

REPORT ON
PILOT CENSUS OF SETHIATOPE IRRIGATION PROJECT

Table of Contents

Abbreviations	2
Definition of Terms Used in Report	4
ABBREVIATIONS	2
DEFINITIONS OF TERMS USED IN THE REPORT	4
1. Background.....	12
2. Scope of Work	15
3. Objectives	16
4. Project Details.....	17
5. Approach and Methodology	26
6. Generation of Canal Network	30
7. Results and Findings.....	39
8. Constraints/ Reasons for Gap	43
9. Recommendations:	45
10 Photographs of Damaged/ Broken Outlets	46
Appendix-I.....	53
Appendix-II.....	54
Annexures:	
Annexure-I Schedule prescribed for Data Collection by CWC for Phase I	61
Annexure-II Schedule prescribed for Data Collection or Phase II	73

ABBREVIATIONS

AFC	AFC India Limited
BRGF	Backward Regions Grant Fund
CAD WM	Command Area Development and Water Management
CCA	Culturable Command Area
Cumec	Cubic meter per second
cusec	Cubic feet per second
CWC	Central Water Commission
Dn	Division
DPR	Detailed Project Report
DSS	Data Storage System
Dy	Distributory
E	East
ERM	Extension, Renovation and Modernisation
FRL	Full Reservoir Level
GPS	Global Positioning System
Ha	Hectare
IPC	Irrigation Potential Created
IPU	Irrigation Potential Utilized
km	Kilometer
KML	Keyhole Markup Language
L	Left
Lat.	Latitude
LBC	Left Bank Canal
LBMC	Left Bank Main Canal
Long.	Longitude

Report on Pilot Census of Sethiatoi Irrigation Project

m	Meter
m ³	cubic meter
MCM	Million Cubic Meter
MDDL	Minimum Draw Down Level
MMI	Major and Medium Irrigation Projects
MNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
Mr	Minor
MW	Megawatts
N	North
NCR	National Capital Region
O & M	Operations and Maintenance
PIM	Participatory Irrigation Management
PSU	Public Sector Units
R	Right
RBC	Right Bank Canal
RBMC	Right Bank Main Canal
RD	Reduced Distance/ Chainage
RFP	Request For Proposal
RL	Reduced Level
SDy	Subdistributory
SLD	Single Line Diagram
SMr	Subminor
Sq. km	Square Kilometer
TAC	Technical Appraisal Committee
UGC	Upper Ganga Canal
UIP	Ultimate Irrigation Potential
WUA	Water Users Association

DEFINITIONS OF TERMS USED IN THE REPORT

AGRICULTURE

Cash Crops

A high value marketable crop such as sugarcane, jute, spices, fruits, tobacco and plantation crops.

Cropping intensity

The percentage of the total crop area during a crop year or season to the culturable command area.

Cropping Pattern

Yearly sequence and spacious arrangement of the crops in a given area.

Gross Cropped Area (GCA) (or Cropped Area)

Gross cropped area is the total cropped area under various crops during the whole agricultural year counting the area as many times as the number of crops grown on the same land. Mixed crops sown simultaneously on the same land are treated as one crop.

Kharif crops

Those crops which are cultivated in the monsoon season. The following are the principal kharif crops: Maize, rice, small millets, peas, groundnut, cotton, tobacco, and sesame.

Mixed Crop

Where more than one crop is raised on the same field in the same season simultaneously, without any definite row arrangement such as gram and wheat.

Net Cropped Area (Net Area Sown)

Net cropped area is the area sown (or cropped) during the agricultural season (July-June), counting the area only once even if two or more crops are grown in different seasons on the same land.

Perennial crops

Crops which last several crop years like plantation or orchard crops.

Rabi Crops

Those crops which are cultivated in the winter season. The following are the principal Rabi crops: Wheat, barley, gram, peas, potatoes, mustard, tobacco and linseed.

Summer Crop

Often represents an intermediate (third) crop between the Rabi and Kharif crops.

HYDRAULIC STRUCTURES

Barrage

A structure built across a river, for diverting water into a canal or for providing a small storage pond. It comprises a series of gates for regulating the river flow and water level, while keeping the afflux during floods within, acceptable limits. The structure may or may not have a raised sill. It is constructed to regulate the water-surface level and to divert the water flow from upstream of the gates.

Composite Dam

A concrete/masonry wall with rockfill or earth-backing in downstream.

Lining

A protective covering (over entire or portion of the perimeter) of a water conductor system or reservoir to reduce seepage losses, to withstand pressure, to reduce and prevent erosion and improve conditions of flow.

Pond Level

The level of water immediately upstream of a structure required to facilitate withdrawal into the canal or for any other purpose.

Sill

a) A structure built under water across deep pools of a river course for counteracting the tendency to excessive scour.

- b) A structure built at the outlet of a channel where certain minimum depth offlow is to be maintained in the channel, or a structure built at the head of a channel to prevent flow entering the channel until the main river stage reaches the crest of the structure.
- c) The invert of a gate or sluice opening.

Under Sluices

The under sluices are bays in continuation of the weir with a crest at lower level on the same side as the canal to maintain a clear and well defined rives channel towards the canal head regulator, to scour the silt deposlted on the river bed in the pocket upstream of canal head regulator or to pass winter freshness and low floods without dropping the weir shutters.

Weir or Anicut

An ungated barrier across a stream or a river for the purpose of:

- a) measuring its discharge, or
- b) raising, controlling and maintaining the water level, and/or,
- c) diverting part or all the water from the stream/river into a canal or conduit.

Run-of-the River Power Station

A power station utilizing the run-of-the river flows for generation of power with sufficient pondage for supplying water for meeting diurnal or weekly fluctuations of demand. In such stations, the normal course of the river is not materially altered.

IRRIGATION

Classification of Irrigation Projects

The irrigation projects can be classified as:

- i. Major Irrigation Scheme - Culturable Command Area (CCA) more than 10,000 hectare (ha)
- ii. Medium Irrigation Scheme- Culturable Command Area (CCA) more than 2000 hectare (ha) and upto 10,000 hectare (ha)

iii. Minor Irrigation Scheme - Culturable Command Area (CCA) upto 2000 hectare (ha)

Closure period

The period when the canal is closed for regular maintenance, repairs and other purposes.

Consumptive Use Efficiency

The ratio of consumptive water use by crop and the soil moisture stored in the root zone of the soil during the crop growth period.

Conveyance

The movement of water from its source through the main or secondary canals or conduits to the tertiary or distributory offtakes.

Conveyance Losses or Transmission Losses

Losses of water in transit from the source of supply to the point of field turn out whether in natural channels or in artificial ones, such as canals, distributaries or watercourses. They comprise evaporation from the water surface, seepage and incidental transpiration by vegetation growing in or along the canals network. These also include the operation losses in the canal system.

Crop Water Requirement

The total water needed for evapo-transpiration from planting to harvest for a given crop in a specific climate regime, when adequate soil water is maintained, by rainfall and/or irrigation so that it does not limit plant growth or crop yield.

Culturable Command Area

It is the area which can be physically irrigated from the scheme and is fit for cultivation **or** The difference between the gross command area and the unculturable area falling under the command **or** Total area in which cultivation is possible.

Distributary or Tertiary

Canal or conduit taking water from the conveyance system and supply it to one tertiary unit.

Diversion Structure

The structure that diverts water from the water sources and supplies it to the irrigation system.

Drip/Trickle Irrigation

It comprises the application of water in drops close to the plant. The entire space between the plants is not watered.

Field Channel

Channel usually taking water from the watercourse and supplying it to one or more farms or fields.

Field Irrigation Requirements

The requirements of irrigation water for crops at the diversion point of supply channel.

Flow Irrigated Area

Area which can be irrigated from the source of water, by flow under gravity alone.

Gross Command Area

The total geographical area which can normally be commanded or serviced from an irrigation project without consideration of water supplies available for irrigation. It is the total area covered by an irrigation project including unculturable area under habitation, road, tanks, waste land, forest land etc.

Gross Irrigated Area

The gross irrigated area is the total irrigated area under various crops during the whole agricultural year, counting the area irrigated under more than one crop during the same year as many times as the number of crops grown. Inter-cultured or mixed crops are treated as one crop.

Irrigation

The supply of water by artificial means for raising crops.

Irrigated Area

The area to which irrigation water has been applied.

Irrigation Potential Created - (As per Planning Commission)

a. The irrigation potential created by a project at a given time during or after its construction is the aggregate gross area that can be irrigated annually by the quantity of water that could be made available by all connected and completed works upto the end of the water courses or the last point in the water delivery system upto which the Government is responsible for construction.

b. Before an area is included and reported under 'Potential Created', it may be ensured that the storage, head-works as well as the distribution system including irrigation outlets to serve the area are completed together with necessary water courses covering chaks or blocks upto 40 hectares in area and that works completed will make available the requisite water for the purpose in a design year for the assumed cropping pattern. The irrigation outlets should be of a capacity of about 0.03 cumec. The capacity may, however, vary depending on local conditions relating to topography, cropping pattern, etc. but it should not normally exceed 0.06 cumec. The figures of the potential which relate to the gross irrigated 'new area' and 'old area stabilized' should be reported separately. The potential which refers to the 'old areas stabilized' should, however, not be considered as adding to the total irrigation potential created since this area would have already counted earlier once.

Irrigation Potential Utilized - (As per Planning Commission)

a. The irrigation potential utilized is the total gross area actually irrigated by a project during the year under consideration. The figures relating to the stabilization of 'old area' should be furnished separately in this case also since these will not be additive to the gross area irrigated.

b. As, generally, the utilization of irrigation potential created can take place only in the year following the creation of such potential, it will be appropriate if the irrigation potential utilized in a particular year is considered with the potential created upto the end of the preceding year for the purpose of comparison.

Irrigation System

It includes storage and diversion structure, main canal, distributory, minors, water courses, field channels, and allied structures including head regulator, cross drainage works and control structures.

Irrigation Water Requirement

The amount of crop water requirement that is not provided by effective rainfall, utilization of stored soil moisture or upward flow of water to the root zone from a saturated zone.

Rostering of Channels

It is the sequencing of water delivery in different channels as a part of regulation.

Surface Irrigation

Method of irrigation where the water flows on to the field surface by gravity from the head to the tail end.

Surface Irrigation Method

It is the application of water by surface method such as wild flooding, border strip, check basis, and furrows for raising crops.

Ultimate Irrigation Potential -(As per Planning Commission)

- i. It is the gross area that can be irrigated from a project in a design year for the projected cropping pattern and assumed water allowance on its full development. The gross irrigated area will be aggregate of the areas irrigated in different crop seasons, the areas under two-seasonal and perennial crops being counted only once in the year.
- ii. The following considerations have to be taken into account in estimating the ultimate irrigation potential expected from a project in terms of area:
 - a) It will not be correct to assume the culturable command area as an arbitrary percentage of the gross command area. The CCA should be assessed from actual and by consulting land records.
 - b) A part of the area being proposed to be brought under irrigation from a project may be already receiving irrigation from other sources, whether major, medium or

Report on Pilot Census of Sethiatope Irrigation Project

minor irrigation works, which might have been commissioned earlier. The benefits from the new project may be by way of an additional water allowance to irrigation more secure or to stabilize irrigation the area. Such area should not be counted in new irrigation potential but considered only as stabilize of irrigation in an old area. The Ultimate irrigation potential should indicate only figures of gross irrigation of new area whether in the new command area or in the existing command (by increasing the intensity of cropping). The old area stabilized may be reported separately.

FINAL REPORT

PILOT CENSUS OF SETHIATOPE IRRIGATION PROJECT

1. Background

1.1 The growing gap between Irrigation Potential Created (IPC) and that Utilized (IPU) is becoming a matter of great concern. Though there exists a gap between IPC and IPU, which need to be bridged, but often this gap gets over-estimated since the same command area is counted as potential created under surface water major/medium project and again under supplementary minor project (surface lift/ groundwater project). To assess the actual scenario of irrigation in the country, CWC considered necessary to undertake a census of completed major and medium irrigation projects to collect the following information:

- a. Culturable Command Area (CCA) and their geographical extent
- b. Irrigated area by season
- c. Irrigation Potential created and utilized (IPC & IPU)
- d. Cropping pattern
- e. Other project related information

1.2 CWC has decided to take up the pilot census for standardizing the methodology for the main census of MMI projects by taking one project (major or medium) from each of different regions namely North, South, East, West, North-West, South-East, South-West & Central. As such about 8 projects would be covered in the pilot census. The Pilot Census is to be covered in two phases described as below:

Phase-I: Collection of data pertaining to inventory detail of 8 selected projects from project authorities.

