MONITORING OF IWMP WATERSHED PROJECTS USING GEO-INFORMATION

SUMMARY REPORT

IWMP-Batch-V

EAST GODAVARI -08/2013-14
Andhra Pradesh

Submitted to NRSC, Balanagar, Hyderabad
January-2022

T 0 - T 1 - T 2 - T 3 - T 4 - T 5

AGRICULTURE & SOIL DIVISION
Andhra Pradesh Space Applications Centre (APSAC)
ITE&C Department Govt. of Andhra Pradesh

RURAL DEVELOPMENT AND WATERSHED MONITORING DIVISION
Land Resources and Land Use Mapping and Monitoring Group,
Remote Sensing Application Area,
National Remote Sensing Centre, ISRO

DEPARTMENT OF LAND RESOURCES
Ministry of Rural Development
Government of India

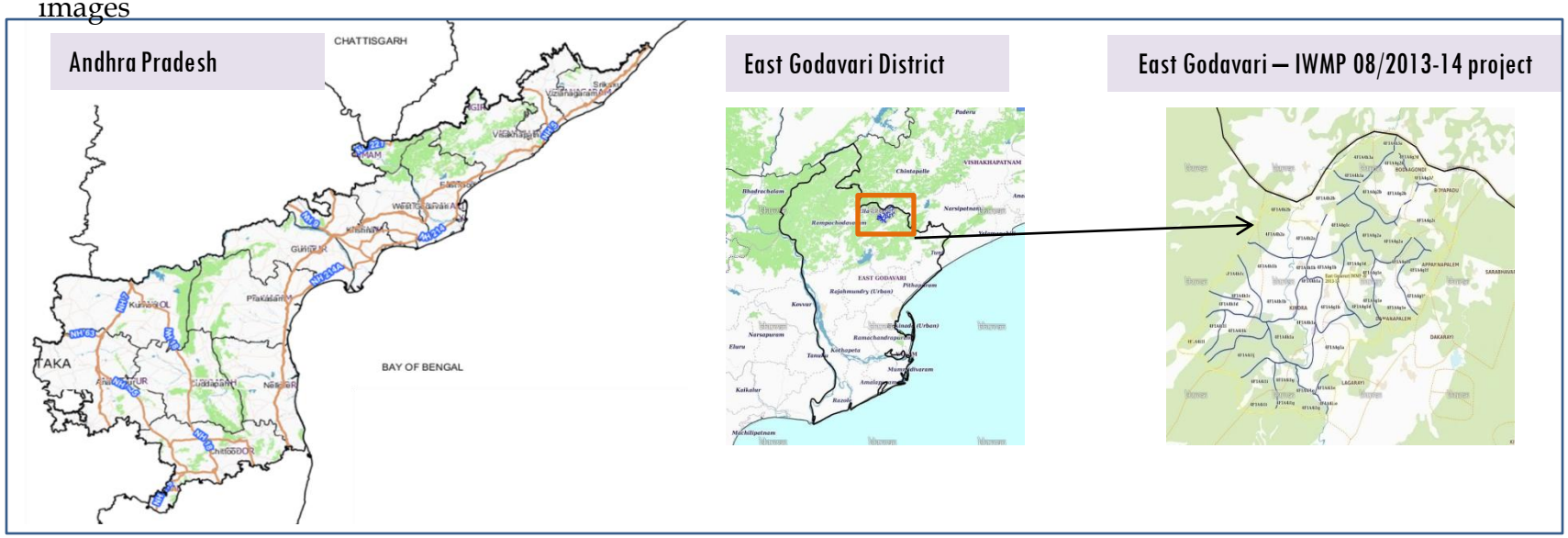
CONTENTS

EXECUTIVE SUMMARY

- Integrated Watersheds Management Project (IWMP) is a flagship programme of Department of Land Resources (DoLR), Ministry of Rural Development (MRD).
- National Remote Sensing Centre (NRSC), ISRO has designed and developed Bhuvan Geo-ICT Web portal tools namely – Srishti and Drishti for monitoring and evaluation of IWMP watersheds. It uses high spatial and temporal resolution sensors viz., Carto-1/2(2.5 m) , LISS-IV(5.8 m color).
- Current summary report gives details of Project – IWMP-08/2013-14, East Godavari District of Andhra Pradesh. The total geographical area of the project is 9,669 ha. It comprises of 23 micro watersheds.
- In the project area 53 Drishti photos were uploaded showing check dams/Rock fill dam, livelihood activities, and remaining showing other activities.
- Water bodies have shown an increased by 49 ha , which correspond to the other land use classes that have been converted into various water bodies in this period.
- Major percentage i.e. 27.4 % is covered by the agriculture, 33.3 % is covered by forest, 9.8 % is covered by scrubland and remaining by other land use classes.

PROJECT : EAST GODAVARI - IWMP-08/2013-14
DISTRICT : EAST GODAVARI , STATE : ANDHRA PRADESH

- The study area falls in Rajavommangi Mandal of East Godavari district of Andhra Pradesh state. The total geographical area of the project is 9,669 ha. It comprises of 23 micro watersheds. Location Map of the study area is shown in Figure below. Analysis is done for 2013-14 (T0) period (***Batch -1***) projects taking 2021-22 (T5) period satellite images



- The Climate is Comparatively moderate throughout the year except during the months of April to June when the temperature reaches a maximum of 48 deg. Centigrade.

- The normal rainfall of the district is 1280 mm. More than half of the rainfall is brought by south-west monsoon while a large portion of the rest of the district receives rainfall from the North-East Monsoon also, during October and November.

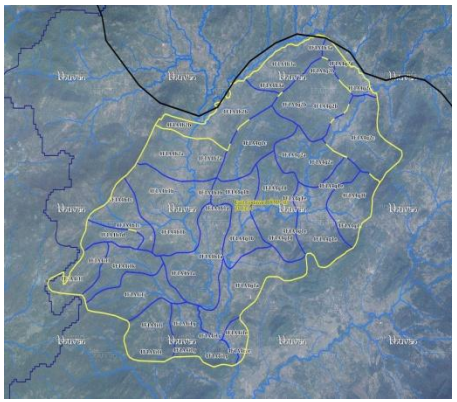
Satellite Data and Ancillary Data

Satellite data*	T0-A**	T0-B**	T5
	2013-14	2011-12	2021-22
LISS IV	2013-14		
SCENE 1			6-Jan-22
SCENE2			
SCENE 3			
SCENE 4			
CARTO	2013-14		
SCENE 1			6-Jan-22
SCENE2			
SCENE 3			
SCENE 4			

Ancillary Data

	Category	Sub category	Status
1	Thematic maps		
	LULC (1: 10 000)		
		DRAIANGE	YES
		SETTLEMENT	YES
		ROADS/RAILS	No
	LULC (1: 50 000)		
		2005-06	
		2008-09	
2	Activity Plan Maps		
3	Drishti Photographs		
		Total	53
4	Detailed Project Report		

Natural Color Composite overlaid with Project boundaries and high detail stream network



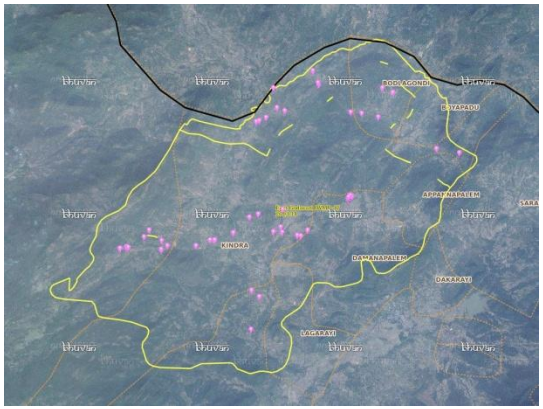
Legend

Drainage (1:10000 Scale)

