

**WELCOME
TO
A LECTURE ON**

**UTILIZATION OF GODAVARI &
KRISHNA WATERS**

By

Prof. M. Pandu Ranga Rao,
Ph.D.

Former Professor

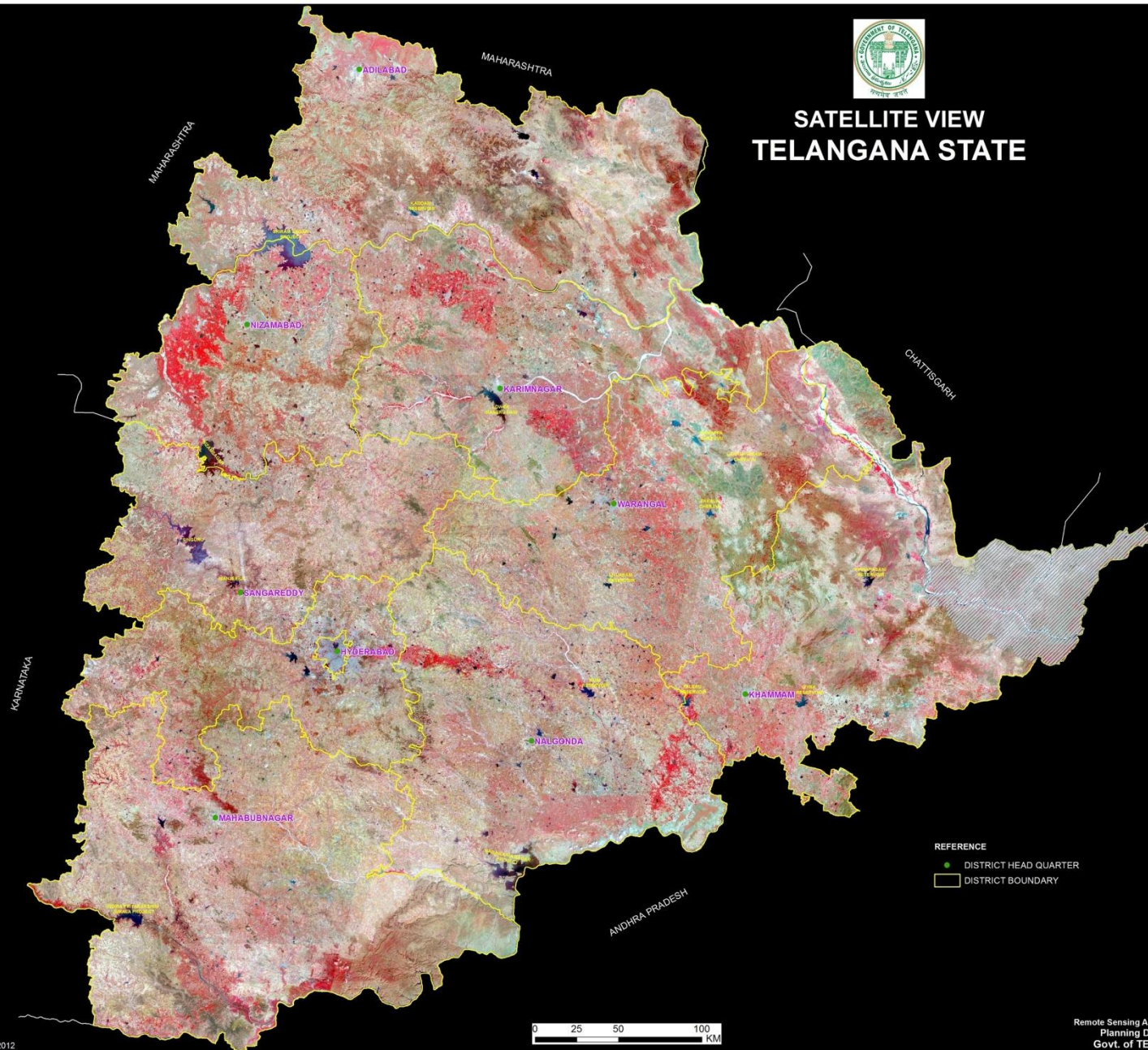
**National Institute of Technology,
Warangal**

GODAVARI & KRISHNA BASINS



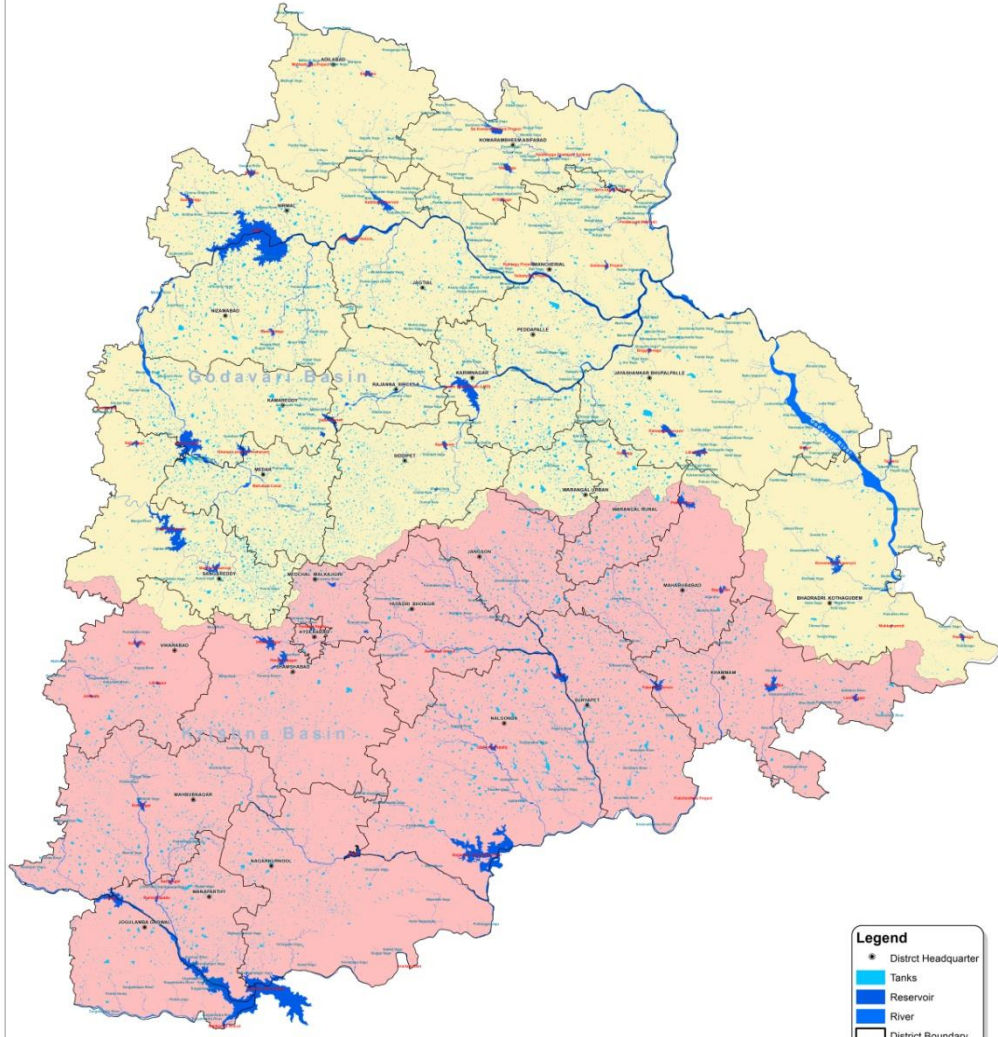


SATELLITE VIEW TELANGANA STATE





SURFACE WATER BODIES
TELANGANA STATE



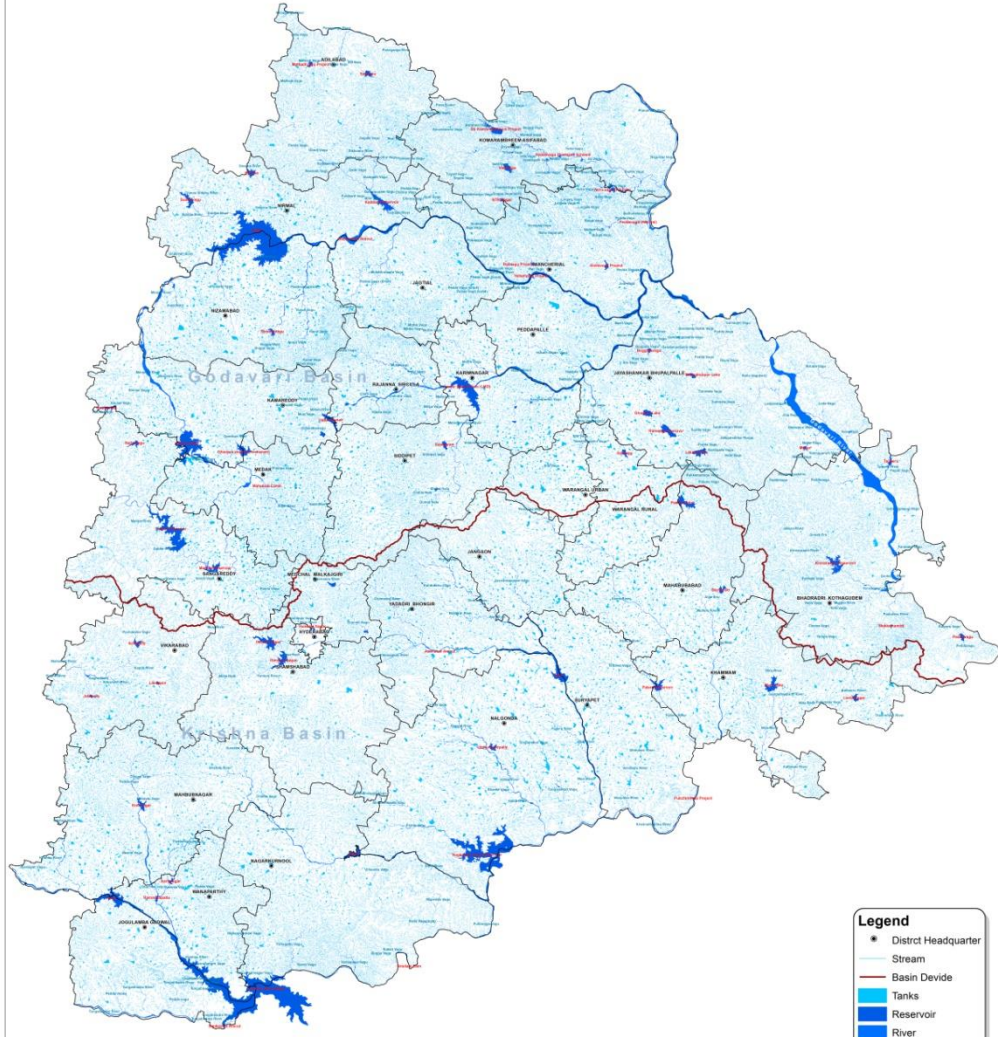
Legend

- District Headquarter
- Tanks
- Reservoir
- River
- District Boundary
- Godavari Basin
- Krishna Basin





DRAINAGE AND SURFACE WATER BODIES
TELANGANA STATE



Legend

- District Headquarter
- Stream
- Basin Divide
- Tanks
- Reservoir
- River
- District Boundary



State wise allocation of Water under Bachawath Award (Godavari Basin)

Maharashtra	..	889 TMC	
Karnataka	..	20 TMC	
Andhra Pradesh and *Telangana	..	1173 TMC	(+307 regenerated Water and regulated releases from Bhoopal Patnam Hydro Electric Project, amounting to 1480 TMC)
Madhya Pradesh and Chattisgarh	..	625 TMC	
Orissa	..	293 TMC	

Total	..	3000 TMC	

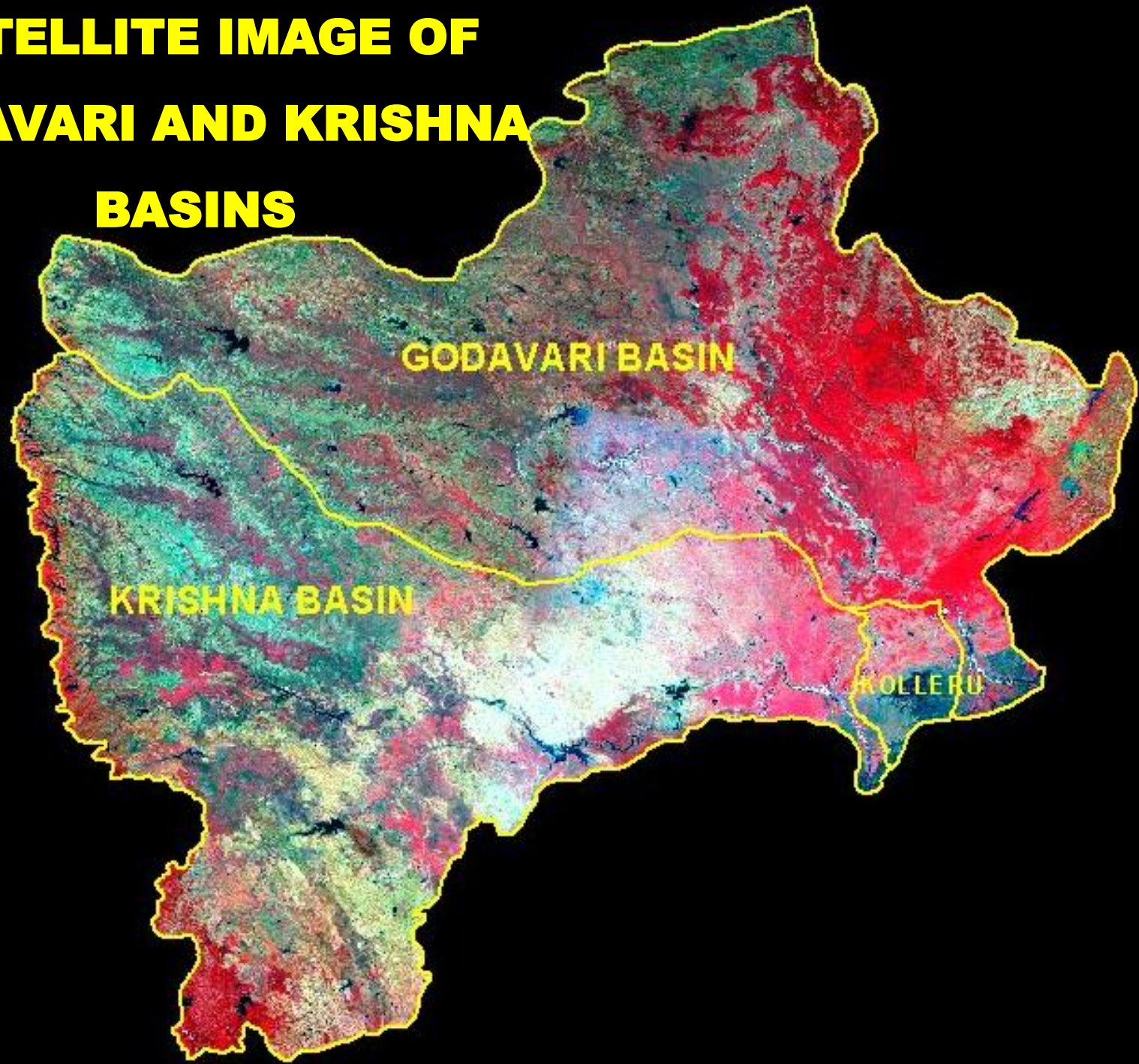
* The share of Water for Telangana state is 954.23 TMC

State wise allocation of Water under Bachawath Award (Krishna Basin)

Maharashtra	..	560 TMC
Karnataka	..	700 TMC
Andhra Pradesh	..	501 TMC
Telangana	..	299 TMC

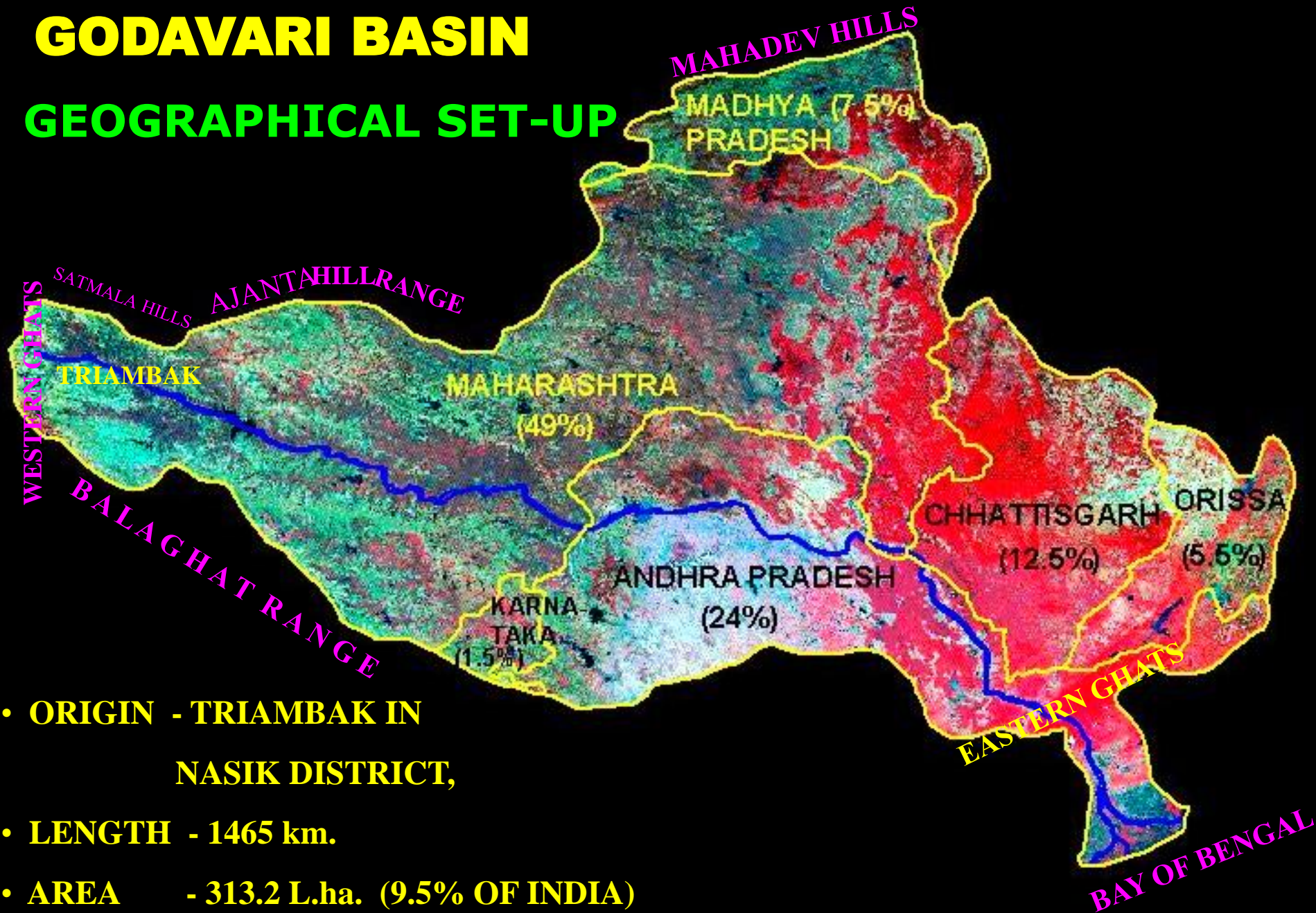
Total	..	2060 TMC

SATELLITE IMAGE OF GODAVARI AND KRISHNA BASINS



GODAVARI BASIN

GEOGRAPHICAL SET-UP



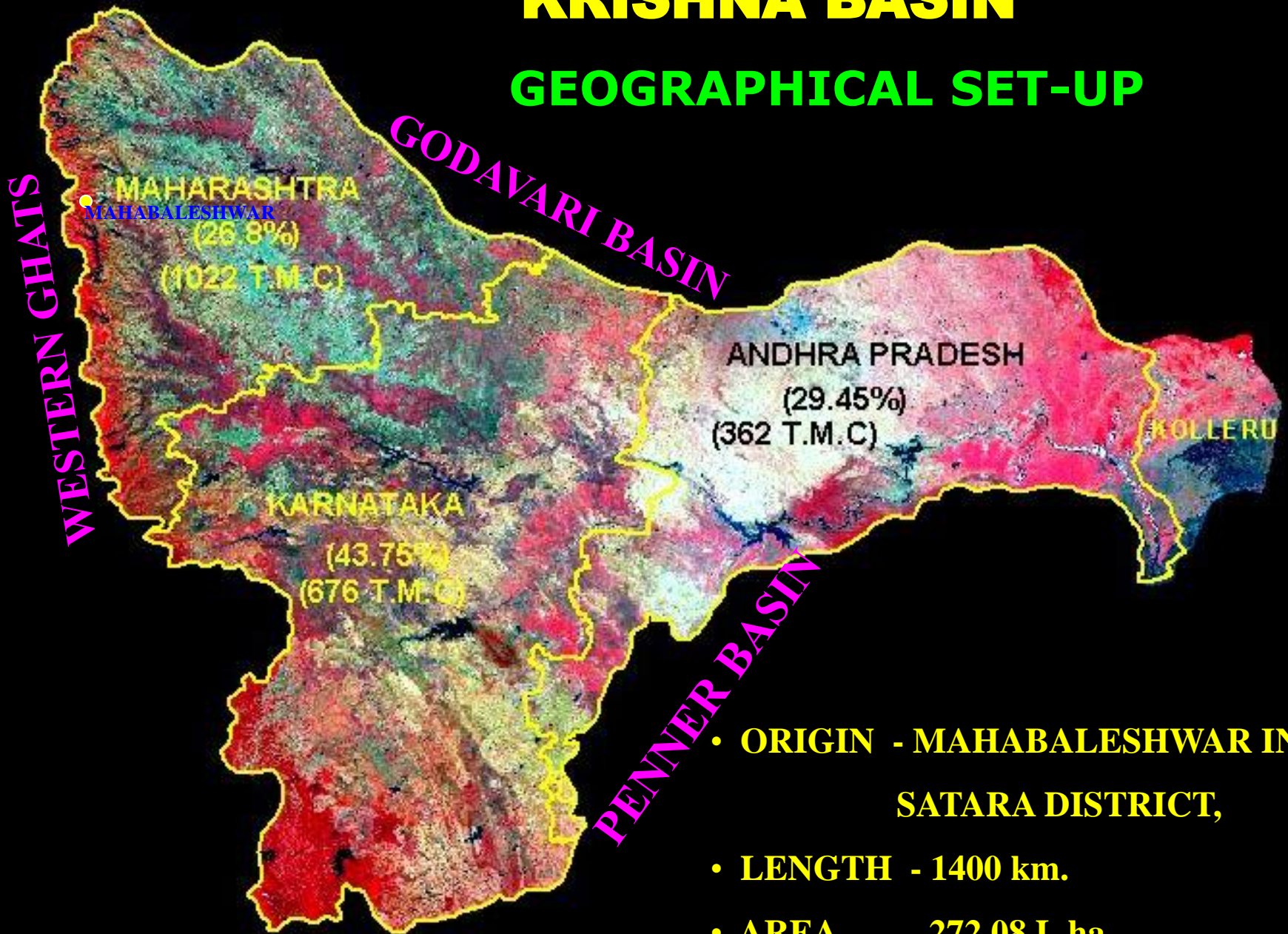
GODAVARI BASIN

WARNING LEVELS ALONG GODAVARI RIVER



KRISHNA BASIN

GEOGRAPHICAL SET-UP



KAVERI BASIN

- **ORIGIN** - MAHABALESHWAR IN SATARA DISTRICT,
- **LENGTH** - 1400 km.
- **AREA** - 272.08 L.ha. (8.3% OF INDIA)

**Impact of Babhali and Eleven
Other Projects on Sri Ram Sagar Project:
Socio - Economic Implications for Telangana**



Prof. M. Pandu Ranga Rao Ph.D.

Water has been bone of contention between

Two warring factions since

times immemorial

Sharing of River Waters between countries and states is not a new subject

The most sacred river in South India is

Godavari, which took birth in

Triyambakeshwaram Near Nasik in the

Sahayadri Mountain ranges of Western Ghats

in Maharashtra

Total length of Godavari is – 1465 km.

Length of Godavari River in A.P. –
800 km.

Godavari Water Dispute Tribunal
(GWDT)

awarded 1480 TMC out of the
total yield of 3000 TMC
at 75% dependability

SRSP is the first multipurpose project
on

River Godavari in Andhra Pradesh
with FRL – 1091 ft.

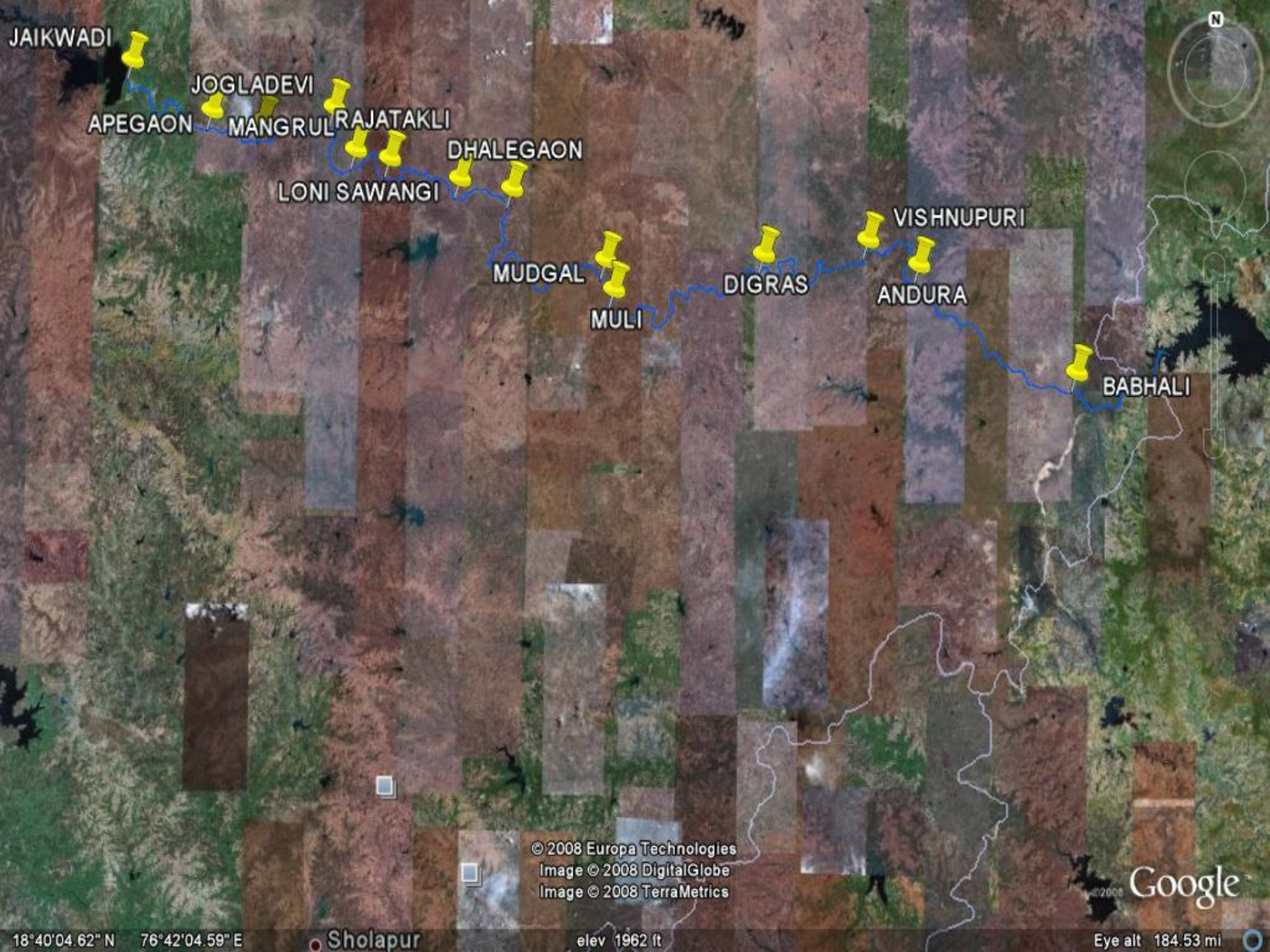
MWL – 1093 ft.

Original storage - 112 TMC

Present storage due to siltation – 90
TMC

Proposed Projects between Jaikwadi & Babhali

- 1) Appe Gaon – 0.25 TMC
- 2) Hirvopuro – 0.90 TMC
- 3) A Jogola Devi – 0.33
- 4) Mangrul – 0.83
- 5) Rajatakli – 0.83
- 6) Loni Savangi – 1.00
- 7) Dhalegaon – 0.42
- 8) Mudgal – 0.36
- 9) Muli – 0.33
- 10) Digras – 1.73
- 11) Amdura – 0.32
- 12) Babhali – 2.70



JAIKWADI
JOGLADEVI
APEGAON MANGRUL RAJATAKLI
DHALEGAON
LONI SAWANGI
MUDGAL
MULI
DIGRAS
VISHNUPURI
ANDURA
BABHALI

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18°40'04.62" N 76°42'04.59" E

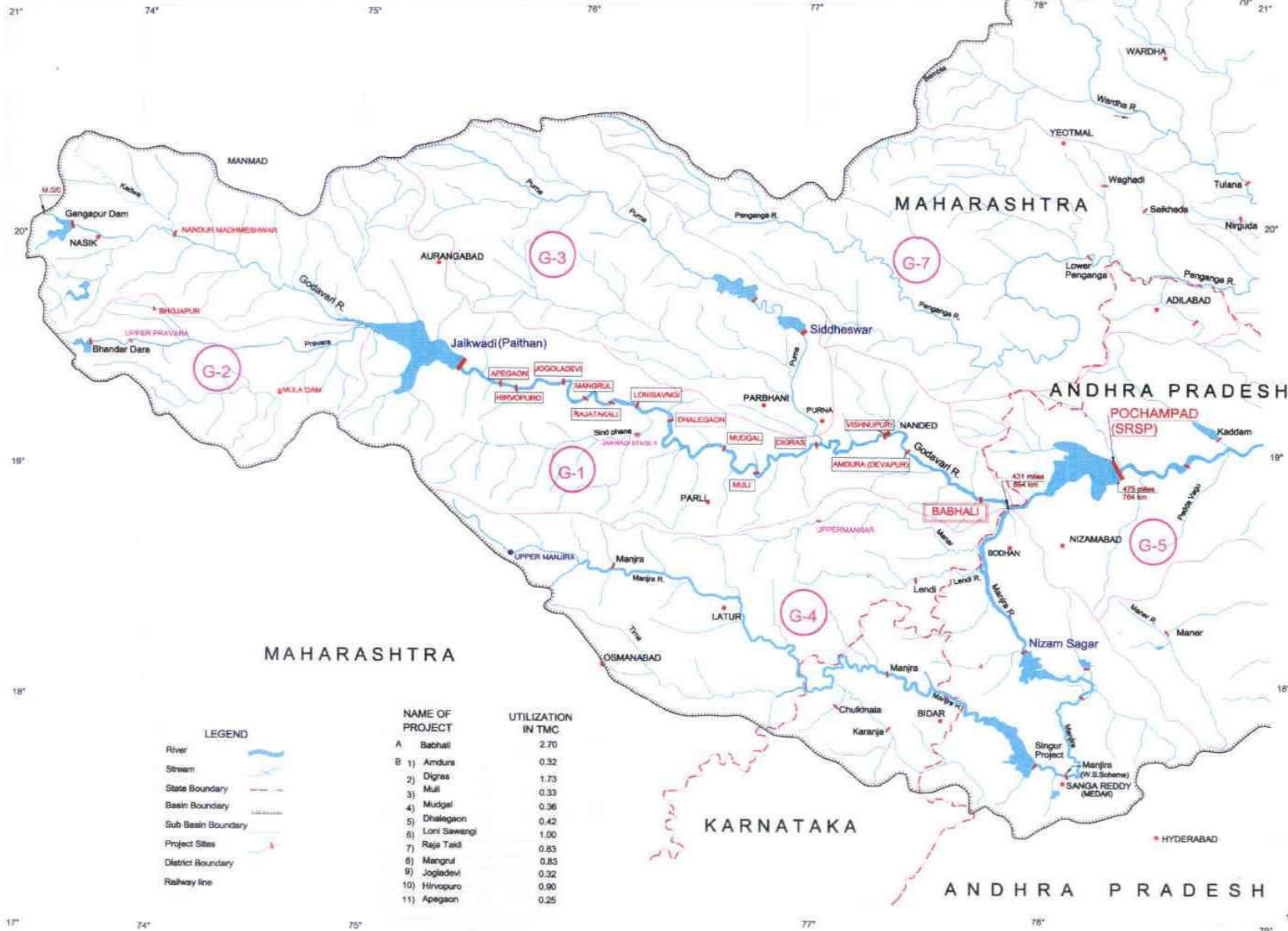
Sholapur

elev 1962 ft

Eye alt 184.53 mi

GODAVARI BASIN UPTO SRSP M A P SHOWING BABHALI & 11 BARRAGES PROPOSED BY MAHARASHTRA

NOT TO SCALE



LEGEND

- River
- Stream
- State Boundary
- Basin Boundary
- Sub Basin Boundary
- Project Sites
- District Boundary
- Railway line

NAME OF PROJECT

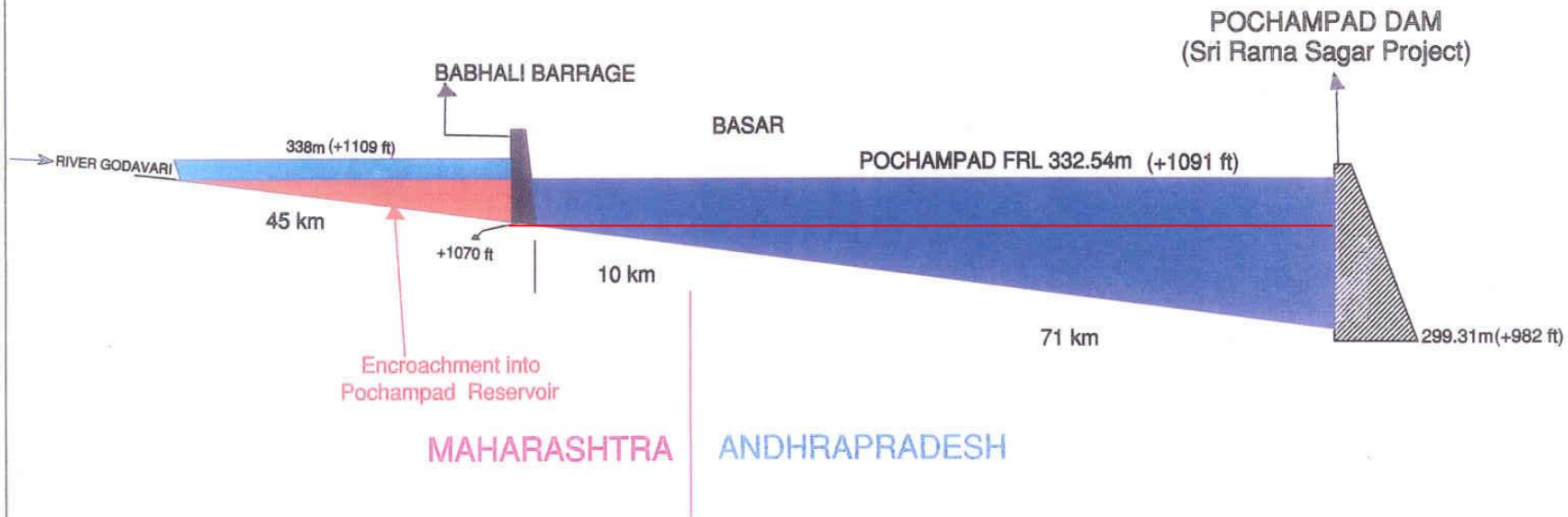
- A Babhali
- B 1) Amdura
- 2) Digraa
- 3) Mulli
- 4) Mudgal
- 5) Dhalegaon
- 6) Loni Sawangi
- 7) Raja Taid
- 8) Mangrul
- 9) Jogladevi
- 10) Hinvoipuro
- 11) Apegaon

UTILIZATION IN TMC

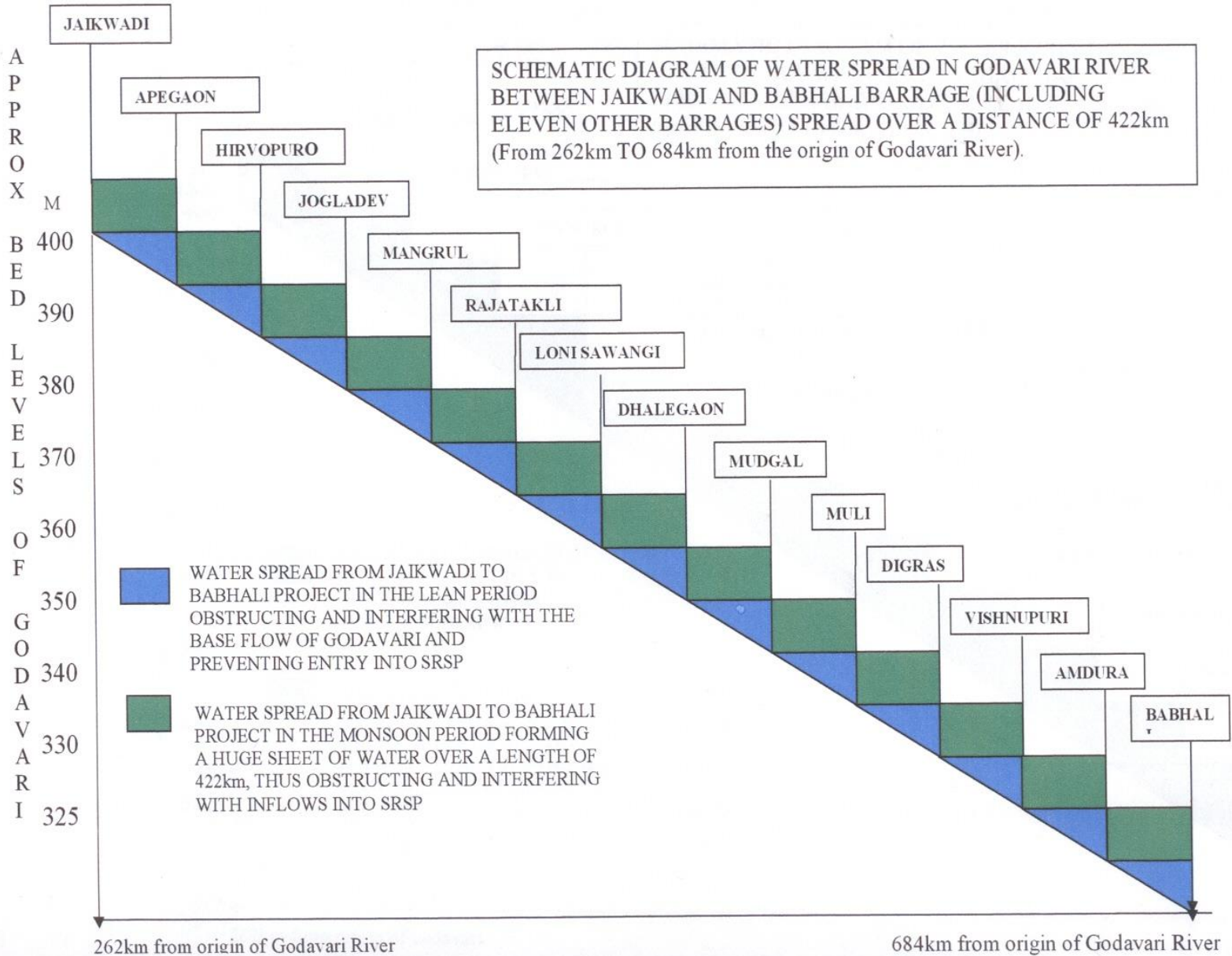
A	Babhali	2.70
B	1) Amdura	0.32
	2) Digraa	1.73
	3) Mulli	0.33
	4) Mudgal	0.36
	5) Dhalegaon	0.42
	6) Loni Sawangi	1.00
	7) Raja Taid	0.63
	8) Mangrul	0.83
	9) Jogladevi	0.32
	10) Hinvoipuro	0.90
	11) Apegaon	0.25

