PRE-FEASIBILITY REPORT AND DRAFT TERMS OF REFERENCE

OF

MODIKUNTA VAGU IRRIGATION PROJECT

NEAR KRISHNAPURAM VILLAGE, WAZEEDU MANDAL, JAYASHANKAR BHUPALAPALLY DISTRICT, TELANGANA

TO IRRIGATE 5500 HA OF LANDS IN WAZEEDU MANDAL OF JAYASHANKAR BHUPALAPALLY DISTRICT, TELANGANA & TO SUPPLY DRINKING WATER TO THE ENROUTE VILLAGES

Submitted to

THE DIRECTOR AND MEMBER SECRETARY,
RIVER VALLEY AND HYDROELECTRIC PROJECTS,
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1. Executive Summary

Modikunta Vagu project envisages construction of 1359 m earthen dam across Modikunta Vagu which is a tributary of Godavari River to store 2.142 TMC of water to irrigate 5,500 ha of command area along with supply of 0.12 TMC drinking water belongs to 35 benefiting villages of Wazeedu Mandal in Jayashankar Bhupalapally District, Telangana.

Modikunta Vagu is Minor tributary of River Godavari rises from the hills near Baster District in Godavari basin and passes in between Krishnapuram and Kadekal villages in Wazeedu Mandal, Jayashankar Bhupalapally Dist of Telangana.

The proposed dam site is located at about 2.00 Km from Krishnapuram village, Wazeedu Mandal which is about 292 Km from Hyderabad on Hyderabad-Chandruptla (Via Warangal –Eturnagaram) NH 163 Road.

The construction work involves construction of 1359 m earthen dam, spill well, sluice gates and distributory networks. The net commendable area under the project is 5,500 Ha. Out of which 900 Ha on right flank the rest of 4,600 Ha is on left flank. Due to existing high hillock on left flank only one head sluice is provided on right flank to cater the needs of whole command. The Main canal taking off from Ch. 600 of the Dam. The carrying capacity of the main canal at head reach is 9.03 Cumecs against the required discharge of the main 8.08 Cumecs. The first distributor of length 5.270 km starts from CH: 0.12 at EL: 95.94M through Pipe Culvert or Trough cross the TRC of length 150 Mts, to feed an Ayacut of 900 Ha. The left main canal crosses the main course of the Modikunta Vagu by an Aqueduct to feed an Ayacut of 4600 Ha. The length of the Main canal is 21.850 Km.

The project involves submergence of 472 Ha of forest land. The stage-II clearance from MoEF New Delhi is awaited. 500.20 ha of CA land is handed over to Forest Department.

According to EIA Notification, 2006 and its subsequent amendments, the project is categorized as 'B'. However, General conditions applicable for the project due to the presence of Eco-sensitive Zone boundary of Eturnagaram Wildlife Sanctuary at a distance

of 4.9 Km. Hence, the project is categorized 'A' and requires Environmental Clearance from MoEF, New Delhi.

The location of proposed intake is at longitude 80°0.26'20"E and latitude 18°0.32'47"N near Krishnapuram Village of Wazeedu Mandal Jayashankar Bhupalapally district.

Total cost of the project is 491.25Cr. The B – C Ratio as per CWC guidelines is works out to be 1.697.

2. Introduction of the Project/ Background Information

2.1 Identification of project proponent and project.

The new State of Telangana came into existence on 2nd June 2014 with 10 Districts from erstwhile State of Andhra Pradesh. In the process of achieving Golden Telangana, Irrigation & CAD Department of Telangana State is making every effort to harness and utilize all the available water resources for benefitting of Agricultural sector, Industrial Sector and also providing drinking water for overall development.

The development of Irrigation in Telangana is mostly dependent on Godavari & Krishna Rivers and their tributaries, Tanks & Ponds. The project envisages construction of 1359 m earthen dam across Modikunta Vagu a tributary of Godavari River to store 2.142 TMC of water to irrigate 5,500 ha of dry lands belongs to 35 villages of Wajeed Mandal in Jayashankar Bhupalapally District, Telangana. The project also envisages supply of 0.12 TMC drinking water to the benefitting villages.

2.2 Brief description of nature of the project.

To accelerate the development of backward, naxal affected and drought prone areas, Telangana government has proposed to take up Modikunta Vagu project, by proposing 1359 mt earthern dam near Krishnapuram village, Wazeedu Mandalm, Jayashankar Bhupalapally district.

The project envisages construction of 1359 m earthen dam across Modikunta Vagu to store 2.142 TMC of water to irrigate 5,500 ha of dry lands belongs to 35 villages of Wajeed Mandal in Jayashankar Bhupalapally District, Telangana. The project also envisages supply of 0.12 TMC drinking water to the benefitting villages.

Table – 1 List of benefitting villages under the scheme

Sl.No.	Name of Villages	Sl.No.	Name of Villages
1	Perur	19	Gummadi Doddi
2	Korakallu	20	Pragallapally
3	Mothugudem	21	Poosuru
4	Ghat Veerabpuram	22	Gangapuram
5	Dharmaram	23	Tekulagudem
6	Peda Gangaram	24	Veerapuram (koya)
7	Chandru Patla	25	Laxmipuram
8	Kodaikal	26	Bhoomanpally
9	Arlgudem	27	Krishnapuram
10	Cherukuru	28	Mulakanapally
11	Peda Gollagudem	29	Bhoomanapally
12	Lingampeta	30	Vejedu
13	Cheekupally	31	Nagaram
14	Padiga Puram	32	Kongala
15	Chintoor	33	Kasaram
16	Ayyavaripeta	34	Jangalapally
17	Tekulagudem	35	Ippagudem
18	China Gollagudem		

The command area map of proposed LIS is given below.