MWS Boundary

Project Boundary

Natural Color Composite overlaid with Drishti Points



Drishti Upload Status

Classification of the Activities

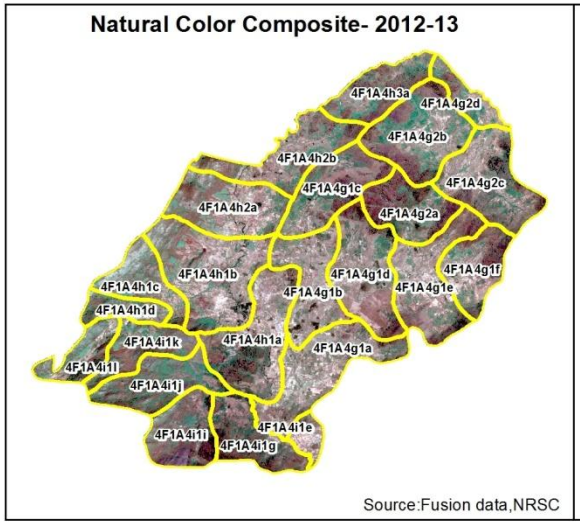
Sr. No	Activity	Drishti Photo	Visible on satellite
1	Afforestation	0	0
2	Horticulture	0	0
3	Agriculture	0	0
4	Pasture	0	0
5	Trench	0	0
6	Field Bunds	0	0
7	Terrace	0	0
8	Checks & Plugs	3	3
9	Gabion structure	0	0
10	Farm ponds/Dug out pit	0	0
11	Civil work-Check dams/Rock fill dam	4	4
12	Nallah Bunds/Drainage treatment	0	0
13	Percolation tanks / Ground water recharge structure	0	0
14	Production System and Micro-Enterprises	1	1
15	Livelihood Activities-Plantation/Horticulture	0	0
16	Capacity Building Activities	0	0
17	Entry Point Activity	12	12
18	Others	33	33
	TOTAL	**53**	**53**

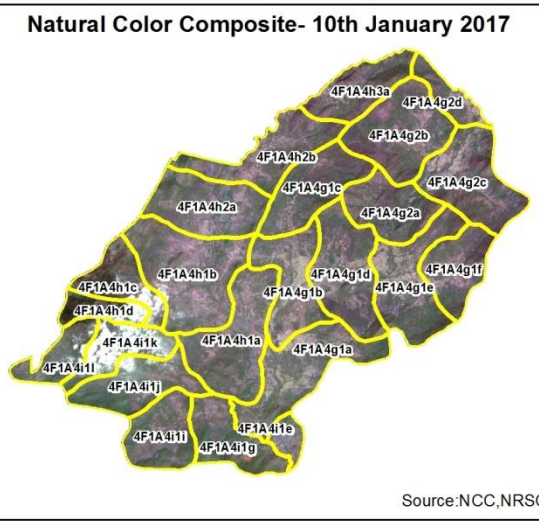
MONITORING IN THE PROJECT AREA

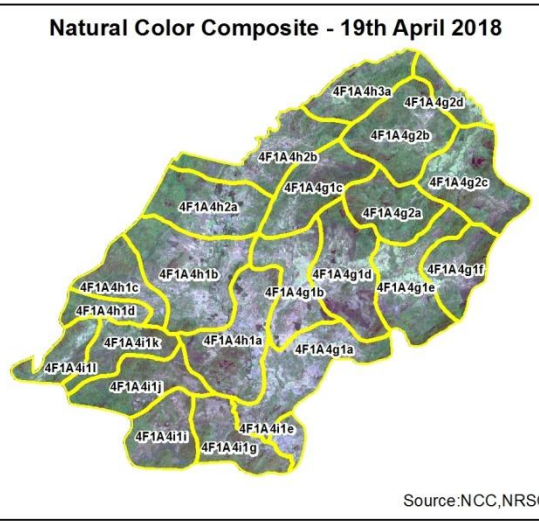
Site Wise Changes in the Project

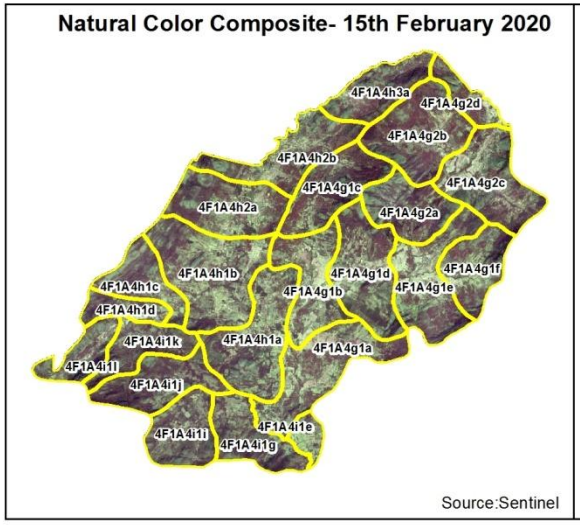
- Impacts of the activities carried out are presented through combination of Drishti and Srishti captures.
- T0 is the baseline period before implementation (2013-14) and T5 is 2021-22 period for monitoring.
- Captures are also provided wherever changes are observed in satellite images, that may match expected activity related impact, even though they don't have Drishti report yet.

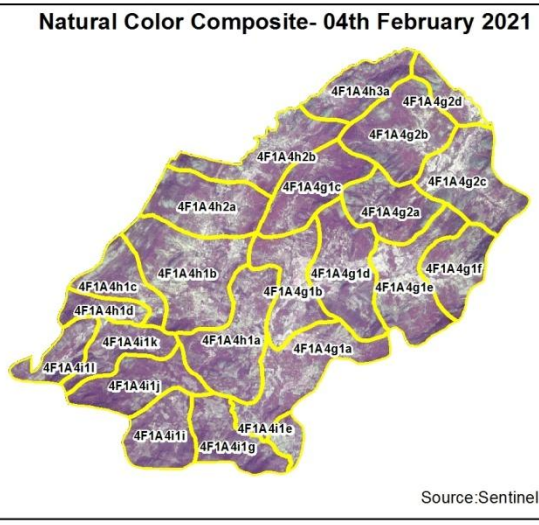
Natural Colour Composite (NCC)

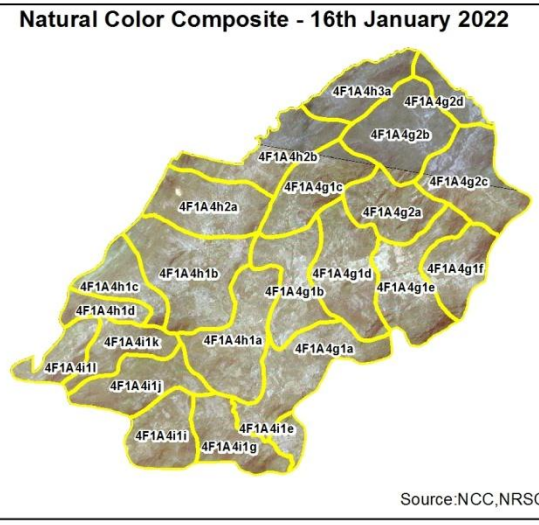












T0 Satellite data 2013

T1 Satellite data 2015

T2 Satellite data 2016

T3 Satellite data 2017

T4 Satellite data 2018

T5 Satellite data 2020

Drishti Id. 1704995

Horticulture

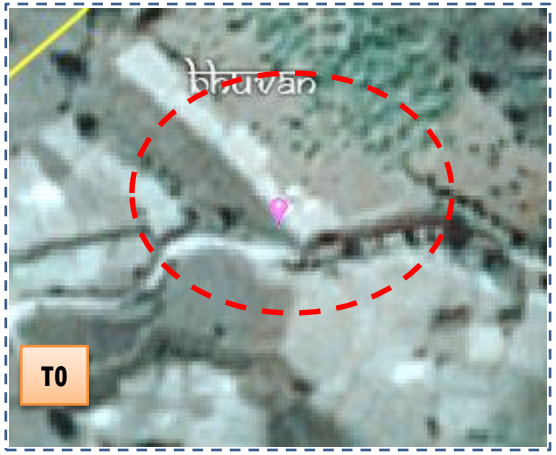
Monitoring of activities in East Godavari Dt Andhra Pradesh. IWMP-08/2013-14

