Ministry of Irrigation and Water Resources Management

Irrigation Department

Left Bank Development project in kalu Ganga

Kantale-Kinniya areas

A brief note about the project

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1. Introduction of the problem to be addressed

Trincomalee has the weakest economy in the East. The main economic activities in Trincomalee are agriculture, fisheries, animal husbandry, and business. The agriculture crops are mainly rice, onions and vegetables, which were previously sent to other districts. Fisheries used to bring significant income to Trincomalee and provided employment opportunities. Tourism was also a sizeable industry.

Productivity has greatly decreased in recent years. Six divisional secretariats - namely Kinniya, Seruwila, Muttur, Echchilampattai, Kuchaweli and the town of Gravets - were affected severely by the war and the Tsunami.

According to Statistics of District Secretariat, Trincomalee, 2013, the total irrigated area under major and medium tanks in Kanthale are 6615 ha and 869 ha respectively while the cultivation area under rain fed is 891 ha. In Kinniya, the total irrigated area under major and medium tanks are 980 ha and 508 ha respectively while the cultivation area under rain fed is 2117 Ha.

According Statistics of Division Secretariat, 2012 there were 3209 Samurdhi recipient families out of 13940 families in the Kanthale DS Division while there were 8177 Samurdhi recipient families out of 18257 families in the Kinniya DS Division. Average monthly income of a family is less. Project area is varying in the range of Rs. 6,000 to Rs. 8,000 which resulted the poor living standards for most of the families.

In order to alleviate poverty and improve living standards of the people of Kantale and Kinniya Divisional Secretariat Divisions, it is proposed increase the agricultural productivity and thus increases the farmer income. The agriculture in the area is hampered both during Yala season due to dry spells and also Maha season due to high intensity rainfalls. Even in dry periods, there is a sufficient water flow in the Mahaweli River in the project area draining unproductively to sea throughout the year. Either use of excess water in wet season during the dry season by conserving in storages (reservoirs) or diverting water form Mahaweli River during the dry spells are possibilities to mitigate scarcity of water. This project has been formulated based on the above fact.