21° 74° 75° 76° 77° 78° 79° 20° 19° 18° 17°

MAP SHOWING ENCROACHMENT OF BABHALI BARRAGE INTO POCHAMPAD RESERVOIR



NOT TO SCALE



ELEVEN BARRAGES BETWEEN JAIKWADI AND BABHALI

BABHALI



AS PER GOVT. OF MAHARASHTRA P.W.D. DEPT.
 NO. HES/2580/C-9/270-G/DESK-14
 DATED: 3-1-1981 ADDRESSED TO
 CHIEF ENGINEER, GOVT. OF ANDHRA PRADESH

ROADS AND MINOR BRIDGES	LENGTH OF ROAD
I. LENGTH OF ROAD FROM PATODA TO HAJIPUR TO KODALVADI KEMANGAON	5.20
II. LENGTH OF APPROACH ROAD FROM KHELA TO TO BIRGA CHOLE TO G.S.R. TO BH	9.20
III. LENGTH OF KODALVADI TO HAJIPUR APPROACH ROAD	19.20
IV. LENGTH OF BONGARGAON BRIDGE - BONGARGAON ROAD	4.80
V. LENGTH OF PARVAZI - HALEGAON TO HALEGAON ROAD	6.80
VI. LENGTH OF BANGAPUR TO BANGAPUR TO BANGAPUR HANDE DISTRICT	4.20
VII. LENGTH OF CHOLE - CHOLEVA TO KHELA TO	4.20
VIII. LENGTH OF WADIPUR TO SATEGAON TO SALEGAON	2.20
IX. LENGTH OF APPROACH ROAD TO BANGAON	6.70
X. APPROACH ROAD TO KHAPRALA - SULTI - CHOLE IN HANDE DIST. DISTRICT	6.20
XI. KODALVADI - BANG - HAJIPUR ROAD	22.24
IX. KODALVADI - KODALVADI - 1.31 & 2.10 ROAD	16.20
XII. SHANON - HANDE - HANDE - HANDE KODALVADI KHELA - YESO	4.20
XIII. A.P. TO BANGAON - BANGAON ROAD	
XIV. 4 HAS E.S. WORKS TO CONSTRUCT ACCESS CANY TRAILS	
GRAND TOTAL	122.81

MAJOR BRIDGES
1. LENGTH OF BRIDGE ACROSS GODAVARI RIVER NEAR CHOLEVA VILLAGE
2. LENGTH OF BRIDGE ACROSS GODAVARI RIVER NEAR BIRGA CHOLE
3. LENGTH OF BRIDGE ACROSS GODAVARI RIVER NEAR BOLLER
4. LENGTH OF BRIDGE ACROSS MANJIRA RIVER NEAR HANDE DISTRICT VILLAGE
5. LENGTH OF BRIDGE ACROSS GODAVARI RIVER NEAR BANGA
6. LENGTH OF BRIDGE ACROSS GODAVARI RIVER NEAR SALEGAON
7. LENGTH OF BRIDGE ACROSS MANJIRA RIVER NEAR YESO

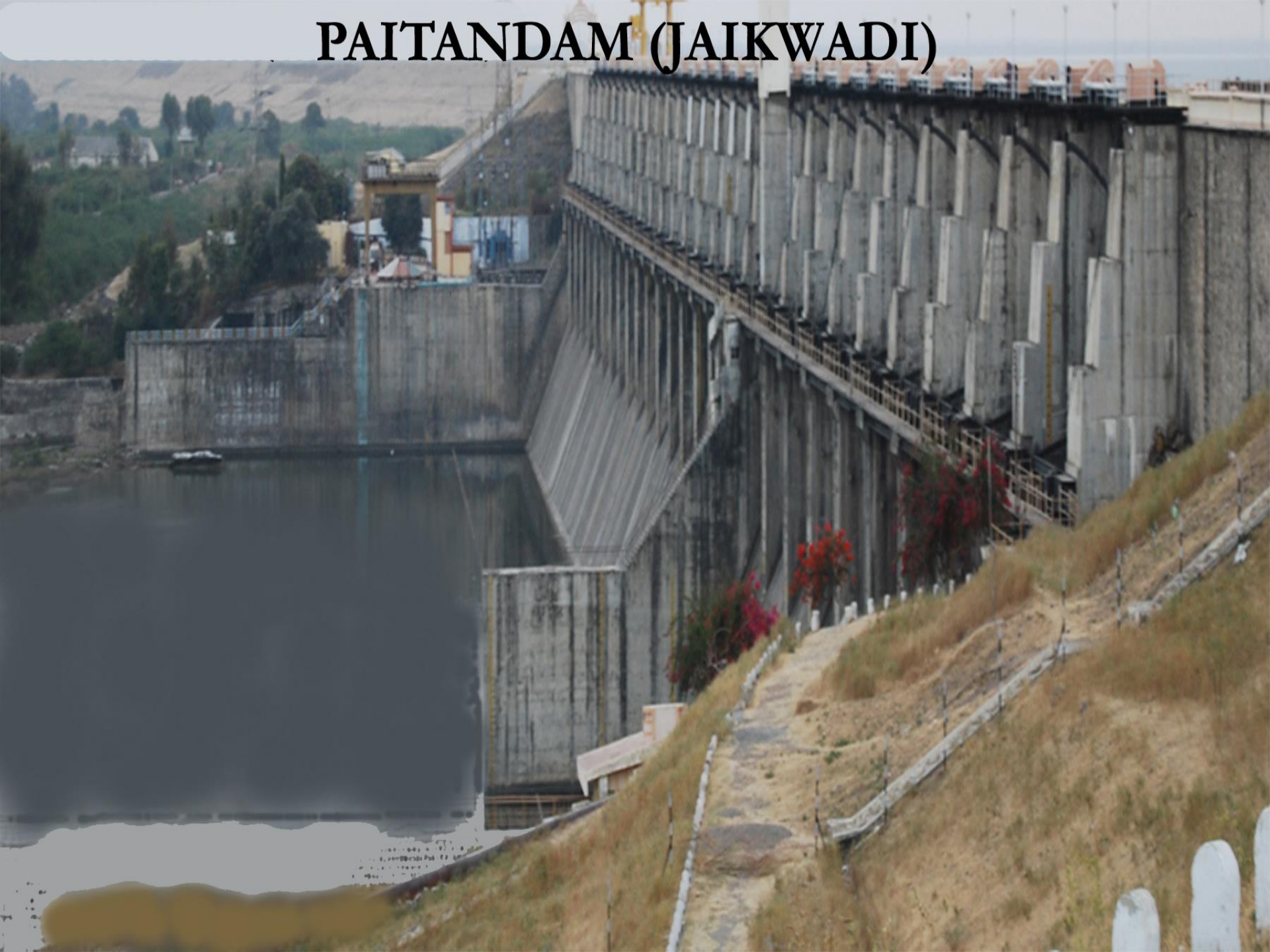
NOTE
 DETAILS IN THIS DRAWING ARE
 EXTRACTED FROM THE ORIGINAL SOURCE
 SUPPLIED BY MAHARASHTRA

NOT TO SCALE

POCHAMPAD DAM

SUBMERGENCE MAP SHOWING STRUCTURES
 OF ALL TYPES, FOR WHICH COMPENSATION
 OF RS. 601 LAKHS PAID BY
 ANDHRA PRADESH TO MAHARASHTRA

PAITANDAM (JAIKWADI)



ARPE GOAN



HIRVOPURO



JOGLA DEVI



MANGRUL



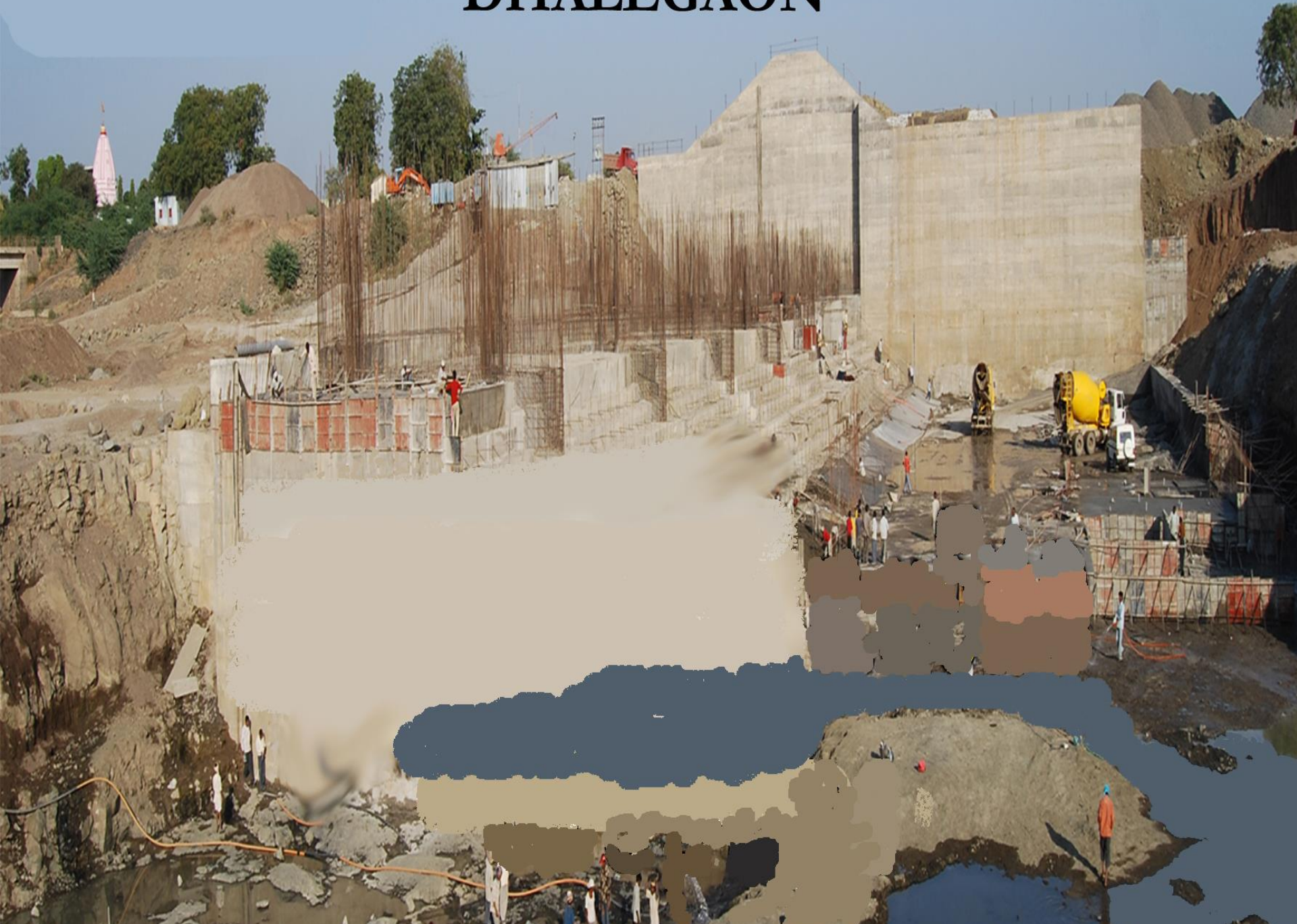
RAJA TAKLI



LONI SAWANGI



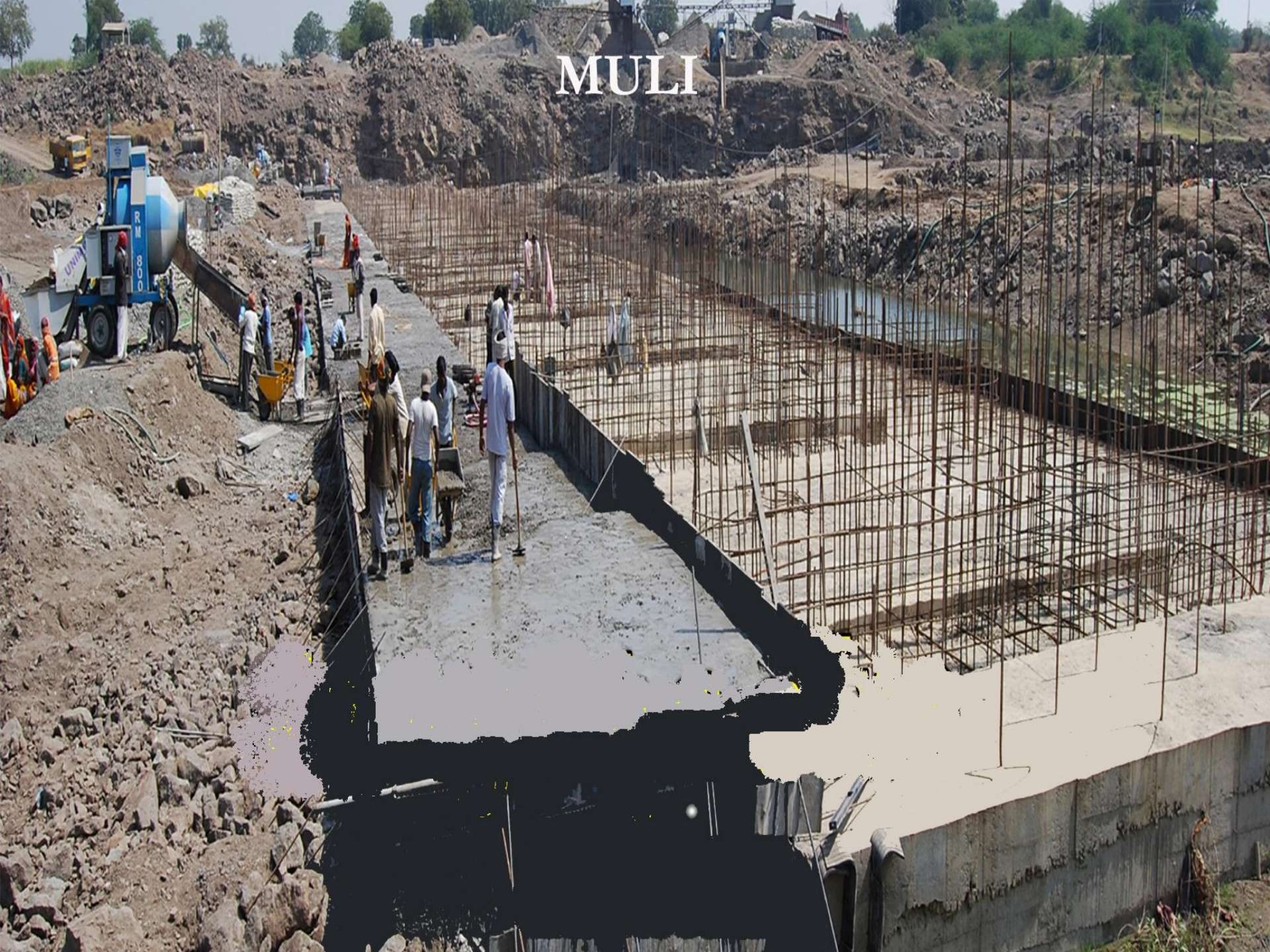
DHALEGAON



MUDGAL



MULI



DIGRAS



AMDURA



BABHALI (BABLI)





Comptroller & Auditor General of India in his report 2001-02 made this statement on the adverse effect on the yield of Jaikwadi Project

Provision for Jaikwadi Project – 115.50 TMC

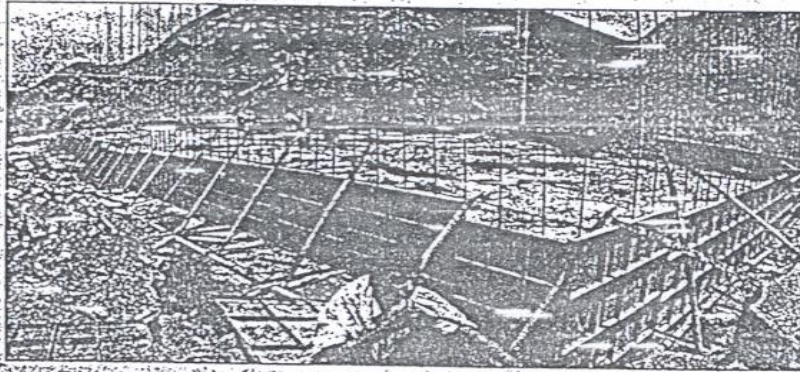
Cost of the Project – Rs.243.44 crores in 1986

Govt. of Maharashtra sanctioned additional storage of 156.60 TMC of water

Above Jaikwadi

గోదాటి నీరు గుట్టకాయస్యాహా!

మహారాష్ట్ర పన్నెన మహా కుతంత్రం



గోదావిపై మహారాష్ట్రలోని బాల్జీ వద్దపాన విద్యుత్తున్న ప్రాజెక్టు (పైర్రోల్)

ఎనిమిది తెలంగాణ జిల్లాలకు జలవనోదీ అయిన శ్రీరాం సాగర్ ప్రాజెక్టుకు సంబంధించి కీర్త ఆస్పిక్ల స్థితి సెలకవి ఊది. ఈ ఆస్పిక్లకి కారణం మహారాష్ట్ర ప్రభుత్వం నిర్మిస్తున్న ప్రాజెక్టులు. ఆ రాష్ట్రం చేతుడున్న నిర్మాణాల్లో అనేక ప్రాజెక్టులకు కేంద్ర జలసంఘం అనుమతి లేదు. ఆ ప్రాజెక్టుల నిర్మాణ వ్యవహారం ముగియలేదు. దీనివల్ల రాష్ట్రంలో జల రార సహాయం అదెం జరుగుతోందో చూద్దాం.

మహారాష్ట్రలోని కైన్యాడ్ ప్రాజెక్టుకు పైన గోదావికి జలా లందిం ప్రాంతాలున్నాయి. వాటిని ఎగువ గోదావి ప్రాంతంగా పేర్కొన్నారు. అక్కడ ఉన్న మధ్య రహదారి ప్రాజెక్టుల సంఖ్య ఇప్పటికే అర్ధశతాబ్దం చేరింది. 64 ప్రాజెక్టుల నీటి నిల్వ సామర్థ్యం 85 కరోట్ల. మహాపురుగు (టి.ఎం.సి.)యి. ఇంతకు ముందు రెప్పిన్లుగా ఇవి కైన్యాడ్ ప్రాజెక్టుకు ఎగువన నిర్మించబడిన కైన్యాడ్ ప్రాజెక్టులో 110 టి.ఎం.సి.ల నీటిని నిల్వ చేసుకోవడం అనుమతి ఉంది. ఎగువన నిర్మించిన ప్రాజెక్టులు గోదావి ప్రధాన ప్రవాహంలోకి జలరారులు రాకుండా అడ్డుకట్టలుగా నిర్మించినవి కాదు. 64 అడ్డుకట్టలు నిర్మాణంపై ఉన్నాయి. కాబట్టి కైన్యాడ్ ప్రాజెక్టులోకి రావాల్సిన నీటిని నిల్వంచేయడానికి కాలాల్లో ప్రాజెక్టు నుంచి శ్రీరాంసాగర్ ప్రాజెక్టుకు రావాల్సిన గోదావి నీటిజలం నాశనం చేస్తున్నట్లుగా భావిస్తున్నారు. మహారాష్ట్ర ప్రభుత్వం చేస్తున్న మరో మహాకార్యం ఏమిటంటే... పన్నెన కనుమల ద్వారా లందిం వద్దపానాని నిర్మింకొచ్చడం అనుమతించడం. పన్నెన కనుమల్లో నీటి వర్షం గోదావికి ఎదురు మెండుగా చేరుతుంది. 27 రాష్ట్రాలు, దిన్న జలశయాలు (నీటినిండి సంఖ్య దాదాపు 5000), 17 మధ్య రహదారి ప్రాజెక్టులు నిర్మించబడుతున్న సమాచారం. అలా నిర్మించిన మధ్యరహదారి ప్రాజెక్టులు వాటి నీటి నిల్వ సామర్థ్యాలను పక్కకలో చూడండి.

ప్రాజెక్టు పేరు	నీటి సామర్థ్యం (టి.ఎం.సి.లలో)
1. మకెసి	12
2. పాల్కర్	5
3. విల్సన్	20
4. దార్వా	5
5. మూల-ప్రవార	20
6. గంగాధార	5
7. కమి	5
8. భాన్సి	5
9. కివన	8
10. నైరవం	8

పన్నెన కనుమల్లో వర్షపాతం లాభంగా ఉంది. ఒక్కసారి సంవత్సరానికి 2000 మిల్లీ మీటర్ల స్థాయిని మించిపోతుంది. ఇది కాక, ఎత్తరేలం ద్వారా కూడా దీనివల్ల మధ్య నీటిని జలశయాల్లోకి మళ్ళించారు. శ్రీరాంసాగర్ ప్రాజెక్టులో

ప్రాజెక్టులో రూపొందించబడుతున్న సమయంలో కైన్యాడ్ ప్రాజెక్టు ద్వారా మిగులు జలాన్ని పేరుగా శ్రీరాంసాగర్ ప్రాజెక్టులోకి ప్రవహించే అనుమతి. అలా శ్రీరాంసాగర్ ప్రాజెక్టులోకి ప్రవహించే మిగులు నీరు 198 టి.ఎం.సి.ల ఉంటుంది అంచనా వేశారు. కైన్యాడ్ ప్రాజెక్టుకు చేరకముందే గోదావి జలంకు మహారాష్ట్ర ఆక్రమణ అడ్డుకట్టలు వేసిన మీటట- శ్రీరాంసాగర్లోకి రావాల్సిన ప్రవాహం కుంపించుకుపోయింది. మహారాష్ట్ర చేసిన అన్యాయం అంటే అగిపోలేదు. కైన్యాడ్ ప్రాజెక్టు దీనివల్ల దాగంలో మధ్యరహదారి ప్రాజెక్టులు అయిపోయిన నిర్మించాలన్నది మహారాష్ట్ర ఇప్పటి అంచనా. రహదారి వాణి పెంపొందించుకోవడానికి ఇప్పుడు నీటి నిల్వ సామర్థ్యం మరో 60 టి.ఎం.సి.లు. ఆ ప్రాజెక్టుల నిల్వ సామర్థ్యాన్ని అలా ఉంచితే, చేరే ప్రతి నీటి బొట్టునూ ఉపయోగించుకోవచ్చునట్లు ఏర్పాటు చేసుకొని ఆరకంగా మహారాష్ట్ర కాపాడుకోవచ్చునట్లు 200 టి.ఎం.సి.లు. ఈ వ్యవహారం ఎన్ని ఘోరంగా నష్టపోయేది శ్రీరాంసాగర్ నే నమ్ముకున్న ఎనిమిది తెలంగాణ జిల్లాల ప్రజానీకం.

మహారాష్ట్ర నిర్మించే తలపెట్టిన విద్యుత్తు ప్రాజెక్టుకు ఉదాహరణగా కిమికోండి. ఆ ప్రాజెక్టు నీటి సామర్థ్యం 2.85 టి.ఎం.సి.లు. కానీ ఆ ప్రాజెక్టు ద్వారా 11.40 టి.ఎం.సి.ల నీటిని (ఇంతకు ముందు రెప్పిన్లు వరదలో ప్రతి నీటిబొట్టును మర్చిపో) ఉపయోగించుకోవాలన్నది మహారాష్ట్ర ప్రభుత్వ ప్రణాళిక. అంటే, ఎగువ ప్రాంతాల్లో ఎట్టిదేకట్టి అడ్డుకట్టలు ఉండటంతో ప్రాజెక్టుకు 2.85 టి.ఎం.సి.లకు మించి నీరు చేరడం లేదు. అయినా, మిగిలిన 8.45 టి.ఎం.సి.ల నీటిని వినియోగించే అనుమతి విద్యుత్తు ప్రాజెక్టుకు ఎగువన దీనివల్ల ప్రాంతాల్లో

మరో 11 ద్వారాలు నిర్మిస్తున్నారు. వాటి వివరాలి పక్కకలో చూడండి...

ప్రాజెక్టు పేరు	నీటి సామర్థ్యం (టి.ఎం.సి.లలో)
1. అప్పలర్	0.32
2. డీగ్రెస్	1.7
3. ములి	0.32
4. ముర్దర్	0.36
5. ధర్వాన్	0.42
6. లోవి సంఖ్య	1.00
7. రాజాకర్	0.83
8. మన్సూస్	0.83
9. జొగ్గడేవి	0.32
10. అమ్బుగాన్	0.24
11. బార్జి	2.74

ఇందులో బార్జి వద్ద 2.74 టి.ఎం.సి.ల గోదావి జలాన్ని అడ్డుకోవడం నిర్మించే ప్రాజెక్టుకు రూ.70కోట్లు ఖర్చవుతుంది అంచనా. ఇంకా గుమస్తా శ్రీరాంసాగర్ ప్రాజెక్టుకు చేరాల్సిన నీటిని కాజీయడానికి మహారాష్ట్ర ఎలాంటి కడతలకు పాల్పాలోవడం ఆలోచిస్తుంది. వారు నిర్మించబడ్డిన 11 ద్వారాలను 60 కోట్లమీటర్ల ప్రాంతంలో రూపొందించనున్నారు. ఇలా మహారాష్ట్ర తన ఇష్టానుసారం నిర్మిస్తూ పోతున్న ప్రాజెక్టుల వల్ల శ్రీరాంసాగర్లో నీటి ప్రవాహం ప్రాధికంగా మారుతుంది. ఈ వ్యవహారం అందరూ ప్రజానీకం

స్వయంగా దక్కాల్సిన గోదావి జలం అనే రావణక విహారం కలిగిస్తోంది.

విద్యుత్తు ప్రాజెక్టుకు మరికొంత వివరంగా పరిశీలిద్దాం. అందులో 14 మంపులను అమర్చారు. మొత్తంగా వాటి సామర్థ్యం 8.68 మెగావాట్లు (హార్ట్ సెక్ సామర్థ్యం దాదాపు 8020). ఈ మంపులు ఇర్లెవాట్టగుంటుల వద్ద స్థాయి. 16 మీటర్ల వ్యాసం ఉన్న ట్రైబ్లైన్లు మూడింటి ద్వారా అలా తోటి నీటిని వ్యవహారం, మంపులను, తాగునీరు వంటి దీనిని అవసరాలకు మళ్ళిస్తున్నారు. ఇలా అక్కడ ప్రతి బొట్టు నీటిని 1989 నుంచి ఉపయోగించుకోవచ్చును. విద్యుత్తు ప్రాజెక్టుకు తోడుగా మరో నాలుగు ప్రాజెక్టుల్ని నిర్మించడానికి మహారాష్ట్ర ప్రభుత్వం పడక రహదారి చేస్తోంది. ఆ ప్రాజెక్టుల వివరాలి... మజల్గావ్ 12.4 టి.ఎం.సి.లు, దుర్గా 14.0 టి.ఎం.సి.లు, విష్వంట్ 11.4 టి.ఎం.సి.లు, మంజ్ర 11.2 టి.ఎం.సి.లు, దెన్ 11.0 టి.ఎం.సి.లు. మొత్తం 60.0 టి.ఎం.సి.లు. ఈ ప్రాజెక్టులు కైన్యాడ్కి దీనివల్ల నిర్మిస్తున్న పరిధిగా శ్రీరాంసాగర్ ప్రాజెక్టుకు, రహదారి తెలంగాణ జిల్లాలకు ఎంతటి ముప్పు పొంది ఉంటే అప్పుడు చేతులవచ్చు మిగతా ప్రాజెక్టుల నిర్మాణాన్ని పనులయిన అనుమతి తెలుగు జిల్లాల్లో పన్నెననాలు దాకుతాయి.

గోదావిలోకి నీటిని అందిస్తున్న ప్రాంతాల్ని పన్నెననాని వివరించుచున్న అంకి... ఎగువ గోదావి, ప్రవార, ఫల్క, మంటే, మన్ గోదావి, మానేరు, పెనగంగ్ వాల్ల ప్రాంతాల్లో, దీనివల్ల గోదావి, బొల్లారావతి, కలవి, గోదావి అవర దక్షిణ ప్రాంతాల్లో బొల్లారావతి మీద ఇంతకు ముందు వివరించబడ్డాయి ప్రాజెక్టులు నిర్మించడానికి మహారాష్ట్ర మధ్యరహదారి, ట్రైబ్లైన్లు నిర్మిస్తున్నట్లుగా పైన వివరించిన పన్నెన అవరవల్లో ప్రాజెక్టు ద్వారా 40 కె.ఎం. బొల్లారావతి ద్వారా 20 కె.ఎం జలం గోదావికి సుమారుతున్నాయి. వర్షాలు వచ్చినప్పుడు ఆ సమయంలో నీరుండి ప్రాంతంలోని ప్రవాహాలను అలా రాష్ట్రం అడ్డుకట్టలు వేసి కట్టల్ని కట్టుకుంటూ పోతే ఇప్పుడల్లా దుమ్ముగొలిపి పోలవారి ప్రాజెక్టులకు కూడా నీరుతుంది.

1998-99-లో 2500కోట్ల రూపాయలు వ్యయం చేసి నిర్మించిన శ్రీరాంసాగర్ ప్రాజెక్టు తెలంగాణ ప్రాంతమందరికీ జీవనానార జలంకల్ని అందిస్తోంది. మహారాష్ట్ర ఎగువనున్న ఇంత రాష్ట్రం అక్కడ ప్రాజెక్టుల పన్నెననాని ఎలా ఉంటుంది అనుభూతి కాదు. హామీ ఇచ్చిన ప్రకారం మహారాష్ట్ర నుంచి నీరు విడుదల కాని వద్దలో శ్రీరాంసాగర్ నీరు తప్ప మరో ప్రత్యామ్నాయం లేని తెలంగాణ ప్రైవేటు అడ్డుకట్టులకు పాల్పాడుం నిర్మిస్తున్నందుకు, కాబట్టి మన రాష్ట్ర ప్రభుత్వం కైన్యాడ్ నుంచి లాభే వరకూ మహారాష్ట్ర నిర్మించలేదన్న ప్రాజెక్టుల్ని తక్షణం నిలుపు రెయిన్లు అవసరాన్ని తీరే ప్రయత్నానికి వివరించి తననుకుంటున్న వర్షాలు కేటాసునా చూడండి.

- ఎం.పాండురంగారావు
(రచయిత వరంగల్లోని నేషనల్ మెన్స్ కలెజ్ లో ఉప విద్యాలకు లెక్చర్ ప్రొఫెసర్)

This 14 TMC will be utilized regularly

By pumping 4 to 5 times its storage

Utilization is about 56 TMC

Encroachment of Babhli into SRSP

shows clearly about the possible utilization of 65
TMC water

Govt. of Maharashtra is planning to store 60
TMC of water which means the utilization is 90
TMC

The total water utilization in $56 + 65 + 90 = 211$ TMC

water allotted to Maharashtra – $60 + 19 = 79$ TMC

Excess use by Maharashtra = $211 - 79 = 132$ TMC

which is unauthorized

storage in SRSP – 90 TMC

unauthorized utilization which is 132 TMC is more than

then storage of 90 TMC in SRSP

Godavari Basin and its sub-basins

Yield of Godavari as per GWDT – 3000 TMC

At 75% dependability

Water allotted to A.P. share – 1480 TMC

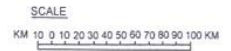
Sub basins & yields

1 to 12 Borrow this table from text

Sharing of Godavari Waters up to SRSP



- G&D SITES**
- 1 POLAVARAM
 - 3 KONTA
 - 9 PATHAGUDEM
 - 21 TEXERA
 - 22 BHATPALLI
 - 23 SIRPUR
 - 33 ASHTI



GOVT. OF ANDHRA PRADESH	
IRRIGATION & CAD DEPARTMENT	
CATCHMENT AREA MAP OF GODAVARI BASIN	
MADE BY Prasanna Kumar	CONSULTANT WAPCOS (I) LTD.
APPROVED BY [Signature]	WATER AND POWER COMMANDS & CANALS DEPARTMENT CORPORATE OFFICE, 7th FLOOR, UNITED TRUSTS BLDG, SECTION - 1A, GE. BELAGHATA, HYDRABAD
<small>MAP SCALE: 1:50,000</small>	

b.y

The problems in future may be acute leading to further national disharmony. Therefore keeping in view of the impending future it is felt necessary to suggest that the constitution may be amended for the establishment of an independent, apolitical, high power constitutional authority, with all the judicial powers to resolve the disputes and to enable the proper and effective implementation of the Awards of the Tribunals. This is intended to fill the exiting gap in implementation of the awards and peg the loopholes in resolving the disputes amicably to all the concerned.

Utilization of Godavari Waters in the New Millennium

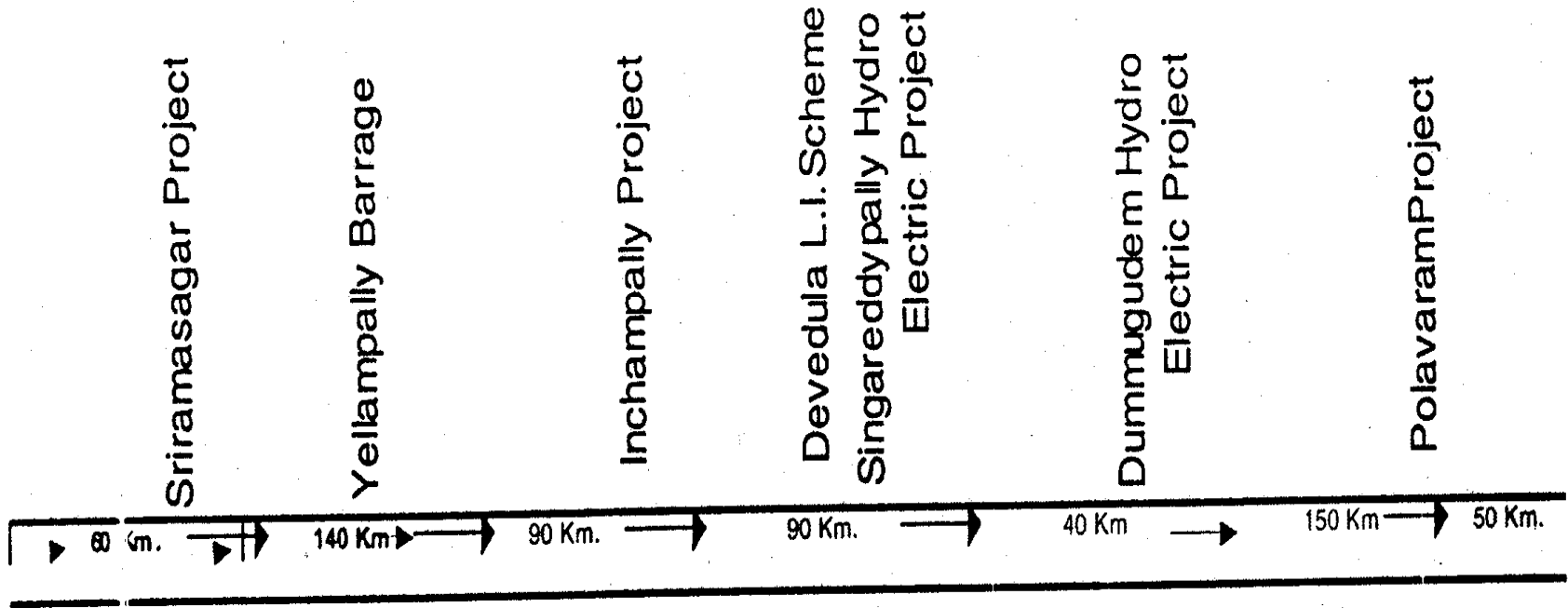
- Utilization so far 800 TMC ft
- To be utilized 680 TMC ft

Total Share of A.P. 1480 TMC ft

Total yield of Godavari Basin - 3000 TMC ft

Bachavat Tribunal Award – 1980.