2.3 Need for the project and its importance to the country and or region.

The project area falls under Agro climatic zone II i.e., Central Telangana Zone. This region receives an annual rainfall between 800 - 1150 mm, mostly Southwest monsoon. Maximum and minimum temperature recorded range from 30°C to 37°C and 32°C to 42°C respectively.

In this zone the rainfall is uncertain, uneven and sparsely distributed. The type of soils Red earths with loamy soils (Chalkas), Red sandy soils and Black Cotton soils in pockets.

2.4 Demand-Supply

The project envisages construction of 1359 m earthen dam across Modikunta Vagu to store 2.142 TMC of water to irrigate 5,500 ha of dry lands belongs to 35 villages of

Wajeed Mandal in Jayashankar Bhupalapally District, Telangana. The project also envisages supply of 0.12 TMC drinking water to the benefitting villages.

2.5 Imports vs. Indigenous production

By implementation of the proposed project improvement in crop cultivation can be achieved.

2.6. Export possibility

This project may ultimately lead to export of excess food grains.

2.7. Domestic/ Export markets.

The project produce will have favorable impact on domestic and export markets.

2.8. Employment Generation (Direct and Indirect) due to the project.

Around 150 people (50 Technical and 100 construction laborers) are expected to be employed temporarily for the construction of 1359 m earthen dam, spill well, sluice gates, canal system and distributory networks. During operation phase labourers will be appointed for operation and maintenance.

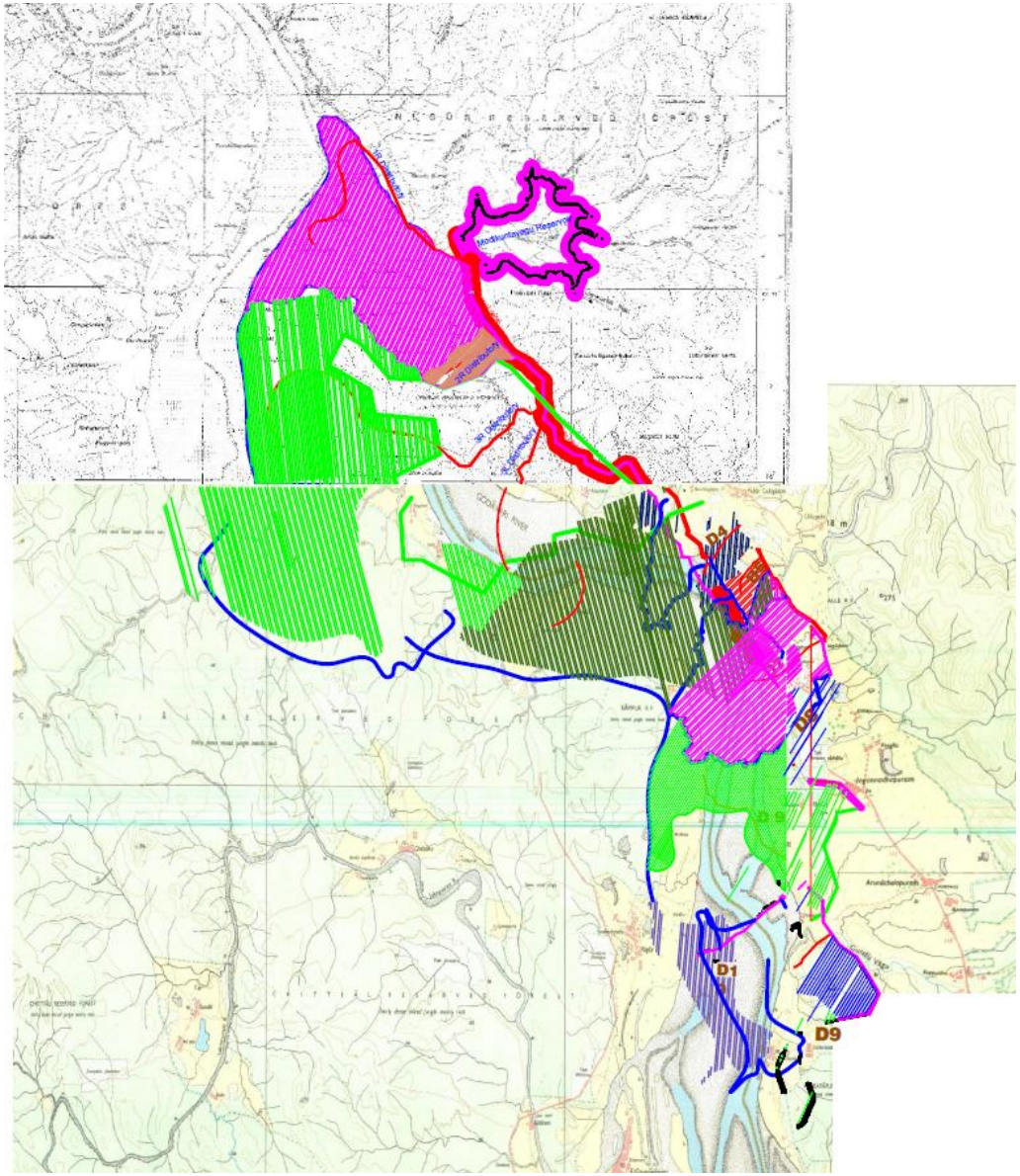


Fig.2.1 Command area map

3. Project Description

3.1. Type of project including interlinked and interdependent project, if any.

According to EIA Notification, 2006 and its subsequent amendments, the project is categorized as 'B'. However, General conditions applicable for the project due to the presence of Eco-sensitive Zone boundary of Eturnagaram Wildlife Sanctuary at a distance of 4.9 Km. Hence, the project is categorized 'A' and requires Environmental Clearance from MoEF, New Delhi.