2. Topography of the project area and Map of project area

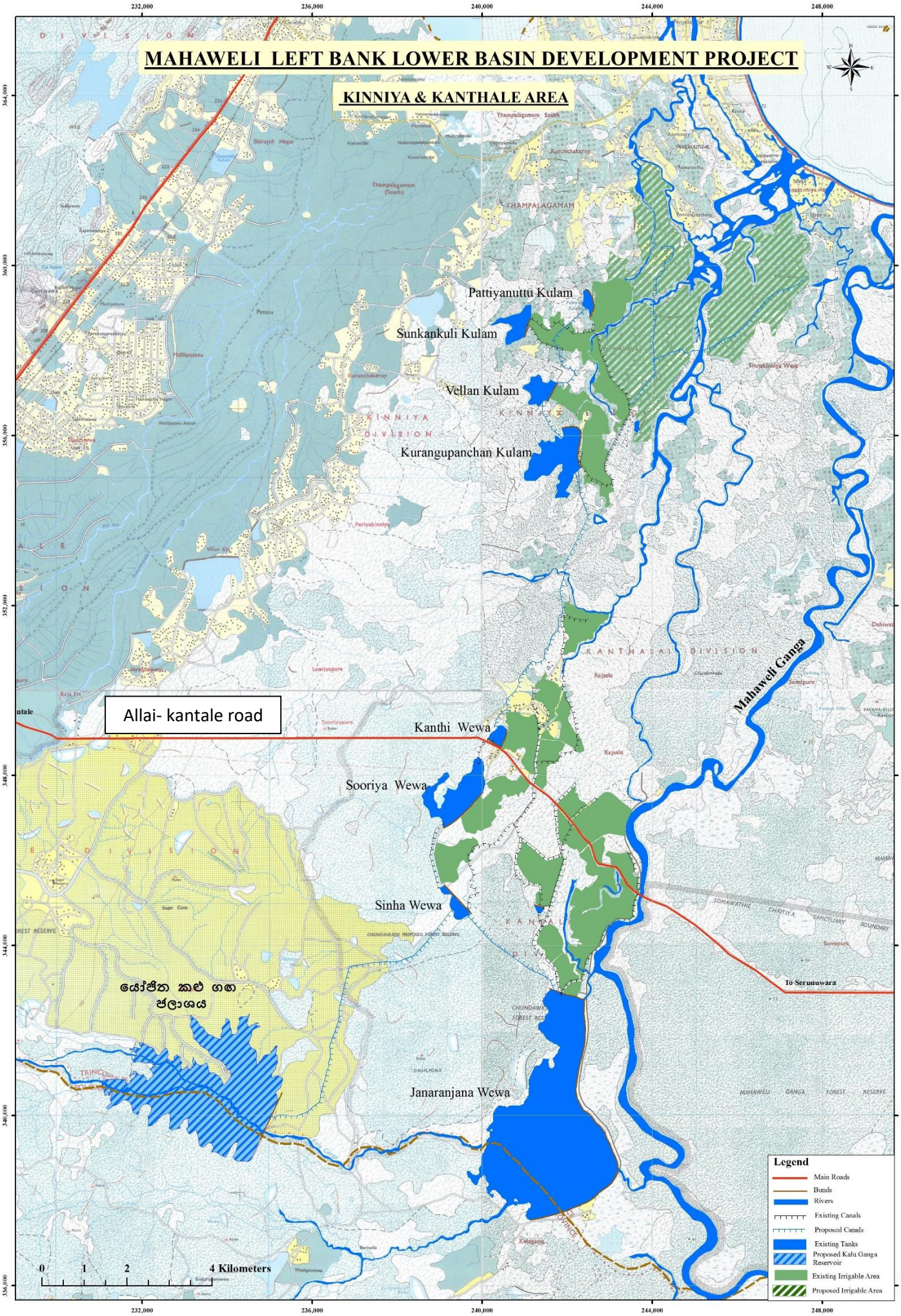
Trincomalee District is situated in the northern part of the Eastern province in Sri Lanka is bounded in the North by Mullaithivu district, in the West by Anuradapura District & Polonaruwa Districts in the south Batticaloa District and in the East Indian Ocean. The total District land extent is 2,728 sqkm including water bodies. Water bodies cover an extent of 96 sq.km.

The proposed project area is mainly located in Kanthale and Kinniya Divisional secretary divisions in the Trincomalee district of the Eastern Province except the right bank area of the proposed Kalu Gaga reservoir which is located in the Madirigiriya Divisional secretary division in the Polonnaruwa District.

Access

The proposed Dam of Kalu Gaga can be reached by travelling along A6 road to reach the clock tower at 85 km post (Potankadu Junction). Then travel another 10 km along the Sugar-factory road and turn right and travel another 200 m, then turn left and travel another 10 km along the earthen road to reach the location of the dam. The total distance to the location of dam from Colombo is 236 km.

The dam axis of the Janaranjana Wewa can be accessed by travelling 18 km along Alle – Kantale road and turn right Sooriyapura (Siththaru Bridge) and travel 3.1 km along the Sooriyapura Flood Protection Bund Road to reach the dam axis. This side is 237 km away from Colombo.


MAHAWELI LEFT BANK LOWER BASIN DEVELOPMENT PROJECT
KINNIYA & KANTHALE AREA
Pattiyanuttu Kulam
Sunkankuli Kulam
Vellan Kulam
Kurangupanchan Kulam
Allai- kantale road
Kanthi Wewa
Sooriya Wewa
Sinha Wewa
Janaranjana Wewa
Mahaweli Ganga
යෝජිත කළු ගඟ
ජලාශය
To Seruwawara
Legend
Main Roads
Bunds
Rivers
Existing Canals
Proposed Canals
Existing Tanks
Proposed Kalu Ganga Reservoir
Existing Irrigable Area
Proposed Irrigable Area
0 1 2 4 Kilometers
232,000
236,000
240,000
244,000
248,000
364,000
360,000
356,000
352,000
348,000
344,000
340,000
336,000