IRRIGATION PROJECTS ON GODAVARI BASIN IN ANDHRAPRA



SRSP	
Water Utilisation	
Stage-I	4166 Mm ³
Stage-II	1140 Mm ³
FFC	566 Mm ³
Power	27 MW

Yellampally	
Utilisation	1784 Mm ³
Power	Nil

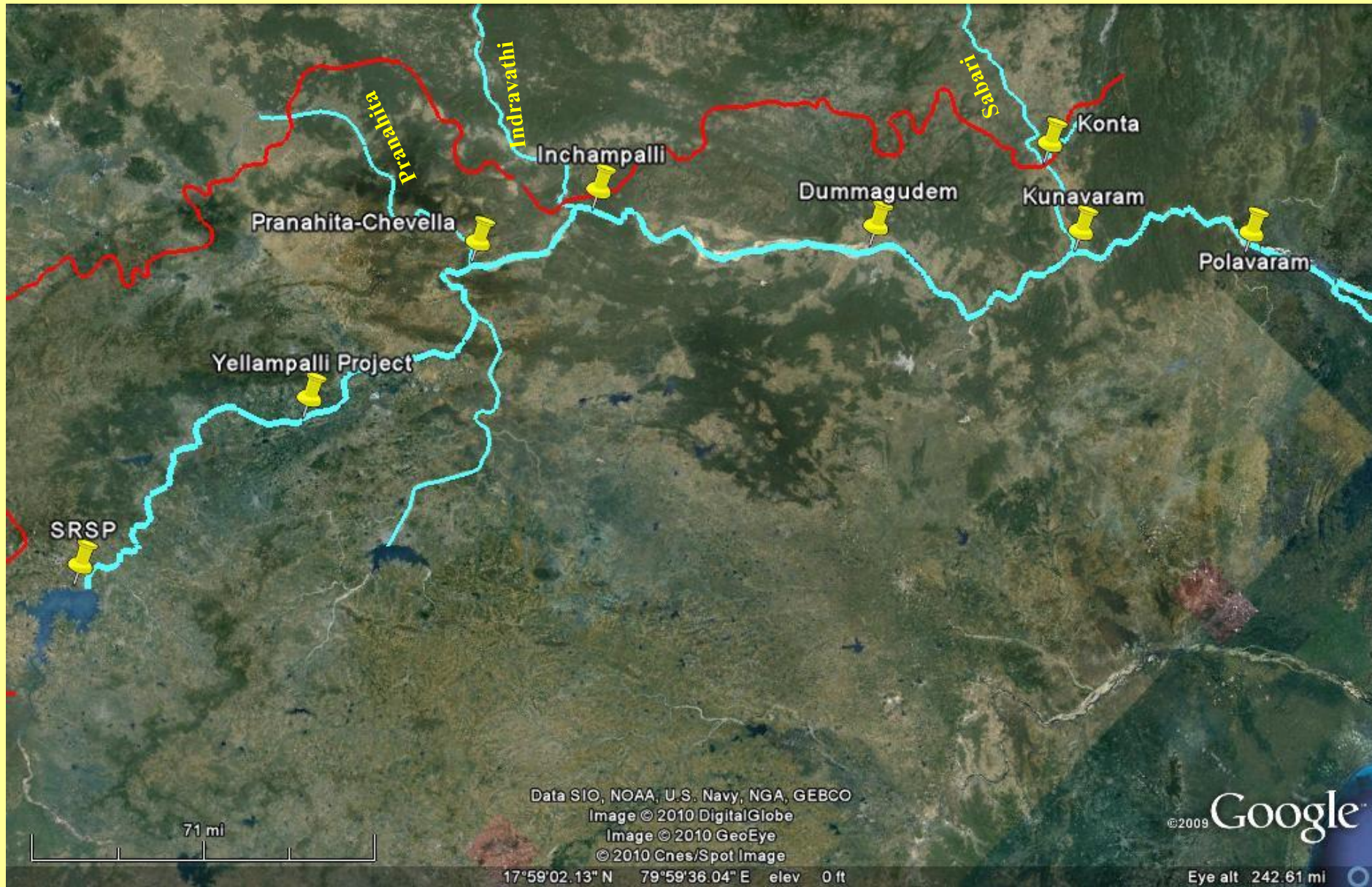
Inchampally	
Utilisation	2407 Mm ³
Power	350 MW
CCA	63500 Ha

Singareddypally	
Power	200 MW
Devedula Project	
Utilisation	1416 Mm ³
CCA	202300 Ha.

Dummugudem	
Power	350 MW

Polavaram	
Utilisation	
Power	720 MW

PROPOSED PROJECTS ON GODAVARI RIVER AND ITS TRIBUTARIES



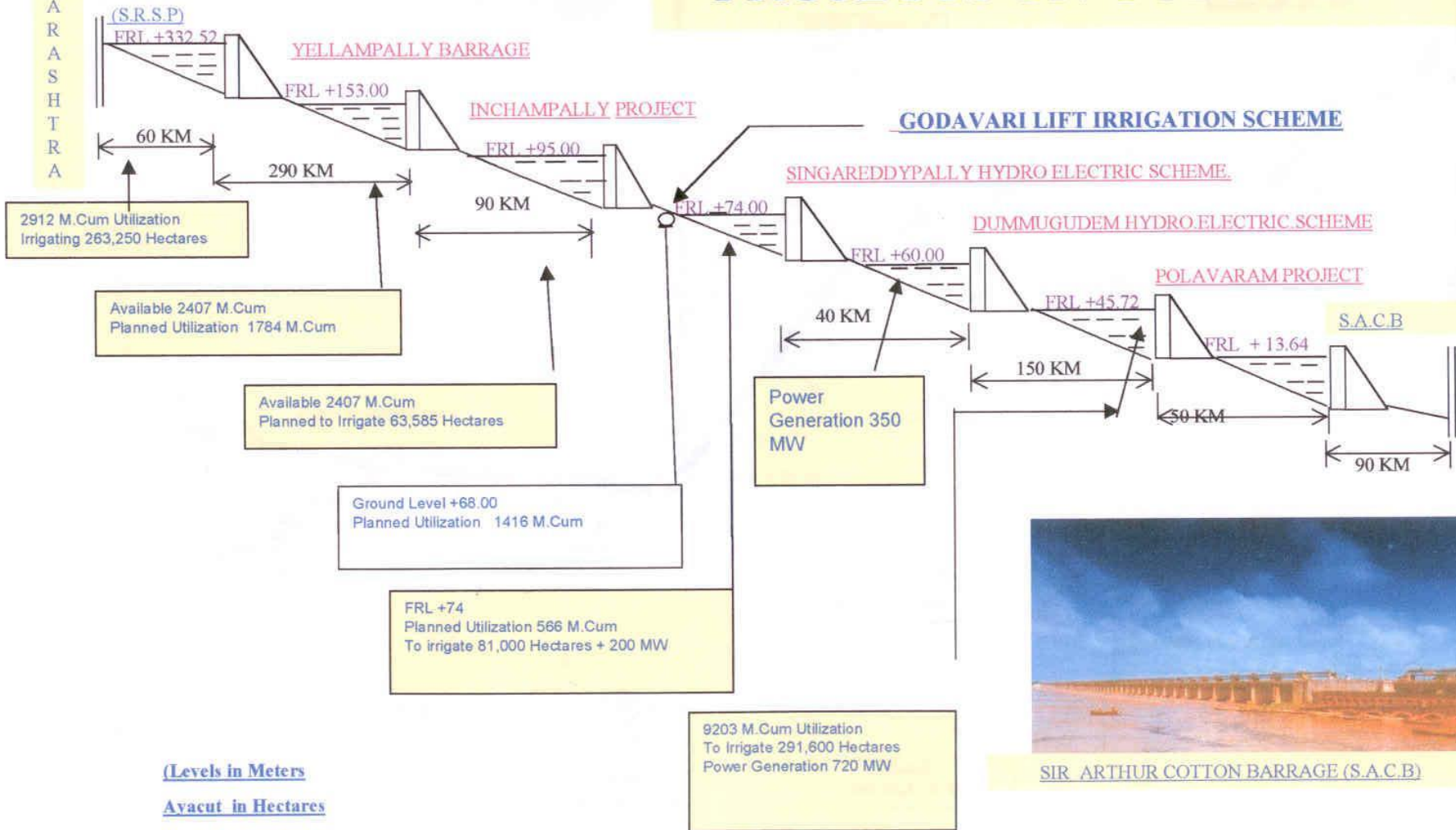
GODAVARI LIFT IRRIGATION SCHEME

SRIRAM SAGAR PROJECT (S.R.S.P)



PROJECTS ON GODAVARI

M
A
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R
A



(Levels in Meters

Avacut in Hectares

Water Utilization in

Million Cubic Meters- M.Cum)

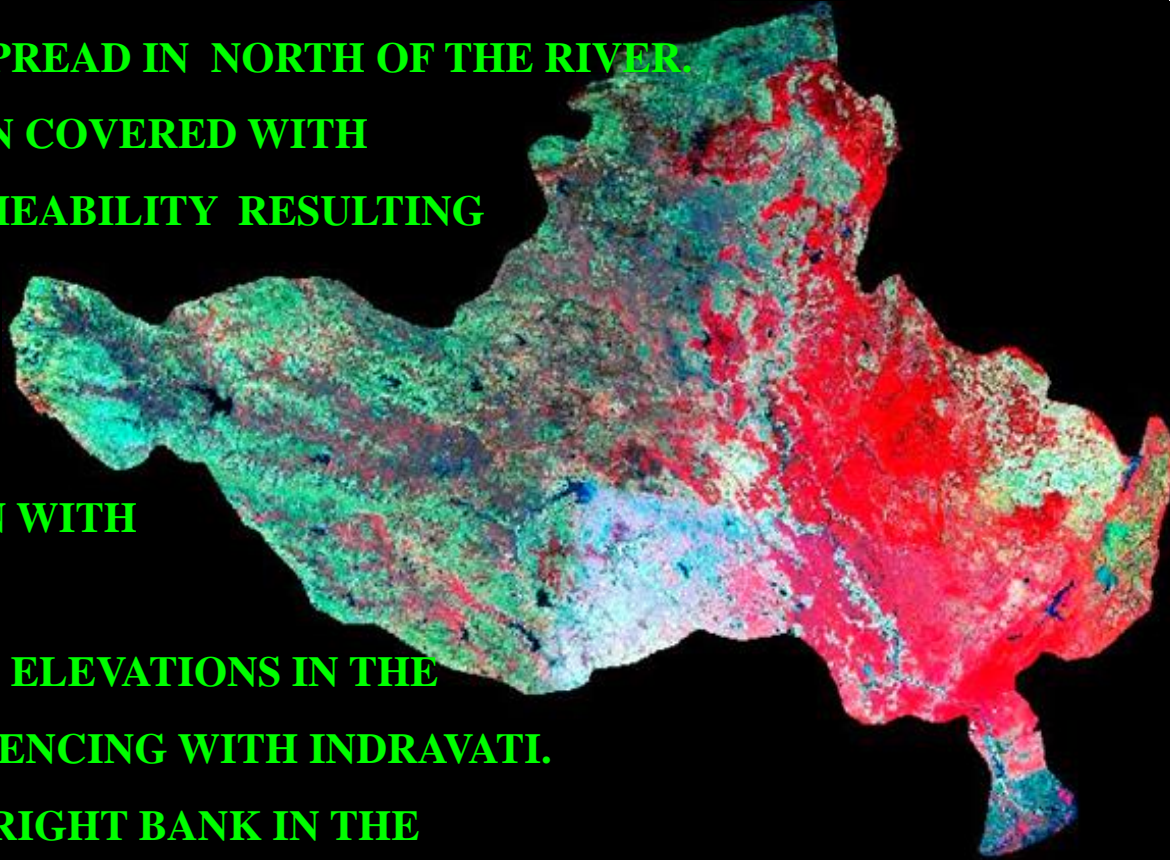
BA
Y
OF
BE
N
G
AL



SIR ARTHUR COTTON BARRAGE (S.A.C.B)

WHY SO MUCH WATER GOING WASTE

- **HIGH RAINFALL IN THE NE PART OF THE BASIN AND MAINLY COVERED WITH DANDAKARANYA.**
- **MORE AREA OF THE BASIN SPREAD IN NORTH OF THE RIVER.**
- **WESTERN PART OF THE BASIN COVERED WITH CLAYEY SOILS OF LESS PERMEABILITY RESULTING MORE SURFACE RUN – OFF.**
- **NE PART OF THE AREA IS TRAVERSED BY HIGHLY UNDULATING HILLY TERRAIN WITH LESS ARABLE LANDS.**
- **GODAVARI FLOWS AT LOWER ELEVATIONS IN THE LOWER PART AFTER CONFLUENCING WITH INDRAVATI.**
- **THE ARABLE LANDS ON THE RIGHT BANK IN THE LOWER PART OF THE BASIN ARE SITUATED AT ELEVATION BETWEEN 300-400 m.**
- **NOT MUCH DEVELOPMENT OF GROUND WATER IN NE PART OF BASIN**



Initial Proposals

- Visit of former Prime Minister of INDIA smt Indira Gandhi on 14th October 1984.
- Made a promise at Jangaon for bringing surplus flood waters of Godavari.
- A three dimensional model of the project was prepared under the guidance of Professor M. Pandu Ranga Rao R.E.C and exhibited in the open house.
- Sri P.V. Narasimha Rao visited REC to see the flood flow canal project model in 1984.

1984



Yellampally Barrage

- **FRL -- 153 M -- 40 TMC**
- **To Supplement 10 TMC to Ramagundam
10 TMC to Hyderabad Water Supply**

By Lifting to D – 83 SRSP

Ayacut of Cuddam Project

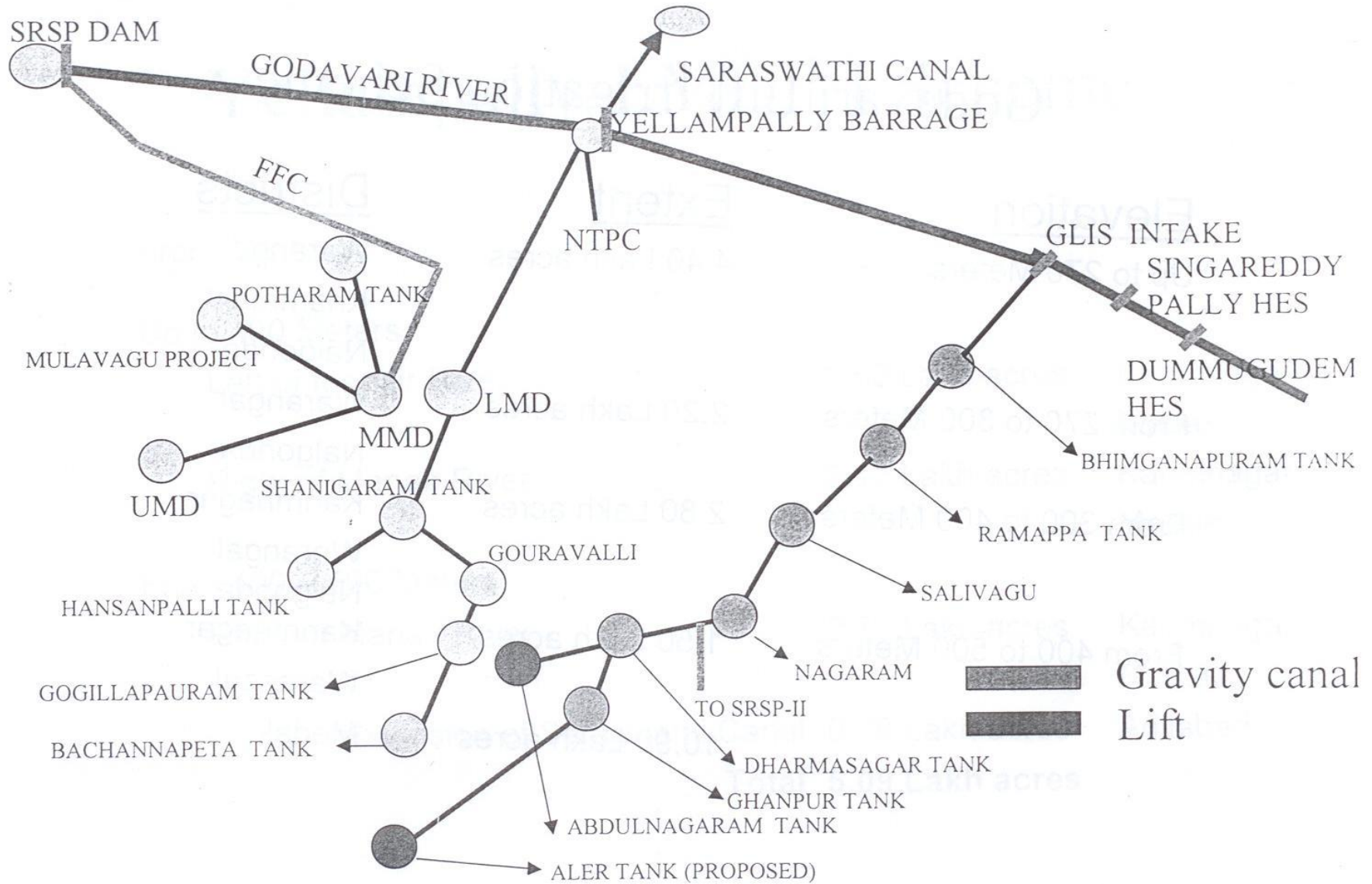
Cost of the Project Rs. 600 Crores



Inchampally Project

- Original Proposals 112.77 M High Dam
- Storage 366 TMC ft
- Power 975 M W
- Submergence AP - 38815 Hectares 9024
(Forest)
- Maharashtra - 43186 Hectares 6754
(Forest)
- Chattisgarh - 18097 Hectares 14392 (Forest)
- Villages submerged - 229 ---- 1 Lakh People

LINE DIAGRAM OF INTEGRATED PLAN



AMRP / SLBC

Salient Features

Original Proposal

- To draw Water from Srisaïlam left bank from foreshore by gravity through open channel and tunnel to feed number of Reservoirs enroute including AKBR for irrigation & drinking Water
- Estimated irrigation – 20 lakh acres
- About 20 Reservoirs to be filled
- FRL of Srisaïlam Reservoirs is 885 ft.
- Scheme Abandoned for want of huge funds.

Revised Proposals

- ❖ SLBC has been converted into with drawl of water from NS foreshore through lift Scheme
- ❖ Area of irrigation is 2.8 lakh acres
 - 2.3 lakh acres from this scheme
 - 0.5 lakh acres from fore shore of NS at lower
- ❖ Drinking Water supply to 212 villages which are fluoride effected.
- ❖ Total Water is 26 TMC per year
 - Karif about 1.8 lakh acres
 - Rabi about 1.0 lakh acres

The Scheme Consists of

- ✓ 4 Vertical Francis Turbine Pumps of 18 MW (24000 HP) (BHEL Bhopal)
 - Rated Speed 428.6 RPM
 - Discharge – 595 Cusecs at 440 V, 50 Cycles
 - Cost of each Pump – 30 Crores

- ✓ Pumping Head

Dynamic Head – 81 M

Static Head -- 92 M

Min. Pumping Head – 77 M

Max. Pumping Head – 95 M

(Water level difference between surge pool and

Main Reservoirs

1. Cistern 0.4 TMC
2. AKBR 1.5 TMC
3. Udayasamudram 1.5 TMC

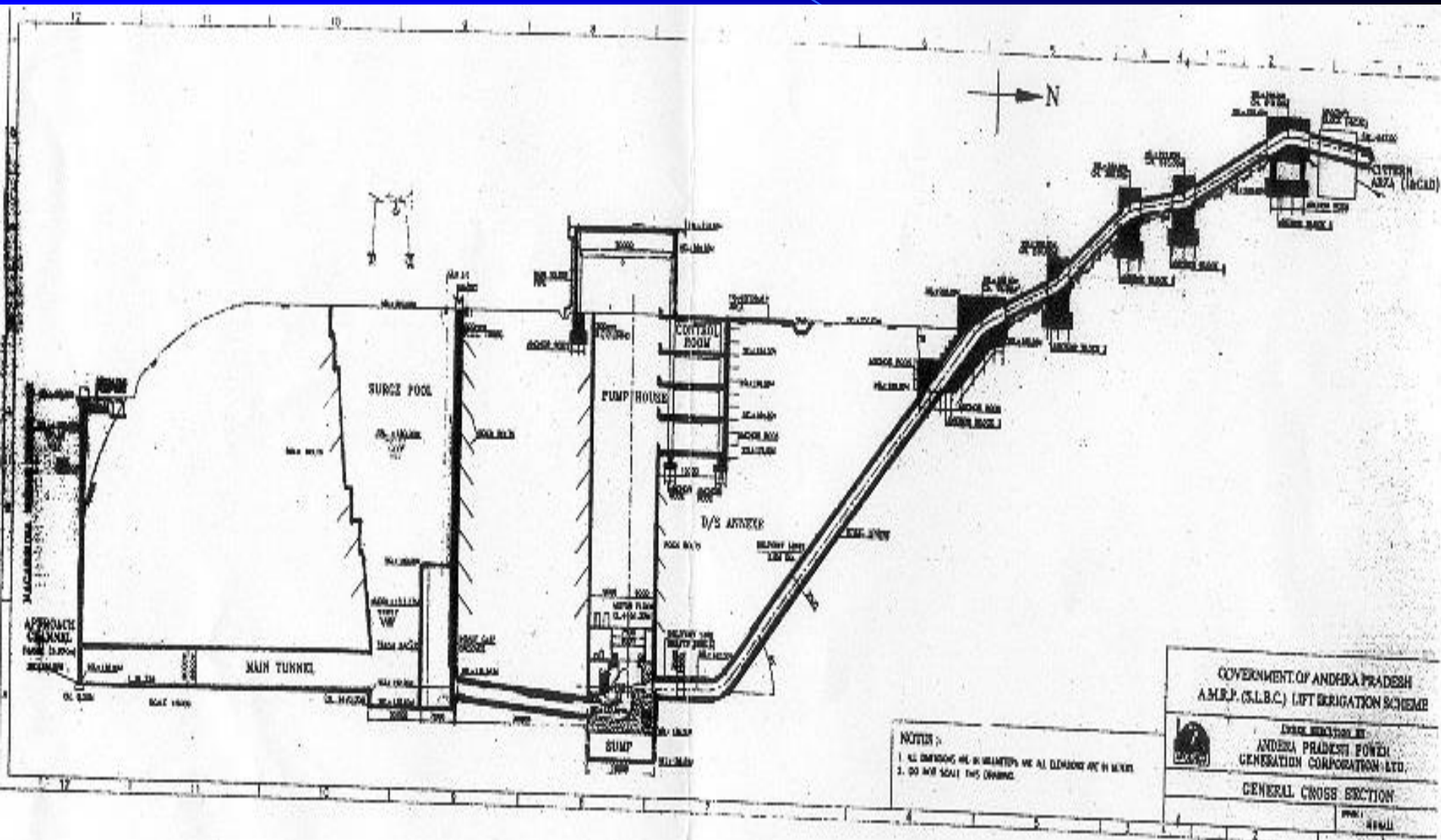
Length of link Canal from Cistern to AKBR – 9 km

Discharge – 64 Cumecs = 2240 Cusecs

Length of Main Canal from AKBR - 81 km

Discharge – 60 Cumecs = 2100 Cusecsaa

AMRP (S.L.B.C) Plan of Lift Irrigation Scheme



**N.S Foreshore Water Spread indicating FRL
in the foreground and the present Water level
at 498 ft.**



Approach Channel from foreshore of NS up to tunnel entrance and intake structure at the entrance of tunnel



Rock structure in the approach channel at the entrance of tunnel After opening of the tunnel



Lining at the entrance of the tunnel and intake structure raft concreting



Tunnel after concrete lining



Draft tube gates structure in Surge pool



Lining in Pump House with RCC 0.5 m thickness

Bottom Level 135.5 m

Top Level 200.0 m



SPIRAL CASING OF THE PUMP AFTER COMPLETION





Pump after completion of erection



Control Panels



Erection of delivery lines in inclined Shafts



**Delivery Pipes in inclined Shafts after
Completion**



**Delivery Pipes in inclined Shafts after
Completion of bends erection at ground level**



**Erection of 2.5 m dia delivery Pipes
(14 mm thick M.S. Plate)**

Panoramic view of the 4 delivery lines with NS foreshore water spread



Erection of 2.5 m dia delivery Pipes (14 mm thick M.S. Plate)



Panoramic view of Pipe Lines pump house & Foreshore of NS



Water spread in the Cistern



Water spread at AKBR



Head regulator at AKBAR (short view)



Main Canal on the D/S side of the regulator from AKBR



Cost of Project

- Lift Scheme -- 240 Crores
- Total Cost of Project -- 1250 Crores
as per 1998 – 99 SSR
- Present estimated Cost -- 1600 Crores
- Total expenditure so far -- 400 Crores
as against 1600 Crores.

Intake arrangements from NS foreshore

- ❖ Length of Open Channel 3.3 km
- ❖ Tunnel Length 1.47 km
- ❖ Dia. Of tunnel 6.00 m
- ❖ Size of Surge Pool 50 m X 20 m
depth – 60 m at 138 m bottom level.
- ❖ Size of Pump House 60 m X 16 m
depth – 65 m at bottom.

➤ Annexe floors of size – 60 m X 15 m
depth – 21 m

Size of five no. of draft tube tunnels
shape is rectangle – 4.5 m X 2 m.

Length of each draft tube tunnel is 30 m
Connecting Surge pool & Pump House

Gates facility for closing the water entry into draft
tube tunnel.

Delivery Lines

- ❖ 2.5 m dia each – 4 nos.
- ❖ Length of each line – 610 m.
(Length of Pumping Main)
- ❖ Delivery head – 142 m to 247 m
= 105 m head of Pumping
- ❖ Duration of Pumping – 8 Months
- ❖ Daily Pumping Hours – 24 hrs.

Power Consumption

- ✓ Estimation for 4 Pumps for 8 Months – 26 TMC Water – 153 Million Units.
- ✓ Cost of Power per acre is
 $153 \times 10^6 \times \text{Rs. } 2 \text{ Per Unit Cost}$
 $\frac{\text{Rs. } 306 \text{ crore}}{2.8 \text{ lakh acres}} = \underline{\text{Rs. } 10928.57 \text{ per acre}}$ Ω is 1000 per acre
- ✓ Maintenance Charges Rs. 500 per acre of 100 m lift
- ✓ Total cost per acre is Rs. 1500=00.
- ✓ Another Method – 1 month for one Pump is Rs. 50 lakhs
4 Pumps for 8 Months
 $4 \times 8 \times 0.5 = 16 \text{ Crores}$

- **Project Cost per acre is approximately Rs. 50000.00**
3 lakh acres at Rs. 50000.00 = 1500 Crores
- It is presumed with all other sundry expenditure the cost per acre is Rs. 2000.00
- Agricultural produce = Rs. 6000.00 per acre
3 lakh acres = 180 Crores

Earlier Proposal from NS Foreshore

- To draw water from fore shore of NS directly without a tunnel over a Pumping length of 2.1 km
 - * This would enhance the dia of Pumping Main
 - * Thickness of Pipe
 - * HP of Pump
 - * Additional Cost of Power
 - * Estimated Cost is 430 Crores
(97-98 SSR Rates)

By Planning a tunnel of 1.5 km Length

- Drastically reduced the cost of Project and recurring expenditure.
- Cost of New Scheme is only 250 Crores
- Pumping main alone costs Rs. 100 Crores
- Cost of 1.5 km tunnel is only 15 Crores

Key to Investigations and Analysis

- ❖ Storage of NS at FRL – 410 TMC
- ❖ Present Storage is about - 41 TMC
- ❖ Proper analysis and investigations to be taken up in detail for any Lift Irrigation Scheme

Conclusions

1. Detailed investigations to be carried out
2. Technical feasibility studies to be made
3. Economic viability to be evaluated
4. Political sagacity to be taken into consideration

DEVADULA LIFT IRRIGATION SCHEME

1. To lift water from Gangaram village near Eturnagaram of Warangal District from 70 mts to 540 mts height.
2. To irrigate 6.47 lakh acres utilizing 50 tmc of water.
3. Project report prepared by WAPCOS.
4. Irrigation potential:
 1. Warangal District: 4,44,081 acres
 2. Karimnagar District: 14,833 acres
 3. Nalgona District 1,49,458 acres
 4. Medak District 38,197 acres

=====

Total: 6,46,569 acres

=====
5. Cost of Project Rs. 844 Crores Ist phase,
Rs. 1820 Crores IInd phase.

=====

Total Cost Rs. 2664 Crores
6. Length of Pumping main – 135 km – 2.5 m dia and 3 mts dia

J.C.R. DEVADULA LIFT IRRIGATION SCHEME

SALIENT FEATURES

Utilisation

• Water to be lifted from river Godavari	:	38.182 TMC
• Water for Agriculture usage	:	36.250 TMC
• Water for Non-Agriculture usage	:	1.932 TMC
Industrial usage	:	0.012 TMC
Drinking Water usage	:	1.920 TMC
Power Requirement (Ultimate)	:	484 MW
Project Cost (Estimated Cost)	:	Rs.6016 Crores
Revised Estimate Cost (TAC, CWC, Govt. of India accorded clearance during 106 th Meeting held on 16-09-2010)	:	Rs.9427.73 Crores

Ayacut

• Ayacut with lifted water through Canals	:	5,43,750 Ac.
• Ayacut with regenerated water	:	77,250 Ac.
Total	:	6,21,000 Ac.

District Wise Ayacut

• Warangal District	:	5,61,229 Ac.
• Karimnagar District	:	14,100 Ac.
• Nalgonda District	:	45,671 Ac.
Total	:	6,21,000 Ac.

PHASE-I

Quantum of Water lifting	:	5.18 TMC	
No. of Lifts	:	4 Nos.	
Power Requirement	:	56 MW	
Pump House Location	:	1) Intake at Gangaram	3) Nagaram (Pulkurthy)
		2) Bheemghanpur	4) Dharmasagar
Length of Pumping Main	:	138.50 Km.	
Total Static Head	:	268 M	

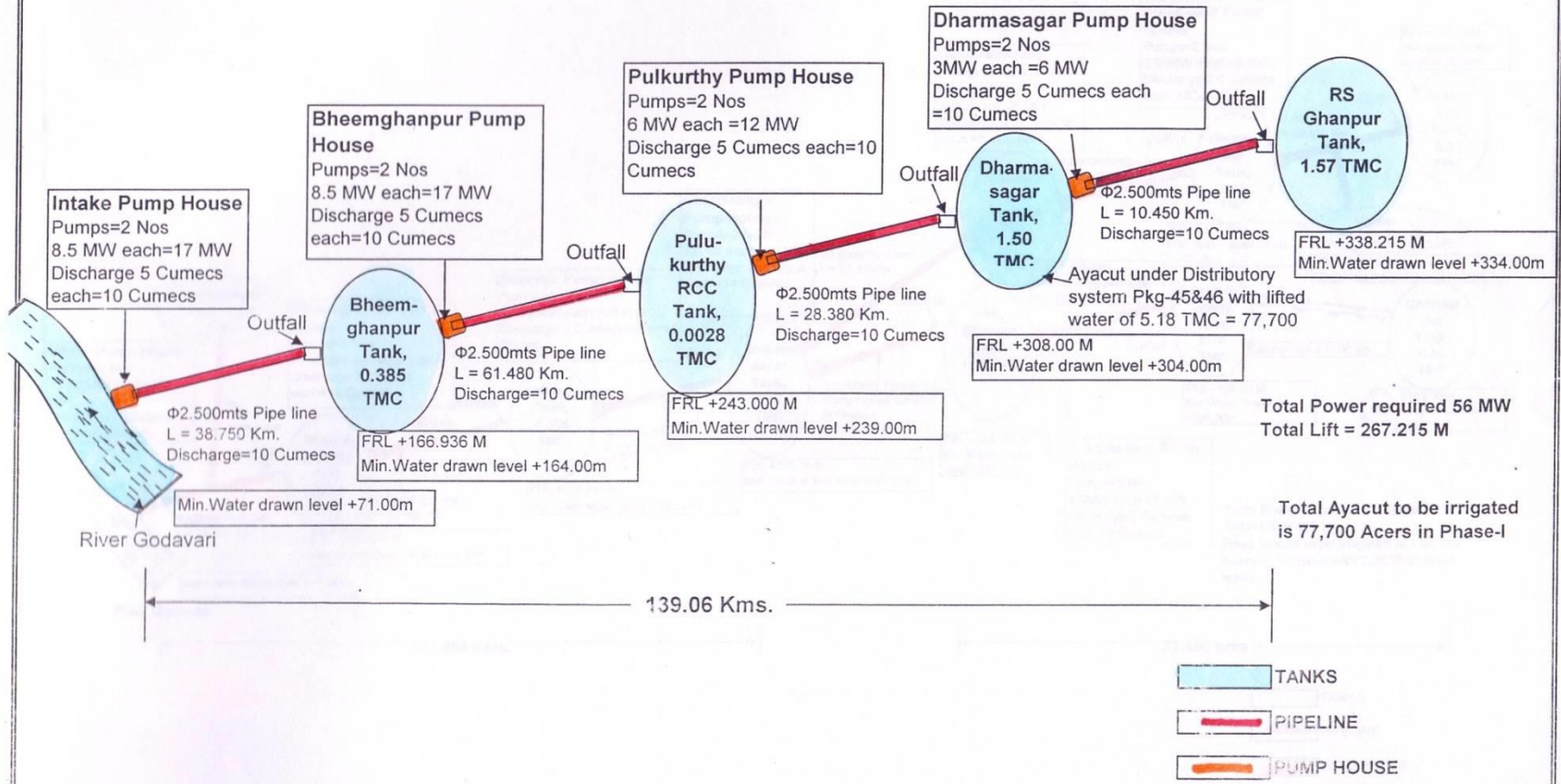
PHASE-II

Quantum of Water lifting	:	7.25 TMC		
No. of Lifts	:	7 Nos.		
Power Requirement	:	123.60 MW		
Pump House Location	:	1) Intake at Gangaram	4) Dharmasagar	7) Bommakur
		2) Bheemghanpur	5) R.S.Ghanpur	
		3) Salivagu.	6) Gandiramaram	
Length of Pumping Main	:	196 Km.		
Gravity Canal	:	13.90 Km.		
Formation/Improvements of Tanks	:	7 Nos. R.S. Ghanpur, Aswaraopally, Chittakoduru, Gandiramaram, Bommakur, Tapashpally, Narsingapur and Veldanda.		
Total Static Head	:	470 M		

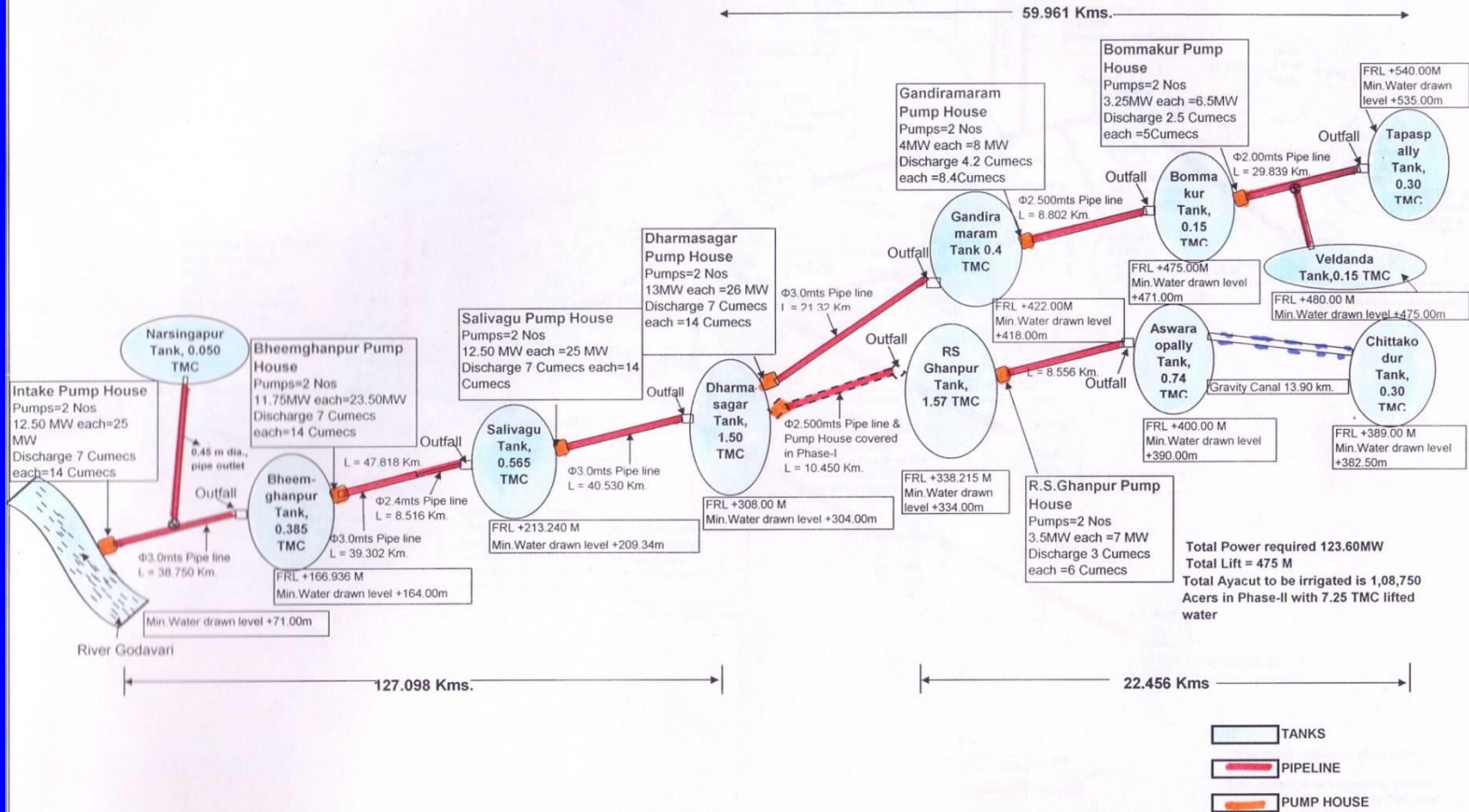
PHASE-III

Quantum of Water lifting	:	25.69 TMC		
No. of Lifts	:	9 Nos.		
Power Requirement	:	304.40 MW		
Pump House Location	:	1) Intake at Gangaram	4) Gandiramaram	7) R.S.Ghanpur (2 Nos.)
		2) Ramappa	5) Bommakur	
		3) Dharmasagar (2 Nos.)	6) Tapashpally	
Length of Pumping Main	:	113 kms.		
Length of Tunnel	:	89 Kms.		
Total Static Head	:	510 M		

