engaged (Rs.)
Accommodation and food service	55 Accommodation	Formal	3,078	51,076	89,203	39,180	50,023	16,251,931	979,392
		Informal	12,423	16,284	6,670	1,846	4,823	388,267	296,207
	56 Food and beverage service activities	Formal	795	19,120	23,094	11,221	11,872	14,933,770	620,939
		Informal	73,555	138,660	79,737	37,686	42,051	571,696	303,268
Transportation and storage	49 Land transport and transport via pipelines	Formal	162	52,825	67,873	32,154	35,719	220,489,062	676,180
		Informal	32,393	63,941	66,524	32,614	33,910	1,046,856	530,345
Information and communication	62 Computer programming consultancy and related activities	Formal	162	9,622	24,439	3,821	20,618	127,274,526	2,142,847
		Informal	114	268	1,116	930	186	1,632,714	694,513
	63 Information service activities	Formal	36	3,971	4,921	1,431	3,489	96,919,225	878,643
		Informal	347	535	245	128	117	338,894	219,806
Education	85 Education	Formal	1,424	48,927	42,830	17,044	25,785	18,107,904	527,023
		Informal	41,943	159,433	22,970	7,184	15,786	376,374	99,015
Human health and social work activities	86 Human health activities	Formal	304	24,242	42,486	20,880	21,605	71,071,277	891,249
		Informal	12,753	27,702	17,719	3,757	13,962	1,094,837	504,024
	87 Residential care activities	Formal	79	2,155	1,003	588	415	5,255,840	192,673
		Informal	611	3,528	1,871	1,434	436	713,769	123,615
	88 Social work activities without accommodation	Formal	46	1,436	1,507	132	1,375	29,897,780	957,728
		Informal	1,666	5,390	1,657	1,169	487	292,713	90,475

Source: Economic Census -2013/14 Final Report on Construction, Trade & Services (Formal Sector) and Economic Census 2013/14 Final Report on Informal Non-Agricultural Activities Department of Census and Statistics.

Table 6.7.11 Registered Commercial Places in Kandy District by D.S. Division - 2015

DSD	Retail shops	Restau-rant and canteen	Textile and foot-wear	Meat, fish and vegeta-bles	Dispen-sary and pharmacy	Wood and iron furniture	Electri-cal items	Glossary goods	Building material and paints	Liquor shops	Jewell-ery	Books and stationa-ry	Spare parts of motor	Other	Total
Akurana	296	95	74	180	17	34	15	45	59	2	13	23	10	499	1,362
Gangawatta Korale	1,366	664	988	234	93	232	133	208	182	35	50	97	154	1,895	6,331
Harispaththuwa	505	185	20	92	27	3	13	68	80	4	2	52	26	101	1,178
Kundasale	666	122	103	219	17	85	34	78	65	8	18	34	38	45	1,532
Pathadumbara	531	121	99	104	33	60	16	39	34	5	15	26	56	1,941	3,080
Pathahewaheta	347	119	37	34		42	10	17	42	5	3	16	9	5	686
Poojapitiya	428	85	55	132	15	20	14	22	34	1	5	38	13		862
Thumpane	531	71	64	43	12	10	36		32	3	7	22	10	658	1,499
Udunuwara	477	68	41	152	23	22	20	26	57	8	13	25	35	550	1,517
Yatinuwara	563	221	91	104	37	38	56	39	94	10	21	43	44	301	1,662
Greater Kandy	**5,710**	**1,751**	**1,572**	**1,294**	**274**	**546**	**347**	**542**	**679**	**81**	**147**	**376**	**395**	**5,995**	**19,709**
Outside Greater Kandy	**3,532**	**828**	**408**	**324**	**117**	**95**	**94**	**208**	**179**	**53**	**76**	**211**	**116**	**1,777**	**8,018**
Kandy District	**8,817**	**2,477**	**1,939**	**1,627**	**367**	**642**	**437**	**752**	**834**	**123**	**202**	**549**	**492**	**7,760**	**27,018**

Source: District Statistical Handbook Kandy 2016, Department of Census and Statistics

For the informal sector, it is also important to consider the trade and services sectors since there are 44,014 establishments and 92,478 persons engaged in Kandy district as shown in Table 6.7.12. Although there are no officially available statistics regarding the trade and services sectors for the formal sector at the provincial and district levels, figures for the informal sector are sometimes similar to, or even higher than, the figures for the formal sector. Table 6.7.12 shows estimated figures for the informal sector. The figures illustrate that in order to better understand the economic activities, the informal sector cannot be ignored.

Table 6.7.12 Number of Informal Trade and Service industries in Kandy District

	No. of Establishments	Persons engaged (No.)	Value of Output(Rs.)	Value of Intermediate Consumptions (Rs.)	Value added (Rs.)
Trade	25,830	49,415	26,870,399,218	7,247,572,893	19,086,364,820
Services	18,184	43,063	17,913,599,478	8,172,794,965	10,277,273,364
Total	**44,014**	**92,478**	**44,783,998,696**	**15,420,367,858**	**29,363,638,184**

Note: Value of Output, Value of Intermediate Consumptions and Value Added for the informal sector are estimated by JICA team.

Source: Economic Census 2013/14 Final Report on Informal Non-Agricultural Activities, Department of Census and Statistics

(4) Non-Agricultural Economic Activities in Kandy District

1) Number of Establishments by DSDs

Table 6.7.13 illustrates the number of establishments and persons engaged in the non-agricultural sector by DSDs based on the Non-Agricultural Survey 2015. There are non-agricultural establishments in Kandy DS and 40,084 were recorded in the Greater Kandy Area. They are concentrated in Gangawatta Korale (9,459, or 15.2% of the DS in total), Kundasale (5,778, or 9.3%), and Udunuwara (5,093, or 8.2%).

Table 6.7.13 Non-Agricultural Establishments

DSD	Total	Industry & Construction	Trade	Services
Kandy	62,062	15,455	26,746	19,861
Thumpane	1,663	396	707	560
Poojapitiya	2,603	730	1,046	827
Akurana	2,610	634	1,123	853
Pathadumbara	3,854	1,096	1,516	1,242
Udadumbara	1,026	344	332	350
Kundasale	5,778	1,672	2,370	1,736
angawata Korale	9,459	1,121	4,575	3,763
Harispattuwa	4,000	1,165	1,689	1,146
Yatinuwara	3,998	859	1,896	1,243
Udunuwara	5,093	1,729	1,927	1,437
Greater Kandy Area	40,084	9,746	17,181	13,157
Outside GK Area	21,978	5,709	9,565	6,704

Source: Non-Agricultural Economic Activities in Sri Lanka Economic Census 2013/2014, Dept. of Censuses and Statistics

6.7.2 Present Major Economic Activities

(1) Agriculture

As discussed in subsection 6.7.1 (1), paddy production in Kandy does not meet the demand of the residents. As shown on Table 6.7.14, production of other crops is also not enough to cover the demand of the residents. According to the JICA survey, vegetables brought into the Central Market and Menikkumbura Economic Centre are cultivated in other districts such as Matale, Nuwara Eliya and Kurunegala. At the same time, according to EDB, the organisation is working with exporters to export agricultural products from some villages.

The Department of Agriculture and the Department of Export Agriculture (DADEA) promote green agriculture and organic farming as well as Good Agricultural Practice (GAP). Although it may not make sense to convert from conventional farming to organic farming due to cost and time, increasing value added by introducing GAP farming may be suitable in order to provide agricultural products to visitors and tourists coming to Kandy.

Table 6.7.14 Major Seasonal Crops Cultivated in Kandy District

Crop	Yield (Tonne)					
	2014/15 (Maha)	2015 (Yala)	2015 Total	2015/16 (Maha)	2016 (Yala)	2016 Total
Manioc (Cassava)	7,172	8,100	15,272	6,680.2	10,204.0	16,884.2
Tomatoes	6,120	4,881	11,001	6,310.1	4,841.8	11,151.9
Cabbage	3,970	5,224	9,194	3,799.5	5,559.9	9,359.4
Bean	3,584	3,925	7,509	3,673.6	4,369.6	8,043.2
Ginger	3,860	3,650	7,510	3,981.5	3,623.3	7,604.8
Brinjals (Eggplant)	2,970	3,030	6,000	2,582.3	3,009.2	5,591.5
Turmeric	2,740	3,102	5,842	2,912.4	2,609.4	5,521.8
Raddish	1,680	1,601	3,281	1,676.5	1,631.8	3,308.3
Ladies' fingers	1,202	1,681	2,883	1,129.1	1,981.6	3,110.7
Pumpkin	1,408	1,187	2,595	1,268.7	1,425.8	2,694.5

Source: District Statistical Handbook Kandy 2016-2017, Department of Census and Statistics

(2) Manufacturing

As discussed in subsection 6.7.1(2) regarding industry, in Kundasale DSD, Kandy Industrial Park and Pallekele Industrial Estate are located, whose basic data are shown on Table 6.7.15 and Table 6.7.16, respectively.

Kandy Industrial Park was developed by the Board of Investment (BO)I for export-oriented industries, where the largest industry is the garment sector operating eight (8) factories. Satellite and pharmaceutical manufacturers are located in the area. Kandy Industrial Park also plans to construct a facility to attract ICT companies.

Pallekele Industrial Estate, developed by the Industrial Development Board (IDB) under the Ministry of Industry and Commerce, is mainly for domestic SMEs.

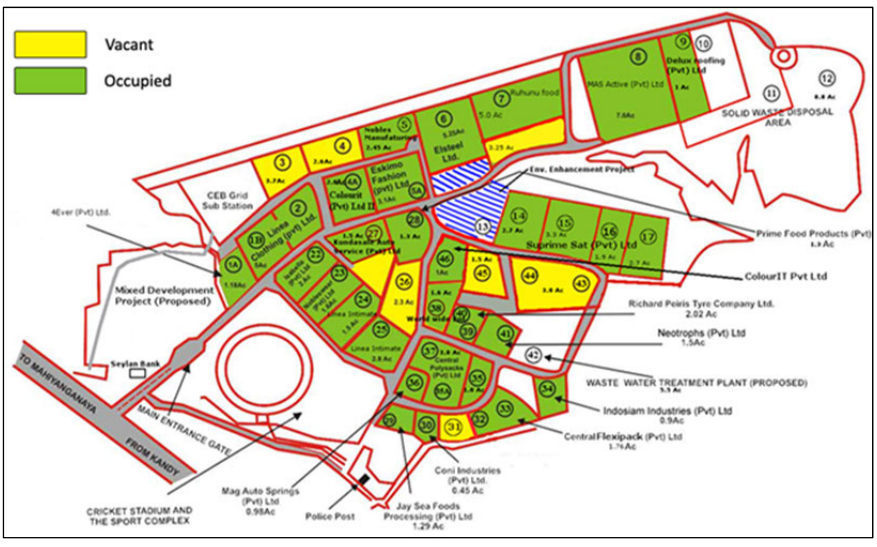
Current issue in both places is traffic congestion. It causes longer commuting time for workers and longer transportation time of cargoes between the factory and the port.

Although National Export Strategy (NES) 2018-2022 mentions cereals processing, biscuits and cocoa processing are available in the Central Province to deliver to the local and overseas markets, there is no regional investment policy to set the focus industries in order to attract investments in Kandy efficiently. The Greater Kandy Area must attract eco-friendly industries with high value added to overcome constraints such as labour force and logistics issues.

Table 6.7.15 Outline of Kandy Industrial Park

Establishment	1997
Developer	Board of Investment
Location	Pallekele (between Kundasale and Digana)
Target	• Export-oriented industries
Area	• 205 acres: • Occupied 85 acres, the rest is vacant
Number of industries	• Occupants: 25 private companies • Foreign investments: India, Germany
Type of industry	• Mainly garments, apparel and food processing • Recently, the pharmaceutical industry came in • Target industry: less water consuming, light industry • No heavy industry
Number of employees	• 8,000 persons, from the Greater Kandy Area or Kandy
History	• Land was not expensive • Cotton industry was robust
Location and Development constraints	• Not good location • Within 100m from Victoria Reservoir (drinking water) • No discharge of waste water
Infrastructure	• Waste water treatment: Individual waste water treatment system by the firms; Recycled water used for internal use (gardening) • Solid waste management: Individual firms manage to do incineration and land filling. • Planned waste incinerator: Planned at Mirigama 80 km west) is used.
Issues	• Traffic congestion between Colombo and Kandy: Logistics and access problem for raw materials from Colombo and export from Colombo • Need for bypass road: Road not passing through Kandy, Tunnel, Expressway) • Secure labour force: At present, has shortage of 200 workers. Young people do not want to work in the manufacturing sector.
Future plan	• Expansion to adjacent area of 17 acres, attract service industries like IT/BPO industries • 5,000 more employees are expected and it is projected that IT/BPO can attract such labour force.

Source: Interview with the BOI



No	Products
1	Garments
2	Garments
3	Garments
4	Garments
5	Garments
6	Garment
7	Garments
8	Food Processing
9	Steel Encloses / Ele. Panels
10	Smoked Sea Food
11	Garment printing
12	Cosmetic Items
13	Roofing Sheet
14	Provide Telecommunication
15	Pharmaceutical Manufacturing
16	Steel Furniture
17	Manuf. Steel tubes
18	Poly Sacks Bags
19	Polythene Printing & Packing
20	Vehicle Painting
21	Plastic Water Tanks
22	Tyres rebuilding
23	Vehicle Service
24	Vehicle Repair
25	Spicy Production
26	Polythene bags

Source: Kandy Industrial Estate

Figure 6.7.1 Kandy Industrial Estate

Table 6.7.16 Outline of Industrial Estate Pallekele

Items	Description
Establishment	1964, one of the oldest IE in Sri Lanka, same as those in Jaffna, Kotagala (Nuwara Eliya)
Developer	Industrial Development Board (IDB) under the Ministry of Industry and Commerce
Location	Palekelle (between Kundasale and Digana)
Target	• To create employment opportunities in the rural areas
Area	• 59 acres • All sold out in 2016
Number of industries	• 69 firms
Type of industry	• Garments, apparel, furniture, plastic moulding (castings).
Number of employees	• 2,500 persons
Issues	• Logistics and access: raw material from Colombo • Lack of labour force: shortage of 600 workers • Market is around Kandy; no issues • Less expectations around Pallekele, unlikely in Colombo
Future plan	• No expansion plan: No land available, and difficulty in securing labour force

Source: Interview with the IDB

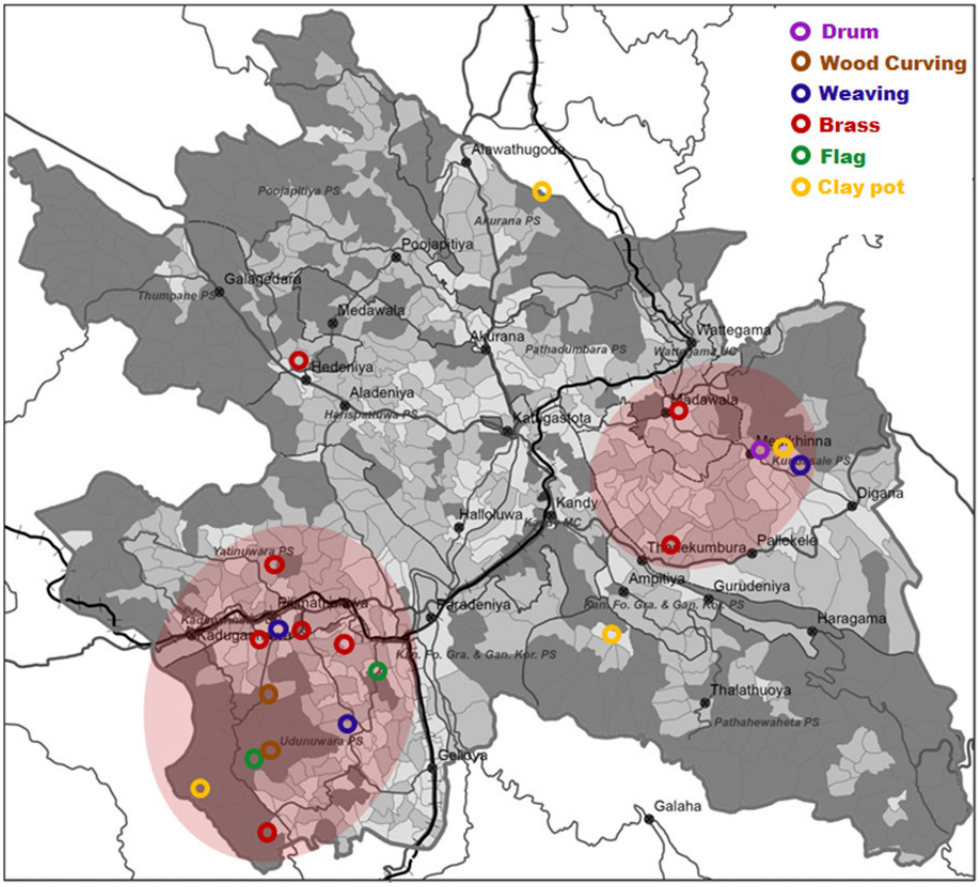
(3) Handicrafts

There are also some traditional handicraft villages in the Greater Kandy Area. Some of the major traditional handicrafts manufactured in the Greater Kandy Area include drums, wood carvings, weaving, brass, flags and clay pots as shown on Figure 6.7.2.

Although the impact of handicrafts promotion on the regional economy might be small, however, the history of handicraft villages in Kandy, as quoted below, is unforgettable and composes a part of the pride of Kandy. Moreover the synergy with the tourism industry, e.g. the hands-on visitor experience, is also not negligible. Under the current trade circumstances high margin is exploited by intermediate traders and it is not easy for artisans to approach to tourists and consumers. If the artisans can access and sell to tourists and consumers through direct sales outlets and e-commerce sites, more revenue could be earned by the artisans and income distribution in the rural area in Greater Kandy could be improved. Without support from the government, the handicraft techniques may not be transferred to the next generation as the artisans are aging. Therefore the handicrafts promotion needs to be drawn more attention.

"During the late Sirimavo Bandaranaike' tenure as Prime Minister in the 1970s, 36 families in this area[4] were given free land as an inducement to promote making brassware. During the same period another 36 blocks of land were awarded for the same purpose. The craftsmanship, prowess and great talents in needle-craft, which throughout won multitude of accolades saw Ms Manel Madawala receive a land in Naththarampotha during President Ranasinghe Premadasa era when he awarded land to another 36 families."[5]

[4] Naththarampotha village, about six km off Kandy on the Kandy-Digana road
[5] "Delicate art of Needle-craft in the hills of Kandy" the Sunday Times June 2,2013 (cited on August 10, 2018)



Source: The JICA Team based on information from the Department of Industrial Development and Enterprise Promotion

Figure 6.7.2 Traditional Handicraft Villages in Greater Kandy Area

Table 6.7.17 shows the types of handicrafts produced in the Central Province.

Table 6.7.17 Types of handicrafts produced in the Central province

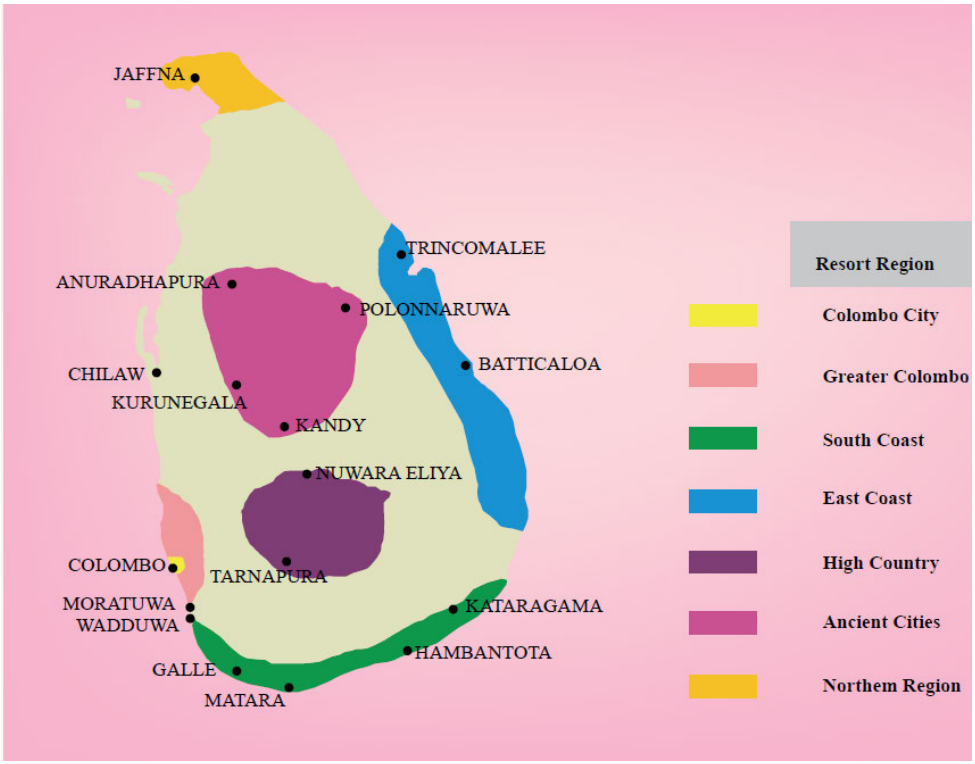
Types	
➢ Brass, silver and mixed metal work	➢ Lac work & sesat crafts
➢ Kandyan jewellery	➢ Dumbara mats & reedware
➢ Wood carving	➢ Pottery & stone carving
➢ Kandyan drums & musical instruments	➢ Leather products
➢ Weaving of handloom fabrics	➢ Optical lenses from Diyatarippu (quartz)
➢ Batik	➢ Artificial flowers & bamboo craft

Source: "Kandyan Handicrafts of Sri Lanka" Department of Small Industries of the Ministry of Industries, Trade, Commerce and Tourism of the Central Provincial Council

The current issue is mainly poor direct access and communication between artisans and customers, such as tourists and international buyers, in order to better promote handicrafts by producing higher value added products.

(4) Tourism and MICE

Kandy is one of the popular tourism destinations in Sri Lanka for being a World Heritage City with the Temple of the Tooth Relic. According to the Department of Tourism, there are seven large tourism resort regions in Sri Lanka as shown in Figure 6.7.3. Kandy is grouped in Ancient Cities.



Source: Tourism Board Annual Report 2015

Figure 6.7.3 Resort Regions in Sri Lanka

Table 6.7.18 shows the night spent by tourists in hotels by resort region in 2015. The total night spent in Sri Lanka during 2015 were 10,533,603 (8,945,380 for international tourists and 1,588,223 for domestic tourists). Among the regions, resort in South Coast recorded the most night spent by tourists with 3,687,790 (35.0%) nights, followed by Colombo City with 2,090,703 (19.8%) nights, Greater Colombo with 1,788,221 (16.9%) nights, and Ancient City with 3,687,790 (35.0%) nights. Night spent of the Kandy Area was recorded as 860,781 (8.2%) nights.

Among the four areas in Ancient City, Kandy recorded the largest number of night spent number with a total of 860,781 nights. (689,970 nights for international tourists; 170,811 for domestic tourists.

Table 6.7.18 Night Spent by Tourists in Hotels (by Region) in 2015

Resort Region	Foreigner	%	Local	%	Total	%
Colombo City	1,907,463	21.3%	183,240	11.5%	2,090,703	19.8%
Greater Colombo	1,540,548	17.2%	237,673	15.0%	1,778,221	16.9%
1. North of Colombo	1,323,881	14.8%	152,260	9.6%	1,476,141	14.0%
11. South of Colombo	216,667	2.4%	85,413	5.4%	302,080	2.9%
South Coast	3,173,817	35.5%	513,973	32.4%	3,687,790	35.0%
1. Up to Galle	2,244,100	25.1%	323,196	20.3%	2,567,296	24.4%
11. Beyond Galle	929,716	10.4%	190,777	12.0%	1,120,493	10.6%
East Coast	340,072	3.8%	122,120	7.7%	462,192	4.4%
High Country	468,297	5.2%	100,533	6.3%	568,830	5.4%
Ancient Cities	1,494,794	16.7%	424,605	26.7%	3,687,790	35.0%
I. Kandy Area	689,970	7.7%	170,811	10.8%	860,781	8.2%
II. Anuradhapura Area	137,328	1.5%	62,738	4.0%	200,066	1.9%
III. Polonnaruwa / Giritale	152,170	1.7%	60,717	3.8%	212,887	2.0%
IV. Habarana/Sigiriya/Dambulla	515,326	5.8%	130,339	8.2%	645,665	6.1%
Northern Region	20,389	0.2%	6,079	0.4%	26,468	0.3%
All Regions	8,945,380	100.0%	1,588,223	100.0%	10,533,603	100.0%

Note: Hotels include Classified/ Unclassified/ Boutique Hotels

Tourism has more rooms to develop as the main industry of the Greater Kandy Area. Tourism Act mandatorily regulates to register tourism businesses to Sri Lanka Tourism Promotion Bureau. According to the website of the Bureau, there are only 267 registered properties in Kandy as shown on Table 6.7.19; however the online booking website, *agoda.com*, has 1,673 properties available for booking. If this figure is correct, only less than 20% of properties are registered to the Bureau, and it appears that there are around 10,000-15,000 rooms available for tourists in Kandy. Tour guides and drivers are also required to register.

Table 6.7.19 Registered Accommodation Properties in Kandy

Accommodation type	Grade	No. of properties		No. of rooms	
Boutique Hotels	n.a.	1	1	10	10
Boutique Villas	n.a.	5	5	28	28
Bungalow	Standard	7	62	31	260
	Superior	22		80	
	Deluxe	33		149	
Guest House	A Grade	39	60	434	592
	B Grade	20		140	
	C Grade	1		18	
Heritage Bungalow	Standard	0	2	0	9
	Superior	0		0	
	Deluxe	2		9	
Home Stay	Standard	29	97	78	282
	Superior	40		109	
	Deluxe	28		95	
Hotels	1 Star	3	29	87	1,530
	2 Star	5		243	
	3 Star	3		303	
	4 Star	1		100	
	5 Star	3		312	
	Other	14		485	
Rented Apartment	Standard	4	10	10	28
	Superior	5		17	
	Deluxe	1		1	
Rented Homes	Standard	1	1	3	3
	Superior	0		0	
	Deluxe	0		0	
Total		267		2,742	

Source: Sri Lanka Tourism Promotion Bureau's website

The Regional Economic Development Agency (REDA) is the public-private-partnership service window of the Central Provincial Council and operates some activities related to tourism such as Tourism Information Centre, Matale Hotel School and Vocational Training Programme for school leavers.

However, there is no clear tourism promotion policy to set the target layers/segments of tourists in Kandy. Kandy must attract the following targeted tourists:

- Tourists with upper middle class income;
- Tourists seeking wellness or healing;
- Tourists wishing to visit places of worship; and
- Senior and long-stay tourists.

Meetings, Incentives, Conventions and Exhibitions (MICE) is another industry which can also be a potential field to attract tourists. Presently Sri Lanka receives around 2 million tourists per year, and 10-15% are MICE tourists. However, according to Sri Lanka

Convention Bureau, Kandy is not yet prepared to accept MICE tourists because even Colombo does not have a special place with a capacity of over 3,000 participants for international conferences, and venues in Kandy have a much lesser capacity. Moreover, Kandy does not have enough options for night life, and the traffic congestion between Colombo and Kandy causes inconvenience to tourists wanting to transfer to other cities.

One of current issues is that Kandy is a short stay destination for tourists, who may also want to visit Colombo on a day trip or have an overnight transit to other tourist destinations such as Sigiriya Rock fortress in Matale district and Horton Plains National Park in Nuwara Eliya District. Moreover, traffic congestion and poor public transport limits the tourists' movement in the Greater Kandy Area. Although there are a lot of interesting places in the region, they are not well recognised by tourists due to lack of information.

(5) Healthcare

Asiri Hospital, the largest private hospital chain in Sri Lanka with 4 hospitals in Colombo, is constructing a hospital on a land extent of 2 acres and 15.5 perches (some 8,400 m^2) situated at Srimavo Bandaranayaka Mawatha, Mulgampola [6], whose land belongs to the Urban Development Authority. Based on their project proposal, the following are some of the advantages of opening a new private hospital in Kandy equipped with the latest medical technology.

1) Location

- Kandy is a commercially and economically important city as well as a a popular tourist destination.
- Patients can be accessed from Central Province, North Central Province, North Western Province and Uva Province.

2) Human Capital

- It is easy to find specialists and qualified paramedical staff, since there are several large hospitals.
- There is an abundance of young people who can be trained for nursing and other related disciplines.
- Human resource mobility is lower in Kandy than in Colombo.

3) Competition

- There are no advanced, fully-equipped private hospitals in Kandy.
- There are several existing private nursing homes in Kandy, which provide only basic medical and surgical care without ensuring quality of care and hygiene.
- Many patients seek treatment in Colombo.

Moreover, the natural and spiritual environment in the Greater Kandy Area may attract aged people, or people coming from other areas who are seeking physical and mental wellness.

However, there are two obstacles that can be observed which hinder the promotion of medical tourism in Greater Kandy. One is the level of the existing medical facilities, and the other is the traffic congestion between Colombo and Kandy. The international medical tourists usually refer to the Joint Commission International (JCI)[7] accreditation to evaluate the level of the hospitals. As shown on Table 6.7.20 there are only three (3) JCI-accredited hospitals in Sri Lanka, and all of them are located in Colombo.

[6] Peradeniya Road
[7] "Joint Commission International (JCI) is one of the world's leading non-profit patient safety organizations" and "JCI accreditation is viewed as the gold standard in the global health care community." (www.worldhospitalsearch.org)

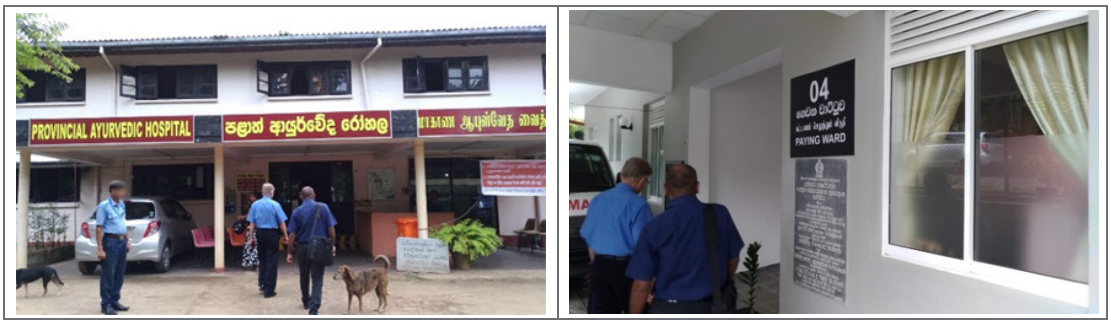
Table 6.7.20 Number of JCI-accredited hospitals in Selected Asian and South Asian Association for Regional Cooperation (SAARC) countries

Country	Located in the capital city and surrounding areas	Located in the other cities	Total
Sri Lanka	3	-	3
Indonesia	6	18	24
Malaysia	4	9	13
Philippines	5	-	5
Thailand	44	18	62
Afghanistan	-	-	-
Bangladesh	1	-	1
Bhutan	-	-	-
India	5	32	37
Maldives	-	-	-
Nepal	-	-	-
Pakistan	1	2	3

Source : https://www.worldhospitalsearch.org (cited May 28, 2018)

On the other hand, the natural and spiritual environment in Greater Kandy may attract aged people, or people coming from other areas who are seeking physical and mental wellness. Therefore, Ayurveda spa and wellness centre are also being promoted.

The Department of Ayurveda – Central Province is operating the Pallekele Provincial Ayurvedic Hospital. The hospital provides free services to the public. A public hospital, it owns a ward for paid patients. A new ward is also under construction. The hospital also produces medicines from the herbal plantation and improves knowledge of Ayurveda. It also has traditional doctors performing Ayurveda treatments.

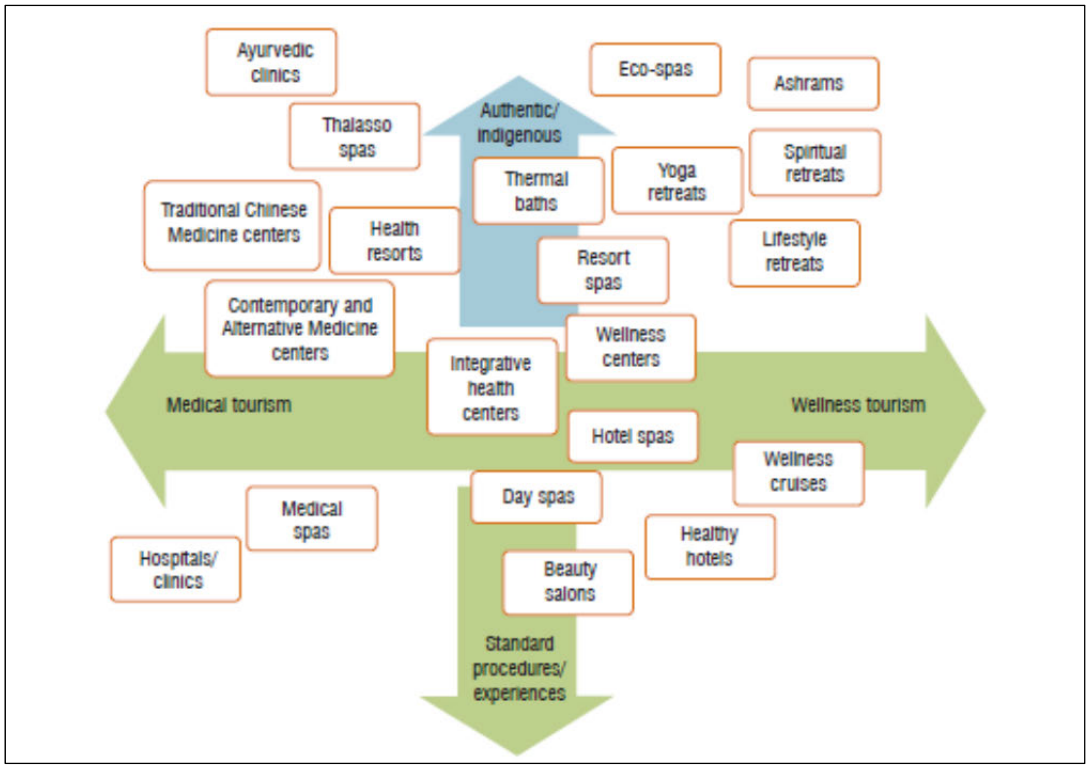


Source: The JICA team

Figure 6.7.4 Provincial Ayurvedic Hospital in Pallekele

In Kandy District, there are more than 1,300 Ayurvedic practitioners registered in the Ayurvedic Medical Council under the Ayurveda Act.

The Department plans to open a new hospital in Matale by renovating the existing facility. This new hospital will also target the foreigners. The private sector is working with the Department to provide Ayurvedic treatment.



Source: National Export Strategy of Sri Lanka – Information Technology Strategy 2018-2022

Figure 6.7.5 Existing Service Areas in Wellness and Medical Tourism in Sri Lanka

(6) IT/ Business Process Management (BPM)

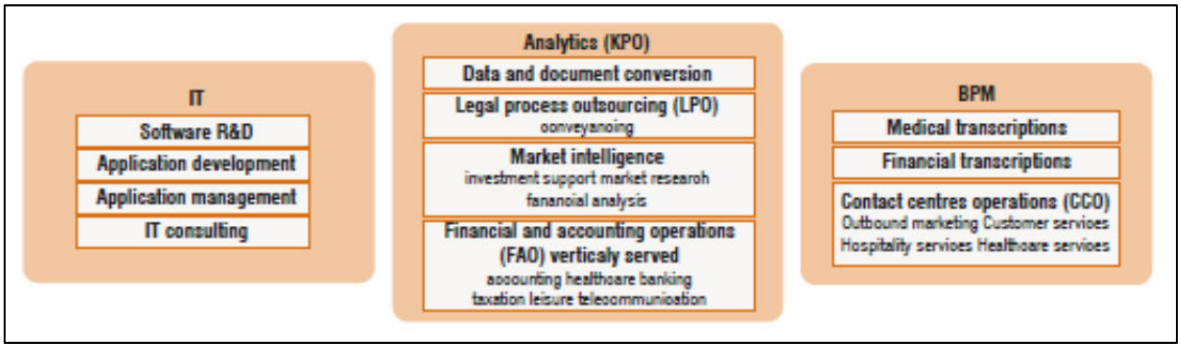
Based on information from the Sri Lanka Association of Software and Service Companies (SLASSCOM), in 2014, the IT and Business Process Management (BPM) industry in Sri Lanka was comprised of over 300 companies, more than 60,000 employees, and USD 600 million of export revenue. The following are key competencies and strengths of IT/BPM industry in Sri Lanka:

- Sri Lanka's competitive advantage in the IT/BPM industry is built around agility, high value-to-cost, a niche talent base, strong ethics, cultural adaptability and superior quality of life as a destination for doing business.
- Sri Lanka is recognised as a Global Centre of Excellence for Financial Accounting Outsourcing – Sri Lanka, which has the second largest pool of UK-qualified accountants next to UK.
- Sri Lanka is emerging as a high-end global product engineering / building destination – where availability of deep niche skills is a key advantage along with cultural adaptability and product engineering heritage.
- Sri Lanka is a highly cost-competitive destination and despite a highly educated workforce, wage costs are comparable (and almost 1/3rd less for certain BPO roles) to other regional markets.
- Nearly 50% of the students who have finished their higher education are trained in technical and business disciplines.
- Sri Lanka offers tier 1 infrastructure with a tier 2 cost structure.
- The country has created a national intellectual property rights office and as per AT Kearney, is among the most rigorous intellectual property protection regime in the region.

According to SLASSCOM's Vision 2022, the Sri Lankan IT Sector will become a USD5 billion industry, create 200,000 direct jobs, and enable the launch of 1,000 startups.

Kandy, along with Kurunegala, Hambanthota, Jaffna and Galle, is also identified as a potential regional hub to achieve the above targets. In 2016, SLASSCOM organised the Kandy IT week to build regional skills capacity to support the growth of the country's IT/BPM industry. The event was aimed at encouraging around 2,000 students to pursue IT degrees and highlighted the possible career options within the scope of IT at varying levels.

Kandy is also located in a good position to utilise talents from the University of Peradeniya, ICBT and NIBM. NES 2018-2022 also mentions the investment activities which will help to support industry growth. These activities included the establishment of dedicated ICT research centres in order to support the IT industry development in the Central province and to create linkages with other sectors such as agriculture, electronics and tourism, since it is important to develop technologies, applications and methods for improving production and services. To achieve this, the establishment of dedicated ICT research centres at University of Peradeniya is required. Financing can come from public-private partnerships with technical support from the Ministry of Higher Education and Highways and the Ministry of Finance's University Grants Commission.



Source: National Export Strategy of Sri Lanka – Information Technology Strategy 2018-2022

Figure 6.7.6 Sri Lanka IT-BPM and Analytics ICT-Enabled Services

6.7.3 Link with the National Export Strategy (NES)

The NES of Sri Lanka is an official document of the Government of Sri Lanka and was developed on the basis of the process, methodology and technical assistance of the International Trade Centre within the framework of its Trade Development Strategy Programme.

The Ministry of Development Strategies and International Trade and the Sri Lanka Export Development Board (EDB) recently issued NES 2018-2022 to the public.

Source: National Export Strategy of Sri Lanka – Information Technology Strategy 2018-2022

Figure 6.7.7 Overall Picture of NES 2018-2022

According to NES, the focus sectors were identified based on quantitative and qualitative parameters derived from export potential assessments conducted by EDB and BOI under the guidance of Harvard University, as well as studies by the Commonwealth Secretariat, McKinsey, the World Bank and ITC. The Sri Lanka Cabinet of Ministers formally validated the six (6) focus sectors selection on 14th July 2017. Each NES focus sector possesses a stand-alone export strategy to determine the industry-specific requirements for a sustained industry development and export competitiveness.

Six focus sectors were specified in innovation and export diversification, namely: IT-BPM, Wellness Tourism, Boat Building, Electrical and Electric Components, Processed Food and Beverages, and Spices and Concentrates as shown in Figure 6.7.7. Among the six sectors, there were five focus sectors, namely: IT-BPM, Wellness Tourism, Electrical and Electric Components, Processed Food and Beverages, and Spices and Concentrates, which could be located in Greater Kandy.

However, NES mentions the constraints that require urgent action. There were two (2) issues identified related to regional economic development. One is the limited development of logistics services (cold storage, reefers, dry ports, etc.) outside of the Western Province with limited loading/unloading points along trade corridors as trade and logistics hub issues. The other is the high concentration of export industries and services in Western Province with underdeveloped SMEs / export services networks in other regions as export diversification and innovation issues.

6.7.4 Conditions and Issues of Foreign Direct Investment (FDI)

As confirmed with BOI Kandy, there are only six (6) projects which have foreign investments in the Kandy District. Manufacturing sector has three (3) projects which are pharmaceutical, solid state discs and value added tea. Three (3) other projects are real estate projects.

In order to enhance regional economic development, the related authorities such as BOI shall attract more foreign investment by focusing on industries suitable for Kandy. However, it is recommended to approach the foreign investors which have already invested in other areas in Sri Lanka. This is so because among foreign investors, Kandy has much less awareness as an investment destination compared to other industrial destinations in South and Southeast Asian countries. The existing investors in Sri Lanka may learn more about the advantages of investing in Kandy and have more opportunities to utilise the existing resources in Sri Lanka.