T0:2013-14

T1: 08 March 2018

Drishti Sl no. 7080474 MWS : 4F1A4h1c

Percolation tank



T0:2013-14

T1: 08 March 2018

Drishti Sl no. 1772492 MWS : 4F1A4h3a

Percolation tank

Monitoring of activities in East Godavari Dt Andhra Pradesh. IWMP-08/2013-14

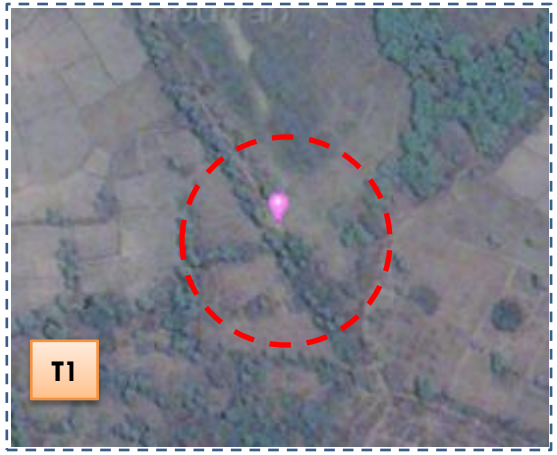
T0:2013-14

T1: 08 March 2018

Drishti Sl no. 7024603 MWS : 4F1A4g2b

Percolation tank

T0:2013-14



T1: 08 March 2018

Drishti Sl no. 1857605 MWS : 4F1A4g1d

Percolation tank

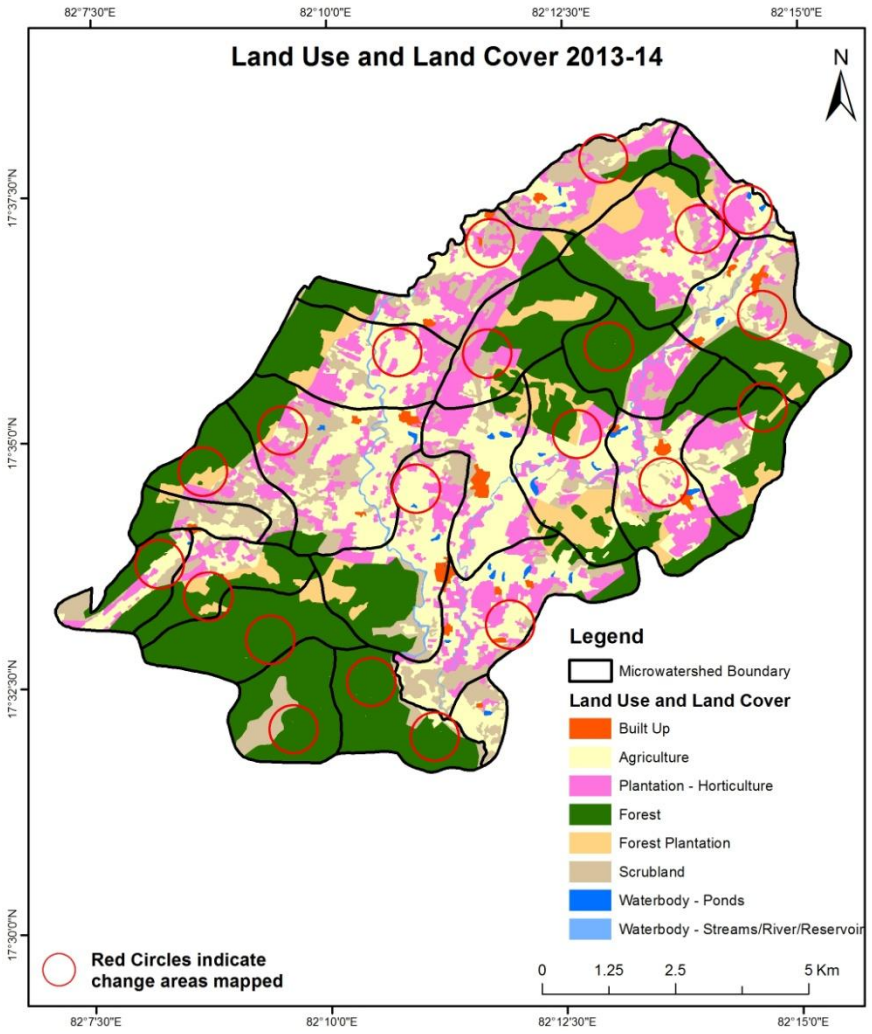
MONITORING IN THE PROJECT AREA

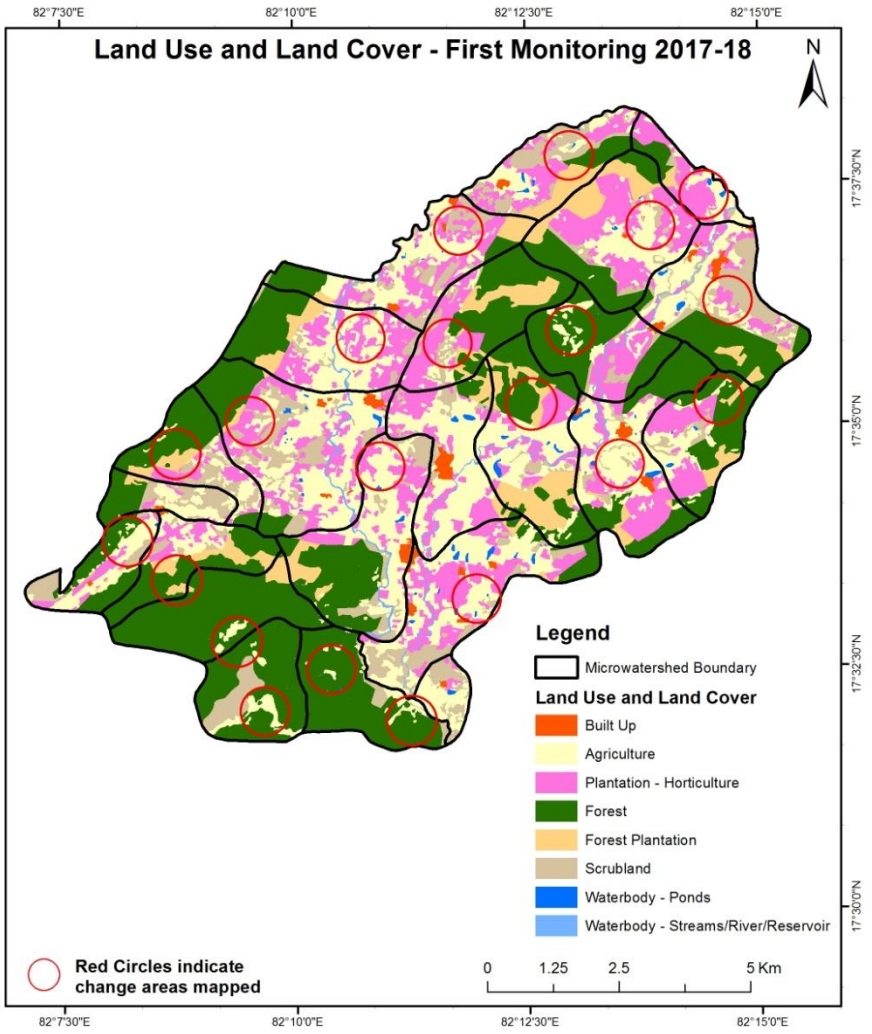
Land use and Land cover Changes in the Project

- Change in land use and land cover form T0 to T5 are analyzed in terms of built up, mining/dump, agriculture, plantation- horticulture, forest, barren rocky waterbody-streams/river/reservoir and waterbody –ponds.
- Captures are also provided wherever changes are observed in satellite images, that may match expected activity related impact, even though they don't have Drishti report yet.
- The result obtained for the period T0 to T5 are given in the change matrix table.
- In matrix table column represents the T0 (2013-14) and row represents the T5 (2021-22)

Comparative assessment of Land Use and Land Cover for Pre and Post IWMP implementation (2013-14 to 2017-18)