3. Description of the project proposals

During the study two scenarios were considered to get the water for this area. As the water is available in the Mahaweli river for significant period of the year, the possibility of diverting water from Mahaweli river by building a concrete weir or rubber dam across Mahaweli river was considered as first scenario. The construction of Kalu Gaga reservoir and increasing the capacities of Janaranjana Wewa and other minor tanks to store water during wet season and later use was considered as second scenario. The other irrigation system developments are common for both scenarios. The viability of both scenarios was taken into consideration in the initial studies. The construction of any structure across the Mahaweli River in the lower basin of Mahaweli river would be high cost and also encounter practical issues such as designing a suitable foundation, changing river morphology, propagation of flood etc. Therefore, scenario 1 was omitted in the preliminary studies and detailed studies were carried out for the scenario 2. The details of the studies carried out for the scenario -2 are presented in this report

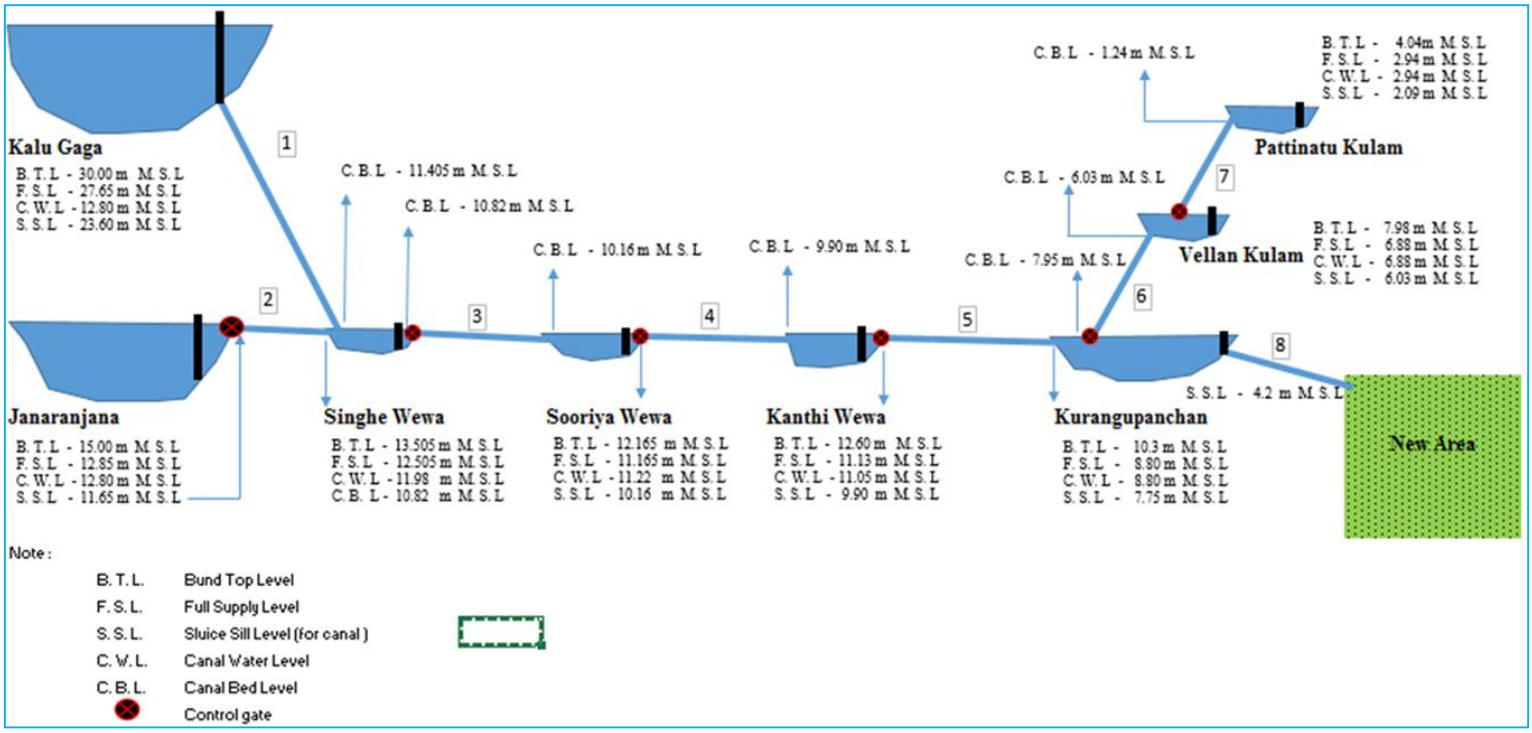
Under this new project, it is proposed to provide irrigation facilities to 3000 acres of new lands for cultivation of paddy during Maha season and 2750 acres of new lands for cultivation of OFCC during Yala season while maintaining over 80 % success rate for the proposed cropping pattern. Paddy is the main crop during the Maha season and OFCC such as Maize, Chilies, Green Gram and Ground nut are promoted during the Yala season for the new expansions of irrigable areas. The target area of the project is located in Theeneriveli. This rain fed cultivation areas in the Theeneriveli area is developed for new agricultural lands by providing irrigation facilities during both seasons. Even though lands are available for developments, only a part of it can be taken for developments due to limited availability of water resources. Other than the irrigation infrastructure development, 2 MCM of water is allocated for domestic water needs of people in the project area.