3.2. Location (map showing general location, specific location, and project boundary & project site layout) with coordinates.

The proposed project is situated near Krishnapuram village in Wazeedu Mandal, Jayashankar Bhupalapally District, Telangana. Location map of the project is shown in Fig.3.1.

3.3. Details of alternative sites, considered and the basis of selecting the proposed site particularly the environmental considerations gone into should be highlighted.

Not applicable

3.4. Size & magnitude of operation

The project envisages construction of 1359 m earthen dam across Modikunta Vagu to store 2.142 TMC of water to irrigate 5,500 ha of dry lands belongs to 35 villages of Wajeed Mandal in Jayashankar Bhupalapally District, Telangana. The project also envisages supply of 0.12 TMC drinking water to the benefitting villages.

3.5. Project description with process details (a schematic diagram/flow chart showing the project layout, components of the project etc) should be given.

The project comprises of major components which are listed below:

- The net commend area under the project is 5,500 Ha. Out of which 900 Ha on right flank the rest of 4,600 Ha is on left flank. Due to existing high hillock on left flank only one head sluice is provided on right flank to cater the needs of whole command.

- The Main canal taking off from Ch. 600 of the Dam. The carrying capacity of the main canal at head reach is 9.03 Cumecs against the required discharge of the main 8.08 Cumecs.
- The first distributor of length 5.270km starts from CH: 0.12 at EL: 95.94M through Pipe culvert or trough cross the TRC of length 150 mts, to feed an Ayacut of 900 Ha.
- The left main canal crosses the main course of the Modikuntavagu by an Aqueduct to feed an ayacut of 4600 Ha. The length of the Main canal is 21.850 Km.
- EIA/ EMP report and R&R plan if applicable.

The schematic diagram of project is given as fig 3.2.