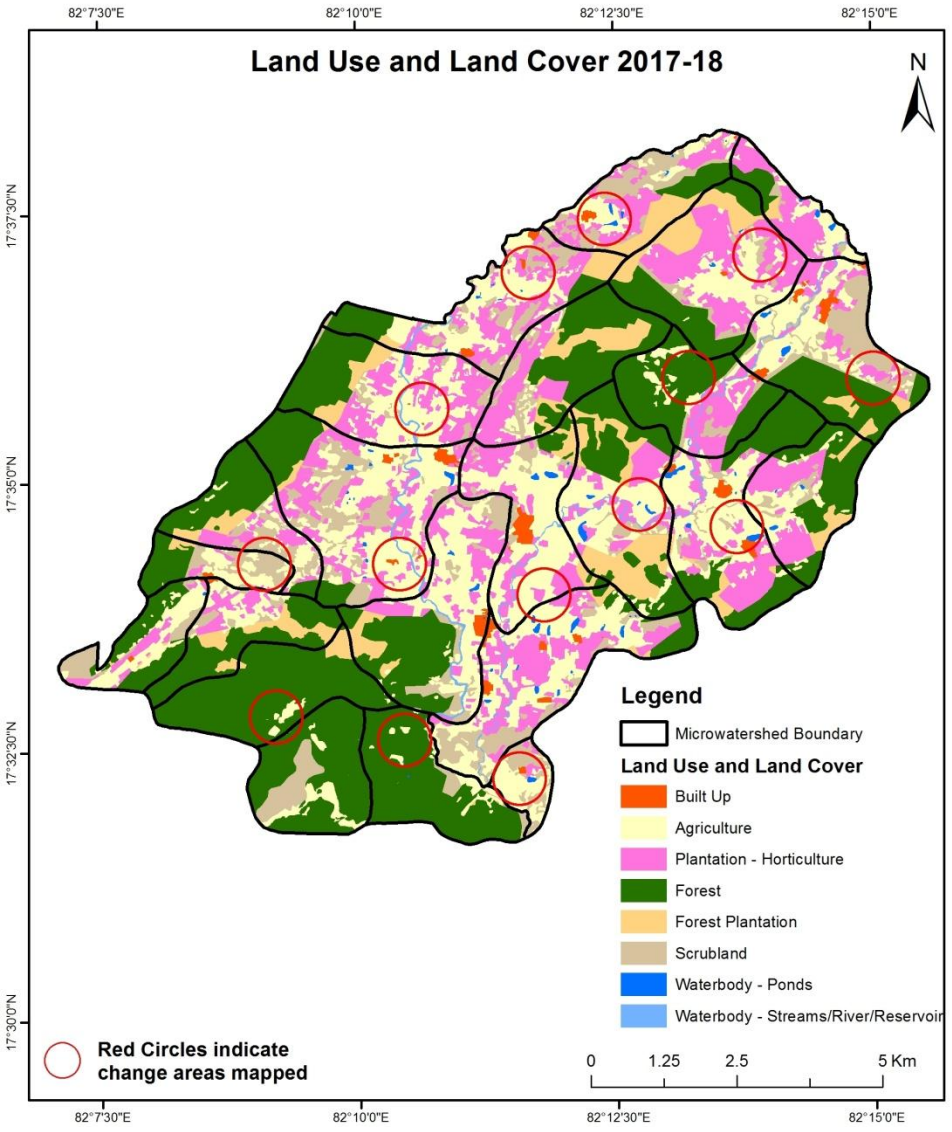
Scale: 1:10000

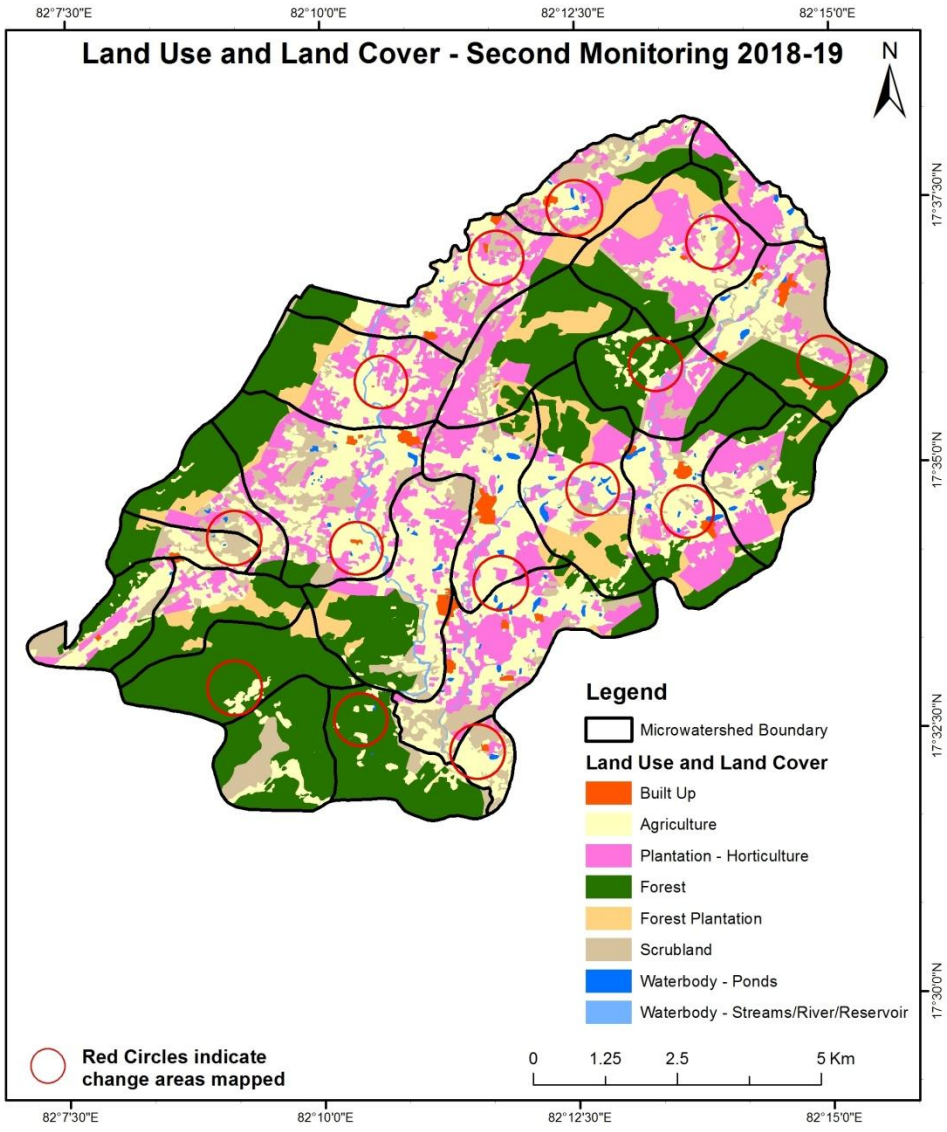




Comparative assessment of Land Use and Land Cover for Pre and Post IWMP implementation (2017-18 to 2018-19)

