

MONITORING OF IWMP WATERSHED PROJECTS USING GEO-INFORMATION SUMMARY REPORT

IWMP-Batch-V

VISAKHAPATNAM -07/2013-14

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

C O N T E N T S

- **EXECUTIVE SUMMARY**

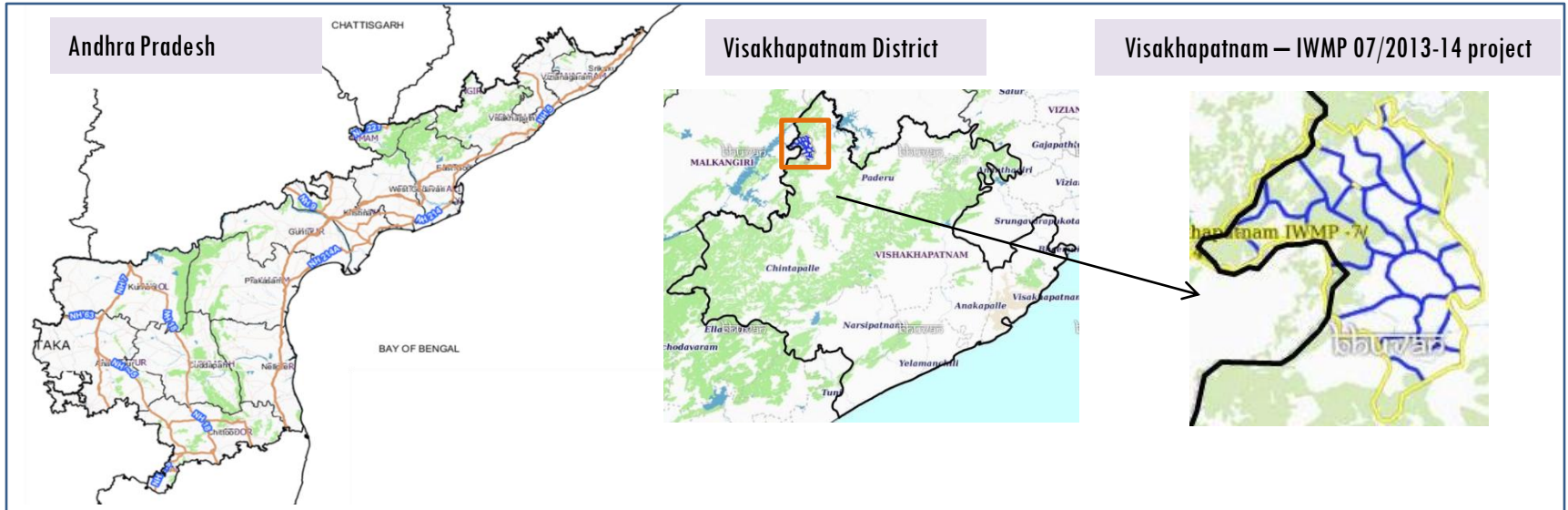
01. STUDY AREA
02. SATELLITE & ANCILLARY DATA INCLUDING DRISHTI STATUS
03. MONITORING IN THE PROJECT AREA : Site wise changes in the project
04. CONCLUSIONS

E X E C U T I V E S U M M A R Y

- 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-07/2013-14, Visakhapatnam District of Andhra Pradesh. The total geographical area of the project is 7,363 ha. It comprises of 21 micro watersheds.
- In the project area Drishti points were not uploaded in Bhuvan.
- Water bodies have shown an increased by 2.61 ha , which correspond to the other land use classes that have been converted into various water bodies in this period.
- Major percentage i.e. 33.8 % is covered by the agriculture, 31.08 % is covered by forest, 33.01 % is covered by scrubland and remaining by other land use classes.