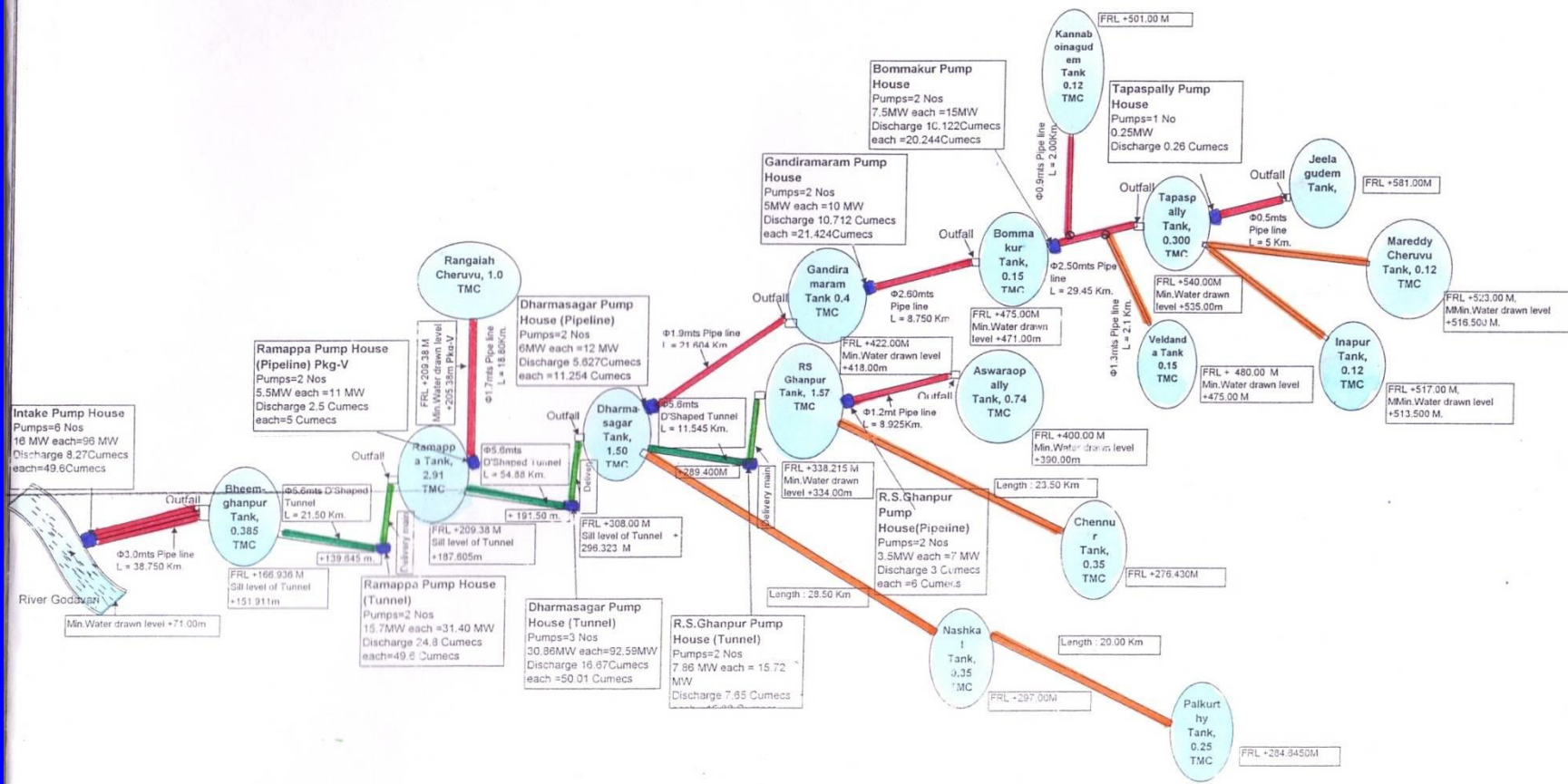
SCHEMATIC DIAGRAM PHASE-I WORKS OF J.CHOKKA RAO DEVADULA LIFT IRRIGATION SCHEME, WARANGAL



SCHEMATIC DIAGRAM PHASE-II WORKS OF J.CHOKKA RAO DEVADULA LIFT IRRIGATION SCHEME, WARANGAL



**SCHEMATIC DIAGRAM PHASE-III WORKS OF
J.CHOKKA RAO DEVADULA LIFT IRRIGATION SCHEME, WARANGAL**



- TANKS
- PIPELINE
- PUMP HOUSE
- TUNNEL
- DELIVERY MAIN
- CANALS

Total Power required : 304.40 MW
 Total Lift = 510 M
 Total Ayacut to be irrigated is 357,100
 Acres in Phase-III with 23.82 TMC lifted
 water

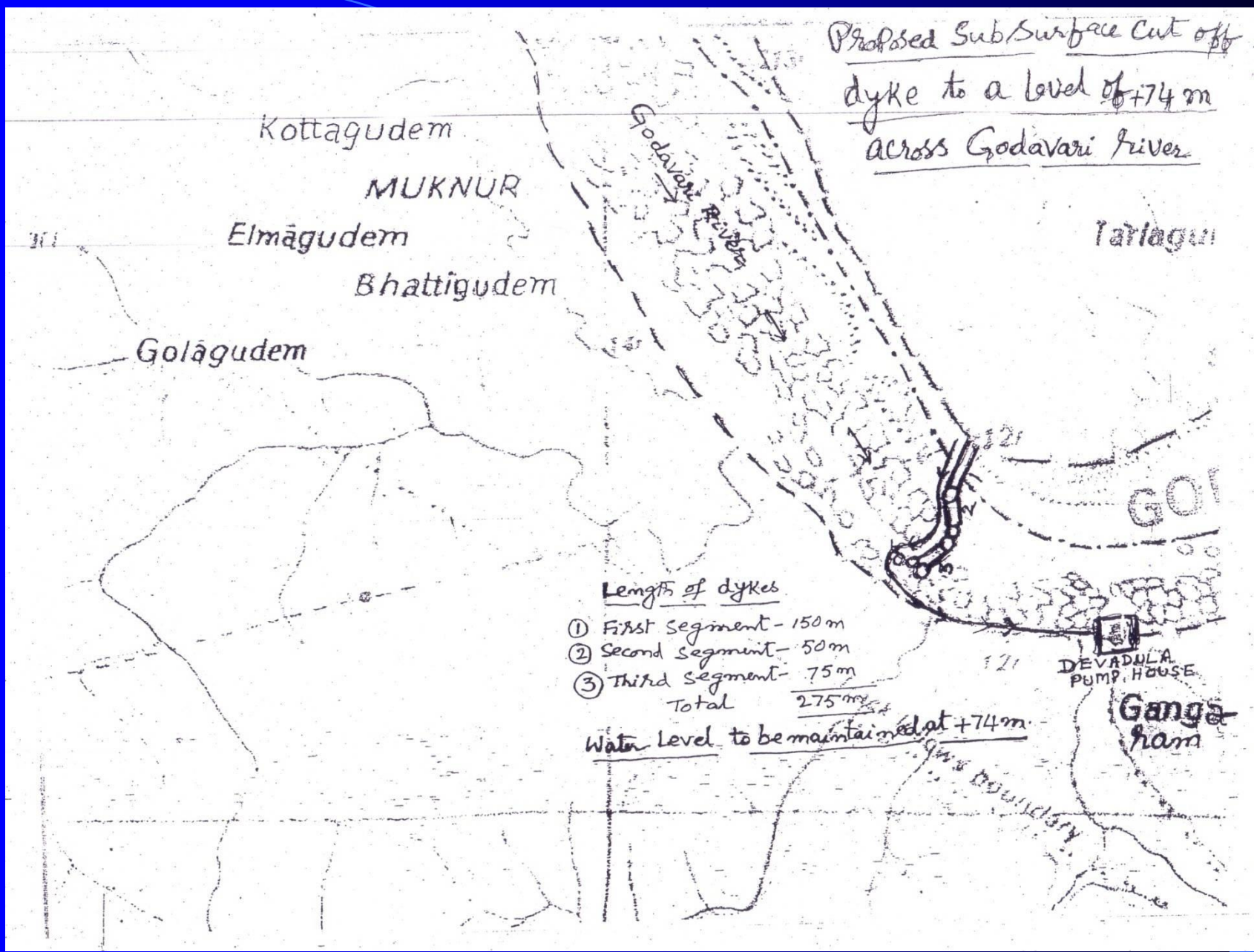
INTAKE AT DEVADULA



LIFTING PUMPS



Proposed Sub/Surface Cut off
dyke to a level of +74 m
across Godavari River



Kottagudem
MUKNUR

Elmāgudem

Bhattigudem

Golāgudem

Tāriāgūl

Godavari River

GOL

Lengths of dykes

- ① First segment - 150 m
 - ② Second segment - 50 m
 - ③ Third segment - 75 m
- Total 275 m

Water level to be maintained at +74 m.

DEVADULA
PUMP HOUSE

Ganga
Ram

Boundary





Proposed segments ①, ② and ③ of the sub-surface cutoff dyke in Godavari river u/s of Devadula Pool.

Dummugudem Barrage

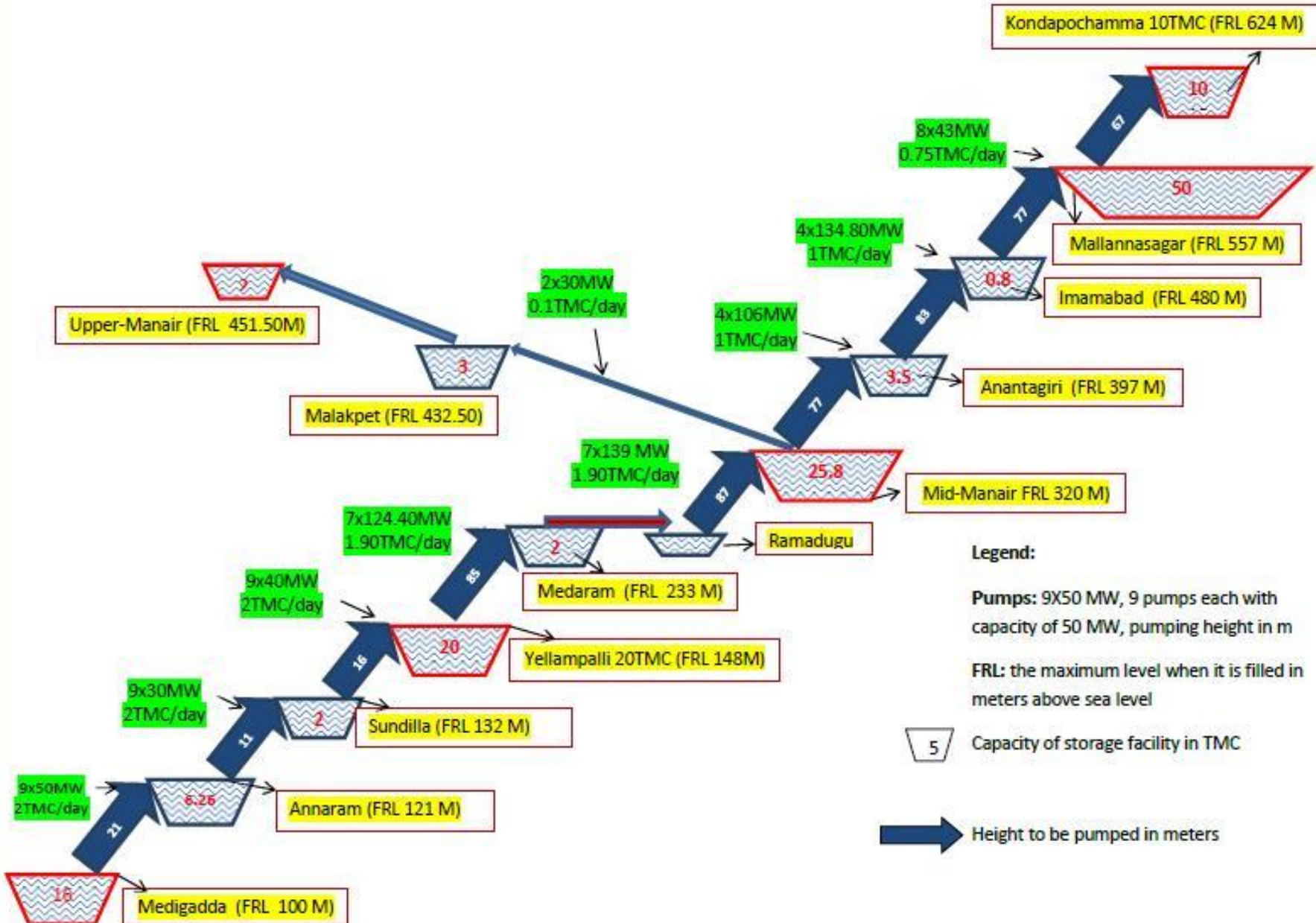
- **Built By Britishers Similar to Godavari Barrage Built By Sir Arthur Cotton in 1844 at**

Dhavaleswaram -- 10.12 laks -- 260 TMC

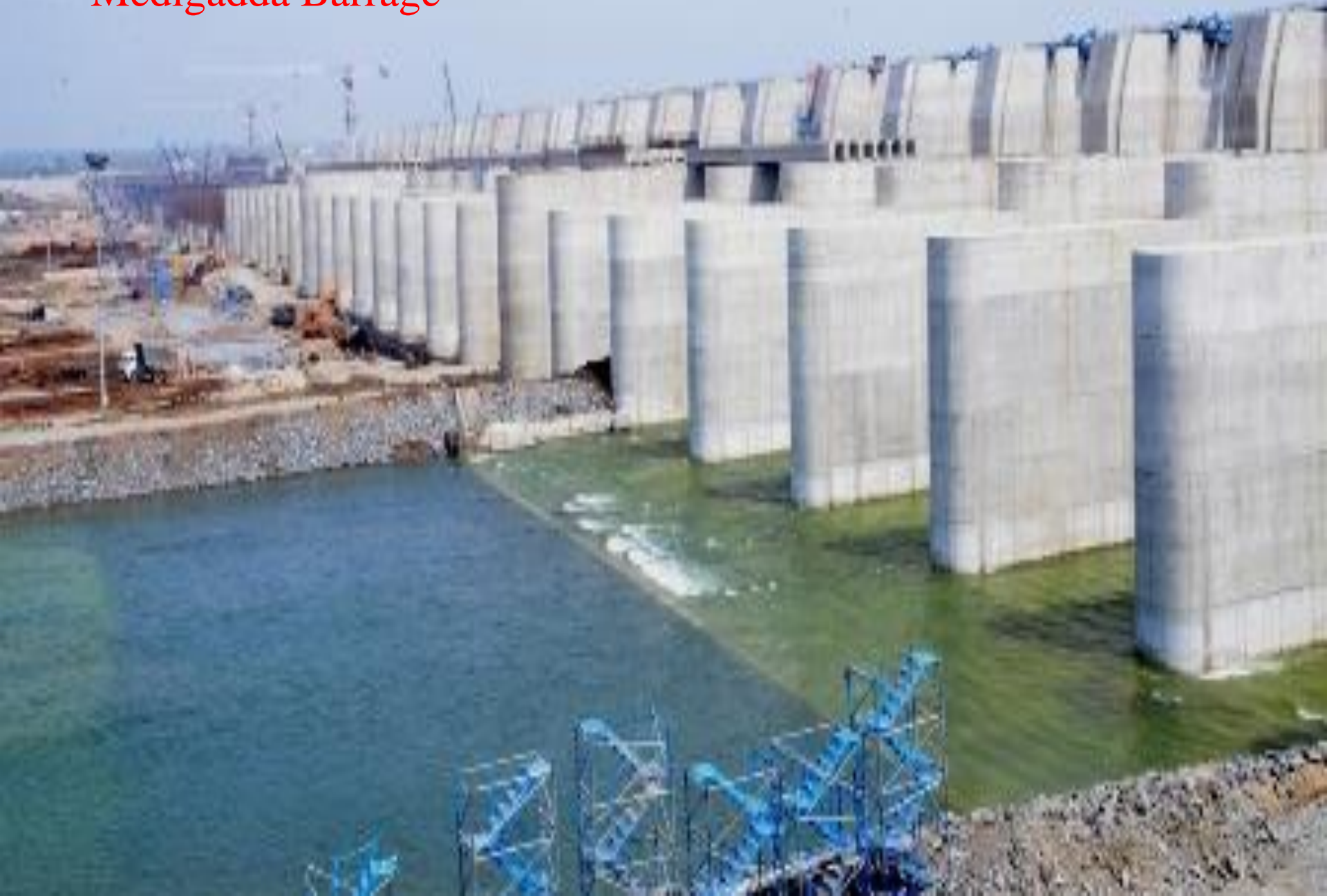
Providing Shutters -- 2 laks -- 50 TMC -

Rs. 300 Crores

SCHEMATIC DIAGRAM OF KALESHWARAM LIFT IRRIGATION SCHEME



Medigadda Barrage



Annaram Barrage



Sundilla Barrage



Kannepalli Pumphouse



Underground Tunnel



Entrance to the Tunnel



Wet Run of the Pumps



Open Channel



Surge Pool





ANNARAM PUMP HOUSE

KALESWARAM PROJECT

Mid Maneru Dam



Yellampally Barrage



Flood Flow canal



Mallanna Sagar



Satellite view of Mallanna Sagar



Lingampet

Thoguta

Etigadda Kistapur

Etigadda Kistapur

Thothanur

Wenuaghat

Palicpadu

Thimmareddypally

Ahamedipuram

Singaram

Errawally

Konaipalle

Matnpally

Lakudaram

Tipparam

Mangol

Mangolu

Madinipur

Tappa

Muddapur

Kuknorpally

Babaipalli

Image © 2016 CNES, Airbus, Image © 2016 DigitalGlobe, Image © 2016 DigitalGlobe

Imagery Date: 4/9/2016

Konda Pochamma Reservoir



Shamirpet Lake





REDMI NOTE 6 PRO
MI DUAL CAMERA



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**IRRIGATION
TECHNOLOGY OF
KAKATIYAS –Rejuvenation
of Minor Irrigation Network
in TELANGANA STATE**

-An Analysis

INTRODUCTION

- Kakatiyas were the benevolent rulers and have created mighty irrigation projects throughout south India and to commemorate them they have built magnificent rock temples during 11th to 14 centuries

- The water bodies created by them are serving the population by providing water both for irrigation and drinking even after nearly thousand years, unlike the present day reservoirs whose life is limited due to heavy sedimentation

- Kakatiyas have developed excellent irrigation technology in harnessing every drop of rain water that falls on land , conserved and utilised in the form of garland of tanks. The successive pickup weirs of Pakal lake at down stream is yet another example of excellence of irrigation practices

- Kakatiyas have built these tanks with 2 to 3 times storage compared to the yield of the basin. As such the excess water available in a good monsoon period is being utilized for storage in reservoirs to cater to the requirements during drought period

Study of Kakatiya Period Reservoirs

Sl. No	Name	Command Area in Sq.Miles	Yield in MCFt	Capacity in MCft	Ayacut in Hectares	Ayacut Villages
1	Pakhal	103.0	1878	3262	5272	8
2	Ramappa	71.0	1120	2913	1968	5
3	Laknawaram	108.5	2272	2135	3522	6
4	Ghanpur	38.75	602	1430	1213	4

- As many as 46,351 tanks (small & big) have been identified through remote sensing technology in the entire Telangana State. Of which 5000 tanks have been partially identified with a storage capacity of about 50 MCFT each.

- If provision is made to lift water from the surplus Godavari Water during monsoon period to fill all these tanks at the rate of 25 MCFT per tank a total of 125 TMC of water can be stored without creating additional reservoirs, without submerging any land.

- This water can irrigate 12.5 lakh acres directly and improve the ground water table and rejuvenating defunct and abandoned open wells and bore wells. More than 15 lakh open and bore wells are functioning in Telangana State, they will be rejuvenated, resulting in an additional irrigation for 15 lakh acres.

- This Project will enhance aquaculture, horticulture, animal husbandry and will revolutionize the agrarian economy in entire rural Telangana, thus creating socioeconomic upliftment.

REJUVENATION OF TANKS

The water bodies are in a state of distress due to

- Encroachments
- Lack of maintenance of Tanks
- Lack of maintenance of bunds
- To improve feeder channels
- Catchment area treatment



DRAINAGE AND SURFACE WATER BODIES ADILABAD DISTRICT

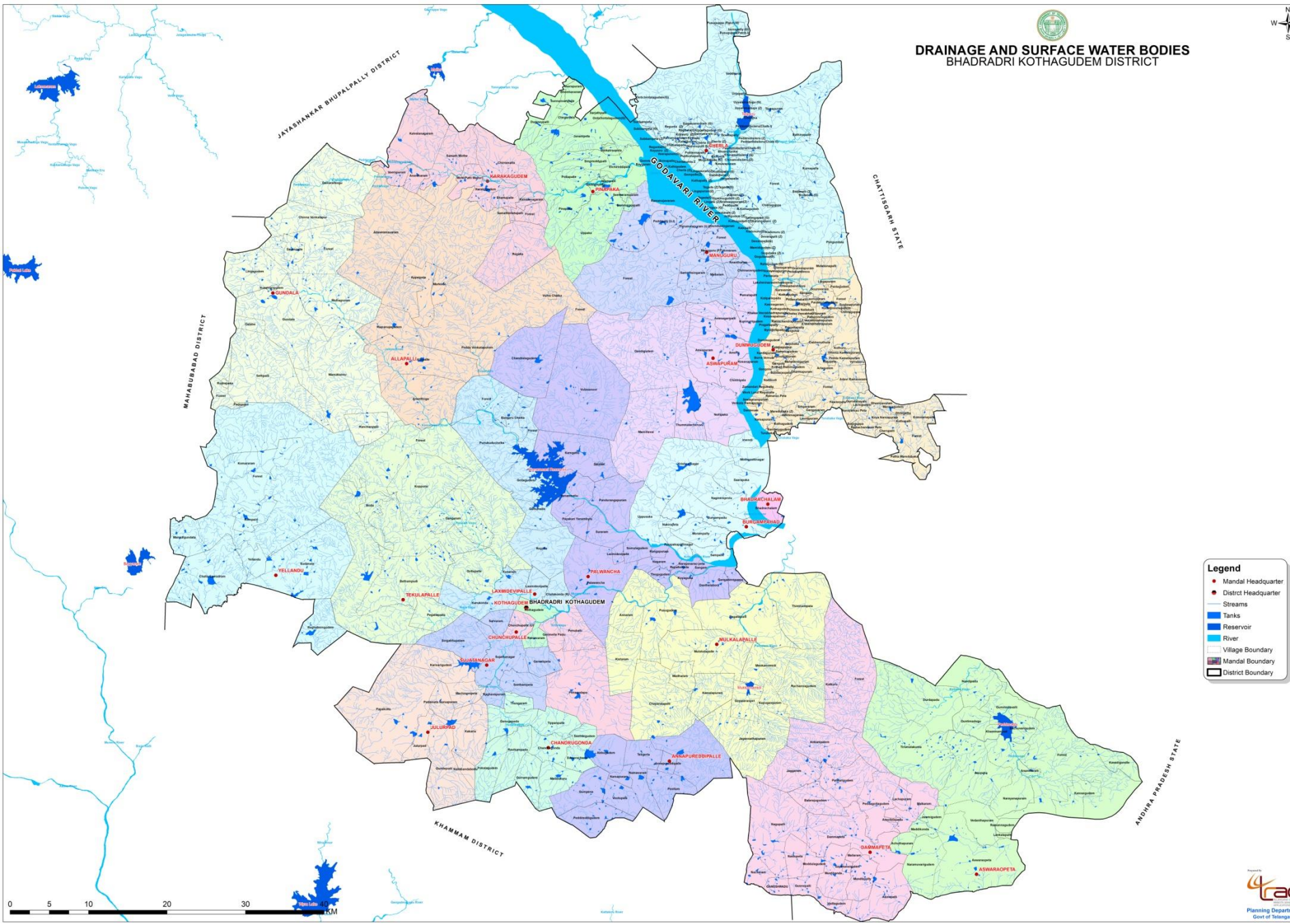


- Legend**
- Mandal Headquarter
 - District Headquarter
 - Streams
 - Tanks
 - Reservoir
 - River
 - Village Boundary
 - Mandal Boundary
 - District Boundary





DRAINAGE AND SURFACE WATER BODIES BHADRADRI KOTHAGUDEM DISTRICT

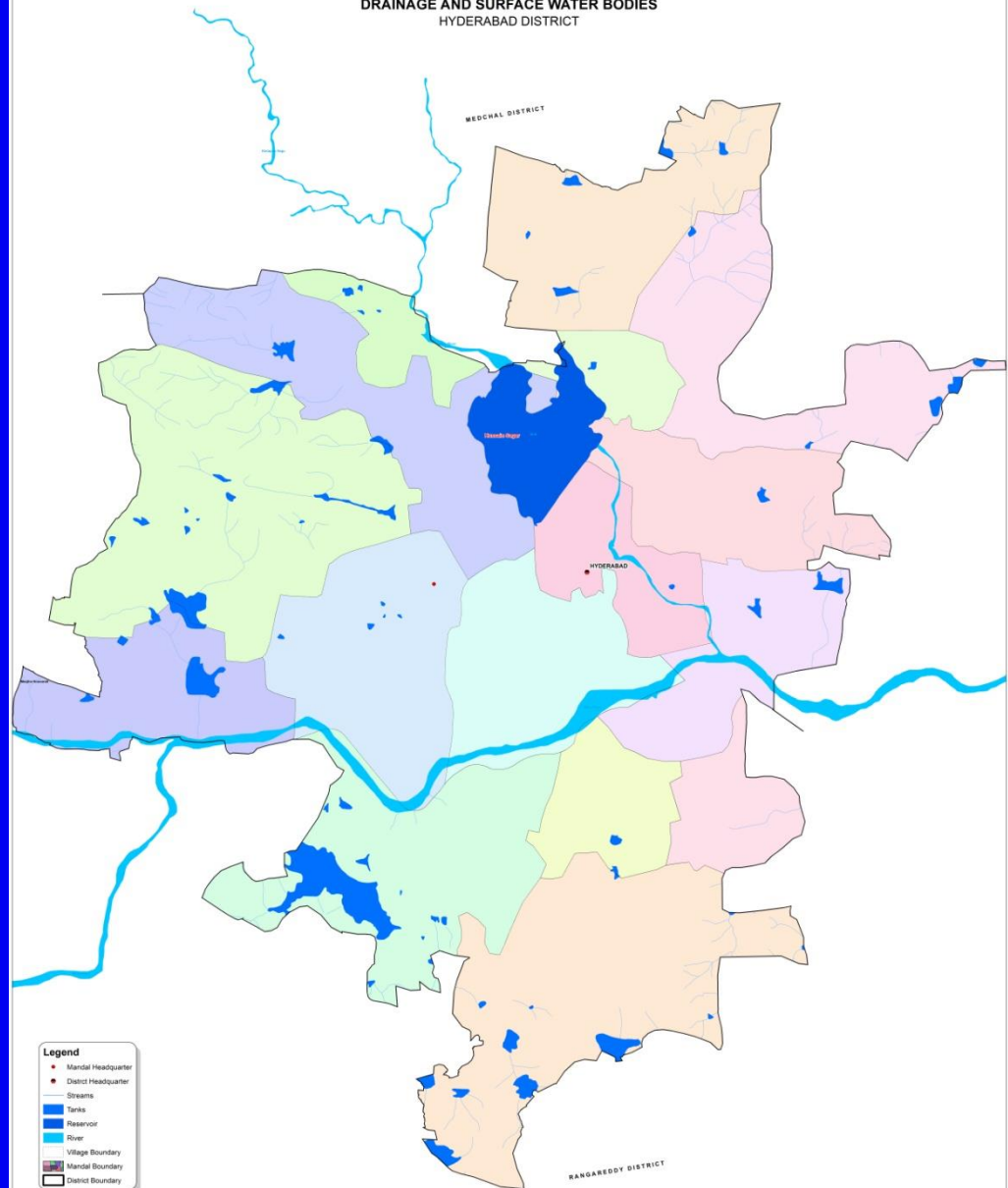


Legend

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DRAINAGE AND SURFACE WATER BODIES HYDERABAD DISTRICT



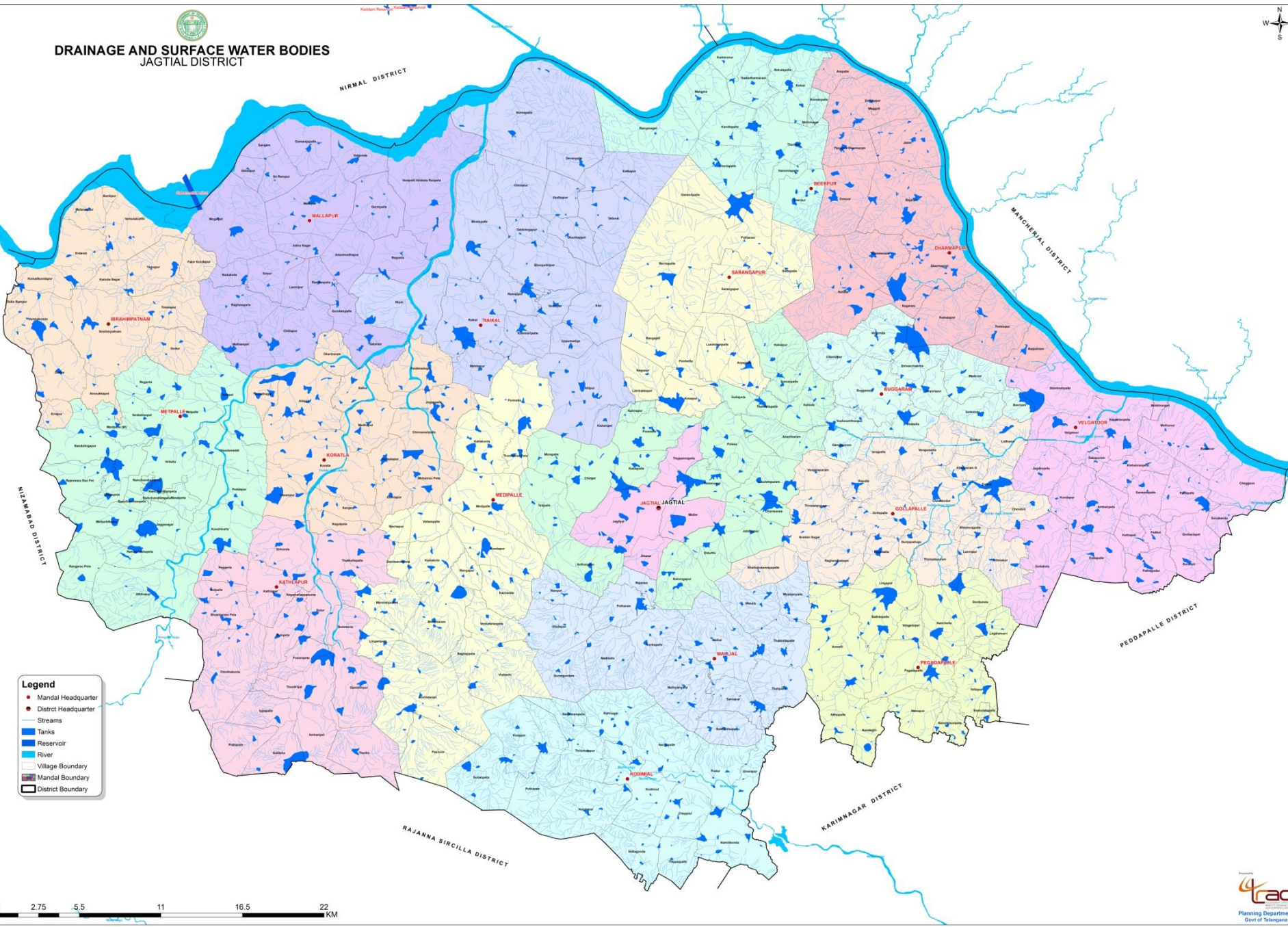
Legend

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DRAINAGE AND SURFACE WATER BODIES JAGTIAL DISTRICT



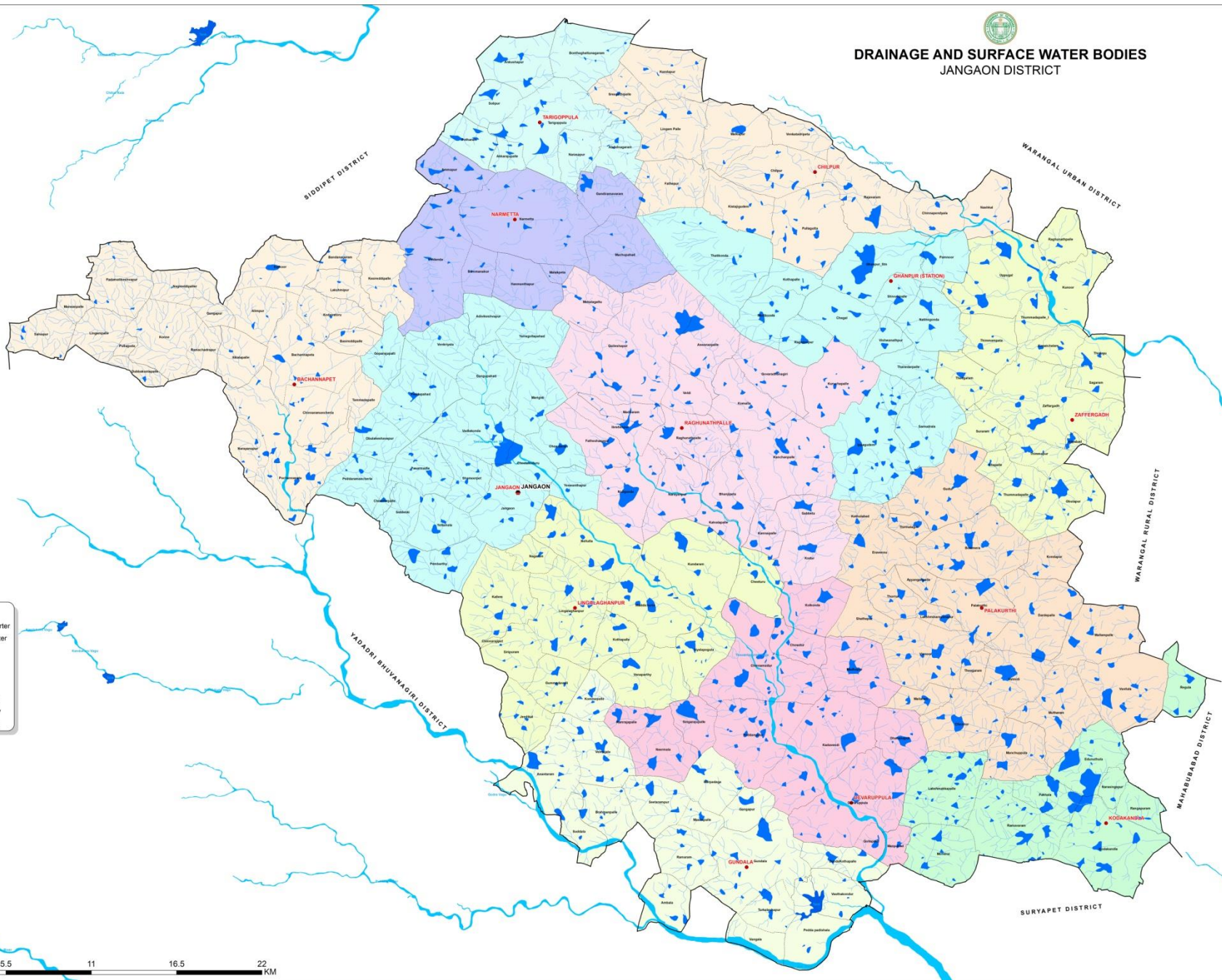
Legend

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DRAINAGE AND SURFACE WATER BODIES JANGAON DISTRICT



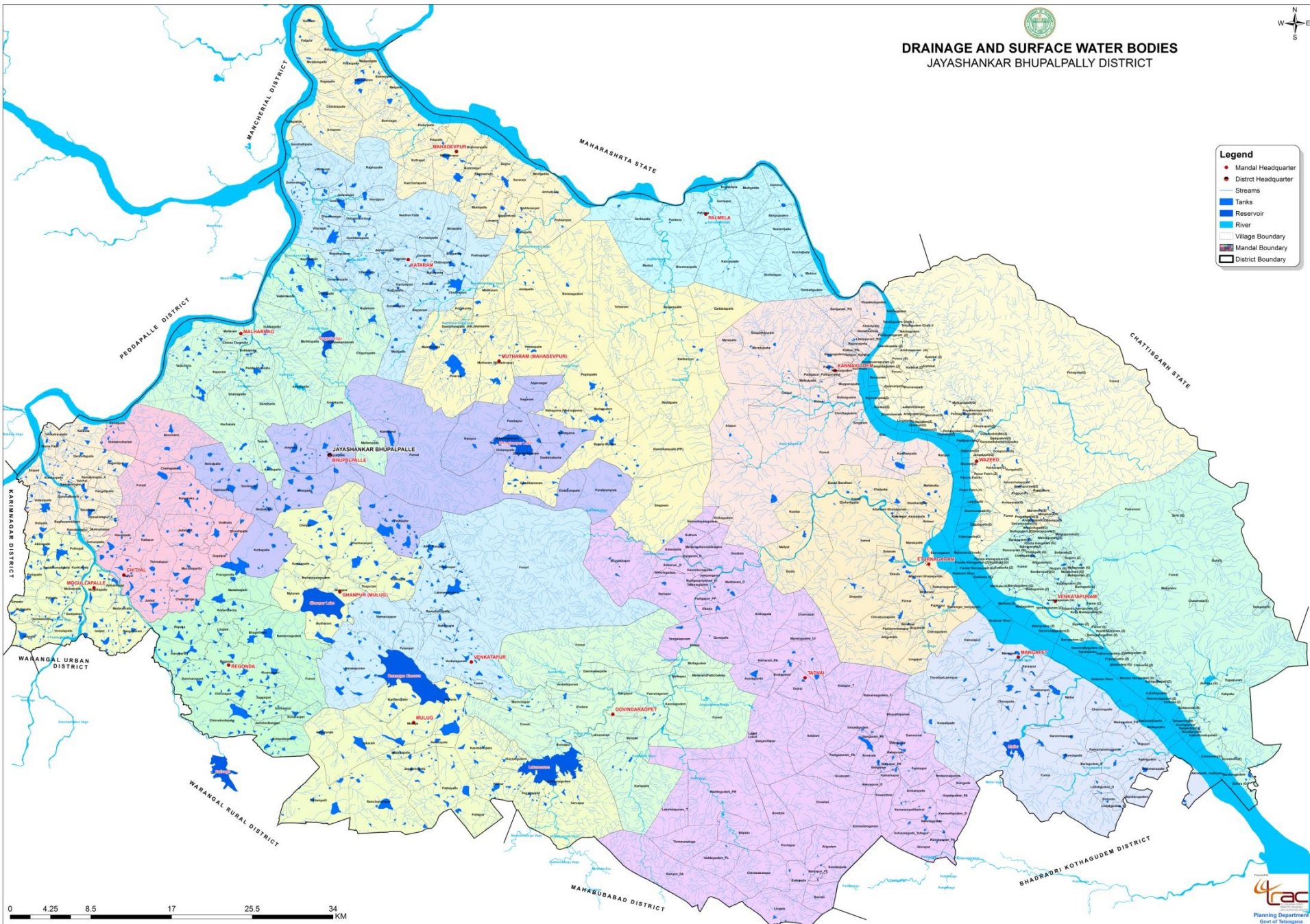
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DRAINAGE AND SURFACE WATER BODIES JAYASHANKAR BHUPALPALLY DISTRICT