Fig.3.1 Location map of proposed project

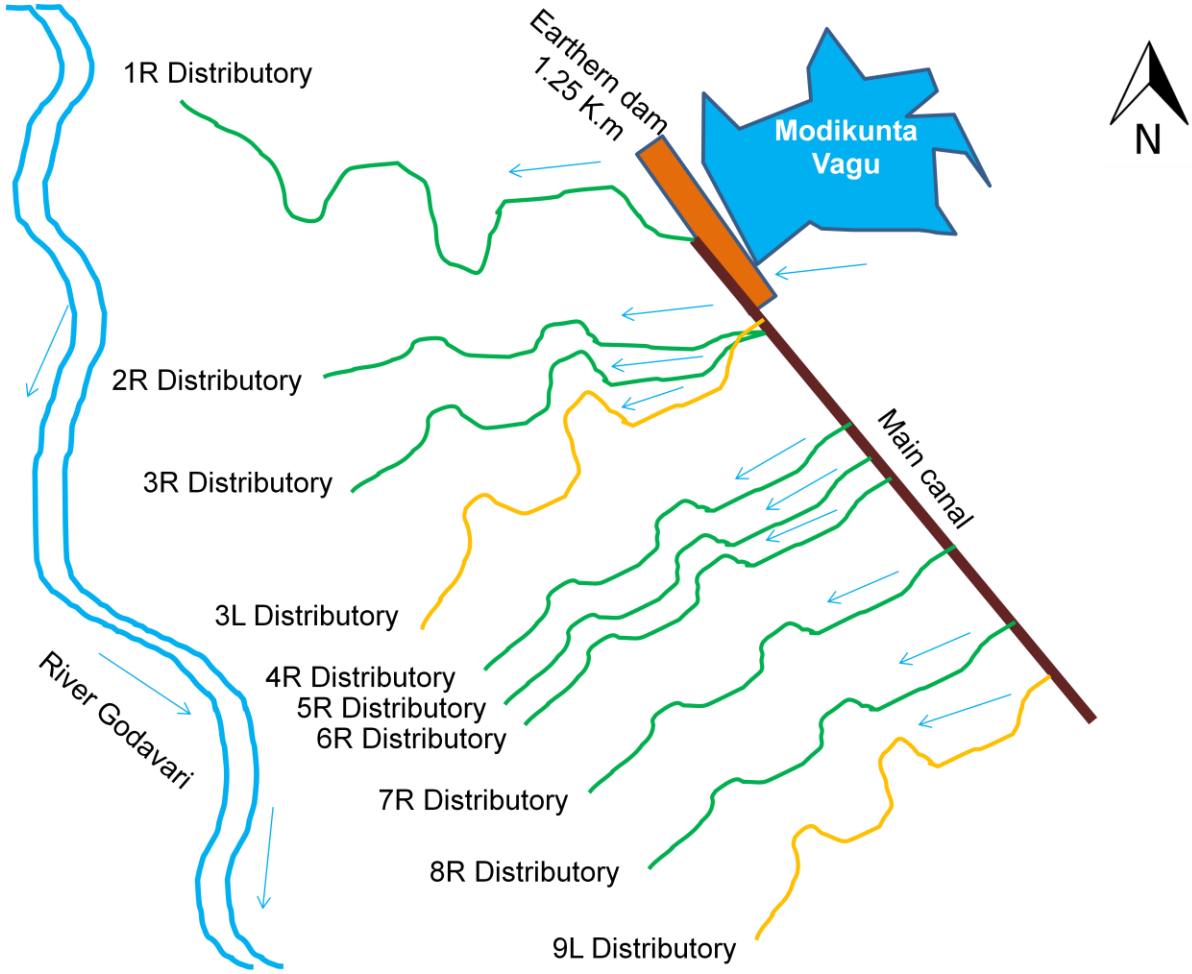


Fig.3.2 Flow diagram of Distributories

3.6. Raw material required along with estimated quantity, likely source, marketing area of final products, mode of transport of raw material and finished products.

Raw material required for the construction purpose will be sourced from Government approved quarries.

3.7. Resource optimization/recycling and reuse envisaged in the project, if any, should be briefly outlined.

Resource Optimization / recycling and reuse is not envisaged in this project, however depending on the suitability of the soil, the excavated soil will be used for bund construction, laying of service roads as well as for green belt development. Construction site would be properly leveled. The leveling will be made mandatory for the contractor, involved in the construction.

3.8. Availability of water, its source, Energy/ Power requirement & source water requirement

- Water Requirement

About 7 KLD of water will be required during construction phase (45lts per day/ labour, 150 x 45lpd = 6,750 lpd i.e., 7 KLD). It is proposed to store 2.142 TMC of water from Modigunta Vagu to irrigate 5,500 ha for irrigation purpose during operation phase.

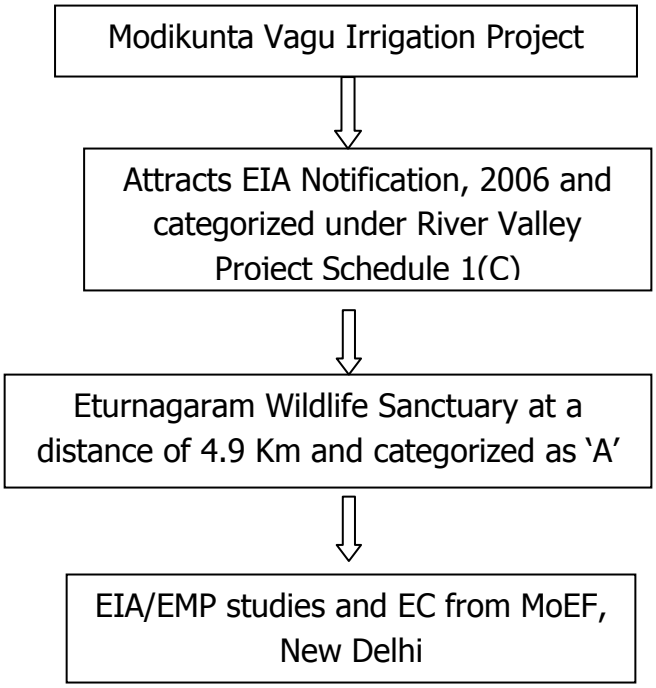
- Power Requirement

The scheme comprises of gravity flow and hence power requirement doesn't arise.

3.9. Quantity of wastes generated (liquid and solid) and scheme for their Management/disposal.

Sewage generated from the labour camps will be treated in septic tank and soak pits that will be designed and constructed as per IS 2470 Part-I and Part-II. Domestic solid wastes proposed to be generated from labour camps will be disposed to nearby Municipal authorities. Total water consumption is 7 KLD for labor camps, wastewater generated is 80% of total water consumption i.e., 5.6 KLD. Total solid waste generated from 250 labors is 68 kg/D.