PROJECT : VISAKHAPATNAM - IWMP-07/2013-14
DISTRICT : VISAKHAPATNAM , STATE : ANDHRA PRADESH

- The study area falls in Munchingiputtu Mandal of Visakhapatnam district of Andhra Pradesh state. The total geographical area of the project is 6,623 ha. It comprises of 21 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.



- Visakhapatnam has a tropical wet and dry climate. The annual mean temperature ranges between 24.7 °C to 30.6 °C, with the maximum in the month of May and the minimum in January; the minimum temperatures ranges between 20-27 °C.
- The climate of the district is varied and has differing climate conditions in different parts. Near the coast the air is humid and moist and relaxing, but gets warmer towards the interior and cools down in the hilly areas on account of elevation and dense vegetation.

Satellite Data and Ancillary Data

Satellite data*	T0-A**	T0-B**	T5
	2013-14	2011-12	2021-22
LISS IV	2013-14		
SCENE 1			10-Jan-22
SCENE2			
SCENE 3			
SCENE 4			
CARTO	2013-14		
SCENE 1			10-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	Drishiti Photographs		
		Total	0
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 Drishiti Points

No Drishiti Points Uploaded



Drishiti Upload Status

Classification of the Activities

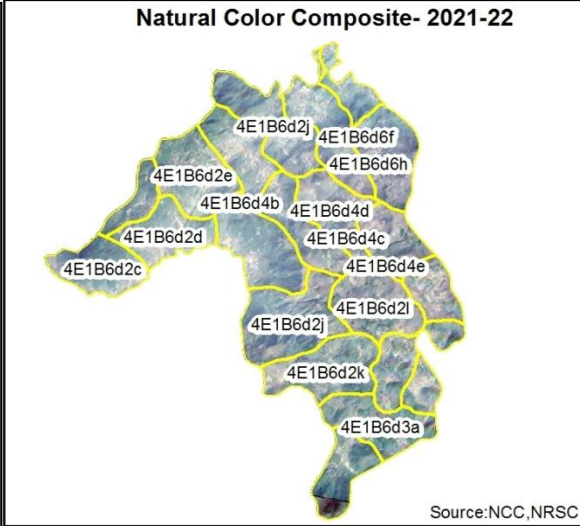
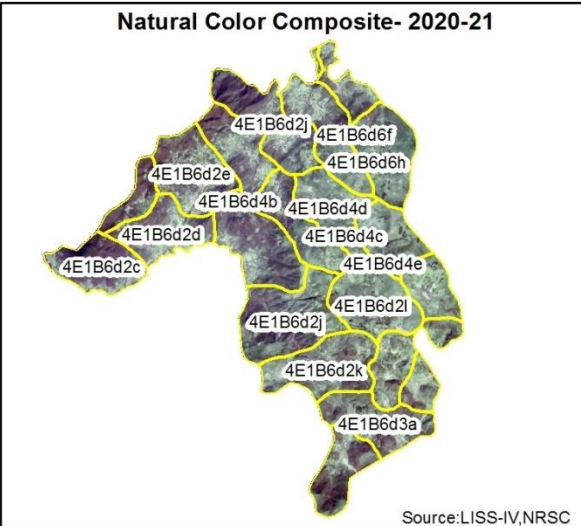
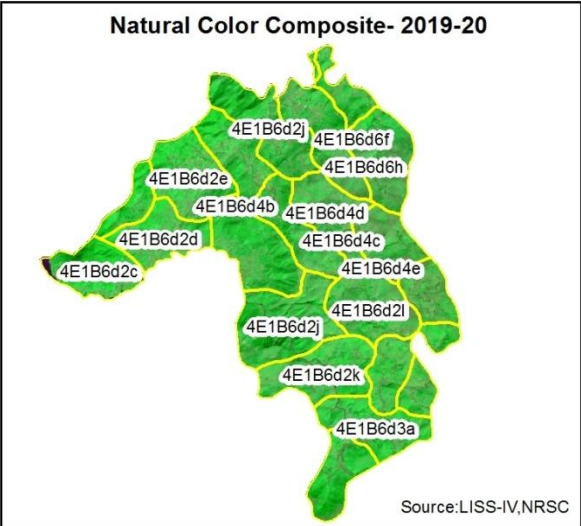
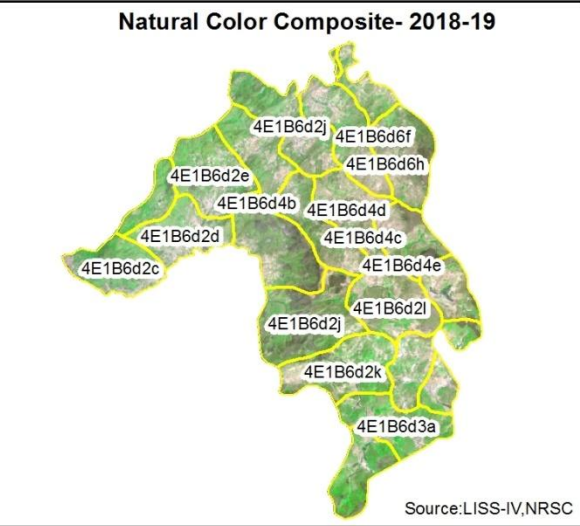
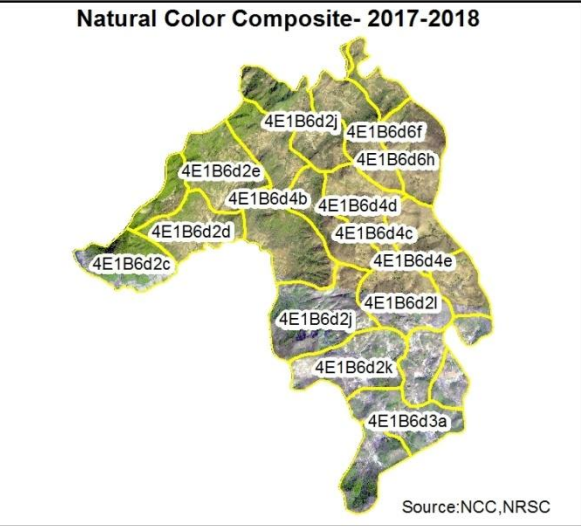
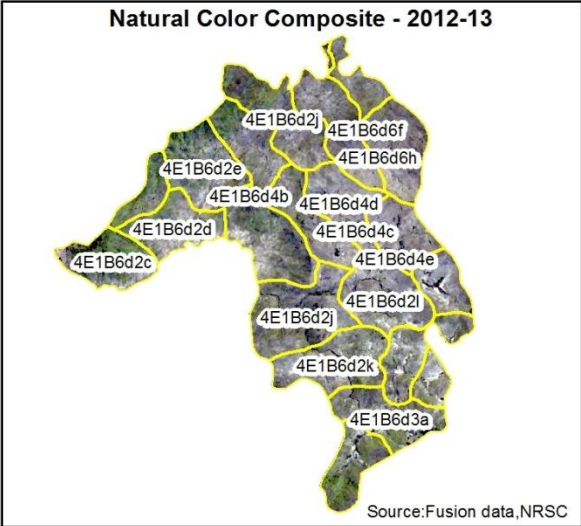
Sr. No	Activity	Drishti Photo	Visible on satellite
1	Afforestation	0	0
2	Horticulture	0	0
3	Agriculture	0	0
4	Pasture	0	0
5	Trench	0	0
6	Field Bunds	0	0
7	Terrace	0	0
8	Checks & Plugs	0	0
9	Gabion structure	0	0
10	Farm ponds/Dug out pit	0	0
11	Civil work-Check dams/Rock fill dam	0	0
12	Nallah Bunds/Drainage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

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)