Phase-II: Collection of data through outsourcing up to outlet level (i.e. data on utilization part) of the 8 projects covered in the Phase-I.

1.3 **Progress achieved by CWC:** CWC has selected 8 projects covered in the Phase-I for collecting inventory-details. The list of 8 selected projects is as below:

Report on Pilot Census of Sethiathope Irrigation Project

S. No.	Name of Project	Type (Major/Medium)	Region	State
1	Upper Ganga Canal	Major	North	Uttar Pradesh
2	Sethiathope Anicut System	Major	South	Tamilnadu
3	Mangalam	Medium	South	Kerala
4	Midnapur Canal	Major	East	West Bengal
5	Damanganga	Major	West	Gujarat
6	Fulzar-I	Medium	West	Gujarat
7	Pairi	Major	Central	Chhattisgarh
8	Sukla	Major	North-East	Assam

- 1.4 The data pertaining to inventory details has been collected by CWC in a prescribed schedule while executing Phase – I of the Pilot Census.
- 1.5 CWC has called for expression of Interest in January 2016 and AFC India Limited (AFC) has expressed its interest to carry out the proposed phase- II of pilot census of selected Major and Medium irrigation projects. Thereafter CWC issued the RFP in April 2016 and AFC submitted its offer online on 5th May 2016 for the 8 selected projects. CWC has awarded the assignment of conducting Census survey for the following five projects to AFC.

S. No.	Name of Project	Type (Major/ Medium)	Region	State
1	Upper Ganga Canal	Major	North	Uttar Pradesh
2	Midnapur Canal	Major	East	West Bengal
3	Fulzar-I	Medium	West	Gujarat
4	Pairi	Major	Central	Chhattisgarh
5	Sukla	Major	North-East	Assam

- 1.6 Later CWC decided to award the assignment of conducting Census survey for another two projects viz., Mangalam Medium Irrigation Project in Kerala and Sethiatope Anicut system in Tamilnadu to AFC.

2. Scope of Work

2.1 AFC carried out a comprehensive and critical review of the existing irrigation scenario in the field with the following scope of work.

- i. To identify the gaps as reported by project-authorities in each project.
- ii. To assess the reasons of reported gaps.
- iii. To diagnose the constraints and difficulties if any in achieving the targets of achieving IPC as envisaged.
- iv. To suggest remedial measures for minimizing the identified gaps of IPC and IPU.
- v. To suggest suitable methodology for carrying out the main census of major and medium irrigation projects in the country.
- vi. To prepare a command area map including canals.
- vii. To prepare Canal Network diagram with attributes attached and types of canal structures marked along with chainage. The output map will be given in *.pdf and *.kml form.

3. Objectives

3.1 The main objectives of this study are as follows:

- i. To develop a command area map including canals;
- ii. To develop Canal Network Diagram up to outlet level;
- iii. To identify the gap between IPC and IPU.
- iv. To suggest remedial measures to bridge the gap between IPC and IPU.

4. Project Details

4.1 Sethiatope Anicut system is located near Sethiatope town in Cuddalore District of Tamilnadu. The location of the Sethiatope anicut system is shown in **Fig. 4.1**.

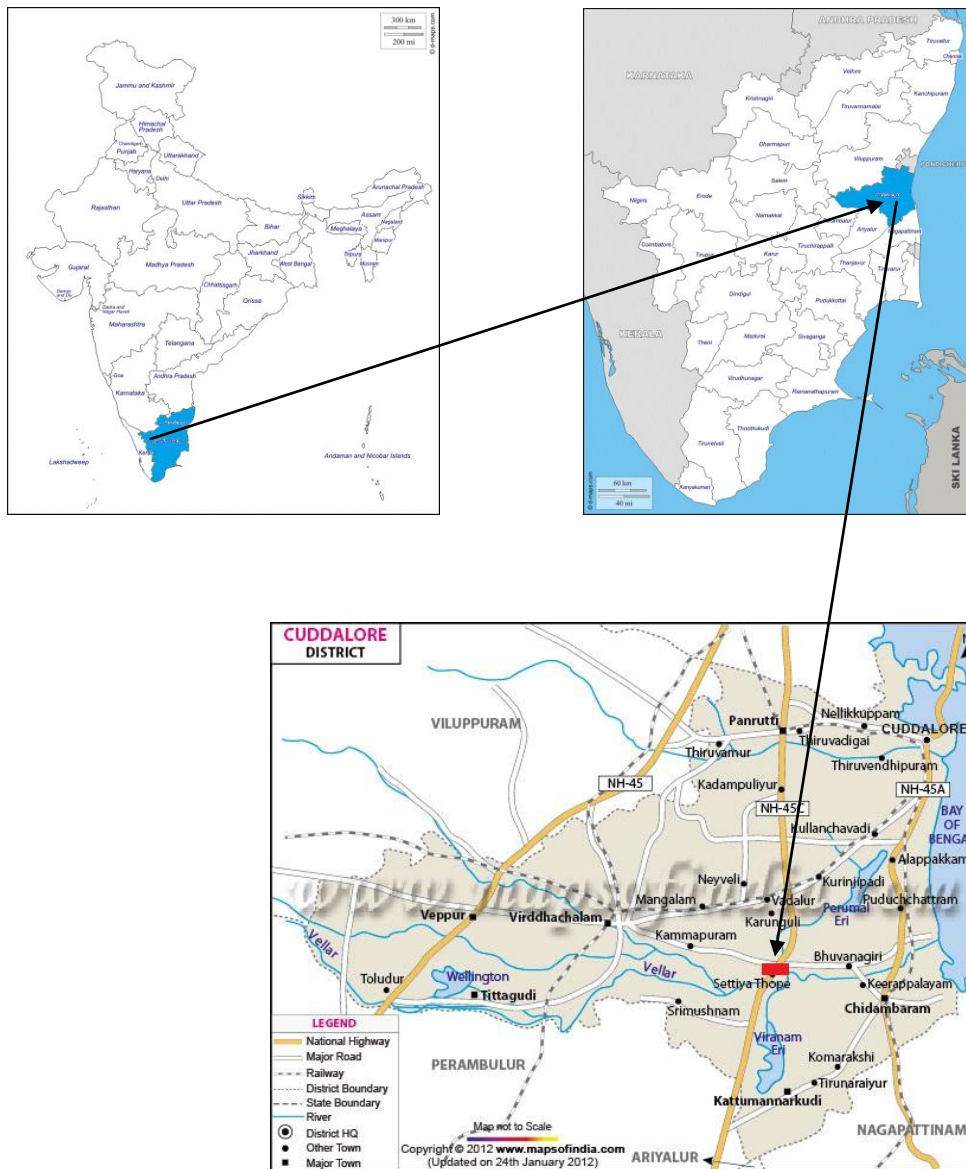


Fig. 4.1 Location of Sethiatope Anicut Sytem in Cuddalore District of Tamilnadu

4.2 Profile of District Cuddalore

Cuddalore District is one of the districts of Tamil Nadu state in southern India. The city of Cuddalore is the district headquarters. According to Census 2011, Cuddalore district had a population of 2,605,914 with a sex-ratio of 987 females for every 1,000 males. Cuddalore has been subject to a number of foreign powers through centuries including the Netherlands, Portugal, France and more recently, the British. In the 1600s, the French and English came to Cuddalore for trade and business. The French established a settlement at Pondicherry and the British at Cuddalore. The French and English, while engaged in the Seven Years' War, fought the naval "Battle of Cuddalore" in 1758. Some streets in Cuddalore retain British names such as Clive street, Wellington street, Sloper Street, Canning Street, Rope Street (Rope Street, Wellington Street, Sloper Street and Canning Street jointly known as Salangukara Village), Lawrence road and Imperial road. The Cuddalore Central Prison, opened in 1865, is an historically important landmark. Subramanya Bharathi and other political leaders served prison terms there. The siege of Cuddalore in 1783 in sea Tsunami waves that followed the 2004 Indian Ocean earthquake near Sumatra hit the eastern coast of India on 26 December 2004 at 0832h, resulting in 572 casualties. Several fishing hamlets disappeared, while Silver Beach and the historically important Cuddalore Port were devastated. Fort St. David survived without damage. In 2012, Cyclone Thane caused widespread damage to crops and buildings.

The district has an area of 3,564 km². It is bounded on the north by Viluppuram District, on the east by the Bay of Bengal, on the south by Nagapattinam District, and on the west by Perambalur District. The district is drained by Gadilam and Pennaiyar rivers in the north, Vellar and Kollidam River(Coleroon) in south. In 2006 the Ministry of Panchayati Raj named Cuddalore one of the country's 250 most backward districts (out of a total of 640). It is one of the six districts in Tamil Nadu currently receiving funds from the Backward Regions Grant Fund Programme (BRGF).

According to 2011 census, Cuddalore district had a population of 2,605,914 with a sex-ratio of 987 females for every 1,000 males, much above the national average of 929. A total of 279,950 were under the age of six, constituting 147,644 males and 132,306 females. Scheduled Castes and Scheduled Tribes accounted for 29.32% and .6% of the

Report on Pilot Census of Sethiatope Irrigation Project

population respectively. The average literacy of the district was 69.66%, compared to the national average of 72.99%. The district had a total of 635,578 households. There were 1,169,880 workers in the district comprising of 136,035 cultivators, 325,599 main agricultural labourers, 19,151 in house hold industries, 356,486 other workers, 332,609 marginal workers, 29,135 marginal cultivators, 213,813 marginal agricultural labourers, 12,876 marginal workers in household industries and 76,785 other marginal workers. The district has a population density of 702 inhabitants per square kilometre (1,820/sq mi).

Cuddalore district has 3 divisions viz., Cuddalore, Chidambaram and Virudhachalam. It has 9 taluks viz., Cuddalore, Kurinjipadi, Panruti, Chidambaram, Kattumanarkoil, Virudhachalam, Veppur, Tittakudi and Buvanagiri. There are 13 blocks in the district viz., Cuddalore, Kurinjipadi, Annagramam, Panruti, Keerapalayam, Parangipettai, Melbhuvangiri, Kumarachi, Kattumannarkoil, Virudhachalam, Nallur, Kammapuram and Mangalore. Moreover, there are 16 Town Panchayats including Sethiatope.

The district contributes significantly to the Tamil Nadu state production of cashew nut and jack fruit. The main cultivated crop is paddy over an area of 127485 ha followed by black gram (52237 ha), sugarcane (30324 ha), maize (20520 ha), Groundnut (11670 ha), green gram (11229 ha) and cotton 8614 ha) among other major crops of the district.

4.3 Salient Features of the Project

Background data of the project has been collected and salient features of the project have been given in the following:

Name of the Project	Sethiatope Anicut Project
Category of Project	Major
Name of Basin	Vellar Basin
Name of the River	Vellar River
State	Tamilnadu
Completion of Project	1895
Districts Benefitted	Cuddalore, Tamilnadu

Report on Pilot Census of Sethiatope Irrigation Project

Address of Project Headquarters	Executive Engineer, Coleroon Basin Division, Railway Feeder Road, Chidambaram- Cuddalore, Tamilnadu- 608001.
Purpose	Irrigation
Mean Annual Rainfall	1309.4 mm
Stage of Completion	Completed
Barrage:	
Name of River	Vellar
Location	11°25' N 97°32' E
Length of barrage	210 m
Catchment Area	6964 Km ²
Storage capacity	3944 MCM
Full Pond Level	12.715 m
Design Flood	3394 Cumec
HFL	16.03 m
Crest level	10.43 m
Pier Top level	18.05 m
Spillway Bays:	
Total Length	177.55 m
Number of Bays	17
No. of Gates	17 + 4 (under sluice)
Type of Gates	Vertical Lift
Size of Gate	Width- 9.45 m Height – 2.29 m.