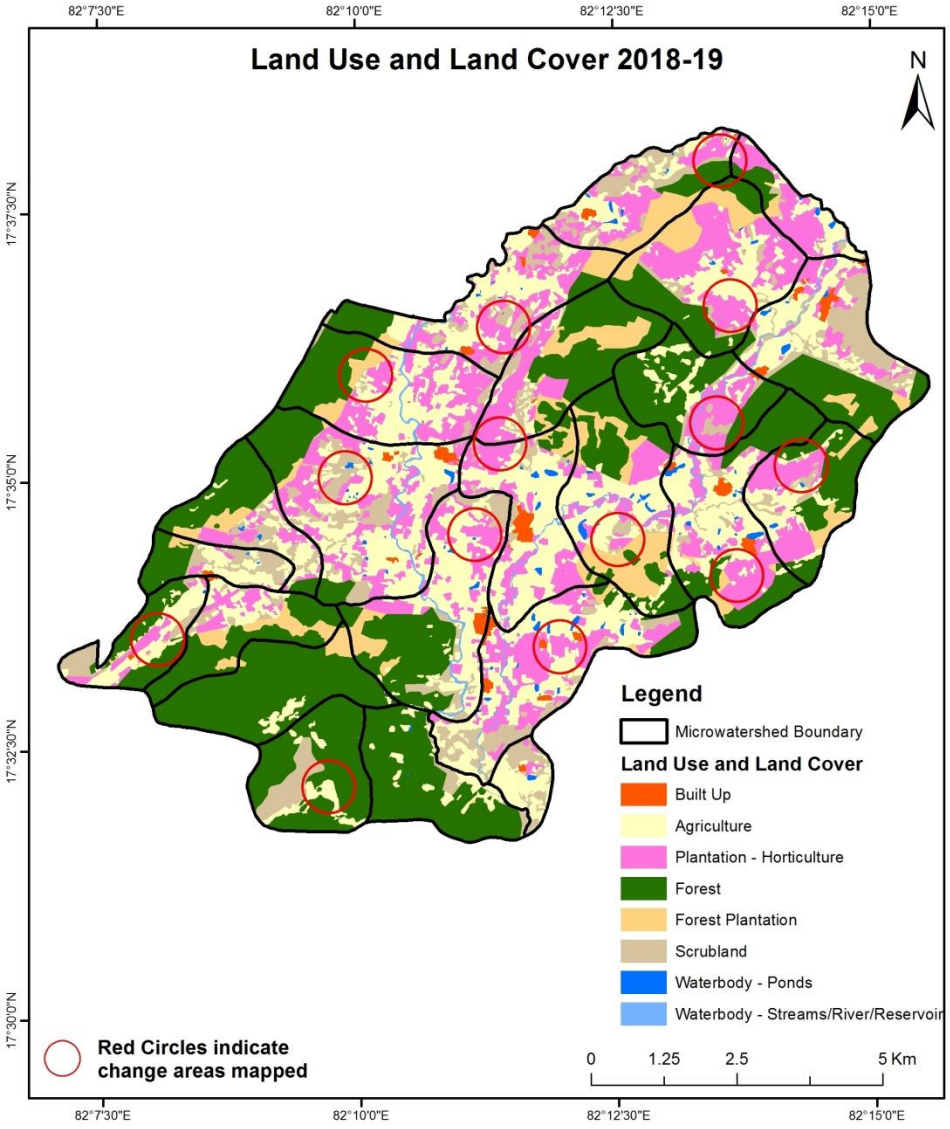
Scale: 1:10000

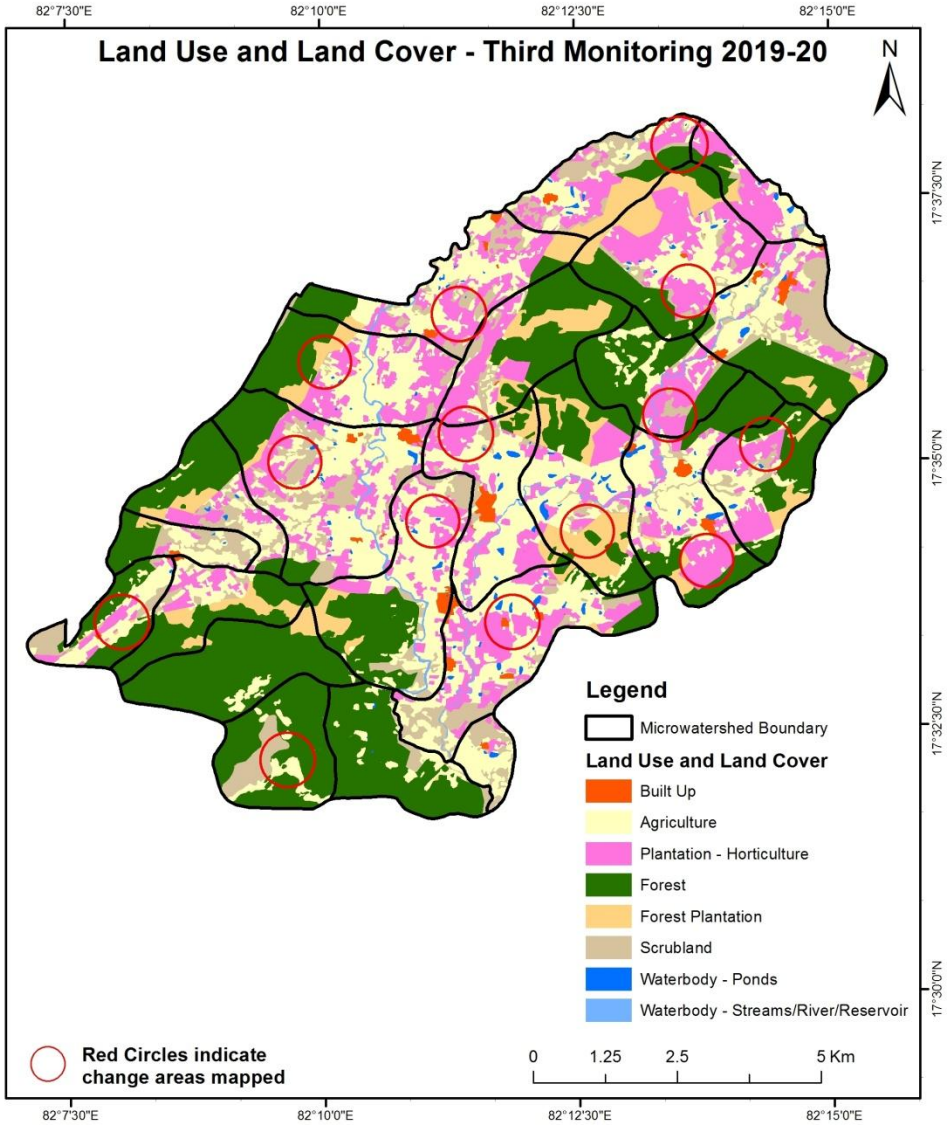




Comparative assessment of Land Use and Land Cover for Pre and Post IWMP implementation (2018-19 to 2019-20)