Moreover, due to the current strict fiscal discipline in Sri Lanka, the tax incentives stipulated in the Inland Revenue Act were suspended. Without the tax incentives, it is not easy to compete with other cities in the region to attract foreign investment.

6.7.5 Conditions and Issues of Micro and SMEs

(1) SME Distribution in Kandy District

Non-agricultural establishments in Kandy District are categorised as Micro, which accounts for more than 90% in number while employment is just less than the half of the total employment.

Table 6.7.21 Non-Agricultural Establishments and Persons Engaged in Kandy District

No. of Non-Agricultural Establishments

	Total	Micro	Small	Medium	Large
Sri Lanka	1,019,681	935,736	71,126	10,405	2,414
	100.0%	91.8%	7.0%	1.0%	0.2%
Kandy District	62,062	56,228	5,027	683	124
	100.0%	90.6%	8.1%	1.1%	0.2%

Persons engaged

	Total	Micro	Small	Medium	Large
Sri Lanka	3,003,119	1,338,675	529,751	386,756	747,937
	100.0%	44.6%	17.6%	12.9%	24.9%
Kandy District	168,057	82,852	37,309	23,528	24,368
	100.0%	49.3%	22.2%	14.0%	14.5%

Note: SME group definition based on the number of persons

- Industry and Construction: Micro (1-4) , Small (5-24), Medium)25-99), Large (100+)
- Trade: Micro (1-3), Small (4-14), Medium (15-34), large (35+)
- Services: Micro (1-4), Small (5-15), Medium (16-74), Large (75+)

Source: Non-agricultural Economic Activities in Sri Lanka Economic Census 2013/2014, Dept. of Censuses and Statistics

(2) Micro and SMEs in the Greater Kandy Area

The JICA Team collected participant voices from Micro and SMEs operating horticulture, food production, trade, commerce and services, handicrafts, and production during a workshop held on February 24th, 2018.

Issues which the participants pointed out that should be improved for Micro and SME businesses are shown in Table 6.7.22. Business persons in the Greater Kandy Area face difficulties to access to the market to procure materials or machinery with the same prices as

those in Colombo, or sell products directly to customers. They also face difficulties to hire skilled labour and obtain finance at low interest rate. Moreover, they cannot create a brand to sell their products with higher value. In order to add higher value to their products, it is recommended that Kandy creates a common brand to distribute the ***value of Kandy*** to customers.

Table 6.7.22 Issues of Micro and SMEs in Greater Kandy Area

Sector	Issues	Expectation to Government
Procurement	• No markets to be procured locally with standard price • No water • High electricity cost (for commercial use)	• Construct special market
Labour	• Shortage of workforce • No high technical knowledge/ skill	• Construct training centre
Finance	• Shortage of capital (Cannot get loan) • High interest rate	• Set up financial support
Production/ Delivery	• No latest equipment/instruments/machines • No standard/certificate	• Set up financial support • Set standard
Marketing	• No market to sell directly • No Brand	• Construct marketplace • Organise association

Source: The JICA Team based on the discussions at the Micro and SMEs Workshop held on Feb 24, 2018

6.7.6 Summary of Issues

For the agricultural sector, the Greater Kandy Area has no more room to produce more crops by increasing the land due to limitation of land for cultivation. However, it can increase its value added such as through GAP farming in order to provide agricultural products to the visitors in Kandy.

For the industry sector, the shortage of labour force and inefficient logistics due to traffic congestion are reported. It is necessary to increase value added for food production by improving the manufacturing process or branding to show the value of Kandy. Handicrafts also need to be developed in line with the tourism promotion policy. Moreover, eco-friendly industries with high value added such as robotics, medical devices and healthcare/wellness products should targeted attracting investment by overcoming the abovementioned constraints.

For the services sector, tourism is currently one of the highest value added businesses in Kandy; however, there is no clear tourism promotion policy. Kandy must attract the targeted tourists and offer them to stay longer by making improvements to its poor tourism infrastructure. Healthcare and IT/BPM industries also have potential opportunities to utilise the rich resources in Kandy. Enhancement of trade function is also important due to the strategic location of Kandy in the middle of Sri Lanka. As Micro and SMEs face problems in procuring materials and hence, have been selling products ineffectively, in order to reduce procurement cost and maximise profit by having a direct access to the consumers, establishment of markets or logistic centres is recommended.

CHAPTER 7 VISION, GOALS AND STRATEGIES

7.1 Visioning

The vision for the Greater Kandy Urban Plan shall represent Kandy's inherited values and what it aims to become in the future with a new approach to development.

To derive the vision, as shown in the following chart, firstly (1) major potentials and issues though reviewing/considering existing conditions and the results of the SWOT analysis were identified; (2) visions and missions of existing related plans and those of the Central Province, Kandy District, 13 local authorities, and 10 DSDs were reviewed; and (3) through discussions and interviews with the stakeholders, the major development potentials and issues were determined.

For visioning process based on these potentials and issues, many stakeholders emphasised during various stakeholders' meetings the significance and importance of the major values of Kandy, namely: religious, historical, natural and cultural values, which should be the focal points in identifying the unique features of Kandy that Greater Kandy should aim at. The common good and the positive points raised in the SWOT analysis as well as the visions of local authorities and other government bodies shall be reflected in the vision. On the other hand, some issues and negative points to be addressed, which were raised in the problem structure and the SWOT analysis, are reflected in the development goals in order to provide more clarity on the status of the vision and to create the mission statements of the local governments.

Source: The JICA Team

Figure 7.1.1 Process of Visioning

7.2 Issues and SWOT

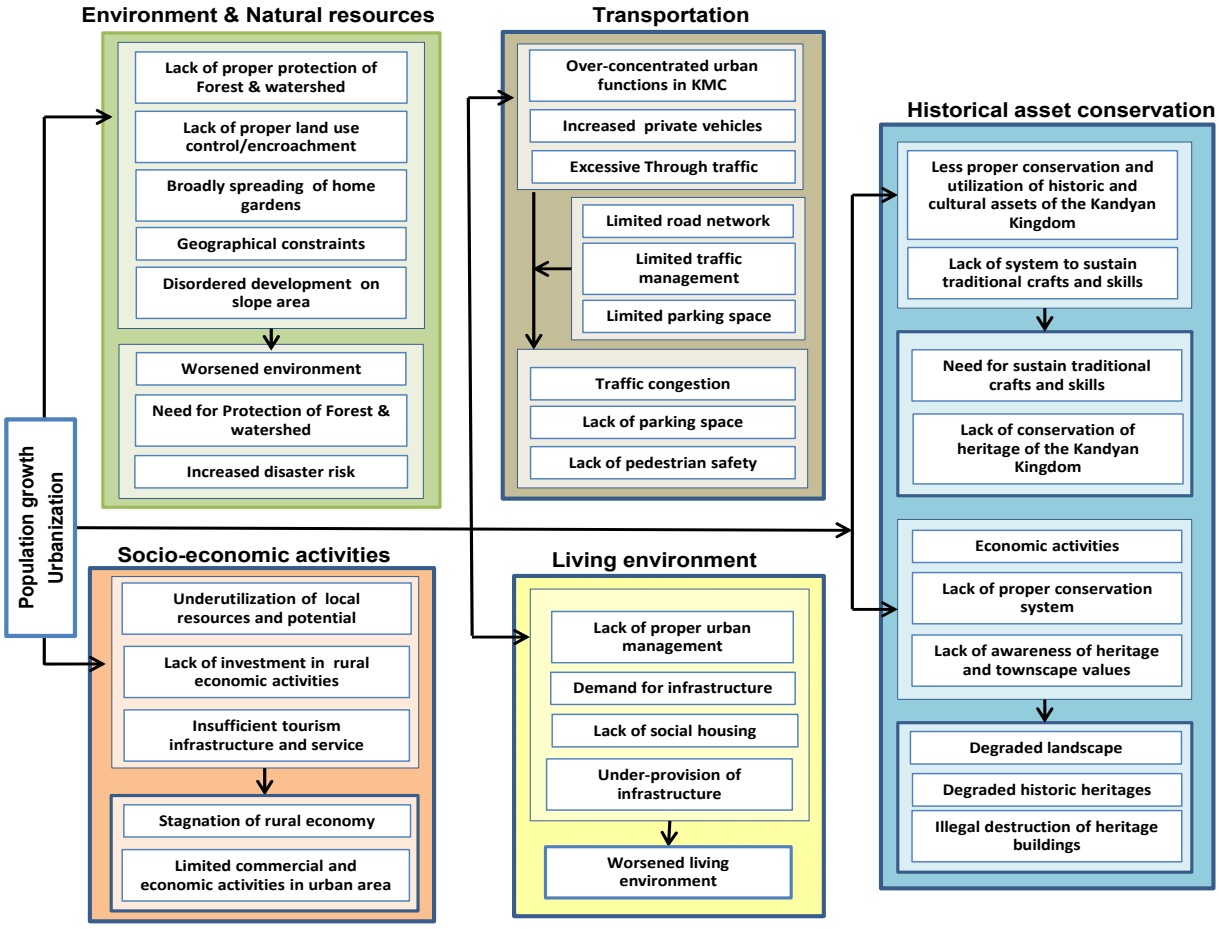
Problem structure, issues, and SWOT (strength, weakness, opportunity, and threats) concerning Greater Kandy were identified based on the analysis of the current situation, identified problems and issues, existing plans, and results of various stakeholders' meetings such as Steering Committee meetings, Urban Development Vision Technical Working Group (TWG) meetings, SEA stakeholders' meetings, among others.

7.2.1 Problem structure

Urban problems in the Greater Kandy Area have been triggered by population growth and not-well planned urbanisation. Based on review of past studies, discussions with stakeholders, and results of site survey, these problems are largely categorised as major aspects pertaining to natural environment, heritage conservation, socio-economic activities, transportation problems, and living environment.

Though heritage conservation seems to be the most important issue in Kandy from an objective viewpoint, citizens consider transport and environmental conditions as the most pressing concerns, and seemingly it is difficult for them to pay much attention to matters concerning heritage. It is also obvious that heavy traffic and degraded environment caused negative impacts on the Heritage City of Kandy.

It is necessary to consider these identified urban issues in a comprehensive manner as well as from a regional perspective.



Source: The JICA Team

Figure 7.2.1 Problem Categories in Greater Kandy Area

7.2.2 SWOT Analysis

For purposes of development plan formulation for the Greater Kandy Area, the SWOT components were identified, sorted out by the JICA Team, and discussed at various meetings, including Steering Committee, Urban Development Vision TWG, and SEA (Strategic Environmental Assessment). The results of the SWOT analysis are summarised in Table 7.2.1.

Table 7.2.1 SWOT Analysis

<Opportunities>	<Threats>
• Various World Heritages are accessible from Kandy • Road development plans of highways and bypasses • Development potential of abandoned agricultural lands • Many local industries and traditional crafts flourishing in the area	• Development is controlled as the Greater Kandy Area is designated as The Central Fragile Region under National Physical Plan • Increasing traffic flow and daytime population inflow • Fear of being listed as an endangered World Heritage because of the degradation of heritage buildings • Natural disaster risk • Inappropriate coordination of intergovernmental organisations in planning and heritage conservation
<Strengths>	**<Weaknesses>**
• Abundant natural environment • World Heritage as the "Sacred City of Kandy" • Historic properties of the Kandyan Kingdom • Kandy's tradition and history, including intangible cultural assets like Perahera, or "Kandy Brand" • Popularity and publicity as a tourism area • Stable population growth • Availability of various esteemed educational and medical facilities • World-class human resources and technology based at Peradeniya University and BOI • Dedicated and well-informed citizens to accommodate and participate in public consultation meetings	• Limited flat land for development; these lands are surrounded by mountains and rivers • Being located inland which may constraint industrial development • Chronic traffic congestion and lack of parking areas in the city centre • Occupation of valuable lands in prime locations by public facilities (market, police barracks, stadium, etc.) • Air pollution caused by traffic emissions • Degraded urban utilities (drainage, sewerage, solid waste management facilities, etc.) • Loss of historic values of townscape and heritage buildings • Over strict and impractical regulations on conservation of historic and cultural heritage • Degraded natural environment • Inappropriate tourism services • Deterioration of security • Limited job opportunities • Limited competitiveness and marketing network of local industries and traditional crafts • Limited public finance • Lack of coordination among government agencies • Citizen's feelings of distrust regarding government • Lack of public participation opportunities

Source: The JICA Team

In formulating the Greater Kandy Urban Plan, potentials are to be positively utilised and the issues and constraints shall be addressed and overcome. The following are major potentials and issues/constraints that should be reflected in the vision.

Major Potentials

- Various assets such as the World Heritage, historic properties, and rich and beautiful natural environment
- Renowned as peaceful tourism area
- Stable population distribution
- Potential for industrial and tourism development
- Planned transport network

Major Issues

- Concentration of socio-economic activities and traffic in the city centre
- Degrading natural environment
- Stagnation of rural economy
- Degraded landscape and historic townscape
- Increased disaster risk due to development in disaster prone areas
- Worsening living environment

It is necessary to fully make use of the potentials and address issues of both Greater Kandy and the city centre in a comprehensive and integrated manner.

7.3 Values of Kandy and Keywords for Visions Based on Existing Plans and Inputs from Local Authorities

Based on the Development Needs of Province and LAs, DS and DSDs (see Chapter 3 for the details), there are some common keywords derived from their mission statements. These keywords shall be taken into consideration when setting up the vision for the Greater Kandy Urban Plan. The keywords are as follows:

- **Prosperity and satisfaction:** aiming at economic vitalisation, prosperity and provision of employment opportunities, thus local people can feel satisfaction
- **Sustainable development**: aiming at development in an environmentally sustainable manner as well as strengthening of social cohesion and economic sustainability
- **Good governance and excellent/efficient/effective public service:** aiming at accountability and transparency as well as adequate public services
- **Heritage:** concerns both tangible and intangible historical and cultural heritage not only of the World Heritage City of Kandy, but those of the Kandy Kingdom and others
- **Rural and village excellence:** aiming at rural and village development in pursuit of excellence through economic vitalisation and diversification, and provision of sufficient public services
- **Community participation:** aiming for the participation of people in the planning and implementation process as part of good governance

7.3.1 Layers of Values of Kandy

Greater Kandy has many valuable properties and assets which could represent its future vision. Through meetings and interviews with the stakeholders, it has been identified that the diversified properties of nature, culture and history; diversified industries (medical, education, IT, traditional craft, agro-products, tourism, etc.); diversified religions and tolerance; diversified people including citizens, business people, pilgrims, tourists, etc. and diversified people who live, work, and visit Kandy are the assets of Kandy.

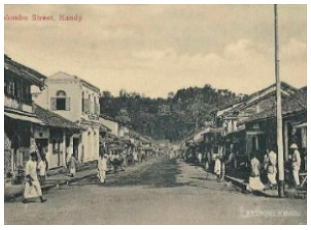
While various assets have been identified, many stakeholders put emphasis on the importance and significance of *inherited values* of Kandy. These are the four main layers of Kandy's religious, historical, natural, and cultural values which are closely related and integrated in people's daily lives. These values distinguish Kandy from other heritage cities in the world. When these values are properly preserved, the people's uniqueness in both rural and urban areas will be highlighted, and this could bring sustainable benefits to people's everyday lives in the future.

Religious values: The Temple of Sacred Tooth Relic (Dalada Maligawa) is the heart of religious values in Kandy. Worshippers visit not only this temple, but also the church and the Hindu temple in the same area. Kandy shows that harmonisation of religion could be beneficial for local sustainable growth. Meanwhile, many international and domestic tourists visit to see the Esala Perahera Festival, the largest event in Kandy.

Historic values: The urban spatial structure of the Heritage Area has been sustained from the Kandyan Kingdom period, the British Colonial period, and the modern period. Based on this traditional spatial structure, various types of historical buildings are clustered in the heritage area as well as in rural areas.

Natural values: A huge portion of Greater Kandy Area is surrounded by mountains and forests, connected by water network of the Mahaweli River, reservoirs, and lakes. Distinguished natural landscape with greenery, water forms, and tea farms are indispensable to form Kandy. Based on the importance of these natural resources, ecosystems such as sanctuary, paddy field with animals, etc., are preserved.

Cultural values: There are rich cultural tangible and intangible properties, such as historic buildings, Kandyan home gardens, Kandyan dance and traditional dress, traditional crafts, etc.

Religious Values			
	Temple of Tooth Relic	Perahera Festival	St. Paul Church
Historic Values			
	Colombo Street in the old days	Bogambara Prison	Designated Heritage Building
Natural Values			
	Mountains	Mahaweli River	Spice Garden
Cultural Values			
	Kandyan Dance	Rural Life	Traditional Handicraft

Source: The JICA Team

Figure 7.3.1 Layers of Values of Kandy

7.3.2 Keywords of the Visions of Existing Plans and Local Authorities

In the Development Needs of Province and LAs, and of DS and DSDs (see Chapter 3 for details), there are some common keywords in their mission statements. These keywords are to be taken into consideration for setting up the vision and goals for the Greater Kandy Urban Plan. These are as follows:

- **Prosperity and satisfaction:** aiming at economic vitalisation, prosperity, and employment opportunities, thus local people can feel satisfaction
- **Sustainable development**: aiming at development in an environmentally sustainable manner, as well as strengthening social cohesion and economic sustainability
- **Good governance and excellent/efficient/effective public service:** aiming at accountability and transparency as well as adequate public services

- **Heritage:** concerns both tangible and intangible historical and cultural heritage, not only of the World Heritage City of Kandy, but those of the Kandy Kingdom and others
- **Rural and village excellence:** aiming at rural and village development towards the excellence through economic vitalisation and diversification, and providing sufficient public services
- **Community participation:** aiming for the participation of people in planning and implementation process as part of good governance

7.3.3 Vision

As explained, Kandy has unique and diversified values based on tangible and/or intangible religious, historical, natural, and cultural properties. Toward achieving the vision, these values shall be further promoted locally and on a regional scale.

Preservation and enhancement of these values in the Greater Kandy Area will contribute towards the promotion of socio-economic benefits through transport, tourism, and industrial development.

With regard to the vision of Greater Kandy, the following vision statement has been reached through discussions with the stakeholders, including the members of the Steering Committee, Technical Working Group (TWG) for Urban Development Vision, and Strategic Environment Assessment (SEA).

Vision:

"Greater Kandy shall be Sri Lanka's repository of historic, natural, cultural and religious heritage."

Kandy is the foundation of faith and spiritualism in the centre of Sri Lanka. To attain the vision, the values of Kandy must be preserved and promoted not only by the public sector, but also by the local communities and citizens (through public and citizen's partnership) in a sustainable manner to ensure growth in the future through conservation and innovation.

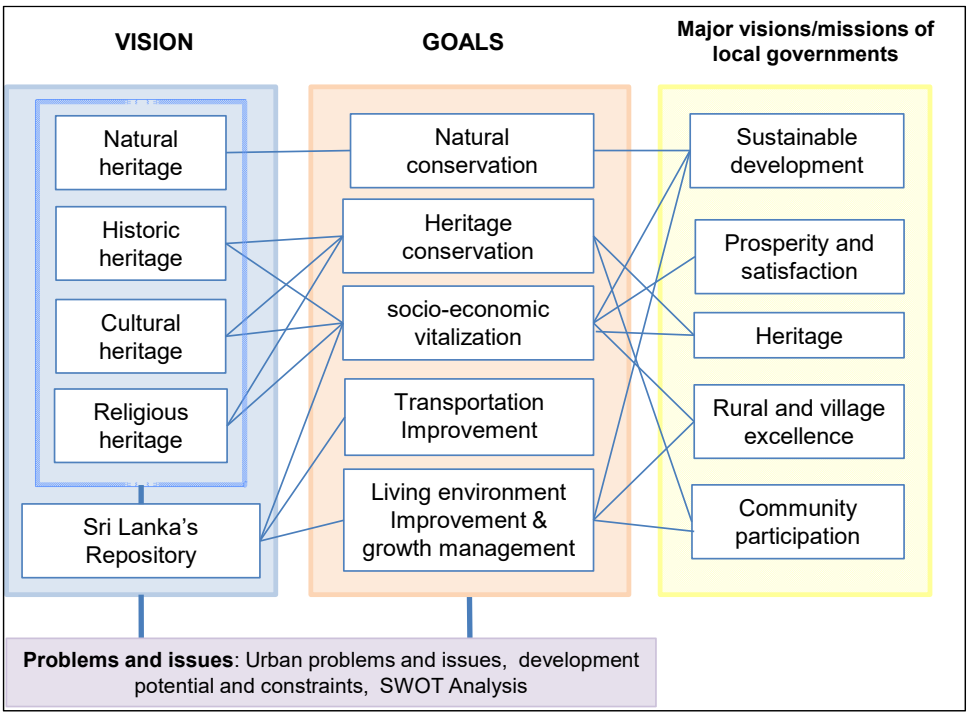
7.4 Goals, Objectives, and Strategies

In this section, goals, objectives, and strategies are summarised.

7.4.1 Development Goals

The vision reflects the future image of Greater Kandy. The Greater Kandy Area must be transformed into an area that is suitable to be the repository of the values of Kandy. For this, the Greater Kandy must be transformed by utilising the strong points and opportunities and solving various issues.

The following five goals are derived to accomplish the vision (as explained in 7.1 Visioning). The goals are set to correspond with the vision and development issues and major visions and missions of the local governments as discussed earlier. The figure below summarises the relationships between visions, goals, and major visions and missions of local governments.



Source: The JICA Team

Figure 7.4.1 Relationships between Visions, Goals, and Major Visions and Missions of Local Governments

Goal 1: Environmental conservation and management: To preserve and conserve the rich natural resources of greenery and water in the Central Highland by development control towards sustainable growth

Goal 2: Conservation/preservation of historic and cultural heritage: To conserve historic and cultural heritage including that of the Kandyan Kingdom, with the World Heritage City of Kandy as the centre, and bequeath these to future generations

Goal 3: Vitalisation of socio-economic activities: To vitalise the regional economy by promoting the urban and rural local economies through enhancement of the industrial potentials based on local resources

Goal 4: Transportation improvement: To enhance regional transport network and services through the development of expressway and bypass roads, utilisation of railways, reduction of through traffic and traffic congestion. Alleviate air pollution through the implementation of traffic management policy in the Heritage Area

Goal 5: Improvement of living environment and urban growth management: To create an excellent, liveable urban space and living environment by determining the proper location of urban functions, land use zoning, redevelopment/development of infrastructure, disaster prevention, etc., and formation of a compact city

7.4.2 Objectives

To realise the goals, the following objectives are formulated:

(1) Objectives for Goal 1: Environmental Conservation and Management

To conserve the environmental resources in the Greater Kandy – which is classified as "environmentally vulnerable area" by the National Physical Plan 2030 and 2050 and is suffering from disorderly development and encroachment into the rich and precious environmental resources – the following objectives are set:

Objective 1-1: Proper conservation and utilisation of the rich natural environment

The rich natural resources of Greater Kandy, which include the protected areas such as the Victoria Randenigala Rantembe Sanctuary, Udawatta Kele Forest (Sanctuary), and Hanthana Mountain Range – where many precious fauna and flora are found – shall be properly preserved based on appropriate environmental management plans. At the same time, these natural resources could be utilised to promote socio-economic activities such as eco-tourism.

Objective 1-2: Proper control of development

To prevent environmental degradation by disorderly development – including illegal development and encroachment into the beautiful mountain areas, the Mahaweli River basin, watersheds and riverbeds, and other rich natural environment – the development shall be controlled and regulated properly and strictly.

Objective 1-3: Alleviation of environmental pollution

The river systems and soil are polluted by direct discharge of non-treated wastewater and illegal disposal of waste. Similarly, the air in the central area of KMC is polluted due to congested traffic during rush hours. Accordingly, pollution control and monitoring system for air, water, and waste management shall be properly implemented to manage pollution.

(2) Objectives for Goal 2: Conservation/preservation of Historic and Cultural Heritage

The Greater Kandy is endowed with rich tangible and intangible historic, cultural, and religious heritage. However, these are not well preserved and are degrading and underutilised to benefit socio-economic activities. The following objectives are set to attain the goal:

Objective 2-1: Rediscovery and utilisation of the valuable heritage in the Greater Kandy

There are many heritage sites all over the Greater Kandy Area, but many of them do not attract attention. Hence, they are not well-preserved and utilised. Accordingly, the historical, cultural, and religious heritage, including those of the Kandyan Kingdom, shall be rediscovered and utilised properly not only for the succeeding future generations, but toward promoting regional socio-economic activities.

Objective 2-2: Enhancement of attractiveness as a World Heritage

Kandy's attractiveness as a World Heritage has been degraded by heavy traffic congestion, unsafe and uncomfortable pedestrian spaces in the city centre, disregarded heritage buildings and landscapes, less proper usage of public facilities located on prime lands in the city centre, less wise use of the city centre area for tourism-related economy, etc. By addressing these issues, Kandy could regain its attractiveness and thereby revitalise its socio-economic activities.

Objective 2-3: Conservation of landscape, townscape, and historic buildings

For proper conservation, the foremost is for all the individual listed heritage buildings and groups of buildings to be re-evaluated and re-designated. The existing institutional arrangements for conservation should be improved, which include regulations on heritage and non-heritage buildings, approval and monitoring system, incentives to owners/occupants, financial mechanism, research and advocacy, adaptive reuse of the heritage buildings, and so on. Furthermore, community activities and involvement shall be promoted, as the government alone cannot conserve the heritage but requires the community's understanding and initiated activities.

(3) Objectives for Goal 3: Vitalisation of Socio-Economic Activities

Many local authorities in the Greater Kandy are eager to promote their economies, as their resources are not being tapped properly to maximise economic potentials. Another reason is to complement the socio-economic activities concentrated in KMC which shall be transferred to the cluster cities of Katugastota, Peradeniya, and Kundasale-Digana. The following objectives are set to attain the goal:

Objective 3-1: Promotion of rural and local products

Rural and local economies in the Greater Kandy shall become more productive and profitable by promoting the existing micro, small, and medium industries, including handicrafts and other agri-based products which characterise the rural economy in the Greater Kandy.

Objective 3-2: Promotion of high-value added and advanced industries and services

There are industrial estates in Pallekele where some high-tech and IT companies are operating, and there are concentrations of health and education-related facilities in Peradeniya. It is essential to boost economic activities by focusing on the strengthening of these advantageous industries.

Objective 3-3: Promotion of tourism-related industries

Tourism is the key industry of Kandy, and Kandy is one of the most famous tourist attractions in the country mainly due to the Temple of Sacred Tooth Relic. The potentials for tourism can be utilised to promote socio-economic activities in the region.

Objective 3-4: Promotion of socio-economic activities of the cluster cities

In order to balance socio-economic activities among KMC, Katugastota, Peradeniya, and Kundasale-Digana, the three cluster cities shall be developed further to accommodate the increasing population and provide various services to the people. Kundasale shall be developed as the medical and educational centre, Katugastota shall be the commercial centre, and the Kundasale-Digana shall be the public administration and the centre for advanced industries.

(4) Objectives for Goal 4: Transportation improvement

Traffic congestion in the city centre is a fundamental issue to address. To alleviate the worsening situation, public transport shall be promoted as well as the development of regional transport network with bypass roads, and mobility management to reduce the traffic volume in the city centre. The following objectives are set to attain the goal:

Objective 4-1: Promotion of public transportation

To ease the chronicle traffic congestion in the city centre, modal shift from private modes to public transport shall be promoted. To this end, the railway-centred public transportation system with multimodal facilities and park & ride system that can provide quality service shall be established, especially in Kandy, Katugastota, Peradeniya, and Tennekumbura areas.

Objective 4-2: Development of a transportation network with wide area coverage

Regional road network shall be developed to connect the regional centres and town centres efficiently, taking into account (as part of the network) the Central Expressway which is under construction. The bypass road around Kandy shall be developed so that much traffic presently passing through the city centre causing congestion shall be diverted.

Objective 4-3: Securing smooth mobility within urban areas

Currently, the mobility of vehicles and pedestrians in the city centre are clogged and chaotic. Various measures have to be undertaken to secure smooth mobility in the city centre, which include traffic and parking management, improvement of intersections, pedestrian movement, traffic control on trucks and buses, and promotion of public transportation, especially railway use.

(5) Objectives for Goal 5: Improvement of Living Environment and Urban Growth Management

Greater Kandy has various urban problems. Congestion in the city centre – which is largely caused by the concentration of public facilities which attract many visitors – needs to be resolved by relocation and rehabilitation which are often discussed. In addition, the living environment has become degraded due to disorderly development and inadequate infrastructure provision. The situation is aggravated by disaster-prone areas that require proper disaster prevention measures. The following objectives are set to attain the goal:

Objective 5-1: Restructuring of urban functions and urban development and redevelopment

There are many public facilities located in prime lands in the city centre, such as Bogambara Prison, city market, police barrack, public library, city car parking, and other governmental offices. Some of these facilities need not be necessarily located where they are currently situated and could be relocated to outer areas such as Katugastota, Peradeniya, and Kundasale-Digana; or rehabilitated to create a more comfortable urban space suitable for Kandy. Katugastota, Peradeniya, and Kandasale-Digana will become the secondary centres with relocated public facilities and other service and commercial activities. Katugastota and Peradeniya are being developed along with the development of the station area. The restructured urbanisation areas should form a compact city to minimise the adverse effects on the environment and to attain a low carbon society.

Objective 5-2: Improvement of living environment

Some residential areas, especially those along Meda Ela and Mahaiyawa, are degraded as a result of informal settlement or not well-planned development. These substandard residential areas shall be improved. Along with the development, housing shall be provided to accommodate the increasing population, particularly at Katugastota, Peradeniya, and Kundasale-Digana. Basic infrastructures, such as sewage and water supply, shall be provided.

Objective 5-3: Proper disaster prevention based on disaster risk reduction principles

Greater Kandy is often suffering from natural disasters, such as landslides and floods. Accordingly, disaster prevention based on Disaster Risk Reduction principles is required to protect human lives and assets from disasters. The NBRO's hazard maps and other scientific disaster risk information can be adopted.

Objective 5-4: Creation of amenity urban space in the city centre

Kandy's comfortable, walkable, safe, clean, serene, and beautiful features have been degrading gradually, thus diminishing its amenity value and attractiveness, especially in the Heritage Area. Urban space with amenities suitable for Kandy's features shall be established in the Heritage Area.

7.4.3 Strategies for Environmental Conservation and Management

The following strategies are proposed for each objective for **Goal 1: Environmental Conservation and Management**.

(1) Strategies for Objective 1-1: Proper Conservation and Utilisation of the Rich Natural Environment

Proper conservation requires a proper management plan and its implementation including monitoring, utilisation of natural resources, and people's awareness about the environmental management. For this, the following are set:

- Proper preservation of forests, river basin, and watersheds including the Mahaweli River to be guided by an Environmental Management Plan formulated based on the scientific survey of natural resources including ecological network. This plan shall be consistent with the development plans prepared for local authorities by the UDA.
- Establishment of a strict monitoring and enforcement system of natural resources protection and/or conservation through patrolling by rangers.
- Proper conservation and utilisation of the natural environment based on clear zones for protection and those for outdoor recreation, educational activities and tourism, etc.
- Rehabilitation of degraded forest and watershed areas by reforestation, planting, and relocation of the illegal settlers.
- Promotion of public awareness on natural resource conservation/utilisation.

(2) Strategies for Objective 1-2: Proper Control on Development

Disorderly and illegal development must be controlled by the appropriate plan, regulation and enforcement. For this, the following are set:

- Appropriate control of land use and development following the development plans for the local authorities prepared by the UDA based on environmental zoning and disaster hazard risks

- Strengthening of monitoring and legal enforcement on development by the local governments and the UDA

(3) Strategies for Objective 1-3: Alleviation of Environmental Pollution

As for pollution, water contamination, air pollution, and solid waste management must be properly alleviated. For this, the following are set:

(Reduction of water contamination)

- Strengthening of enforcement of water quality standards
- Strengthening of water monitoring system
- Strengthening of inspection system of industrial wastewater
- Improvement of wastewater treatment system (including sludge treatment facility, sewage system in major cities, and septic tank) by imposing proper on-site treatment according to the size of the city and its population

(Alleviation of air pollution)

- Strengthening of enforcement of air quality standards
- Strengthening of air quality monitoring system
- Strengthening of car inspection
- Reduction of vehicle-borne air pollution by traffic control in city areas
- Encouragement of use of public transportation system
- Promotion of replacement of outdated vehicles to latest environmentally-friendly models

(Proper solid waste management)

- Proper solid waste management that includes the proper use and construction of disposal sites and facilities, promotion of waste separation and 3Rs, etc.
- Promotion of community-based solid waste management especially for city beautification
- Promotion of awareness for solid waste management

7.4.4 Strategies for Conservation of Historic and Cultural Heritage

The following strategies are proposed for each objective for **Goal 2: Conservation of historic and cultural heritage**.

(1) Strategies for Objective 2-1: Rediscovery and Utilisation of the Valuable Heritage in the Greater Kandy

Greater Kandy has a lot of valuable heritage, both tangible and intangible. However, not all of them are recognised and utilised properly. For this, the following are set:

- Based on a study about heritage resource preservation stand utilisation status, the formulation of tourism promotion plans and programmes including promotion of historic and cultural tourism destinations, traditional heritage-related handicraft industries and local traditional health-related industries.
- Conservation and promotion of traditional art, handicraft, performance art, and skills.
- Conservation and promotion of intangible historical, cultural, and religious properties and traditions, such as Perahera and other religious and local observances.

(2) Strategies for Objective 2-2: Enhancement of Attractiveness as a World Heritage

Urban problems like traffic congestion has degraded the attractiveness of the city centre area. To enhance the degraded attractiveness of Kandy as a World Heritage, the following are set:

- Improvement of the city centre area to create an urban space suitable for the World Heritage City of Kandy by alleviating traffic congestion and improving public spaces and walkability.
- Promotion of beautification of the city centre

(3) Strategies for Objective 2-3: Conservation of Landscape, Townscape, and Historic Buildings

Many buildings to be conserved in the Heritage Area have not been conserved and have become degraded. To properly conserve them, strategies related to heritage property, heritage preservation system, and citizen's conservation activities are required. For this, the following strategies shall be undertaken:

(Heritage property preservation)

- Implementation of a detailed building survey of the conserved buildings in order to re-evaluate them and identify the groups of buildings with a collective townscape value, and then re-listing the conserved building with the consensus of the owner
- Establishment of archive of heritage building information
- Implementation of preservation efforts for the listed conserved buildings by the public sector to hasten good demonstration impact to the citizens
- Maintenance and succession of traditional skills and materials for the heritage buildings

(Setting up of proper institutional arrangement for heritage preservation)

- Establishment of regulations by revising the existing regulations in the Development Plan for KMC and adding new regulations, including street line, façade, colour, and signs, to create better streetscapes.
- Relaxation of the present "too strict rule" on the conserved buildings to make it more practical. Presently, the rule does not allow any change in neither the exterior nor the interior of the heritage buildings.
- Proper development control on the slope area and high elevation area around the Kandy Lake for good landscape and better safety management.
- Strengthening the monitoring system for the conserved buildings to maintain them and avoid their degradation.
- Introduction of a practical and easy procedure for the conservation of the Heritage Area by introducing an applicant-friendly, one-stop service system by relevant organisations with the functions of management, financing, research and advocacy, and adaptive reuse of the conserved buildings
- Provision of appropriate incentives and financial and technical support to the heritage building owners for the conservation of historic buildings
- Improvement of the conservation management system, including building permits, inspection and monitoring

(Promotion of community-based activities for heritage conservation and town planning)

- Enhancement of collaboration between the government, community, and the private sector for conservation-related activities
- Promotion of awareness raising of citizens, students, and tourists on conservation
- Utilisation of the heritage buildings by adaptive reuse

7.4.5 Strategies for Vitalisation of Socio-Economic Activities

The following strategies are proposed for each objective for **Goal 3: Vitalisation of socio-economic activities.**

(1) Strategies for Objectives 3-1: Promotion of Rural and Local Industries

The stagnant rural economy, which most of the local governments in the surrounding areas suffer from, shall be promoted by employing the following strategies:

- Promotion of local products by marketing and promoting the products of agricultural and traditional industries
- Promotion and sales of local products in the Heritage Area in relation to tourism initiatives
- Enhancement of support for SMEs which comprise the majority in the local industry

(2) Strategies for Objectives 3-2: Promotion of High-value added and Advanced Industries and Services

To enhance the strong points of industry in Greater Kandy, high-value added and advanced industry shall be promoted by employing the following strategies:

- Enhancement of coordination of Peradeniya University with the public sector and industrial sector, and international collaboration
- Promotion of collaboration with the existing ICT/R&D industries in the Pallekele IE (BOI)
- Incubation of start-ups with incentives

(3) Strategies for Objective 3-3: Promotion of Tourism-related Industries

The potential of tourism in the Greater Kandy area has not been fully tapped. In order to make the most of its potential, the following strategies are derived:

- Promotion of tourist destinations, historical and cultural tourism, eco- and rural tourism by providing tourism package based on the tourism promotion policy and plan
- Promotion of traditional, heritage-related handicraft industries to serve as the link-up with tourism industry
- Conservation of historic and cultural heritage of the Kandyan Kingdom and the World Heritage and the development of their tourism routes
- Promotion of health-related industries, including local and traditional medicines such as Ayurveda, for tourism development
- Enhancement of tourism services such as tourism information and infrastructure for tourism (tourist centre, tourist transport, and hotels/lodges, road-side stations)
- Promotion of the cultural and local industries in the city centre along with the relocation and rehabilitation of public facilities
- Utilisation of the heritage buildings to promote socio-economic activities in the Heritage Area.

(4) Strategies for Objective 3-4: Promotion of Socio-economic Activities of the Cluster Cities

The development of the cluster cities of Katugastota, Peradeniya, and Kundasale-Digana is a key to achieve a balanced development in Greater Kandy and to avoid overconcentration in the city centre of Kandy. For this, the following strategies are set:

- Development of Katugastota as commercial hub along with the connection of the Central Expressway and station area development of Katugastota station
- Development of Peradeniya as the medical and educational centre, taking advantage of the existing medical institutes and the University of Peradeniya
- Development of Kundasale-Digana as the centre of public administration and advanced industries based on the existing concentration of regional government offices and industrial estates

7.4.6 Strategies for Transportation Improvement

The following strategies are proposed for each objective for **Goal 4: Transportation Improvement.**

(1) Strategies for Objective 4-1: Promotion of Public Transportation

To alleviate traffic congestion in the city centre area, the usage of public transportation must be promoted. For this, the following are set:

- Improvement of operation services of railway and buses by increased operational frequency and re-routing in the short run
- Enhancement of railway service by developing a double-track railway between Peradeniya and Katugastota first, and then further development between Wattegama to Katugastota, Peradeniya to Kadugannawa, and Peradeniya to Gelioya
- Development of a new station and station plaza at the Sinha Regiment
- Development of multimodal facilities at Katugastota and Peradeniaya stations for smooth transfer between railway and bus terminal facilities, and park-and-ride facilities at Tennekumbura
- Establishment of information management system to improve public transportation service
- Promotion of Station Area Development or Transit-Oriented Development (TOD) along the railway and around the railway stations between Peradeniya, Kandy, and Katugastota

(2) Strategies for Objective 4-2: Development of a Transportation Network with a Wide Area Coverage

Aside from the roads in the Kandy City centre area, the regional road network must also be developed to alleviate the traffic congestion in the city centre as well as to link the various areas in Greater Kandy efficiently. For this, the following road development strategies are set:

- Enhancement of regional transportation axis between Colombo and Kandy (expressway) through Katugastota by improving the regional road network: Katugastota-Galagedara to connect to the Central Expressway in the short term
- Improvement of bypass roads to Katugastota-Digana, Katugastota-Peradeniya in the short term, and development of Tennekumbura-Katugastota or Tennekumbura-Madawala in the mid-term, to divert traffic passing through the city centre. Southern bypass road to connect Peradeniya and Tennekmbura shall be further studied.
- Improvement of roads to link town centres: Poojapitiya-Alawathugoda, Hedeniya-Poojapitiya, Aladeniya-Peradeniya, and Ampitiya-Thalathuoya
- Development of new road bridges over the Mahaweli River at Katugastota, Peradeniya, and Tennekumbura

- Improvement of inner ring roads in KMC, such as Dharmasoka Mawatha
- Development of a new road on the west side of the Grid City along the railway to avoid traffic passing through the Grid City.
- Improvement or development of access roads around Katugastota and Peradeniya to promote station area development
- Development of logistics facilities at Katugastota, Peradeniya, and Kundasale

(3) Strategies for Objective 4-3: Securing Smooth Mobility within Urban Areas

In the city centre area, vehicles and pedestrians cannot move smoothly due to less proper traffic management, lack of pedestrian space, etc. To secure smooth mobility, the following strategies are set:

- Regulation and management of car parking, especially on-road parking and development of parking space
- Improvement of intersections and introduction of traffic lights
- Alleviation of traffic bottlenecks (improvement of three-way intersection, development of underpass and pedestrian bridge at intersections, improvement of bridges, etc.)
- Introduction of measures to control trucks that congest the roads
- Introduction of countermeasures to reduce school-related traffic congestion
- Improvement of pedestrian walking environment, especially from Kandy Station - Civic Hub Zone - Temple of the Tooth Relic
- Introduction of electric three wheelers to alleviate air pollution
- Establishment of information management centre to provide traffic-related information at station, multimodal, and park-and-ride facilities

7.4.7 Strategies for Improvement of Living Environment and Urban Growth Management

The following strategies are proposed for each objective for **Goal 5: Improvement of Living Environment and Urban Growth Management**.