Report on Pilot Census of Sethiatope Irrigation Project

Mode of Operation	Manual
Number of under sluice bays	4
Head Regulator	1
Location of Head Regulator	Latitude : 11°25' N, Longitude: 97°32' E
Name of River	Vellar River
GCA	19466 ha
CCA of Project as per DPR	16465 ha
CCA of Project as on March 2013	16465 ha
IPC of Project as o March 2013	13415 ha
Area irrigated during 2012-13	5295.3 ha
Volume of Water Released through head regulators (MCM)	79.69 MCM
Number of Water User Associations	58

The system envisages withdrawal of water from Vellar river through an anicut. The water is diverted to Walajah tank through Vellar Rajan canal providing irrigation enroute through several channels. The Walajah tank further transfer the water to Perumal tank. Irrigation is ensured through canal network from Walajah tank and Perumal tank.

4.4 Directory of Canal System

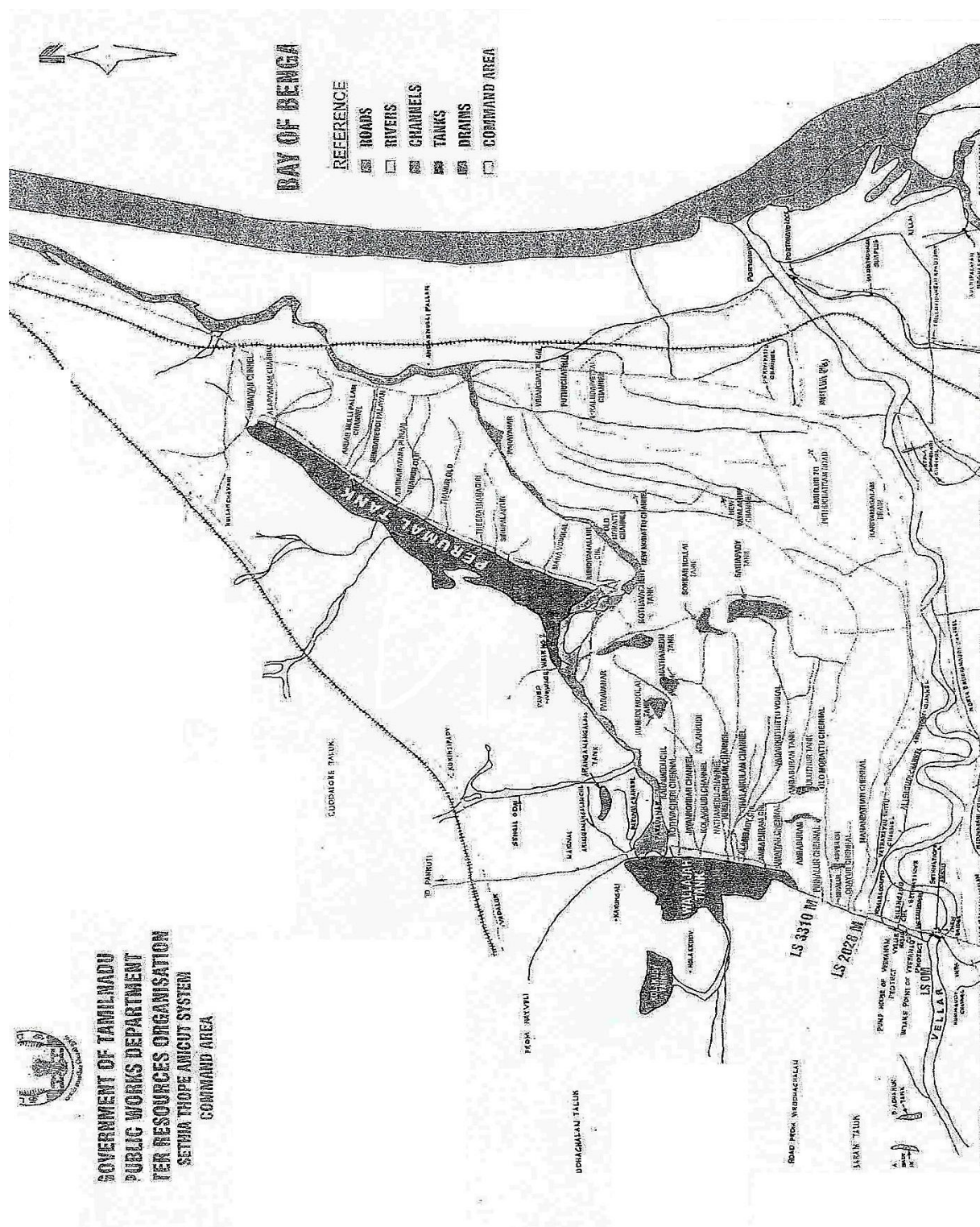
Name of Source/ Parent Canal	Name of the Canal	Off-take (RL) of the canal	Length of the canal	Canal Lined/ unlined	Head Discharge Capacity in cumec	Command Area (CCA) in Ha	Number of Outlets
Vellar Rajan	Sethiyathope High Level Channel		1610	Lined		132.39	0
Vellar Rajan	Keelangadu Channel	1215	1620	Lined	0.141	60.73	5
Vellar Rajan	Vetharayan Thittu Channel	2228	3220	Lined	0.708	191.09	5

Report on Pilot Census of Sethiatope Irrigation Project

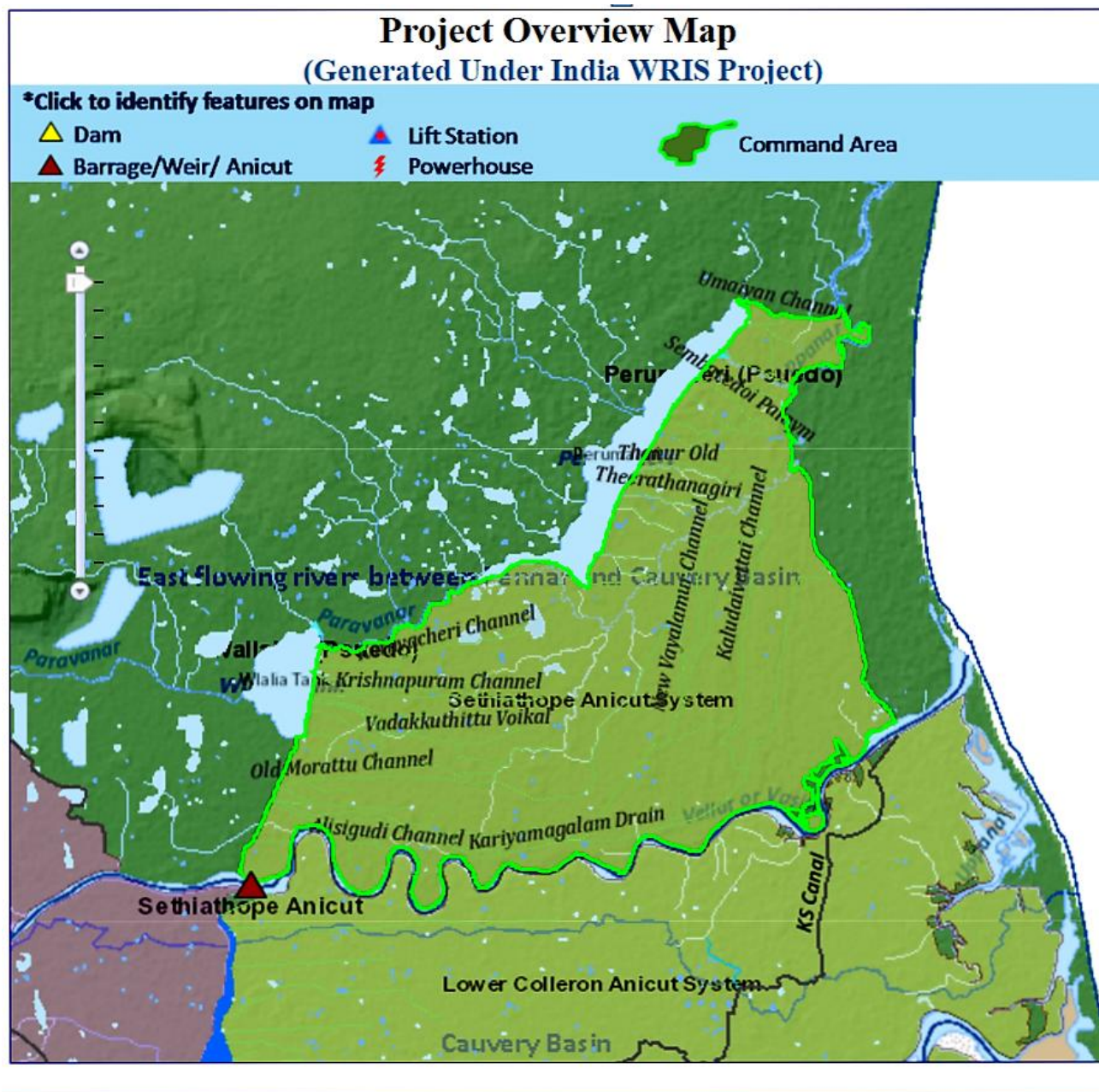
Name of Source/ Parent Canal	Name of the Canal	Off-take (RL) of the canal	Length of the canal	Canal Lined/ unlined	Head Discharge Capacity in cumec	Command Area (CCA) in Ha	Number of Outlets
Vellar Rajan	Ariaghosti Channel	3230	18110	Lined	3.823	2722.27	25
Vellar Rajan	Manampathan Channel	2705	42100	Lined	5.182	3563.04	35
Vellar Rajan	Odaiyur Channel	2720	4020	Lined	0.558	388.66	8
Vellar Rajan	Miralur Channel	3150	3220	Lined	0.141	101.21	4
Vellar Rajan	Old Murattu Channel	2422	16570	Lined	2.463	1735.62	9
Vellar Rajan	Pinnalur Ambapuram Channel	3290	4000	Lined	0.227	162.75	4
Walajah Tank	Umaiyan Channel	N.A.	1610	Lined	0.064	57.89	2
Walajah Tank	Ambapuram Channel	N.A.	3220	Lined	0.34	319.84	5
Walajah Tank	Alambadi Channel	N.A.	6440	Lined	0.464	272.06	14
Walajah Tank	Vadakkuthitai Channel	N.A.	8860	Lined	0.566	485.83	6
Walajah Tank	Thalaikulam Channel	N.A.	4830	Lined	0.294	339.27	9
Walajah Tank	Krishnapuram Channel	N.A.	4810	Lined	1.29	1220.24	7
Walajah Tank	Jayamkondam & Kolakkudi Channel	N.A.	1030	Lined	0.875	564.78	3
Walajah Tank	Kothavacheri Channel	N.A.	8500	Lined	0.744	1123.08	6
Walajah Tank	Karaimedu Channel	N.A.	1610	Lined	0.089	75.71	2
Walajah Tank	Maruvai Channel	N.A.	3610	Lined	0.102	87.45	2
Walajah Tank	Arangamangalam Channel	N.A.	4830	Lined	0.076	66	2

Report on Pilot Census of Sethiatope Irrigation Project

Name of Source/ Parent Canal	Name of the Canal	Off-take (RL) of the canal	Length of the canal	Canal Lined/ unlined	Head Discharge Capacity in cumec	Command Area (CCA) in Ha	Number of Outlets
Perumal Tank	Kundiya-mallur Channel	N.A.	3220	Lined	0.311	208.5	7
Perumal Tank	Manavoikkal Channel	N.A.	4830	Lined	0.283	202.43	6
Perumal Tank	Kalayankuppam Channel	N.A.	5640	Lined	0.339	202.43	10
Perumal Tank	SiruPalaiyur Channel	N.A.	6440	Lined	0.283	257.49	15
Perumal Tank	Theerthanagiri Channel	N.A.	4830	Lined	0.311	222.67	14
Perumal Tank	Old Thannur Channel	N.A.	8050	Lined	0.389	242.92	15
Perumal Tank	New Thannur Channel	N.A.	6440	Lined	0.283	202.43	15
Perumal Tank	Sambarettipalaya m Channel	N.A.	5830	Lined	0.311	248.99	18
Perumal Tank	Andarmullipalam Channel	N.A.	4830	Lined	0.368	216.6	18
Perumal Tank	Alapakkam Channel	N.A.	5640	Lined	0.425	304.45	22
Perumal Tank	Umaiyan Channel	N.A.	4830	Lined	0.453	323.89	17



Command Area of Sethiatope Anicut Irrigation Project



Command Area of Sethiatope Anicut Irrigation Project

5. Approach and Methodology

5.1 Methodology Envisaged

In order to accomplish the task the following methodology was envisaged to be adopted.