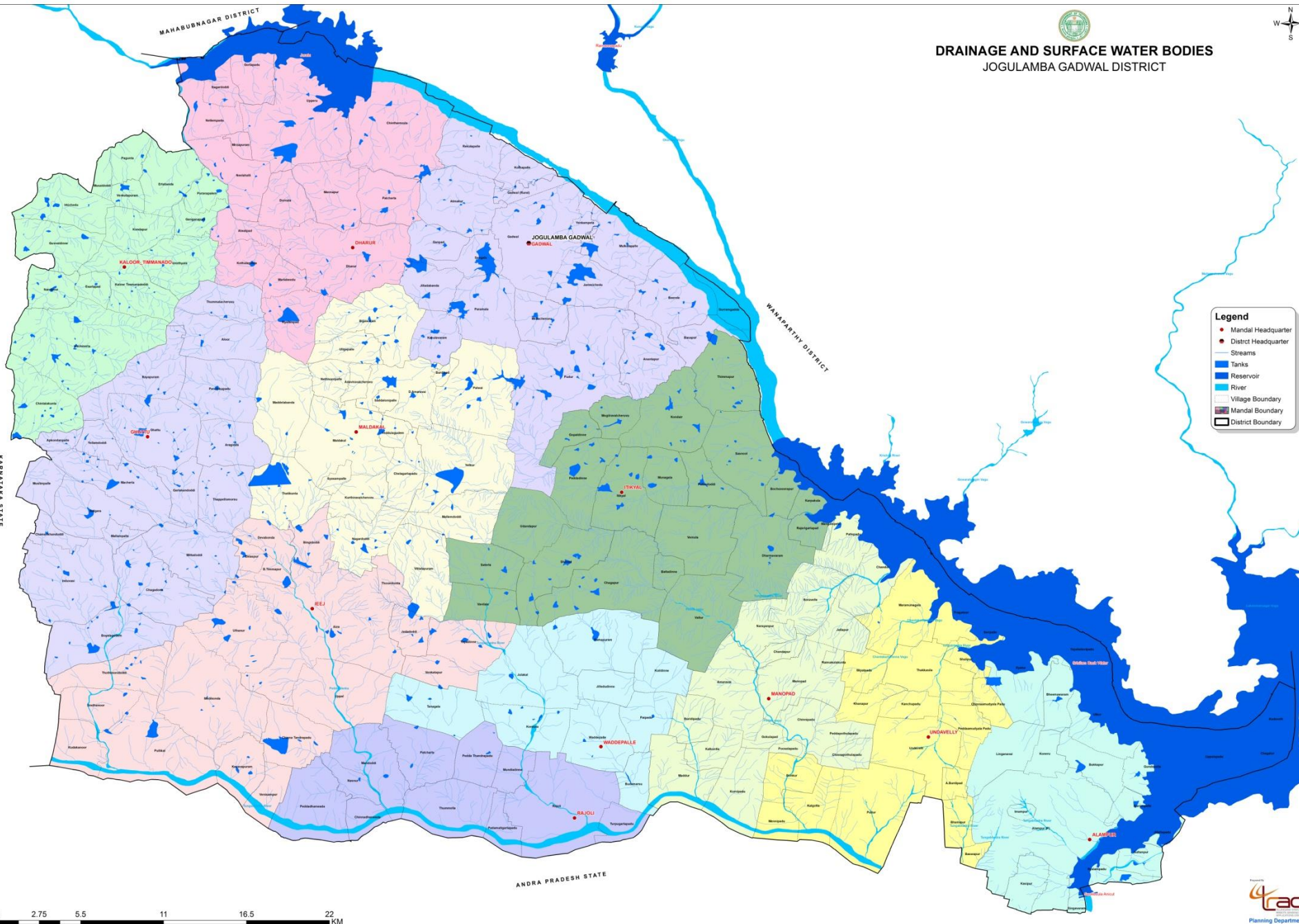


Legend

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DRAINAGE AND SURFACE WATER BODIES JOGULAMBA GADWAL DISTRICT



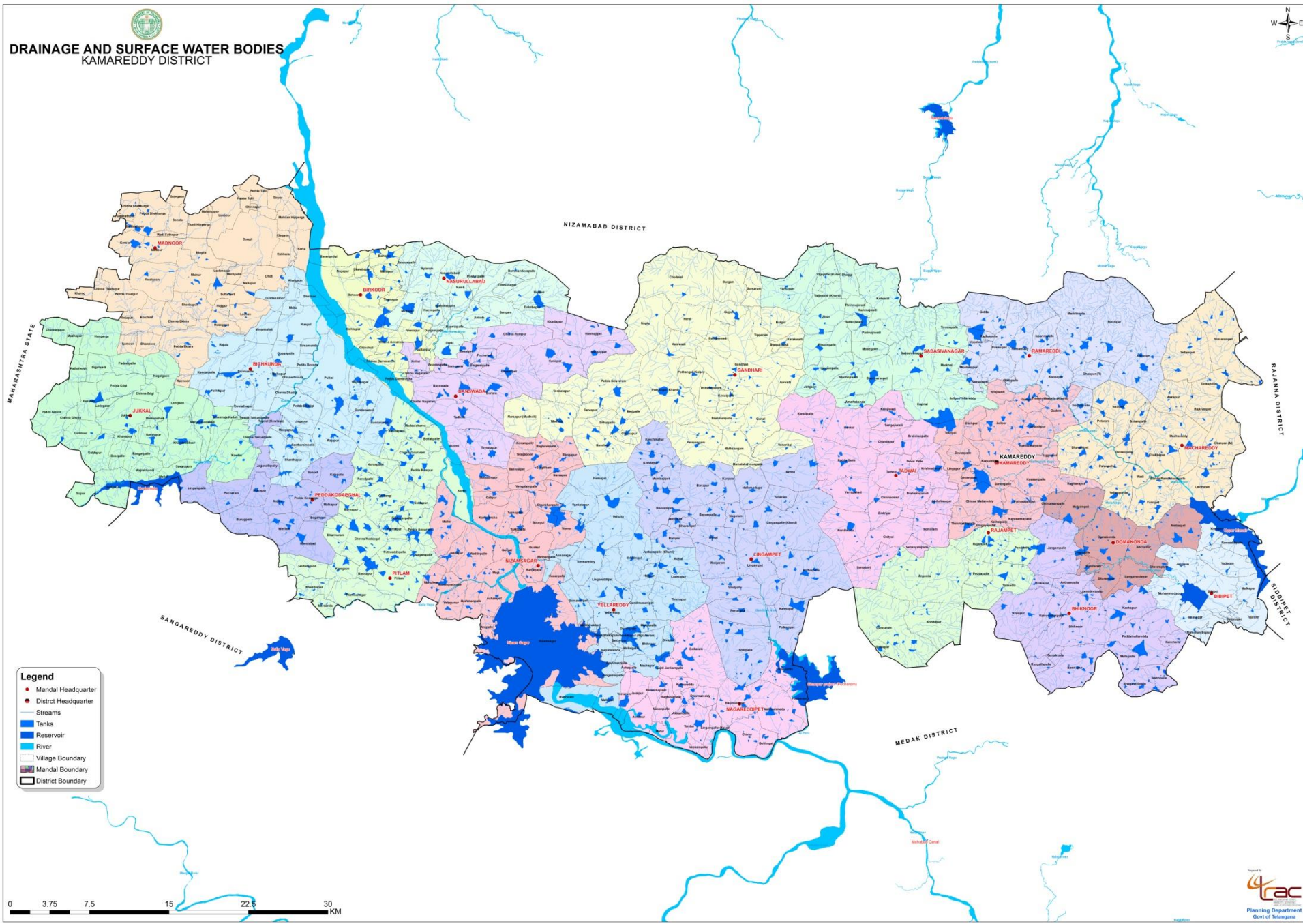
Legend

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- District Headquarter
- Streams
- Tanks
- Reservoir
- River
- ▭ Village Boundary
- ▭ Mandal Boundary
- ▭ District Boundary

0 2.75 5.5 11 16.5 22 KM



DRAINAGE AND SURFACE WATER BODIES KAMAREDDY DISTRICT

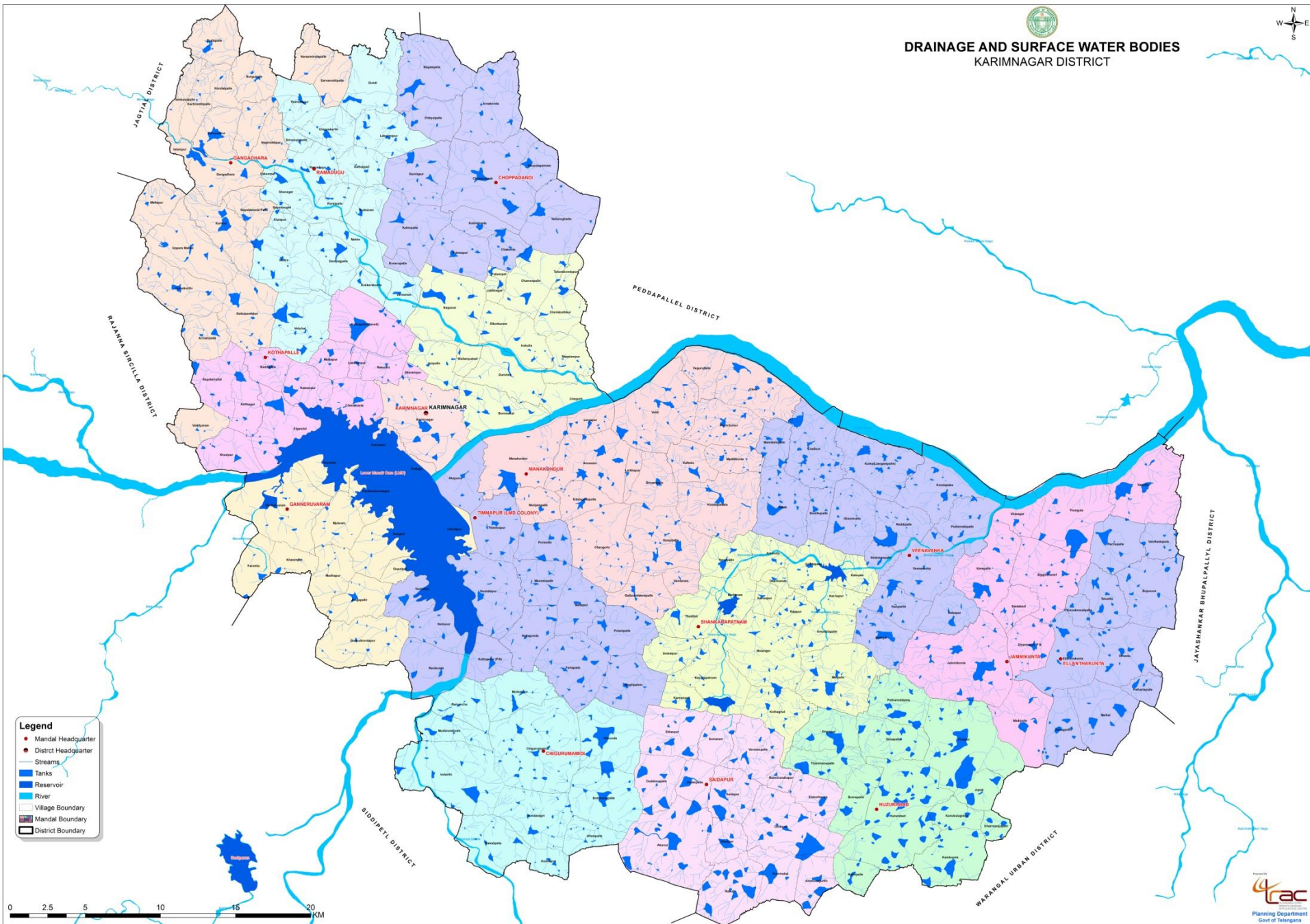


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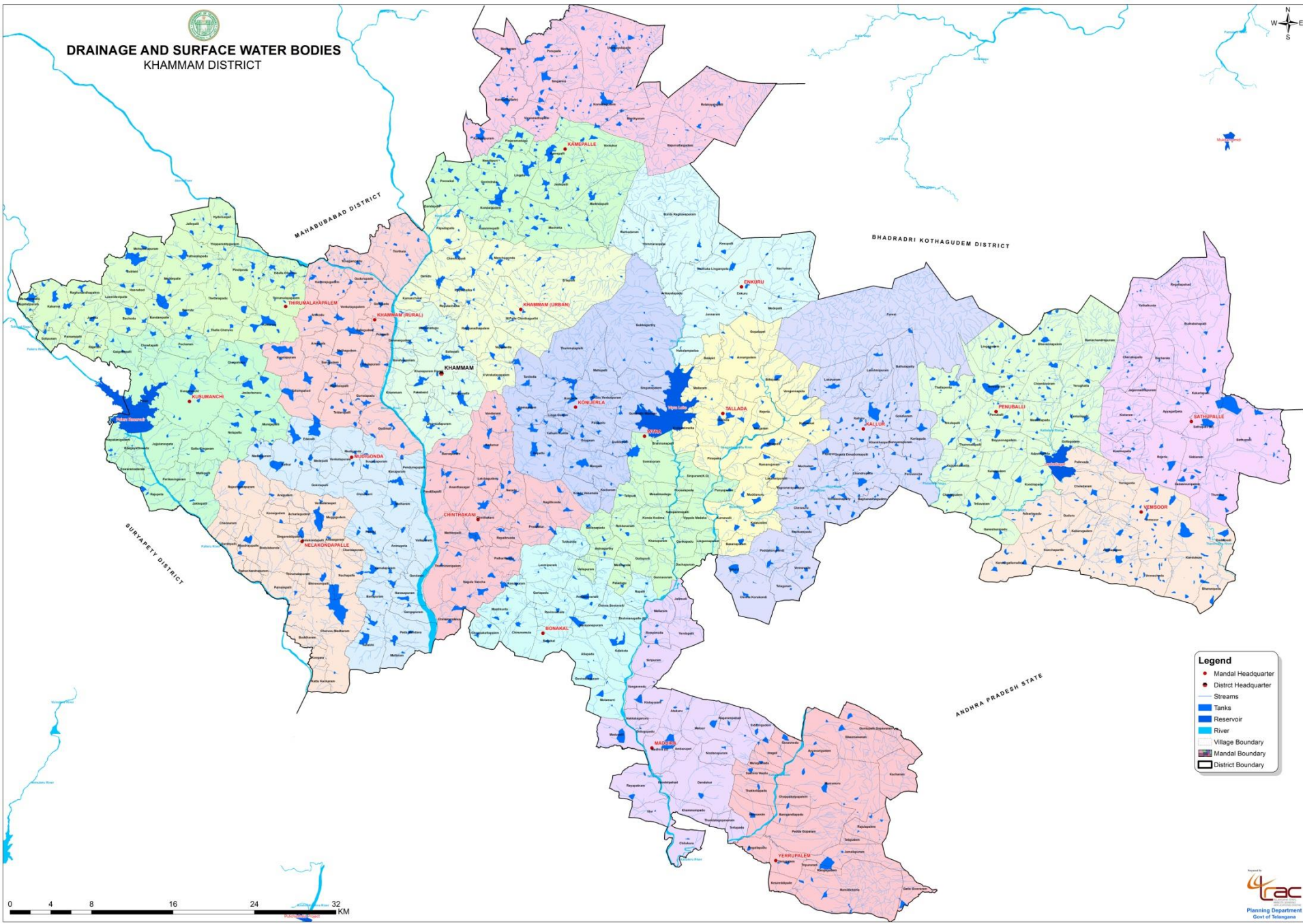


DRAINAGE AND SURFACE WATER BODIES KARIMNAGAR DISTRICT





DRAINAGE AND SURFACE WATER BODIES KHAMMAM DISTRICT



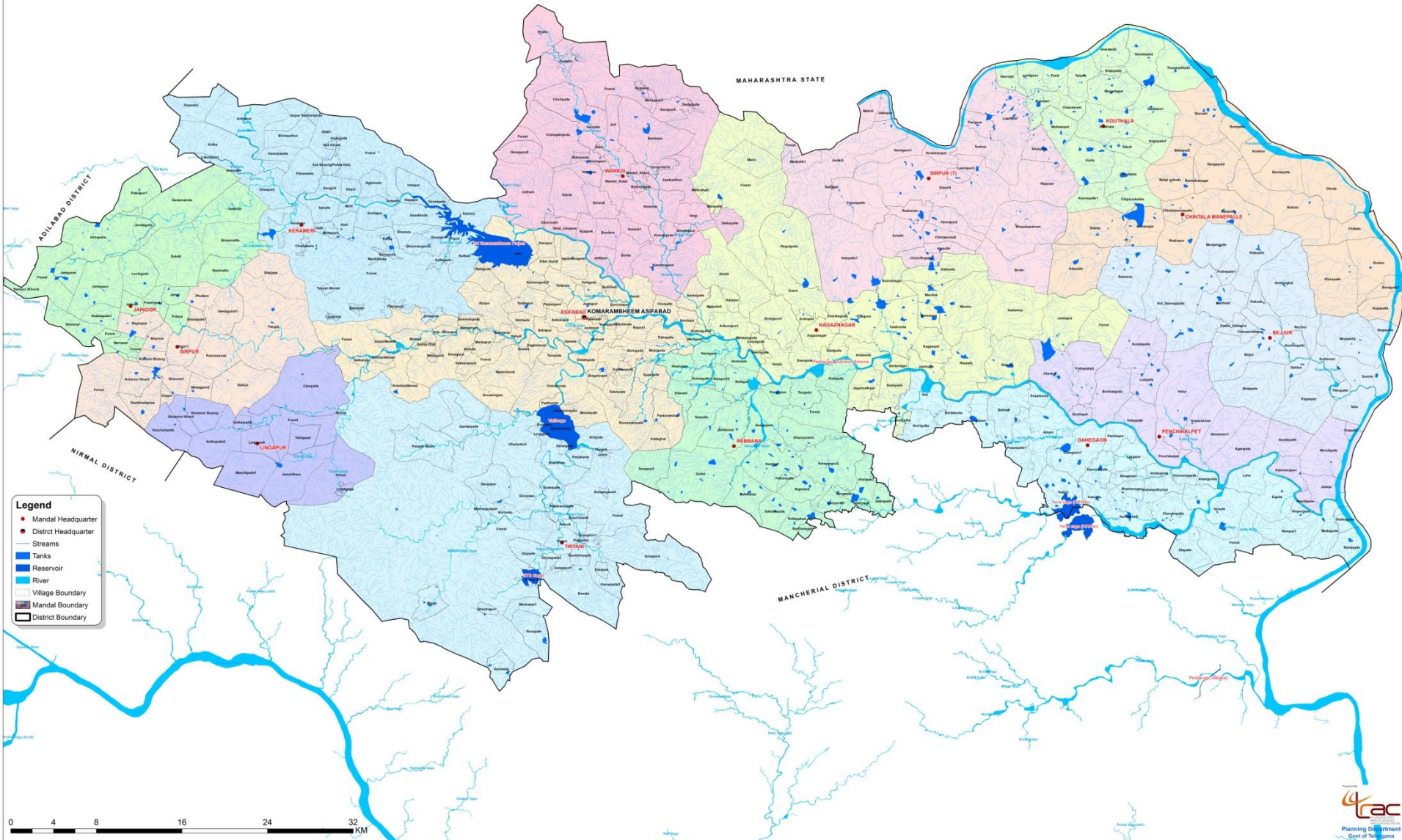
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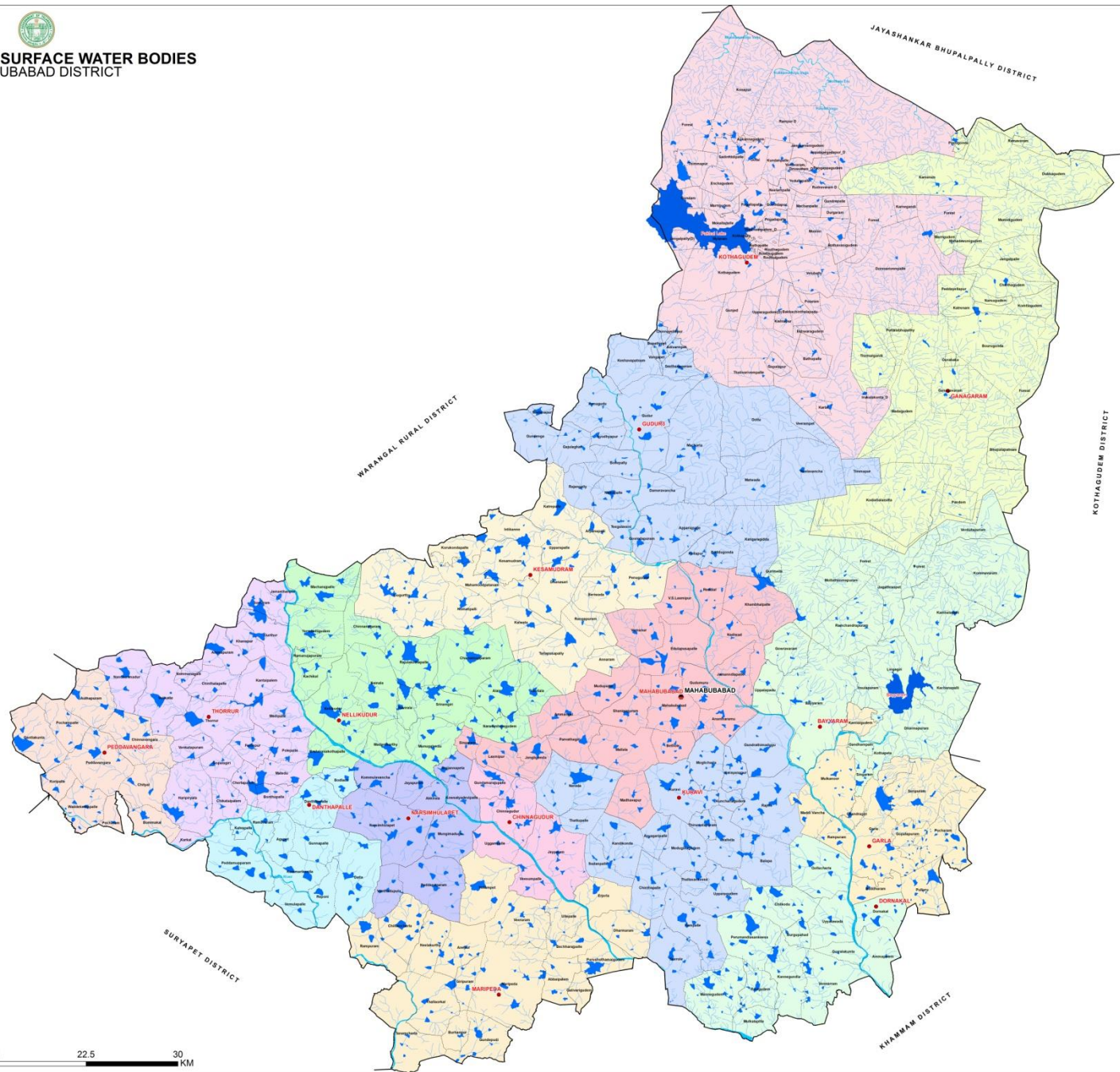


DRAINAGE AND SURFACE WATER BODIES KUMARAMBHEEM ASIFABAD DISTRICT






DRAINAGE AND SURFACE WATER BODIES MAHABUBABAD DISTRICT



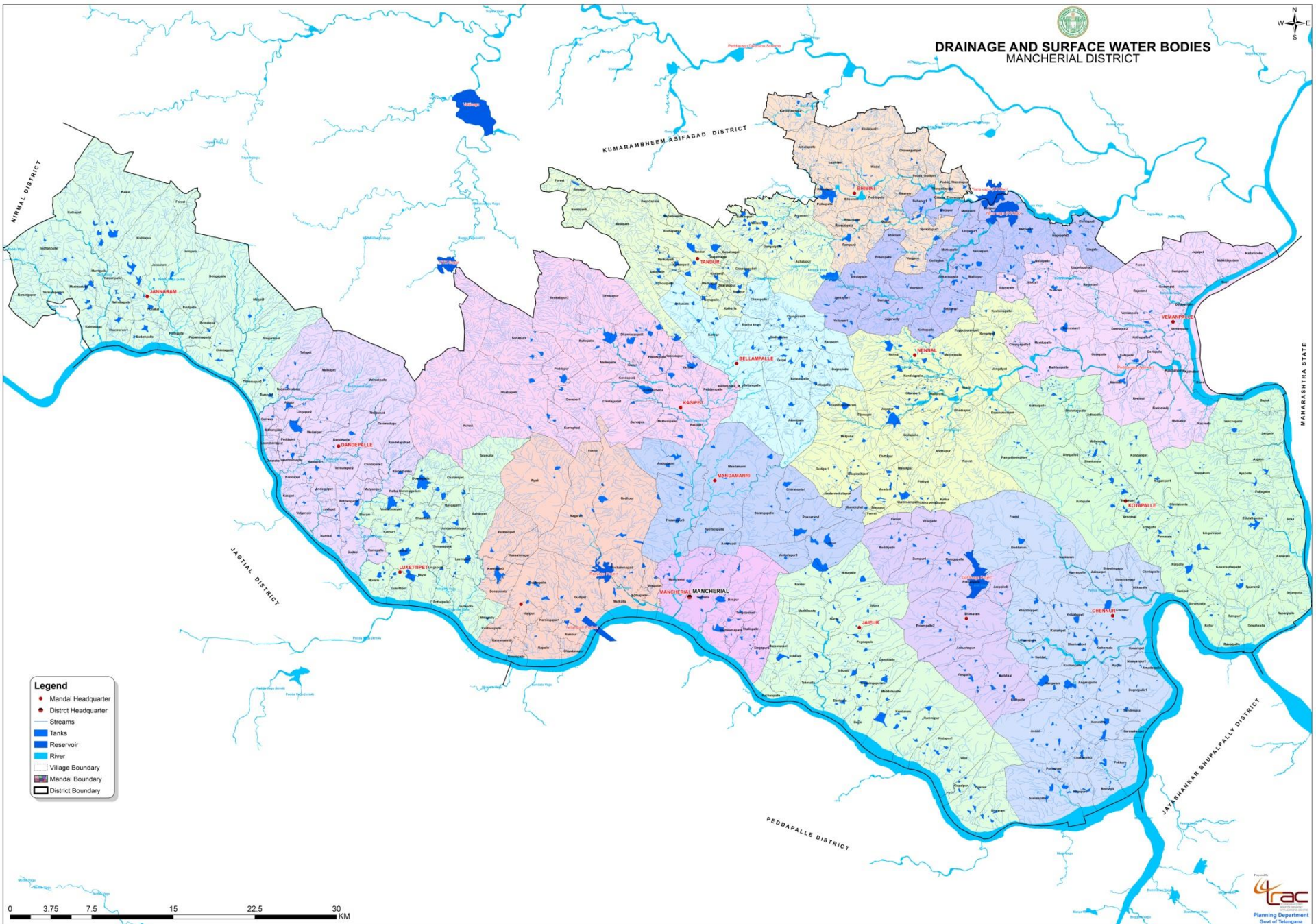
Legend

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DRAINAGE AND SURFACE WATER BODIES
MANCHERIAL DISTRICT

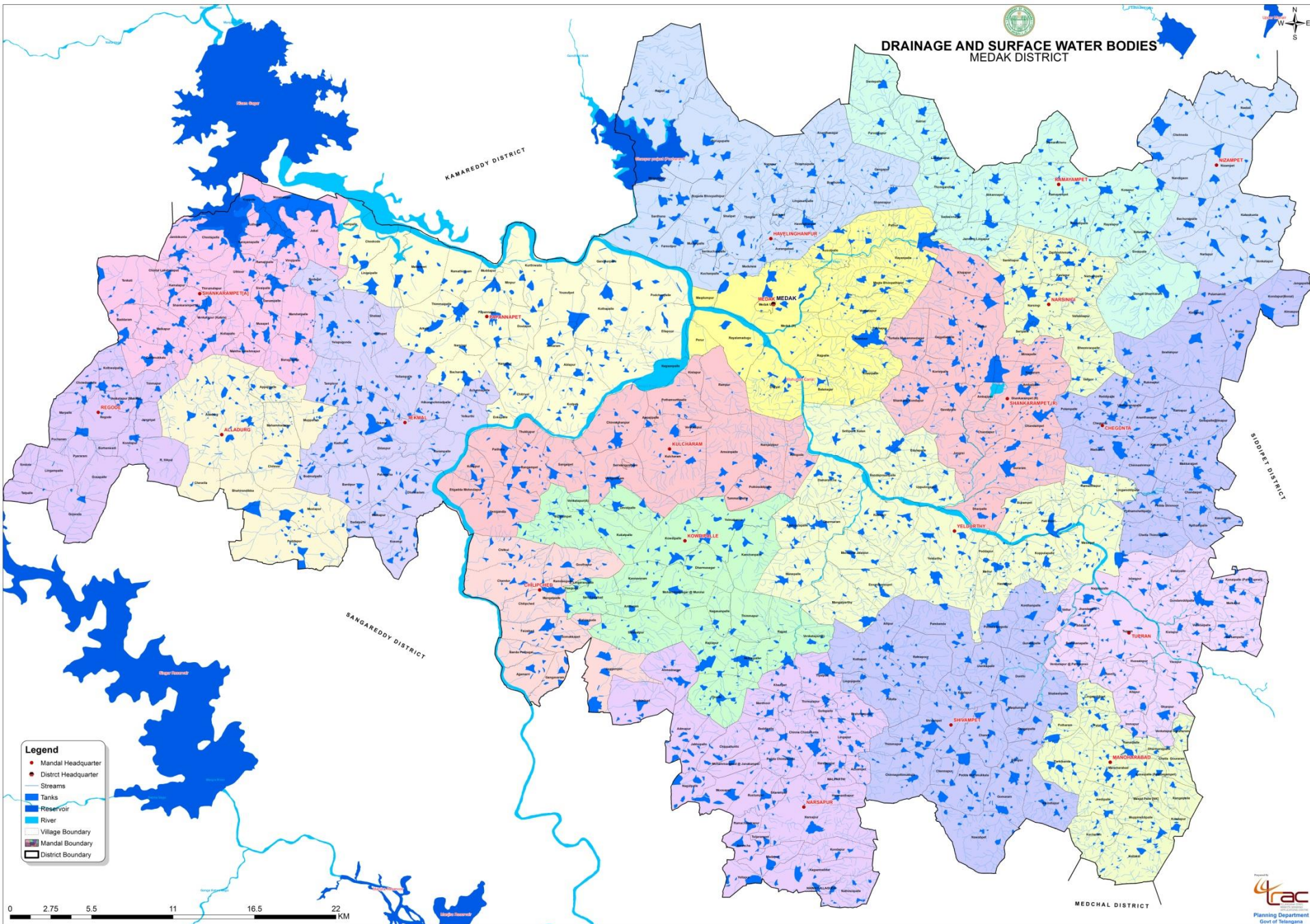


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 - Tanks
 - Reservoir
 - River
 - ▭ Village Boundary
 - ▭ Mandal Boundary
 - ▭ District Boundary

0 3.75 7.5 15 22.5 30
KM



DRAINAGE AND SURFACE WATER BODIES MEDAK DISTRICT

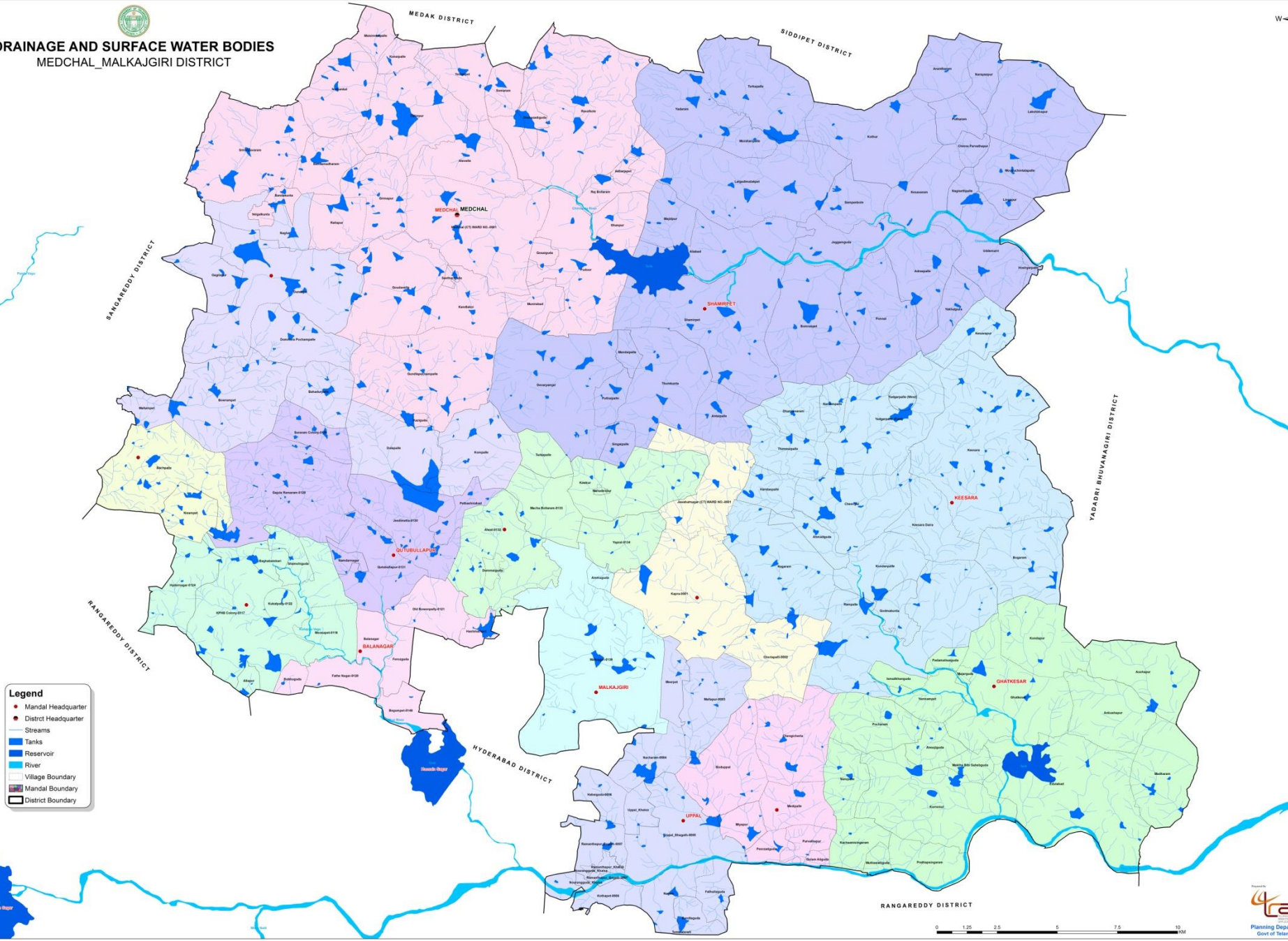


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 - Mandal Boundary
 - District Boundary





DRAINAGE AND SURFACE WATER BODIES MEDCHAL_MALKAJGIRI DISTRICT



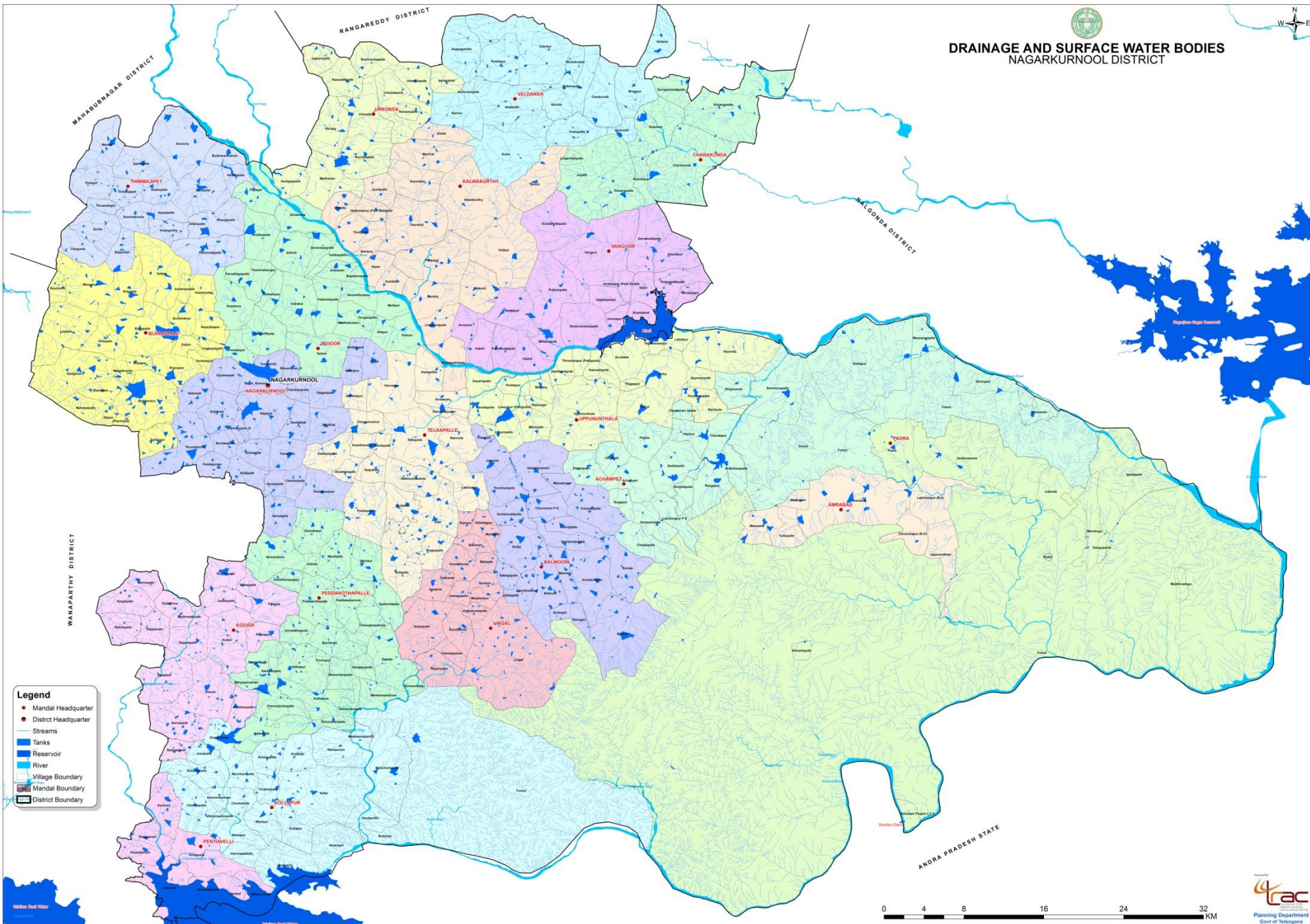
Legend

- Mandal Headquarter
- District Headquarter
- Streams
- Tanks
- Reservoir
- River
- Village Boundary
- Mandal Boundary
- District Boundary