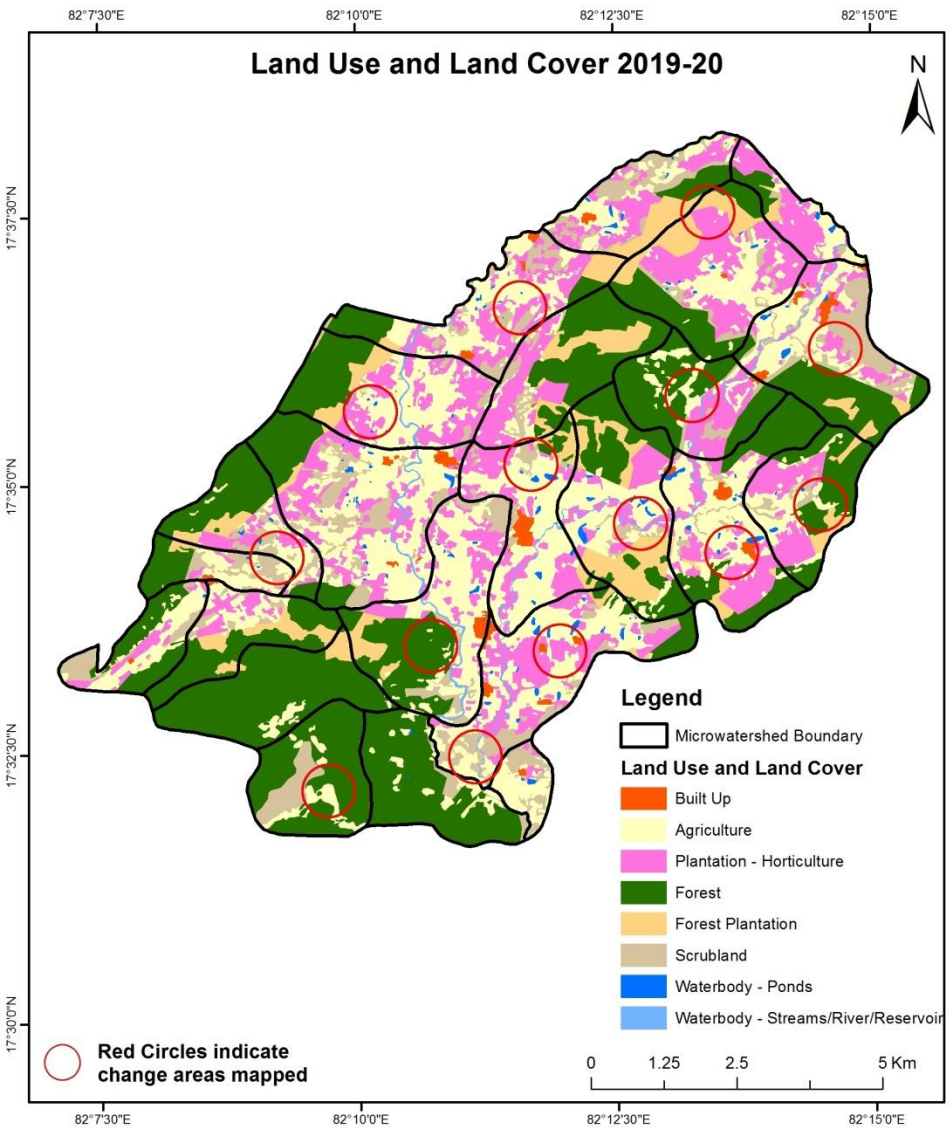
Scale: 1:10000

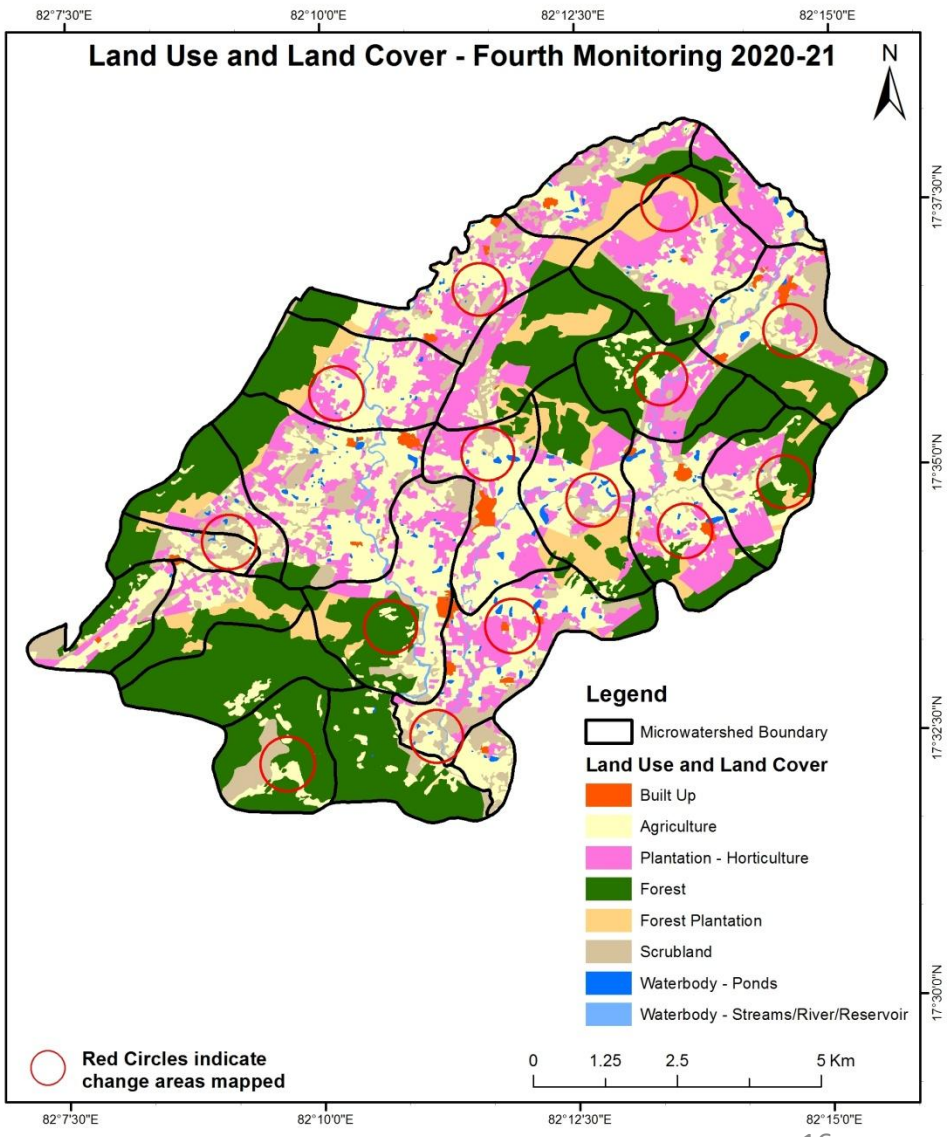




Comparative assessment of Land Use and Land Cover for Pre and Post IWMP implementation (2019-20 to 2020-21)