- i. Constitution and deployment of a Multi-Disciplinary Team of Experts and required field teams;
- ii. Orientation and training programme for the Field Teams (Supervisors and Enumerators) for field survey. The Field teams, so deployed, will be working under the overall guidance and supervision of the Core Team deployed at Head Quarters;
- iii. Discussions with State Level Departmental Heads as well as CWC Regional Heads by personnel of Core Team and Field Team;
- iv. Discussions with Senior Irrigation/Water Resources Department Officials at different levels;
- v. Secondary data as available with state Govt. Including area irrigated under each crop, amount of water released in main canal, branch canal, distributary, minor up to outlet level etc. in each crop season was envisaged to be collected. Additionally, the data was proposed to be collected for Head, middle and tail reach of the canal network
- vi. Index and Canal Network Map was to be procured. Additionally, list of outlets for entire system of each of the projects along with their chainage/RD was also proposed to be procured;
- vii. It was envisaged to collect information on storage versus water released during the year so as to correlate the same with the rainfall, existing cropping pattern to estimate the gap between potential created and potential utilized.
- viii. CWC had collected inventory details the project in structured format under Phase I. Filled in schedule prescribed for Data Collection by CWC for Phase I is given in (Annexure-1). CWC desired that the information collected by them earlier and

supplied to AFC India Limited shall be vetted while carrying out the survey. It was also desired by CWC that the data gaps, if any, identified in the project shall be filled in during the interactions and from various records maintained with the project officials at different levels.

- ix. However detailed project information including outlet details are to be collected by the consultant during interaction with stakeholders as envisaged by CWC vide their Proforma specifically designed for Phase-II of the study.
- x. During interactions with CWC officials it was desired that while carrying out the survey for collection of information as solicited in Proforma -II to identify the gaps as reported by project-authorities and reasons thereof, constraints and difficulties, if any.
- xi. The team would visit the project area to get the first-hand information on the status of canal distribution system including outlet details as per Proforma II and have discussions with state govt officials, farmers, water user associations etc., to identify the lacunas in achievement of full utilization of created potential.
- xii. During interactions with state govt. officials, efforts may be made to identify remedial measures for minimizing the identified gaps of IPC and IPU;
- x. Coordinates (Latitude and Longitude) of the each of the outlets will be recorded by the Field Team at the sill level of each outlets using GPS meters for the respective canal systems;
- xi. The collected data will be geo-referenced to get the SLD and KML files for the canal network;
- xii. Study teams will interact with the officials/departmental staff as well as group of the farmers in the outlet command villages to identify the gaps as reported by the department and actual ground situation reported by the farmers. The Group of Farmers will be representative of the Head, Middle and Tail reaches of the system, individually (minors/distributary), as well as overall (complete canal system).

- xiii. The data collected under Proforma I and II shall be shared by CWC with the key functionaries of the respective project authorities to develop a suitable methodology to carry out the main census of major and medium irrigation projects in the country;

5.2 Methodology Adopted

- CWC provided the project details vide filled up Proforma-I as collected from project authorities by them. The same was examined by the AFC team and shortcomings therein were identified for collection during field visits and interaction with state govt officials.
- A multidisciplinary team visited the senior officer at State level and appraised them about the study being carried out by CWC and the benefits thereof. The senior officials agreed and assured to provide all available information to the team members and directed the field formations to help the team members during their visit to the project area.
- The core Team comprised of Dr. S.K. Jain, Mr. A Shukla, cMr. Deepak Kumar etc.
- The team visited the project area and interacted with the concerned Executive Engineer and his team of officials at Sethiatope Anicut System, Sethiatope, Tamilnadu. Detailed discussions were held and the data available at the project office was shared with the AFC team.
- The team met with officials at different levels to procure the data and support for field work. The field work continued with the support of departmental officials for data collection.
- Subsequently, an official was nominated and deputed by Executive Engineer for providing the relevant information and to accompany the field team for identification of canal network including outlets located thereof.
- The team along with the nominated official traversed along the whole canal network including main canal, distributaries and minors. Cent- percent tracking

along the network was made to identify the outlets including their geo-referencing (latitude and longitude) with a hand-held GPS system. The condition and status of the canal, outlet etc., was observed and recorded.

- The Team had an active interaction with the farmers during the survey along the main canal, distributaries and minors and also discuss the state of affair of irrigation/ water availability in the command area and to identify the constraints.
- Data was also collected from Office of the Subdivision Engineer, Sethiatope, Tamilnadu.
- The data so collected has been scrutinize at AFC, Delhi office and shortcomings identified for fulfilling the information in Proforma -II prescribed by CWC.
- The AFC team also interacted with the state govt officials to bridge/ procure the deficient information. However, some information was reportedly not available with the department which have been indicated in the filled up Proforma-I as well as Proforma-II also.
- The data collected by the AFC field teams has been entered in a structured database system. Relevant attribute table has been generated.
- The collected data has been georeferenced for the canal network system for the project.
- The AFC team asked project officials to provide the copy of DPR of the project but it was not available with project officials at different levels.
- After completion of data collection and its analysis the core team interacted with senior project officials to take their views and opinions for consideration in preparation of Draft report.
- ArcGIS software has been used to create canal network, attachment of attributes and generation of *.kml file to view the network components along with attached attributes on google earth.
- Soft copy of the same is enclosed.

6. Generation of Canal Network

On the basis of field survey using prescribed proforma wherein details of canal network up to outlet level have been captured using the GPS device Zuno- SB of M/s Trimble of USA. The canal network along with command area and the outlets have been shown in **Fig. 6.1 to 6.8**.

The Sethiatope Anicut System is maintained by Public Works Department (**PWD**) of Tamilnadu.

Dry outlets have been demarcated by separate colour in *.kml files. All other outlets are wet outlets (liable to receive irrigation water). Farmers also corroborated it during interaction.

Since the command area map based on Google Earth is quite big and when attempted to print on A0 size the map was pixelated and was not readable. Accordingly, efforts were made and Grid has been formed on Command Area Map. The print of each grid is given along with Index map for easy readability.

Since a large number of minor irrigation schemes exist in the command area, the data for them about the location and area covered are not available, the same could not be demarcated.

The project DPR is not available with project officials. However, salient features of the project were made available by project authorities. The designed details about IPC, Cropping Pattern, IPU were not available.

Data of Phase I and Phase-II have been collected as per prescribed format and has been given in Annexure-I and II respectively.

The findings are base on field observations and discussions with various groups. The opinion of project officials is also considered while reporting.

The data in the form of network diagram depicting the canal network has been generated on the basis of field survey and geo-referencing of field observations.

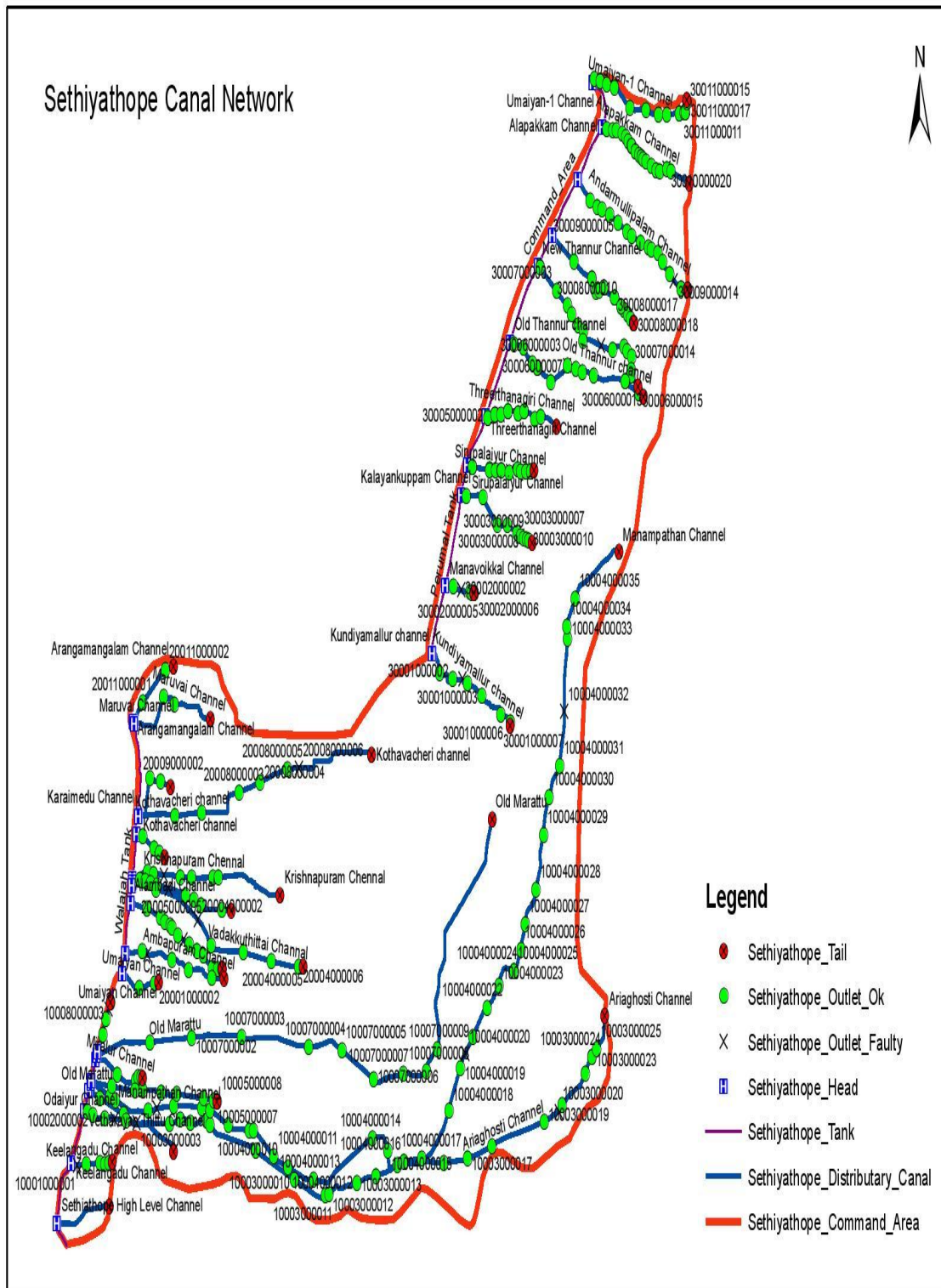


Fig.