3.10. Schematic representations of the feasibility drawing which give information of EIA purpose



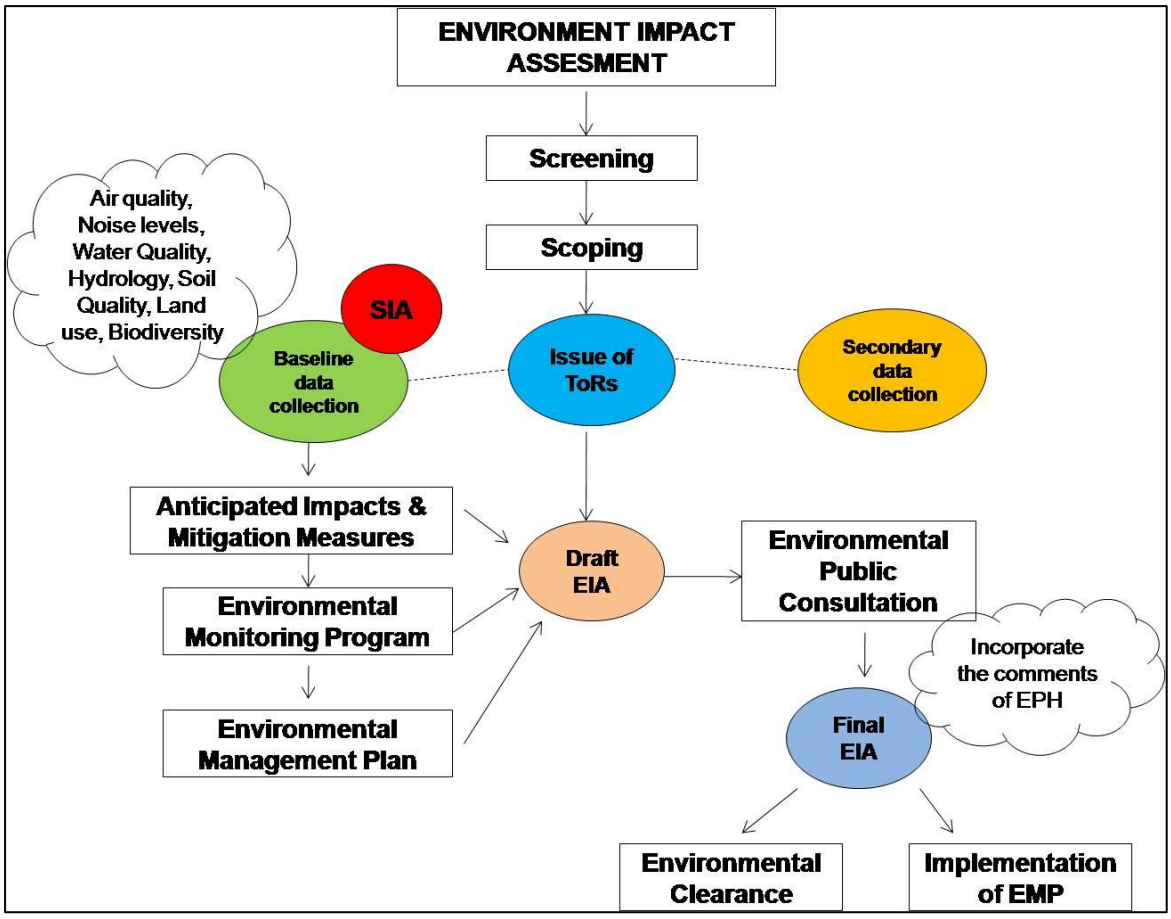


Figure 3.3 Sequence of approach for EIA studies

4. Site Analysis

4.1. Connectivity

The proposed site is located at about 2.00 Kms from Krishnapuram village, Mandal Jayashankar Bhupalapally District, which is about 292 Kms from Hyderabad on Hyderabad-Chandruptla (Via Warangal –Eturunagaram) NH 163 Road.

4.2. Land form, land use and land ownership.

The land use in the proposed project area is deep black cotton soil, deep red soil, Laterite soil and medium black soil. Commonly grown crops in the region are paddy, Jowar, maize, Green, red and Bengal grams. Land use pattern of the district is given below:

Table – 2 Land use of Bhupalapally district

Sl.No.	Category	Area in Ha.
1	Forest	250410
2	Barren and uncultivable land	83834
3	Non – agricultural land	80475
4	Cultivable waste	19234
5	Permanent pastures and other grazing lands	54852
6	Misc. tree crops and groves	7131
7	Other fallow lands	53143
8	Current fallow	306425
9	Net area sown	332992
10	Geographical area	1188499

4.3. Topography (along with map)

The interior of the basin is a plateau divided into a series of valleys sloping generally towards West and slopes towards Godavari river.

4.4. Environmental Sensitivity

The proposed project requires 498.89 Ha of forest land, Eco-sensitive Zone boundary of Eturnagaram Wildlife Sanctuary at a distance of 4.9 Km. View of the location of Eturnagaram WLS is given below.