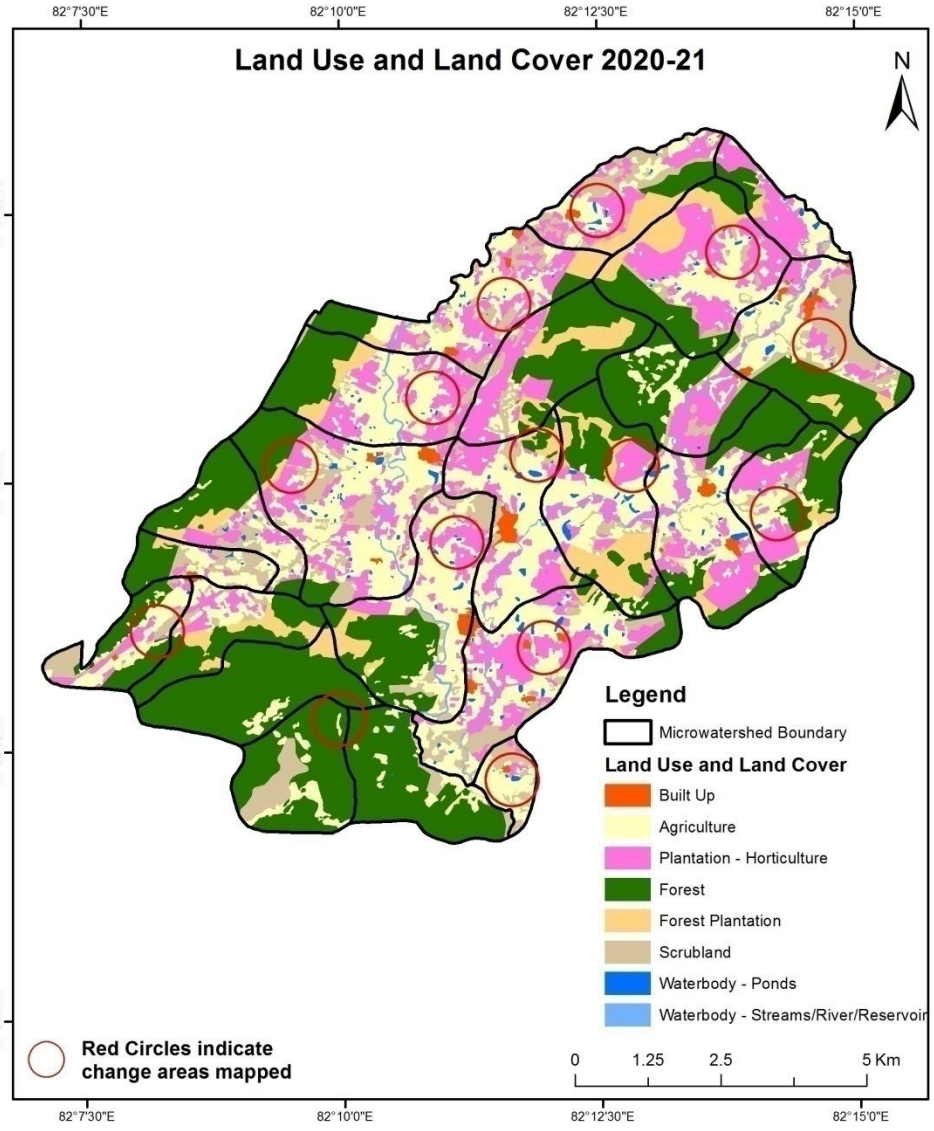
Scale: 1:10000

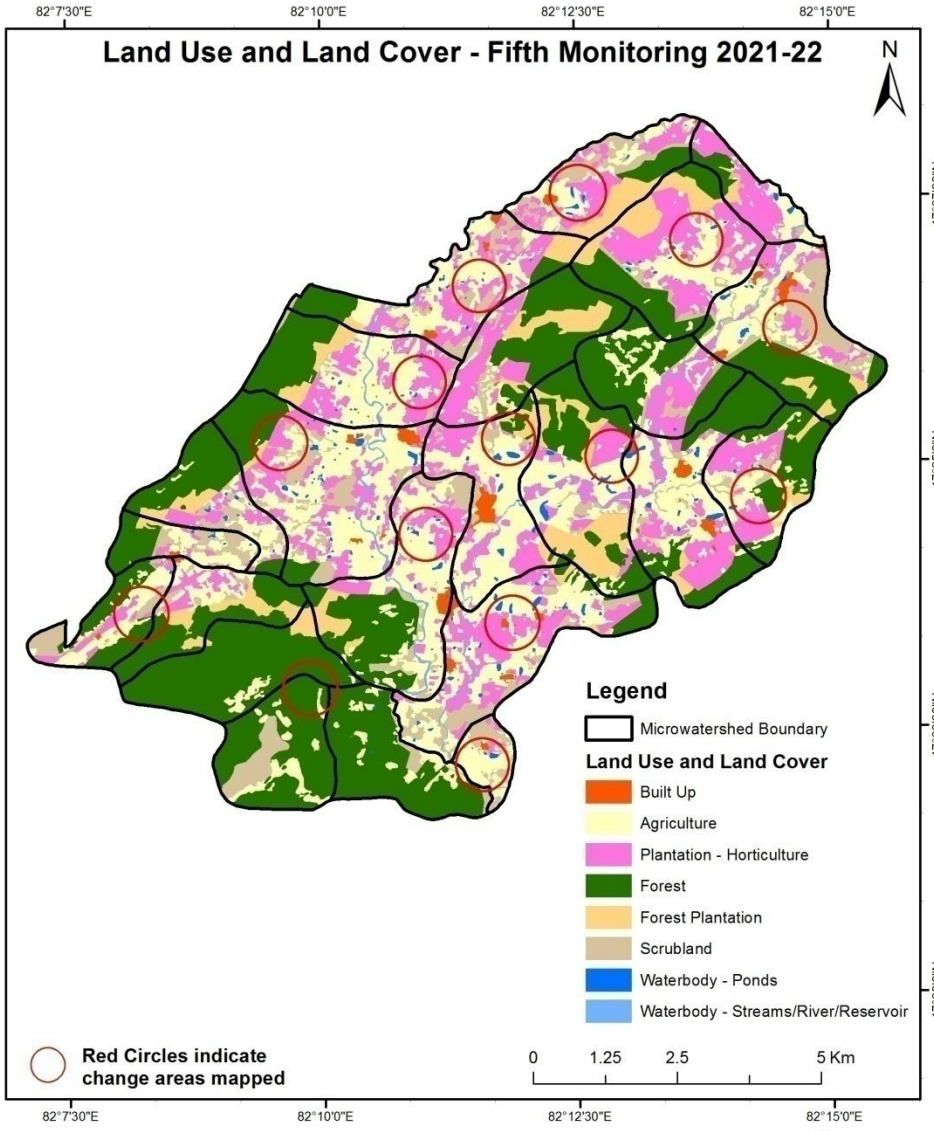




Comparative assessment of Land Use and Land Cover for Pre and Post IWMP implementation (2020-21 to 2021-22)

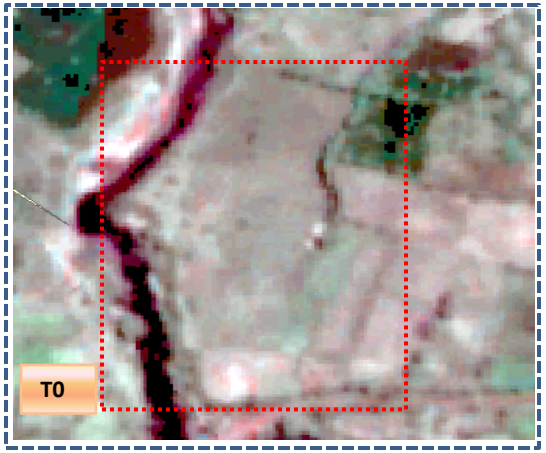
Scale: 1:10000



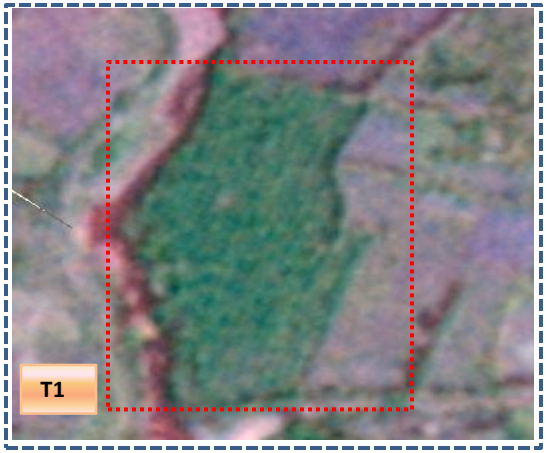


Land Use and Land Cover changes for Pre and Post treatment dates

Agriculture to Plantation

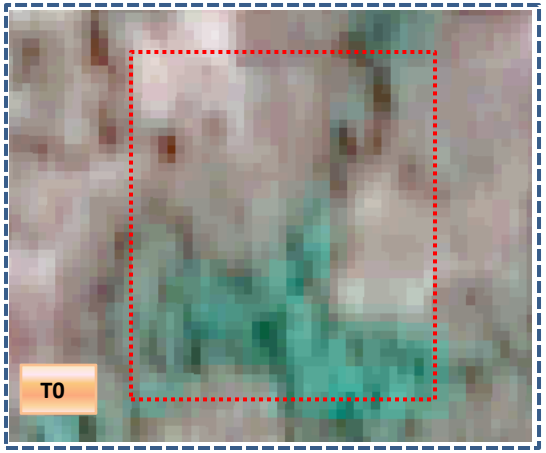


T0: 2013-14 (82°10'37.993"E 17°33'58.01"N)

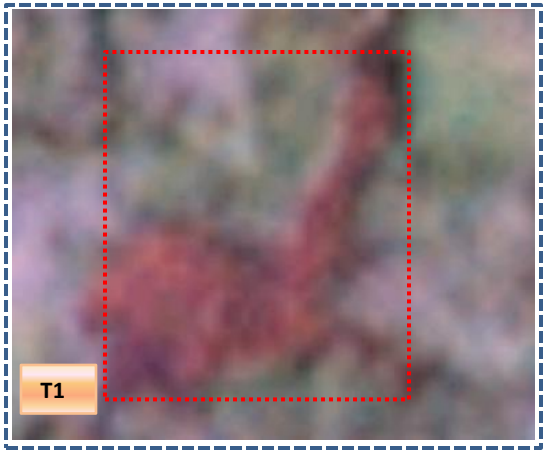


T1: 06 January 2018

Agriculture to Water body



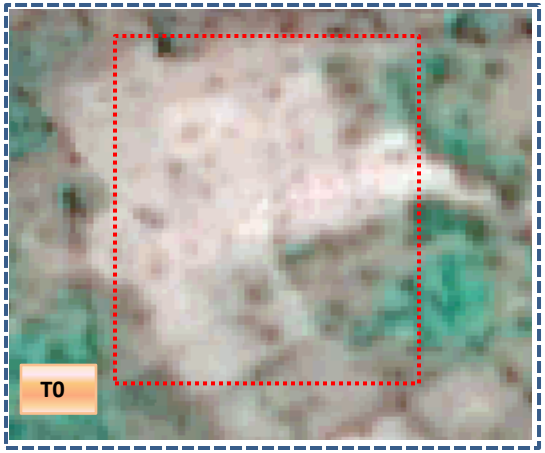
T0: 2013-14 (82°10'37.993"E 17°33'58.01"N)

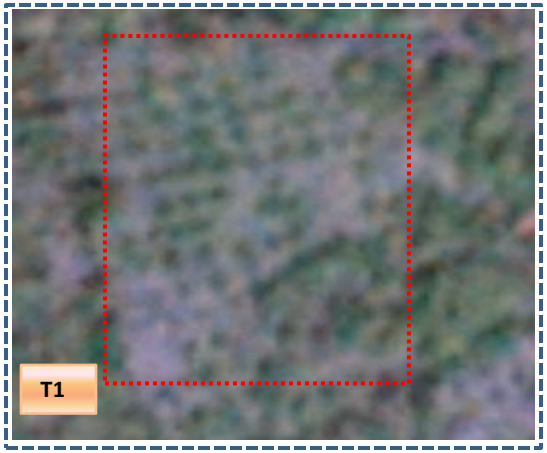


T1: 06 January 2018

Land Use and Land Cover changes for Pre and Post treatment dates

Agriculture to Plantation

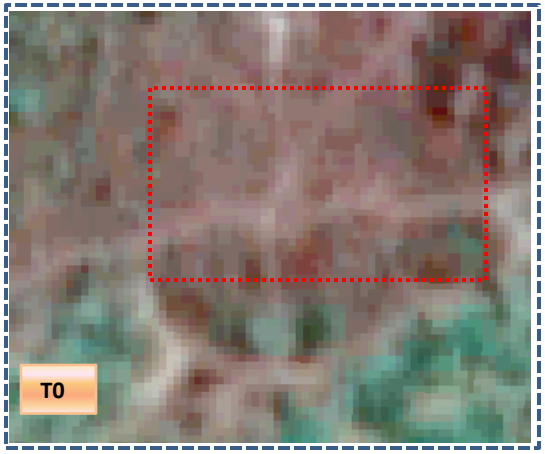


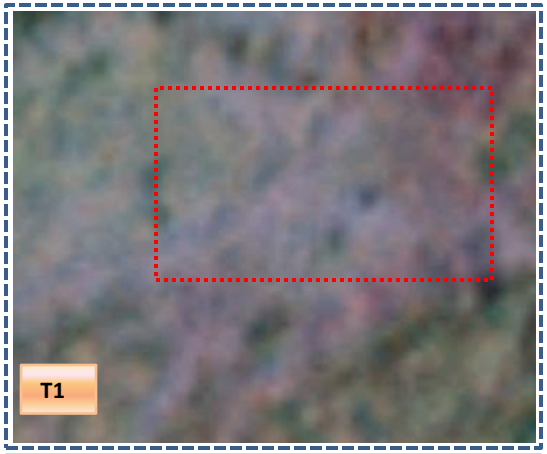


T0: 2013-14 (82°14'2.613"E 17°37'22.052“N)