6.1 Canal Network of Sethiathope Anicut System, Cuddalore, Tamilnadu

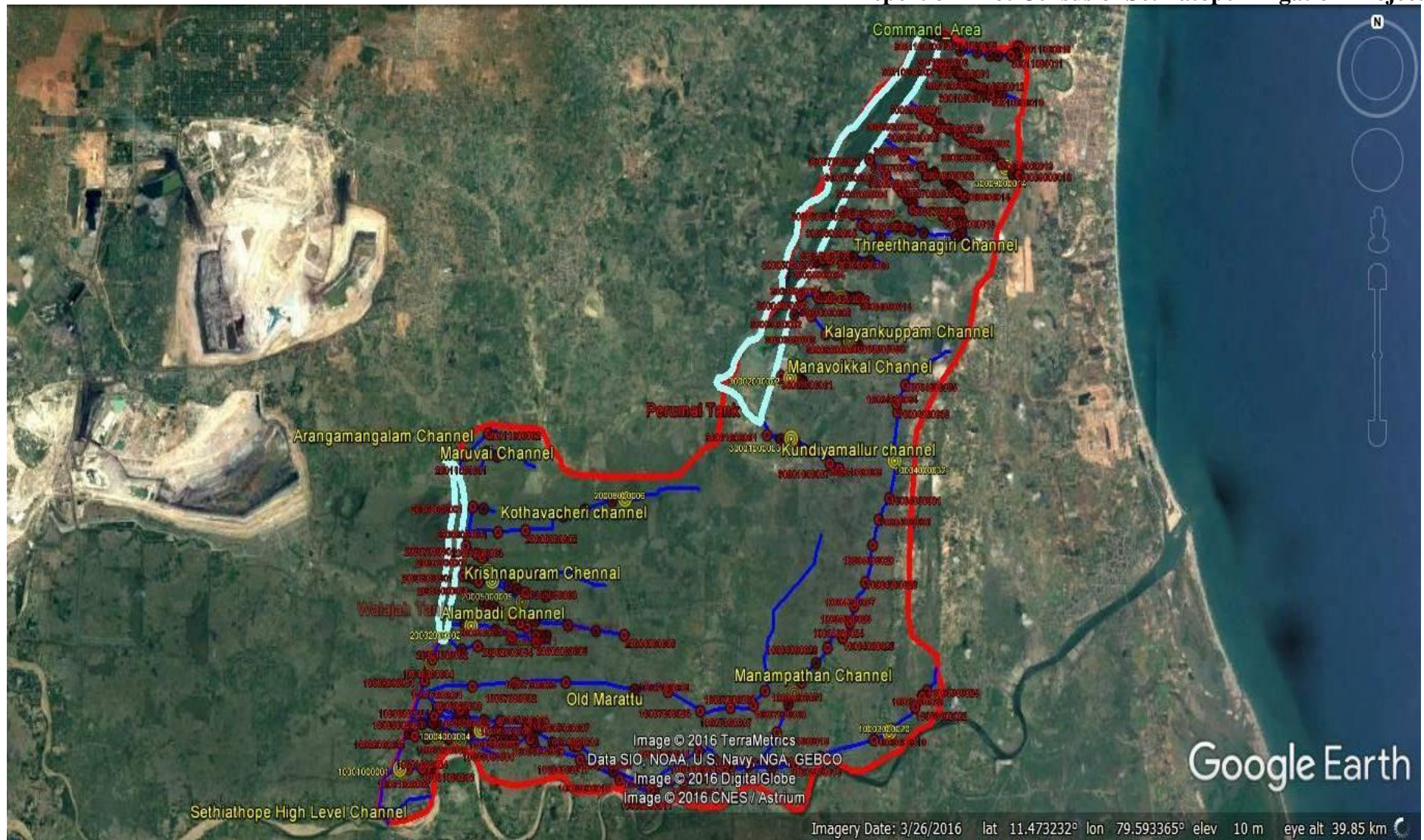


Fig. 6.2 Canal Network of Sethiathope Anicut Irrigation Project

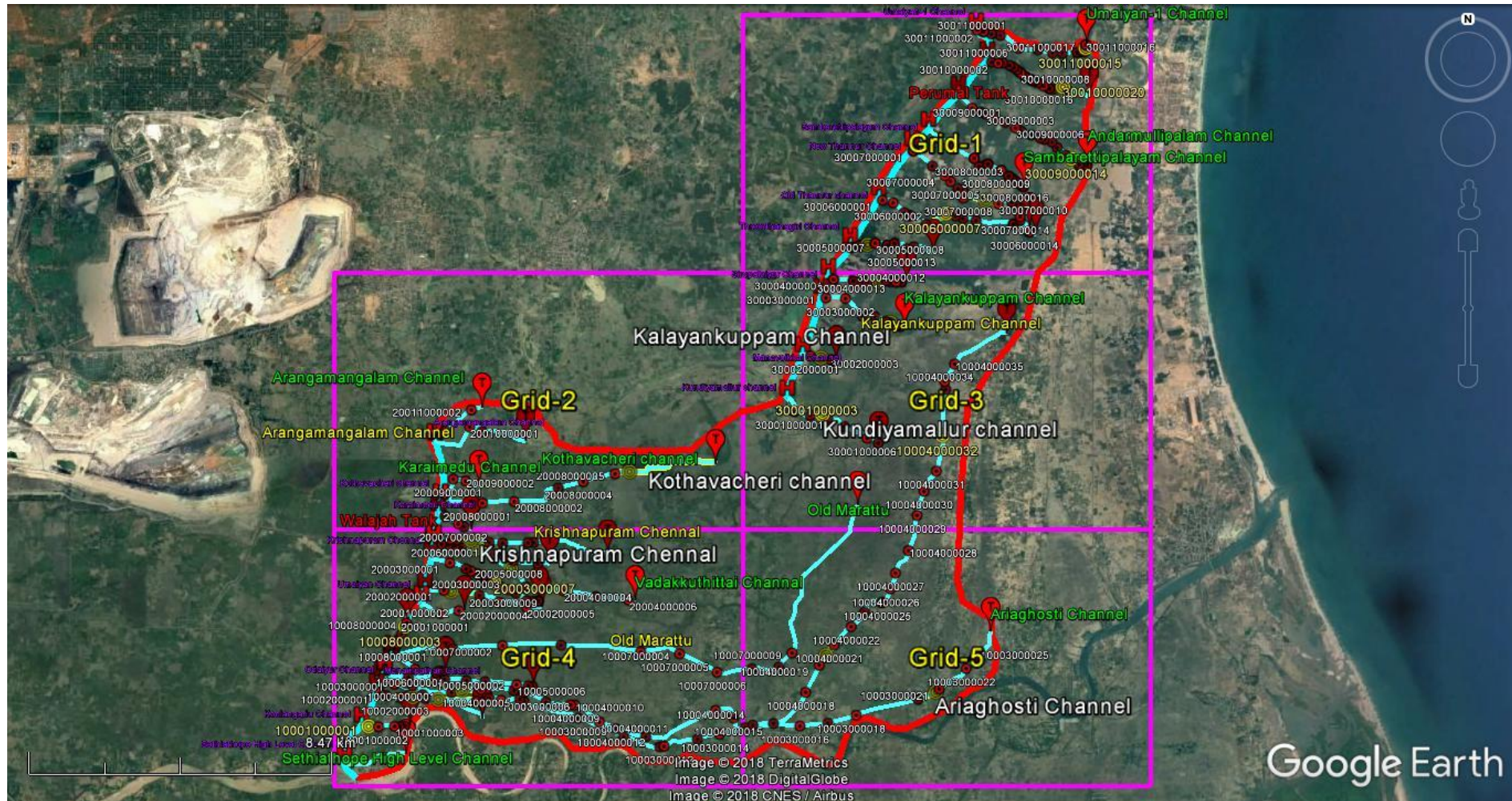


Fig. 6.3 Index Map of Canal Network of Sethiatope Anicut Irrigation Project

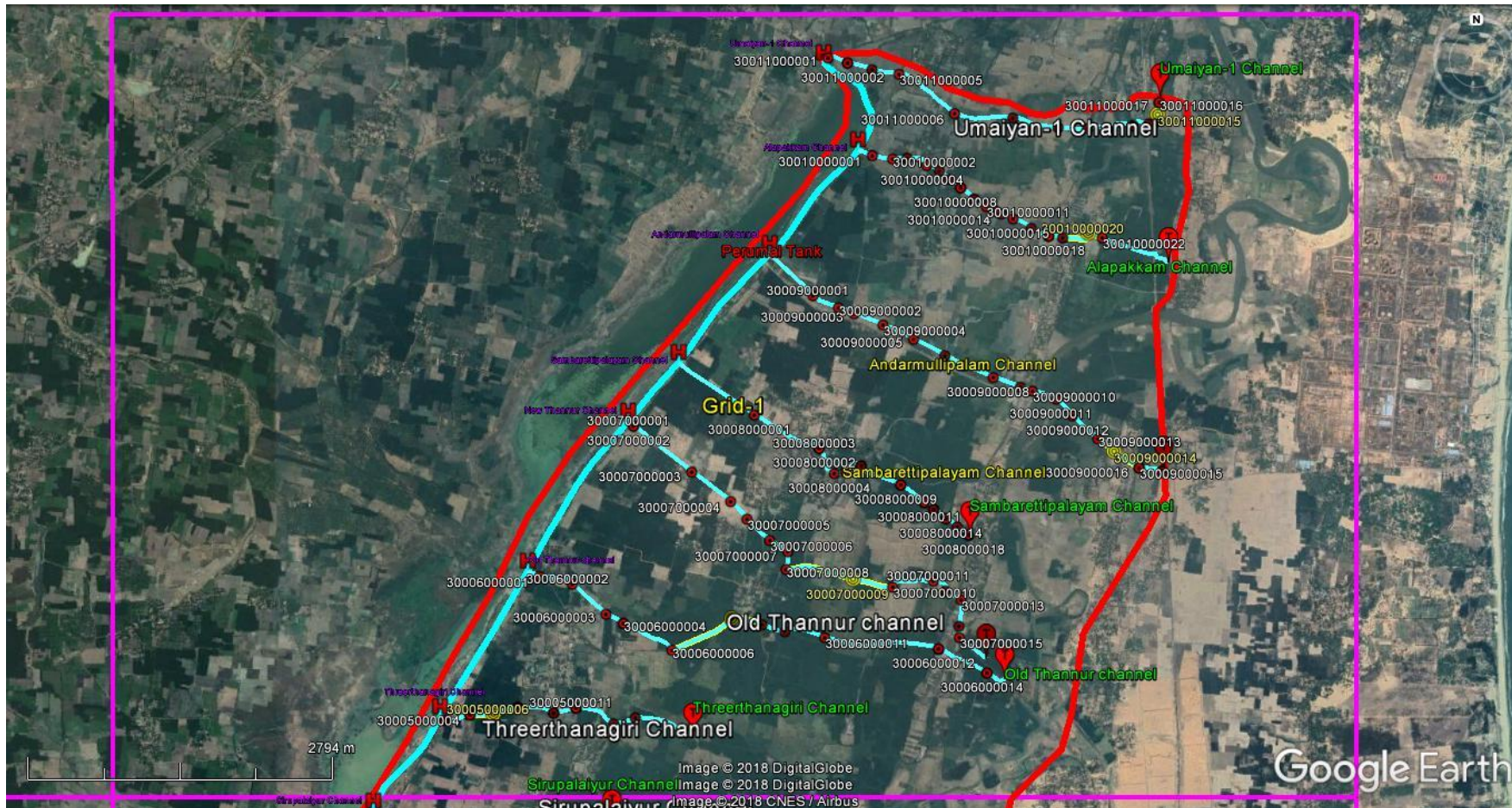


Fig. 6.4 Canal Network of Sethiatope Anicut Irrigation Project- Sheet 1

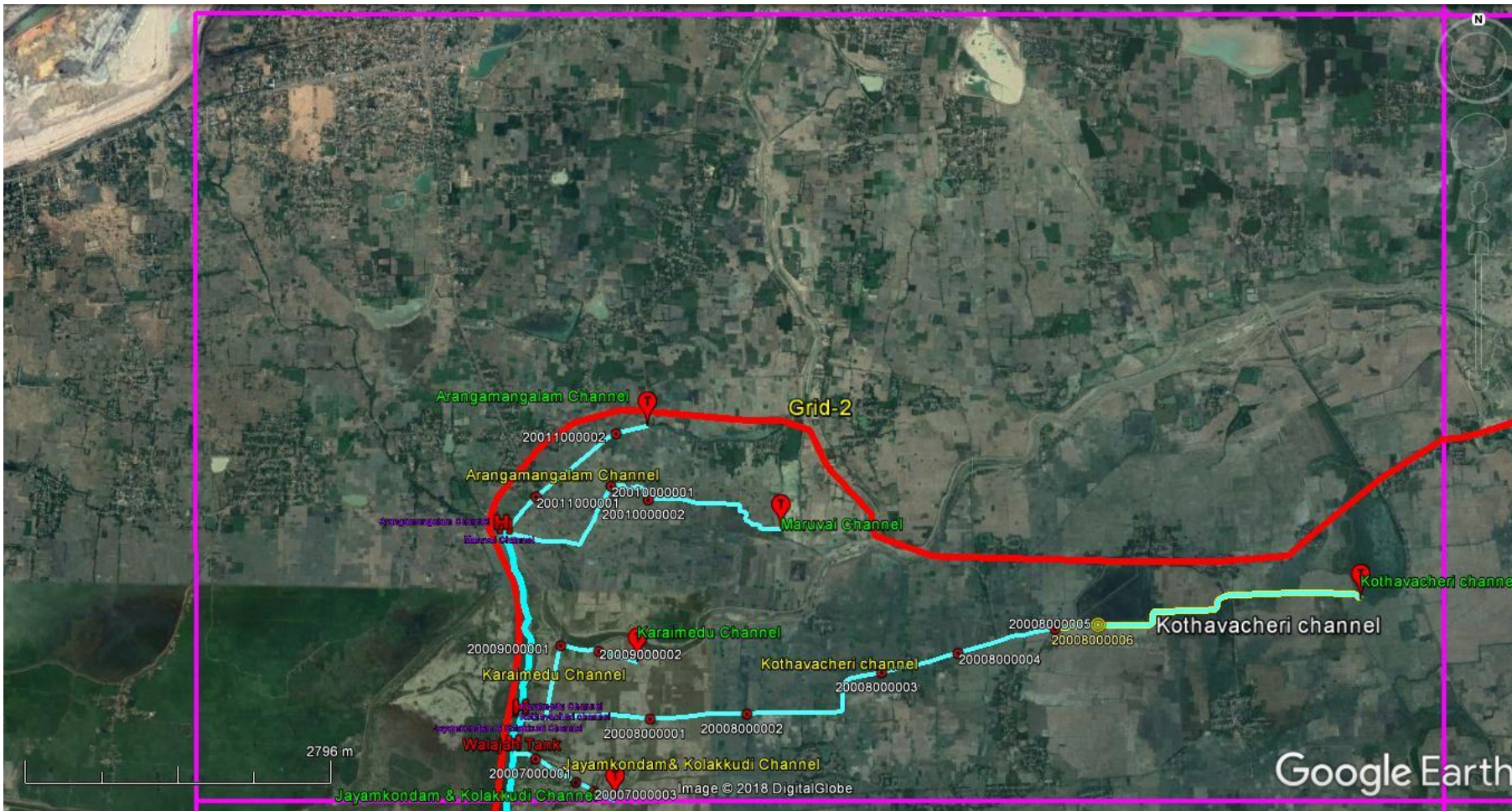


Fig. 6.5 Canal Network of Sethiatope Anicut Irrigation Project – Sheet 2

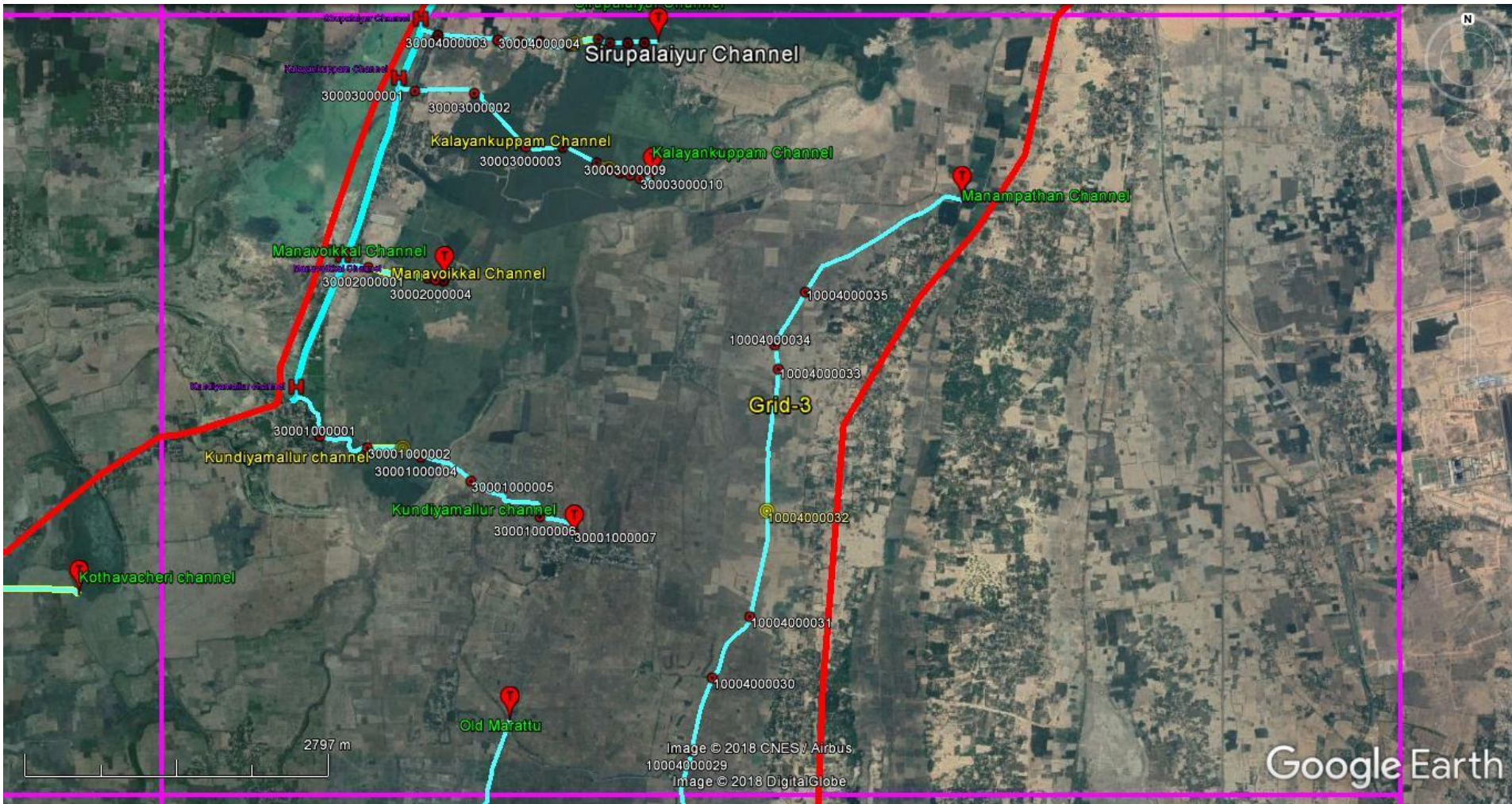


Fig.6.6 Canal Network of Sethiatope Anicut Irrigation Project – Sheet 3

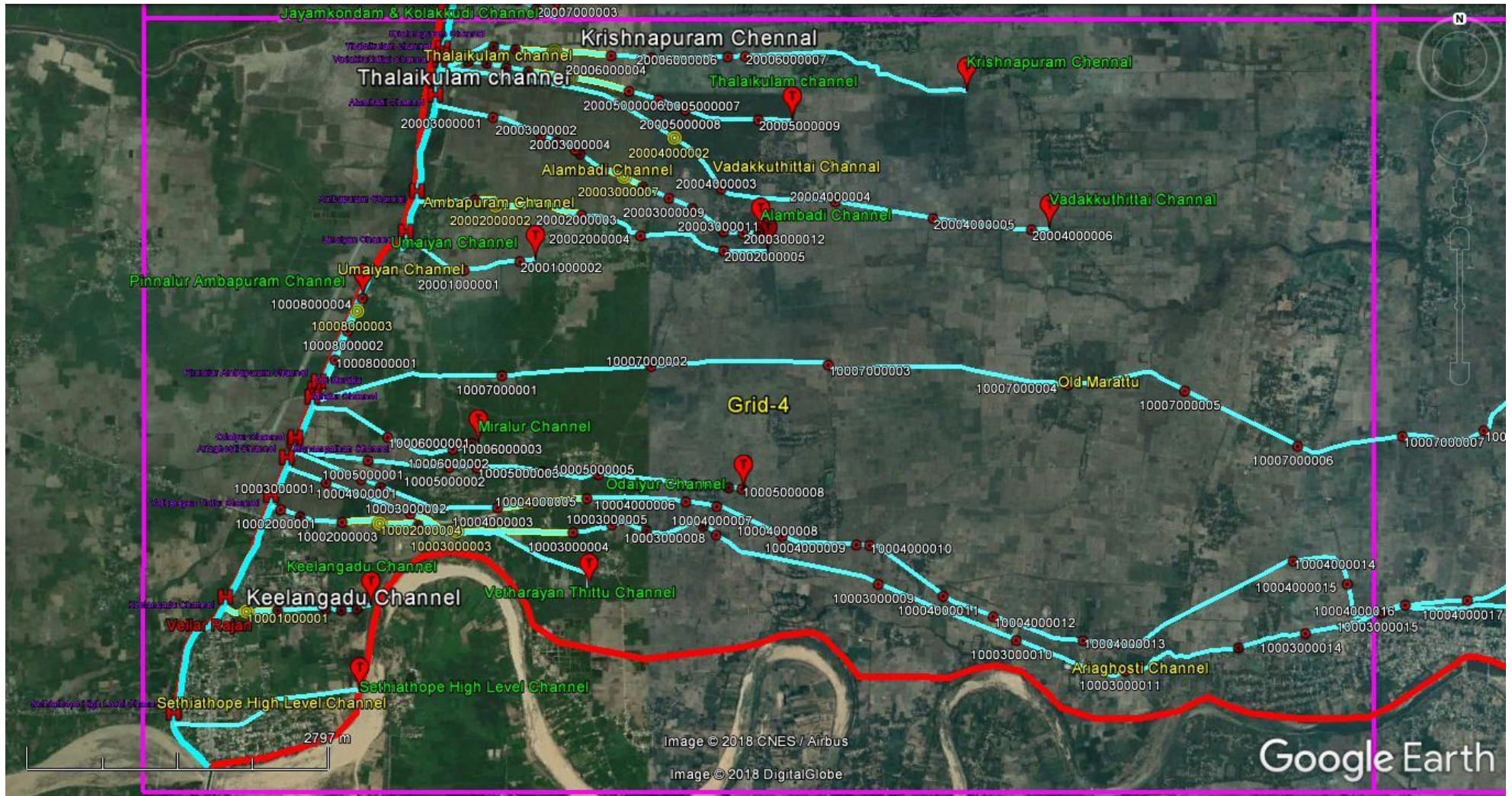


Fig. 6.7 Canal Network of Sethiatope Anicut Irrigation Project – Sheet 4

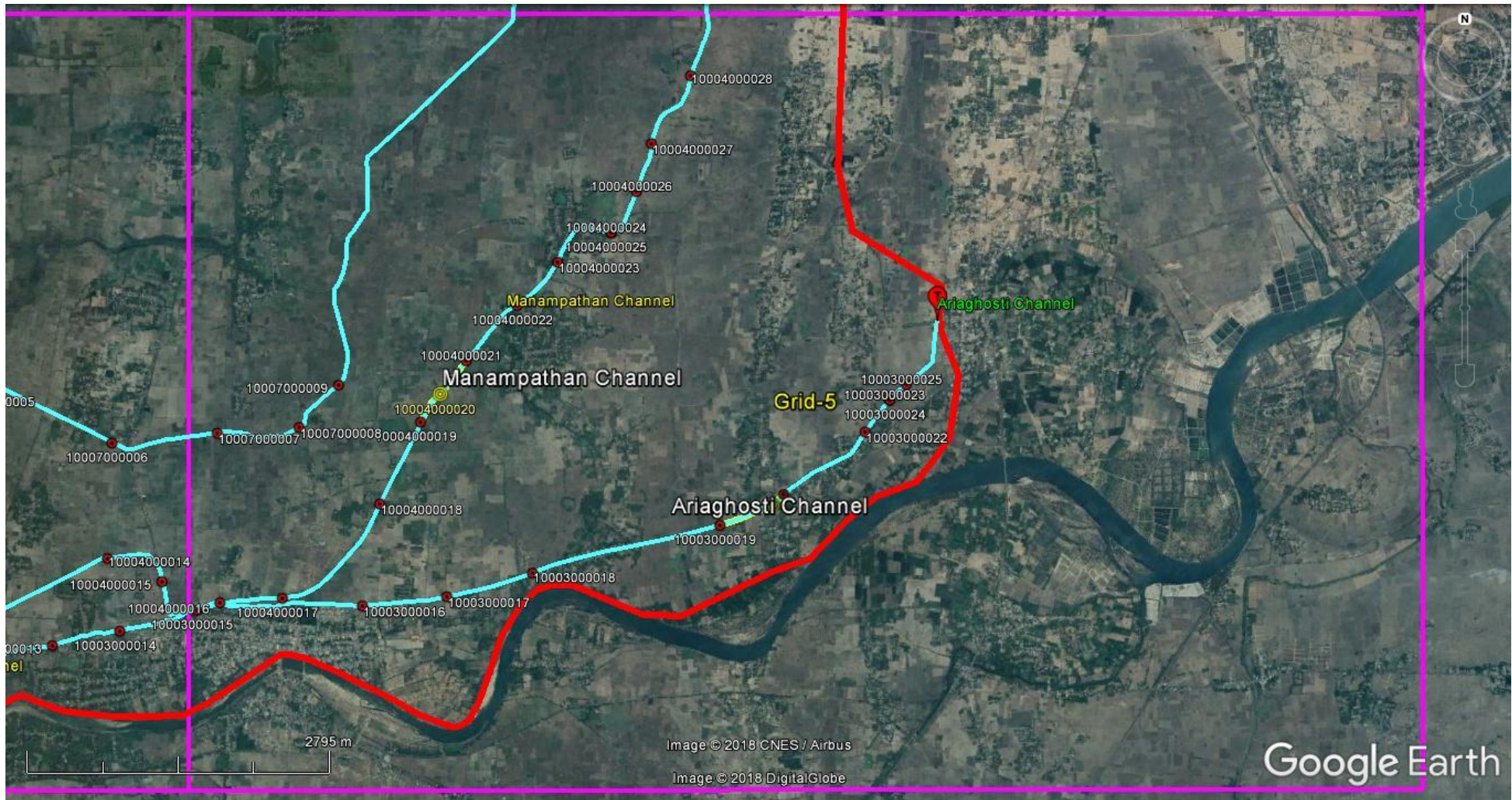


Fig. 6.8 Canal Network of Sethiatope Anicut Irrigation Project – Sheet 5

7 Results and Findings

- The Gap between IPC (13415 ha) and IPU (5295 ha) has been found to be 8120 ha in the year 2012-13 which is about 60.5 % of IPC.
- Project officials clarified that the project was designed for Rabi irrigation. However, water flows in the system whenever surplus water is available in the river.
- The data on IPU has been collected from the project officials on the basis of their records. It was reported that field functionaries of the project note down the area irrigated in their jurisdiction which is then aggregated at higher levels and the figures for the project level is worked out by them.
- In the absence of DPR, designed cropping pattern was not available. However actual cropping pattern as ascertained from the project has been reported in Annexure-I.
- Cropping Pattern in the Command area of the project is give in the following:

Table 7.1 Cropping Pattern I Command Area (2012-13)

Season	Crop	Area in ha
Kharif	-	-
Rabi	Paddy	5295
Total		5295

- The naming of the canals, distributaries, minors and outlets have been made by project officials as per their own norms.
- Untimely maintenance of canals due to shortage of funds had resulted in abnormal deviation of canal cross sections. This has resulted in increase of canal bed width, change in bed slope which had resulted in non-supply of designed discharge in the canals.
- The field channels are lined. Due to lack of maintenance the lined portions have damaged.

- Due to lack of effective control of water at control levels, breakage of structures and untimely opening and removal of shutters resulted in unregulated free flow of water.
- All these factors lead to restriction of free flow of water and deficiency of water at the tail ends.
- Lack of awareness/ interest among farmers for participation in running of irrigation water and its rational use of the same thereby leading to deterioration of productivity.
- During the survey, it was noticed that the canal/ distributary in general are having weed growth, siltation and broken outlets on canal and canal itself resulting in leakage and seepage of water.
- Outlets are broken at many places (some typical illustrations are given in photograph section) due to which water divert and do not flow in the direction it was planned.
- There is no incentive to save precious water.
- Canal maintenance is not there so siltation, weed growth and breakage occurs leading to obstruction in water reaching tail end. Water reaches up to tail when it is not required by farmers at higher reaches.