The water requirement for the project is met by constructing Kalu Ganga reservoir across Kalu Ganga having capacity of 15.85 MCM in the upper catchment and also increasing the capacity of Janaranjana Wewa by another 5.7 MCM and augmenting some of the minor tanks in the lower cascade in Kantale and Kinniya DS Divisions.

The proposed project mainly envisages

a) Construction of Kalu Gaga Reservoir having capacity of 15.85 MCM
b) Augmentation of Janaranjana Wewa from capacity 9.07 MCM to 14.78 MCM and Improvements to head works structures
c) Augmentation of minor tanks; Singhe Wewa, Sooriya Wewa, Kanthi Wewa, Kurungupanchankulam, Vellan kulam, Sunkanthikulikulam and Pattiyanththukulam and development of irrigation infrastructure under these minor tanks
d) Construction of feeder channels (30 km) connecting minor tanks in the cascade Feasibility
e) Irrigation infrastructure development of 3000 acres of lands in the Theenniraweli rain fed area.
f) Other Irrigation infrastructure in the Kanthale and Kinniya DS Divisions in the Trincomalee

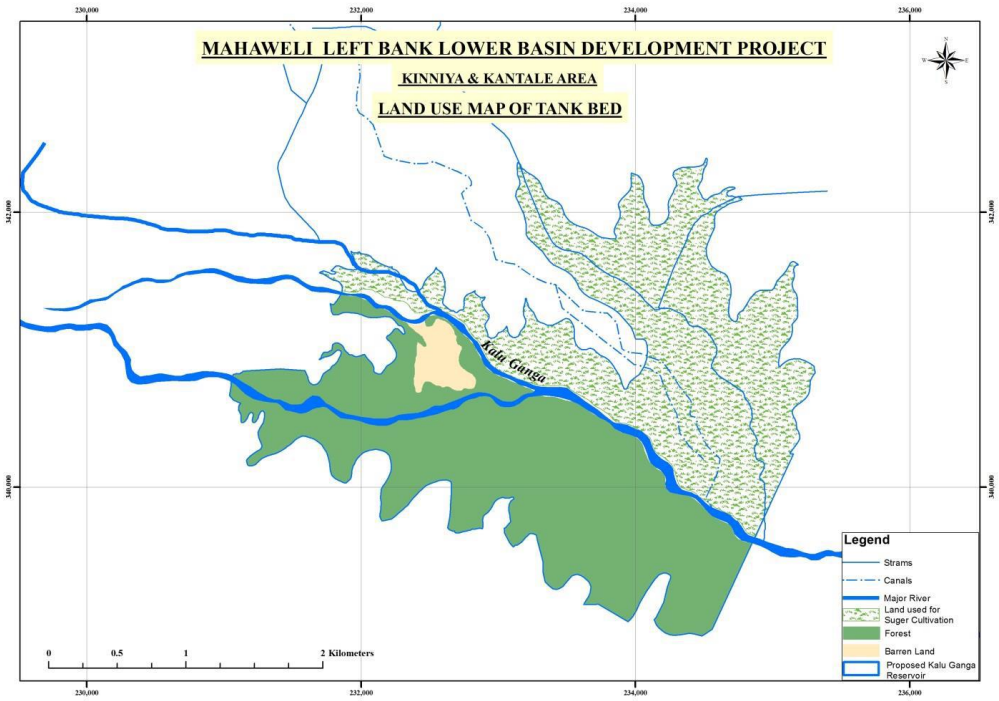
A schematic diagram showing entire project is given below.