Drishti points were not uploaded in Bhuvan

<p>T0</p>	<p>T1</p>	
<p>T0:</p>	<p>T1:</p>	<p>Drishti Sl no MWS :</p>
<p>T0</p>	<p>T1</p>	
<p>T0:</p>	<p>T1:</p>	<p>Drishti Sl no. MWS :</p>

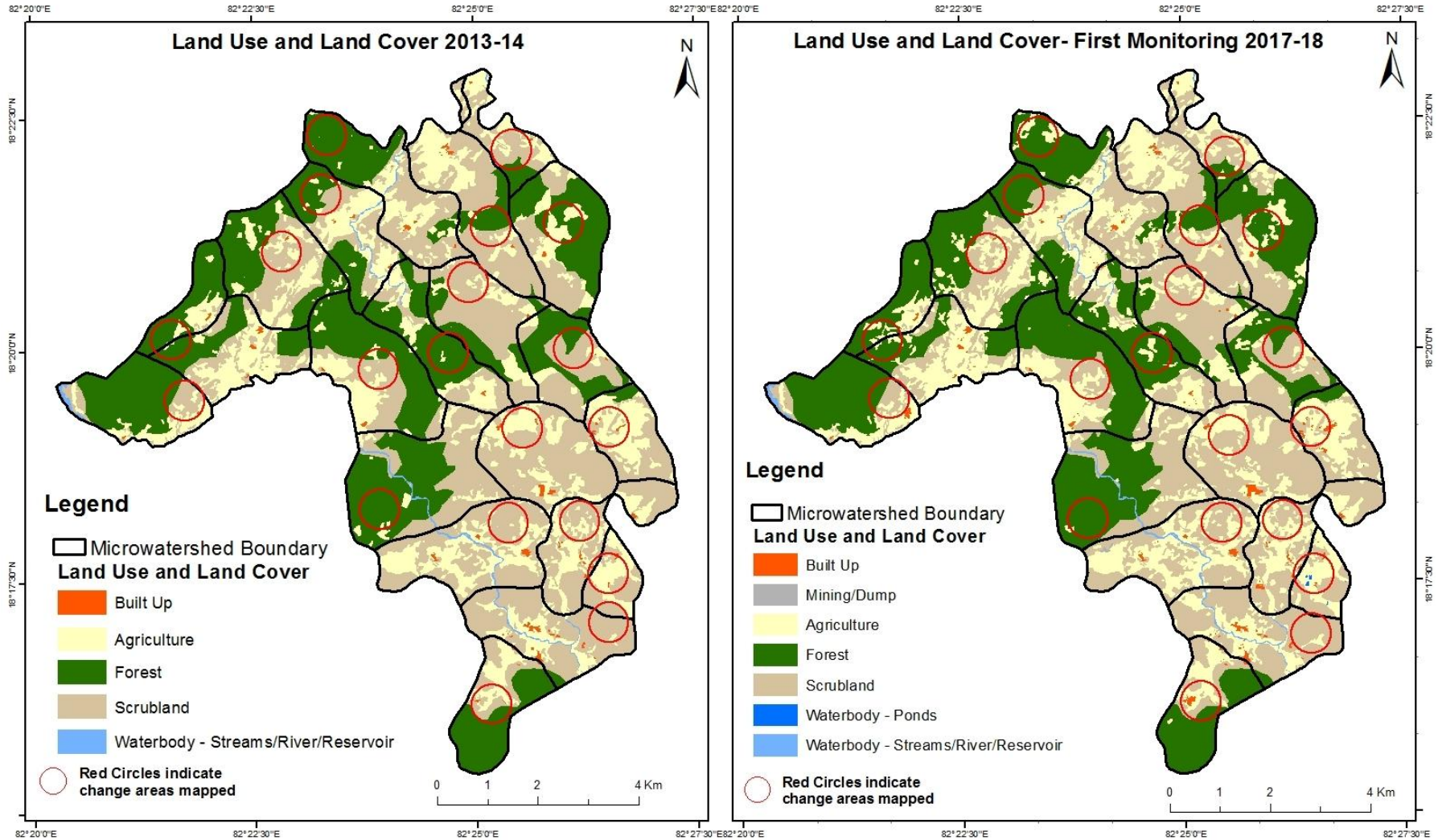
MONITORING IN THE PROJECT AREA

Land use and Land cover Changes in the Project

- Change in land use and land cover from 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)