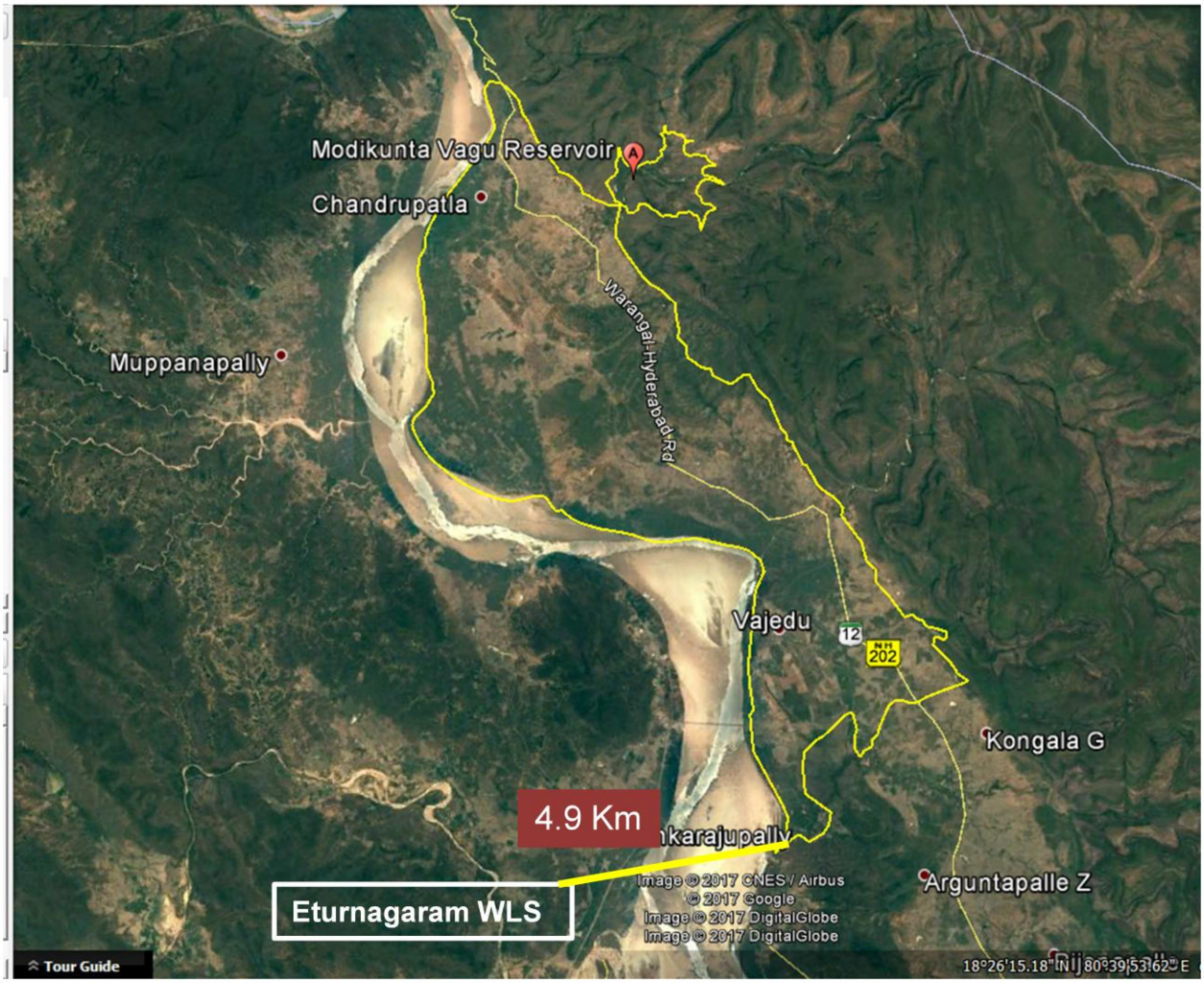


Figure 4.1 Distance of Eturnagaram WLS to the project boundry

4.5. Existing Infrastructure

Project head works is approachable by Hyderabad Warangal road, and also by other service roads.

4.6. Soil Classification

Red soil is predominant in this region which includes chalkas, red sandy and deep red loamy soil. Very deep black cotton soil is also seen in some parts of the zone. Deep and moderately well drained cracking clayey and calcareous soils are located seen near valley.

4.7. Climatic data from secondary sources

The proposed command area falls under Agro – Climatic zone IV i.e., North Telangana Zone with an annual average rainfall ranging from 900 – 1150 mm, mostly received during southwest monsoon.

During summer the period of sunshine is more than 8 hours, whereas during rainy the availability of sunshine is about 5 hrs. However it is observed that the rainfall is erratic and cannot be depended for irrigation purpose.

4.8. Social Infrastructure available

In the close proximity of the project site, educational, religious and transportation facilities are found. The habitants have a good transportation facility as these are accessible easily. There is good number of educational institutes like Government College and Hospitals. Overall it is clearly seen that the social infrastructure in and around the project site is of a good standard.

5. Planning

5.1. Planning concept (type of industries, facilities, transportation, etc.,) Town and Country Planning Development authority classification.

Transportation facility is approachable through Hyderabad Warangal road, and also by other service roads. List of Benefitting villages are as follows:

Sl.No.	Name of Villages	Sl.No.	Name of Villages
1	Perur	19	Gummadi Doddi
2	Korakallu	20	Pragallapally
3	Mothugudem	21	Poosuru
4	Ghat Veerabpuram	22	Gangapuram
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16	Ayyavaripeta	34	Jangalapally
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18	China Gollagudem		

5.2. Population Projection.

Influx of labourers will be only during construction phase, only few people will be employed for operation and maintenance of the project.

5.3. Land use planning (breakup along with green belt etc.)

No changes are planned in land use as the proposed project will stabilize existing command area.

5.4. Assessment of Infrastructure Demand (Physical & Social).

The proposed project envisages construction of 1359 m earthen dam across Modikunta Vagu to store 2.142 TMC of water to irrigate 5,500 ha of dry lands belongs to 35 villages and thereby agricultural productivity will be enhanced.

5.5. Amenities/facilities

Proper site services such as First Aid, Canteen / Rest Shelter, Drinking Water will be provided to the construction workers. Various facilities to be provided during construction and operation of the project are as follows:

- Electricity shall be provided by transmission lines and DG sets.
- Drinking water will be provided to the workers by tankers during construction.
- To provide the first aid for any sort of injuries encountered during the operation, one first aid room shall be provided. First aid kit and sufficient stock of material / medicines needed for first aid shall be provided as per requirement.
- In future if women workers are employed, arrangement for a crèche shall be made as per the requirement.
- Necessary arrangement shall be made for conducting refresher course as laid down in vocational training rules to upgrade skills of the persons involved in the project.
- Construction workers engaged in forest areas of the project will be provided.
- LPG/Kerosene for cooking purpose to prevent possible tree felling in forest areas.

6. Proposed Infrastructure

6.1. Industrial Area (Processing area)

Not applicable

6.2. Residential Area (non processing area)

Not applicable

6.3. Social Infrastructure

There is good number of educational institutes like Eturnagaram Government Junior college, and Eturnagaram Government hospital etc are available in the region. Overall, it is clearly seen that the social infrastructure in and around the project site is of a good standard.

6.4. Connectivity Traffic and Transportation Road/Rail/Metro/Water ways etc.,

The project site (Head works) is approachable by Warangal-Hyderabad.