T1: 06 January 2018

Scrubland to Agriculture





T0: 2013-14 (82°14'8.918"E 17°35'9.299"N)

T1: 06 January 2018

Table showing change matrix depicting Land cover transitions during study period-2013-14 to 2017-18

Land cover	Monitoring period (T1)										Units in Hectares
T0	Built up	Mining/ dump	Agriculture	Plantation Horticulture	Forest	Forest Plantation	Barren Rocky	Scrub	Waterbody-Streams/River	Water body Ponds	Grand Total
Built up	99.32										**99.32**
Mining/dump											
Agriculture	4.02		2036.39	210.14						8.94	**2259.50**
Plantation Horticulture	0.60		44.06	1707.92						0.72	**1753.30**
Forest			146.21		3318.37	44.59				0.29	**3509.46**
Forest Plantation			3.02			624.94				0.17	**628.14**
Barren Rocky											
Scrub	0.09		199.40					1103.84		1.28	**1304.61**
Waterbody-Streams/River									81.23		**81.23**
Waterbody – Ponds										33.94	**33.94**
Grand Total	**104.03**		**2429.08**	**1918.06**	**3318.37**	**669.53**		**1103.84**	**81.23**	**45.35**	**9669.51**

• In matrix table diagonal elements represent the both periods in the same class and off diagonal elements represents the changes in between the classes.

• In T0 223 ha of the agriculture area has decreased and it is converted into Built-up, plantation and water body in T1.

• In T1 389 ha of the agriculture area has increased from plantations, forest, forest-plantation and scrubland of T0. The additional agriculture are coming from waterbody in T1 represents seasonal agriculture.

Table showing change matrix depicting Land cover transitions during study period-2017-18 to 2018-19

Land cover	Monitoring period (T2)										Units in Hectares
T1	Built up	Mining/ dump	Agriculture	Plantation Horticulture	Forest	Forest Plantation	Barren Rocky	Scrub	Waterbody-Streams/River	Water body Ponds	Grand Total
Built up	104.03										**104.03**
Mining/dump											
Agriculture	0.11		2395.91	23.34						9.73	**2429.08**
Plantation Horticulture	0.05		9.00	1908.55						0.46	**1918.06**
Forest			49.32		3265.01	3.70				0.34	**3318.37**
Forest Plantation			0.06			669.47					**669.53**
Barren Rocky											
Scrub	0.32		87.65					1013.73		2.14	**1103.84**
Waterbody-Streams/River									81.23		**81.23**
Waterbody – Ponds										45.35	**45.35**
Grand Total	**104.51**		**2541.95**	**1931.89**	**3265.01**	**673.17**		**1013.73**	**81.23**	**58.01**	**9669.51**

- In matrix table diagonal elements represent the both periods in the same class and off diagonal elements represents change in between the classes.
- In T1 33 ha of the agriculture area has decreased and it is converted into Built-up, plantations, scrub and water body in T2.
- In T2 145 ha of the agriculture area has increased from plantations, forest, forest-plantations and scrubland of T1
- The additional agriculture are coming from waterbody in T2 represents seasonal agriculture.

Table showing change matrix depicting Land cover transitions during study period-2018-19 to 2019-20

Land cover	Monitoring period (T3)										Units in Hectares
T2	Built up	Mining/ dump	Agriculture	Plantation Horticulture	Forest	Forest Plantation	Barren Rocky	Scrub	Waterbody-Streams/River	Water body Ponds	Grand Total
Built up	104.51										**104.51**
Mining/dump											
Agriculture	0.41		2526.81	7.87						6.86	**2541.95**
Plantation Horticulture	0.13		36.42	1894.71						0.63	**1931.89**
Forest			10.38		3254.43	0.20					**3265.01**
Forest Plantation						673.17					**673.17**
Barren Rocky											
Scrub			20.33					992.90		0.51	**1013.73**
Waterbody-Streams/River									81.23		**81.23**
Waterbody – Ponds										58.01	**58.01**
Grand Total	**105.05**		**2593.94**	**1902.58**	**3254.43**	**673.37**		**992.90**	**81.23**	**66.01**	**9669.51**

- In matrix table diagonal elements represent the both periods in the same class and off diagonal elements represents change in between the classes.
- In T2 15 ha of the agriculture area has decreased and it is converted into Built-up, plantations and water body in T3.
- In T3 67 ha of the agriculture area has increased from plantations, forest & scrubland of T2.
- The additional agriculture are coming from waterbody in T3 represents seasonal agriculture.

Table showing change matrix depicting Land cover transitions during study period-2019-20 to 2020-21

Land cover	Monitoring period (T4)										Units in Hectares
T3	Built up	Mining/ dump	Agriculture	Plantation Horticulture	Forest	Forest Plantation	Barren Rocky	Scrub	Waterbody-Streams/River	Water body Ponds	Grand Total
Built up	105.05										**105.05**
Mining/dump											
Agriculture	1.77		2536.81	42.67						12.69	**2593.94**
Plantation Horticulture	0.20		32.71	1868.23						1.44	**1902.58**
Forest			9.75		3244.09	0.59					**3254.43**
Forest Plantation			9.34			664.03					**673.37**
Barren Rocky											
Scrub	1.04		27.69					961.87		2.29	**992.90**
Waterbody-Streams/River									81.23		**81.23**
Waterbody – Ponds										66.01	**66.01**
Grand Total	**108.07**		**2616.30**	**1910.89**	**3244.09**	**664.62**		**961.87**	**81.23**	**82.43**	**9669.51**

- In matrix table diagonal elements represent the both periods in the same class and off diagonal elements represents change in between the classes.
- In T3 57 ha of the agriculture area has decreased and it is converted into built-up, plantations and water body in T4.
- In T4 70 ha of the agriculture area has increased from plantations, forest, forest plantation and scrubland of T3.
- The additional agriculture are coming from waterbody in T4 represents seasonal agriculture.

Table showing change matrix depicting Land cover transitions during study period-2020-21 to 2021-22

Land cover	Monitoring period (T5)										Units in Hectares
T4	Built up	Mining/ dump	Agriculture	Plantation Horticulture	Forest	Forest Plantation	Barren Rocky	Scrub	Waterbody-Streams/River	Water body Ponds	Grand Total
Built up	108.07										**108.07**
Mining/dump											
Agriculture	5.47		2607.54	2.14						1.15	**2616.30**
Plantation Horticulture	1.02		11.41	1898.30						0.17	**1910.89**
Forest	0.05		20.59		3223.45						**3244.09**
Forest Plantation			4.71			659.89				0.01	**664.62**
Barren Rocky											
Scrub	0.48		10.90					949.87		0.62	**961.87**
Waterbody-Streams/River									81.23		**81.23**
Waterbody – Ponds	0.16		0.61							81.67	**82.43**
Grand Total	**115.24**		**2655.76**	**1900.44**	**3223.45**	**659.89**		**949.87**	**81.23**	**83.63**	**9669.51**

• In matrix table diagonal elements represent the both periods in the same class and off diagonal elements represents change in between the classes.

•In T4 08 ha of the agriculture area has decreased and it is converted into built-up, plantations and water body in T5.

•In T5 43 ha of the agriculture area has increased from plantations, forest, forest-plantations, scrubland and water body of T4.

• The additional agriculture are coming from waterbody in T5 represents seasonal agriculture.

Conclusion

1. DPR of the project is uploaded on to Bhuvan Portal.
2. The LULC shows that there is an increase in Crop land, Built up area, Reservoir / Tanks & decrease in Scrubland as presented in the change matrix for different years.
3. There is an decrease of 49.6 Hectares in Reservoir / Tanks area as compared between baseline LU/LC data 2013-14 (T0) & 2021-22 (T5) years.
4. There is an increase of 170, 112, 51, 22 & 39 Hectares from T0-T1, T1-T2, T2-T3, T3-T4 & T4-T5 respectively and overall increase of 396 Hectares in Crop land area as compared between baseline LU/LC data 2013-14 (T0) & 2021-22 (T5) years.
5. About **147 ha of the plantation/horticulture area has been increased** in during the monitoring period of 2013-14 (T0) to 2021-22 (T5) years.
6. There is a decrease of 354 Hectares in Scrubland area as compared between 2013-14 (T0) & 2021-22 (T5) years.
7. Farm ponds (09) is visible on IWMP Bhuvan Srishti portal out of Bhuvan Drishti photo of Farm ponds (09) verified from the portal.