(1) Strategies for Objective 5-1: Restructuring of Urban Functions and Urban Development and Redevelopment

Concentrations of public facilities are thought to cause congestion in the city centre, and the relocation and rehabilitation of these facilities are proposed by the existing plans. For this, the following are set:

- Relocation of urban facilities which should not necessarily be located in the city centre (such as police barrack, Sinha Regiment, other regional and national level government offices) and to use the vacated land
- Rehabilitation and adaptive reuse of facilities in the Civic Hub, such as Bogambara Prison and the city market, to create pedestrian-oriented zone in the city centre
- Enhancement of daily service functions in the town centres so that they can be independent of the city centre of KMC
- Promotion of station area development or transit-oriented development (TOD) along the railway between Peradeniya and Katugastota

(2) Strategies for Objective 5-2: Improvement of Living Environment

Living environment is degraded due to disorderly development and urbanisation, lack of basic infrastructure provision, insufficient disaster prevention, etc. To improve the living environment, the following strategies are set:

- Proper land use control and enforcement of development regulation
- Disaster prevention such as proper slope protection against landslide and slope failure, flood mitigation and fire fighting activities
- Improvement of water supply, sewage, drainage system and waste management system, including sanitation facilities in the city centre
- Improvement of living environment of dilapidated substandard housing area
- Improvement of infrastructure, such as drainage and sewage, and water supply system

(3) Strategies for Objective 5-3: Proper Disaster Prevention based on Disaster Risk Reduction Principles

Greater Kandy is suffering from disasters such as landslides, flooding, and fire breakout. To reduce disaster risk, the following strategies are set:

- Strict development control according to proper land use plan and zoning based on the NBRO's hazard maps
- Reduction of landslide risk, slope failure and debris flow by identification of disaster types, introduction of countermeasures, and site level disaster risk assessment
- Reduction of flood risk by enhancement of canal / drainage capacity, such as those in Akurana and Meda Ela in KMC
- Strict control and prohibition of development in the river and creek bed
- Relocation of houses in the disaster high risk areas
- Reduction of fire risk by enhancement of firefighting capacity

(4) Strategies for Objective 5-4: Creation of Amenity Urban Space in the City Centre

To make the city centre attractive and comfortable, amenity space, especially for pedestrians, shall be created. For this, the following are set:

- Conservation of landscape and townscape
- Improvement of pedestrian space by designating pedestrian priority zone at the Grid City and the zone from Kandy Station to the Temple of the Tooth Relic
- Improvement of parks and open spaces for resting
- Beautification of the city centre

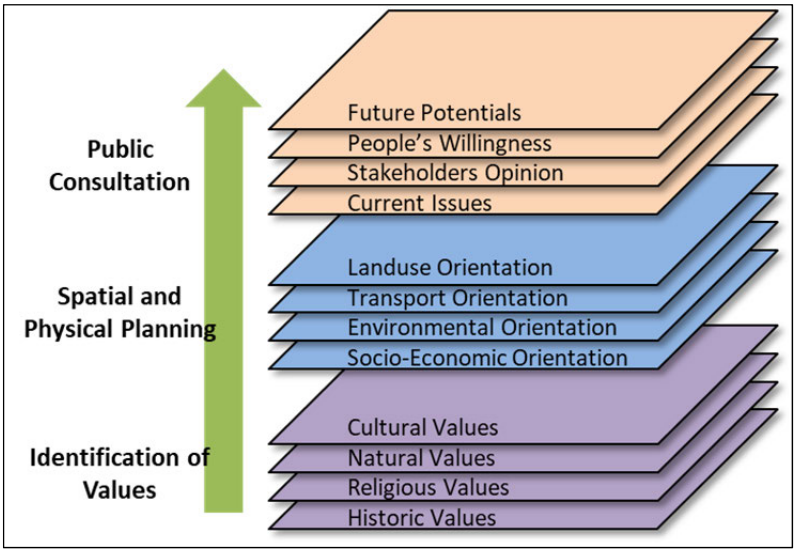
CHAPTER 8 URBAN STRUCTURE AND DEVELOPMENT ORIENTATION

8.1 Overall Development Scenario

8.1.1 Planning Approach

The values of Kandy – such as history, culture, nature and worship – are diversified and are closely linked and integrated. Without consideration and respect for these values, it is difficult to solve the present issues and to set a proper vision and strategies for the future.

Generally, the urban plan is formulated by overlaying the spatial and physical conditions such as land use, transport, environment, etc. In this project, values are identified as a basis of planning. In addition to special and physical planning, a public consultation was conducted to collect various stakeholders' opinions and their willingness to identify Kandy's future potentials as well as the current issues at hand (see Figure 8.1.1).



Source: The JICA Team

Figure 8.1.1 Overlay Planning Approach

8.1.2 Development Scenario

In order to restore what Kandy – regarded[1] as "one of the most beautiful cities in the most beautiful region in the world" – had in the past, the GKUP proposed regional solutions to enhance the economic value of the region by utilising the values of Kandy.

Urban functions in the Heritage Area, such as wholesale and public administration which need not be necessarily located there, are proposed to be relocated to the clusters of Katugastota, Peradeniya, and Kundasale - Digana. This will be done in order to reduce traffic congestion and the concentration of people and urban functions in the city centre and to preserve its historic townscape and natural landscape. Comfortable spaces will also be revitalised in the vacated area in the Heritage Area for communities, priests and tourists to enjoy economic benefits.

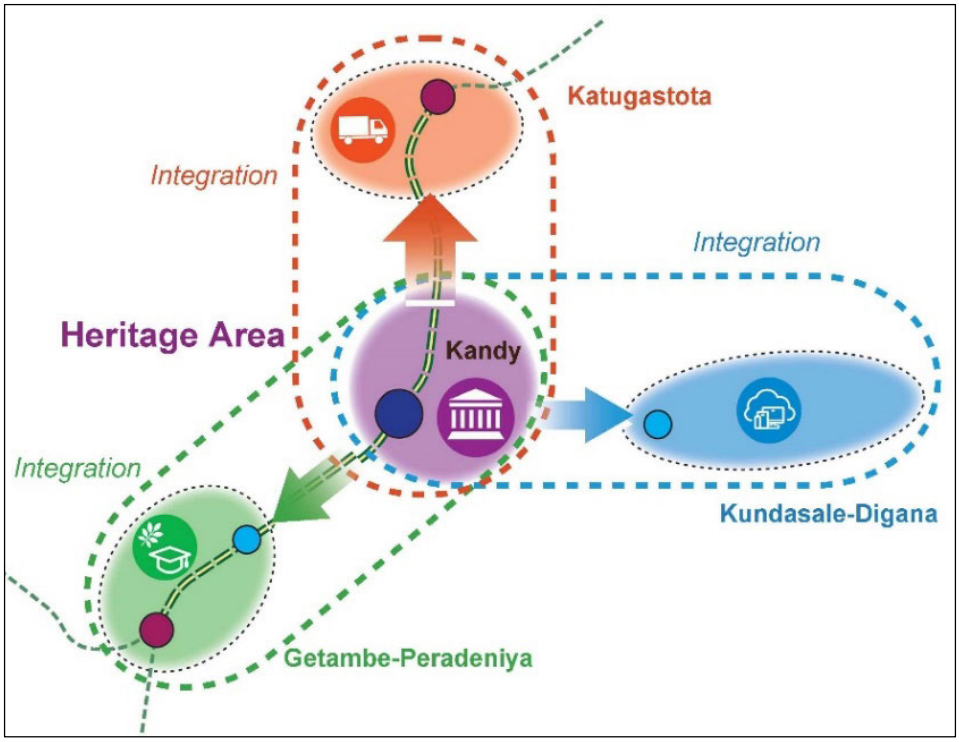
[1] Davy, J, 1821, An account of the Interior of Ceylon and of its Inhabitants with Travels in that Island, London: Longman, Hurst, Rees, Orme and Brown

To realise this, the following steps are proposed for appropriate development and management:

(i) At Cluster Cities: To relocate urban functions (public facilities) in the city centre to cluster cities and to promote commercial and new industrial developments

(ii) At City Centre: To promote tourism and cultural-related industries; to preserve historical townscapes and buildings; and to enhance socio-economic growth and resilience. To shift to public transport to alleviate traffic congestion.

(iii) For Greater Kandy: To promote regional socio-economic development while preserving the vulnerable natural environment and enhancing the values of Kandy. To enhance resiliency by increasing redundancy of the urban function distribution in the region.



Source: The JICA Team

Figure 8.1.2 Overall Development Scenario

8.2 Greater Kandy

8.2.1 Planning Framework

In this Greater Kandy Urban Plan, the planning frameworks consist of the following:

- Population framework
- Economic framework
- Orientation of the environment
- Orientation of future land use

To set the above planning framework, the following items were considered:

- Current economic situation and trend of population growth of the whole country and in other metropolitan areas
- Future role of Kandy City and other cluster cities in Greater Kandy
- Development trend of economic sectors in Greater Kandy

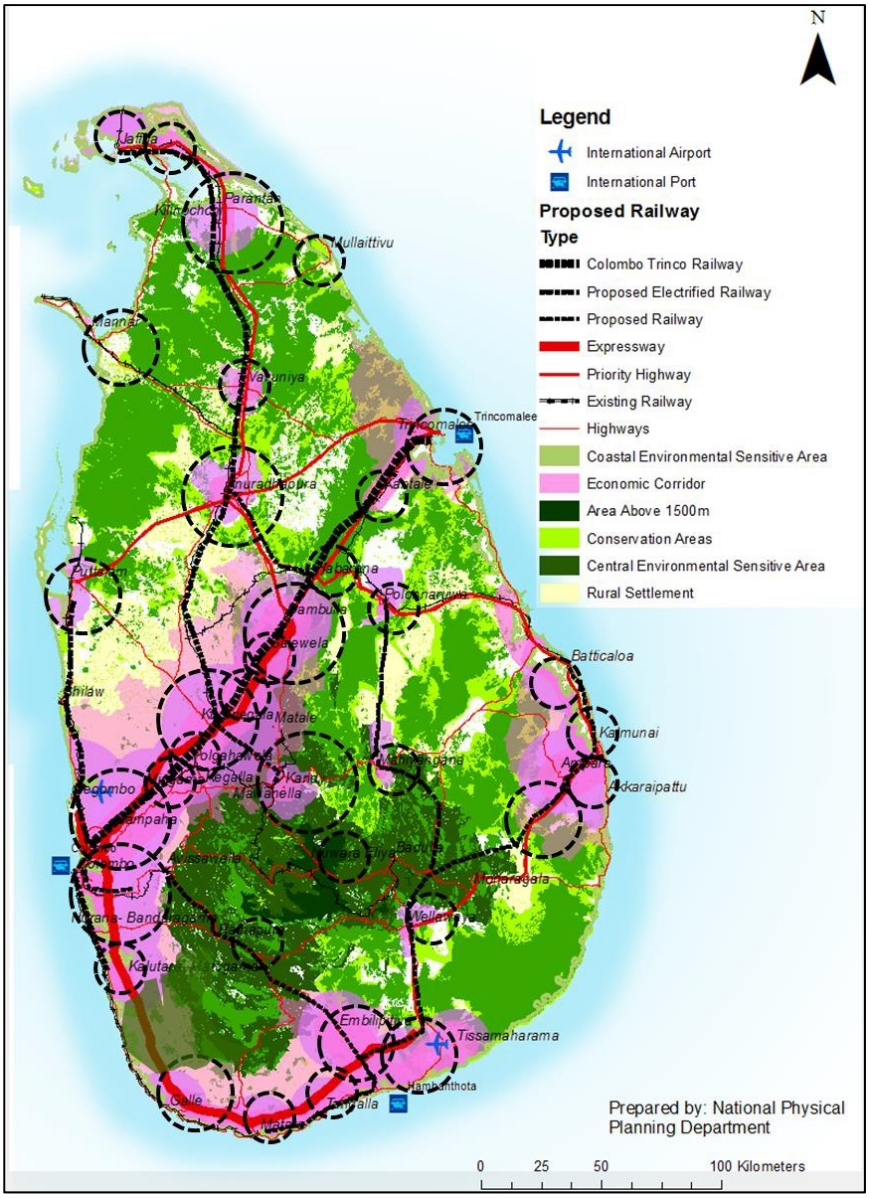
In addition to the above, the result of environmental zoning was considered for the future orientation of the environment.

(1) Future Role of Kandy City and the Surrounding Cities in Greater Kandy

1) Future Role of Greater Kandy within Sri Lanka

As described in Section 3.1.2, the National Physical Planning Policy 2050 (NPPP), which is currently being finalised, proposes to promote the urban corridor development of the four urban corridors, namely: Northern Corridor, Cross Country Urban Corridor, Eastern Urban Corridor, and Southern Urban Corridor. Besides the four urban corridors, two metro regions at Anuradhapura and Kandy are also considered as major residential areas.

The NPPP promotes 30-35% of the national population (approximately 8 million inhabitants) to be settled in the area that falls within the corridor between Colombo and Trincomalee (Cross Country Urban Corridor) in order to capitalise upon the advantages of the two major ports, the transport infrastructure and the favourable living conditions.



Source: The National Physical Planning Department, 2017, National Physical Planning Policy

Figure 8.2.1 Proposed Spatial Configuration of the Physical Environment in NPPP 2050

Although the GKUP Area is not directly included in the corridors, it is close to the Cross Country Urban Corridor via Kurunegala, which is accessible by National Road A10 through Galagedara, and Kundasale from Kandy.

The NPPP 2050 projects that the future population of major urban centres in Sri Lanka will continue to grow at current growth rate and the population of Greater Kandy will is assumed to reach 1 million by 2030 and 1.2 million by 2050.

(2) Development Trend of Economic Sectors in Greater Kandy

Kandy is a well-known tourist destination for both local and foreign tourists. Due to its strategic location, the city originally grew as a centre of commerce and transport. Over two-thirds of the employed population in Greater Kandy are engaged in the service sector – a figure which is above the national average. The commercial area is developing mainly along the main national roads.

In Pallekele, approximately 10 km east of Kandy, there are two industrial parks. Both industrial parks are not fully utilised at present and also have the issue of lack of workers. To further utilise these industrial parks, there is a plan to build an area within the industrial park for ICT business.

Pathahewaheta DSD, which is located in the southeast of Kandy Four Gravets & Gangawatta Korale DSD, has the highest share of employed population engaged in the agriculture sector.

Another area is Peradeniya, located approximately 6 km west from Kandy, which is a well-known centre for education where Peradeniya University can be found.

(Please refer to Section 4.4 for more details on the development trend of economic sectors in Greater Kandy.)

(3) Population Framework for Greater Kandy

The target years for the population framework are as follows:

- Mid-term: 2025
- Long-term: 2035

1) Future Population Framework for Greater Kandy

Table 8.2.1 shows the future population framework for Greater Kandy. The population of Greater Kandy is assumed to be just over 1 million in 2025 with 1,018,000. In 2035, it is assumed to become 1,063,000. Despite the out-migration to Colombo and other countries from Greater Kandy, Greater Kandy is expected to continue to be a migration destination for people from the surrounding rural areas.

Two DSD which is assumed to increase the population the most is Kundasale DSD.

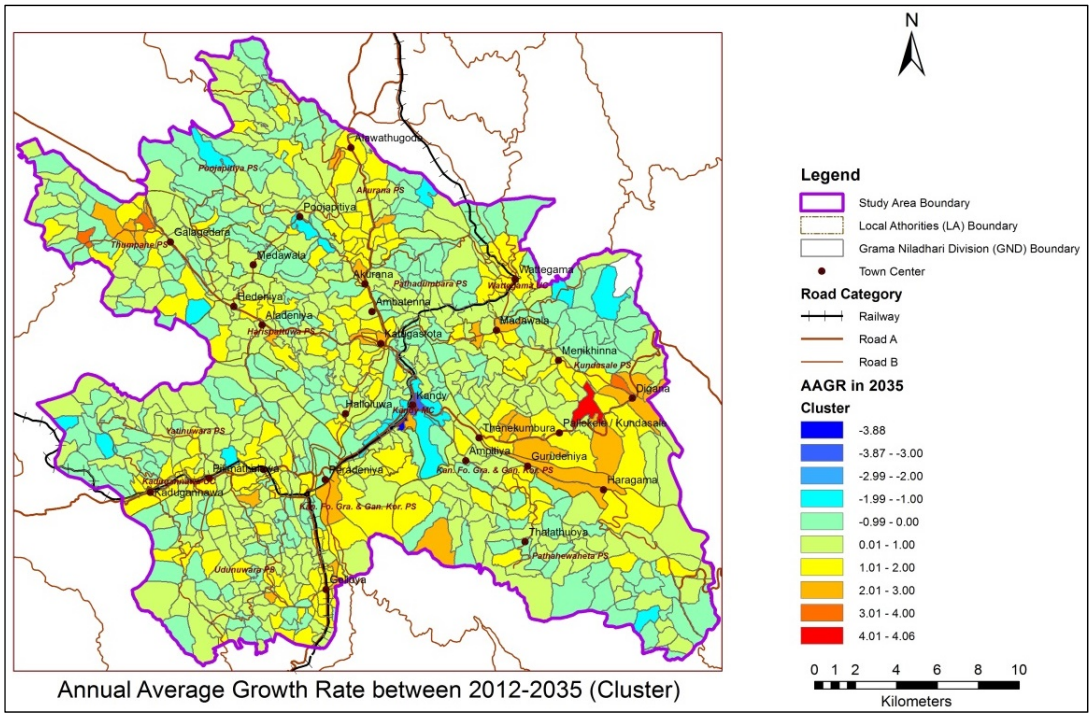
Table 8.2.1 Future Population Framework for Greater Kandy

	Population					Average Annual Growth Rate			
DSD	2001	2012	2017	2025	2035	01-12	12-17	17-25	25-35
Akurana	55,744	63,397	69,631	79,504	90,922	1.18%	1.89%	1.67%	1.35%
Harispattuwa	78,880	88,177	94,197	101,227	105,654	1.02%	1.33%	0.90%	0.43%
Gangawatta Korale	160,630	158,561	162,503	166,367	167,135	-0.12%	0.49%	0.29%	0.05%
Kundasale	107,180	127,070	137,875	154,382	172,303	1.56%	1.65%	1.42%	1.10%
Pathadumbara	80,558	88,725	94,280	101,023	106,009	0.88%	1.22%	0.87%	0.48%
Pathahewaheta	53,843	58,188	61,168	63,880	63,869	0.71%	1.00%	0.54%	0.00%
Poojapitiya	54,172	57,914	60,627	62,802	61,886	0.61%	0.92%	0.44%	-0.15%
Thumpane	35,447	37,642	39,344	40,956	41,257	0.55%	0.89%	0.50%	0.07%
Udunuwara	99,235	110,905	118,348	126,433	129,723	1.02%	1.31%	0.83%	0.26%
Yatinuwara	97,835	106,027	111,821	117,871	120,026	0.73%	1.07%	0.66%	0.18%
Greater Kandy	**823,524**	**896,606**	**949,793**	**1,014,445**	**1,058,784**	**0.78%**	**1.16%**	**0.83%**	**0.43%**
Outside Greater Kandy	455,504	478,776	497,300	512,743	509,156	0.45%	0.76%	0.38%	-0.07%
Kandy District	1,279,028	1,375,382	1,447,093	1,527,188	1,567,940	0.66%	1.02%	0.68%	0.26%

Source: The JICA Team

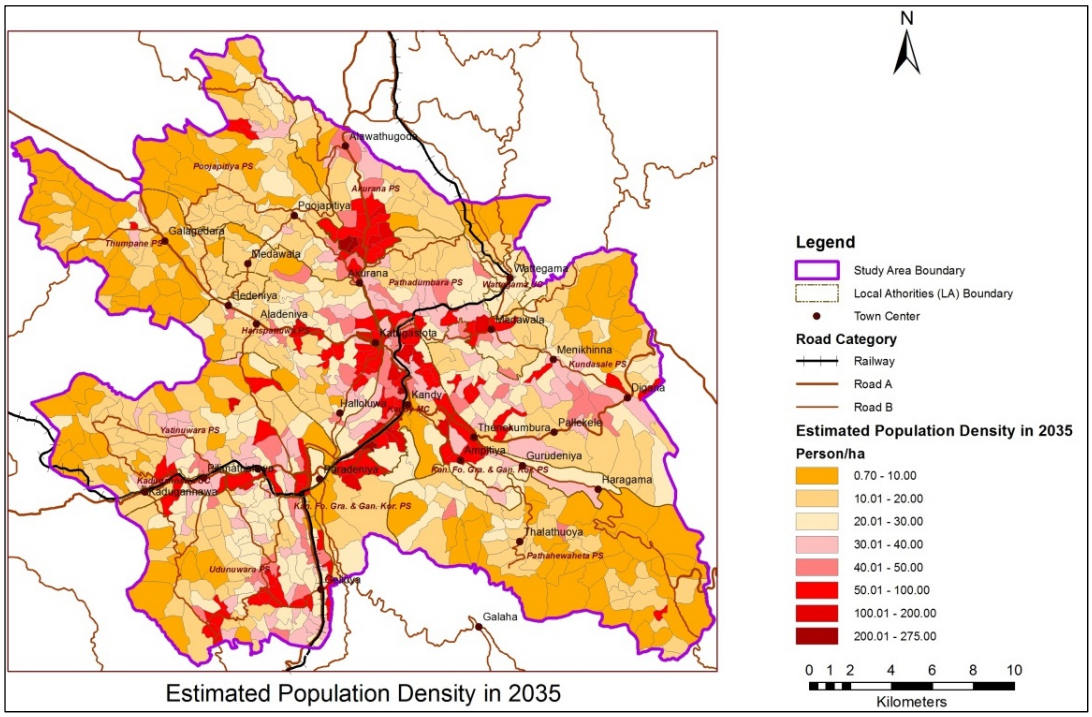
2) Future Population Distribution

Based on the selected urban structure in Section 7.3.2, the average annual population growth rate between 2012 - 2025 and the population distribution by GN for the year 2035 are shown in Figure 8.2.2 and Figure 8.2.3, respectively.



Source: The JICA Team

Figure 8.2.2 Annual Average Population Growth Rate by GN Between 2012 – 2035



Source: The JICA Study Team

Figure 8.2.3 Estimated Population Density by GN in 2035

3) Economic Framework

The annual growth rate of the GDP (constant price) of Sri Lanka between 2015 and 2022 as estimated by IMF is shown in the table below. IMF estimates that the annual growth rate of GDP will continue to increase gradually from 4.4% between 2015 and 2016, to 5.2% between 2021 and 2022.

Table 8.2.2 Future GDP and Economic Growth in Sri Lanka (2010 prices)

	2015	2016	2017	2018	2019	2020	2021	2022
Billions Rs.	8,633.89	9,012.03	9,437.94	9,890.96	10,375.62	10,894.40	11,450.02	12,045.42
Annual Growth Rate		4.4%	4.7%	4.8%	4.9%	5.0%	5.1%	5.2%

Note: Figures from 2017 is the estimated amount by IMF
Source: IMF World Economic Outlook Database, October 2017

Although Sri Lanka is assumed to become an ageing society soon, there is still potential to increase the labour force. In Sri Lanka, the share of economically active female population is extremely low. According to the 2012 population census, only 31% of females over fifteen years old were economically active, while 76% of males over fifteen years old were economically active. The Eastern Province had the lowest share of females working with only 20%. For a continuous and stable economic growth, it is important for more females to participate in the society.

Table 8.2.3 Economically Active Population by Sex in Each Province (2012)

	Total (age 15+)			Economically Active Population					
	Both	Male	Female	Both		Male		Female	
	No.	No.	No.	No.	Share	No.	Share	No.	Share
Western	4,524,129	2,177,212	2,346,917	2,339,818	52%	1,615,530	74%	724,288	31%
Central	1,893,560	886,979	1,006,581	982,407	52%	650,758	73%	331,649	33%
Southern	1,855,363	879,838	975,525	944,273	51%	653,440	74%	290,833	30%
North-Western	1,776,504	840,825	935,679	915,112	52%	653,100	78%	262,012	28%
Sabaragamuwa	1,461,128	701,458	759,670	788,805	54%	533,772	76%	255,033	34%
Eastern	1,083,137	514,052	569,085	510,106	47%	398,715	78%	111,391	20%
Northern	840,992	368,167	472,825	413,990	49%	271,794	74%	142,196	30%
North-Central	1,031,714	451,722	579,992	611,849	59%	366,202	81%	245,647	42%
Uva	926,857	445,981	480,876	516,621	56%	347,818	78%	168,803	35%
Sri Lanka	15,393,384	7,266,234	8,127,150	8,022,981	52%	5,491,129	76%	2,531,852	31%

Source: Department of Census and Statistics, Census of Population and Housing 2012

Based on this estimation by IMF, and the fact that Sri Lanka still has the possibility of increasing its labour force despite the population increase, the future GDP of Sri Lanka is set to continue to increase constantly to 5.5% in 2025, then remain to grow at 5.5% per annum till 2035.

Future real GDP and real GDP per capita based on the above assumption are estimated as shown in Table 8.2.4. Moreover, based on the estimated Sri Lanka's future GDP, for Kandy District, real GRDP and real GRDP per capital were estimated by the JICA Team in high and low growth cases as shown in Table 8.2.4, and the mid (average) case was derived from the high and low cases for GRDP and GRDP per capita. As for the future economic framework for Kandy District, the mid case has been adapted. In 2035, Kandy District's real GDP and GRDP per capita will be 1,555 billon Rs. and 991,500 Rs., respectively.

Table 8.2.4 Economic Framework for Sri Lanka and Kandy District

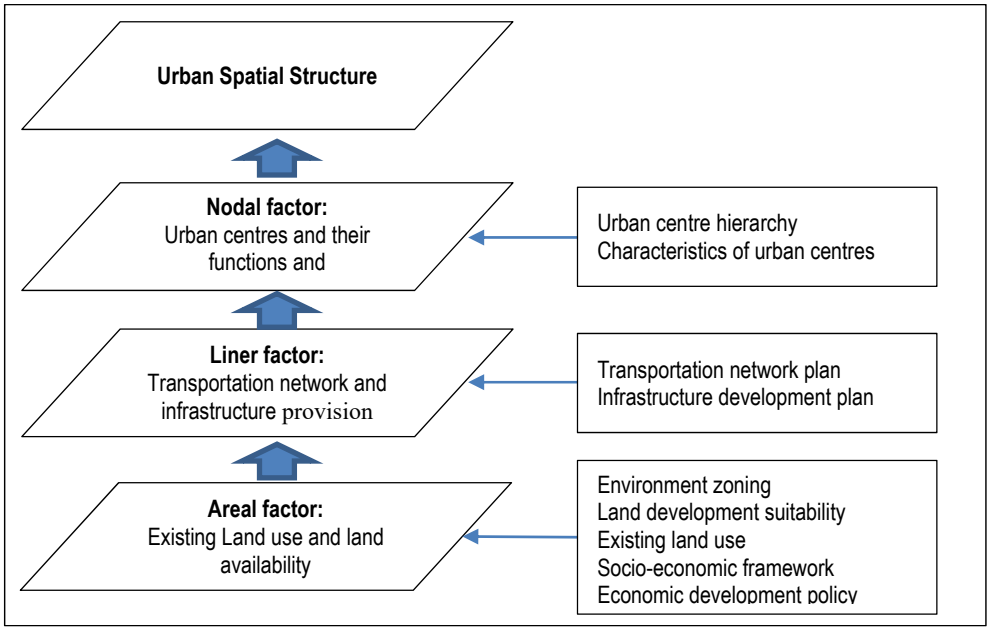
Area	Item		Unit	2012	2017	2025	2035
Sri Lanka	Real GDP		Billion Rs.	7,879	11,978	17,899	30,575
			Growth Rate		4.46%	5.15%	5.50%
	GDP per Capita		Rs.	372,727	441,462	626,434	1,043,118
			Growth Rate		3.44%	4.47%	5.23%
	Population		Thousand	20,359	21,379	22,515	23,096
Kandy District	Real GRDP	High case	Billion Rs	-	743	1,143	1,874
		Low case	Billion Rs	-	711	1,055	1,235
		Mid (average) case	Billion Rs	-	727	**1,099**	**1,555**
	GRDP per Capita	High case	Rs.	-	514,000	748,000	1,195,000
		Low case	Rs.	-	491,000	691,000	788,000
		Mid (average) case	Rs.	-	502,500	**719,500**	**991,500**
	Population		Thousand	1,375	1,447	1,527	1,568

Source: The JICA Team based on various data

8.2.2 Urban Spatial Structure and Functions

(1) Factors that Determine Urban Spatial Structure

A future urban spatial structure is determined by (1) land use including existing land use and distribution of developable land and restricted land as *areal factor*, (2) transportation networks and provision of infrastructure which has a strong influence on settlement and urbanisation as *liner factor*, and (3) urban functions or characteristics of urban centres or settlements as *nodal factor.*



Source: The JICA Team

Figure 8.2.4 Factors which Determine Urban Spatial Structure

(2) Future Urban Spatial Structure of the Greater Kandy

To realise the development vision, a future urban structure is planned by taking into consideration the following spatial structure and urban function.

- **Conservation based on environmental zoning and land use**: the Greater Kandy Area is an environmentally vulnerable area, and urbanisation must be controlled in a sustainable matter based on the environmentally sensitive zoning results.
- **Regional transport network connecting rural centres and the City Centre:** Transportation networks are pivotal elements which decide urbanisation and thus, spatial structure. Accordingly, the future transportation network is carefully studied in connection with urban development.
- **Hierarchical urban functions:** Urban functions are to be concentrated on hierarchical urban centres. In the Greater Kandy Area, the following urban centre hierarchy is assumed.
- Primary Centre, or City Centre: KMC
- **Secondary Centre, or Cluster Centres:** Getambe-Peradeniya, Kundasale-Digana, Katugastota-Akurana
- **Tertiary Centre, or Major Suburban Centres:** Akurana, Galagedera, Kadugannawa, Gelioya, Talatu Oya, Wattegama
- Quaternary Centres, or Suburban Centres: Townships/ Villages
- **Formation of Compact City/Urban Area:** in order to minimise the adverse effect on the environment and the cost for public services including utilities, a compact urban form should be attained by controlling urbanisation and density.

8.2.3 Orientation of Environment

(1) Concept of Environmental Zoning

In formulating the Greater Kandy Urban Plan, it is essential to understand the environmental constraints in the Greater Kandy Area. The concept of *Environmental Zoning* is a major part of SEA. Environmental constraint analysis can give useful information in environmental zoning to identify development suitability and constraints of the land. In addition, the results of this analysis are used for environmental management. It is indispensable to take into consideration the environmental aspects that serve as an obstacle to development.

Two different types of obstacles are identified. One is those with high ecological or social values that ought to be preserved (e.g. rich forests, biodiversity); the other is natural disasters whose impact ought to be managed (e.g. landslides, floods).

(2) Purposes of Environmental Zoning

Spatial analysis visually shows the potential effects to development. The purposes of spatial analysis are as follows:

- To identify the areas which are environmentally vulnerable and contain development constraint factors so that it becomes possible to identify which areas need special measures for conservation.
- To give guidance for the development concept from the viewpoints of environmental conservation, disaster prevention and economic improvement.

On the other hand, the environmental zoning will not legally direct any permission or prohibition of certain developments. Needless to say, any development/projects shall comply with the laws/regulations and gazette. For instance, UDA has regulated no building

permission over 2,500 feet altitude. Meanwhile, it does not issue other types of activities which will not consist of building/structure construction. Also, activities in the forest areas have control limit to indicate "accepted" or "prohibited" under the forest law and/or relevant regulations.

Hence, Zone Guidance on Development is prepared to show the planners, decision makers, etc. how to utilise the environmental zoning in the planning process.

(3) Methodology

1) Selection of Indicators

Based on a review of literature on Sri Lankan environmental status, environment-related policies, plans, and legislation as well as a number of interviews with intellectuals and stakeholders, the following items were selected as constraint indicators which are likely to become major environmental constraints to urban development in the Greater Kandy.

Table 8.2.5 Environmental Indicators

Environmental Indicators	Data Source
Designated land for protection • Conservation areas such as national parks • Forest reserve	Department of Forest, Department of Wildlife, Central Environmental Authority
Land cover • Forest cover • Agricultural land	Department of Survey, 2001
Watershed • River network • Water intake points	Department of Survey, 2001
Disaster risk • Landslide risk • Elevation • Slope condition	NBRO Department of Survey 2001 Department of Survey 2001
Soil condition	Soil Science Society of Sri Lanka, Peradeniya, 1999

Source: The JICA Team

2) Evaluation Method

The evaluation indicators are scored in ranks of four levels at 0, 1, 2 and 5, according to the level of constraint, with level 5 at the highest constraint.

Thematic maps of these indicators are to be analysed in a raster (mesh) form of GIS to be integrated to develop scoring maps based on the above scoring method. A total score for each raster, showing an overall constraint level, is calculated by aggregating the scores of the indicators.

For evaluation of land in this way, the following three evaluation criteria are taken: (1) designated land for protection, (2) land cover, and (3) disaster risk.

Table 8.2.6 Evaluation Criteria for Environmental Zoning

Evaluation Criteria	Description
1. Designated Land for Protection	Environmentally sensitive areas which are designated to be protected or reserved for natural environmental conservation
2. Land Cover	Land use suitability, especially in terms of agricultural production and water supply
3. Disaster Risk	Risks of landslide and flood

Source: The JICA Team

Evaluation maps are generated by the overlaying of scoring maps; three evaluation maps are created which represent the level of constraint in terms of the following environmental information:

The following tables describe the evaluation criteria and each scoring method.

Table 8.2.7 Scoring for Environmental Indicators

A. Designated land for protection

Indicator	Score				Remarks
	0 (low)	1	2	5 (high)	
A1: Protected areas	No		· Buffer area of sanctuary within 500m · Environmental Protection Zone with periphery within 100m	· Sanctuary[1)] with periphery within 100m · National park[2)]	1) Including conservation forest 2) Botanical garden
A2: Forest	No		· Buffer area of reserved forest within 500m	· Reserved forest with periphery within 100m	

B. Land use/cover

Indicator	Score				Remarks
	0 (low)	1	2	5 (high)	
B1 Land cover, plantation	No	· Scrub/marsh, coconut, rubber, · Other cultivation: · (Agricultural Farm, · Banana, · Cashew, · Cinnamon, · Mixed Crops, · Pepper, · Rubber, · Seasonal Crops) · Other forest: · (Forest Plantation)	· Paddy (abandoned), · Tea · Open/Dense Forest	· Paddy (productive)	
B2 Water body, reservoir	No		· Buffer area of water body within 500m both sides or circle	· Water body[3)] (including 60m width both sides or circle)	3) River/stream, pond/lake
	No	· Proposed service reservoir within 500m circle	· Existing service reservoir within 500m circle	· Water intake with 250m width both sides and 1km up stream	

D. Disaster risk

Indicator	Score				Remarks
	0 (low)	1	2	5 (high)	
D1 Landslide risk	Not likely	Modest level	Expected	Most likely	
D2 Elevation			1,800feet≦X<2,500feet	Over 2,500 feet	X denotes elevation (ASL)
D3 Slope (degree)	X<20	20≦X<30	30≦X<45	Over 45	X denotes slope degree
D4 Soil condition	Others	Alluvial soil	-	-	

Source: The JICA Team

Figure 8.2.5 shows the conceptual diagram of environmental assessment flow using spatial analysis tool (Plus Method) by overlaying the score map of each elements. Weightage (define by score in this study) of each element in the layer were determined based on its constraint level.

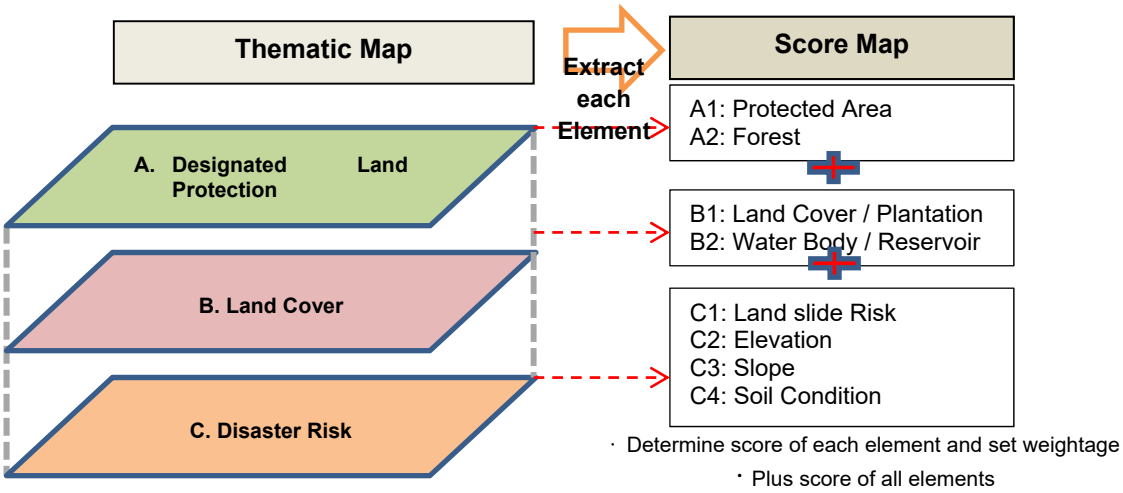


Figure 8.2.5 Conceptual Diagram of Environmental Assessment Flow

(4) Results

1) Environmental Zoning

Output maps are listed in the following tables:

Table 8.2.8 List of Maps

Thematic Map

Title		Remarks, items
T-1	Designated land for protection	Protected areas (A1), Forest (A2)
T-2-1	Land cover	Plantation (B1), Forest, scrub, marsh, home garden
T-2-2	Water body	Water body (B2: river/stream, pond/lake, existing/proposed service reservoir, water intake)
T-3	Landslide risk	Landslide risk (D1)
T-4	Elevation	Elevation (D2)
T-5	Land slope	Land slope (D3)
T-6	Soil condition	Soil condition (D4)

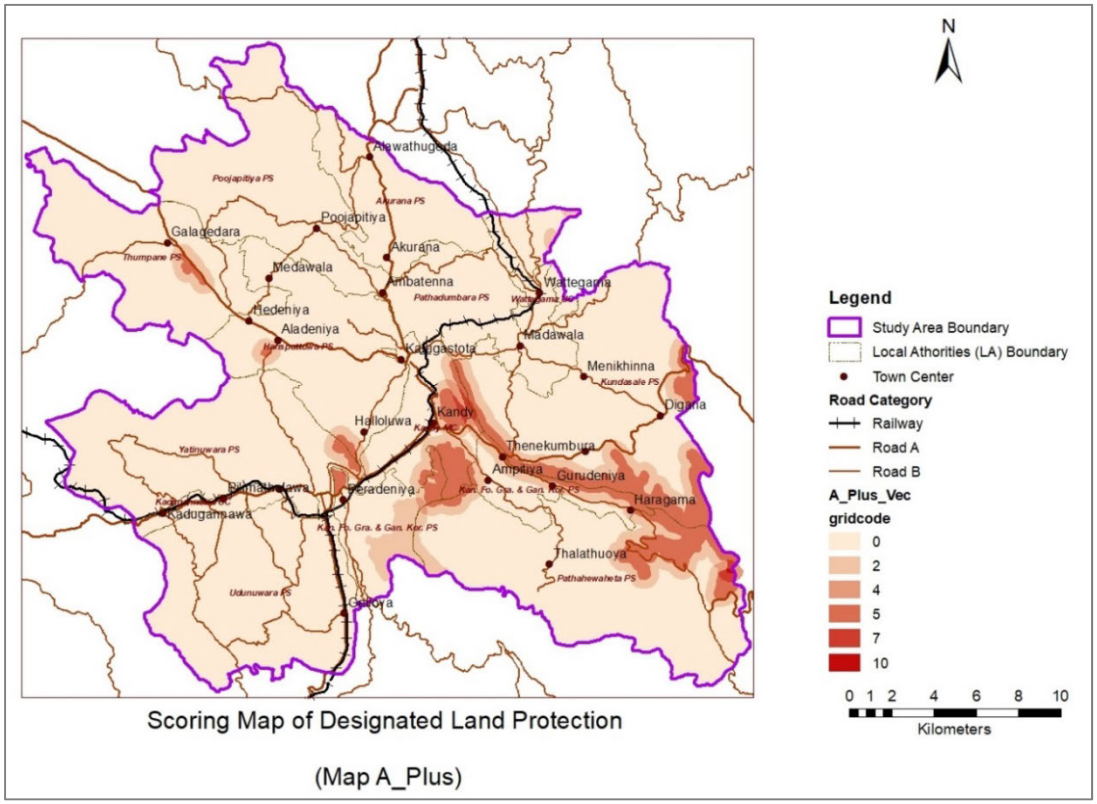
Scoring Map

Title		Items	Remark (white / orange / red)		
E-1-1	Protected area	Protected areas (A1)	Low sensitivity	Moderate sensitivity	High sensitivity
E-1-2	Designated forest	Forest (A2)	Low sensitivity	Moderate sensitivity	High sensitivity
E-2-1	Land use	Plantation (B1)	Low sensitivity	Moderate sensitivity	High sensitivity
E-2-2	Water body	Water body (B2)	Low sensitivity	Moderate sensitivity	High sensitivity
E-3-1	Landslide risk	Landslide risk (D1)	Low risk	Moderate risk	High risk
E-3-2	Elevation (feet)	Elevation (D2)		1,800≦X<2,500	2,500 or more
E-3-3	Land slope (degree)	Land slope (D3)	20≦X<30	30≦X<45	45 or more
E-3-4	Soil Condition	Soil condition (D4)	Alluvial soils		

Overlay Scoring Map

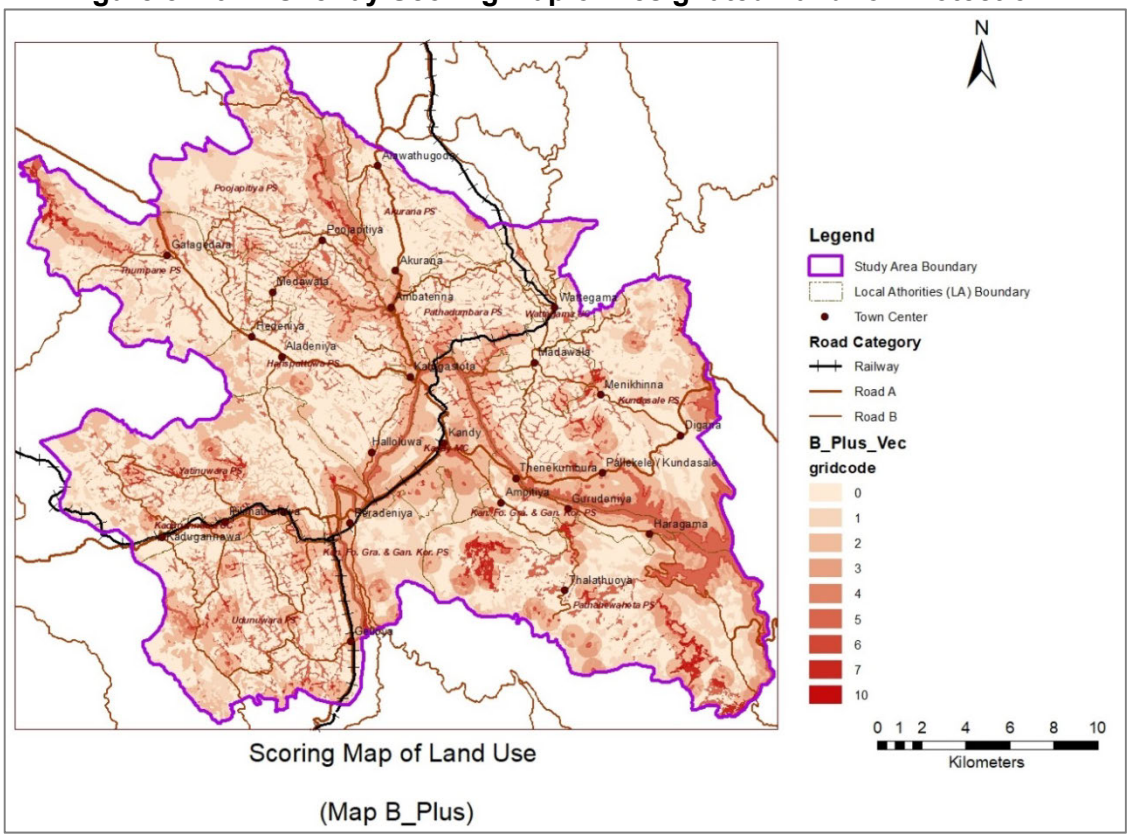
Maps	Calculate total score	Level	Reference
A. Designated land for protection	Score = A1 + A2	0 - 10	Figure 8.2.6
B. Land use	Score = B1 + B2 x 2	0 - 15	Figure 8.2.7
C. Disaster Risk	Score = D1 + D2 + D3 + D4/2	0 – 13 / 18	Figure 8.2.8
T: Consolidated Constraint	**Total Score = A x 2 + B + D**	**0 – 53**	Figure 8.2.9

Overlaid maps of A, B, C and T are delineated in Figure 8.2.9.