6.5. Sewerage System

Sewage generated from the labour camps is proposed to be treated in Septic Tank and Soak Pits designed and constructed as per IS 2470 Part-I & Part-II.

6.6. Industrial waste management

Not Applicable

6.7. Solid waste management

Domestic solid waste will be handover to municipal authorities.

6.8. Power requirement & Supply/Source

The scheme comprises of gravity flow and hence power requirement doesn't arise.

7. Rehabilitation and Resettlement (R&R) Plan

7.1. Policy to be adopted (Central/State) in respect of the project affected persons including home ouster, land ouster, and landless labourers (a brief outline to be given).

The project involves construction of earthen dam for which 472.25 Ha will be submerged at FRL 124 m. The total land required for the project is 75.96 Ha of non forest land and 499 Ha of Forest Land is required for the project. 500.20 Ha of CA land is handed over to Forest Department land for compensatory Afforestation. No villages will be submerged under the scheme. Land shall be acquired as per Right to Fair Compensation and Transparency in Land Acquisition Rehabilitation and Resettlement Act (RTFC&LARR Act), 2013. The forest land will be acquired as per the Forest (Conservation) Act, 1980.

8. Project Schedule & Cost Estimation

8.1. Project Schedule

The total developmental period of the entire proposed project will be about 2 years.

8.2. Cost Estimates

The total cost estimated for the proposed project is Rs 491.25 Crores.

9. Analysis of proposal (Final recommendation)

9.1. Financial and social benefits with special emphasis on the benefit to the local people including tribal population, if any, in the area

BC Ratio of the project is 1.697**.**

Sl. No	Item	Rs. In Lakhs	
		Before Irrigation (Without Project)	After Irrigation (With Project)
A	**GROSS RECEIPTS**		
1	Gross value of farm produce	904.631	9263.151
2	Dung receipts (30 % of the fodder expenditure (B.4))	40.709	277.895
3	Total (A) Gross receipts (1+2)	945.340	9541.046
B	**EXPENSES**		
1	Expenditure on seeds	45.616	332.350
2	Expenditure on manures etc	79.280	333.580
3	Expenditure on hired labour (human and bullock).	123.560	373.740
4	Fodder expenses (15% for pre and 10% at post project of (A1))	135.695	926.315
5	Depreciation on implements (2.70 % on A1)	24.425	250.105
6	Share and cash rent (5 % for pre and 3 %for post project of A1)	45.232	277.895
7	Land revenue (2 % of A1)	18.093	185.263
8	Total (B) Expenses (1 to 7)	471.901	2679.248
C	**NET VALUE OF PRODUCE**		
1	Total Gross receipts (Total A.3)	945.340	9541.046
2	Minus Total expenses (Total B.8)	471.901	2679.248
3	Net Value of Produce (C) : (1-2)	473.439	6861.798
D	**ANNUAL AGRICULTURAL BENEFITS**		
1	Net value after Irrigation (C.3)	6861.798	
2	Net value before irrigation (C.3)	-473.439	
3	Loss of agri. Produce due to submergence (580.30 x 89.96 / 13591)	0.000	
4	Benefit from drinking water supply (3.511 M.cum @ Rs 77 per Kilo liter as per SSR 2014-15)	2703.470	
5	Benefit from fisheries (avg of area at FRL & MDDL) (472 + 53.25)/2 x 1500 x 2.47	9.730	
6	Net annual benefit (1-2-3+4+5)	9101.559	
E	**COST**		
1	Capital cost of project	49125.030	
2	Cost of land development @ Rs. 2000 / ha on 5500 ha	0.000	
3	Power charges at Rs100/- per Ha for 1500 Ha	1.500	
4	Cost of Borewells (As per ground water department report).	303.000	
5	Total cost of project	49429.530	
F	ANNUAL COST		
1	Interest on capital @ 10 % of cost (E.5)	4942.953	

2	Depreciation of the project @ 2 % of the cost (F.1)	98.859
3	Depreciation of LIS	
	a. 2% on estimated cost of civil work of LIS	0.000
	b. 3.3% on the cost of mechanical portion	0.000
	c. 8.33% on cost of pumps	0.000
4	O & M charges @ Rs.1175 per ha of CCA (5500ha)	64.625
5	Maintenance charges of head works @ 1 % of Rs 26483.68 lakh	257.893
6	TOTAL ANNUAL COST	5364.330
	Benefit Cost Ratio B/C : (9101.559 / 5364.33) =	1.697

10. Draft Terms of Reference (TOR's)

10.1 Study Area

Modikunta Vagu envisages construction of 1359 m earthen dam across Modikunta Vagu to store 2.142 TMC of water to irrigate 5,500 ha of dry lands belongs to 35 villages of Wajeed Mandal in Jayashankar Bhupalapally District, Telangana.

10.2 Environmental Monitoring/Baseline study

- Soil Quality sampling stations - 7 locations
- Water Quality sampling stations - 5 Locations (Surface Water-2 & Ground Water-3)
- Air Quality Sampling Stations - 3 Locations
- Noise Quality Sampling Stations - 3 Locations

10.2.1 Draft Terms of Reference (TOR's) Proposed to be covered in EIA/EMP Report

Baseline Environmental Studies

- The baseline environmental studies will be conducted in three season.