- General neglect and lack of annual budget for operation and maintenance (O& M) so the system deteriorates.
- During the survey, it has been noticed that the canal/ distributaries/ minors are in general not properly maintained. The survey carried out by AFC India Limited worked out and observed that the status of canal network is in bad shape being not maintained properly for a long time.
- Theft of water and revenue on mass scale.
- Neglect and lack of annual budget for operation and maintenance (O& M) so the system deteriorates.
- Reportedly, shortage of manpower and resources was also reported to be a major reason for gap in maintenance of canal system.

- Farmers reported that their main crop was paddy and pulses.
- Functional Water User Associations (WUA) not found during survey.
- There is lack of monitoring of canal operations.

Table 7.2 Details of Affected Outlets in Sethiatope Anicut Irrigation Project

S.No.	Main Canal	Distributory	Chainage	Location	Size	Latitude	Longitude	Remark
1	Vellar rajan	Keelangadu Channel	240	Left	15.24	79.544	11.4448	Broken
2	Vellar rajan	Vetharayan Thittu Channel	1060	Right	15.24	79.555	11.4521	Broken
3	Vellar rajan	Ariaghosti Channel	1695	Right	15.24	79.562	11.4515	Broken
4	Vellar rajan	Ariaghosti Channel	16304	Right	15.24	79.690	11.4534	Broken
5	Vellar rajan	Manampathan Channel	2290	Right	15.24	79.568	11.4539	Broken
6	Vellar rajan	Manampathan Channel	14444	Right	15.24	79.662	11.4627	Broken
7	Vellar rajan	Manampathan Channel	21858	Left	15.24	79.692	11.5179	Siltation
8	Vellar rajan	Pinnalur Ambapuram Channel	900	Right	15.24	79.554	11.4699	Weeds
9	Walajah tank	Ambapuram Channel	786	Right	15.24	79.565	11.4787	Broken
10	Walajah tank	Alambadi Channel	1892	Left	15.24	79.576	11.4811	Broken
11	Walajah tank	Vadakkuthittai Channal	1780	Left	15.24	79.581	11.4844	Siltation
12	Walajah tank	Thalaikulam channel	1219	Left	15.24	79.572	11.4894	Broken
13	Walajah tank	Krishnapuram Chennal	1080	Left	15.24	79.570	11.4916	Broken
14	Walajah tank	Kothavacheri channel	5608	Left	15.24	79.611	11.5088	Broken
15	Perumal Tank	Kundiyamallur channel	1400	Right	15.24	79.661	11.5231	Broken
16	Perumal Tank	Manavoikkal Channel	540	Right	15.24	79.660	11.5375	Broken
17	Perumal Tank	Kalayankuppam Channel	2225	Left	15.24	79.678	11.5463	Broken
18	Perumal Tank	Sirupalaiyur Channel	1470	Left	15.24	79.675	11.5567	Broken
19	Perumal Tank	Threerthanagiri Channel	520	Left	15.24	79.672	11.5659	Broken
20	Perumal Tank	Old Thannur channel	2180	Right	15.24	79.692	11.5738	Broken
21	Perumal Tank	New Thannur Channel	2700	Left	15.24	79.703	11.5770	Broken
22	Perumal Tank	Andarmullipalam Channel	3713	Left	15.24	79.725	11.5875	Broken

23	Perumal Tank	Alapakkam Channel	2387	Right	15.24	79.723	11.6056	Broken
24	Perumal Tank	Umaiyan-1 Channel	3360	Right	15.24	79.728	11.6153	Broken

- It was found that **24 outlets** are broken/ damaged out of **310 outlets** of the system accounting for about 7.74% outlets.
- Canal network has been found broken at various locations which need to be rectified and canal system restored for proper flow of water in the system.
- It was observed that the canals are full of weeds, outlets are broken at various places. (Some typical Illustrations are given by Photographs of the canal System taken during survey)
- The farmers revealed that they do not get water due to seepage in canal system.