DRAINAGE AND SURFACE WATER BODIES NAGARKURNOOL DISTRICT

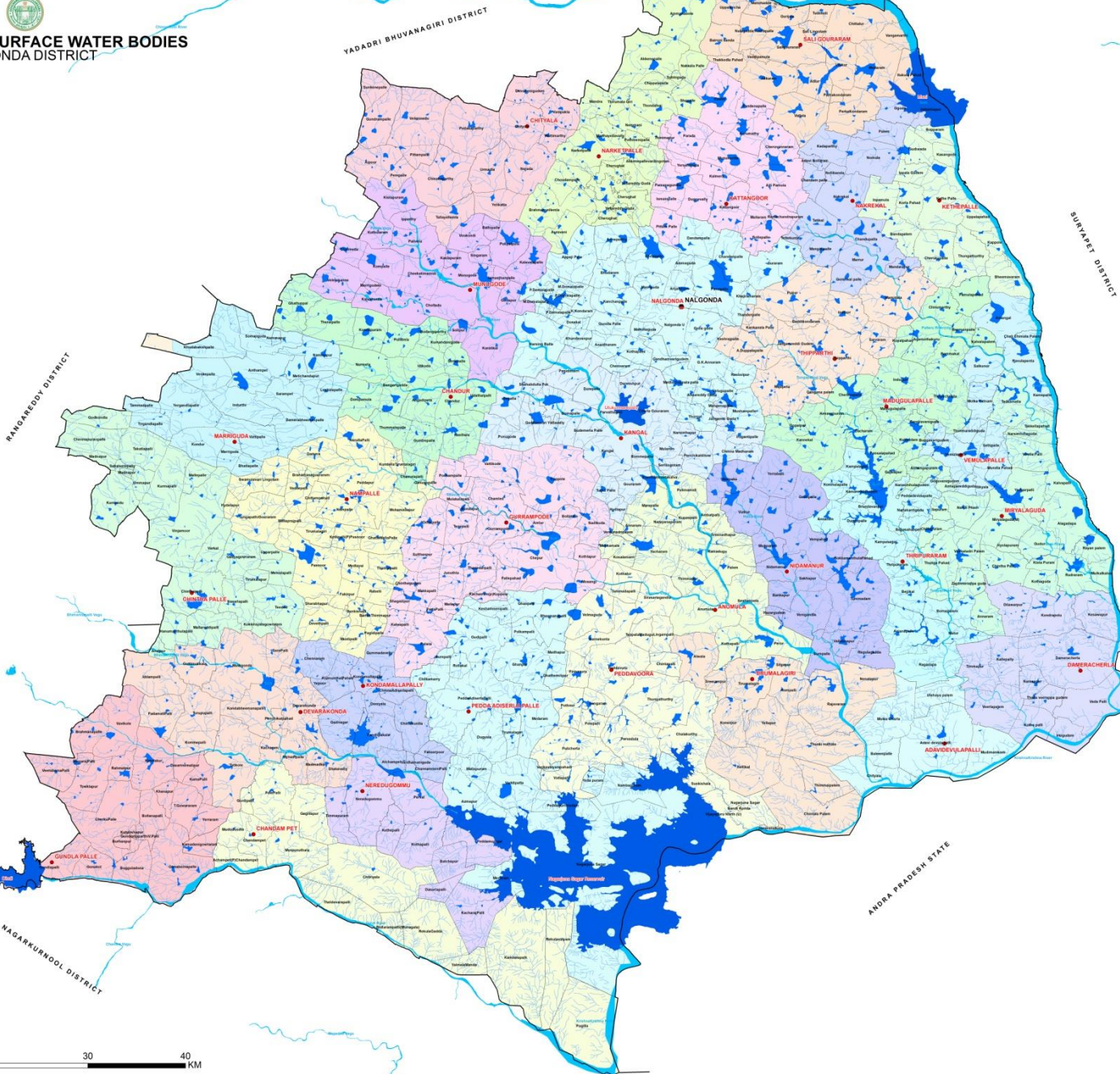


- Legend**
- Mandal Headquarter
 - District Headquarter
 - Streams
 - Tanks
 - Reservoir
 - River
 - Village Boundary
 - Mandal Boundary
 - District Boundary





DRAINAGE AND SURFACE WATER BODIES NALGONDA DISTRICT



Legend

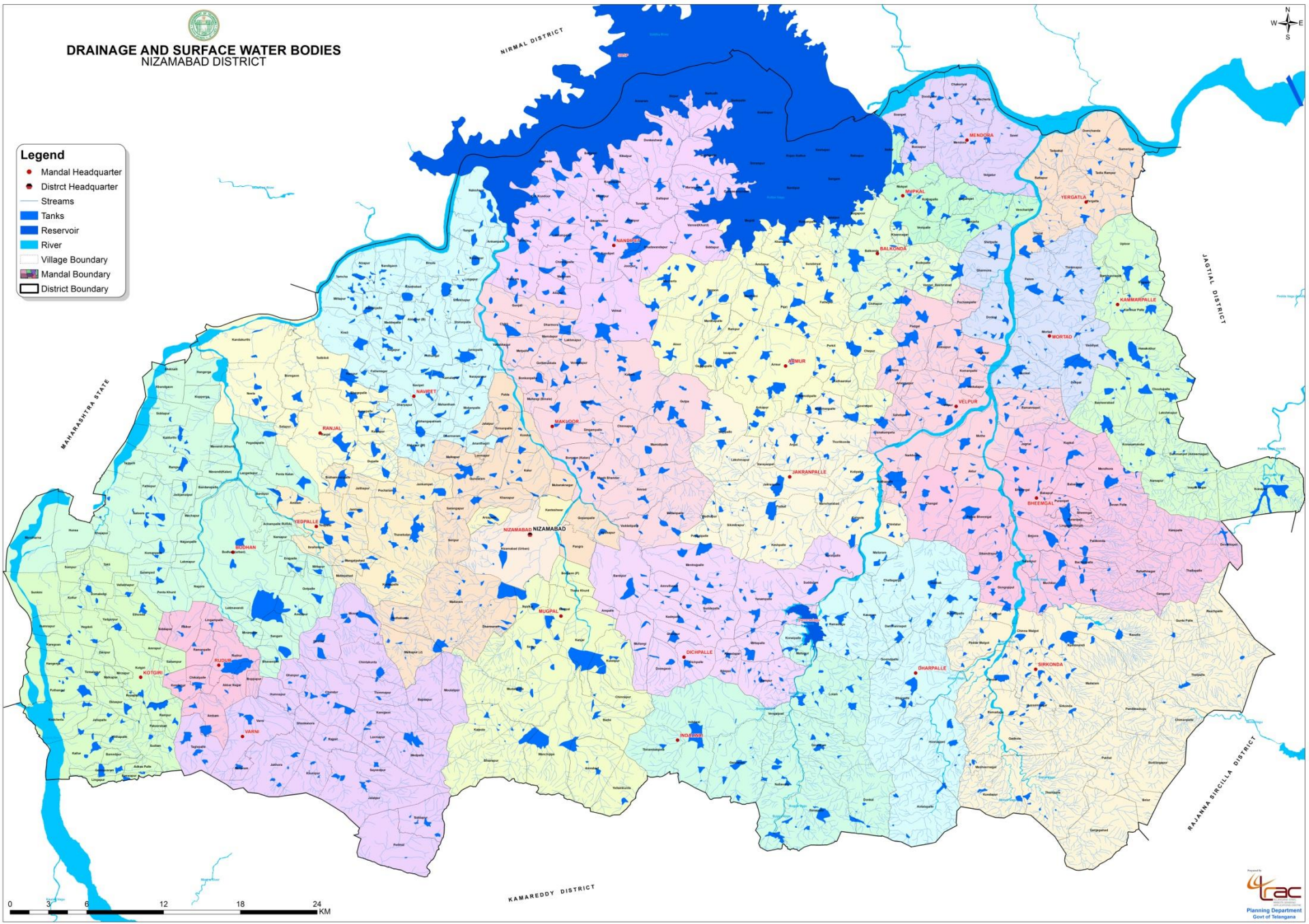
- Mandal Headquarter
- District Headquarter
- Streams
- Tanks
- Reservoir
- River
- Village Boundary
- Mandal Boundary
- District Boundary



DRAINAGE AND SURFACE WATER BODIES NIZAMABAD DISTRICT

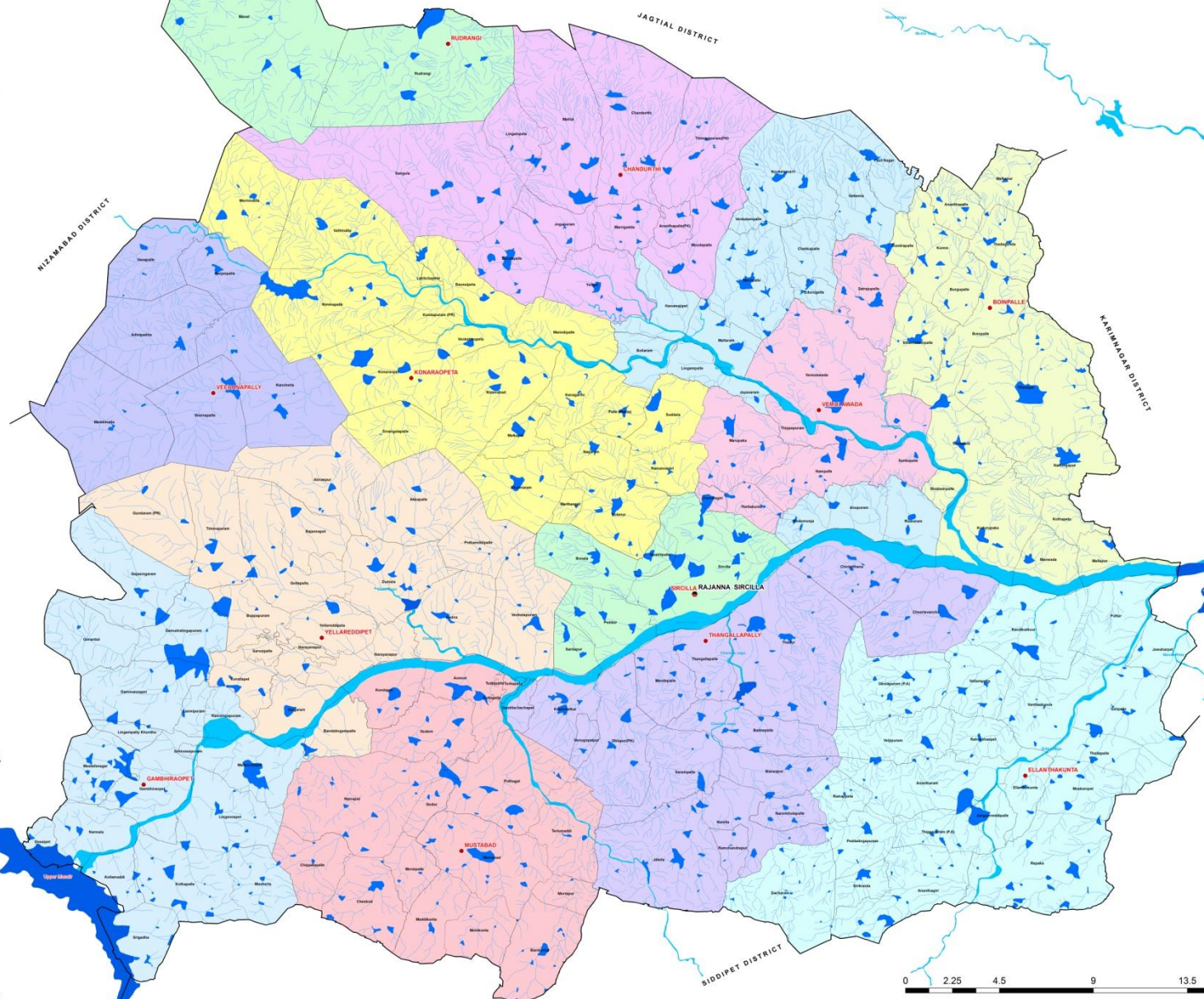


- Legend**
- Mandal Headquarter
 - District Headquarter
 - Streams
 - Tanks
 - Reservoir
 - River
 - Village Boundary
 - Mandal Boundary
 - District Boundary





DRAINAGE AND SURFACE WATER BODIES RAJANNA SIRCILLA DISTRICT

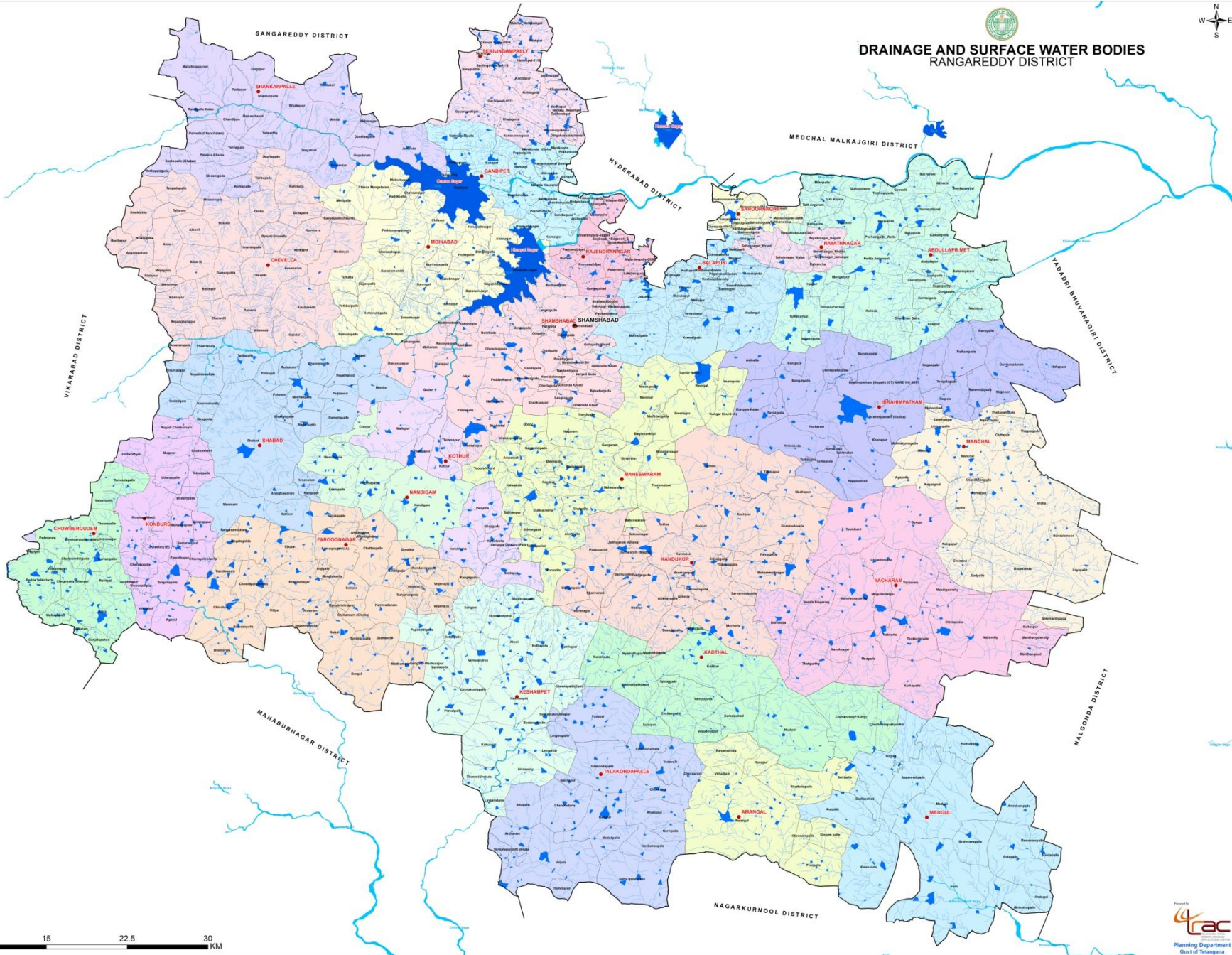


- Legend**
- Mandal Headquarter
 - District Headquarter
 - Streams
 - Tanks
 - Reservoir
 - River
 - Village Boundary
 - Mandal Boundary
 - District Boundary





DRAINAGE AND SURFACE WATER BODIES RANGAREDDY DISTRICT

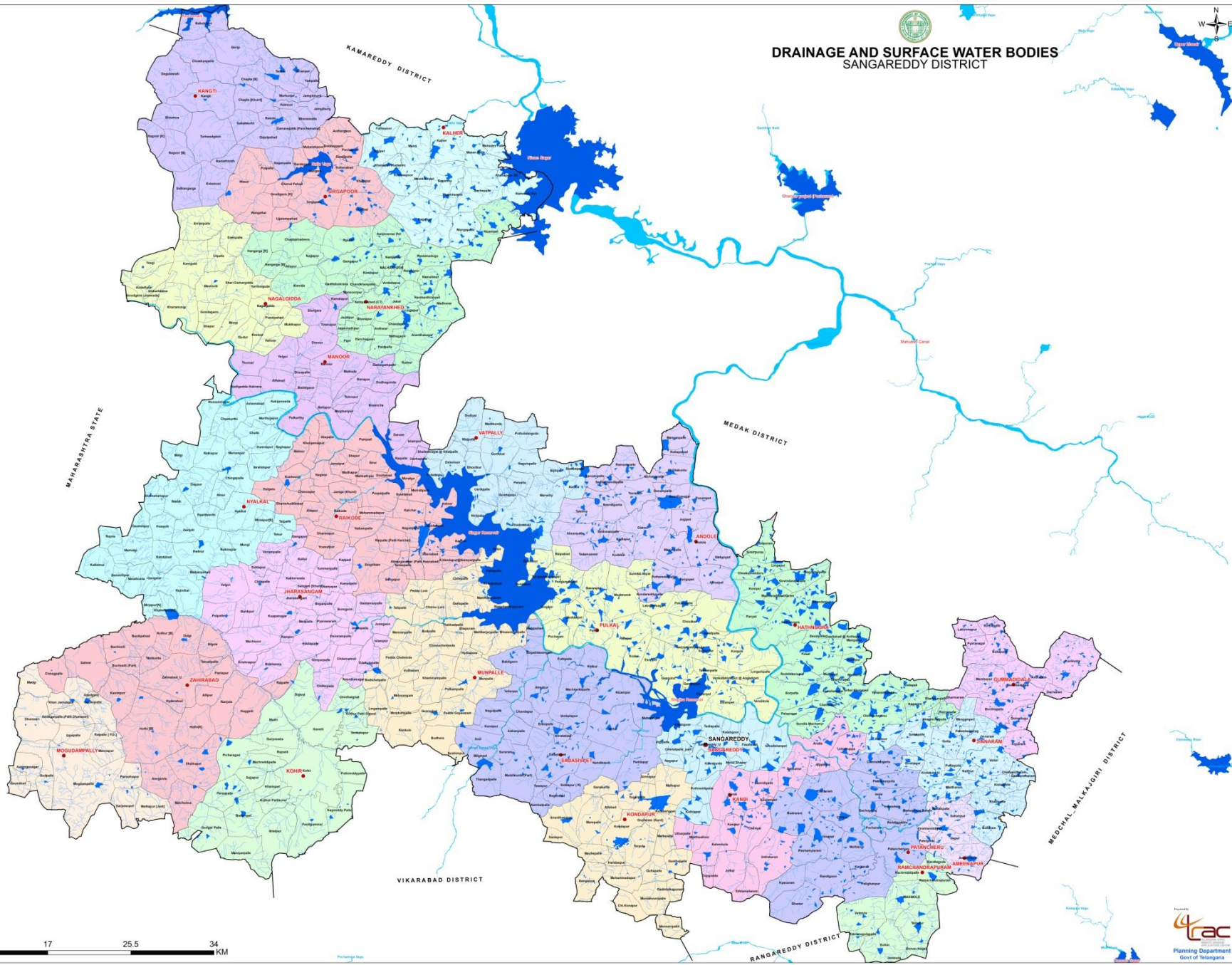


- Legend**
- Mandal Headquarter
 - District Headquarter
 - Streams
 - Tanks
 - Reservoir
 - River
 - Village Boundary
 - Mandal Boundary
 - District Boundary





DRAINAGE AND SURFACE WATER BODIES SANGAREDDY DISTRICT



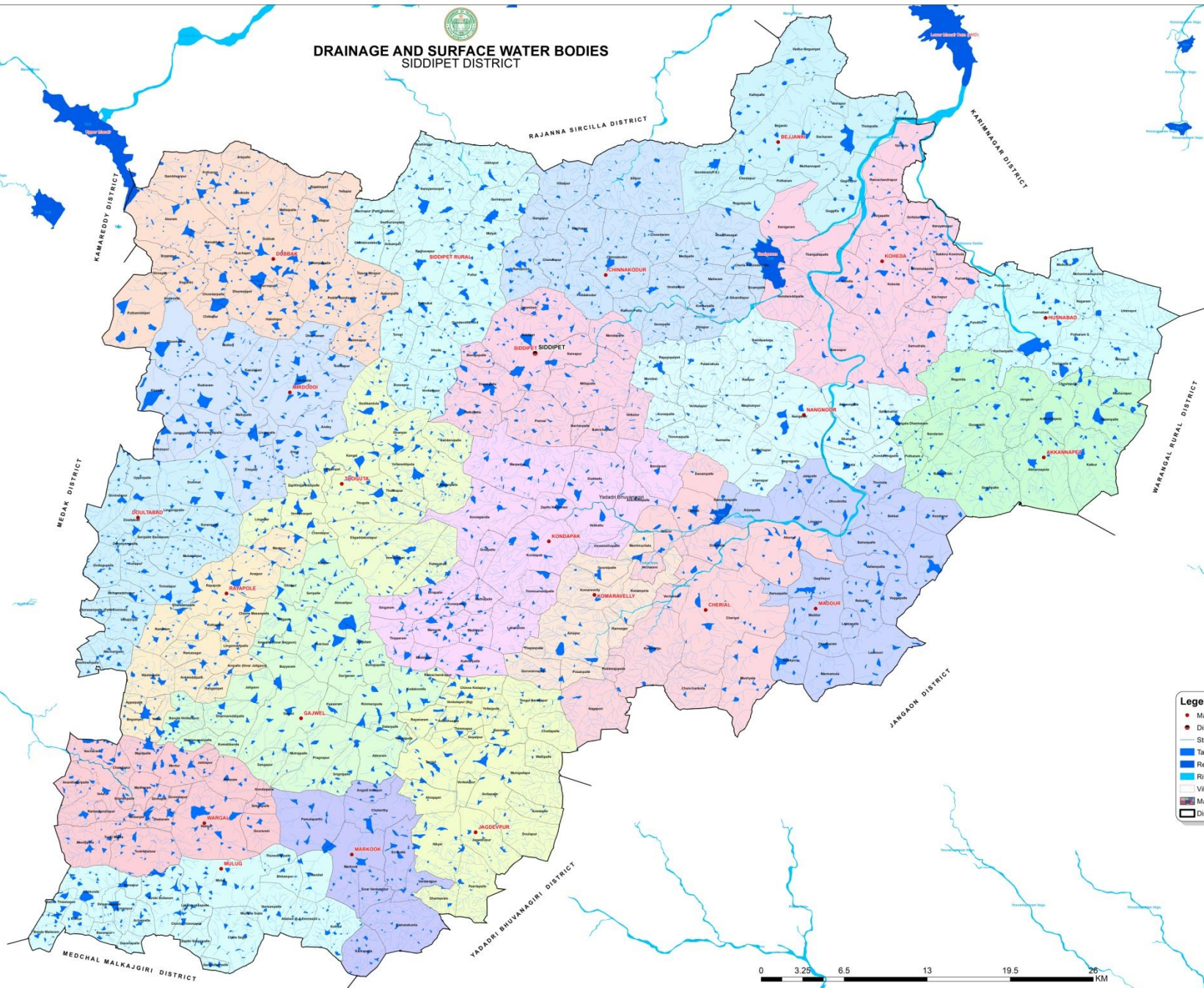
Legend

- Mandal Headquarter
- District Headquarter
- Streams
- Tanks
- Reservoir
- River
- Village Boundary
- Mandal Boundary
- District Boundary





DRAINAGE AND SURFACE WATER BODIES SIDDPET DISTRICT



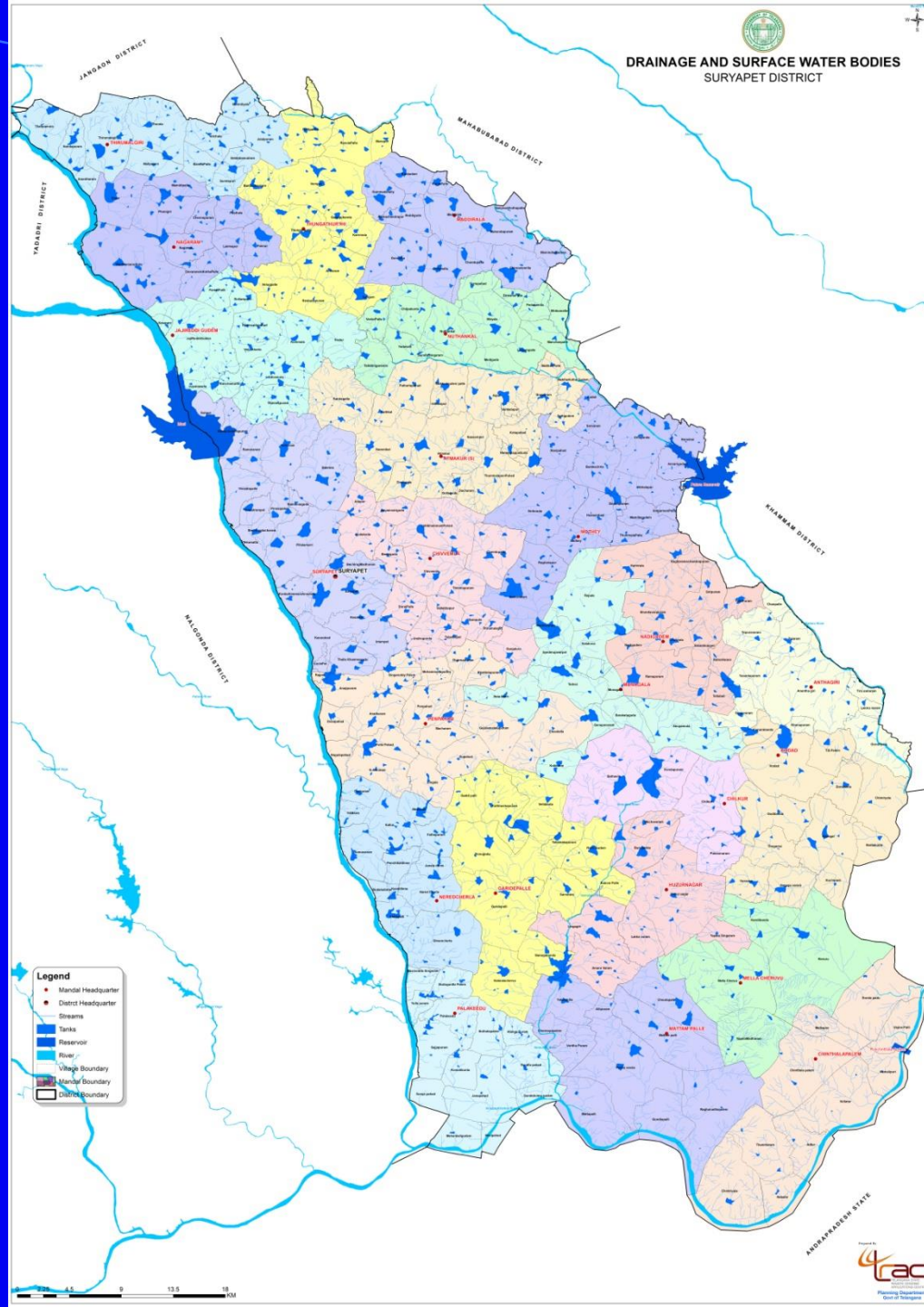
Legend

- Mandal Headquarter
- District Headquarter
- Streams
- Tanks
- Reservoir
- River
- Village Boundary
- Mandal Boundary
- District Boundary





DRAINAGE AND SURFACE WATER BODIES SURYAPET DISTRICT



Legend

- Mandal Headquarter
- District Headquarter
- Streams
- Tanks
- Reservoir
- River
- Village Boundary
- Mandal Boundary
- District Boundary



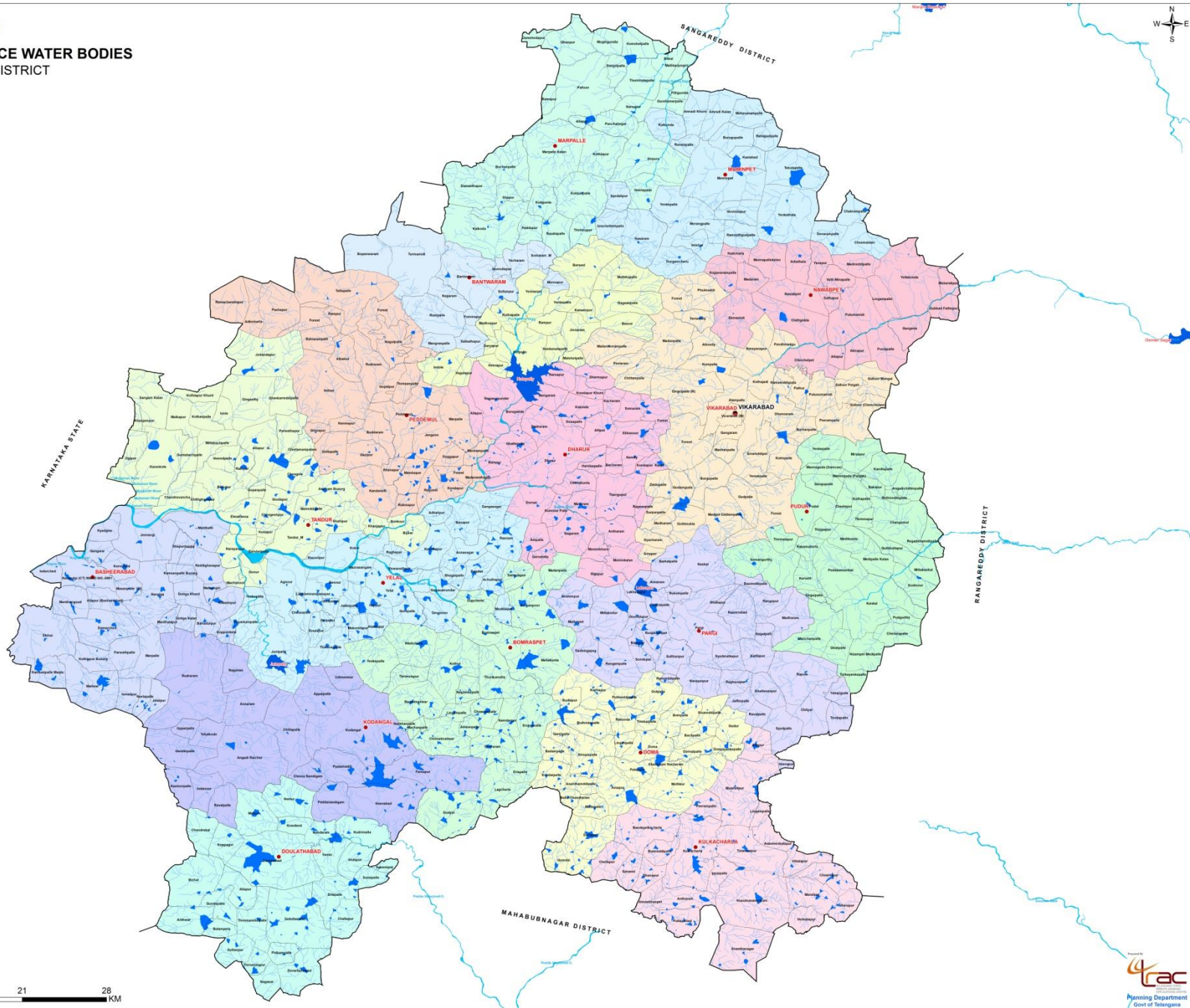
ANDHRA PRADESH STATE



Project No. 4
Crac
Water Resources Department
Government of Andhra Pradesh



DRAINAGE AND SURFACE WATER BODIES VIKARABAD DISTRICT



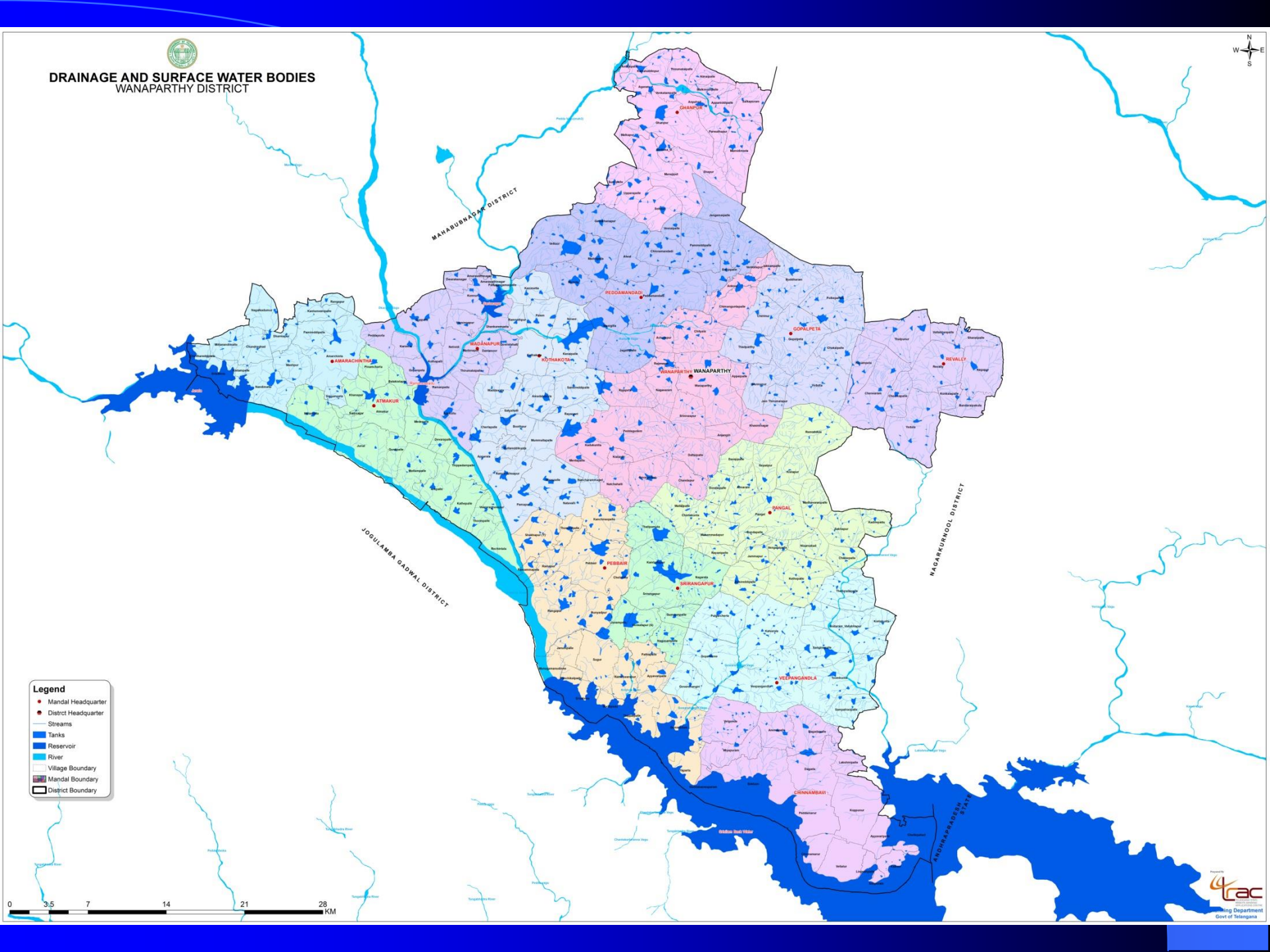
Legend

- Mandal Headquarter
- District Headquarter
- Streams
- Tanks
- Reservoir
- River
- Village Boundary
- Mandal Boundary
- District Boundary