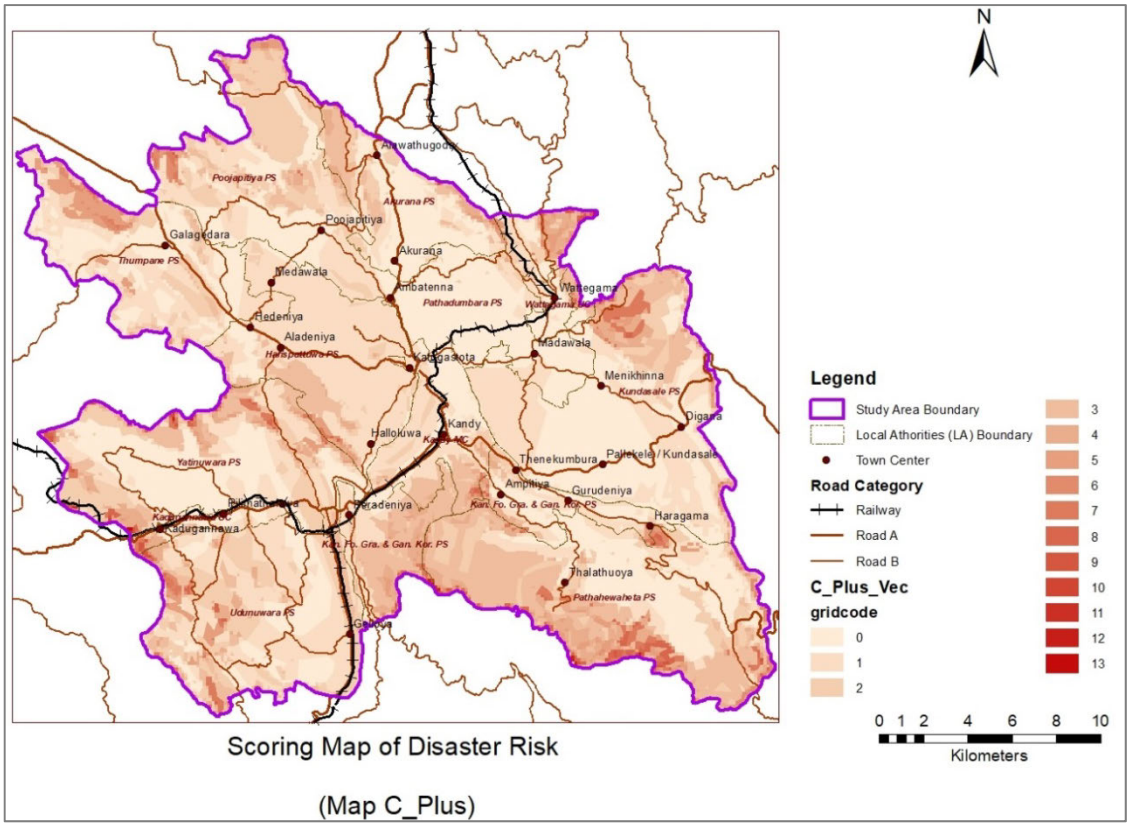
Source: The JICA Team

Figure 8.2.6 Overlay Scoring Map of Designated Land for Protection



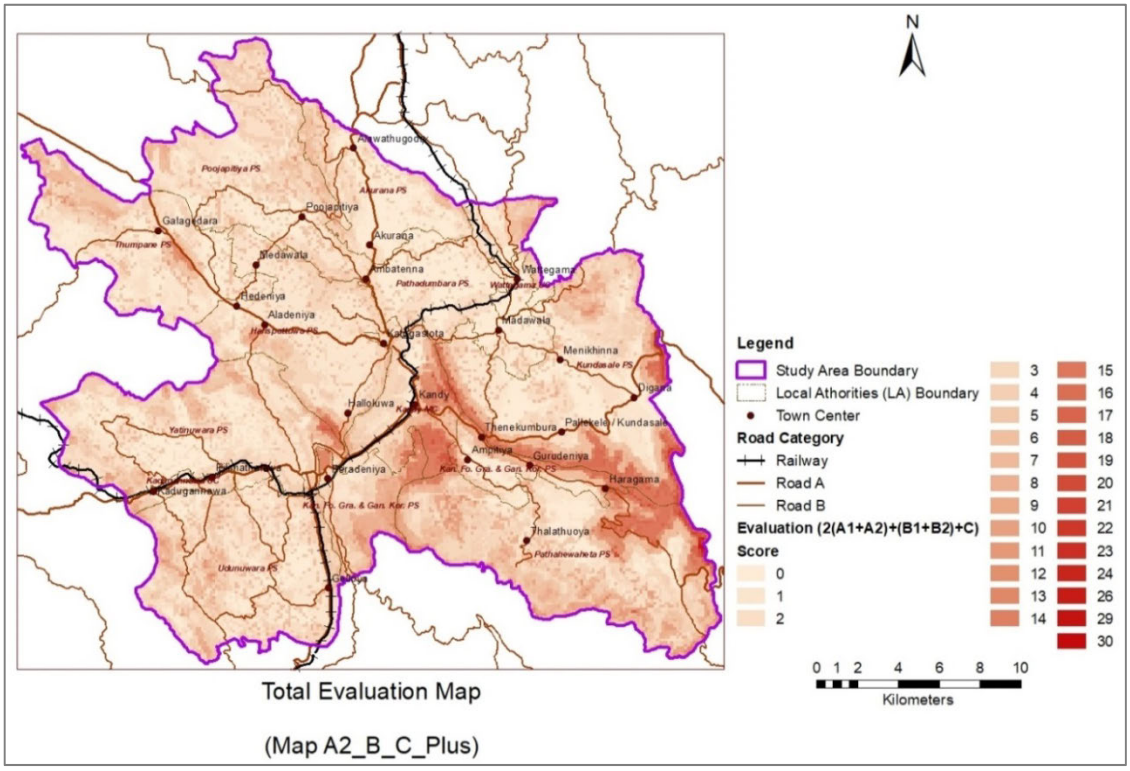
Source: The JICA Team

Figure 8.2.7 Overlay Scoring Map of Land Use



Source: The JICA Team

Figure 8.2.8 Overlay Scoring Map of Disaster Risk



Source: The JICA Team

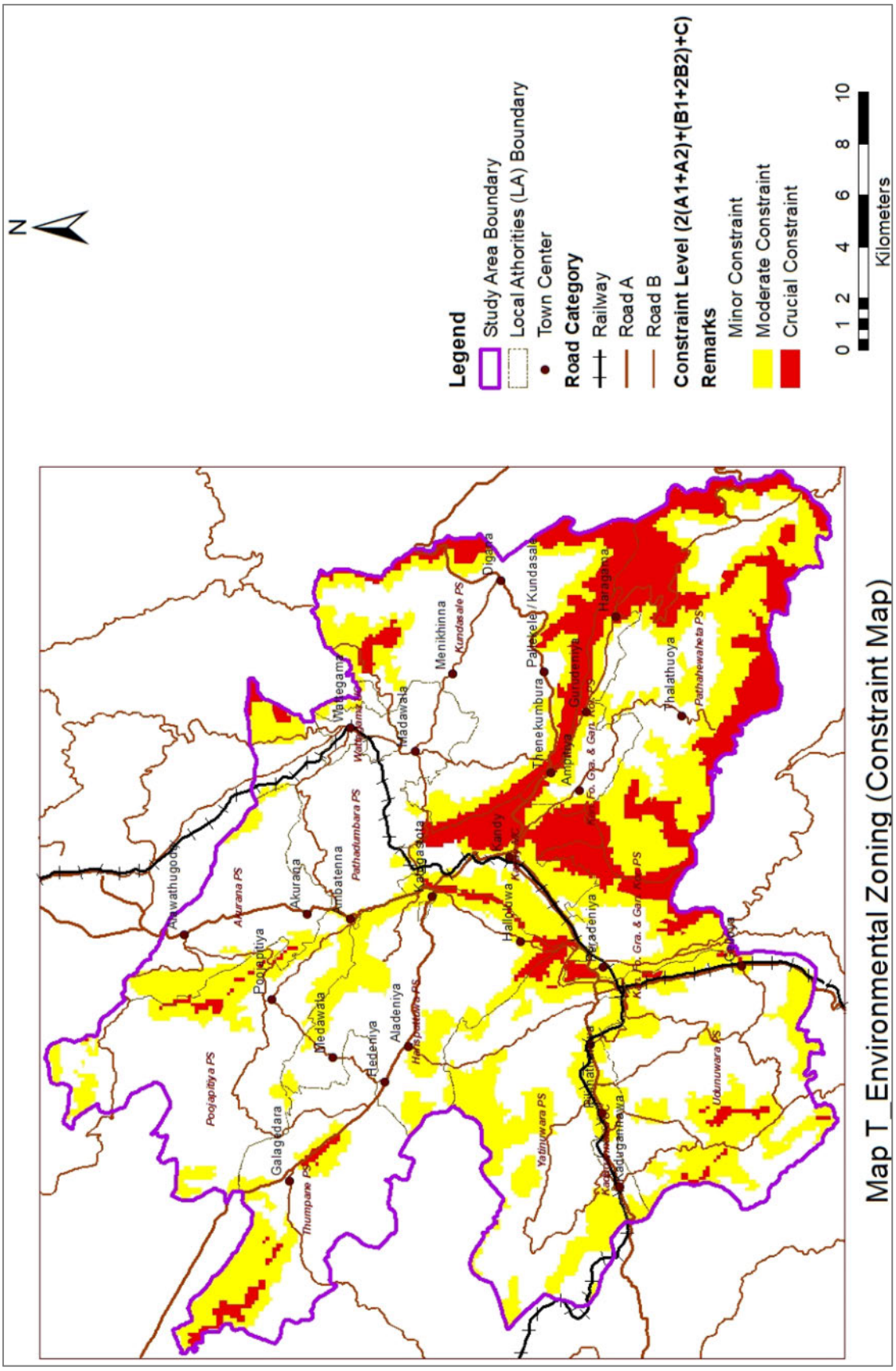
Figure 8.2.9 Total Scoring Map (Consolidated Constraint)

Through the land evaluation based on the above procedure, the following constraint maps were created in terms of 1) designated land for protection, 2) land use, and 3) disaster (landslide) risk. In addition, the sanctuaries and high elevated lands above 2,500 feet are prohibited from development unless a special exception is given by relevant authorities.

2) Zone Guidance on Development

Because of the principle purpose of the environmental zoning, the guidance indicating how environmental values are evaluated is very important. How much the sites possibly contain environmentally crucial constraint and how the development and project sites shall be environmentally considered are evaluated.

Through the process of environmental zoning and coordination with the task of making land use the following development guidance is proposed:



Source: The JICA Team

Figure 8.2.10 Constraint Map

Table 8.2.9 Zone Guidance on Development

Zones	Minor Constraint	Moderate Constraint	Crucial Constraint
Size of occupancy in the Greater Kandy (%)	59.0	29.3	11.7
Basic Direction	Constraint in this zone is expected to be nothing, less or minor. However, development activities, especially big and/or complex projects that can possibly cause adverse and or cumulative impacts, shall be properly assessed.	This zone has moderate constraint which needs ordinal control measurements to be mitigated; however, it could be a risk to generate considerable impacts.	It is not suitable to take projects involving physical construction
Description of Area	This area seems not to have specific constrains; this area might be suitable for any type of development/ activity. The land is mostly occupied by "home land", residential zone and/or farm land. The topographical future looks flat and not of higher elevation.	This zone may have moderate constraints and environmental sensitiveness; it pertains to the middle level between "white zone" and "red zone". Considerable areas are located to be drawn around a "red zone"; those areas may function as a buffer zone to protect a "red zone". Major areas occupied by this zone are spread along rivers, surrounding a forest/sanctuary, and the southern-east mountainous area.	This area is mostly covered with environmentally sensitive areas such as sanctuaries, reserved forests, and high slope and high elevation areas. The area is vulnerable against environment and disaster risk. Considerable laws/ regulations, gazette issue limitations.
Development Concept	Because less critical constraint or environmentally sensitiveness is expected, any type of developments/activities could be introduced conditionally upon obtaining the necessary environmental assessment. This is especially for large-scale development which occupies a huge land area and/or generates considerable pollution. In addition to environmental consideration, disaster prevention must be included in the planning stage.	There are less critical issues that prohibit the developments/activities. However, because this zone is usually surrounding a "red zone" having critical constraint and environmental sensitiveness, large-scale development which occupies a huge land area and/or generates crucial pollution must be avoided. On the other hand, projects which focus on improving land condition to encourage environmental rehabilitation and to minimise disaster risks are suggested to secure buffer zone.	Because of high constraint against environment and disaster risk, this area is not suitable for any type of developments/ activities. Most especially, large-scale developments which occupy a huge land area and/or generate pollution must be prohibited. Such adverse impact could affect not only the project site, but also the possible project expansion. On the other hand, small-scale developments which have obtained higher environmentally friendly countermeasures to minimise environmental impacts and disaster risks could be introduced. Also, the following types development could be applicable:

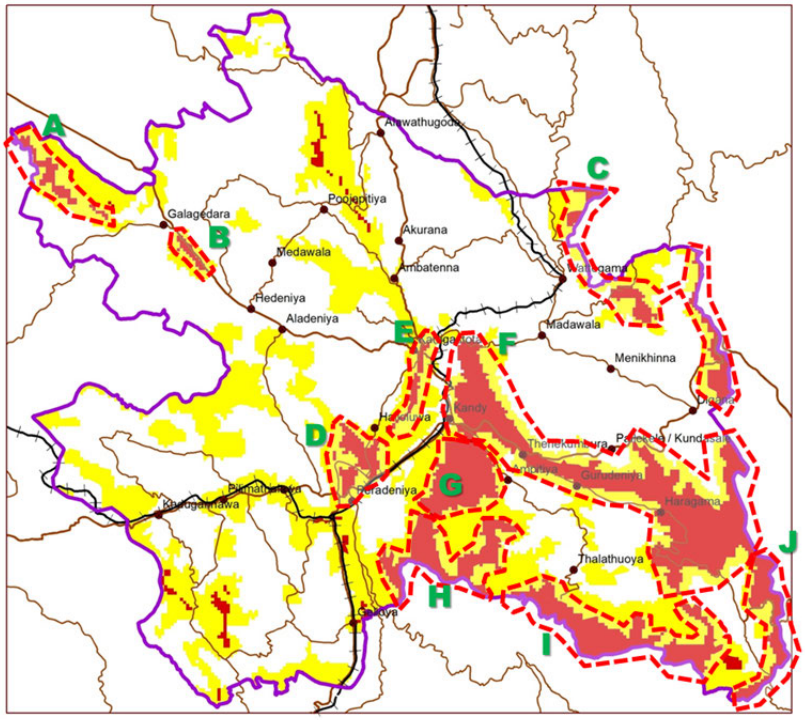
Zones	Minor Constraint	Moderate Constraint	Crucial Constraint
			- Soft component project which does not consists of physical construction (e.g. institutional development, academic research); - Environmental protection and/or disaster prevention development; - Utility development (water supply, electric network, bypass road, e.g.) When development is implemented in this zone, it is important to prohibit any other uncontrolled expanded projects being planned and implemented without proper assessment. For instance, there might be potential to develop hosing or commercial structures; such uncontrolled activities could aggravate the environment and raise disaster risk.
Examples of Applicable or Non-Applicable Development/ Activities	Large-scale development and infrastructure projects are applicable, but need considerable impact assessment.	Applicable developments are, for instance: - Environmental rehabilitation (reforestation, plantation, agricultural development), disaster prevention (flood protection, dike road, flood/ landslide protection) - Medium-/small-scale housing/complex - Traditional and/or light industries - Eco tourism with limited size of structures - Road development (not national road, Type A) While the following shall be avoided: - Large-scale housing/commercial complex, industrial zone (Board of Investment) - Heavy/ chemical factories	Applicable developments are for instance: - Tourism development with limited physical construction; for instance, mountain trekking, forest walking. - Environmental/academic research - Environmental protection (reforestation, watershed conservation, e.g.) and disaster prevention (landslide protection, dike road, flood control, e.g.) - Bypass or residential road (small scale) - Agricultural improvement - Utility service (small scale) - Traditional culture improvement

Source: The JICA Team

The major issues which result in "crucial constraint" could be summarised as the following three (3) typical crucial constraint areas:

- Important water body brings benefits to human life and encourage natural resources protection
- Crucial constraint could have an effect on degradation of forest, nature protected area
- The area with high slope and/or elevation could raise disaster risks.

Figure 8.2.11 delineate a typical crucial constraint area.



Area	Major Reasons for Crucial Constraints
A	Landslide risk in mountainous area High slope and elevation
B	Forest area
C	High landslide risk in mountainous area High slope and elevation
D	Protected area with forest Peradeniya Botanical Garden
E	Important water body Landslide risk
F[1)]	Important water body Sanctuary and protected area Forest
G	Forest and cultivation area
H	High elevation with forest and protected area Agricultural land
I	Landslide risk in mountainous area High slope and elevation
J	Water body High elevation and slope

1) Parts of this area had been developed without environmental zoning. Special environmental concerns could be required to avoid further environmental degradation.

Source: The JICA Team

Figure 8.2.11 Typical Crucial Constraint Areas

8.2.4 Orientation of Land Use

(1) Formulation of Proposed Zoning System

Land use zoning is proposed by integrating (i) results of environmental zoning, (ii) proposed urban structure and (iii) population framework. This process is included the following examinations of several land and socio-economic factors.

Examination of Environmental Zoning: As described in the section above, conservation areas are elaborated, including (i) strict conservation of the protected areas, (ii) control of development areas, (iii) conservation of fertile lands, and (iv) conservation of the ecological network. In principle, future urbanisations will avoid those environmentally sensitive lands.

Examination of Future Urban Structure: After examination of the existing urbanised area and land use pattern, a future urban structure for the Greater Kandy Area is formulated. It is based on the cluster and corridor development concept. The proposed land use zoning system is proposed in order to realise the urban structure.

Synchronisation with Population Framework: At the same time, the proposed zoning system is examined with the population framework in order to accommodate the future population in the Greater Kandy Area.

(2) Principle for Orientation of Land use

By considering the above-mentioned factors, the principle of orientations is to divide Greater Kandy Area into three types of areas; namely: **"Urbanised Areas", "Home Gardens", and "Protected Areas."**

Usually, a typical land use zoning system clearly defines urbanised areas divided from non-urbanised areas by growth boundaries. However the three types of areas are specially proposed for Greater Kandy Area with the following reasons.

- Boundaries of urbanised areas are vague, as the existence of home gardens or very low-dense residential condition.
- "Home Garden", which is specially characterised for Sri Lankan land use categories, should be kept in order to preserve cultural and traditional lifestyle in Greater Kandy Area.
- Population growth in Greater Kandy Area is not so rapid. Therefore, huge urbanised areas will not be required.
- Landscape of Greater Kandy Area which is composed by combination of greeneries, culture and lives, should be kept. The National Physical Plan also emphasised that high urbanisation is not promoted in the central areas of Sri Lanka.

(3) Orientation of Land Use by Type of Areas

The orientations of the three major areas are described as follows:

1) "Urbanised Areas"

Urbanised Areas where urbanisations are promoted depending on the characteristics of existing urban activities and natural conditions. The main urbanised areas are designated in and around the centre of Kandy and the cluster cities, and along the major roads.

Residential

- **Densify residential areas around urban centres** and along major corridors to make the urban area compact. This type of residential areas consists of major land use categories within "Urbanised Areas". To avoid uncontrolled urbanisation, densification of residential uses is promoted in the designated areas.

Commercial

- **Activate commercial functions around urban centres** which are identified in the proposed urban structure. This will be realised by concentrating commercial uses around urban centres and promoting commercial activities based on the characteristics of the cluster cities.
- **Allow commercial use along major corridors to promote smooth traffic flow.** In the current condition, many commercial buildings are found along the major roads. Since "urbanised areas" are limited due to topographic condition and urban structure is defined as "Multi-Cluster and Transport Corridors", roadside commercial uses would be allowed. At the same time, necessary major steps should be taken so as not to obstruct traffic flows.

Industrial

- **Prohibit large/heavy industries.** Following the industrial development concept of the Greater Kandy Area and to protect the environmental condition and cultural landscape, large-scale or heavy industries are not suitable and are prohibited.
- **Promote IT-related industries which do not generate pollution and traffic.** In order to protect the environmental condition, non-polluting industries such as IT are promoted. The Greater Kandy Area has higher educational facilities, and it is an advantage to promote such industries. The only condition is that these industrial activities should not generate traffic because the road network is limited in the area.
- **Promote small-scale industries for handicrafts to perpetuate the tradition.** As a historical and tourism city, traditional handicrafts or small-scale industries are allowed and promoted.

2) "Home Gardens"

Density should be controlled so as not to destroy the original landscape. In the other words, residential buildings (mainly stand-alone houses) are allowed in most of the lands with very low-dense conditions.

Residential and related activities

- **Maintain the existing low-density residential condition for "home gardens**" which is dominant land use in the most parts of the rural areas to uphold the traditional lifestyle and to preserve the greenery. People, especially those who are living in rural areas, tend to live in very low-dense condition with greeneries such as agricultural land, forests, or gardens. This type of land use is considered a special character of Sri Lanka as well as the Greater Kandy Area. Between "Urbanised Areas" and "Protected Areas", the home gardens will be allowed with very low-density housing condition and minimal provision of related activities for residents, such as agriculture and handicraft making.

3) "Protected Areas"

Environmentally sensitive zones are designated as non-urbanised areas. For such areas, no construction is allowed unless the relevant authorities give permission as a special case.

(4) Other Land Use Orientations

- **Preserve historical/cultural urban settings.** The Heritage Area is set for the centre of Kandy in consideration of the historical and cultural values, and it is necessary to activate urban activities to make Kandy more attractive. While the proposed detailed plan proposes specific directions for the preservation and utilisation of the area and buildings, land use orientation for the heritage area is treated as a special case differing from the other types of areas.
- Specific land uses, such as administrative, educational, or cultural land uses, are set based on the characteristics of each area and the proposed urban structure and urban centres.

(5) Orientation for Zoning Categories and Conceptual Zoning Map

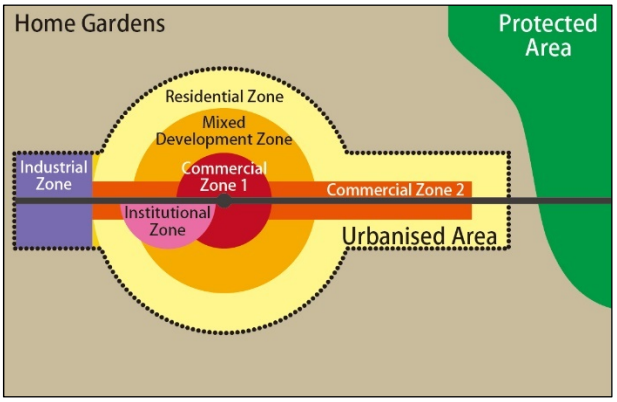
As described in Section 3.3, zoning categories of the draft development plans for local authorities within the Greater Kandy Area are not same. A unified category is proposed in order to deal the Greater Kandy Area as one agglomeration, realise the proposed urban structure, and preserve the traditional landscape. Each land use zone has building usage and regulations being applied. The following table shows the proposed land use category.

Table 8.2.10 Proposed Land Use Zoning Categories

Zoning Category		Orientation
Urbanisation Areas		
	Heritage Zone	• Special designation for the Heritage Areas is applied in the central area of Kandy, including the Grid City, so as not to disturb its historical and cultural characteristics. • Detailed regulations are to be set once the detailed plan is formulated.
	Commercial Zone 1	• It is applied where commercial activities are dominated around the centre of cluster cities & other urban centres with the aim to activate and promote commercial functions around urban centres which are identified in the proposed urban structure.
	Commercial Zone 2	• It is applied along the major roads. Consideration for smooth traffic flow is required.
	Mixed Residential Zone	• It is applied around the commercial zones to allow several urban functions, such as residential, commercial and small-scale industries.
	Residential Zone	• Zones where residences are promoted.
	Industrial Zone	• Zones where industrial activities are promoted. • Types of industries are to be set based on the policies for industries within the Greater Kandy Area. Generally, IT-related and knowledge-based industries are promoted.
	Public Zone	• Zones where administrative and educational facilities are located and proposed.
	Open Space and Recreational Zone	• Zones where public parks, green spaces, open spaces, and recreational facilities are secured
Home Gardens and Agricultural Areas		
	Low-Dense Residential Zone	• Areas where urbanisation is not promoted and the existing conditions of "home gardens" are preserved.
	Agricultural Zone	• Areas where productive agricultures are preserved
Protected Areas		
	Conservation Zone	• Environmentally important, sensitive areas, or hazardous areas
	Sacred Area Zone	• Religiously important areas, and basically, no construction is allowed
	Water Bodies	• Water Bodies

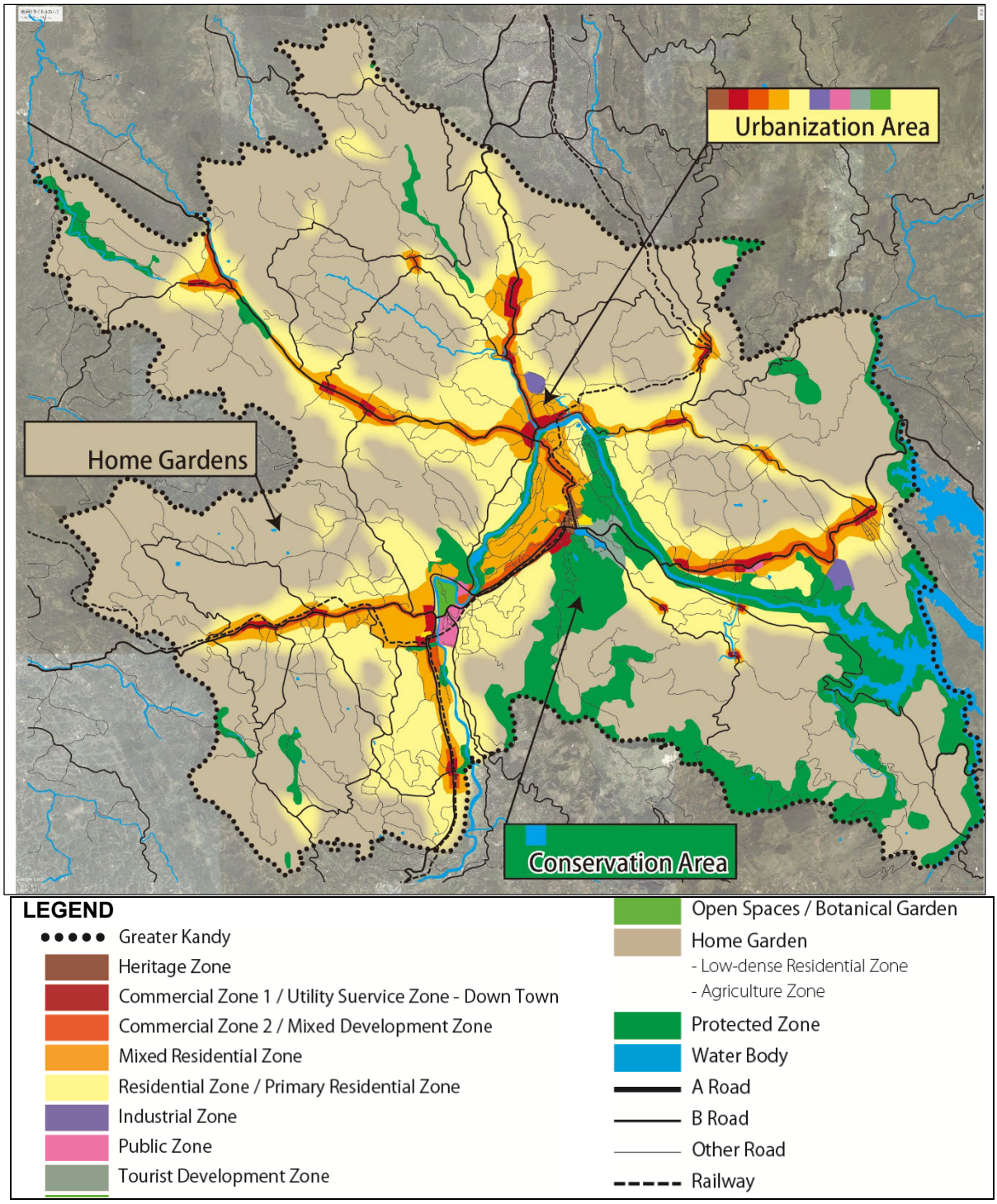
Note: These zoning categories are proposed by the JICA Team, based on the existing development plans of KMC and the other draft development plans of local authorities within the Greater Kandy Area. See Section 10.7 for detailed descriptions.
Source: The JICA Team

Schematically, the designation of land use zones is done in order to realise the proposed urban structure. The commercial zones are set around the urban centres and along the major roads, and mixed development zone and residential zone enclose the commercial zones. The Industrial Zone and Institutional Zone are designated on the existing facilities and the potential lands. Protected areas are designated based on the environmental zoning. This designation pattern is shown as a model in Figure 8.2.12, and conceptual application to the actual lands of Greater Kandy Area is shown in Figure 8.2.13.



Source: The JICA Team

Figure 8.2.12 Schematic Model of Land Use Orientation



Source: The JICA Team

Figure 8.2.13 Land Use Concept Map for Greater Kandy

In addition, the following examinations are essential when development plans for the local authorities are formulated.

- For specific designation of the urbanised area and each land use zone, capacity and coverage of infrastructure/urban services should be carefully assessed. Likewise, agricultural land and tea farms in urbanisation areas should be controlled properly for environmental preservation and industrial development.

- Building usage, BCR (Building Coverage Ratio), FAR (Floor Area Ratio), and other necessary building regulations need to be set in accordance with the conditions of the targeted local authorities.

8.2.5 Orientation of Transport

(1) Issues on Transportation

As mentioned in Chapter 5, issues on transportation in the the Greater Kandy Area, town centres and Kandy City Central area were shown in Table 5.1.4.

The Greater Kandy Area is surrounded by mountains which restricts road development. In such situation, socio-economic activities tend to cause traffic congestions in the City Centre. Hence, it is necessary to improve traffic flow and support the socio-economic activities that enhance tourism and industrial development for regional economic vitalisation without inducing traffic congestion. To achieve this, the highest priority should be given to the realisation of a wide area for efficient transportation through the promotion of a wide area use for public transport.

In particular, traffic problems in the Greater Kandy area more concentrated in Kandy City, making it necessary to widen the city's transport network and to avoid the concentration of activities in the centre of Kandy. In addition, local traffic congestions in many urban areas and traffic congestion which will be caused by highway development and population concentration should be solved.

Therefore, transport development strategies for the entire Greater Kandy lay the first priority in traffic calming by decongesting the urban functions to the cluster cities and traffic management in the city centre of Kandy to avoid traffic congestion, as well as securing a safe and efficient transportation. This can be attained by maximising the existing road network through establishing a transportation system specialised in public transportation. The second priority is to put on the development of a wide area transportation network to facilitate economic growth by strengthening the connection with other cities; and the third priority is to secure a smooth mobility within each city as necessary.

(2) Consideration of the Future of Greater Kandy

To formulate comprehensive transport strategies, it is necessary to consider the future assumption of socio-economic change and the future of infrastructure development.

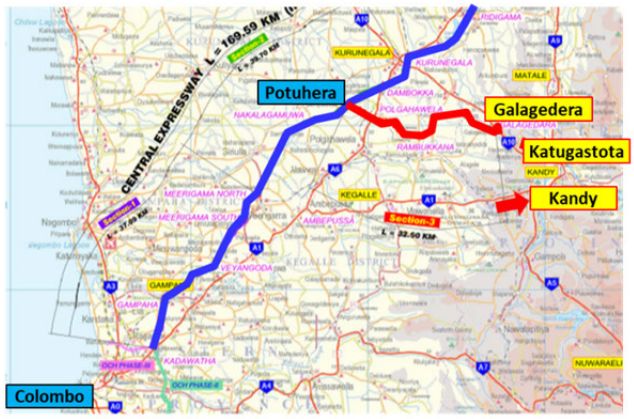
i) **Impact of Expressway:** Expressway development will affect the future transport network, which requires the review and revision existing plans particularly for the north area (see Figure 8.2.14). If the central expressway is constructed, traffic volume from Colombo will be increased and the main traffic flow will be shifted to north area of Greater Kandy (Galagedara - Katugastota). If the capacity of connecting roads from the expressway to the towns is limited, traffic congestion around Katugastota will be more serious (see Figure 8.2.13).

ii) **Population change:** Though population will not increase rapidly, it is assumed that citizens will own their private vehicles if GDP and household income will further increase in the future (see Figure 8.2.14 and Figure 8.2.15). This means that traffic volume will also increase and will cause more traffic problems over the long term.

iii) **Necessity of transport planning for socio-economic development:** Population increase in the central region will be stable in compliance with the National Physical Development Plan, so transport network is crucial to sustain socio-economic development under limited population and finance.

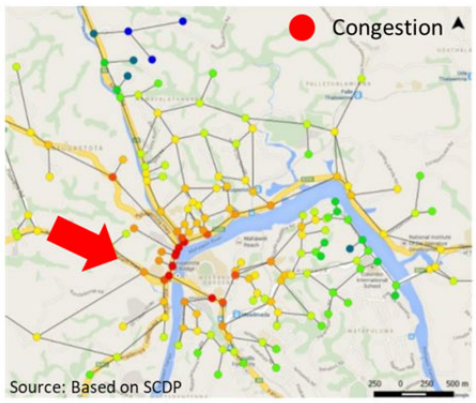
iv) **Relocation of urban function from the city centre to outside:** As the concentration of urban functions (urban facilities) in the city centre of Kandy causes unnecessary traffic

congestion, traffic calming by relocation of such urban functions (facilities) to outside the city centre is required to alleviated traffic congestion in the city centre.



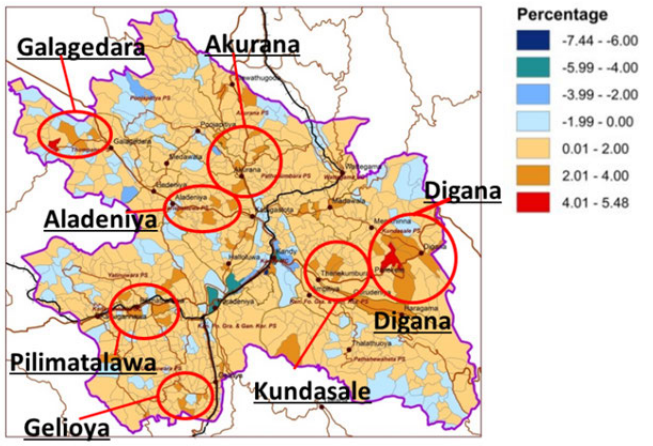
Source: The JICA Team based on CEP Project

Figure 8.2.14 Central Expressway and Connecting Road



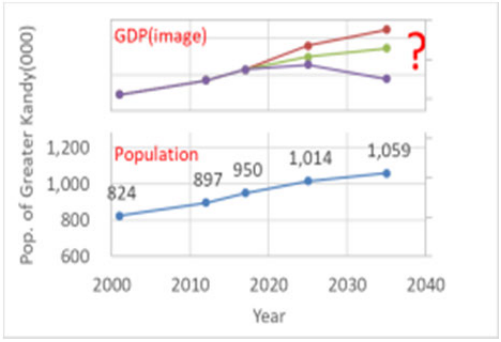
Source: SCDP

Figure 8.2.15 Congestion Point in Katugastota



Source: The JICA Team, based on Department of Census& Statistics, Census 2001& 2012

Figure 8.2.16 Annual Average Population Growth Rate (2001-2012)



Source: The JICA Team based on Department of Census& Statistics, Census 2001& 2012

Figure 8.2.17 Population Projection of Greater Kandy

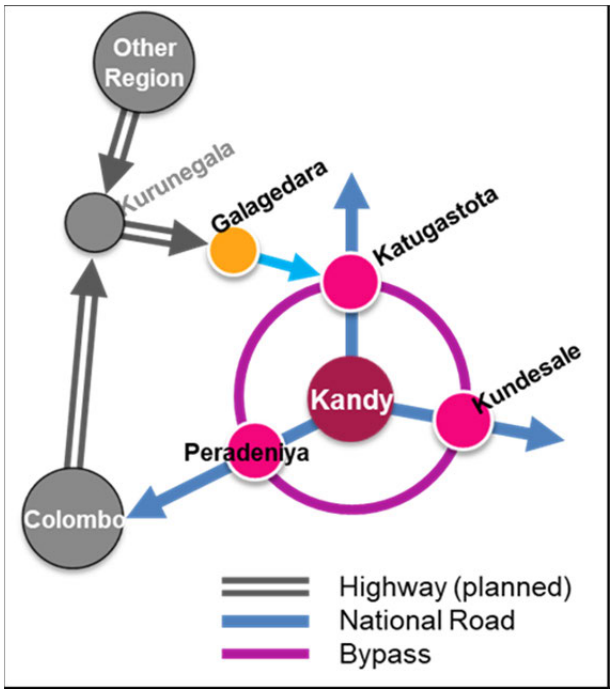
(3) Objectives and Strategies for Transport Improvement in Greater Kandy

Constraints for transport development of Greater Kandy are summarised as follows: (i) concentration of increased traffic into present road network; (ii) physical constraints (limitation of land because of terrain); and (iii) limited budget. Furthermore, at present, most of transport plans and projects are focus on Kandy City Centre for easing of traffic congestion.

For this, a comprehensive transport plan for Greater Kandy from the viewpoint of regional development is indispensable.

The objectives of transport development are to establish an efficient transport system which strengthens the regional linkages, thereby fostering economic activities in each local area in the Greater Kandy Area; to alleviate traffic congestion through cluster development in suburban centres; and to remove transport bottlenecks in urban areas.

The strategies are: (i) promotion of public transport; (ii) formulation of transport network; and (iii) smooth mobility.