- Outlets are broken at many places (some typical illustrations are given in photograph section) due to which water gets diverted and do not flow in the direction it was planned.
- Shortage of manpower and resources was also reported to be a major reason for gap in maintenance of canal system.

8. Constraints/ Reasons for Gap

The reasons for Gap may be categorised as follows:

- Technical;
- Socio-economic;
- Institutional/ Managerial;
- Policy related

Technical Reasons

- Non-maintenance of water courses/ distributaries, growth of weed, damage to sides and bed, reduced waterways etc are responsible for gap between IPC and IPU.
- Non-availability of required infrastructure such as Headwork, Control/ measuring devices and broken outlets etc
- Irregular de-silting of distribution channels
- Incomplete water distribution channels
- Operation & Maintenance budget being inadequate

Socio-Economic Reasons

- Excessive use of irrigation water many a times results in water-logging
- Farmers resort to flood irrigation.
- Lack of cooperation among farmers, villages.
- Often minor disputes related to distribution are blown out of proportion
- Wastage on account of over irrigation
- Water not released at the time of requirement

Institutional/ Managerial

- Non-existence of effective functional WUAs
- Low technical exposure of the officials of Department at grass root level.
- Modern Managerial capabilities of the staff for conflict resolution is lacking

- Lack of staff
- Lack of Operation & Maintenance Budget
- Lack of supervision by staff
- Lack of facilities for Movement along canal network for staff and officers of Department

Policy Related

- Lack of administrative powers to Department staff
- Lack of coordination between line departments

9. Recommendations:

- The Sethiatope Anicut system was commissioned in 1895. The system is in a dilapidated condition and needs restoration in the distribution system, outlets etc.
- Since more than a century has elapsed the data is also not maintained systematically. It is recommended that suitable data acquisition system along with proper data storage system (DSS) may be evolved for the project to keep track of the precious water resource storage and distribution through the system.
- Canal cross sections to be restored to carry the design discharge in most of the reach.
- Proper monitoring system also needs to be evolved to keep a track of leakage.
- Capacity building for field functionaries is required together with adequate staff to keep the system in order.
- Adoption of PIM is suggested. It is suggested that the WUAs shall be revamped revitalised so that they could take the responsibility.
- Enhance role of Women in water management. It is essential for survival.
- Renovation of system is required. Repairs of lining of canal may be undertaken to reduce seepage.
- Silt removal is an essential part of canal maintenance which shall be undertaken frequently.
- Practice of giving incentive for less water consuming crop cultivation.
- Proper monitoring shall be enforced which is significantly lagging.
- Conveyance efficiency shall be enhanced by proper repair and maintenance of the canals.
- Adequate budget commensurate with proper maintenance of canal system to be ascertained annually.
- Third party technical and financial monitoring is required to ascertain proper utilization of manpower, budget and upkeep of system at project level on regular basis.