0 3.5 7 14 21 28 KM



DRAINAGE AND SURFACE WATER BODIES WANAPARTHY DISTRICT



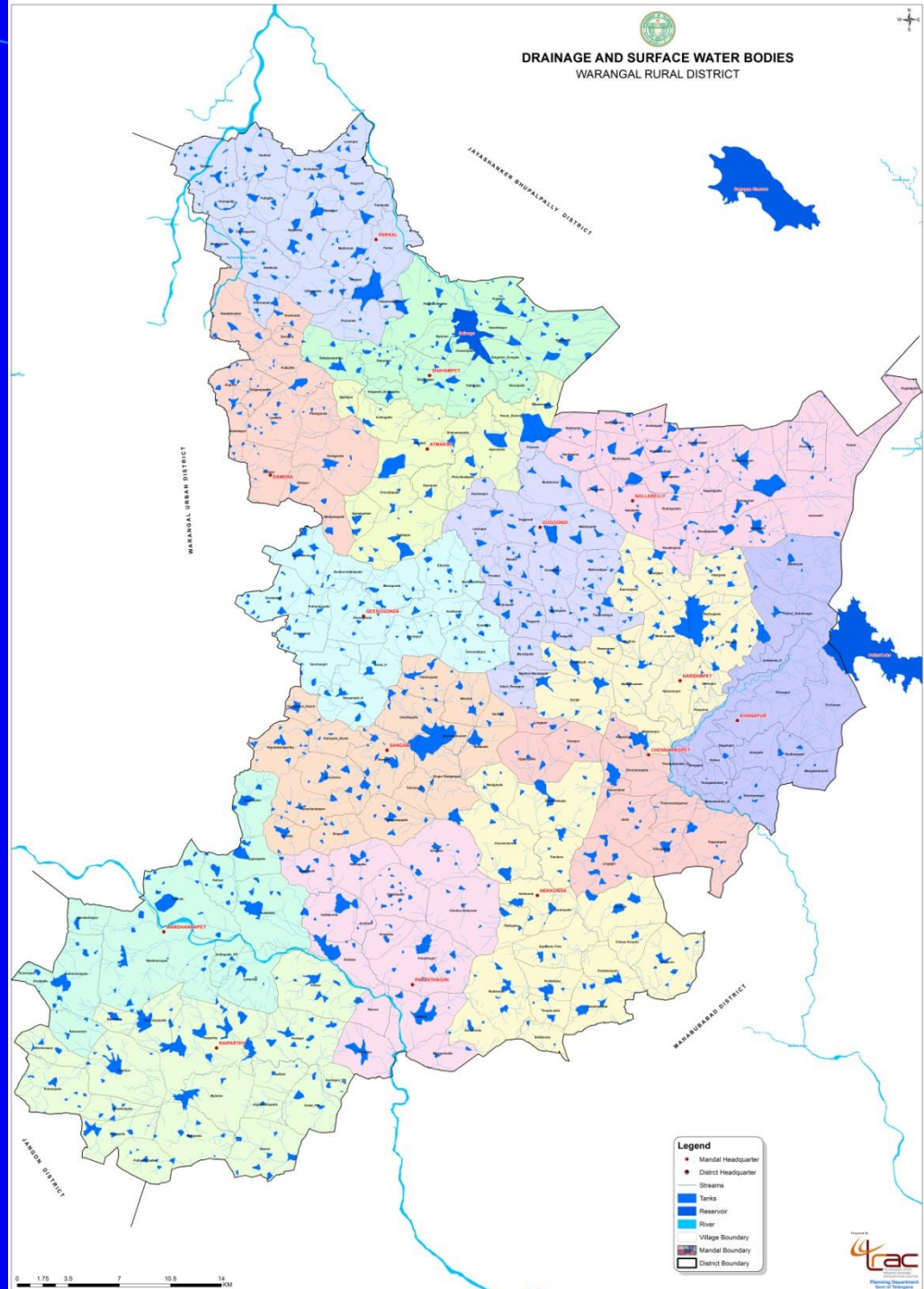
Legend

- Mandal Headquarter
- District Headquarter
- Streams
- Tanks
- Reservoir
- River
- Village Boundary
- Mandal Boundary
- District Boundary





DRAINAGE AND SURFACE WATER BODIES
WARANGAL RURAL DISTRICT



Legend

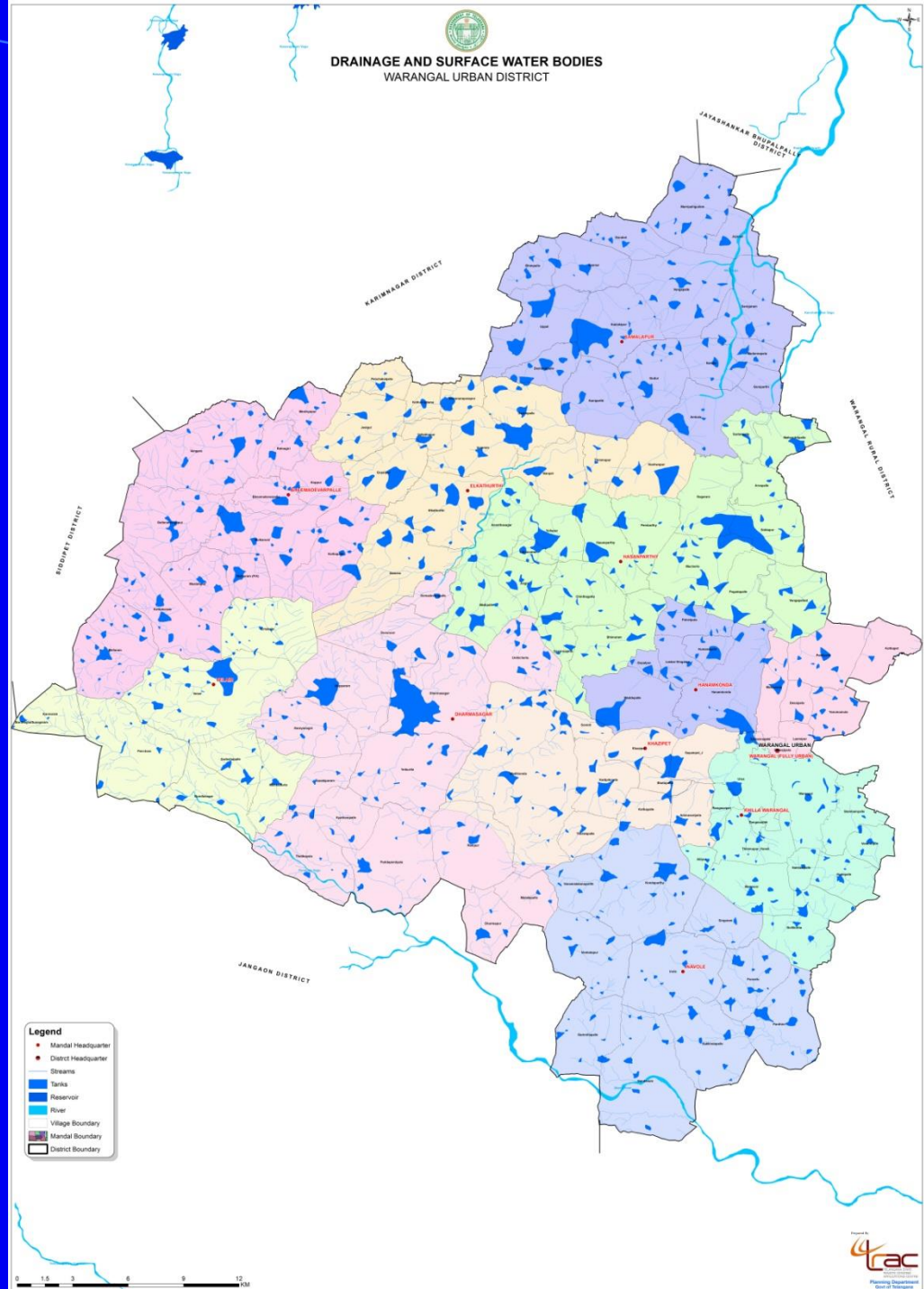
- Mandal Headquarter
- District Headquarter
- Streams
- Tanks
- Reservoir
- River
- Village Boundary
- Mandal Boundary
- District Boundary

0 1.75 3.5 7 10.5 14 KM



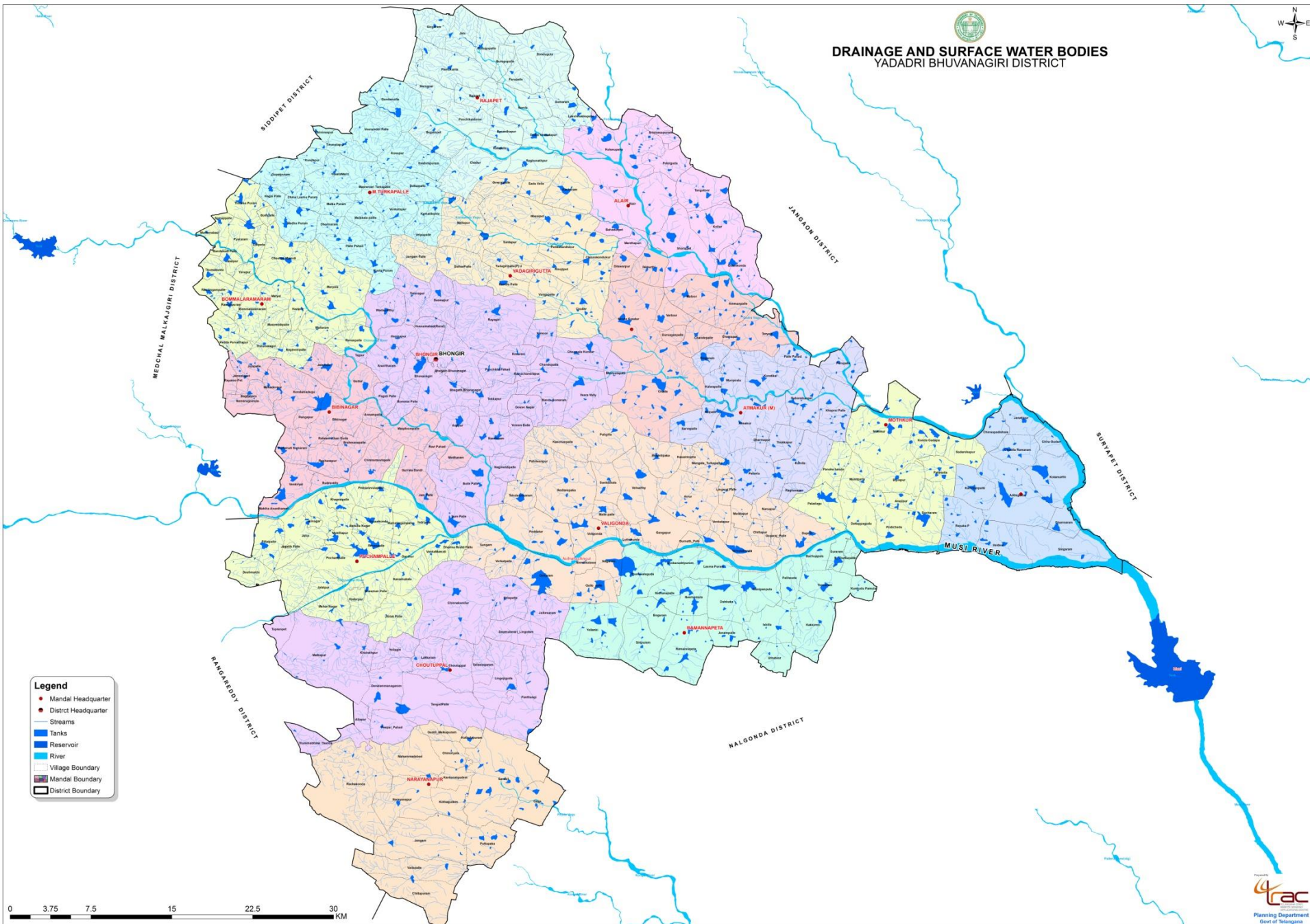


DRAINAGE AND SURFACE WATER BODIES
WARANGAL URBAN DISTRICT





DRAINAGE AND SURFACE WATER BODIES YADADRI BHUVANAGIRI DISTRICT



- Legend**
- Mandal Headquarter
 - District Headquarter
 - Streams
 - Tanks
 - Reservoir
 - River
 - Village Boundary
 - Mandal Boundary
 - District Boundary



Re orientation of rural agrarian economy

1. Water
2. Quality Seeds
3. Fertilizers & Pesticides
4. Good soils
5. Reasonable Market Prices for the Produce



A Satellite imagery of Warangal and its environs



A Satellite imagery of Karimnagar and its environs



A Satellite imagery of Suryapet and its environs

EYE IN THE SKY



ROLE OF REMOTE SENSING & GIS IN MONITORING MISSION KAKATIYA

Prof:M.Pandu Ranga Rao, NIIT WARANGAL

Dr. A.V.Subba Rao, Senior Scientific Officer, TRAC

**Shri. Y.M. Gopla Krishna, Scientist 'SD' Dy.E.E,
TRAC**

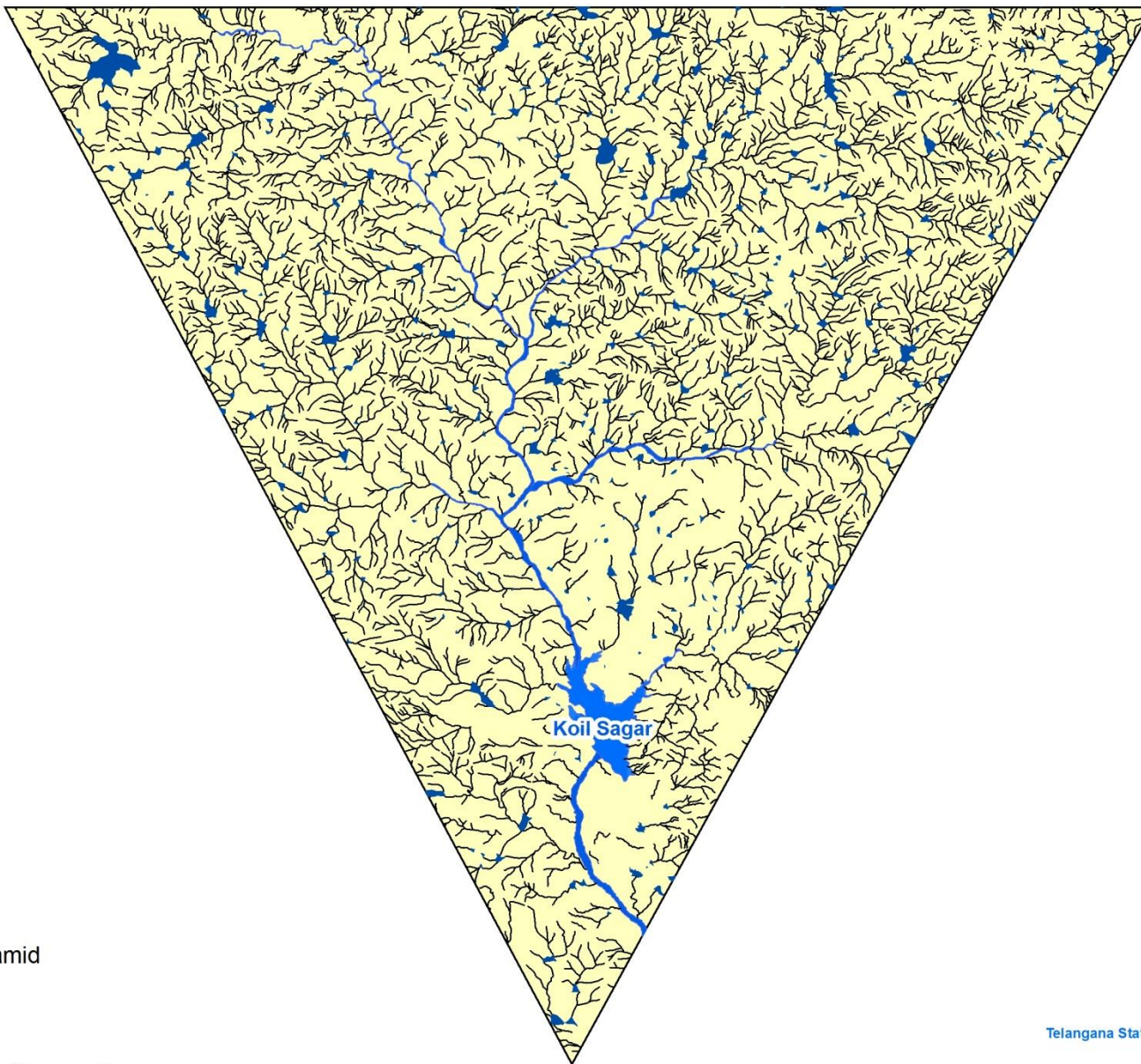
Shri. Ramteke Gajanan, Scientist, 'SC' TRAC

Concept of Mission Kakatiya:

The irrigation skills and engineering marvels of the Kakatiya rulers were extensively used to promote tank based irrigation . The concept is also known as chain link tank system or interlinking of tanks or otherwise known as “**Golusu Kattu Chervulu**” which were designed in tandem with the slope and drainage density of that particular location. The tanks were used for two purposes namely for providing drinking water and secondly for irrigation system.

Maintenance of these tanks were done on community participatory approach, wherein local farmers and villagers are the stake holders and the kings played the role of a facilitator.

INVERTED PYRAMID MODEL FOR DRAINAGE AND WATERBODIES - MAHABUBNAGAR DISTRICT



Legend

- Stream
- Reservoir
- Tank
- River
- Inverted Pyramid

0 2 4 8 12 16 Kilometers

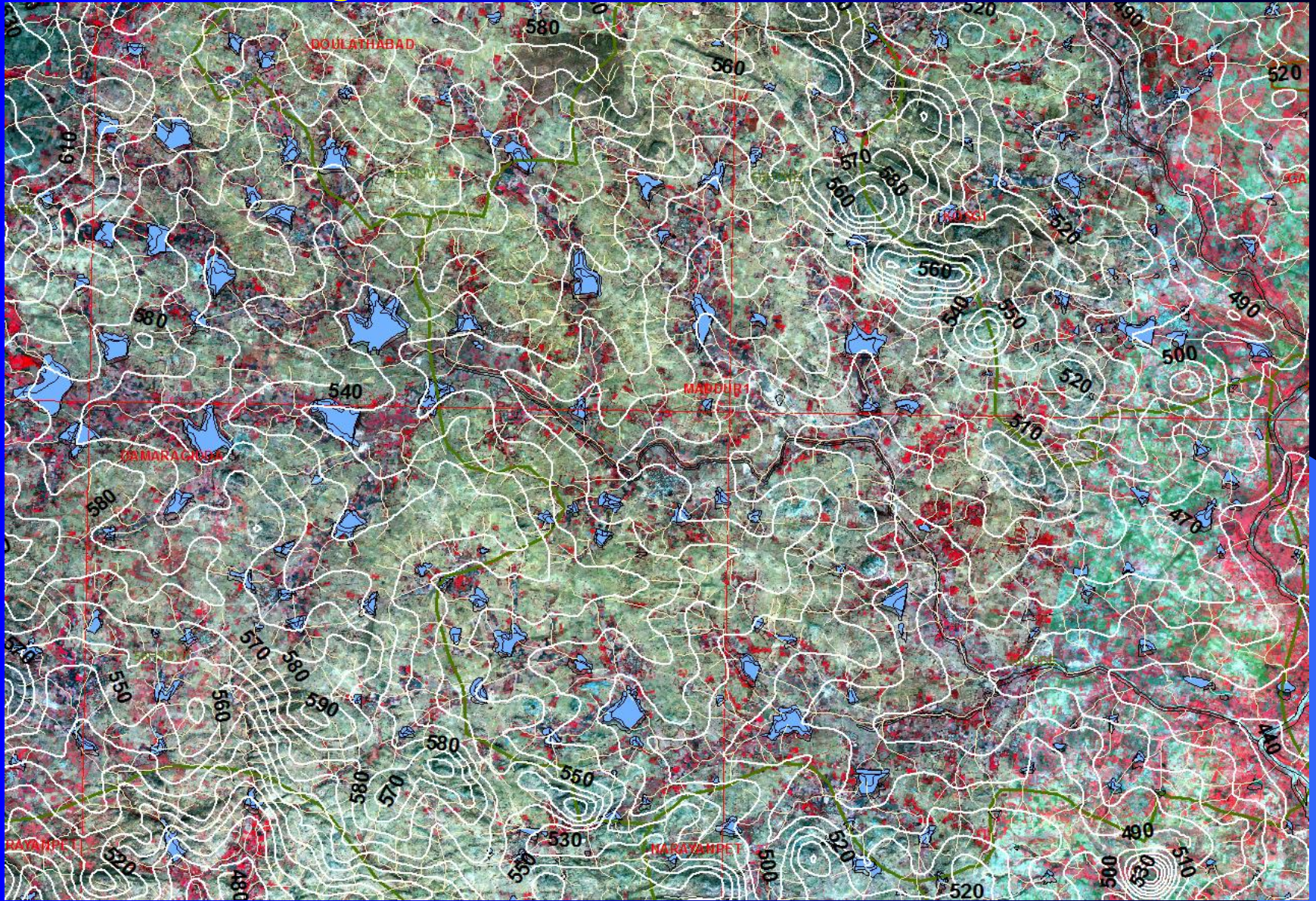


Prepared By
Telangana State Remote Sensing Applications Centre
(TRAC)
Dept. of Planning
Govt. of TELANGANA

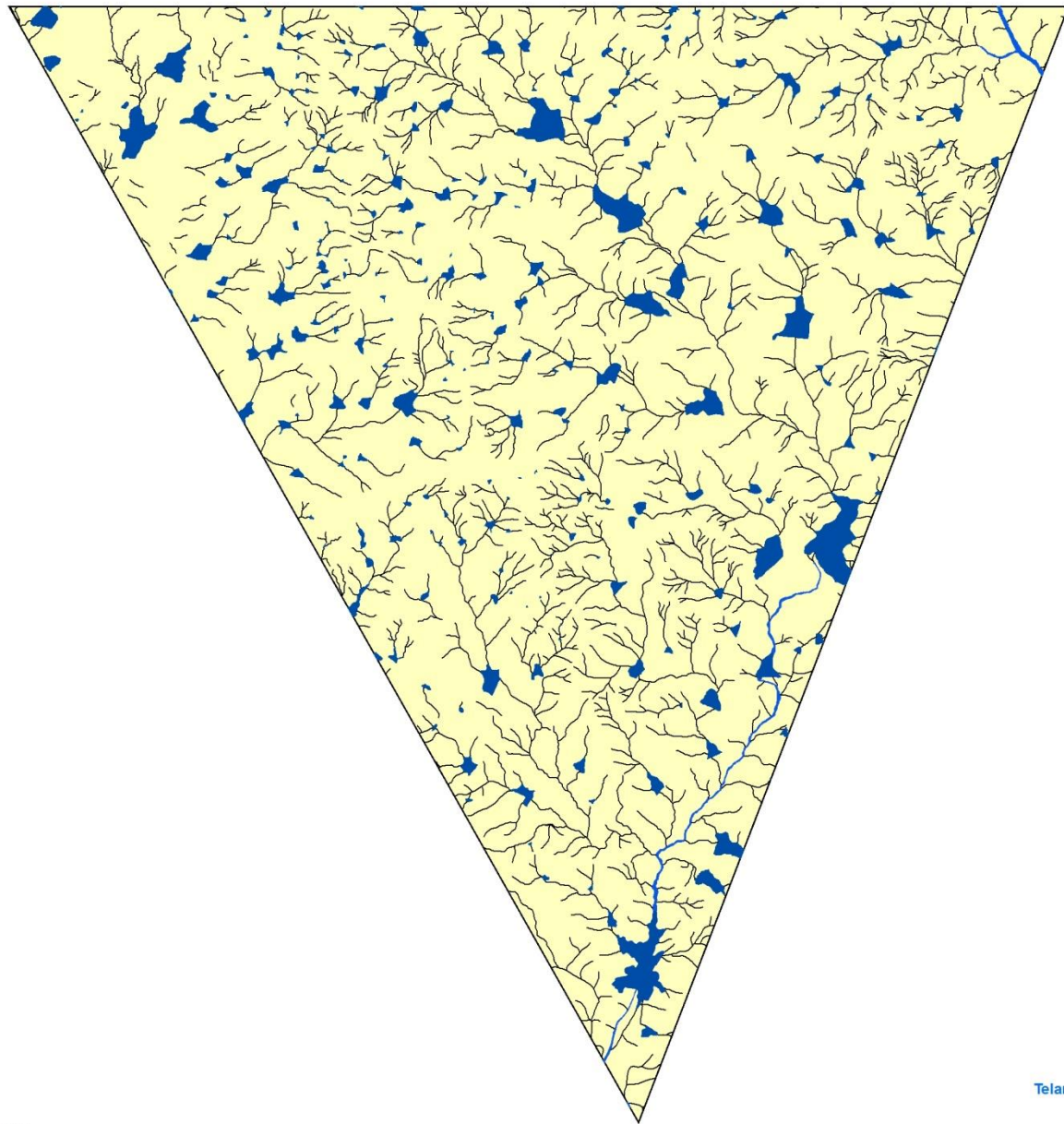
IRS-LISS IV Image showing the Drainage System upstream of Koilsagar Dam Mahabubnagar District



SRTM Derived 30 Meter Contour Layer Superimposed on to the Drainage

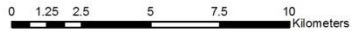


INVERTED PYRAMID MODEL FOR DRAINAGE AND WATERBODIES - NALGONDA DISTRICT



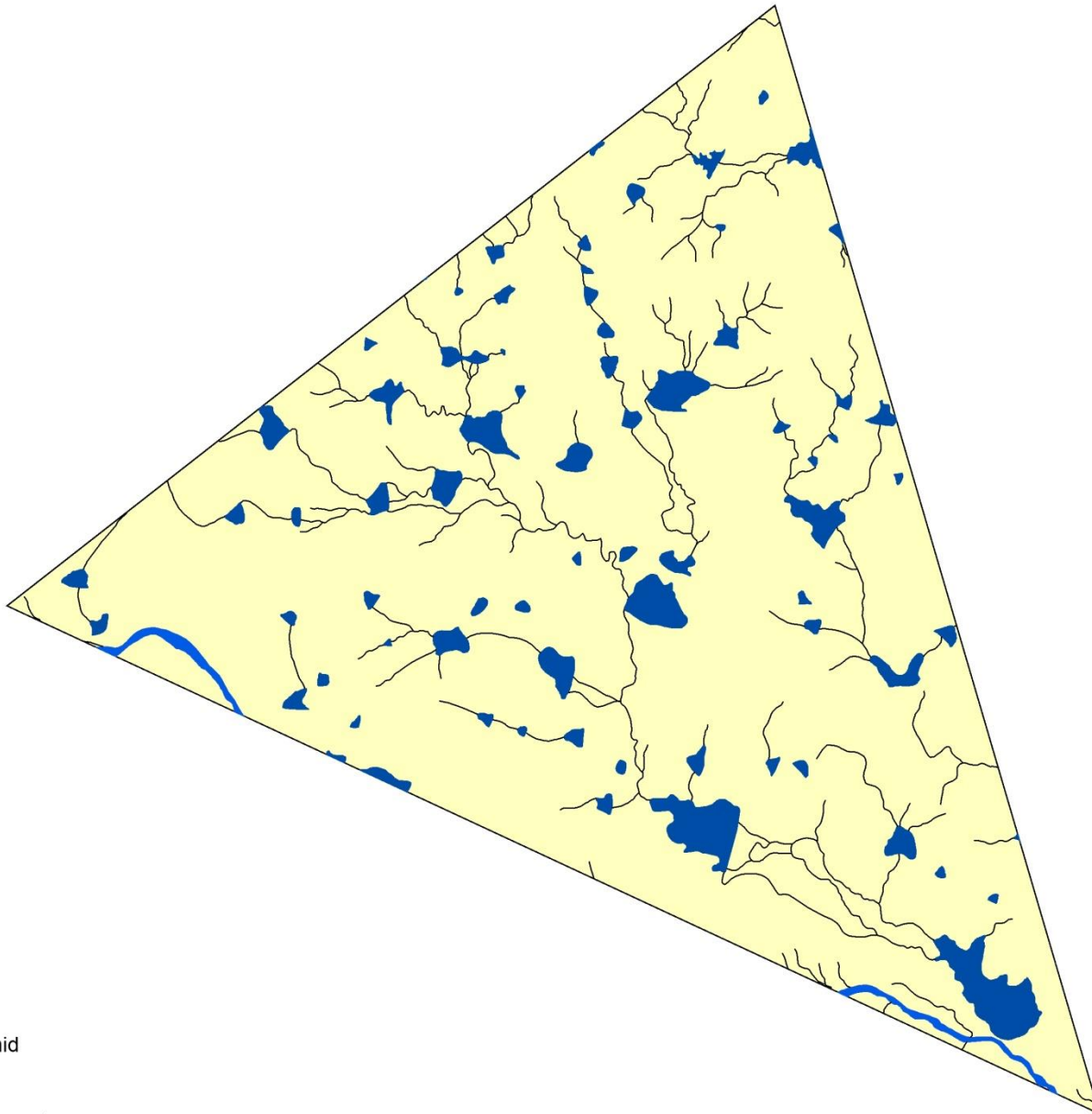
Legend

- Stream
- Reservoir
- Tank
- River
- Inverted Pyramid



Prepared By
Telangana State Remote Sensing Applications Centre
(TRAC)
Dept. of Planning
Govt. of TELANGANA

INVERTED PYRAMID MODEL FOR DRAINAGE AND WATERBODIES - WARANGAL DISTRICT



Legend

- Stream
- Tank
- River
- Inverted Pyramid

0 0.5 1 2 3 4 Kilometers



Prepared By
Telangana State Remote Sensing Applications Centre
(TRAC)
Dept. of Planning
Govt. of TELANGANA

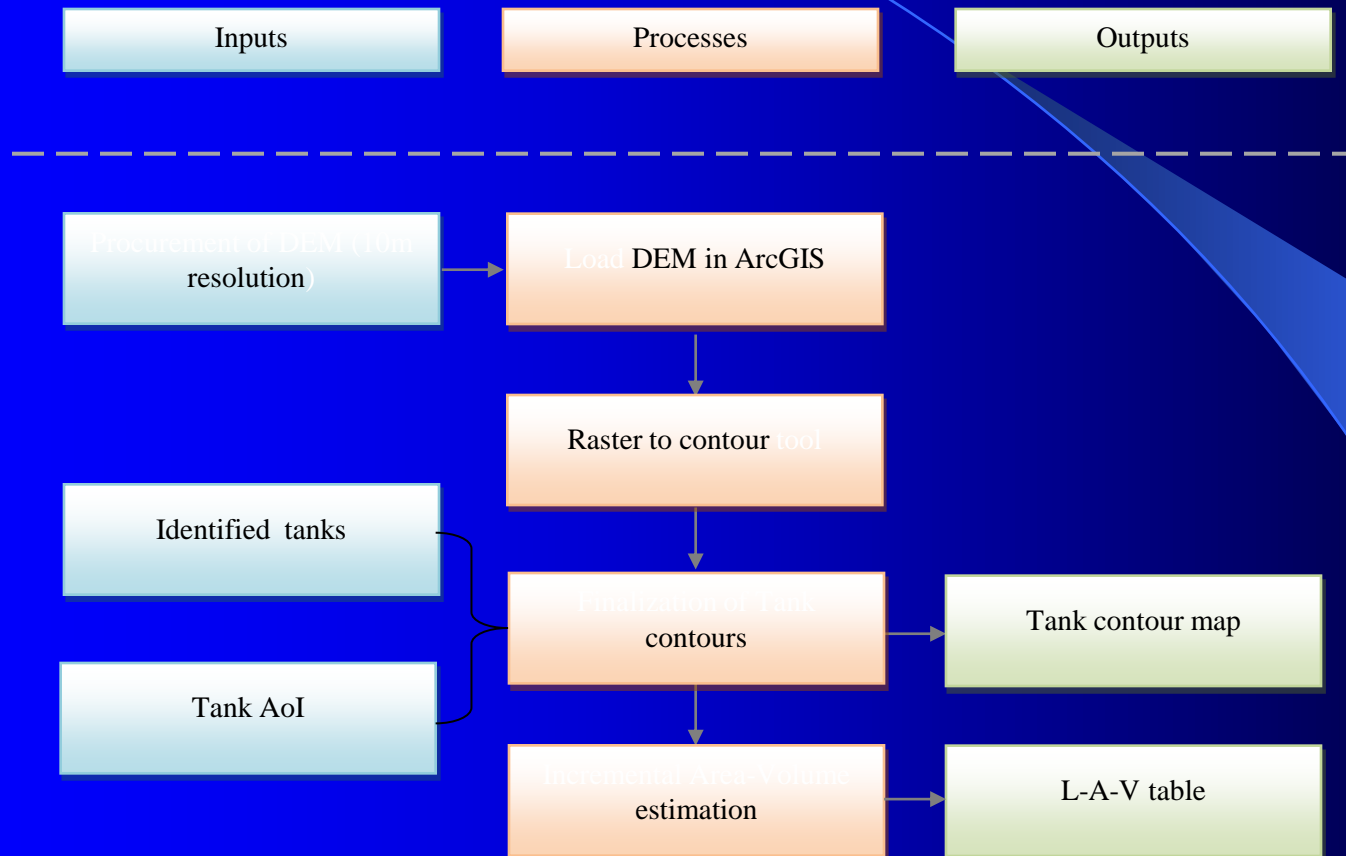
Role of Remote Sensing & GIS in Mission Kakatiya

1. Satellite Imagery provides the exact water spread within a water body.
2. Multi temporal satellite images procured during, Kharif, Rabi and Summer Seasons will provide the diminishing water spread within a water body.
3. High Resolution satellite images like CARTOSAT – 1A with 2.5 meter resolution with overlap regions will provide the stereoscopic vision of the ground because of which the 'Z' coordinate can be derived.
4. TRAC has initiated a pilot based study on estimation of storage levels of Minor Irrigation Tanks using the CARTOSAT 1A derived digital elevation models, DEM.

Utilisation of Satellite Derived Contours for Estimation of Tank Storage Capacities

- GIS & Remote Sensing based generation of tank bed contours are useful in estimation of tank storage capacity of each tank.
- Satellite data derived Digital Elevation Model (DEM) is used for drawing contours of tank.
- Contour maps are available for major and medium irrigation projects only.
- For minor irrigation schemes, there is an urgent need to prepare contour maps for each minor irrigation source thereby to arrive at Level-Area-Volume table which is vital for monitoring and evaluation of impacts of Mission Kakatiya.

Objective : Generation of tank-wise contour maps for each tank and estimation of tank storage capacity through Level-Area-Volume table.