Source: The JICA Team

Figure 8.2.18 Concept of Transport Network

(4) Promotion of Public Transport

To ease traffic congestion, a modal shift from private transport to public transport is important. Comprehensive actions in terms of quantity (capacity, frequency), quality (convenience, safety), hardware (infrastructure) and software (management) are required.

Proposed priority actions are as follows:

(a) Comprehensive transport policies

To reduce traffic congestion, such as caused by feeder public transport service from multi modal terminals (e.g. mini bus, wagon, etc.), transport policies and measures are gradually applied, including the application of discounted ticket for transfer from public transport, parking management of private vehicle and three-wheelers in the City Centre, among others.

(b) Enhancement of railway capacity

Railway capacity is enhanced by a double track railway and modernisation of rail facilities and operation systems for commuting.

(c) Promotion of P&R (Park and Ride)

To transfer from private vehicle to public transport (railway, bus) to go to the City Centre, a P&R policy is promoted. Passengers will park cars at P&R parking at the station in clusters and peripheral areas, and transfer to a railway or a bus to commute to City Centre. P&R users can use a discount parking fee and railway/bus ticket, while car parking fees in the City Centre are expensive.

(d) Development of a multimodal bus terminal

In the case of Kandy City Centre, Kandy Multimodal Transport Terminal (KMTT) has been constructed at the Good Shed bus stand under SCDP. Since KMTT is mainly for bus transit, it is proposed to develop station plazas utilising railway lands to improve connectivity and accessibility of railways, three-wheelers and other private vehicles. In case of cluster cities, station area development will be promoted, such as a multimodal terminal including a railway station, a bus terminal and a P&R facility, and a commercial and residential complex. For this, the station area will be revitalised as a

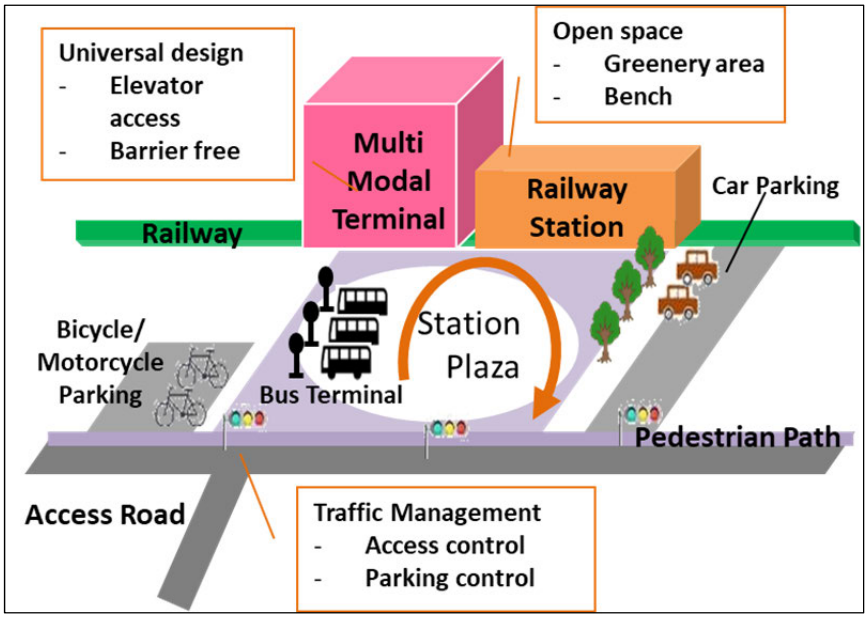
new urban centre of the cluster cities which are convenient to access by public transport and on foot.

(e) Promotion of TOD (Transit-Oriented Development, integrated urban development along railway)

TOD is a planning concept to promote public transport with urban development, which will contribute to promote public transportation use, urban development around the station (i.e. commercial, business, residential), and secure government revenue by raising land price.

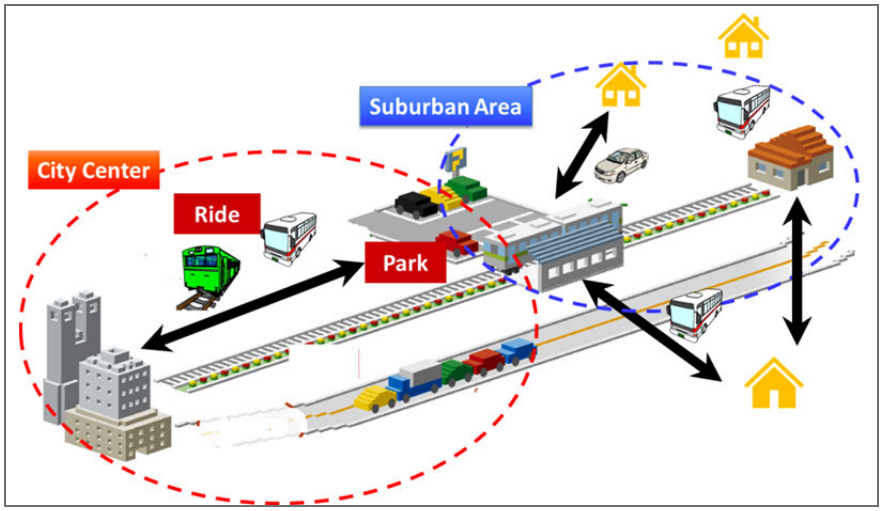
The main TOD components in the Greater Kandy are as follows:

- Development of a new station/halt as a gateway to the Grid City and rehabilitation of Kandy Station area integrated with urban development
- Development of a multimodal terminal and P&R in cluster cities (Tennekumbura, Katugastota, Peradeniya)
- Development of a station area with various urban functions (commercial, residential, etc.) in suburban areas and cluster cities, which includes the relocated urban facilities from the city centre of Kandy to alleviate congestion in the city centre.



Source: The JICA Team

Figure 8.2.19 Station Area Development with Multimodal Terminal and Station Plaza



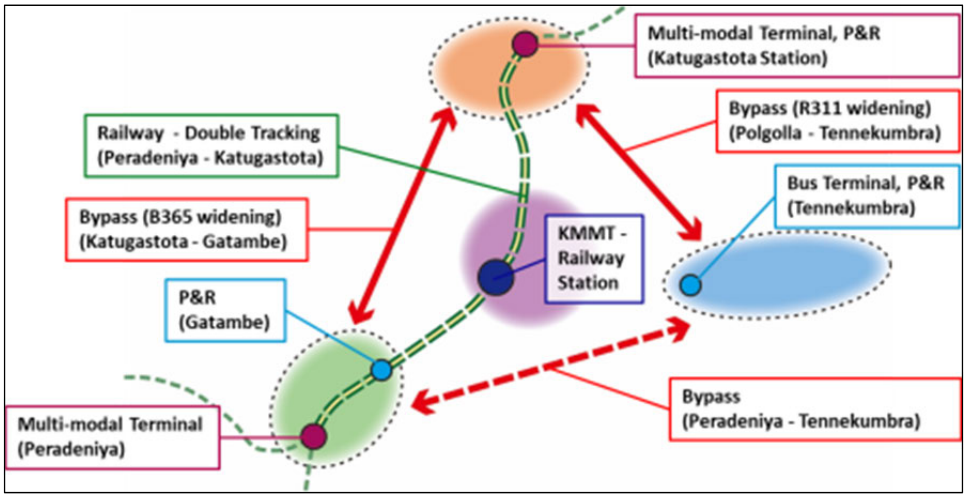
Source: The JICA Team

Figure 8.2.20 P&R Concept

(5) Formulation of Transport Network

To achieve the proposed objective, a transport network concept shall consist of the following:

- **Backbone of railway** with effective public transport system
- **Regional road network** to enhance the potentials and attractiveness of Greater Kandy
- **Bypass (ring roads and railways)** to strengthen linkages between suburban cities
- Secure sm**ooth mobility** within the city by removal of the bottlenecks and improvement of **pedestrian pathways**



Source: The JICA Team

Figure 8.2.21 Formulation of Transport Network

(6) Smooth mobility

Since development land is limited in Kandy, traffic management measures such as parking management for P&R, parking development, introduction of environmental friendly transport, are applied.

8.2.6 Orientation of Economic Development

(1) Potential Industries

Regional industrial development is one of the most important factors under the Greater Kandy Urban Plan. Regional industry development enables people to earn enough income to improve quality of life and contribute to sustainable development of the Greater Kandy Area.

On the other hand, according to the previous discussion, the Greater Kandy Area shall promote industries with one or more of the following characteristics.

- Produce eco-friendly and/or non-polluting products/services
- Provide high value added and/or knowledge-intensive products/services
- Perpetuate the tradition and/or preserve the history
- Promote health and/or well-being
- Located in the right area where each industrial sector may not affect traffic flow
- Related to tourism which is one of the most important industries in Greater Kandy

Target industries to meet above conditions may be identified as follows:

- Agriculture and food processing
- Handicrafts
- Tourism (MICE, Kandyan Heritage, intangible culture, etc.)
- Healthcare services (medical tourism, traditional medicine, Ayurveda, etc.)
- IT/BPM and knowledge-based industry

Table 8.2.11 shows the economic indicators for the above potential industries except for agriculture and manufacturing in the country level. For formal industries, “Computer programming consultancy and related activities” is the highest value added per person engaged. It is more than twice as much as the other industries. Four (4) divisions such as “Accommodation”, “Social work activities without accommodation”, “Information service activities” and “Human health activities” are also relatively higher value added. For informal industries[2], “Computer programming consultancy and related activities” and “Human health activities” are higher value added.

[2] Informal industries are small and unorganized establishments which carry economic activities in homes, small workshops without a fixed location and mostly operated by an individual working either alone or with the help of unpaid family members.

Table 8.2.11 Principal Indicators of Trade and Services Activities by Economic Division - 2013

Economic Section	Economic division	Type	No.of Establishments	Person engaged (No.)	Value of output (Million Rp.)	Value of Intermediate consumption (Million Rp.)	Value added (Million Rp.)	Value added per establishment (Rp.)	Value added per person engaged (Rp.)
Accommodation and food service	55 Accommodation	Formal	3,078	51,076	89,203	39,180	50,023	16,251,931	979,392
		Informal	12,423	16,284	6,670	1,846	4,823	388,267	296,207
	56 Food and beverage service activities	Formal	795	19,120	23,094	11,221	11,872	14,933,770	620,939
		Informal	73,555	138,660	79,737	37,686	42,051	571,696	303,268
Transportation and storage	49 Land transport and transport via pipelines	Formal	162	52,825	67,873	32,154	35,719	220,489,062	676,180
		Informal	32,393	63,941	66,524	32,614	33,910	1,046,856	530,345
Information and communication	62 Computer programming consultancy and related activities	Formal	162	9,622	24,439	3,821	20,618	127,274,526	2,142,847
		Informal	114	268	1,116	930	186	1,632,714	694,513
	63 Information service activities	Formal	36	3,971	4,921	1,431	3,489	96,919,225	878,643
		Informal	347	535	245	128	117	338,894	219,806
Education	85 Education	Formal	1,424	48,927	42,830	17,044	25,785	18,107,904	527,023
		Informal	41,943	159,433	22,970	7,184	15,786	376,374	99,015
Human health and social work activities	86 Human health activities	Formal	304	24,242	42,486	20,880	21,605	71,071,277	891,249
		Informal	12,753	27,702	17,719	3,757	13,962	1,094,837	504,024
	87 Residential care activities	Formal	79	2,155	1,003	588	415	5,255,840	192,673
		Informal	611	3,528	1,871	1,434	436	713,769	123,615
	88 Social work activities without accommodation	Formal	46	1,436	1,507	132	1,375	29,897,780	957,728
		Informal	1,666	5,390	1,657	1,169	487	292,713	90,475

Source: Economic Census -2013/14 Final Report on Construction, Trade & Services (Formal Sector) and Economic Census 2013/14 Final Report on Informal Non Agricultural Activities Department of Census and Statistics.

1) Agriculture and food processing

The Department of Agriculture and the Department of Export Agriculture promote green agriculture and organic farming as well as GAP (Good Agriculture Practice). However, it may not make sense to convert from conventional farming to organic farming due to cost and time.

The introduction of GAP farming may be practical and suitable in order to serve agricultural products to tourists and visitors coming to Kandy. The manufacture of food products made by GAP farming products using modern technology also gives higher value added and a positive image to tourists.

2) Handicrafts

Handicrafts are one of the important industries in Greater Kandy not only to perpetuate the tradition, but also to create value added and synergy along with tourism which is the main industry in the area. The National Design Centre under the Ministry of Industry and Commerce develops sophisticated design and new materials and provide to artisans to make higher value added handicraft products.

Current challenges are poor direct access and communication between artisans and customers, such as tourists and international buyers, in order to promote handicrafts by producing higher value added products.

3) Tourism and MICE

Tourism also has more room to further develop as the main industry in Greater Kandy. However, there is no clear tourism promotion policy to set the target layers of tourists in Kandy. To achieve this, Kandy must attract the following targeted tourist profiles:

- Tourists with upper middle class income;
- Tourists seeking wellness or healing;
- Tourists wishing to visit to the places of worship; and
- Senior and long-stay tourists

The Meetings, Incentives, Conventions and Exhibition (MICE) industry is also a potential field to attract tourists. Presently, Sri Lanka receives around two million tourists per year, and 10-15% is composed of MICE tourists. However, according to the Sri Lanka Convention Bureau, Kandy is not yet prepared to accept MICE tourists because even Colombo does not have a special place that can accommodate a capacity of over 3,000 participants for international conferences, and venues in Kandy have a much lesser capacity. Moreover, Kandy does not have enough options for night life, and the traffic congestion between Colombo and Kandy causes inconvenience to tourists wanting to transfer to other cities.

4) Healthcare services

As mentioned at Chapter 6.7, there are the two (2) obstacles can be observed in terms of promoting medical tourism in Greater Kandy. Therefore, it is not easy to raise awareness of Kandy as a medical tourism destination.

On the other hand, the natural and spiritual environment in Greater Kandy may attract aged people, or people from other areas who seek physical and mental wellness. Therefore, Ayurveda spa and wellness centre are also being promoted. Since there are enough Ayurvedic practitioners in Kandy District, more promotion of Ayurvedic treatment in Greater Kandy may not be so difficult in order to meet the demands of the tourists and the residents with the establishment of proper Ayurvedic facilities.

5) IT/BPM and knowledge-based industry

Kandy is also identified as a potential regional hub to achieve the above targets along with Kurunegala, Hambanthota, Jaffna and Galle. In 2016, SLASSCOM organised the Kandy IT week to build regional skills capacity to support the growth of the country's IT/BPM industry. The event was aimed at encouraging around 2,000 students to pursue IT degrees and highlighted the possible career options within the scope of IT at varying levels.

Currently, there are several IT/BPM companies located in Greater Kandy that can hire engineers who graduated from the University of Peradeniya. However, most of them are only branch offices and do not have so many staff members in Kandy.

(2) Comparison with Other Cities in Asia

Before conducting an orientation on economic development in Kandy, it is important to learn the characteristics of successful developing inland cities in Asia with focus on agriculture, tourism, healthcare and handicraft so that Kandy may consider and take proper measures for economic development.

1) Chiang Mai Province, Thailand

Chiang Mai, "The Most Splendid City of Culture", is located about 700 km north of Bangkok and founded in 1296 as the capital of the Kingdom of Lan Na. The current province-wide population is around 1.7 million. In 2015, the Gross Provincial Product (GPP) was THB217,951 million (approximately USD 6.5 billion[3]) and the GPP per capita was THB126,976 (approximately USD 3,804). The share of the agriculture sector, wholesale and retail sector, education sector, hotel and restaurants sector and manufacturing sector in GPP was 22.5%, 13.6%, 8.4%, 8.3% and 7.7%, respectively.

According to Chiang Mai Province Development Plan (2015-2018), Chiang Mai plans to attain the following positions:

- Tourism Hub / World's Tourist Destination: MICE City, Medical/Health Hub
- Trade, Investment and Transportation Hub: Northern Land Port
- City of Safe Agriculture: Northern Food Valley
- Centre of International Education: Education Hub
- Eco City: Eco-Town, Eco-Village

Moreover, the Plan analysed the following issues as strength and opportunities in Chiang Mai Province:

Strengths

- Diverse economic base
- Many famous tourist attractions and tourism diversity
- Medical tourism promotion with the advantages of a comfortable climate
- Medical / Health Hub of the northern region
- Major source of production of food as well as cold climate vegetables and fruits, and unique flower plants
- Highly distinctive culture
- Strong readiness in terms of transportation routes which allow convenient access to various destinations within ASEAN Economic Community, GMS and BIMSTEC
- Upstream water source with diverse natural resources and ecosystem
- Education Hub of northern region
- Centre of creative handcrafts production
- Complete with functions and facilities capable of organising international events; tourism hub / World's Tourist Destination: MICE City, Medical/Health Hub

[3] USD1.00=THB33.38 as of July 31, 2018 from oanda.com

Opportunities

- Government and central agencies policies to drive Chiang Mai Province toward becoming a MICE City
- Governmental policy to drive Thailand toward becoming the world's food hub
- Tourists' demand for cultural tourism, eco-tourism and health tourism
- Policy on economic cooperation, free trade zone and AEC
- Economic expansion of neighbouring countries
- Policy on the construction of Chiang Mai - Bangkok High Speed Rail
- Awareness on the importance of social and community development
- Growth of hotels and spa businesses which lead to higher demand for Lanna handicraft products
- Preference for education, career, tourism and lifestyle in Chiang Mai Province continue to increase among both Thai and foreigners
- Government strategies and target values concerning national development in terms of growth based on eco-friendly quality of life

Chiang Mai may become a benchmark of Kandy, since Kandy can follow the path of the past economic development of Chiang Mai. However, Kandy has no statistical data similar to Chiang Mai. In order to consider the economic development plan, the Public Sector shall publish statistics for better planning and monitoring.

Table 8.2.12 Statistics Related to Tourism Business in Chiang Mai, Thailand

Category	Type	Unit	Figures in 2016
No. of Visitor (Incl. Tourist)	Thai	Persons	6,721,819 (5,039,830)
	Foreigners		2,902,139 (2,643,290)
	Total		9,623,958 (7,683,120)
Average Length of Stay	Thai	Days	3.05
	Foreigners		3.14
	Total		3.08
Average Expenditure by Tourist	Thai	USD/Person/ Day	Accommodation 25 Food 20 Shopping 19 Entertainment 12 Transportation 8 Others 16 100
	Foreigners		Accommodation 34 Food 24 Shopping 23 Entertainment 15 Transportation 9 Others 15 120
	Total		107
Revenue from Tourism	Thai	Million USD	1,684
	Foreigners		1,016
	Total		2,700
Value of Souvenirs from One Village One Product Project	Total	Million USD	249
Aircraft Movements	Domestic	Movements	50,107
	International		17,027
	Total		67,134
Number of Passengers	Domestic	Passengers	7,108,146
	International		2,084,065
	Direct Transit		16,045
	Total		9,208,256
Number of JCI-Accredited Hospitals	-	Hospitals	2

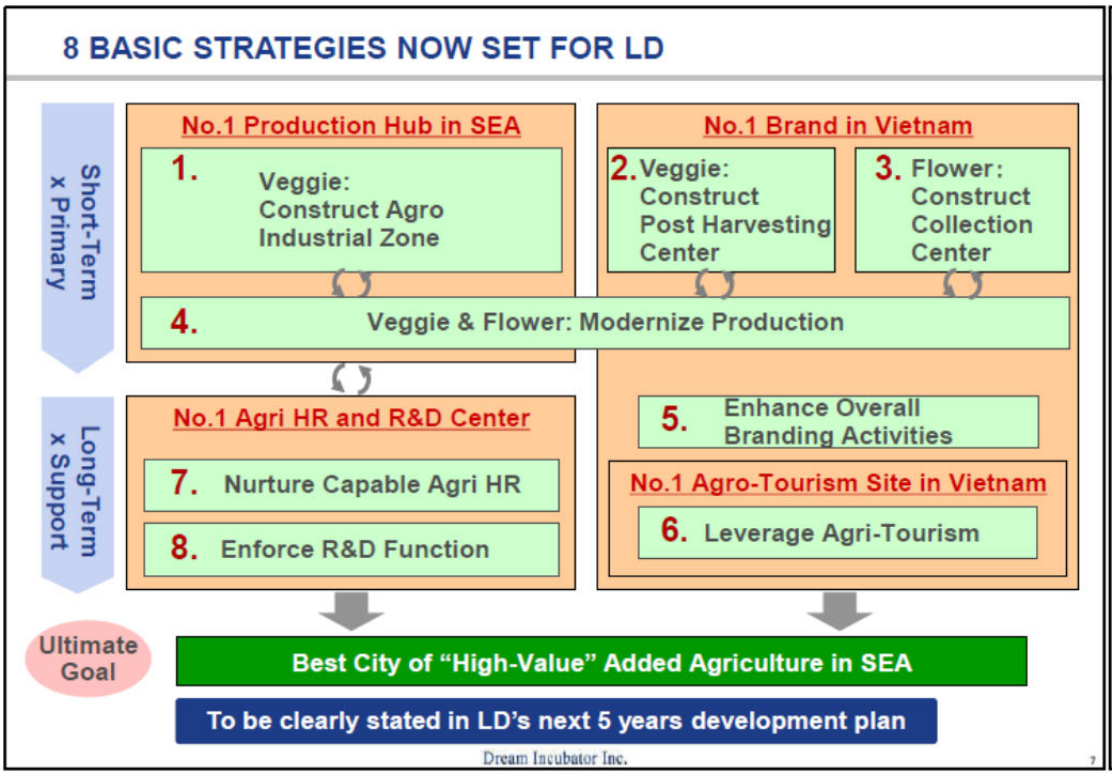
Source: Airport statistics from Annual Report 2017 by Airports of Thailand PCL (AOT), Hospital statistics from Joint Commission International and other statistics on tourists' statistics from Sports and Tourism Office in Chiang Mai Province

2) Lam Dong Province (Da Lat City), Vietnam

Lam Dong Province is located in the Central Highlands region in Vietnam and its capital city is Da Lat. The current province-wide population is around 1.2 million. In 2017, the Gross Regional Domestic Product (GRDP) was VND70,417 billion (approximately USD 3 billion[4]) and the GRDP per capita was VND 54.12 million (approximately USD 2,322). The share of the agriculture sector, manufacturing sector and trade and service sector in GRDP was 47.5%, 17.3% and 35.2%, respectively.

"Lam Dong and its capital city Da Lat's primary products include vegetables, flowers, coffee, tea and dairy products with significant production and marketing advantages compared with their competitors in both domestic and export markets. "Da Lat vegetables/flowers" are particularly competitive and reputable as the main supply for the vast consumption market of Ho Chi Minh City and surrounding provinces."[5]

According to Lam Dong Province's 5-year Social-Economic Development Plan from 2016 to 2020, there are five (5) strategies to promote hi-tech agriculture, food processing and agro-tourism.



Source: "Final Report Data Collection Survey for Formulating Branding and Promotion Strategy of Agricultural Products and Agro-tourism in Lam Dong Province". JICA 2017

Figure 8.2.22 Eight (8) Basic Strategies for Lam Dong Province's Agricultural Development

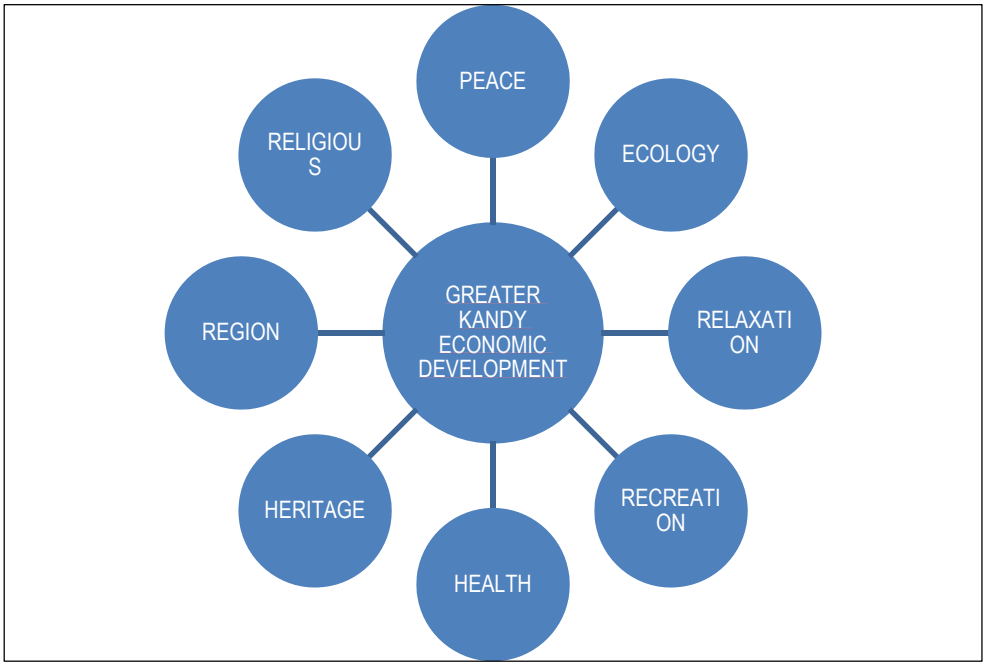
3) Orientation of Economic Development

Based on discussions with stakeholders including SC and TWG members and the private sectors, the following eight (8) elements are identified in order to generate higher value added economic development in Kandy.

[4] USD1.00=VND23,313 as of July 31, 2018 from oanda.com
[5] "Final Report Data Collection Survey for Formulating Branding and Promotion Strategy of Agricultural Products and Agro-tourism in Lam Dong Province", JICA, 2017

- **Peace:** Kandy is a peaceful city, and all industries shall follow this element.
- **Ecology:** Kandy shall promote eco-friendly products/services such as IT/BPM and manufacturing with the use of modern technology.
- **Relaxation:** Kandy has places of relaxation to enhance wellness; hence, spa & wellness centres are promoted.
- **Recreation:** Kandy has access to a big nature reserve; hence, ecotourism shall be developed.
- **Health:** Kandy shall serve green food to visitors; hence, healthcare services shall be developed.
- **Heritage:** Kandy has heritage area and handicrafts to preserve the tradition; hence, experiential tourism shall be developed.
- **Region:** Balanced development of regional economy in Greater Kandy shall be considered.
- **Religion:** Kandy has several famous places of worship; hence, faith tourism shall be developed.

In order to achieve economic development to enhance the Economic Development in Greater Kandy, potential industries can be developed in line with concepts shown on Figure 8.2.23.



Source: The JICA Team

Figure 8.2.23 Concept of Greater Kandy Economic Development

Startups and young entrepreneurs with higher awareness of the above concepts may also be potential key players to support future economic development in Greater Kandy. JICA Team met several business persons who are doing manufacturing, trading and service businesses in Kandy.

One business person practices social entrepreneurship and contributes to the society while doing business. Another person produces herbal foods using high-quality materials, and the herbal foods are packed in beautifully designed packages and advertised through SNS to deliver higher value-added products.

The National Institute of Business Management (NIBM), currently operating as a statutory body under the Ministry of Youth Affairs and Skills Development, opened Kandy Centre in 1996 to offer a Higher Diploma, Diplomas and many certificate courses in Business Management, IT and Foreign Language. Many graduates from NIBM start their own business.

Table 8.2.13 shows the proposed industry promotion strategies in Greater Kandy. However, it shall be noted that the policy makers need to pay more attention on collecting accurate statistical data in order to consider the strategies more efficiently and effectively. Most especially, tourism statistics similar to Chiang Mai's as shown on Table 8.2.13 should be collected.

Table 8.2.13 Industry Promotion Strategies in Greater Kandy

Characteristics	Strategies	Related Organisations
- Produce eco-friendly and/or non-polluting products/services	1. Set and promote target industries with investment privileges at the designated area	- Board of Investment (BOI)
- Provide high value-added and/or knowledge- intensive products/services	1. Utilise University of Peradeniya as the centre of excellence 2. Enhance cooperation between industry, government and university 3. Set up the showroom and/or e-commerce site to reach the consumers directly 4. Access to the international supply chain	- BOI - Exports Development Board (EDB) - Ministry of Industry and Commerce - Univ. of Peradeniya - National Institute of Business Management (NIBM) Kandy Regional Centre - National Design Centre - Central Province Council - Information and Communication Technology Agency (ICTA)
- Perpetuate the tradition and/or preserve the history	1. Develop the potential tourist destinations 2. Develop craft villages to experience handicraft making	- UDA - Central Province Council of Regional Economic Development Agency (REDA) - National Design Centre
- Promote health and/or well-being	1. Attract more accommodations, hospitals and spas at the designated area	- Central Province Council (REDA) - BOI
- Locate in the right area where each industrial sector may not affect traffic flow	1. Follow the urban centre development policy	- UDA
- Related to tourism which is one of the most important industries in Greater Kandy	1. Establish the Destination Management Organisation to enhance collaboration between tourism and other industries.	- Central Province Council (REDA)

Source: The JICA Team

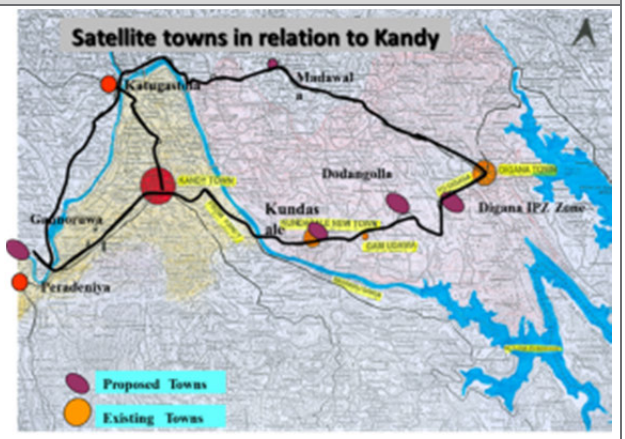
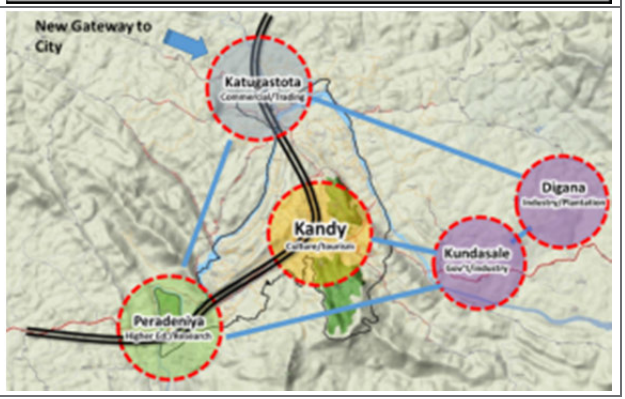
8.2.7 Urban Structure of Greater Kandy

(1) Basis for Proposed Urban Spatial Structure of Greater Kandy

Considering the present conditions, the proposed visions, and urban structures which were mentioned in the previous plans, a new urban structure of Greater Kandy Area is developed.

The Urban Structure is formulated based on ideas which have already been proposed in the existing plans. These past ideas were compounded, and analysis of the existing status and development visions helped create the newly proposed urban structure. The characteristics of the urban structures which were proposed in the previous plans are summarised as follows. More details of the previous plans are described in Chapter 3.

Table 8.2.14 Proposed Urban Structure in Previous Plans

Past Plans and Description	Proposed Urban Structure
Greater Kandy Development Plan 2020 "Satellite Town Development" The vision was proposed "To Provide New Residential Area with All Comforts". Development was not only focused on Kandy, but the surrounding towns also need to be developed. The overcrowding of the Kandy town could be curtailed by shifting some of the incompatible functions such as Administrative Centre, Educational Centres, Hospitals, Army Camps, Bogambara Prison, and Bus Terminals.	
Strategic Cities Development Plan 2030 "Corridor Dominated Development" The vision was proposed as "the modern compact city of excellence in the serene mountainous region of Sri Lanka." Two development corridors were proposed: 1) Peradeniya – Kandy – Katugastota; and 2) Tannekumbura – Pallekele – Digana. Developments were focused on the corridor and based on the National Physical Plan.	
Greater Kandy Master Plan "Clustered Urban Development Structure" The four clusters were clearly proposed: 1) Kandy for Culture/Tourism; 2) Peradeniya for Higher Education and Research; 3) Katugastota for Commercial and Trade; 4) Kundasale for Government and Industry; and 5) Digana for Industry and Plantation. It was aimed to set up a framework to guide and manage the growth of the city for social, environmental and economic development for sustainability.	

Source: The JICA Team

On the other hand, the existing condition of the Greater Kandy Area can be summarised as follows.

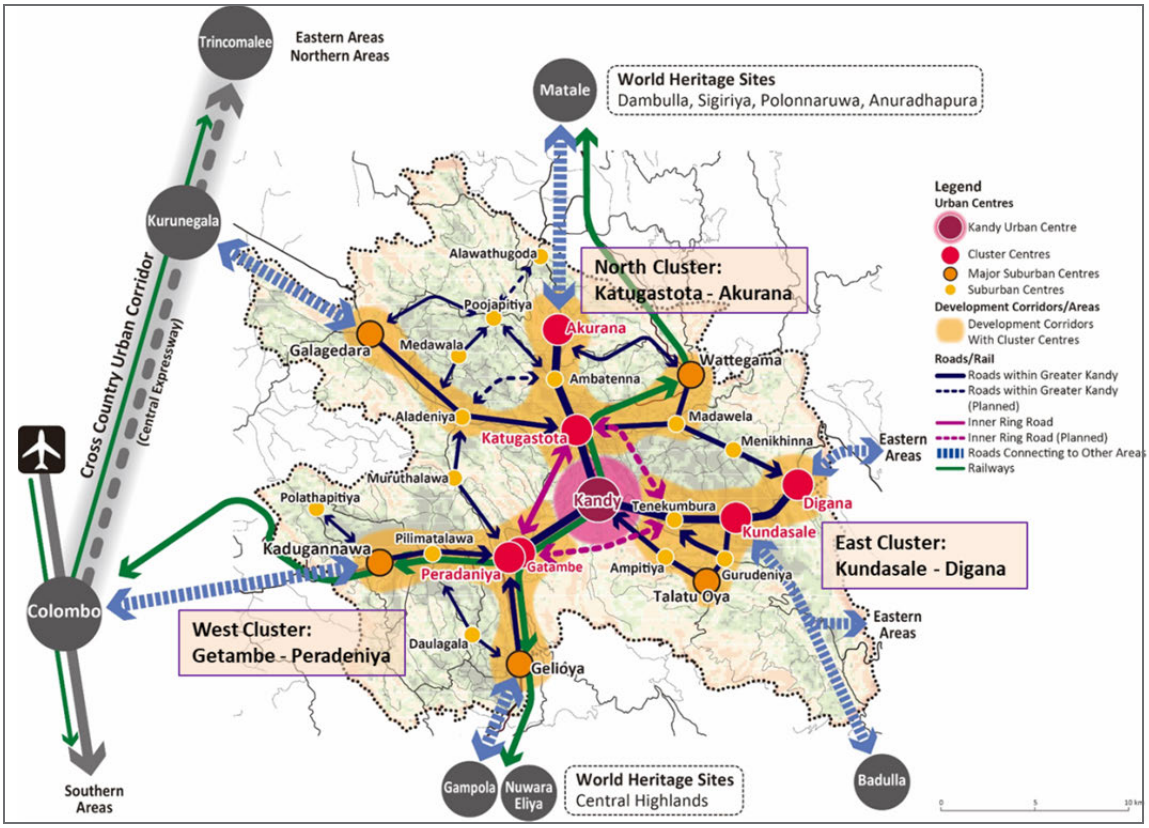
- Urban areas of Kandy have been expanded to form the clusters of Peradeniya, Katugastota and Kundasale/Digana.
- Corridor-based structure causes traffic congestion on trunk roads as well as the centre of Kandy.
- Rural centres and villages remote from corridors are isolated from urban services.

(2) Proposed Urban Structure of Greater Kandy

By considering the past plans and existing conditions, the major concept for the formulation of an urban structure is a combination of "clusters/urban and rural centres" and "corridors":

Multi-Clusters and Transport Corridors are proposed to support socio-economic development including rural areas and ease development pressure of Kandy City Centre.

The new urban structure is characterised by several urban centres (Multi-Clusters) and transport corridors to promote socio-economic development in rural areas and to ease the concentration of urban functions and traffic in the City Centre of Kandy. For this, the centre of Kandy is connected to the three clusters of Katugastota-Akurana, Getambe-Peradeniya and Kundasale-Digana, by transport corridors. In addition, other urban centres are proposed in the rural areas to provide necessary urban services.



Source: The JICA Team

Figure 8.2.24 Urban Structure of Greater Kandy

(3) Hierarchical Urban Centre Development

The proposed hierarchy of urban centres is described below.

1) Urban Centre of Kandy

It is the centre of the Greater Kandy Area. The urban service centre is harmonised with historic values by providing various functions of commercial, business, educational and medical services.

2) Cluster Centres

- They are the major urban centres within the identified clusters with their own characteristics, and where different types of urban functions are concentrated. These cities are strongly connected to the central area of Kandy by roads and railways.

- **Gatambe – Peradeniya:** Higher Education and Medical Centre by utilising agricultural lands, development of P&R
- **Kundasale – Digana:** Admin and New Industrial Centre by promoting advanced industries (IT, R&D, etc.) and administrative services with new towns
- **Katugastota – Akurana:** Commercial Service Centre to provide services for residents and tourists

3) Major Suburban Centres

- Independent suburban centres with a bus terminal and a local industrial centre/market are identified. Improvement of traffic bottlenecks (junction, bridges, etc.) and infrastructure are required. These centres are connected to the major cluster cities.
- Kadugannawa, Gelioya, Talatu Oya, Wattegama and Galagedara

4) Suburban Centres: Township/Villages

- Rural community centres providing services to rural areas are identified. They are providing urban services to the surrounding populations. These centres are connected to the urban centres of the three clusters.
- Pilimatalawa, Ampitiya, Tennekumbura, Menikhinna, Madawala, Ambatenna, Adadeniya, etc.

Table 8.2.15 Hierarchical Urban Centre Development of Greater Kandy

Cluster/ City		Functions
Urban Centre: Kandy Centre		**Urban Service Centre harmonised with historic values** by providing various functions of commercial, business, educational and medical services
Cluster Centres	**Getambe-Peradeniya**	**Higher Education and Medical Centre** by developing the station area with new residential facilities, medical facilities, railway and transport facilities (P&R). Also the location of Peradeniya University.
	Kundasale-Digana	**Advanced Industrial Centre** by promoting advanced industries such as IT, R&D (Research and Development), etc., and bypass development with administrative services and new town
	Katugastota-Akurana	**Commercial Service Centre** to provide services for residents and tourists
Major Suburban Centres	**Akurana, Galagedara, Kadugannawa, Gelioya, Talatu Oya, Wattegama**	**Independent Suburban Centres** with a bus terminal, local industrial centre/ market. Improvement of traffic bottlenecks (junctions, bridges, etc.) and infrastructure are conducted.
Suburban Centres: Townships/ Villages		**Rural Community Centre** providing services to rural areas

Source: The JICA Team

5) Transport Condition of North of Greater Kandy

- Katugastota is one of the urban centres and is located 5km north of Central Kandy. Areas along A9 road are continuously urbanised and many car dealers are found. Katugastota has been developed around the bridges crossing Mahaweli River, and has junctions with A9 (to Matale and Dambulla), A10 (Kurunegara), B365 (Peradeniya through west of the river), B205 (to Madawala), and B205 roads. The Kahalla railway station can be found at West of Katugastota.
- Akurana is located 10km north along A9 road and is one of the largest Muslim community towns. Commercial activities are also active in Akurana.

There are two major national roads to connect to the outside of Greater Kandy Area.

- National Road A9: It is the national road to connect from Greater Kandy Area to the northern area. It is a major tourist route connected to Kandy and the historical world heritage site, or cultural triangle. Ambatenna is the only suburban centre between Katugastota and Akurana. It is located at the junction of A9 and B15 (to Poojapitiya).
- National Road A10: it is a major route to connect to Kurunegara which is one of the major intersections along A6 or "Cross Country Urban Corridor", in which the draft National Physical Plan 2050 identifies as a major important development corridor of the nation. In the future, the central expressway will be constructed, and connectivity to Colombo and the other parts of the nation will be improved on the A10 road. In this sense, Galagedara will be a new gateway to the Greater Kandy Area.
- Galagedara can be a major suburban centre by maximising the potential as the gateway from Colombo and other parts of the nation. One of the concerns for development is topographical difficulty.
- Aladeniya is located around the junction of A10 to connect Katugastota and B5 road to connect to Peradeniya. Around Aladeniya, the topographic condition is relatively good.

The north-east area of the Greater Kandy Area is considered a part of this cluster where potential suburban centres are located. The topographic condition of south of B256 road is relatively suitable; therefore, the area can be considered one of the future urbanised areas.

- Wattegama is located north of Madawala. The town is a service centre having a railway station. By using railway lines, the area can be developed as residential area.
- Madawala is located between Katugastota and Digana, around the junction of B205 and B256. It is still a small service centre, but can become a suburban centre.

6) Transport Condition in South-West of Greater Kandy

- There are two major national roads to connect to the outside of the Greater Kandy Area.
- National Road A1: It is the present major route to connect the western Greater Kandy Area and Colombo. Kadugannawa and Pilimatalawa are located along A1, and the cluster is the major entrance of Kandy.
- National Road A5: It is the major route to connect the south of the Greater Kandy Area such as Gampola, and further to Nuwara Eliya, and to a world heritage site of the central highlands of Sri Lanka. Gelioya is located along A5 and is one of the suburban centres. The route can be considered as a tourist route.
- There are still some lands available for further residential development surrounding the cluster.