4. Land use pattern of the project area

Google Earth image of tank bed area was taken. When this image is observed, it can easily be identified two different land use patterns either side of the Kalu Ganga. The left bank cleared area is a part of the area used for cultivation of sugar cane during period that Kanthale Sugar factory was operated. Kantale Sugar Factory was constructed in 1957 as a grant offered to the country during the tenure of Prime Minister S W R D Bandaranaike by the government of Czechoslovakia and it was opened in 1960. It had been smoothly functioning as a profit earning venture until 1986. Later factory was ceased its operation. At present this area exists as bare land and is not used for any productive purpose. The right bank area is covered with forest belongs to Department of Wildlife. Land use pattern of irrigable area is given below.

Type of cultivation	Extent (ha)
Forest area	355.0
Barren land (used for sugar cultivation)	339.0
Barren land	16.0
River area	38.0
Total area	748.0



5. Land use pattern of the irrigable area

Irrigation scheme	Existing Irrigable area acres		Proposed Irrigable area acres		
	Maha paddy	Yala paddy	Maha paddy	Yala paddy	OFCC
Janaranjana wewa	2000	2000	2000	2000	0
Singhe wewa	100	50	100	50	50
Sooriya wewa	100	50	100	50	50
Kanthi wewa	60	30	60	30	30
Kurankupanchan kulam	580	340	580	340	240
Vellan kulam	135	65	135	65	70
Sankankuli kulam	390	195	390	195	195
Pattiyannooththu kulam	335	170	335	170	165
Thineeriweli area	1000	-	4000	-	1950
TOTAL	**4700**	**2900**	**7700**	**2900**	**2750**

6. Hydrology

Janaranjanwewa has been constructed across a loop of Mahaweli Ganga. The catchment for Mahaweli River at this location is difficult to measure. Other local catchment areas of janaranjanawewa and Kalauganga are given below.

Description	unit	Kalu ganga	Janaranjana
Gross catchment area	Km^2	126	400
Net catchment area	Km^2	126	274
Average annual rainfall at reservoir site	mm	1767	1767
Average annual rainfall at thinneriweli area	mm	1767	1767

7. Project components and parameters

➢ Construction of Kalu Gaga Reservoir

In order to fulfill all irrigation water demands of the project area, Kalu Gaga reservoir is constructed across Kalu Gaga at the upper catchment having highest storage (15.85 MCM) of the project. The reservoir elevation is 12.0 m at the river section. The proposed reservoir is included the followings;

• Constructing of 3.43 km long earthen dam across Kalu Gaga

• Construction of tower sluice having discharge capacity of 3.5 cumec.

• Construction of radial gated spillway with 03 Nos.