(a) Physico-Chemical Environment

- Physical geography, Topography, Regional Geology and presence of mineral deposits, if any in the study area.
- Meteorological monitoring data (Temperature, rainfall, RH, wind speed, wind direction, etc) from Nearest IMD station and also establishing micro meteorological station at the project site.
- Ambient air quality parameters such as Particulate Matter (PM_{10}, $PM_{2.5}$), Sulphur dioxide (SO_2) and Oxides of Nitrogen (NO_2) for the study area at 2 stations.
- Existing Noise Levels in the study area at 2 stations.
- Soil studies considering irrigation component of the project: includes Soil Quality analysis for Physico-Chemical parameters (viz. Soil Type, Texture, Porosity, Permeability, Hydraulic conductivity, Water Holding Capacity, Bulk Density, Moisture, pH, Electrical Conductivity, Magnesium, Calcium, Total Alkalinity, Chlorides, Sodium, Potassium, Organic Carbon, Available Potassium, Phosphorus, Available Phosphorus, SAR, Nitrogen, Nitrates, Nitrites, Salinity, Available nitrogen,

Zinc, Boron, Lead, Manganese, Iron, Nickel, Barium, Copper, Hexavalent Chromium, Cadmium and Mercury) in the study area at 7 locations.

- Physical, Chemical and Bacteriological parameters of water quality (both surface and ground water) such as pH, Electrical Conductivity, Total Dissolved Solids (TDS), DO, Turbidity, Alkalinity, Ca, Mg, Total Hardness, Chlorides, Iron, Fluorides, Phosphates, Sulphate, Nitrates, Sodium, Potassium and Bacteriological parameters comprises of Faecal and Total Coliform at 5 locations (2 surface water and 3 ground water).
- Water use and existing projects upstream and downstream.
- History of groundwater table fluctuation in the Command Area.
- Command Area Development plan.
- Method of sewage and solid waste disposal in labour camps and in staff colony.
- Land use and land cover analysis using remote sensing data, drainage, terrain, contour maps and soil map.

(b) Biological Environment

- Characterization of forest types in the study area, if any and extent of each forest type.
- General vegetation pattern and floral diversity.
- Economically important species viz. non-wood forest producing species, including medicinal plants, timber, fuel wood etc.
- Categorization of Flora/Fauna using International Union for the Conservation of Nature and Natural Resources (IUCN) Red list Status
- Cropping and Horticulture pattern and practices in the study area.
- Birds (resident, migratory), Land animals including reptiles, amphibians, fishes and insects in the study area.
- Details of endemic species found in the project area/study.
- RET flora species will be classified as per IUCN Red Data list, 2017. Details of endemic species will be provided.
- RET fauna species will be classified as per IUCN Red Data list, 2017. Details of endemic species will be provided.
- Aquatic Ecological study of Godavari River including documentation of status of fishes, zoo and Phyto plankton, benthos etc.

(c) Environmental Impact Assessment (Impact Identification and Prediction)

The impacts that will be assessed on various components of the environment during construction and operational stage of the proposed project will be given under the following headings:

1) Land Environment

- Immigration of labour population.
- Muck generation and disposal
- Operation of construction equipment
- Construction of roads, etc.
- Acquisition of Land
- Seismicity
- Inundation of land
- Change in land use pattern and topography etc.,
- Impact on Soil and Water environment of proposed Command Area.

2) Water Environment

- From labour camps/colony
- From equipments washings
- Change in hydraulic regime and downstream flow
- Impact on downstream users and environmental flows
- Water pollution due to disposal of sewage
- Impacts on river water quality

3) Terrestrial Flora

- Pressure on existing natural resource
- Loss of floral diversity

4) Terrestrial Fauna

- Disturbance to Wildlife, if any.
- Impacts on Avian-Fauna, if any.

5) Aquatic Ecology

- Impacts on aquatic ecosystem and biodiversity
- Impact on fish fauna
- Fish population

- Change in aquatic diversity

6) Noise Environment

- Anticipated Increase in Noise Levels during construction
- Impact of noise levels on hearing
- Effect on fauna and human health

7) Air Environment

- Pollution due to fuel combustion in equipments
- Pollution due to fuel combustion in vehicles
- Effects on human health
- Dust pollution
- Impact of emissions from DG sets used for construction on air environment.
- Fugitive emissions from various sources

8) Socio Economic Environment

- Impact of the socio-economic status
- Impact on yield of crops due to irrigation
- Impact on human health due to water/vector borne disease
- Impact on the local community including demographic changes

9) Public Health Environment

- Impacts on Occupational Health and status.
- Endemic disease
- Human waste disposal
- Sewage Disposal

d) Environmental Impact Evaluation

Environmental Impact Analysis/Evaluation during construction and operation phases of the proposed project will be carried out adopting matrix system considering impacts without EMP and with EMP aspects.

e) Environmental Management Plan (EMP)

Environmental Management Plan (EMP) aims at minimizing the negative impacts of the proposed project on the surrounding environment. The mitigation measures for all the likely adverse impacts on the environment due to activities of the project will be given under the various following headings:

- Air Quality Management Plan
- Water Quality Management Plan
- Noise Level Management Plan
- Environmental safeguards (management) during construction activities
- Muck Disposal Plan
- Management to arrest salinity/ alkalinity in the wake of irrigation
- Command Area Development Plan
- Ground water management Plan.
- Public Health Management Plan
- Subsidized Fuel Management Plan
- Greenbelt Development Plan
- Environmental Monitoring Programme (With physical & financial details covering all the aspects of EMP i.e., budgetary allocation estimated for EMP will be included).

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