7) Transport Condition of East of Greater Kandy

The major national roads connecting to east are:

- National Road A26: It is the connection to the east of the Greater Kandy Area, Mahiyangana and towards the eastern coast of Sri Lanka. Tennekumbura is located around the bridge close to the intersection of A26 and B423 road. Since there are no bridges after Tennekumbura crossing Mahaweli River in the east of Kandy, it is an important location of the Greater Kandy Area.
- Other National Roads (B423, B413, B195): Some locally important roads are starting from this cluster towards outside of Greater Kandy. Some suburban centres are located on the B-roads.
- Gurudeniya is located along B413 road in the south bank of Mahaweli River. The road is an alternative route towards Mahiyangana and Badulla, and the road condition is good.

Although this area is still not developed and there are topographical constraints, there is a potential for this area to be developed.

- Ampitiya and Talathuoya are located along B195 road. Although there are topographical constraints, the towns are already functioning as service centres.

It is noted that the areas are considered as environmental constraint areas due to their close locations to Victoria Lake. At the same time, the topographies of the north of the Kundasale – Digana Corridor is relatively gentle, and can be areas for residential expansion.

8) Rural Area Development

- In addition, in the areas between these clusters and corridors, it is necessary to consider rural area development. In the rural area, some service centres are required to provide proper urban services and agricultural activities need to be reorganised.
- Menikhinna is located between Madawala and Digana on the B256 road. It is only a small town, but can be a suburban centre.
- Poojapitya is located on the west side of Akurana. The town provides services to the areas between A9 and A10.

8.3 Orientation of Cluster Development

8.3.1 Urban and Transport Functions of Clusters

(1) Urban Functions and Population Distribution

To ease traffic pressure in the City Centre, three clusters are developed with urban and transport functions:

- Urban functions: Value-added and unique functions are strengthened for each cluster including relocated public facilities from the centre (see Figure 8.3.1).
- Transport functions: Formulate transport hubs in clusters to park private vehicle and transfer to public transport to access to the City Centre (see Table 8.3.1).

Among the three clusters, Katugastota shall be developed as a priority to accommodate increasing traffic and urbanisation pressure in short-term, and to be a gateway of the Central Expressway in the mid-term.

Kandy City Centre	**Capital** of tourism**,** cultural, historic and religious **heritage**
Katugastota	**Commercial and distribution centre** with small businesses and a good access to Colombo and Kandy
Getambe-Peradeniya	**Health and educational centre** with university, garden and agri-complex
Kundasale-Digana	**Advanced industry and IT centre** with **admin centres**, Kandy Industrial Park (KIP) and nature

Source: The JICA Team

Figure 8.3.1 Urban Functions of Cluster Development

At present, 325,000 people flow into the Kandy City Centre every day (source: SCDP). In the future, it is estimated that the daytime population will increase to 500,000 (2%/year). While the main urban functions and services will remain in the Kandy City Centre, new services such as commercial, health, educational, advanced industrial functions which cannot be accommodated in the city centre and will absorb new employment shall be developed in the clusters.

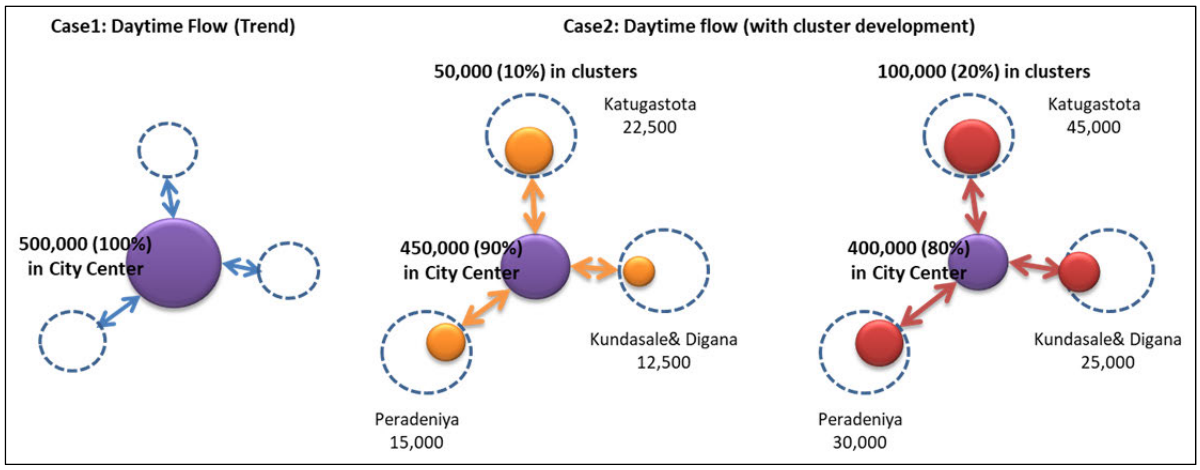
Through appropriate cluster development, including station area development and public transport promotion, it is proposed that approximately 50,000-100,000 of the population will be absorbed in the three clusters (see Table 8.3.1 and Figure 8.3.2). By achieving this, road traffic flow into the city centre will be drastically reduced.

Among the three clusters, Katugastota will be able to absorb daytime population (employees) with cluster development, since this cluster is the nearest to the city centre and will offer a convenient way going to Colombo after expressway development. It also has commercial and economic development potentials through the utilisation of Katugastota station area and other vacant lands.

Table 8.3.1 Daytime Population Flow into City Centre and in Clusters

		Present	Case1: Trend	Case2: with cluster development			
Daytime flow to City Centre		325,000	500,000	450,000		400,000	
Daytime flow in cluster	Katugastota	-	-	**22,500 (45%)**	50,000	**45,000 (45%)**	100,000
	Peradeniya	-	-	15,000 (30%)		30,000 (30%)	
	Kundasale & Digana	-	-	12,500 (25%)		25,000 (25%)	
	Total in Clusters			**50,000 (100%)**		**100,000 (100%)**	

Source: The JICA Team



Source: The JICA Team

Figure 8.3.2 Daytime Population Flow into City Centre and in Clusters

To relocate urban functions of the City Centre to the clusters gradually, strengthening of transport network among clusters and the City Centre is indispensable. Key factors to formulate transport network are as follows:

1) **Improvement of railway capacity and services:** In short-term, railway capacity and service are improved, such as increase in operation frequency, upgrading of railway vehicles, etc. Bus network will be restructured after KMTT is completed; and a transfer system between bus and railway will be also improved.

2) **Double tracking of railway to enhance public transport capacity:** It is promoted between Peradeniya, Kandy and Katugastota sections to operate modern and frequent services especially during commuting time. It is proposed to develop a semi-underground railway with a semi-elevated road along the west of Grid City to enhance transport capacity (this proposal is further explained in the next section).

3) **Bypass development among clusters:** To reduce through-traffic of the city centre, including B365 widening between Katugastota – Getambe, upgrading of the existing road (B311 or others) among Tennekumbra – Polgolla – Katugastota, and a new bypass road between Peradeniya – Tennekumbra, are promoted. It is noted that the new tunnel south bypass road has been proposed by the Ministry of Highways based on the Feasibility Study conducted by a Korean group, but it has been suspended in terms of

environmental and financial aspects. It is observed that the tunnel structure is one of the suitable structures to avoid negative environmental impacts such as tree-cutting, noise and air pollution.

4) **Multimodal terminal with station area development:** In case of the Kandy City Centre, Kandy Multimodal Transit Terminal (KMTT) has been constructed at Good Shed under SCDP. Since KMTT is mainly for bus transit, it is proposed to develop station plazas utilising railway lands to improve connectivity and accessibility with railway, three-wheelers and other private vehicles. In the case of cluster cities, station area development will be promoted such as a multimodal terminal which includes a railway station, a bus terminal and a P&R facility, and a commercial and residential complex. For this, the station area will be revitalised as a new urban centre of the cluster cities which are convenient to access by public transport and on foot.

5) **P&R (Park & Ride)**: To transfer from private vehicle to public transport (railway, bus) to go to the City Centre, P&R policy is promoted. Passengers may park cars at P&R parking at the station in clusters and peripheral areas and transfer to railway or bus to commute to the City Centre. P&R users can use discount parking fee and railway/ bus ticket, while car parking fees in the City Centre are expensive.

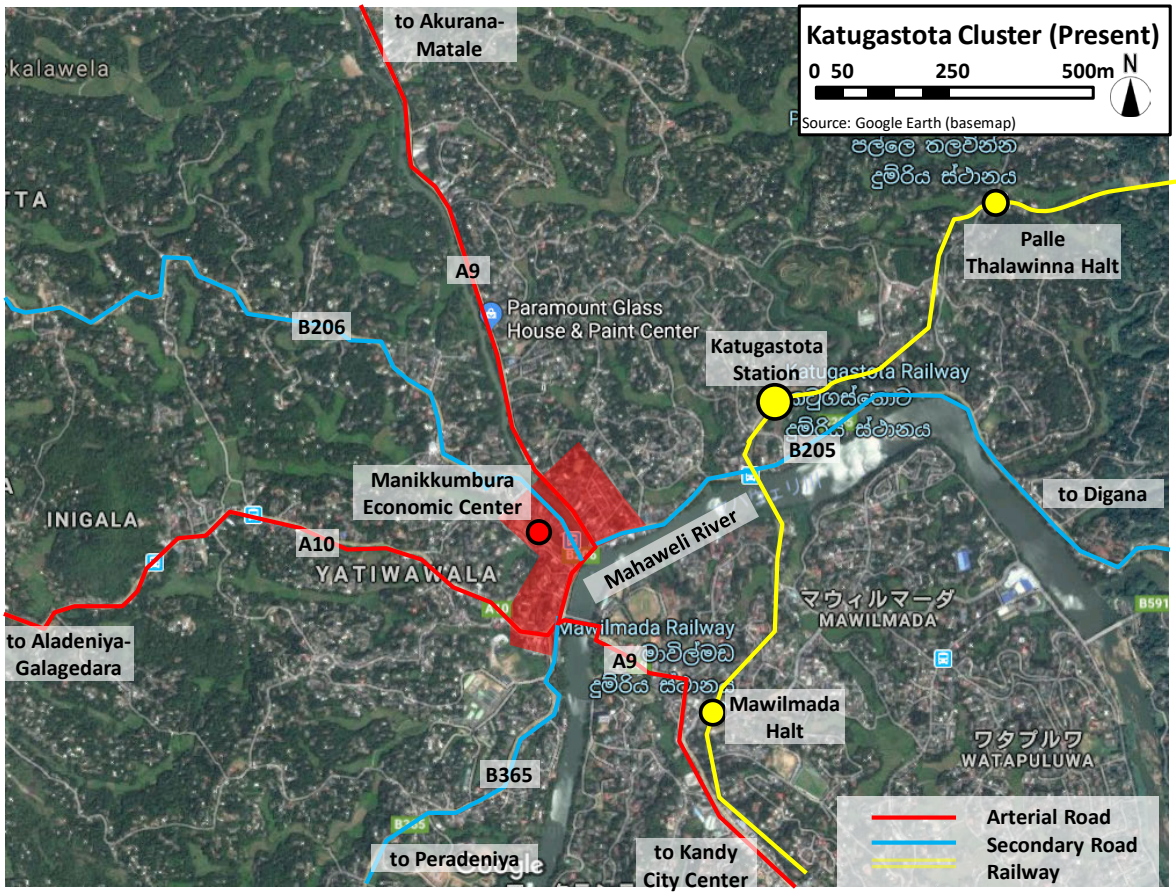
8.3.2 Orientation of Katugastota Cluster Development

(1) Present Condition

Katugastota Cluster will be a new urban commercial centre adjoining the Kandy City Centre as well as a gateway to Colombo and Digana. For this, the priority actions are to expand traffic capacity of road and rail, and to promote station area development including a commercial centre and a multimodal terminal.

At present, the road bridge crossing Mahaweli River is only A9 bridge, and most of the traffic and commercial facilities are clustered around there. Manikkumbura Economic Centre is a market of small wholesale shops where trucks and three-wheelers gather, and this causes traffic congestion around B205. Katugastota Railway Station is located behind B205, which is 1 km far from the urban centre, at T-junction of A9- B205- B365.

For this, it is necessary to promote a station area development at the east of present urban centre to distribute traffic flow, which will be increased after construction of the expressway.



Present Katugastota Transport Network

T-junction crossing A9& B205& B365 near the bridge

Manikkumbura Economic Centre

Katugastota Station

Source: The JICA Team

Figure 8.3.3 Present Condition of Katugastota Cluster

(2) Urban Functions and Economic Development

Katugastota cluster is the nearest cluster among the three clusters, just 4 km north from Kandy City Centre, and connects to Dambulla Dedicated Economic Centre along A9. Furthermore, A10 will be connected to the Central Expressway of Kurunegala, which will be a new gateway to Colombo.

For this, it is appropriate to promote commercial and distribution functions and facilities in this cluster and to relocate public facilities from the city centre. Manikkumbura Economic Centre will be rehabilitated as a new commercial centre with proper access roads. New urban facilities will be developed around the Katugastota station area.

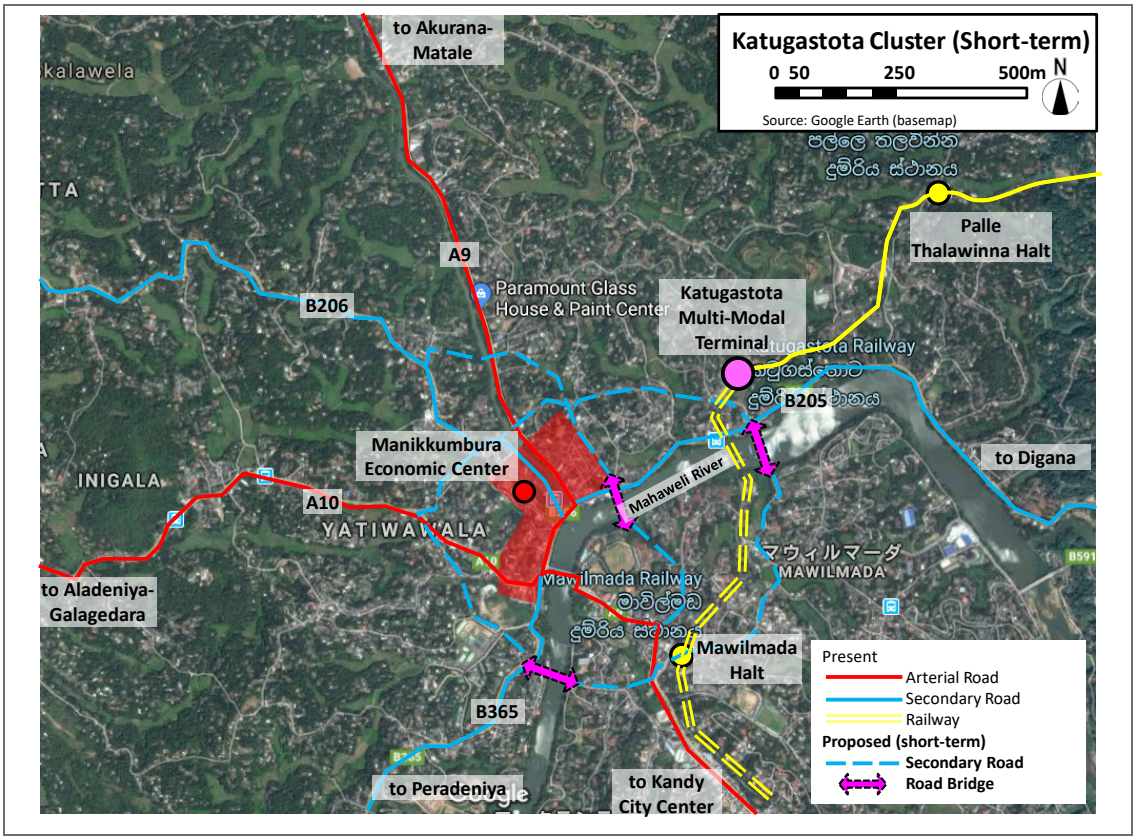
(3) Transport Network Development

In short-term, it is proposed to improve public transportation, particularly railway service (operation frequency, etc.), to shift to public transport usage from private modes. It is also recommended to develop the following transport facilities to strengthen connectivity to Kandy City Centre and accessibility around the railway station:

- Inner ring road connecting A10 – Manikkumbura Economic Centre & A9 – Katugastota Railway Station& B205 – Mawilmada Halt – B365
- Three road bridges
- Katugastota Multimodal Terminal including P&R facility

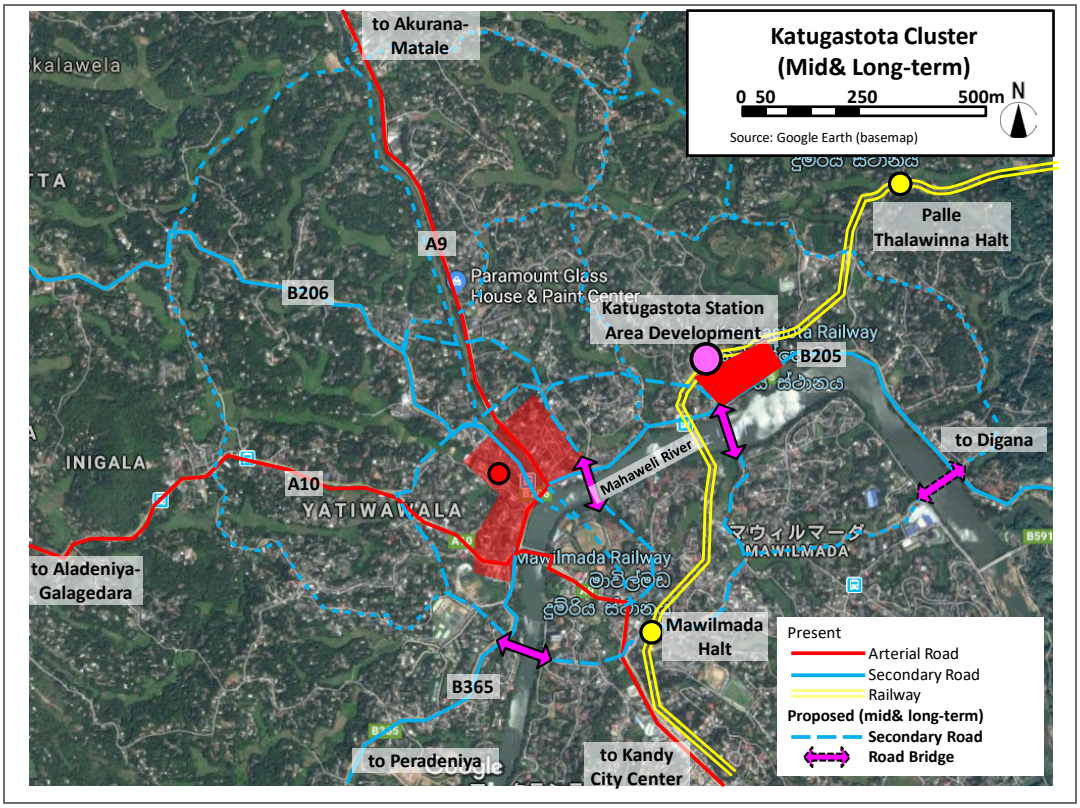
In the mid- and long-term, it is proposed to develop the following transport facilities to strengthen regional connectivity of railway and roads:

- Double track railway
- Katugastota station area development
- Outer ring roads



Source: The JICA Team

Figure 8.3.4 Katugastota Cluster Transport Network Development (Short-term)



Source: The JICA Team

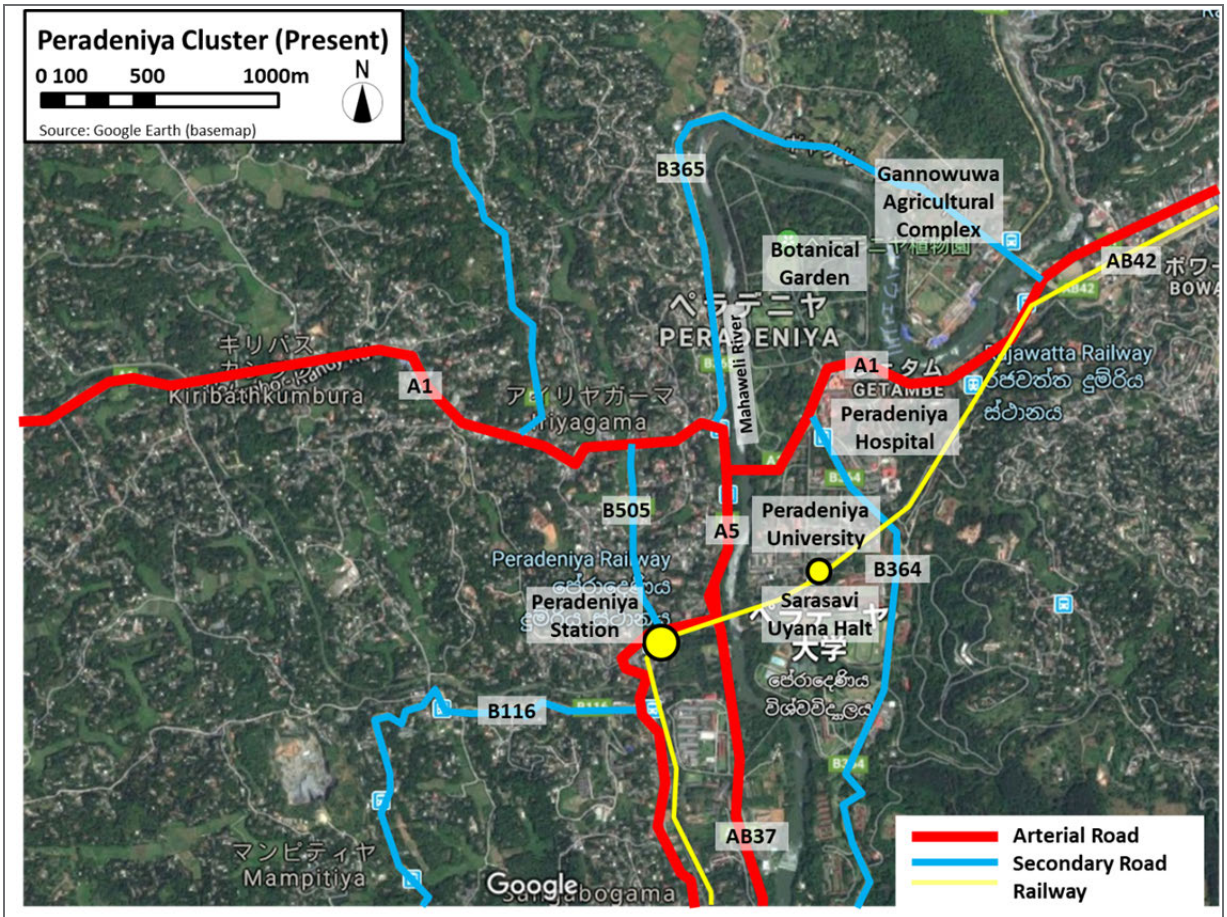
Figure 8.3.5 Katugastota Cluster Transport Network Development (Mid- and Long-term)

8.3.3 Orientation of Peradeniya Cluster Development

(1) Present Condition

Getambe and Peradeniya are considered one set of the major clusters. Peradeniya is home to Peradeniya University and the Peradeniya Botanical Gardens, which are both nationally popular, as well as the location of Peradeniya Hospital and other hospital clusters. Peradeniya has an important junction station of railways to Colombo, Badulla, and Matale. Commercial facilities are very limited only along A1 and A5. In the Getambe area, the Ministry of Agriculture and the Gannoruwa Agricultural Complex are located.

The main trunk road is only A1 connecting between Kandy City Centre to the east and Pilimathalawa, Kadugannawa to Colombo to the west. B365 along Mahaweli River is utilised as a bypass of A1, which passes through Gannoruwa Agricultural Complex. The north-south trunk road is only A5-B365. There is only one road bridge crossing Mahaweli River. Peradeniya Railway Station is 500 m south of A1, which is far from the present main traffic flow of A1.



Present Getambe- Peradeniya Transport Network

A1 crowded with buses and school traffic

T-junction of A1 – A5- B365

Paddy land in front of Peradeniya Station

Source: The JICA Team

Figure 8.3.6 Present condition of Getambe - Peradeniya Cluster

(2) Urban Functions and Economic Development

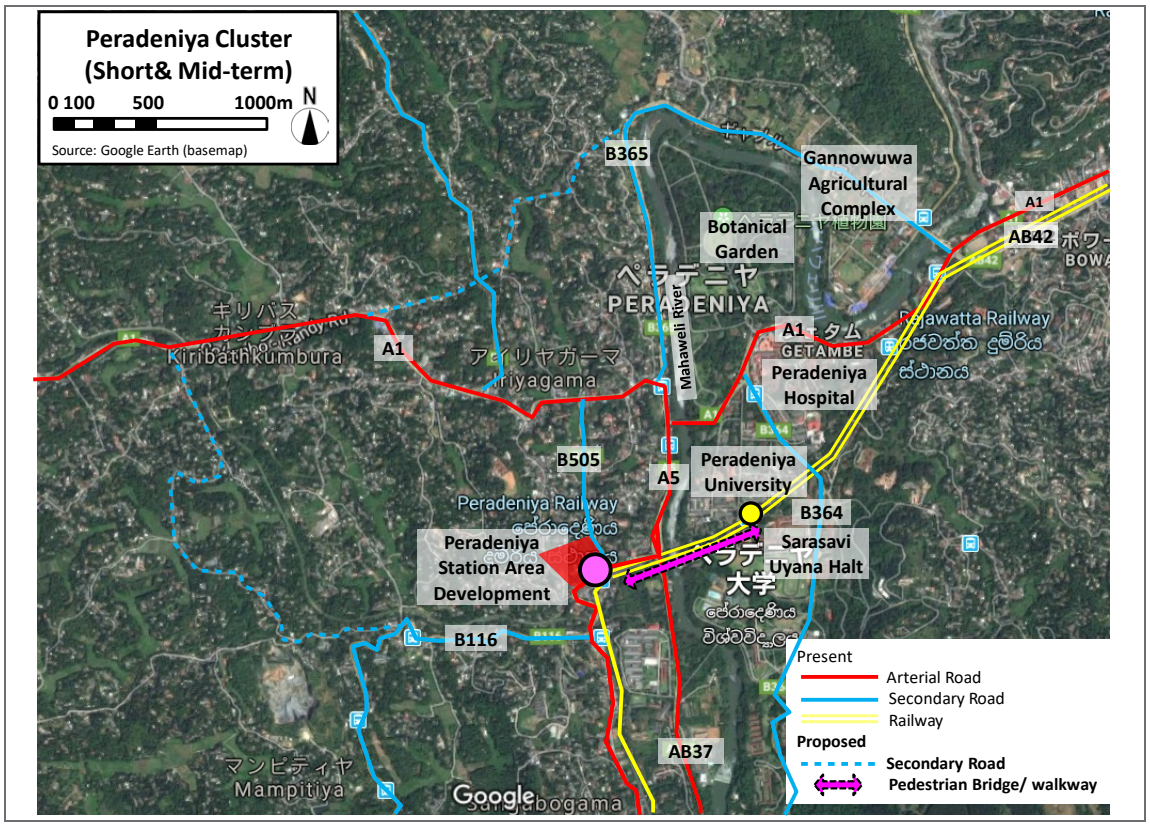
At present, the urban core does not exist where urban service and facilities are clustered. Even though there are various people gathered in the area such as students, patients, and visitors of the Botanical Garden, there are limited places to enjoy shopping or do some relaxing activities.

For this, it is necessary to promote station area development to the north of the station to create a modal shift from private vehicle along A1 to railway and bus to enter Kandy City Centre. It will also contribute towards developing distinguished urban facilities such as medical and healing centre, convention hall, etc., to promote the knowledge and technology of Peradeniya University, which is surrounded by the natural environment of Peradeniya Botanical Garden and the river.

(3) Transport Network Development

In the short- and mid-term, it is proposed to develop the following transport facilities to distribute traffic flow of A1 to other trunk roads, and improve accessibility and walkability around the railway station as well as the university area:

- Bypass roads connecting between A1- B365, A1- B116
- Road widening/improvement of A5 and B505
- Pedestrian bridge and walkway between Peradeniya Station and Sarasavi Uyana Halt
- Peradeniya Station Area Development



Source: The JICA Team

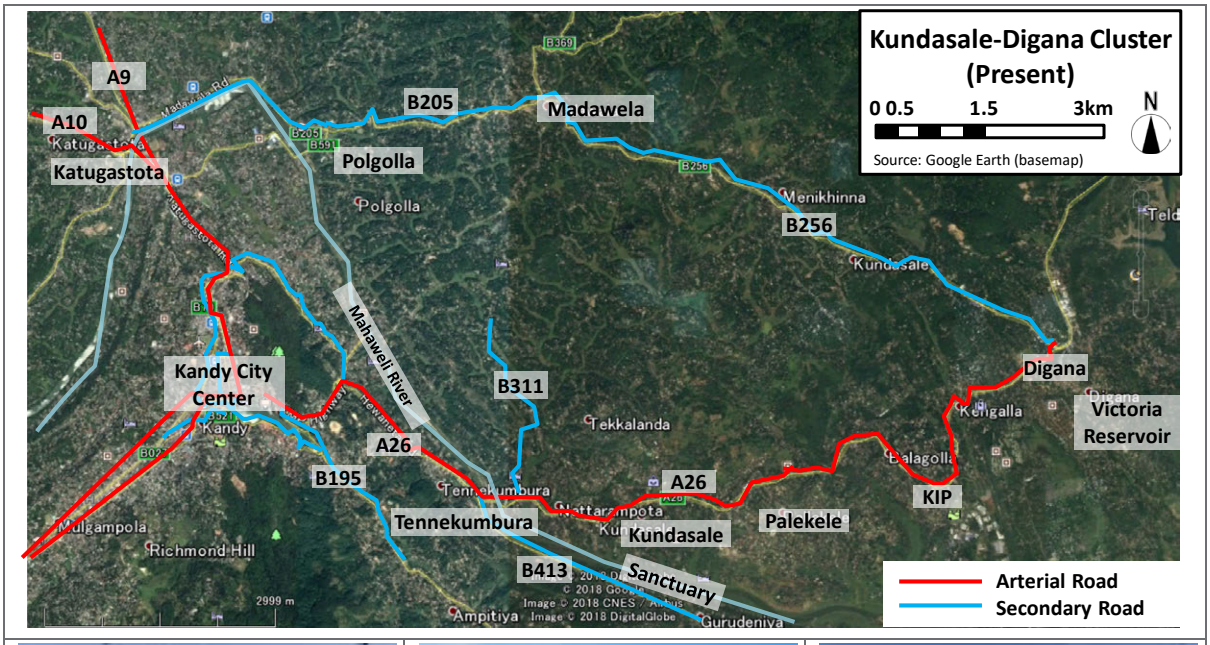
Figure 8.3.7 Getambe - Peradeniya Cluster Transport Network Development

8.3.4 Orientation of Kundasale- Digana Cluster Development

(1) Present Condition

Kundasale is one of the cluster cities where administrative functions are relocated, such as the Central Provincial Council complexes in the Pallekele area. A national school and other schools, hospitals, and military lands are also located there. Digana is a growing service centre and its population is increasing recently. Between Kundasale and Digana, the Kandy Industrial Park (KIP) and National Cricket Ground can be found.

At present, A26 and B256 are the main trunk roads connecting east and west. There are few roads connecting north and south because of the terrain. Railway is not connected, and the bus network is limited.



Tennekumbura Intersection

Mahaweli River near to Digana

B256 under widening by SCDP

Source: The JICA Team

Figure 8.3.8 Present Kundasale - Digana Cluster Condition

(2) Urban Functions and Economic Development

This cluster is a gateway to the south of the Central Province including Nuwara Eliya, other tea farms and plantations. Natural environment along Mahaweli River is protected as a sanctuary. Compared to other clusters in the north and west, this east cluster is distinguished with natural and environmental properties.

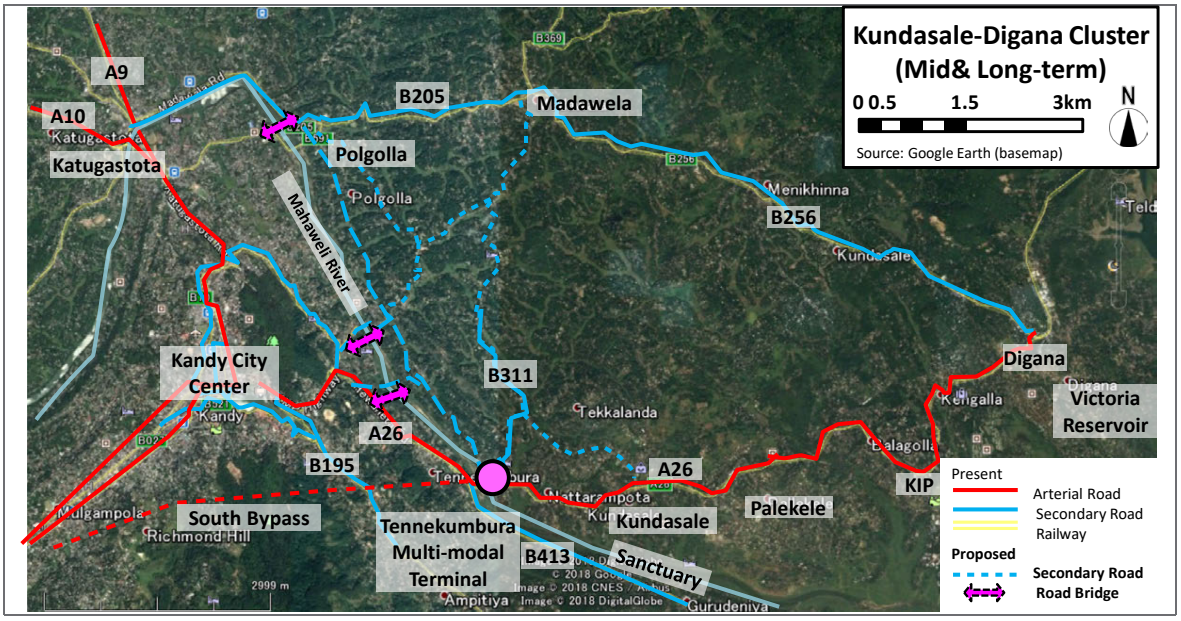
At present, provincial government facilities are clustered in Pallekele. Pallekele is one of the potential areas for the resettlement of public facilities from the City Centre, such as district-level facilities, army and police related facilities, etc. Kandy Industrial Park (KIP) will be promoted to incubate new advanced industries such as IT, R&D and health-related industries.

Furthermore, new towns and residential complex will be developed along B256 which will be convenient to access from Katugastota.

(3) Transport Network Development

In the short- and mid-term, it is proposed to develop the following transport facilities to improve accessibility to Katugastota and Kandy City Centre, as well as the connectivity between north and south:

- Tennekumbura Multimodal Terminal with P&R facility
- New road development between Tennekumbura to Polgolla and Madawala
- Road bridge development
- Road widening/improvement of B256/ B205 (ongoing by SCDP)



Source: The JICA Team

Figure 8.3.9 Kundasale - Digana Cluster Transport Network Development

8.4 Urban Structure of City Centre

8.4.1 Basic Orientation and Strategies

To reduce traffic congestion and ease concentration of urban functions in the City Centre, public facilities should be gradually transferred to cluster cities, and the City Centre will be a centre of culture and tourism, as well as qualified urban services for the Greater Kandy.

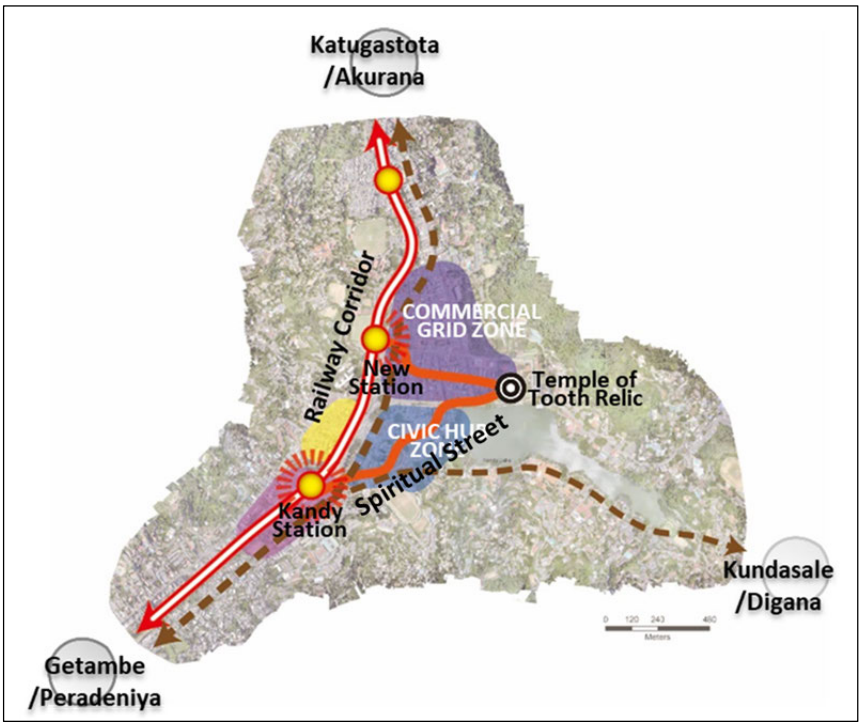
Considering those factors, the basic planning concept in the City Centre is proposed as follows:

a) Development of an urban service centre of Greater Kandy to be integrated with adjacent urban cores (the core of the centre will gradually shift to those cores, particularly Katugastota)

b) Preservation and rehabilitation of historic and cultural assets of the Heritage Area with the surrounding natural environment

c) Creation of pedestrian friendly networks and open spaces

As a result of the integration with the adjacent cluster cities, the mitigation of traffic congestion and capacity of disaster prevention, such as prevention of fire spreading, of the Heritage Area will be enhanced due to the distribution of urban functions.



Source: The JICA Team

Figure 8.4.1 Urban Structure of the City Centre

Based on the basic orientation, the following strategies are required in a comprehensive manner.

(1) **Transport improvement:** improvement of bypass roads, railway capacity enhancement, traffic management, road improvement, and so on.

(2) **Revitalization of urban functions:** relocating public facilities which need not be necessarily located in the City Centre to cluster cities, and introducing new urban functions and development of open spaces by reorganisation of public lands.

(3) **Preservation of townscape:** human-scale historic street scape focusing on the Commercial Grid Zone and vistaed view of the Lake Around Zone.

(4) **Tourism development:** tourism service and information provision, etc.

(5) **Improvement of living environment:** redevelopment of degraded residential areas, social housing and infrastructure development.

8.4.2 Transport Improvement

(1) Overall concept

There are various types of traffic coming into the city centre, such as through traffic of which the orientation is not the city centre; trucks doing distribution to the central market and for individual businesses; traffic due to school commuting; long distance buses; inner city buses; tourist buses; three-wheelers; and private vehicles of residents.

In addition to relocating public administration and wholesale facilities – which generate traffic – from the city centre to clusters, to ease the traffic congestion at the city centre, the following actions are required:

- To develop a bypass[6] to eliminate through traffic in the city centre
- To control the entry of transports with specific purposes (distribution, school, etc.)
- To enhance railway capacity (Katugastota-Kandy-Peradeniya) by double truck, improvement of railway stations and pedestrian facilities/spaces connecting to schools
- To charge higher parking fees in the city centre to guide to parking out of the centre
- To promote traffic management measures (e.g. bus rerouting, one-way system, P&R) after considerable feasibility study/pilot projects

One of the most important requirements for realising the proposed basic planning concept is to transform the Heritage Area into a pedestrian priority area through comprehensive transportation policies. The comprehensive transportation policies which are considered essential are indicated below.