8 Photographs of Damaged/ Broken Outlets





	
<p>Photograph Outlet No : Keelangadu Channel-01(Broken)</p>	<p>Photograph Outlet No : Vetharayan Thittu Channel-04(Broken)</p>
	
<p>Photograph Outlet No : Ariaghosti Channel-03(Broken)</p>	<p>Photograph Outlet No : Ariaghosti Channel-20(Broken)</p>




	
<p>Photograph Outlet No : Manampathan Channel-04(Broken)</p>	<p>Photograph Outlet No : Manampathan Channel-20(Broken)</p>
	
<p>Photograph Outlet No : Manampathan Channel-32(Siltation)</p>	<p>Photograph Outlet No : Odaiyur Channel- 04(Good)</p>

	
<p>Photograph Outlet No : Old Marattu-05(Good)</p>	<p>Photograph Outlet No : Pinnalur Ambapuram Channel-03(Weeds)</p>
	
<p>Photograph Outlet No : Ambapuram Channel-02(Broken)</p>	<p>Photograph Outlet No : Alambadi Channel-07(Broken)</p>

	
<p>Photograph Outlet No : Vadakkuthittai Channal-02(Siltation)</p>	<p>Photograph Outlet No : Thalaikulam channel-05(Broken)</p>
	
<p>Photograph Outlet No : Krishnapuram Chennal-03(Broken)</p>	<p>Photograph Outlet No : Kothavacheri channel-06(Broken)</p>

	
<p>Photograph Outlet No : Kundiyamallur channel-03(Broken)</p>	<p>Photograph Outlet No : Manavoikkal Channel-02 (Broken)</p>
	
<p>Photograph Outlet No : Kalayankuppam Channel-07 (Broken)</p>	<p>Photograph Outlet No : Sirupalaiyur Channel-09 (Broken)</p>

	
<p>Photograph Outlet No : Threerthanagiri Channel-06 (Broken)</p>	<p>Photograph Outlet No : Old Thannur channel-07 (Broken)</p>
	
<p>Photograph Outlet No : New Thannur Channel-09 (Broken)</p>	<p>Photograph Outlet No : Andarmullipalam Channel-14 (Broken)</p>

	
<p>Photograph Outlet No : Alapakkam Channel-20 (Broken)</p>	<p>Photograph Outlet No : Umaiyan-1 Channel-15 (Broken)</p>
	
<p>Photograph Outlet No : Umaiyan-1 Channel-05 (Good)</p>	

Appendix-I

Farmer Interaction Format

Name:

Father's Name:

Village:

Canal Details:

Other Irrigation Source:

Crops Cultivated: Rabi:

Khari

How many times you get canal water: Rabi

Khari:

Timely availability of water:

Adequate Availability of Water:

Has any official of Irrigation/ Agriculture:

Appendix-II

Compliance of CWC Comments

S.No.	Comments	Compliance
1	The report should give a detailed diagnostic of the canal network. Gap reporting needs to be done RD/Chainage wise in the complete network with specific reasons for the gap supported by Satellite imagery/ Google Earth. The gap should be clearly marked on T diagram in red and the T diagram should have all the attributes like structures, etc. As per Scope of Work, the Agency has to give Command Area Map including canals, Canal Network diagram with all attributes attached and types of canal structures marked along with chainage. The Agency may be therefore, advised to reflect all items as per scope of work agreed upon.	Detailed command area and canal network map has been prepared by georeferencing canal network as *.kml file which is based on Google earth. The broken/ affected outlets and canal network have been demarcated by different colours at their geographical location. All the attributes of canal network have been attached in *.kml file.
2	The status of outlets needs to be clearly mentioned (dry or wet). This needs to be corroborated with farmers interaction.	Dry outlets have been demarcated in *.kml files. All other outlets are wet outlets (liable to receive irrigation water). Farmers also corroborated it during interaction.
3	Details of constitution of the core team that went to the field along with the State govt officials with whom the meeting was conducted needs to be incorporated in the report along with photographs.	Please refer to para 5.2 of the report for details. The relevant photographs have been given in para 8 of the report.
4	The methodology to assess the IPU should be given.	The data for IPU has been collected from the project officials on the basis of their records. Field functionaries record the area irrigated under his jurisdiction which is aggregated at higher levels upto project level.
5	Detailed command area map in A0 size clearly excluding the area/CCA being served by other Minor irrigation schemes	Since the command area map based on Google earth is quite big and when attempted the print on A0 size it was

	within the command should be given.	pixlet and was not readable. Accordingly efforts were made and Grid has been formed on Command Area Map. The print of each grid is given alongwith Index map for easy readability. Since a large number of minor irrigation schemes exists in the command area, the same could not be demarcated
6	Designed IPC vs actual IPC achieved alongwith reasons should be given.	Old DPRs could not be traced. As such designed IPC could not be sacertained. The IPC details as provided by project officials have been considered and indicated in the report.
7	Filled in schedules of Phase-I and Phase-II should be parts of the reports.	The filled in schedule of Phase I and Phase II with relevant data are given as Annexure I and Annexure II in the report.
8	It is observed from initial 4 to 5 pages of the reports, the Agency is focussing on the Approach & Methodology etc rather than giving details of the project concerned. It would be better that these reports start by giving highlights on features of the project concerned along with agriculture & irrigation profiles of the districts/states being benefitted by the project.	Project details including location, salient features, districts benefitted, command area map etc have been indicated in para 4 of the report.
9	It is noted that the most of the findings stated in the reports are based on the opinions taken from the State-Govts officials concerned instead of their own.	The findings are based on the field observations and discussions with various groups. The opinion of project officials was also considered while reporting.
10	Hydrologic analysis scenario may be carried out by collecting storage position of water for the five year under reference to correlate the same with the potential utilised and findings based thereon may be given.	The project is a run-off river project. The Potential utilized values were sought from project officials as per their records.
11	The Agency has reportedly met farmers but nothing has been pointed about their interactions/views in regard to potential utilized/working conditions in regard to availability of water to their fields.The	Farmer's Interaction format has been given in Annexure-III. Outcome of discussions and interaction with the farmers has been considered while reporting. Broadly the farmers opined

	format devised by AFC for interaction with the farmers should be given.	that timely adequate water is not available and the condition of distribution need improvement
12	It is observed that in some cases, the data of IPC & IPU at outlet level has been indicated as not maintained. In such cases, the Agency may be advised to give detail at least at Minor Level.	Data at outlet level is not available. The IPC data at Minor level is available and given in Annexure I. Consolidated IPU data is available. It indicates a gap of 10060 ha which is 65.52%. The wide gap is due to erratic and scanty rainfall leading to non filling of Tanks. Accordingly project is unable to provide water. No tidal effect is there project being located 27 Km upstream of sea coast.
13	The designed v/s actual cropping pattern should be given in the project command. The Agency may be advised to point out whether any change in the cropping patterns has occurred in the absence of nil/scanty rainfall (as stated in case of Fulzar-I project).	Designed cropping pattern is not available in the absence of DPR. Actual cropping pattern as provided by project officials on the basis of their records have been reported.
14	The Agency may be asked to give photographs of headworks/canal/distributary/minors wherever conditions are in dilapidated states.	Photographs are given in Para 8 of the report
15	Names of the two projects that were awarded later on to the Agency have not been mentioned correctly in draft reports of Sukla and Midnapur Canal (vide page 4 and page 3 respectively). These names should be (i) Sethiathope Anicut System and (ii) Mangalam.	NA
16	The general status of O&M of the project, funds being made available to the project authorities and expenditure being made may be provided.	Project officials reported that they are short of funds for O & M. Financial details not collected as per TOR
17	Abbreviations should be given in the beginning. Units in tables are missing.	As suggested, Symbols and Abbreviations have been given. Units in tables have been indicated appropriately.

18	Bed slope should be 1 in 500 instead of 500.	NA
19	Units in tables are missing.	Units in tables have been indicated appropriately.
20	The basis for naming the canals, distributaries, minors and outlets has not been given	The naming of canals, distributaries, minors and outlets have been done by project officials as per their own norms
21	Para-wise description of scope of work should be given.	The understanding of Scope of work by AFC and the brief details are given in para 2 of the report
	Besides, you are also requested to do the verification of the data presented after carrying out the necessary arithmetical checks in Block No 7 of Phase I of the Schedule so that it is ensured that the data presented are internally consistent. This is required for payment of submission of data for Phase I.	Arithmetic Checks carried out suitably.

APPENDIX-II



भारत सरकार Government of India
केंद्रीय जल आयोग Central Water Commission
परियोजना प्रबंधन संगठन Project Monitoring Organisation
आयोजना एवं प्रगति निदेशालय Planning and Progress Directorate

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फोन / फेक्स नं०. 011-26108425
ईमेल: ppdtewc@gmail.com, ppdte@nic.in

To,
G.S.Yadav
AFC India Ltd.
B-19, Community Centre,
Janakpuri, New Delhi-110058

This has reference to your submission of the draft reply of Fulzar-I, Sukla, Pairi and Midnapure projects. The said reports were discussed in the meeting of Monitoring Committee for Pilot Census and many short comings were observed. The same are annexed as Annexure I.

You are requested to kindly submit the draft final report accordingly.

एल. के. राजन
14/11/17
(एस. के. राजन)
निदेशक (आ० एवं प्र०)

संलग्नक : यथोक्त

Annexure I

- i. The report should give a detailed diagnostic of the canal network. Gap reporting needs to be done RD/Chainage wise in the complete network with specific reasons for the gap supported by Satellite imagery/ Google Earth. The gap should be clearly marked on T diagram in red and the T diagram should have all the attributes like structures, etc. As per Scope of Work, the Agency has to give Command Area Map including canals, Canal Network diagram with all attributes attached and types of canal structures marked along with chainage. The Agency may be therefore, advised to reflect all items as per scope of work agreed upon.
- ii. The status of outlets needs to be clearly mentioned (dry or wet). This needs to be corroborated with farmers interaction.
- iii. Details of constitution of the core team that went to the field along with the State govt officials with whom the meeting was conducted needs to be incorporated in the report along with photographs.
- iv. The methodology to assess the IPU should be given.
- v. Detailed command area map in Ao size clearly excluding the area/CCA being served by other Minor irrigation schemes within the command should be given.
- vi. Designed IPC vs actual IPC achieved alongwith reasons should be given.
- vii. Filled in schedules of Phase-I and Phase-II should be parts of the reports.
- viii. It is observed from initial 4 to 5 pages of the reports, *the Agency is focussing on the Approach & Methodology etc rather than giving details of the project concerned*. It would be better that these reports start by giving highlights on features of the project concerned along with agriculture & irrigation profiles of the districts/states being benefited by the project.
- ix. It is noted that the most of the findings stated in the reports are based on the opinions taken from the State-Govts officials concerned instead of their own.
- x. Hydrologic analysis scenario may be carried out by collecting storage position of water for the five year under reference to correlate the same with the potential utilised and findings based thereon may be given.
- xi. The Agency has reportedly met farmers but nothing has been pointed about their interactions/views in regard to potential utilized/working conditions in regard to availability of water to their fields. **The format devised by AFC for interaction with the farmers should be given.**
- xii. It is observed that in some cases, the data of IPC & IPU at outlet level has been indicated as *not maintained*. In such cases, the Agency may be advised to give detail at least at Minor Level.
- xiii. The designed v/s actual cropping pattern should be given in the project command. The Agency may be advised to point out whether any change in the cropping patterns has occurred in the absence of nil/scanty rainfall (as stated in case of Fulzar-I project).
- xiv. The Agency may be asked to give photographs of headworks/canal/distributary/minors wherever conditions are in dilapidated states.
- xv. Names of the two projects that were awarded later on to the Agency have not been mentioned correctly in draft reports of Sukla and Midnapur Canal (vide page 4 and page 3 respectively). These names should be (i) Sethiathope Anicut System and (ii) Mangalam.

Report on Pilot Census of Sethiatope Irrigation Project

- xvi. The general status of O&M of the project, funds being made available to the project authorities and expenditure being made may be provided.
- xvii. Abbreviations should be given in the beginning.
- xviii. Bed slope should be 1 in 500 instead of 500.
- xix. Units in tables are missing.
- xx. The basis for naming the canals, distributaries, minors and outlets has not been given.
- xxi. Para-wise description of scope of work should be given.

Fulzar I

- i. Storage position of the reservoir for the year in which maximum IPU was achieved should be given.
- ii. In the column of location, what is the meaning of B.
- iii. How volumetric measurement has been done for ungated outlets.

Midnapore

- i. On page 15 and 59 CCA given is different.
- ii. Cropping pattern is not given.
- iii. It is not stated whether the river is perennial or not.

Besides, you are also requested to do the verification of the data presented after carrying out the necessary arithmetical checks in Block No 7 of Phase I of the Schedule so that it is ensured that the data presented are internally consistent. This is required for payment of submission of data for Phase I.