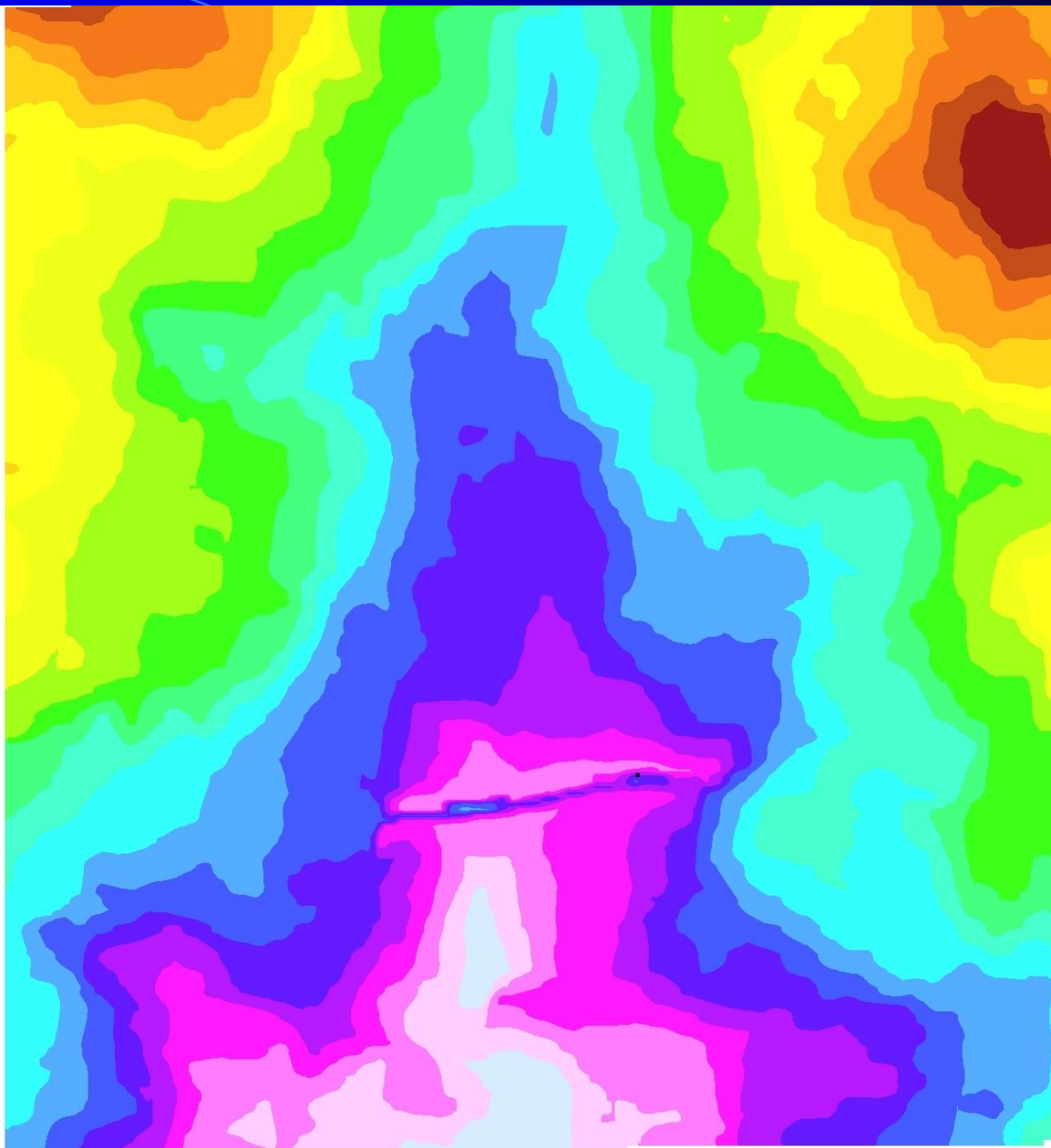
Process flow chart for generation of contours and Level-Area-Volume table

CARTOSAT 1A Derived 10 Meter Contour Data from NRSC

Elevation in m

DEM

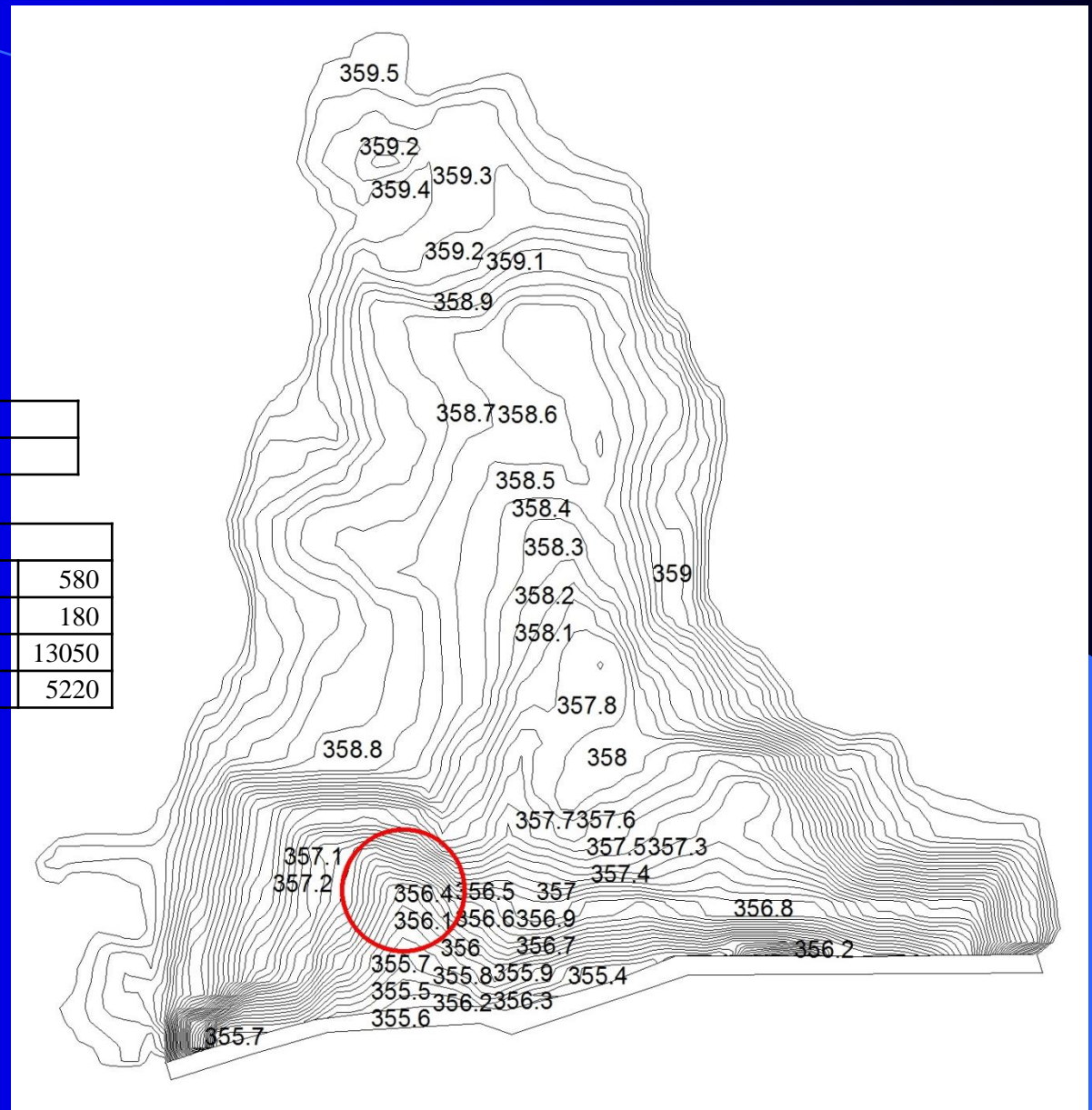
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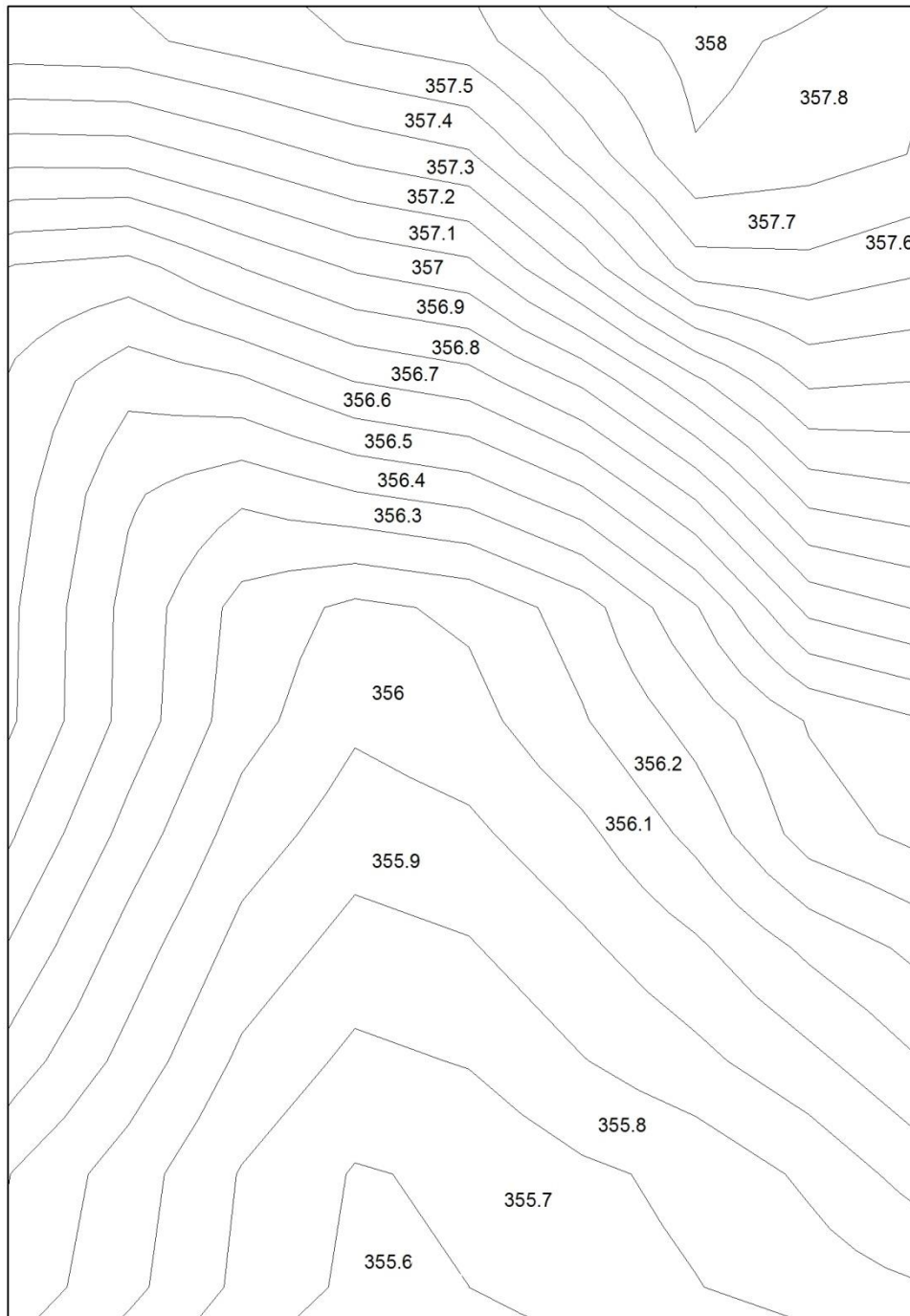
Tank name	Mysamma Cheruvu
Village	Alair
Mandal	Alair
District	Nalgonda
UID	80970500802302

Max Top of Bund Level	+ 359.5 m
Min Tank Bed Level	+ 355.4 m

Estimation of silt	
Approximate Bund Length in m	580
Approximate length of Cistern in m	180
Approximate Silt Volume in Cu.m	13050
Number of tractor truck loads (2.5 Cu.m/truck)	5220



Contours of Mysamma Cheruvu, Alair Mandal, Nalgonda District

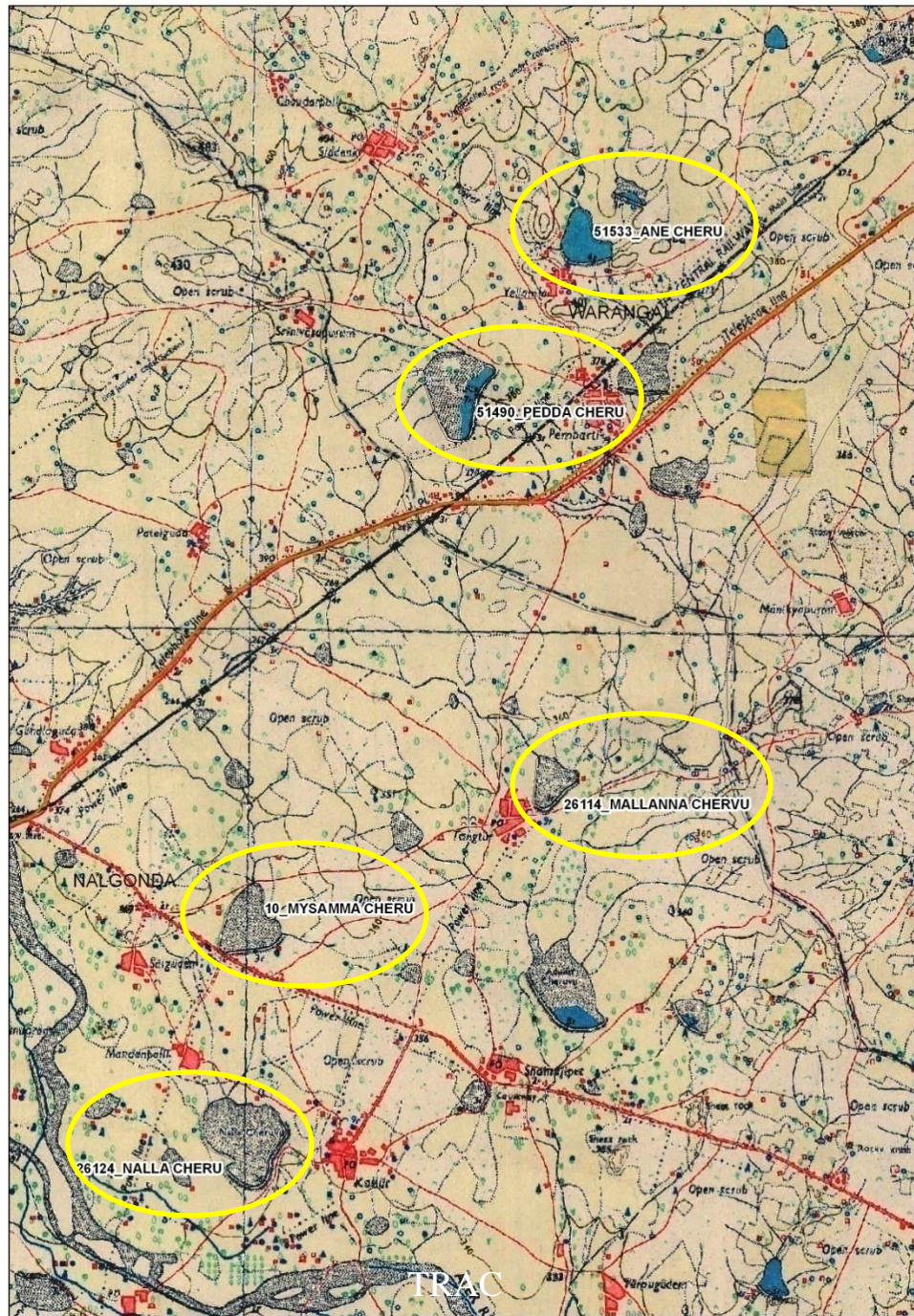


Level-Area-Volume Table

Contour Level in m	Area		Volume	
	in Sq.m	in acre	in Cu.m	in Mcft
355.4	1246.81	0.31		
355.5	2855.16	0.71	205.0982	0.007
355.6	4437.60	1.10	569.7358	0.020
355.7	6550.56	1.62	1119.144	0.040
355.8	8758.39	2.16	1884.591	0.067
355.9	10857.62	2.68	2865.392	0.101
356.0	12910.59	3.19	4053.803	0.143
356.1	15028.91	3.71	5450.778	0.192
356.2	17001.58	4.20	7052.302	0.249
356.3	18994.30	4.69	8852.096	0.313
356.4	20994.22	5.19	10851.52	0.383
356.5	23278.21	5.75	13065.14	0.461
356.6	25728.78	6.36	15515.49	0.548
356.7	28159.69	6.96	18209.92	0.643
356.8	31558.29	7.80	21195.82	0.749
356.9	34382.57	8.50	24492.86	0.865
357.0	37478.43	9.26	28085.91	0.992
357.1	40866.39	10.10	32003.15	1.130
357.2	44324.82	10.95	36262.71	1.281
357.3	49070.73	12.13	40932.49	1.446
357.4	53838.52	13.30	46077.95	1.627
357.5	59046.50	14.59	51722.2	1.827
357.6	64118.69	15.84	57880.46	2.044
357.7	69136.69	17.08	64543.23	2.279
357.8	78081.91	19.29	71904.16	2.539
358.0	85910.98	21.23	80103.8	2.829
358.1	90569.66	22.38	88927.84	3.140
358.2	95499.32	23.60	98231.29	3.469
358.3	101714.19	25.13	108092	3.817
358.4	108910.68	26.91	118623.2	4.189
358.5	124600.28	30.79	130298.8	4.601
358.6	139973.20	34.59	143527.4	5.069
358.7	153909.86	38.03	158221.6	5.588
358.8	170078.05	42.03	174421	6.160
358.9	184584.43	45.61	192154.1	6.786
359.0	196393.21	48.53	211203	7.459
359.1	208021.93	51.40	231423.7	8.173
359.2	222200.81	54.91	252934.9	8.932
359.3	241843.68	59.76	276137.1	9.752
359.4	259249.22	64.06	301191.7	10.636
359.5	283897.79	71.86	328349.1	11.596

**Field visit for ground truth verification
on 12th May 2015**

	Name	Designation
	TRAC	
1	Prof. M. Pandu Ranga Rao	NIT Warangal (Retd.)
2	Dr. A. V. Subba Rao	Senior Scientific Officer
3	Mr. Y. M. Gopala Krishna	Scientist 'SD'/ Dy. E. E.
4	Mr. Gajanan Ramteke	Scientist 'SC'
	I&CAD	
1	Mr. Chanhdra Mouli	Dy. E. E.
2	Mr. Vijay kumar	A.E.E.
3	Ms. Sri Latha	A.E.E.





Field visit of Mysamma Cheruvu, Alair Mandal, Nalgonda District



Field visit of Mysamma Cheruvu, Alair Mandal, Nalgonda District



Field visit of Mysamma Cheruvu, Alair Mandal, Nalgonda District

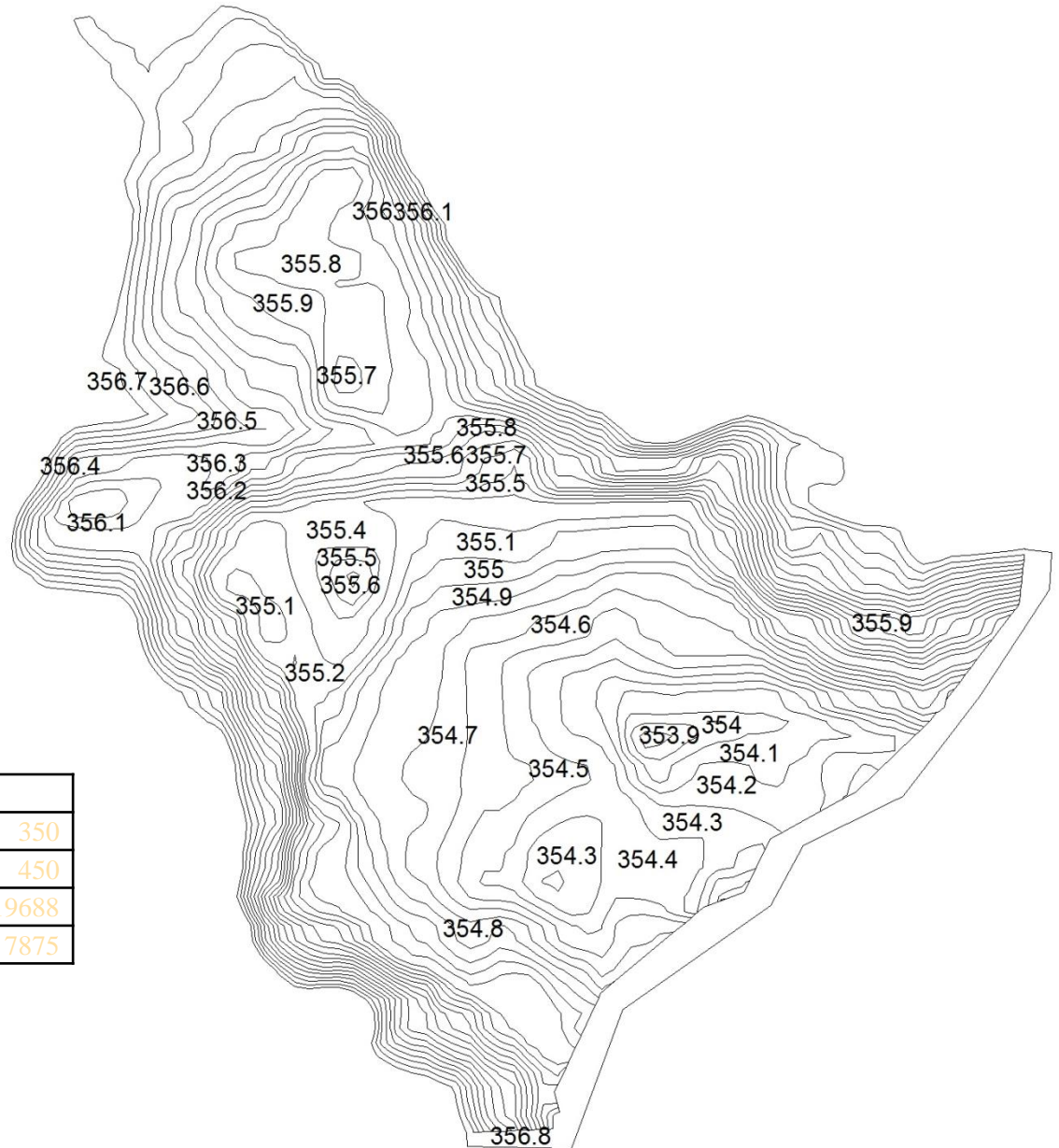


Field visit of Mysamma Cheruvu, Alair Mandal, Nalgonda District

Tank name	Mallanna Cheruvu
Village	Tangutoor
Mandal	Alair
District	Nalgonda
UID	80970500401303

Max Top of Bund Level	+ 356.8 m
Min Tank Bed Level	+ 355.2 m

Estimation of silt	
Approximate Bund Length in m	350
Approximate length of Cistern in m	450
Approximate Silt Volume in Cu.m	19688
Number of tractor truck loads (2.5 Cu.m/truck)	7875



Level-Area-Volume Table

Contour Level in m	Area		Volume	
	in Sq.m	in acre	in Cu.m	in Mcft
355.2	14773.05	3.65		
354.0	16666.18	4.12	1571.961	0.056
354.2	22791.93	5.63	3544.866	0.125
354.1	27412.66	6.77	6055.096	0.214
354.3	36211.36	8.95	9236.296	0.326
353.8	36359.11	8.98	12864.82	0.454
353.9	36992.82	9.14	16532.42	0.584
355.1	44191.68	10.92	20591.64	0.727
354.4	53797.68	13.29	25491.11	0.900
354.5	61618.76	15.23	31261.93	1.104
354.6	71117.26	17.57	37898.73	1.338
354.7	79935.43	19.75	45451.37	1.605
355.7	85064.47	21.02	53701.36	1.896
354.8	94301.03	23.30	62669.64	2.213
355.6	99291.90	24.54	72349.28	2.555
354.9	106106.78	26.22	82619.22	2.918
355.5	111671.54	27.59	93508.13	3.302
355.0	118329.97	29.24	105008.2	3.708
355.4	127058.66	31.40	117277.6	4.142
356.0	137051.54	33.87	130483.1	4.608
356.1	146795.88	36.27	144675.5	5.109
355.8	158479.98	39.16	159939.3	5.648
355.9	170734.89	42.19	176400.1	6.230
356.2	182197.76	45.02	194046.7	6.853
356.3	191896.00	47.42	212751.4	7.513
356.4	200657.54	49.58	232379.1	8.206
356.5	210060.50	51.91	252915	8.932
356.6	219635.80	54.27	274399.8	9.690
356.7	229004.19	56.59	296831.8	10.483
356.8	249632.46	61.69	320763.6	11.328



Filed visit of Mallanna Cheruvu, Alair Mandal, Nalgonda District



Filed visit of Mallanna Cheruvu, Alair Mandal, Nalgonda District

29-06-2019

TRAC

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Filed visit of Mallanna Cheruvu, Alair Mandal, Nalgonda District



Field Photographs of Nalla Cheru Alair Mandal, Nalgonda District



Filed visit of Pedda Cheruvu, Janagaon Mandal, Warangal District



Filed visit of Pedda Cheruvu, Janagaon Mandal, Warangal District



Filed visit of Pedda Cheruvu, Janagaon Mandal, Warangal District



Field visit of Ane Cheruvu, Janagaon Mandal, Warangal District



Field visit of Ane Cheruvu, Janagaon Mandal, Warangal District

29-06-2019

TRAC

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Conclusions

- The contours generated using satellite derived digital elevation model DEM, are found to be in correlation with field profiles.
- Satellite derived DEM contours are provided with levels with respect to Mean Sea Level, MSL.
- Field staff is found to be using local datum i.e., 100 m for all measurements and calculations at all the tanks.
- Level Area Volume LAV table generated using DEM is useful for computing water spread area and storage volume at any particular level within the tank.
- Approximate silt volume can also be estimated using DEM.
- This exercise is useful as equivalent to pre levels without any physical field survey.
- It is a rapid study to estimate the tank storage capacity using DEM contours and avoids cumbersome, time consuming field surveys.

Advantages of Mission Kakatiya

1. Stored water in the tank will help as recharge structures.
2. This facilitates increased water levels in the wells and bore wells, further this will help in increased irrigated area.
3. Sustained availability of water till Rabi season.
4. Availability of water in the tank promotes fishery.
5. It may be concluded that rejuvenation of tanks will promote healthy Hydro-Bio System.

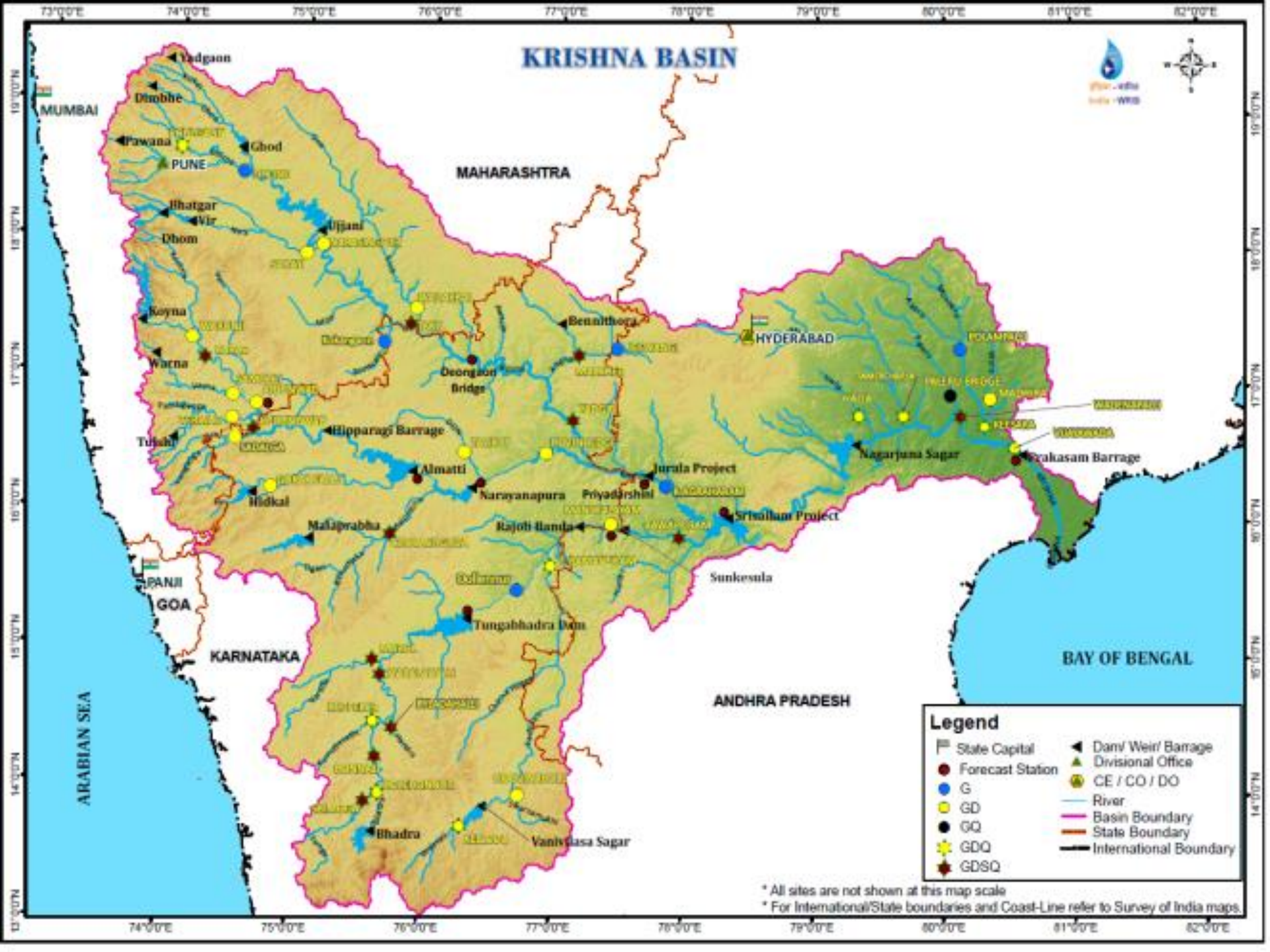


IMPACT OF MISSION KAKATIYA ON TELANGANA

MISSION KAKATIYA PROMOTES HARITHA TELANGANA



KRISHNA BASIN

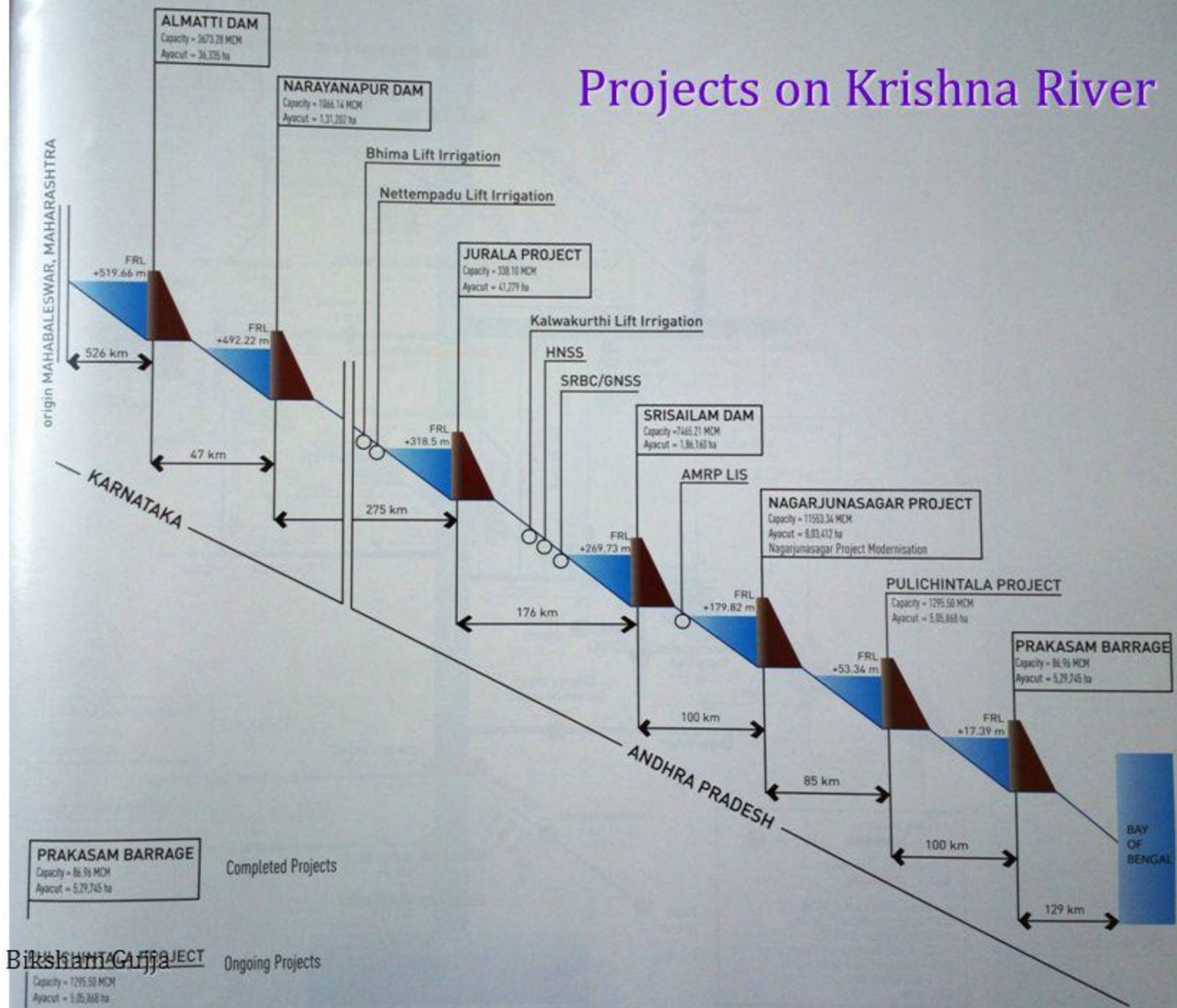


Legend

- State Capital
- Forecast Station
- G
- GD
- GQ
- GQG
- GDSQ
- Dam/ Weir/ Barrage
- Divisional Office
- CE / CO / DO
- River
- Basin Boundary
- State Boundary
- International Boundary

* All sites are not shown at this map scale
* For International/State boundaries and Coast-Line refer to Survey of India maps.

Projects on Krishna River



PULICHINTALA PROJECT

Capacity = 1295.50 MCM
Ayacut = 5,05,868 ha

Ongoing Projects

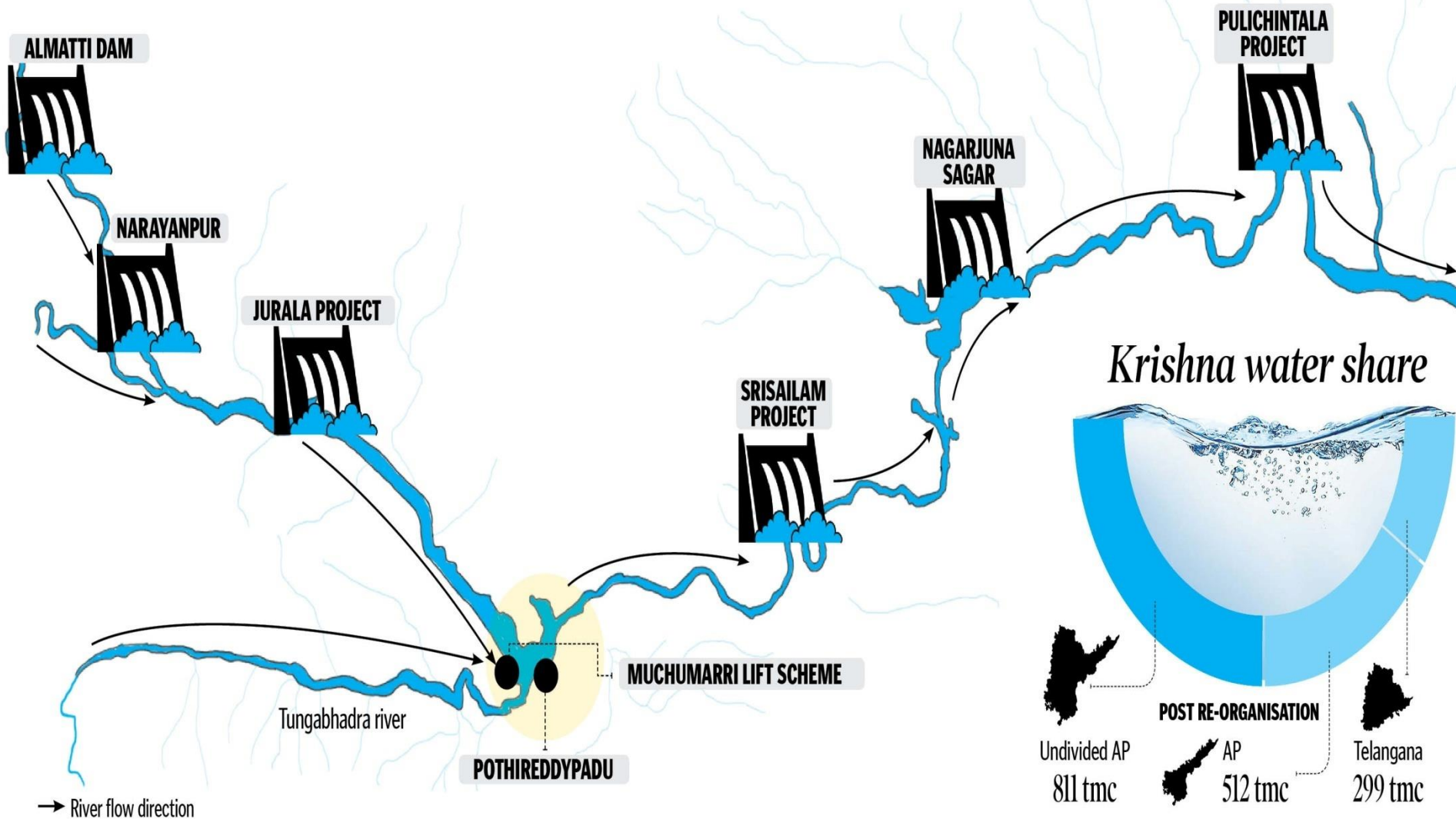
Prakasam Barrage

Capacity = 86.96 MCM
Ayacut = 5,29,745 ha

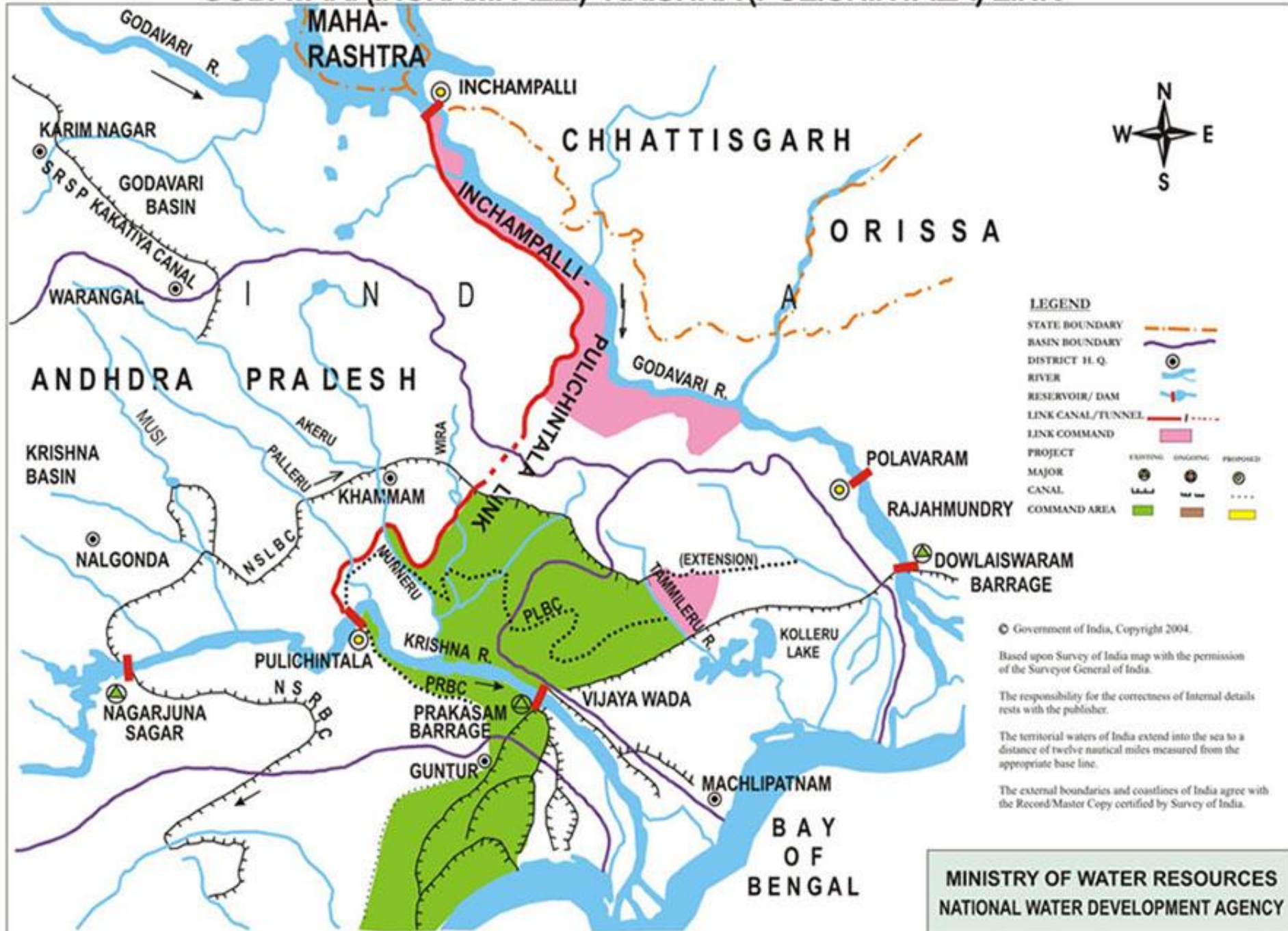
Completed Projects

THE KRISHNA CONUNDRUM

From perennial source to a thinning stream now...



GODAVARI (INCHAMPALLI)- KRISHNA (PULICHINTALA) LINK



LEGEND

- STATE BOUNDARY
- Basin Boundary
- District H. Q.
- RIVER
- RESERVOIR/ DAM
- LINK CANAL/TUNNEL
- LINK COMMAND
- PROJECT
- MAJOR CANAL
- COMMAND AREA

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The responsibility for the correctness of Internal details rests with the publisher.

The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line.

The external boundaries and coastlines of India agree with the Record Master Copy certified by Survey of India.

**MINISTRY OF WATER RESOURCES
NATIONAL WATER DEVELOPMENT AGENCY**

Jurala project



Srisaïlam Dam



Nagarjun Sagar Dam



Nagarjuna Sagar Reservoir



Pulichinthala Project



Prakasham Barrage



Thank you

Every Drop Counts.....

Take care of Water!