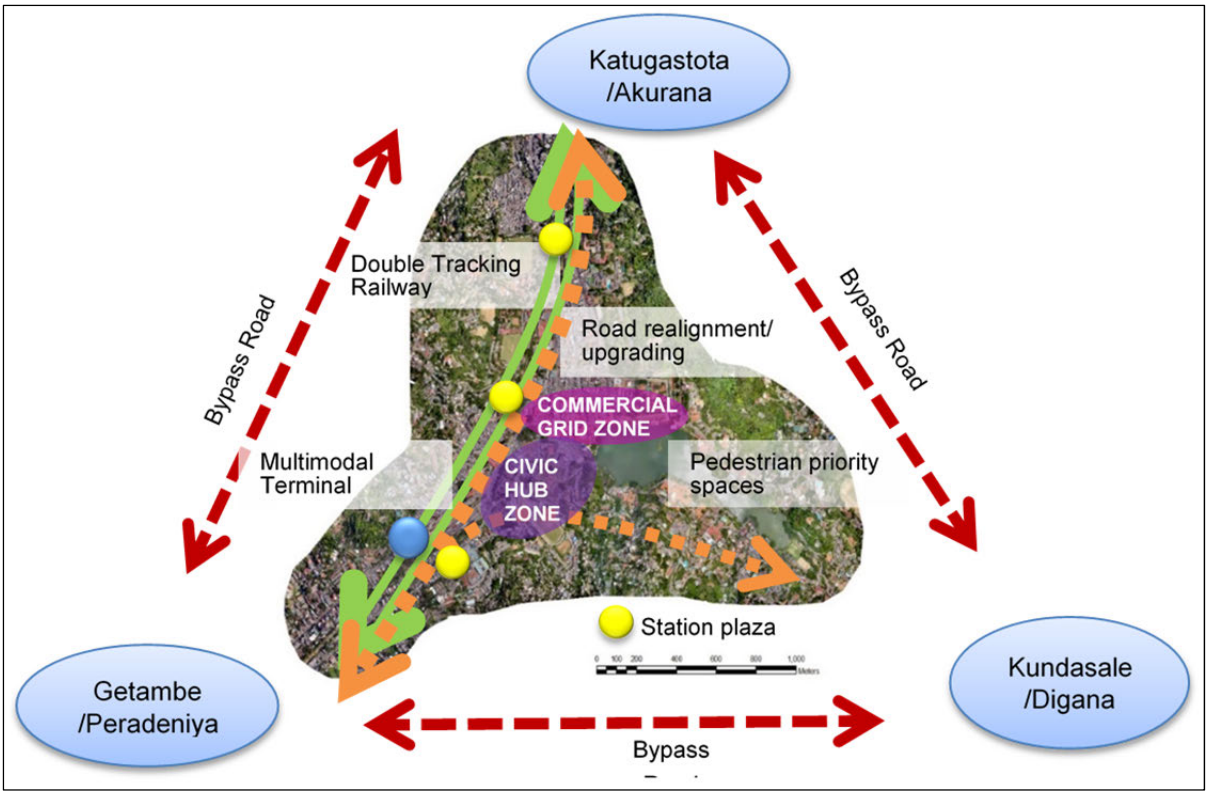
i. Public transportation services will be improved based on the TOD concept, which include double tracking of the railway (Katugastota-Kandy-Peradeniya), enhancing the efficiency of bus operation, development of a park & ride (P&R) system, development of a multimodal terminal and station plazas, promoting a school bus system, and so on.

ii. The car traffic will be reduced and the road capacity will increase with the development of bypass roads to reduce the inflow traffic/ facilitate intersection improvement, securing bus stop spaces, 3-wheeler priority lane, road realignment and upgrading, traffic management (e.g. strict speed control), and so on.

iii. Some areas of the Heritage Area in the Commercial Grid Zone and Civic Hub Zone will be designated as pedestrian priority areas to improve the walking environment.

iv. Car traffic and parking will be strictly controlled.

[6] South bypass is planned as a tunnel. It is required to assess the project impacts in terms of traffic demand, environmental impact (underground water, etc.) and financing. It is proposed not to develop an entrance connecting to Bogambara, since its purpose is to eliminate through-traffic from the city centre.



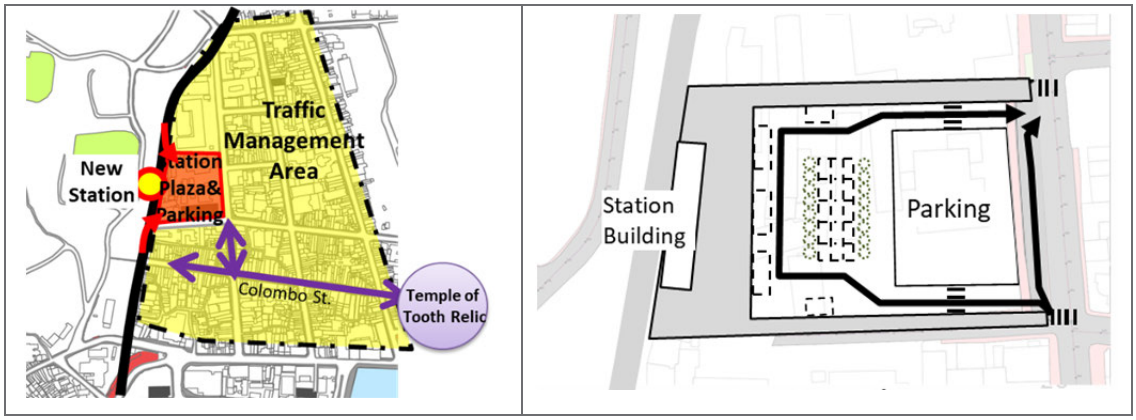
Source: The JICA Team

Figure 8.4.2 Conceptual Map of Transport Strategies

(2) New station development for railway capacity improvement

It is planned that KMTT will be constructed with bus rerouting policies, and railway capacity will be upgraded by increasing frequent operation and upgrading locomotives. To promote public transport utilisation, stations will be upgraded and newly developed, especially in the city centre.

For this, in the Sinha Regiment of Grid City, it is proposed to develop a new station, station plaza and parking, with the designation of a parking management area.



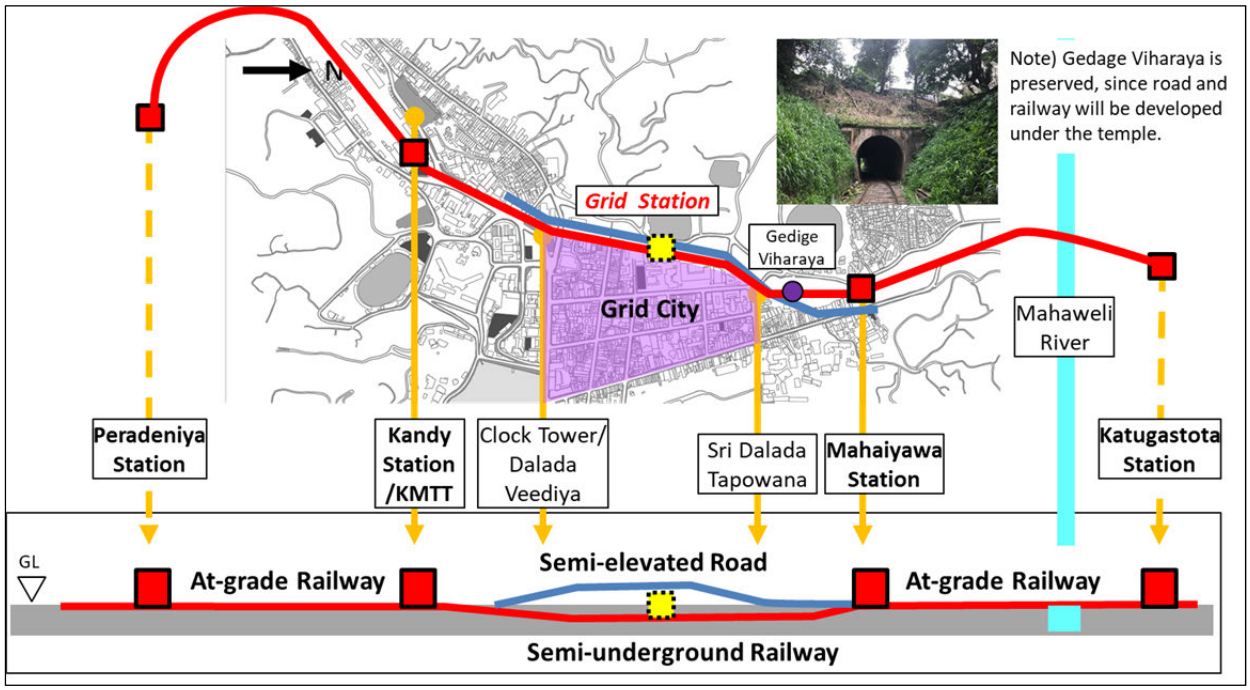
Source: The JICA Team

Figure 8.4.3 New Station and Station Plaza in Grid City

(3) Railway capacity improvement

To facilitate traffic-flow in the city centre, both rail and road capacities need to be strengthened in the west of Grid City to protect the surrounding areas of the Temple of Tooth Relic in the east.

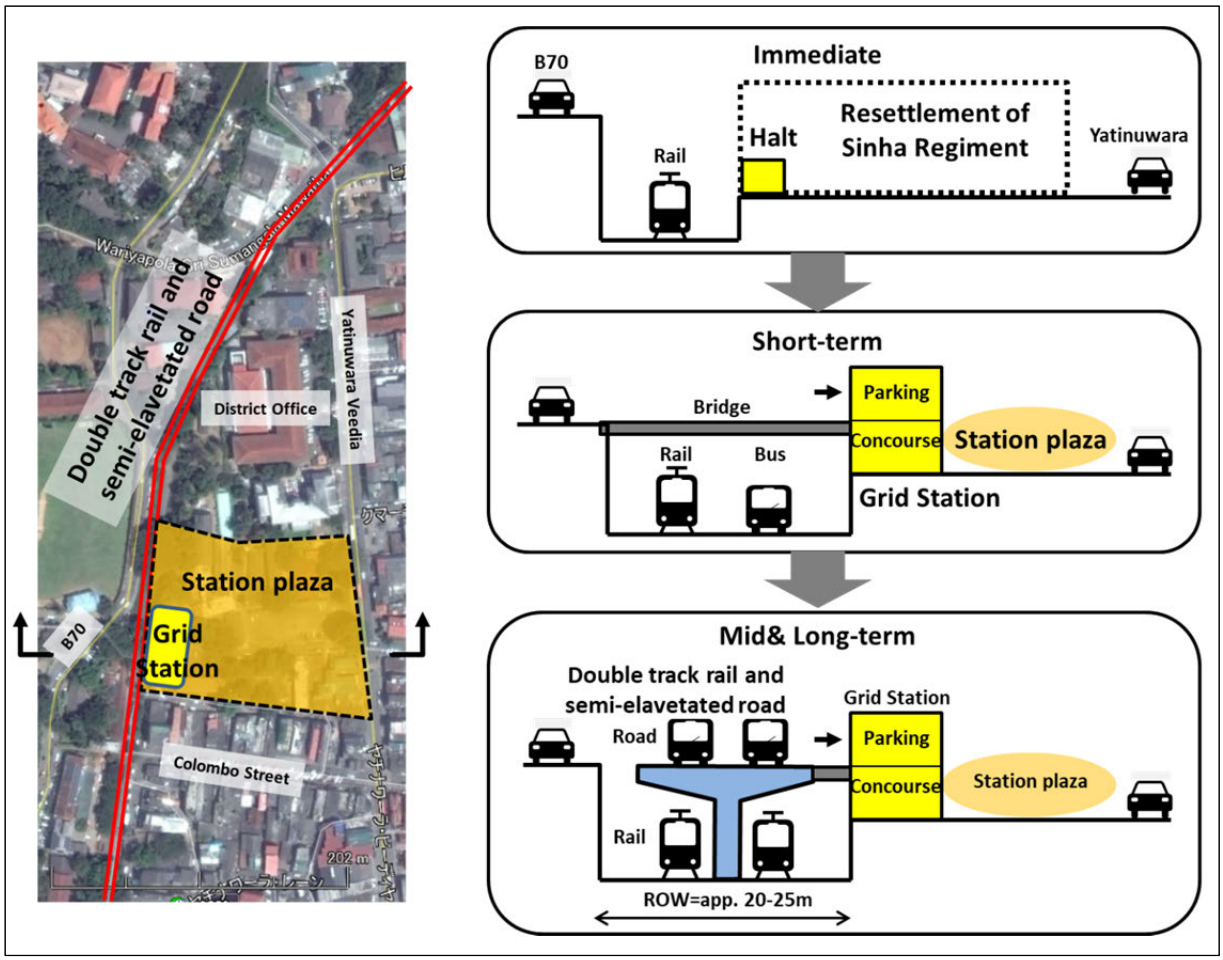
For this, it is proposed to develop a double track railway with a new road as an inner-city bypass along the west of the Grid City (see Figure 8.4.4).



Source: The JICA Team

Figure 8.4.4 Double Track Railway with a New Road along Grid City

In the immediate term, a new halt/ station will be constructed just after the resettlement of (a part of) Sinha Regiment. In the short-term, a station building will be constructed with a parking building and a station plaza, as well as a bridge to access to parking from B70 of west. In the mid- long-term, after the construction of a double track rail, a semi-elevated road will be constructed above the double track rail (see Figure 8.4.5).

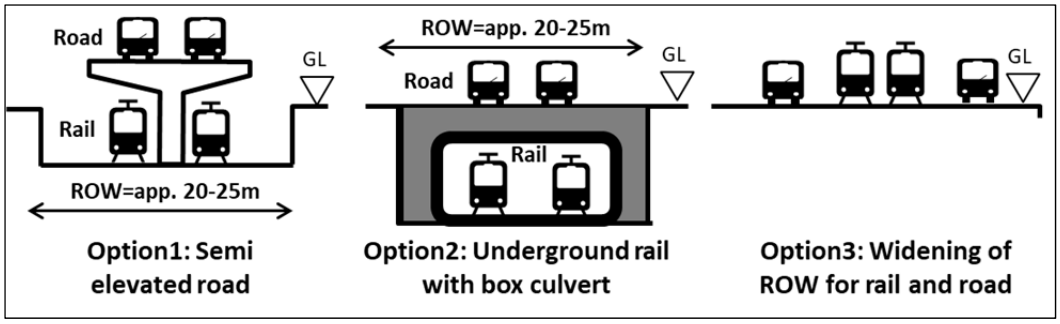


Source: The JICA Team

Figure 8.4.5 Phasing Development of Double Track Railway and Road in Grid City

It is noted there are some options for road development, including (i) semi-elevated road above the railway, (ii) underground rail with box culvert, in which a new road will be developed above it, and (iii) widening of ROW (right of way) for rail and road (see Figure 8.4.6).

It is required to justify the necessity of new road with double track rail in terms of traffic demand, socio-environmental impacts including historic and townscape viewpoints, economic and financial impacts, and consensus among stakeholders.



Source: The JICA Team

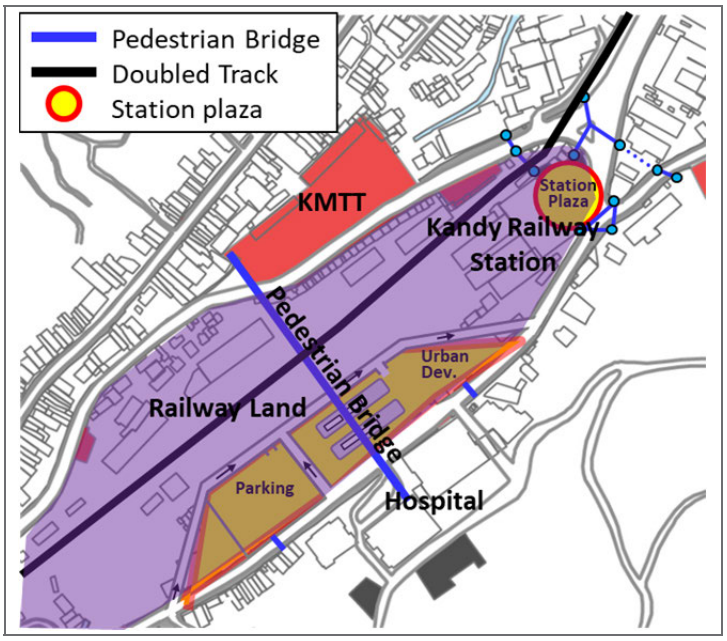
Figure 8.4.6 Options of a New Road Structure in Grid City

(4) Kandy Railway Station Area Development

Kandy Railway Station is one of the historic buildings, but it is not fully utilised and its attractiveness is not optimised because of traffic congestion on the surrounding roads and the gathering of three wheelers in front of the station building. After KMTT construction, a new pedestrian bridge will be installed connecting between KMTT and the Teaching Hospital. It is expected the traffic flow and pedestrian flow will be dynamically changed around the railway area.

It is an opportunity to convert Kandy Railway Station to be a gateway for pedestrian, while the new south gateway will be developed with bus stops, parking and commercial functions.

In the short-term, the Kandy Railway Station Plaza is utilised for transfer, pedestrian space and evacuation at emergency mainly for pedestrian. The south station plaza is utilised mainly for vehicles. In the mid- and long-term, railway land is utilised for urban development project. This area is an outskirt of the Heritage Area, so new commercial and business facilities will be newly developed, while the centre of the Heritage Area (Grid City) should be preserved.



Source: The JICA Team

Figure 8.4.7 Urban Development with Station Plaza in Kandy Railway Station Area

Source: The JICA Team

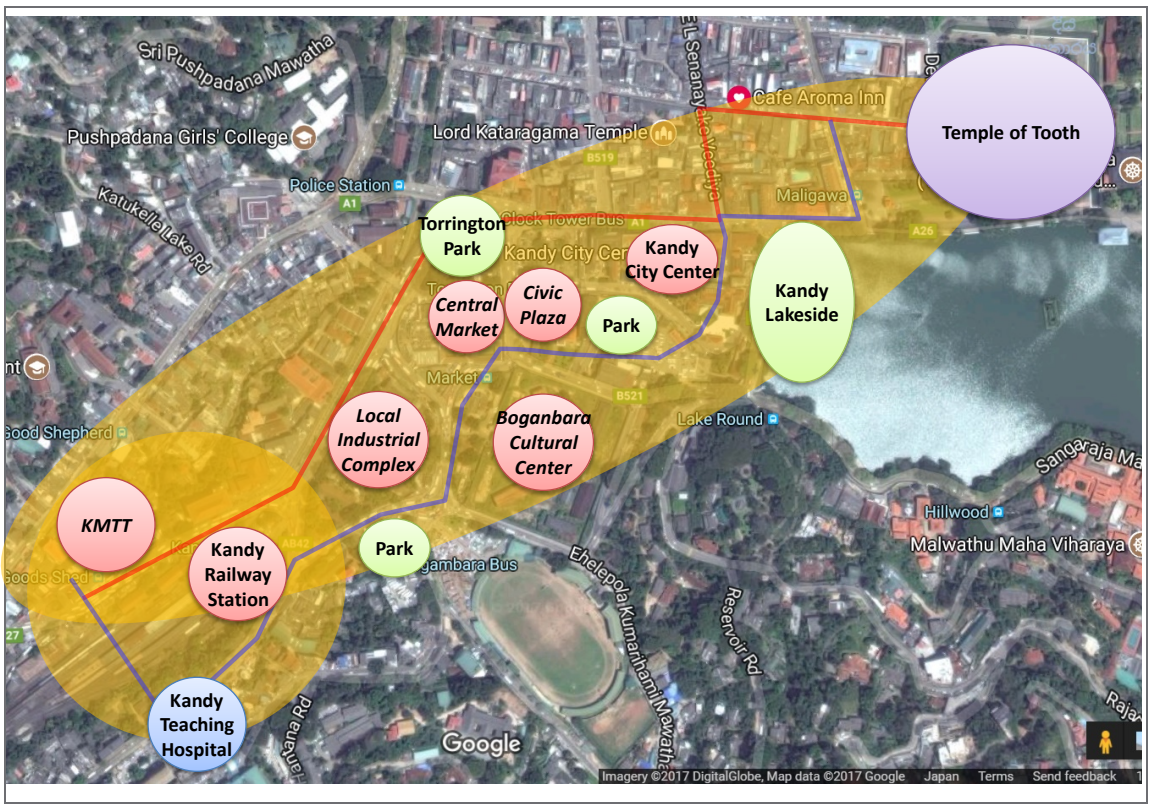
Figure 8.4.8 Image of Kandy Railway Station Pedestrian Plaza

(5) Spiritual Street with Public Facility Revitalisation

To improve and develop open and green pedestrian networks connecting the Temple of the Tooth Relic and to introduce an appropriate facility volume of new urban functions, a "Spiritual Street" will be developed. This is an integrated project of transport and urban development, and the details are as follows:

(a) Walking Environment Improvement: Sidewalk improvement and public space enhancement in the Civic Zone and Pedestrian-Oriented Zone with priority to pedestrian access

(b) Urban Restructuring of Public Facilities/ Lands: Relocation of public facilities to the clusters, preservation of heritage buildings (cf. Bogambara Prison, Police Barrack) and renovation for cultural and environmental public spaces (cf. cultural centre, local industrial promotion centre, etc.)



Source: The JICA Team

Figure 8.4.9 Location of Spiritual Street and Public Facilities

8.4.3 Restructuring of Urban Functions

At present, the land use of the City Centre is mixed and not well demarcated by functions. The Civic Hub Zone in the Heritage Area is mostly occupied by government facilities, which citizens are usually neither allowed to enter nor use often. While the values of the Heritage Area including the Grid City should be preserved, it is required to reorganise urban functions and facilities effectively as follows:

- to develop a safe and comfortable pedestrian network and open space (e.g. Kandy Multimodal Transit Terminal - Kandy Railway Station – Bogambara Prison area – Kandy Lake Around - Temple of the Tooth Relic)
- to utilise public lands/facilities for urban services and amenities (e.g. government facilities, markets, bus terminals) by relocating to other clusters/towns, or redevelopment of facilities

The criteria for relocation are: (a) functions and facilities which generate much traffic (cf. distribution, wholesale), and (b) functions and facilities at the district level (not at the city level).

The criteria for rehabilitation are: (a) facilities to be preserved as heritage, (b) functions to serve all the citizens to improve their daily lives as well as to provide tourist attractions, and (c) facilities to integrate with public facilities to diversify multiple functions.

It is noted that clusters of educational and medical facilities are among the advantages of the Kandy City Centre and add to its attractiveness to sustain its role as an urban core of Greater Kandy. Since these facilities generate traffic, schools, hospitals and clinics shall not be newly developed in the Heritage Area, while existing facilities will remain with appropriate traffic management measures. School branches, medical complex, and channelling centres will be developed in clusters to distribute students and patients from the City Centre.

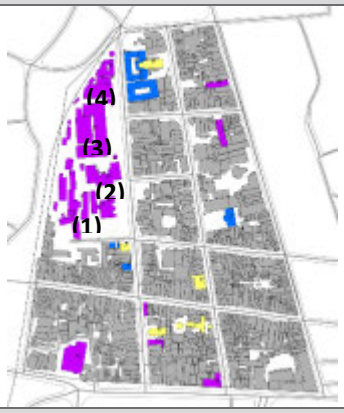
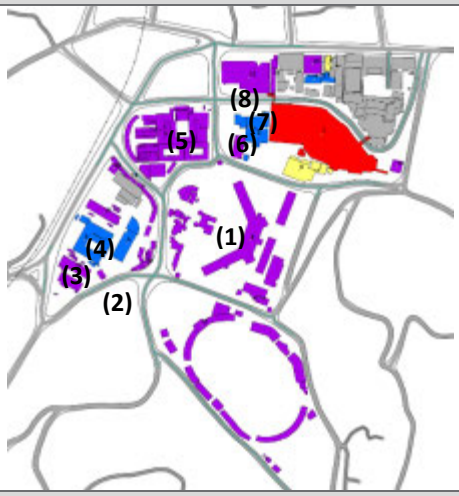
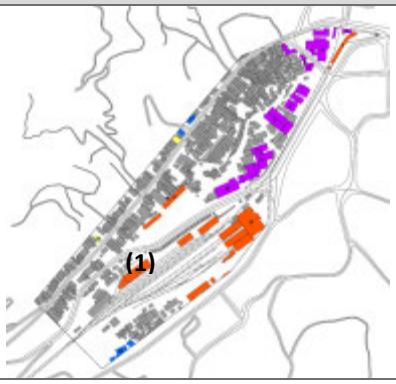
i) Grid Zone: It is planned to resettle Sinha Regiment (army facilities) and to construct a parking building by UDA and KMC. Since this block is near to the railway, after development of new station, this block will be redeveloped as a station plaza and parking space with some commercial facilities, to be a new gateway of Grid Zone.

ii) Civic Hub: The Bogambara Prison is planned to be rehabilitated as a cultural centre which will be open to the public, including tourists. For this, some public facilities at district and national level will be resettled out of the City Centre, while heritage buildings are preserved. After resettlement, these lands will be utilised to build a new complex and an open space where citizens and tourists can use and have easy to, for example:

   - A local industrial and commercial complex such as a traditional craft centre, theatre for traditional dance, local food market, park, etc.
   - A civic plaza including seminar and meeting rooms, library, one-stop centre for admin service, etc.

   These new facilities are connected by a pedestrian street with green and open spaces which will allow citizens, worshippers and tourists to enjoy walking from the station to Kandy Lake and the Temple of Tooth Relic as a Spiritual Street.

iii) Public Transit Zone: Under the KMTT construction project by SCDP, a pedestrian bridge connecting two trunk roads (S.W.R.D Bandaranayake and William Gopallawa Mawatha), a commercial building and bus stops will be developed. Furthermore, a double track railway project is proposed. For this, railway yards and facilities will be relocated out of the City Centre and these lands will be utilised for urban development. This station area in the Public Transit Zone is strategically located to promote TOD (Transit Oriented Development), including commercial and business development, pedestrian space improvement, etc.

Public Facilities in Commercial Grid Zone		●Relocation/ ◇Rehabilitation	Usage
	(1) Sinhe Regiment Office	●	Station plaza/ parking
	(2) National Housing Development Authority	●	
	(3) Kandy District Secretariat Office	●	
	(4) District Labour Secretariat Office	●	
Public Facilities in Civic Hub Zone		**●Relocation/ ◇Rehabilitation**	**Usage**
	(1) Bogambara Prison	◇	Cultural centre
	(2) Bus Parking	●	Open space/ park
	(3) Police Quarters	●	Local industrial& commercial complex
	(4) Education Office Kandy Division	●	
	(5) Central Market	◇	Modern market
	(6) Fire Brigade	◇	Civic plaza
	(7) D.S. Senanayake Memorial Public Library	◇	
	(8) Torrington Bus Terminal	●	Pedestrian priority road
Public Facilities in Public Transit Zone		**●Relocation/ ◇Rehabilitation**	**Usage**
	(1) Kandy Railway Station and railway yard	◇	Commercial and business complex

Source: The JICA Team

Figure 8.4.10 Relocation and Rehabilitation of Public Facilities

8.4.4 Preservation of Townscape

While it is needless to say that the Heritage Area must be preserved, it is necessary to identify why and how it should be preserved, not only the heritage buildings and the historic townscape, but also the precious places for residents, its natural landscape and intangible values.

An attractive townscape is made based on a common understanding / consensus among stakeholders including building owners, citizens as well as tourists. Regulations and incentives will be applied to guide stakeholders to preserve the townscape for the next generation.

Once an attractive townscape is revitalised, local communities will pay more attention to the historic values of the city, the citizens will be able to enjoy walking around, and visitors and tourists will have opportunities to enjoy shopping and eating. For this, townscape preservation will contribute not only to the preservation of values itself, but also to the generation of socio-economic opportunities for the city.

Source: The JICA Team

Figure 8.4.11 Image of Historic Townscape

8.4.5 Tourism Development

To attract both national and international tourists for socio-economic development and cultural preservation, the city centre should be revitalised as follows:

- to improve tourism facilities and services, such as the creation of tourism information centres and materials, hiring of qualified tourist guides, provision of tourist bus management, etc.
- to identify properties with cultural and historic values of Greater Kandy and promote them in the City Centre
- to rehabilitate heritage buildings for various usages (cf. tourism information centre, café, shop, etc.)
- to develop tourism network including Nuwara Eliya, other world heritage sites
- to enhance night attractions

8.4.6 Improvement of Living Environment

Not only the heritage buildings, but also ordinal buildings have degraded, and the environmental situation related to water, sanitation, solid waste management, etc. has worsened. To sustain the City Centre as the active urban core for residents as well as visitors, improvement of the living environment is indispensable, particularly as follows:

- to redevelop degraded residential areas such as Mahaiyawa and Meda Ela including social housing, access road, infrastructure, etc. (by applying TOD concept in line with railway development)

- to improve pedestrian environment especially around urban facilities (e.g. station, bus terminal, hospital, market) by installing pedestrian crossing, pavements, underground passes, pedestrian bridges, etc.
- to upgrade urban infrastructure (e.g. drainage, sewerage, solid waste, etc.) and urban facilities such as public toilets

PART 3: DETAIL PLAN OF THE HERITAGE AREA

CHAPTER 9 REVIEW OF THE ORGANISATION, LEGAL BASIS AND FINANCIAL MECHANISMS FOR THE HERITAGE AREA

9.1 Organisation and Role Sharing

9.1.1 Authorities Responsible for Urban Development

The main authorities responsible for urban development in the Heritage Area are the Urban Development Authority (UDA) and Kandy Municipal Council (KMC). UDA was established under the Urban Development Authority Law No. 41 of 1978 (Amended multiple times) to promote integrated planning and implementation of the economic, social and physical development of the Urban Development Area in the form of a Gazette. The role of UDA is to formulate, implement, invest in, and regulate the development programmes and projects in the Urban Development Area. KMC is a locally elected body constituted by legislation, namely the Municipal Councils Ordinance (1947), Urban Councils Ordinance (1939) and Pradeshiya Sabhas Act (No.15 of 1987). The powers and functions of KMC include regulatory and administrative functions, promoting public health and sanitation, environmental sanitation, and improving public thoroughfares and public utility services. The role sharing of issuing building permit between the UDA Central Provincial Office and KMC will be indicated in the subsequent section.

9.1.2 Authorities Responsible for Heritage Conservation

In addition to the aforesaid UDA Central Provincial Office, there are three other administrative agencies involved in historical building conservation in Kandy: Department of Archaeology (DOA), Central Cultural Fund (CCF) and KMC. Since KMC had been designated as the agency responsible for building authorisation before February 2017, the situation is considered fluid for the time being. Hence, KMC is included in the comparative table below.

Table 9.1.1 Authorities Responsible for Heritage Conservation in Kandy

Agency	Urban Development Authority (UDA)	Kandy Municipal Council (KMC)	Department of Archaeology (DOA)	Central Cultural Fund (CCF)
Competent Ministry	Ministry of Megapolis & Western Development	Ministry of Provincial Councils & Local Government	Ministry of Education	Ministry of Education
Resource related to conservation	Nothing special	Nothing special	Admission fee from temples managed by DOA	Admission fee from historic monuments managed by CCF
Role for conservation	Providing development and building permit	(Currently none)	Designation, management and rehabilitation of cultural assets	Rehabilitation, management of and research on cultural assets
Authority for designation of conserved buildings	○*1	×	○	×
Legal basis	UDA Law	N/A	Antiquities Ordinance (AO)*2	N/A
Authority for providing permit for rehabilitation of listed buildings and monuments	○	×	○	×
Authority for controlling and enforcing punishment	○	×	○	×
Research on historic buildings and monuments	×	×	○	○
Management of historic buildings and monuments	×	×	○	△*3
Rehabilitation of historic buildings and monuments	△*4	×	○*5	○*6
Providing incentives for conservation	×	×	×	×

*1: In the Development Plan based on the UDA Law, the regulation for building conservation can be stipulated. Under this regulation, the historic buildings constructed within 100 years, which cannot be covered by the Antiquities Ordinance, are designated using a gazette. However, this operation has been done only in Kandy.

*2: The buildings constructed more than 100 years after their completion were designated as historic buildings, which are public and private properties with archaeological or architectural value.

*3: The management and selling of tickets to the historic monuments are investigated and rehabilitated by the Cultural Triangle Project.

*4: There are several cases in which UDA's own historic buildings are rehabilitated on the premise of utilising as a commercial building such as the Dutch Hospital Shopping Centre in Colombo.

*5: Historic buildings, which are mainly temples and monuments with high priority, are rehabilitated by utilising the annual budget.

*6: Every year, CCF applies for budget by deciding on the target building projects (mainly temples) or monuments for rehabilitation. In the past, there have been only two cases where private-owned buildings were rehabilitated in Kandy.

Source: The JICA Team

Among the four institutions mentioned above, DOA and CCF have common roles and functions related to the preservation of historical buildings. For comparison purposes, their detailed roles and authorities are shown in the figure below.

As for the designation of historic buildings in Kandy, the UDA Central Provincial Office and DOA have distinct designations. UDA Central Provincial Office designated 488 buildings, while DOA designated about 160 buildings, all of which are included in the UDA-listed buildings.

Table 9.1.2 Detailed Roles and Authorities of DOA and CCF

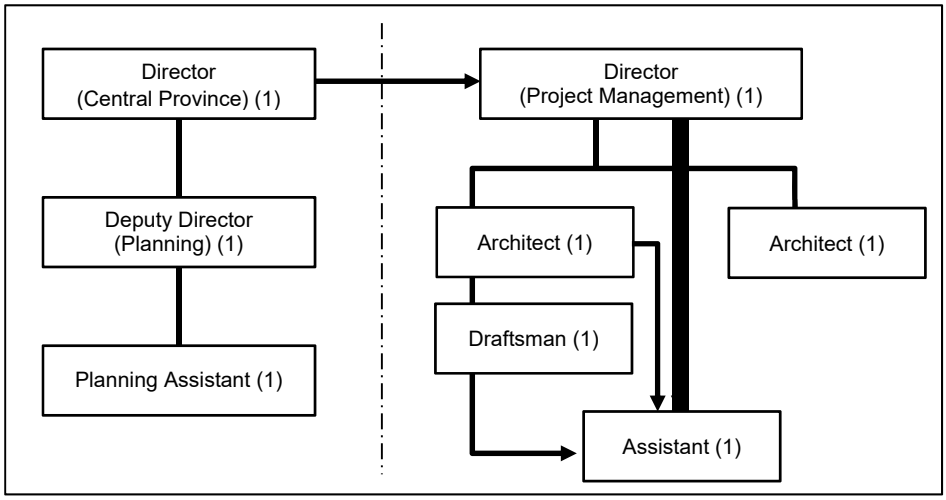
	Department of Archaeology (DOA)	Central Cultural Fund (CCF)
Competent Ministry	Ministry of Education	Ministry of Education
Year of Establishment	1890	1980
Origin of the Organisation (background information)	Established under the British Colonial Government based on similar architectural surveys conducted in India. The Colonial Government ordered to conduct similar surveys in Ceylon (Sri Lanka). Originally, the surveys focused mostly on the Buddhism-related archaeological sites.	Sri Lankan government requested UNESCO for technical and financial assistance to maintain and rehabilitate the major Buddhism-related archaeological sites which were in danger. CCF was established as an organisation to receive funding from UNESCO, the Sri Lankan Government and other international donors. CCF is the main organisation responsible for the implementation of the Cultural Triangle Project (CTP: A triangle area which connects the Anuradhapura, Polonnaruwa and Kandy at each apex) and was engaged in the research of cultural resources, archaeological excavations and conservation)
Ability to designate the archaeological sites and monuments (including buildings)	○	×
Ability to regulate the changes to the designated archaeological sites and monuments	○	×
Ability to punish violations	○	×
To conduct surveys on archaeological sites and monuments	○	○
Management of archaeological sites and monuments	○	△ (Only manages the archaeological sites which were surveyed and conserved under CTP and gains profits from ticket sales of these sites))
Conservation of archaeological sites and monuments	○	○
Notes		• The amount of funding CCF collected for CTP was USD52 million from UNESCO and USD 35million from the Sri Lankan government • Entrance ticket sales (particularly the ones for foreigners which are set higher than the locals) of major archaeological sites which are managed by CCF, such as Sigiriya, are the major sources of income for CCF, even after the completion of CTP. (However, this does not apply to the Temple of the Tooth, as all the tickets sales go to the temple and cannot be used for any CCF activities.)

Sources: JICA Team's interviews with relevant authorities
Stubbs and Thomson (2017), "Architectural Conservation in Asia: National experiences and practice"
Website of the Department of Archaeology, Sri Lanka: http://www.archaeology.gov.lk/
Website of Central Cultural Fund: http://www.ccf.gov.lk/

9.1.3 Organisations and Personnel Involved in Heritage Conservation of Four Institutions

The organisations and staff involved in historic building conservation in the relevant four institutions are shown below:

(1) UDA Central Provincial Office



( ): Number of staff (as of May 2018)
Source: The JICA Team based on information from UDA Central Provincial Office

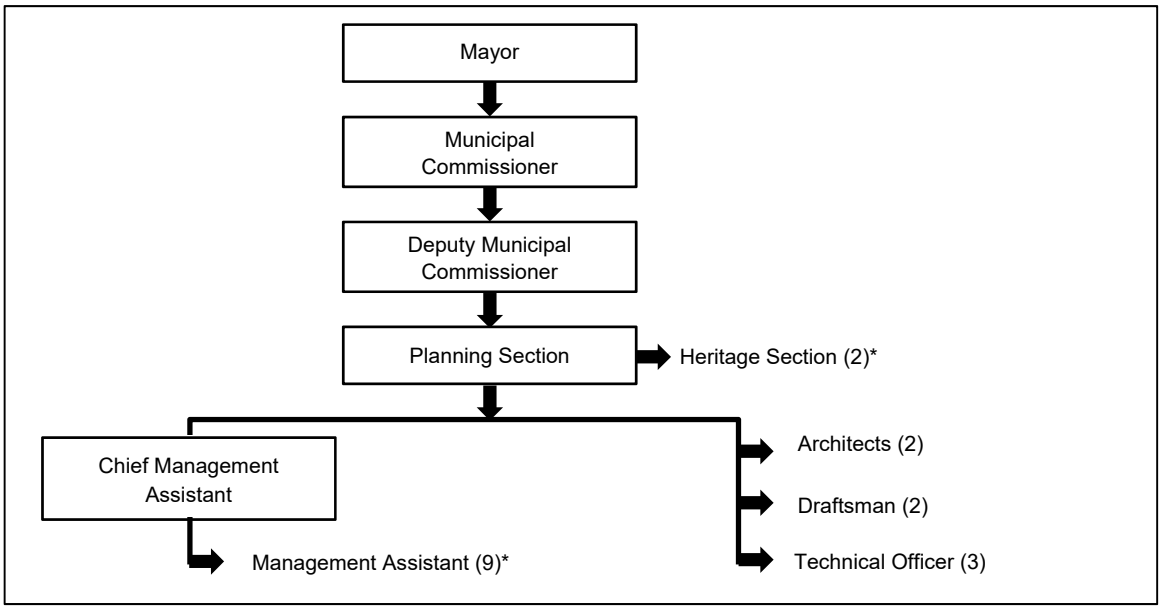
Figure 9.1.1 Organisation and Personnel for Heritage Conservation in UDA Central Provincial Office

In the UDA Central Provincial Office, a total of eight staff are engaged in historic building conservation, which include two director level managers, three urban planning experts and four architecture field experts (see Figure 9.1.1). However, this staffs is ordinarily conducting urban planning and architectural-related works as their major tasks, and conservation-related works are regarded as a concurrent service. There is no personnel who specialises in conservation-related works.

(2) KMC

In KMC, there is a planning section under the Deputy Municipal Commissioner, in which a total of 21 staff – including four architecture field experts and three civil engineers – are engaged mainly in urban planning and building permit-related tasks (see Figure 9.1.2). Some of them are concurrently working on heritage conservation tasks. As in the case of the UDA Central Provincial Office, there is no personnel who specialises in conservation-related works.

Specifically, two development officers under the Chief Management Assistant concurrently serve as secretariat members of Kandy Heritage Committee (KHC) to be described later. A total of three staff from this section are participating in the technical advisory section of KHC, including the Deputy Municipal Commissioner responsible for this planning section and two architects.



( ): Number of staff (as of May 2018)

*: The staff in the Heritage Section are concurrently serving as Management Assistants.

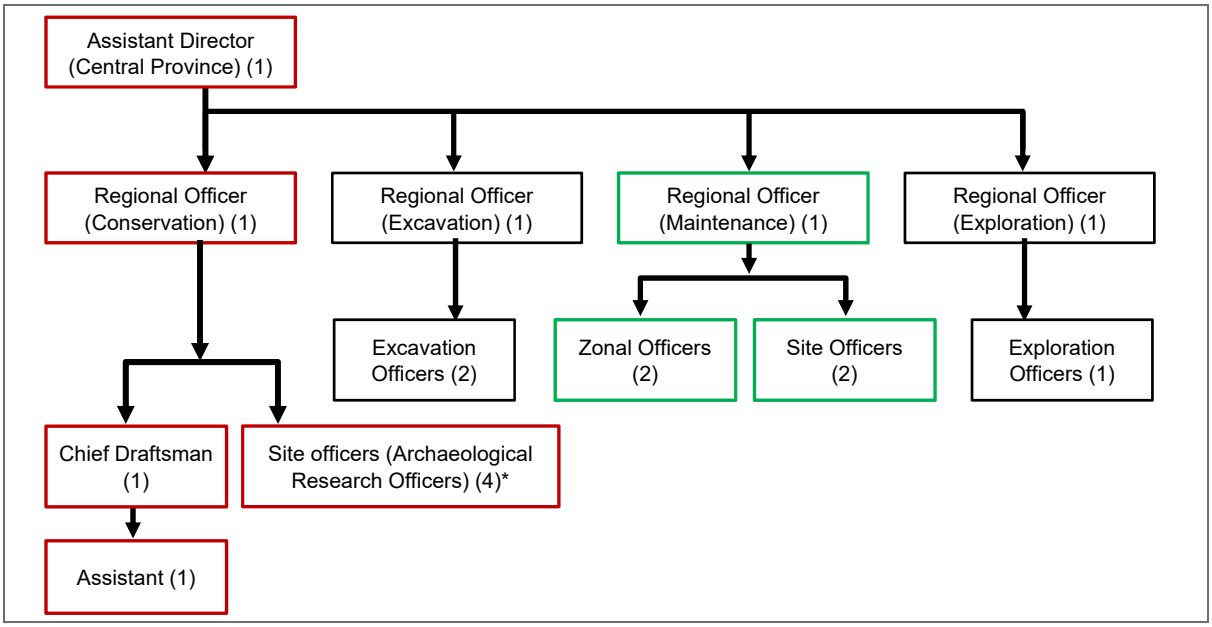
Source: The JICA Team based on information from KMC

Figure 9.1.2 Organisation and Personnel for Heritage Conservation in KMC

(3) DOA Central Province

In DOA Central Province, the staff involved in historic building conservation are in the section of Regional Officer (Conservation) shown in Figure 9.1.3. A total of six staff including Assistant Director (Central Province) are engaged in the building conservation tasks, and their speciality is archaeology. Main historic buildings dealt with by this group of DOA are temple architectures, although most of the listed conserved buildings are private-owned shop houses. According to the interview with a DOA Central Province staff, within eight rehabilitation projects in the fiscal year of 2018, besides the rehabilitation projects of Queen's Bath (historic building located in the next of Temple of Tooth) and one old residential building called "Walauwa" six projects are for temples.