Description	**Data**
Gross Storage	15.9 MCM
Area of Reservoir at FSL	612 Ha (1,511Acs)
Type of Dam	Earth Fill
Length (Main Dam)	3.43 km
Maximum Height of Dam	8.75 m (28.7 ft)
Type of Spill	Radial Gated
Size of the Gate	5.00m x 4.57m(W-20 ft x H-15 ft)

➢ Augmentation of Janaranjana Storage

Other than the Kalu Gaga reservoir (15.85 MCM), the second largest capacity (14.78 MCM) is added to the project by raising the spillway of the Janaranjana Wewa. To get the additional capacity, the following improvements are proposed for the Janaranjana Wewa;

• Construction of high level sluice to feed Sinha Wewa

• Improvements to feeder canal to augment Janaranjana Reservoir from Mahaweli River

• Raising and strengthen of existing bund by 0.45 m (0.3 m to 0.45 m)

• Restoration of right bank and left bank spillways

• Raising of spillway with necessary downstream developments

It is unlikely to create land issues due to additional area needed for the tank bed of the reservoir as compared with the Google images of the project area. The additional quantity of water that can be stored in the project area is limited; the proposed augmentation of Janaranjana Wewa is a prerequisite for the sustainability of the project. It has to be done proper investigation by the Division of Engineering Materials, ID to identify the suitability of the existing bund for the raising and possible ways to raising this bund to storage additional quantity of water.

Description	Unit	Kalu Gaga	Janaranjana Wewa
Co-ordinate		234,867 m E 339,619 m N	243,205 m E 338,726 m N
Full supply level (F.S.L)	m M.S.L	27.65	12.40 - 12.85
Area at F.S.L.	ha	655.0	910.0 – 1071.0
High flood level (H.F.L)	m M.S.L	28.15	13.0 -13.45
Area at H.F.L.	ha	748.0	1127.0 – 1303.0
Bund top level (B.T.L.)	m M.S.L	32.00	14.5 - 15.10
Sluice sill level	m M.S.L	23.60	9.75
Gross storage	MCM	15.85	9.07 - 14.78
Dead storage	MCM	1.29	0.20
Effective storage	MCM	14.56	8.87 - 14.58

8. Project benefits

Under irrigation infrastructure development it is proposed to irrigate 3000 acres of existing and new irrigable lands in Kantalai and Kinniya DS Divisions under the Left Bank Development Project in kalu Ganga (LBDP). It is planned to develop 3000 acres of new lands from the present rain fed irrigation area in Theenniraweli for paddy cultivation in Maha season while only 1750 acres of the same area can be irrigated during the Yala season for cultivation of other crops. At the present there is a shortage of water for 800 acres of land in the existing systems under minor tanks during Yala season. This area is given priority to irrigate to cultivate OFCC during the Yala season and remaining 1975 acres are selected from the Theenniraweli rain fed area to cultivate OFCC. In addition to providing water for irrigation, this project has allocated 2 MCM of water for domestic and industrial needs in DS Divisions of Kantalai and Kinniya.
In addition to direct benefits, there are other indirect benefits such as social and environmental which enhance quality of life and farmer income. The implementation of the project especially investments on other infrastructure shall provide safe water and sanitation, improved health, education and marketing facilities. Investment on irrigation infrastructure development shall provide net present value of 388.39 Million Rupees at 10% discount rate, while achieving 11.60% internal rate of return and 1.42 benefit/cost ratio on the project investment.

8. Project cost and recommendations

The total project cost is Rs 8000 million, while irrigation infrastructure development costs Rs 5775 million and other infrastructure development cost is Rs 500 million. The breakdown of costs is as follows.

Component	Amount (Rs mn)
1. Preliminaries	50.00
2. Construction of kalu ganga	2400.00
3. Improvement to janaranjana wewa	300.00
4. Conveyance system from Janaranjan wewa to pattiyannoththu kulam wewa	1175.00
5. Conveyance system from kalu ganga to Sinha	150.00
6. Irrigation system development in minor tanks	500.00
7. Irrigation system development in Thinnaraweli area	300.00
8. Land acquisition and resettlement	100.00
9. Infrastructure development	500.00
10. Project management	150.00
11. Development of farmer's income	150.00
Total civil cost	**5775.00**
12. Physical contingencies (10 %)	578.00
13. Engineering and administration (6%)	347.00
14. Price contingencies (10%)	578.00
15. Total excluding VAT	7277.00
16. VAT (12.5%)	723.00
Total project cost	**8000.00**

This project is economically viable, technically feasible, environmentally less impact so it is recommended for implemented.