The task of the staff in the Regional Officer (Maintenance) section includes exposure of illegal constructions in Kandy (reporting and charging) in addition to maintaining and managing tasks, which can be said to be a conservation activity in a broad sense.



*: Within the four site officers, two are in charge of Kandy, and the other two are in charge of Matale and Nuwara Eliya.

( ): Number of staff (as of May 2018)

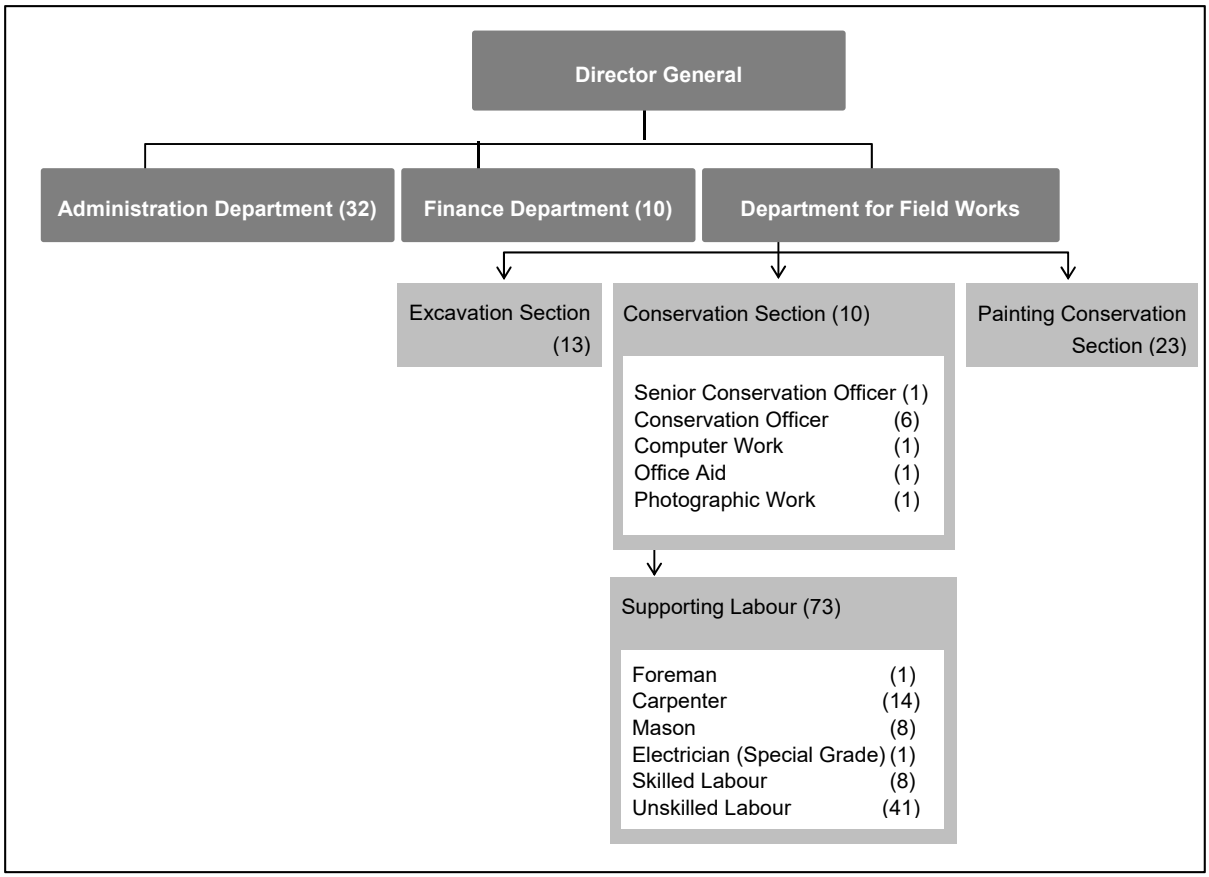
Source: The JICA Team based on information from DOA Central Province

Figure 9.1.3 Organisation and Personnel for Heritage Conservation in DOA Central Province

(4) CCF Kandy

CCF Kandy has a total of ten staff under the Historic Building Conservation Section, including seven experts in the conservation field, such as conservation officers who are supervising building rehabilitation projects. Under this section, there are 32 skilled workers and 41 unskilled workers including foremen, carpenters and masons (see Figure 9.1.4).

As in the case of DOA, most of the historic buildings targeted by CCF are temple architectures. In general, CCF Kandy does not deal with private-owned shophouses listed as conservation buildings in Kandy, with the exception of rehabilitation activities in the past, such as those for Giragama Walauwa and Salvation Army Church in Commercial Grid in Kandy. According to an interview with a CCF Kandy staff, within a proposed budget for the projects in the fiscal year of 2018, only a small portion is allocated for the listed conserved buildings in Kandy, most of which are private-owned shophouses.



( ): Number of staff (as of May 2018)

Source: The JICA Team based on information from CCF Kandy

Figure 9.1.4 Organisation and Personnel for Heritage Conservation in CCF Kandy

(5) Issues of the Four Organisations in Relation to Historic Building Conservation

Since there is no staff dedicated exclusively to the historic building conservation activity in the UDA Central Provincial Office and KMC, it is difficult for them to conduct sufficient conservation activities. In particular, as described in the subsequent section, the UDA Central Provincial Office has taken over the main authority from KMC to issue building permits since February 2017, which makes it difficult for the staff of the UDA Central Provincial Office to contribute to such conservation activity.

DOA and CCF have a group of staff who conduct historic building conservation activities, including conservation experts such as conservation officers and archaeological research officers. These experts are very useful personnel to promote historic building conservation in Kandy. However, most of the projects currently being implemented by DOA and CCF are mainly rehabilitation activities for temple architectures, although majority of the listed conservation buildings in Kandy are private-owned shophouses.

9.2 Legal Basis of Development and Conservation, and Procedure for Obtaining Planning and Building Permit

9.2.1 Legal Basis of Development and Obtaining Building Permit

(1) Urban Development Authority (UDA) Planning and Building Regulations

Development of lands and buildings in a declared Urban Development Area shall be regulated by the Urban Development Authority Planning and Building Regulations (Gazette: 1986.03.10), as per Section 8J of the Urban Development Authority (Amendment) Act No.4 of 1982. The regulations stipulate various items to be regulated as shown in Table 9.2.1

Table 9.2.1 Items of the UDA Planning and Building Regulations

Art. No.	Contents
1, 2	Regulations
3 - 7	Submission of Plans
8, 9	Building Categories
10	Preliminary Planning Clearance and Approval of Plans
11	Appeals Against Refusal
12	Development to be in Conformity with the Permit
13	Suitability of Site
14	Use of Site
15	Floor Area Ratio
16	Access
17	Specification as to Lots
18	Height of Buildings
19	Street Lines and Building Lines
20 - 23	Subdivision of Land
24	Layout for Flats and Housing Units
25 - 30	Open Spaces Around Buildings
31	Parking
32	Splaying of Corners of Streets
33	Architectural Control
34	Conservation of Places of Historical, or Architectural Interest of Landscape Value
35	Landscape and Tree Preservation
36	Advertisement Control
37	Airport and Other Zones
38	Clearance from Electric Lines
39 - 43	Part (IV) Building Regulations
44	Staircases
45 - 53	Lighting and Ventilation
54	Mechanical Ventilation and Air Conditioning
55 - 57	Foundations
58	Lifts
59, 60	Water Supply and Sewerage
61	Drainage
62	Waste Disposal
63	Electrical and Plumbing Work
64 - 66	Fire Safety
67, 68	Certificate of Conformity
69	Unsafe Buildings
70	Definitions

Source: Urban Development Authority Planning and Building Regulations, 1986 (Gazette: 32/9-1986, 1986.03.01)

(2) Approval of Development Plan

For approval of the development plan, (1) a Blocking-Out Plan (BOP) and (2) a building plan must both be approved by the Planning Committee, as per the formal procedures regulated by the UDA Law under the UDA Planning and Building Regulations (1986).

1) Planning Committee

For the purposes of advising the Authority on all matters pertaining to the preparation, implementation and enforcement of a development plan, a Planning Committee shall be appointed. The Planning Committee of Local Authority (LA) is constituted of the members shown in the table below.

Table 9.2.2 Members of the Planning Committee of Local Authority

Position	Appointed member
Chairman	Mayor (MC), Secretary (UC), or Secretary (PS)
Members	• Technical officer, engineer, works superintendent, building clerk • Town planner from the UDA, and • Other members the Chairman requests to be members such as officers of RDA, CEA, NBRO, NWSDB, etc.

Source: Practice manual for Planning Committee Officers

At present, there are no Mayors in the Local Authorities in Sri Lanka; therefore, the Municipal Commissioner will act as Chairman of the PC.

2) Preliminary Planning Clearance (PPC)

For a smooth approval procedure, a Preliminary Planning Clearance (PPC) is required for the following matters prior to the Planning Approval.

- All housing developments over 5,000 sq.ft.
- Non- residential developments over 4,000 sq.ft
- All land blocking out over five (5) numbers and above.
- All building constructions over four [04 (ground flr + 3)] floors or over 15 m height.
- All hotels, guest houses, rest houses and lodges, bedroom capacity of six (6) people and over
- Telecommunication towers
- Warehouses
- Manufacturing industries and service industries
- Special projects (mini hydro, high-tension electric line, mining, highways, etc.)
- Filling of paddy lands or lowlands
- If a land plot size is less than 150 square metres for any reason
- A land plot is given to any government agency by the Divisional Secretariat or any other government agency
- All other necessary developments determined by the LA Planning Committee.

3) Blocking-Out Plan Approval

In general, a blocking-out plan approval includes the following: (1) lot size according to the land slope; (2) prior clearance from related agencies; (3) land sub-division approval; and (4) common space.

4) Lot Size and Slope

As shown in Table 9.2.3, lot sizes of the development are regulated depending on the degree of the slope. Any developments on land over 45 degree slope are prohibited.

Table 9.2.3 Slope and Lot Size

Slope (Degree)	Minimum Lot Size (sq.m.)	Minimum Width of Lots (metre)
0° - 10°	150	6
11°-12°	180	6
13°- 14°	200	6
15°- 17°	250	8
18°-20°	300	8
21°-23°	370	8
24°- 27°	450	12
28°- 30°	500	12
31°-45°	760	20
Over45°	No development allowed	

Note: Land developments blocking out minimum size should not be less than 250 sq.m.
Source: Practice manual for Planning Committee Officers

5) Approval from Related Organisations

Prior to the PC approval, the following clearance and approvals are required.

Table 9.2.4 Clearance from Related Organisations

Approving Organisations	Description
Department of Agrarian Services	Department of Agrarian Service Commissioner General letter (not any intermediate letters) for conversion of paddy land or high land
Sri Lanka Land Reclamation & Development Corporation (SLLR&DC)	Filling Approval
Archaeological Department	If a building or site is heritage or archaeological listed
Mahaweli /LA/DS or Irrigation Dept.	Recommendations for river or canal reservations are required
National Building Research Organisation (NBRO)	If any land instability or strength is low
Central Environmental Authority (CEA)	If any land plot or building is environmentally sensitive

Source: Practice manual for Planning Committee Officers

9.2.2 Regulations on Heritage Conservation

The Antiquities Ordinance, Urban Development Authorization (UDA) Act and the Central Cultural Fund Act are analysed with regard to heritage conservation. UDA's "Development Plan for Urban Development Area of Kandy (Kandy Municipal Council Area) Volume 1 & 2 (hereafter referenced as "Development Plan)" is also studied along with the relevant Gazette.

(1) Antiquities Ordinance No. 9 of 1940 & Ordinance's Amendment No. 24 of 1998

The Antiquities Ordinance is the principal regulatory tool to protect historic and cultural resources in Sri Lanka and covers not only buildings, but also architectural artefacts and ruins. When it was enacted in 1940, it was mainly intended to protect archaeological ruins and artefacts. The criteria for the designation of heritage are as follows (both conditions need to be met):

- Resources owned by public and private could be "listed" if they demonstrate historical and architectural value
- Over 100 years of age

The Antiquities Ordinance requires each designated monument to have a 400 yard (approximately 365 m) buffer zone to control the development around it. In general, once a property is designated under the Antiquities Ordinance, it cannot be demolished.

In this law, there is no system to designate a historically significant area as a district. The protection of such areas is done by the relevant planning laws such as the UDA Act and Town and Country Planning Ordinance (1946) to designate a special area for protection.

In 1998, the law was amended (43A titled "Impact assessment of proposed development projects") to require the Archaeological Impact Assessment (AIA) to identify the potential negative impacts to the historic and cultural resources for development projects. The Director General of the Department of Archaeology is the one who approves or denies the proposed projects based on the outcome of the AIA. The cost of the AIA is to be covered by the project sponsor.

A penalty applies to the violation of the ordinance. Table 9.2.5 shows the details of the penalty and fines in comparison with the UDA Act. In general, the penalty under the Antiquities Ordinance is stricter than that of the UDA Act. However, considering the current situation where such buildings were demolished, it does not seem to work as a deterrent to the owner.

Table 9.2.5 Fines and Prison Term by the Antiquities Ordinance and UDA Law

Laws	Fine (Rs.)	Prison Term
Antiquities Ordinance Article 44	50,000-250,000	not exceeding 5 years
Urban Development Authority Law (Amendment), Article 28	(not exceeding) 50,000	not exceeding 2 years

Source: Created by JICA team based on the texts of the Antiquities Ordinance and the UDA Law

(2) Urban Development Authority (UDA) Law & Development Plan (2000)

In general, the UDA Law is a comprehensive planning law and defines the role of the UDA as a regulatory authority and developer. It allows the UDA to create its own rules as long as it follows the UDA Law by using a gazette, which include regulations on listed building and advertisement, and so on.

Since DOA's Antiquities Ordinance is only able to protect the buildings which are 100 years or older, there were many buildings which were constructed during the Colonial Period but were not old enough to be protected by the Antiquities Ordinance at the time of the listing in the late 1990s. Therefore, the UDA Law was employed as a tool to give special recognition and protection to such buildings by gazetting.

(3) Central Cultural Fund Act

Central Cultural Fund (CCF) was established in 1980 to implement the Cultural Triangle Project based on the Central Cultural Fund Act. The act enabled the establishment of the fund and allows the Sri Lankan government to provide fund for the CCF to engage in its activities (such as restoration of cultural properties and conducting surveys). The law also allows the CCF to receive donations from foreign governments or donors. In the CTP project, the CCF actually received funding of total US52 million for a ten-year project, 60% of which was provided by the UNESCO while the rest by the Sri Lankan government.[1]

(4) Enforcement

Interviews with the authorities and professionals in architecture in Sri Lanka strongly indicate that the practice of illegal construction is quite problematic. This does not only apply

[1] Stubbs, John and Thomson Robert (2017), "17 Sri Lanka and Maldives" in Architectural Conservation in Asia,(Routledge, NY) p405

to Kandy, but also to other cities such as Galle. Additionally, the authorities complain that they do not have enough capacity to monitor such violations. Also, they mentioned the interventions from the politicians on their decision-making process. Judging from the texts of the relevant laws and regulations, both DOA and UDA have the ability to penalise and file lawsuits. However, they have not practised their capabilities to the maximum extent.

9.2.3 Procedure of Planning and Building Permit in Kandy

(1) Role Sharing of Building Permit Between the UDA Central Provincial Office and KMC

As described earlier, the approval and licence for urban development in Sri Lanka were enforced in the lower level local authorities and the DA. In the case of Kandy, the main authority to issue building permits has been devolved from KMC to the UDA Central Provincial Office since February 2017, except for buildings with a floor area of less than 4,000 square feet and for lands with less than 1,000 square feet.

However, because of the limited capacity of the UDA Central Provincial Office, the authority to issue building permits for buildings located outside the area of a circle with a radius of 1,000 m from the Temple of the Tooth Relic (Dalada Maligawa) has been returned to KMC on May 2017, although the UDA Central Provincial Office still has the authority over the designated historic buildings even in the area outside the circle (see Figure 9.2.1 for the exact demarcation boundary between the UDA Central Provincial Office and KMC).

Although the main authority to issue building permits has devolved to the UDA Central Provincial Office, KMC has the opportunity to reflect their opinions on the application procedure, since their officials are included as members of the Planning Committee and Heritage Technical Advisory Committee as discussed later.

Conceptual Boundary of 500m and 1000m

Exact Demarcation Boundary

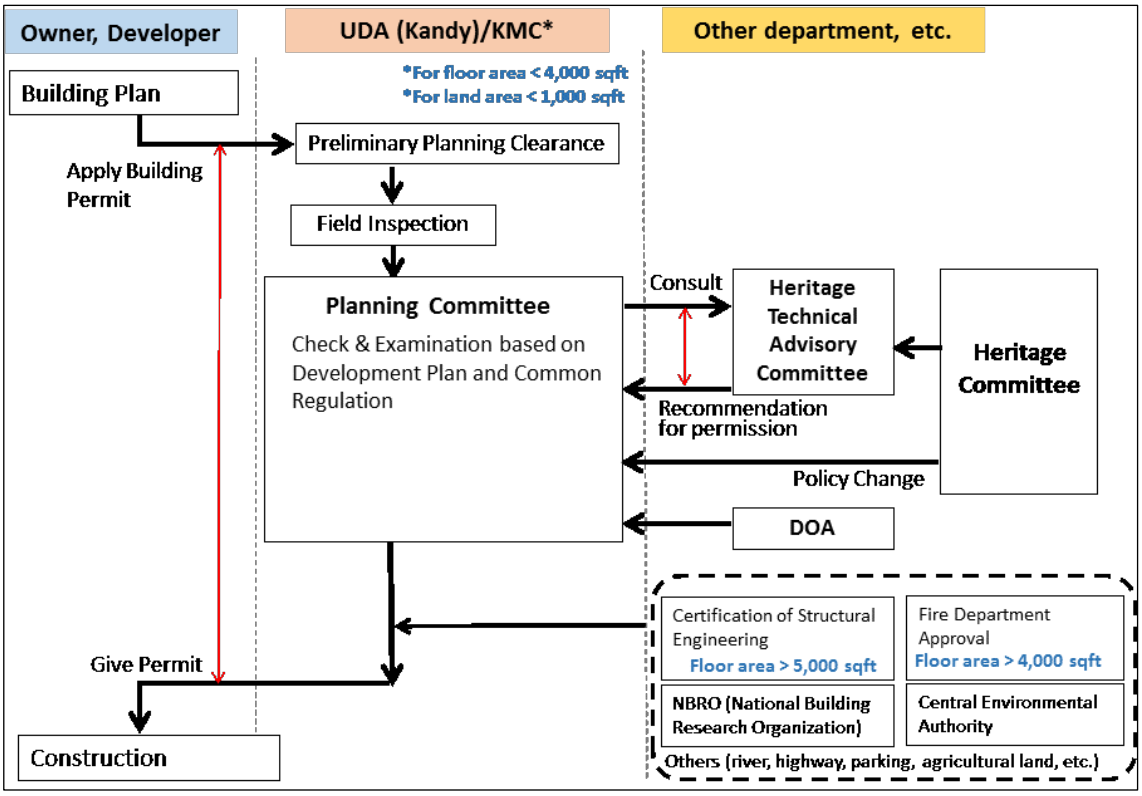
Source: KMC, UDA

Figure 9.2.1 Demarcation of Boundary Between the UDA Central Provincial Office and KMC

(2) Procedure for Obtaining a Building Permit in Kandy

Figure 9.2.2 illustrates the image of the basic procedure to obtain a building permit in Kandy. In the initial stage of application, the competent agency called Preliminary Planning Clearance (PPC) provides the consulting service. An applicant requesting for a building permit is instructed by the PPC about the necessary procedure to be taken. Although the procedure is not stipulated in some regulation, this service is usually provided particularly for most of the large-scale urban development projects.

Before starting an examination process, the person in charge of the competent agency conducts a Field Inspection (FI) to check the existing situation of the land lot in which a building permit was applied for. In the case of the UDA, this process is done by a planning officer, and in the case of KMC, done by a technical officer. After conducting the FI, the development plan is examined by the Planning Committee. Since February 2017, the UDA Central Provincial Office has taken over the Planning Committee from KMC. A director of the UDA Central Provincial Office chairs the committee with four other members, including three officers from UDA Central Provincial Office (a deputy director, a strategic planner and a planning officer) and one officer from KMC.



Source: The JICA Team

Figure 9.2.2 Flowchart of Procedure for a Building Permit Application in Kandy

Although not stipulated in the regulations, the time period of the procedure for a building permit usually takes 2-4 weeks. In the case of a designated historic building as discussed below, the procedure takes 1-3 months, depending on the time at which the sub-committee of the Heritage Committee is held. If development projects have special conditions, the time period of the procedure might take longer than the periods indicated above.

The buildings applied for are examined based on the Development Plan formulated for each local level authority and the aforesaid UDA Planning and Building Regulation (gazetted in 1986). In addition, if the total floor area the buildings applied for is more than 5,000 square feet, its building structure is checked to obtain a Certification of Structural Engineering

(CSE). If the total floor area is more than 4,000 square feet, the approval from the Fire Department is needed. Besides these, depending on the condition of the project, other examinations are required from the relevant organisations as shown in Table 9.2.6.

Table 9.2.6 Approval Required for Building Permit from Relevant Agencies

Item	Organization
Canal Reservations	SLLR&DC/ LA/ DS / Irrigation Dept.
Road Reservations	RDA/ PRDA/ LA.
Industries	CEA, Labour Dept., NBRO
Land Stability	NBRO / Structural Engineer, etc.
Any Other Agency	Recommended by Planning Committee.

Source: Practice manual for Planning Committee Officers

(3) Procedure to Obtain a Building Permit for a Heritage Building in Kandy

In the case of a designated historic building, those applying for a building permit need to consult the Technical Advisory Committee (TAC), which is a sub-committee of the Heritage Committee in Kandy. In addition to the TAC, if the designation was done not only by the UDA but also by DOA, a DOA consultation is also required. The conserved buildings that are applied for are examined based on the criteria described in 2.2.2. Although the recommendation made by the TAC is not a legally binding statement, most of the recommendations have been accepted in Kandy thus far.

The members of the TAC are currently composed of eight members, including the chairman (Prof. Kms Naufal), deputy commissioner, two architects from KMC, an architect from the UDA Central Provincial Office, officers from CCF and DOA and a chartered architect (volunteer).

(4) Façade and Advertisement Control by Zoning Regulation

1) Façade Control

As described in Chapter 3, there is a Development Plan for KMC. Within the Sacred Zone and Commercial Zone 1[2], strict regulations are stipulated in the zoning regulations of the Development Plan for KMC to maintain its historic or architectural interest or landscape values.

As for the façades of the buildings, the following items are regulated by the Zoning Regulations.

- Total maximum area of voids in the façades
- Prohibited materials in the façades
- Specifications as for the ridge lines
- Standards for permitted roofing slopes
- Prohibited roofing materials
- Recommended roof form
- Any new work on an existing conserved building shall blend in ridge height, eaves height and roof form.

2) Advertisement Control

In addition, the authority – taking into consideration the effects of hoardings or advertisements on the quality of the environment, safety of persons, traffic movement and the cultural values of the public – will inspect the following:

[2] Those names are indicated in the development plan, which are the area near the Temple of the Tooth Relics, generally called Grid City.

- the location of the hoarding or advertisement
- dimensions of and advertisement on the hoarding
- size of letters used in the hoarding or advertisement
- colouring and nature of painting to be displayed in the advertisement or hoarding

(5) Issues of Building Permit

According to the JICA Team's observation, several issues on the aforesaid approval and licence system of urban development are identified, which include:

- The procedure for obtaining a building permit has not always been properly enforced due to the insufficient number of officers of the competent agencies and political intervention.
- Since the punitive clauses in the relevant regulations are not severe enough, there have been many cases that the owners or developers intentionally violate them.
- Some of the criteria of regulations are not clear or too strict, which make it difficult to conduct a subjective and proper enforcement of the procedure.

9.3 Financial Mechanisms for Heritage Conservation

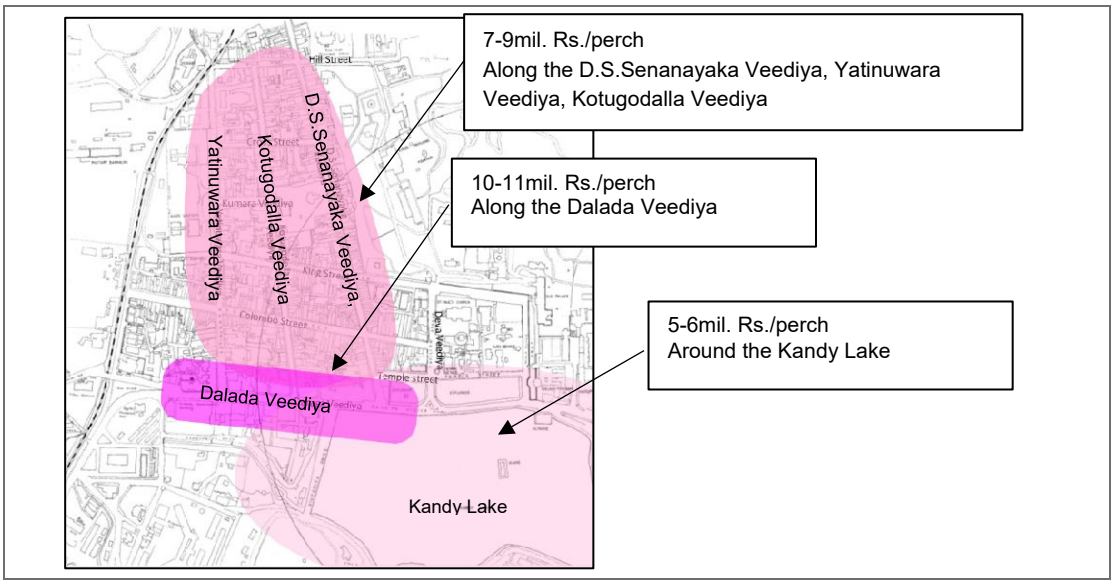
9.3.1 Current Situation Analysis, Problems and Issues

(1) Real Estate Market Trends in the Central Part of Kandy

In Sri Lanka, land value is determined by the market (a balance between demand and supply). It is not open to the public as in the case of Japan.

According to interviews with real estate developers in Kandy, the land value inside the Grid City is approximately 8-10 million Rs./perch if it is done through usual transactions. Also, the land value trend in Kandy is mentioned in the draft of the development plan by UDA. Based on the above information, Figure 9.3.1 describes land value trends. In particular, land value along Dalada Veediya is considered to be the most expensive. Those high land values in the Grid City are extraordinary in Kandy. For example, according to interviews with real estate agents and professional valuers, the land values in the Grid City are 20-100 times higher than those of outside the area. Also, the land values in the Grid City have increased by 50-60% in the last decade.

In the case of land value with a heritage building, it is lower compared to the one without a heritage building. This is one of the reasons why heritage buildings are demolished at night or during holidays without any notification.



Note: one perch of land is equal to about 25.29 m^2

Source: The JICA Team based on "Kandy Municipal Council Area Development Plan (2016-2030) (Draft), UDA"

Figure 9.3.1 Land Values in the Central Area of Kandy

According to interviews with real estate developers, rent for commercial use is approximately 120 – 150 Rs./sqft/month. If it is in the KMC (Kandy City Centre), it is increased to 500 Rs./sqft/month. Construction cost for a new building is approximately 3,500 – 4,000 Rs./sqft including basement, structural engineering, interior design, etc.

(2) Taxation System for Real Estate

As for taxes related to real estate, stamp duty (paid to national government) and an assessment tax (paid to Kandy Municipal Council (KMC)) are important. Additionally, business tax, entertainment tax, parking charge, advertisement charges, etc., are included.

The assessment tax, which is similar to the fixed property tax in Japan, is paid annually by the building owner. The rate of tax levying is approximately 85%. Since the assessment tax value is managed by KMC, it is possible to check each building's tax value.

The assessment tax is calculated based on each building's annual value. The annual value is evaluated by the Department of Valuation based on the profitability of each building.

Currently, there is a tax exemption system for temples or lower income people, but no such system exists for heritage building owners.

1) Taxation System of KMC Related to Real Estate

According to "The Gazette of the Democratic Socialist Republic of Sri Lanka, 2016.11.25, PART IV (B) – LOCAL GOVERNMENT", taxes related to real estate paid to KMC are stated below.

(a) Assessment Tax

The assessment taxes for the year 2017 have been imposed according to the following percentages on the annual value for all properties within the Kandy Municipal limits.

1. For domestic properties: 10% of the annual value
2. For non-domestic properties: 16% of the annual value
   (Commercial, lands fallow fields, buildings under construction)
3. Cultivated fields are exempt from the assessment taxes

The annual value is updated every five years by the Department of Valuation. It is considered that they evaluate each property value by applying a market approach, such as profit approach, cost approach, etc. If the building is retail use or a hotel, it is evaluated depending on how much money each property can earn. If the building is residential (without rental valuation), it is evaluated depending on other categories such as tenement, modern, semi-modern, ultra-modern, etc. Semi and Modern are decided based on the age of the building, access, facilities, model of the building, etc. There are no documents that explain such criteria.

(b) Tax on Land Sale

If any land within the Kandy Municipal Council limits is sold by an auctioneer, a broker or his servant, or a sub-agent through a public auction or in any other manner, it has been approved during the year 2016 to levy a tax equivalent to 1% of the amount from such land sale.

(c) Charges on Advertisement

Table 9.3.1 shows the charges on advertisement.

Table 9.3.1 Charges on Advertisements

Details of Notice Boards			Up to 6 months per square foot	Over 6 months per square foot
Advertisement boards over 8 square foot				
	With electricity	Only one side	110 Rs	150 Rs
		Both sides	135 Rs	200 Rs
	Without electricity	Only one side	60 Rs	150 Rs
		Both sides	75 Rs	200 Rs
Advertisement boards less than 8 square foot				
	With electricity	Only one side	55 Rs	100 Rs
		Both sides	85 Rs	150 Rs
	Without electricity	Only one side	45 Rs	100 Rs
		Both sides	55 Rs	150 Rs

Source: The Gazette of the Democratic Socialist Republic of Sri Lanka, 2016.11.25, Part IV (B) - Local Government

2) Financial Status of KMC

According to the "Budget for the year 2017, KMC / Dec. 19th, 2016", recurring revenue of KMC in 2017 is forecast to be approximately 2.6 billion Rs. Of this, approximately 350 million Rs. (13.5% of total recurring revenue) are from assessment tax, 100 million Rs. are from vehicle parking charges and 20 million Rs. are from charges on advertisements.

(3) Real Estate Investment Conditions for Foreigners

In Sri Lanka, there are rigid conditions for foreigners wanting to invest in real estate.

Foreigners, companies in Sri Lanka with over 50% foreign shareholding, or foreign-owned companies still cannot buy land or condominium property from the ground level to the 4th floor as of today. Although it has been proposed to remove restrictions for buying property from the ground up during the 2018 budget, the proposals still have not been implemented. If enacted, this would allow foreigners to also buy houses, villas and bungalows. Currently, land can only be leased up to 99 years (which is not expected to change as a result of the proposed changes) and apartments can only be purchased from the 4th floor and above.

Private companies with majority foreign holdings will be allowed to lease land on a long-term basis. However, such companies should have invested at least 250 million Rs. excluding the value of the land, have been providing employment to at least 150 people, and have maintained this standing for at least three years.

Any private company with minority foreign ownership can buy or lease property in Sri Lanka. Also, public companies with over 50% foreign ownership will be permitted to buy immovable property.

Under the current law, a foreigner can invest in the property market through the following options:

a) By leasing the property;
b) By virtue of inheritance;
c) As a gift from parents;
d) As part of a private company with a local shareholding of 50% or above;
e) By buying an apartment or condominium from the 4th floor and above (excluding car park and other common areas); and
f) By obtaining Dual Citizenship

1) Buying Land

Foreigners cannot buy land, as sale of land to foreigners has been prohibited in the 2013 budget. Land can only be leased out for a maximum of 99 years. Foreigners or companies with more than 50% foreign ownership no longer need to pay the 15% land tax beginning 1st Jan 2016[3].

2) Taxes for Property

There is a 1% Stamp Duty applicable for leasing of land up to 99 years. If buying a property, there will be a 3% Stamp Duty for the first 100,000 LKR of the property value and 4% thereafter. A lawyer will typically charge 2-3% for preparing the documents.

3) Taxes for Landlords

Anyone leasing out a property to a foreigner or local will need to pay a 1% stamp duty when the rent is collected.

VAT is payable at 15% if the lease is to a VAT registered person other than on residential premises. Furthermore, the sale of land & buildings other than residential premises will also be liable to VAT at 15% of the value.

[3] Land Restrictions on Alienation (Amendment) issued on 2nd Sept 2016

4) Capital Gains Tax (CGT)

The Capital Gains Tax of 10% on the gains (profits) will become effective from 1st April 2018. It will be a flat rate of 10% irrespective of the period of ownership. The tax will be applicable to both foreigners and locals. For any assets owned/bought prior to 1st April 2018, the value of that asset will be calculated as at 30th September 2017. Any gains of less than Rs. 50,000 will not be subjected to CGT. If the property being sold has been an individual's principal place of residence for two of the last three years before disposal, the CGT will not be applicable. If an individual renounces residency in his or her previous country and becomes a resident of Sri Lanka, the CGT should be paid on the investment property in the individual's former country. More information is detailed on the section of "Capital Gains Tax".

5) Residence Visas

A Residence Visa cannot be obtained by simply buying a property. However, foreigners who invest over USD 250,000 will be granted a residence visa in Sri Lanka under the Resident Guest Scheme Visa programme, and anyone over 55 years old can obtain a 2-year renewable visa under the My Dream Home Visa programme by depositing only USD 15,000.

6) Moving Money in and out of the Country

If a foreign resident wants to purchase a property, the money has to be channelled into the country via a special IIA (Inward Investment Account) held at a local bank. Once the property has been sold, the money can be taken out (plus any gains) via the same account in the same currency that the money was deposited in. If an individual currently owns a property where the money has not been brought via an IIA account (e.g. inherited or bought while a citizen of Sri Lanka), an annual limit of USD 20,000 applies when taking the money out of the country. An individual could still take out the money at once if the source of the money can be proven to the bank and the Central Bank (this whole process will take a few months to complete).

The government will allow USD45,000 to be brought into the country without declaring the source (Budget 2017). The budgets for 2017 & 2018 have proposed that foreigners be allowed to borrow money from the local banks for the purchase of condominiums (up to 40% of the condominium value).

(4) Issues and Preliminary Development Orientation

1) Public and Private Cooperation Towards Heritage Building Conservation

Currently, owners are required by the authorities to conserve heritage buildings according to their grade (A, B, C and D) without any incentives or grants from the public sector, which is quite unusual in the field of heritage conservation. This uneven stress is considered one of the reasons why heritage buildings are demolished and re-built without a permit. There is one building (Giragama Walawwa) funded by the public sector, but there is no apparent reason why it was chosen. Therefore, a public and private cooperation is considered one of the options. One idea is to provide public support (subsidy) if the rehabilitation plan is appropriate with the guideline. This relationship (benefit and restriction) should be created and announced to the public.

2) Partial Funding menu

Until now, a small number of heritage building conservation projects conducted in Kandy were funded by the public sectors with contributions of 100%. This measure did not enhance the ownership of the projects and provoked unfair feelings among the building owners. Due to the limited government budget, the projects were not deemed sustainable.

3) Diversification of Incentives and Financing Methods

(a) Tax Allowance

Tax allowance – such as the assessment tax, parking tax, etc. – is considered feasible for the conservation of heritage buildings. Since the rate of building owners who pay the assessment tax is approximately 85% of the whole building owners within Kandy Municipal Council area, a tax allowance system would be useful.

(b) Financing Methods

The following financing methods are considered popular for real estate investment. There is no subsidy for heritage buildings. However, there are possibilities to find a subsidy for other aspects such as environmentally friendly activities or projects, for which it might be possible to obtain subsidies from the newly founded Ministry of Social Empowerment, Welfare and Kandyan Heritage. More detailed information should be collected and a feasibility study should be done.

Table 9.3.2 Diversification of Financing Methods

Method	Overview	Challenges
Grant, Subsidy	• Subsidy from public sectors • Grant from an international authority such as UNESCO and U.S. Ambassadors Fund for Cultural Preservation Small Grants, and private organisations (e.g. World Monuments Fund)	More information regarding financing resources is necessary
Crowdfunding, etc.	• Voluntary investments towards the revitalisation of Kandy through the internet	It could be an opportunity for appeal, but the amount of money generated might be less than expected.
Finance Loan, Equity Finance	• Investment from bank, investors, etc.	Return or guarantee for their investment is necessary

Source: The JICA Team

(c) Other Support from Public Sectors

Besides financial support, other kinds of support from public sectors are expected, such as technical assistance, introduction of restoration experts or architects, supply of traditional materials such as roof tiles, etc.

4) Creation of a Special Fund and Sustainable Mechanism for Heritage Building Conservation

In order to promote heritage conservation, a special fund and a business model are necessary. The special fund is composed of a grant or subsidy from the public sectors or international authority and is utilised as a resource for heritage building conservation.

9.3.2 Review of Related Plans and Projects

(1) Publicly-owned Buildings

In general, publicly-owned buildings are funded and maintained by the public sector. The renovation project of the Old Galle Dutch Hospital is one of the successful projects in Sri

Lanka. Table 9.3.3 shows the main stakeholders and their roles for the renovation project. The total renovation cost was 240 million rupee.

Table 9.3.3 Main Stakeholders for the Old Galle Dutch Hospital Renovation Project

Stakeholder	Roles
Urban Development Authority	Overall management of the renovation project
Department of Cultural Affairs	Providing consultation services on the preservation of cultural aspects
Department of Archaeology	Providing consultation services on the preservation of historical value. For example, all materials that were used in the renovation work had to be approved by them.
University of Ruhuna	Providing engineering consultancy services. For example, the old building had so many cracks. The engineering faculty of the university guided them on suitable solutions.
10th Engineer Services Regiment of the Army	Carrying out the construction work

Source: The JICA Team

Source: Galle Heritage Foundation

Figure 9.3.2 Old Galle Dutch Hospital Prior to Renovation

Source: Galle Heritage Foundation

Figure 9.3.3 Old Galle Dutch Hospital After Renovation

(2) Privately-Owned Buildings

From the viewpoint of the business mechanism, heritage building conservation cases are categorised as follows. These categorisations are targeting only private buildings which need a business mechanism to be sustainable.

1) Case A: Funded by Public Sectors

Example: Giragame Wallawwa

- This conservation project is 100% funded by CCF (Central Cultural Fund) and managed by the owners
- Three owners own the property and rent part of it to a tenant (earthbound, etc.)
- The 2nd floor space is not utilised properly (comment from UDA)

2) Case B: Funded by the Owner

Example 1: Royal Bar & Hotel

- It was funded and managed by the owner.
- The owner considers the property should be maintained "as it is".

Example 2: Olde Empire

- It was funded by the owner and the 1st floor space is leased to a restaurant operator
- The tenant is "Manor House Concept" which manages several boutique hotels and cafes by adaptively reusing heritage buildings in Sri Lanka such as Kandy House.
- Hotel at the 2nd floor is still owned and managed by the owner

Example 3: No. 41, 43, 45 Cross Street

- It was funded by the owner
- Front part of original heritage building is partly conserved (wall and façade). Back part was demolished and re-built. Since this is a big intervention by demolishing most of the building, it should not be considered as "conservation".

3) Case C: Not Well Maintained

- There are several heritage buildings which are not well maintained. Some buildings are used by the owner/tenants, but some buildings are abandoned.

Number of examples of Case A is very few. Case B is the most popular, and many examples of Case C are recognised in the Grid City. If the owners are affluent, they may choose Case B, but if this does not apply to them, they are left with no option but to choose Case C.

(3) Approaches of UDA

UDA has a plan to implement several projects related to heritage conservation. The following are some of them. UDA does not have an annual budget especially for the conservation of heritage buildings. They usually decide on projects they are going to participate in, then request an annual budget from the national government.

1) Bogambara Prison and its Nearby Land

UDA has a plan to restore Bogambara Prison and turn it into a cultural core which will include a culture centre, craft workshop, hotel, restaurants and event space. They also have a plan to develop its nearby land (programmes are not yet fixed). UDA has expressed their wish for foreign investors to support them in this project.

2) Remand Prison

UDA has acquired the property and has a plan to renovate it.

3) Lawyer's Office

UDA has acquired the property and had an agreement with its owners to renovate the buildings, but the project has ceased because of problems of consensus formation regarding the compensation.

4) Buildings between Queen's Hotel and Hotel Casamara

These redevelopment projects were presented by UDA at the Heritage Committee meeting held in July 2017. For the last two years, UDA has encouraged the respective hotel owners to rehabilitate and re-build the buildings.

Source: The JICA Team

Figure 9.3.4 Location and Current Situation of Project between Queen's Hotel and Hotel Casamara

5) Other Proposals Related to Heritage Buildings

According to "Action Projects / UDA Central Provincial Office / 14 March 2017", UDA has adopted the "Conservation of World Heritage Buildings Providing facilities for Local & Foreign Tourists adding Value to Heritage City" and described the following action plans. These are proposals from UDA which have not yet been implemented.

- Conservation of heritage city & façade improvement of outer city
- Back lane improvements with historical characters
- Introduction of tax concession and development guidelines encouraging conservation work by the private sector