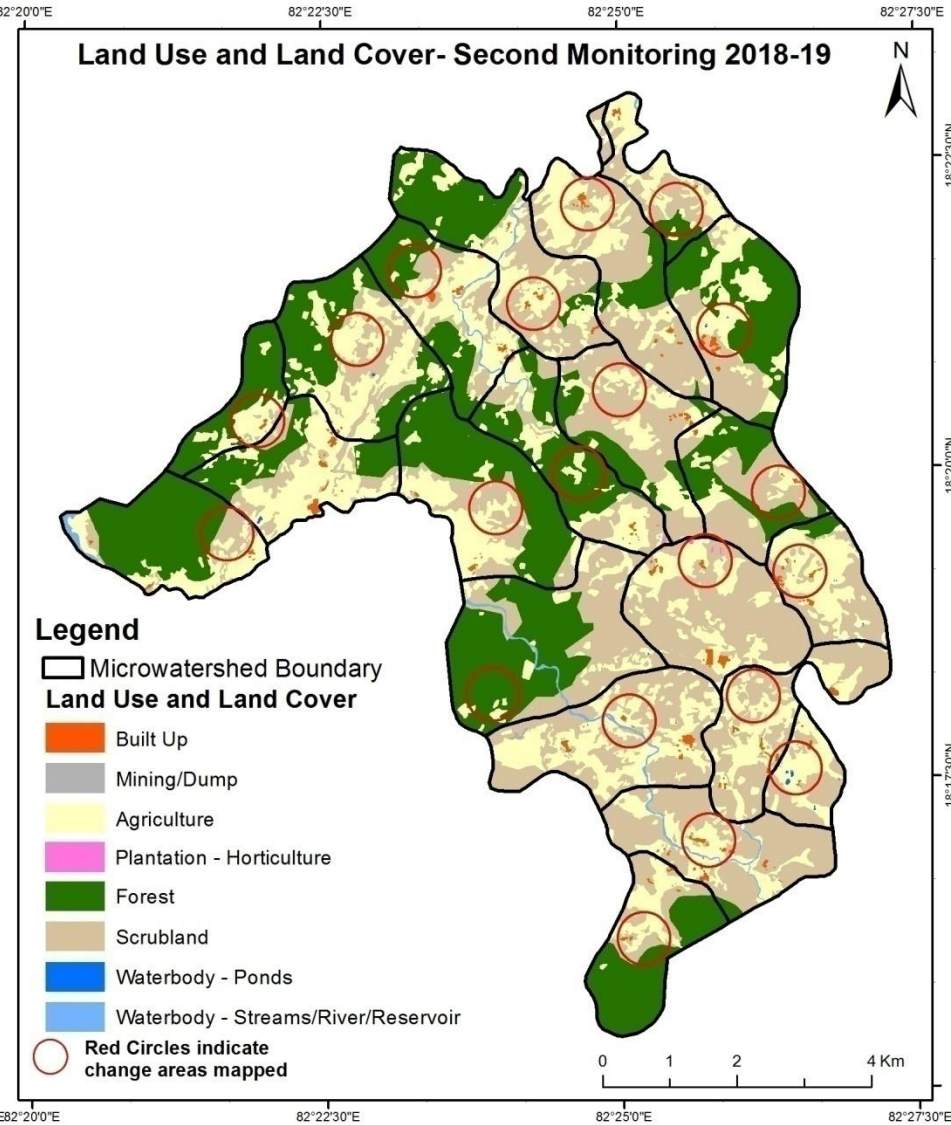
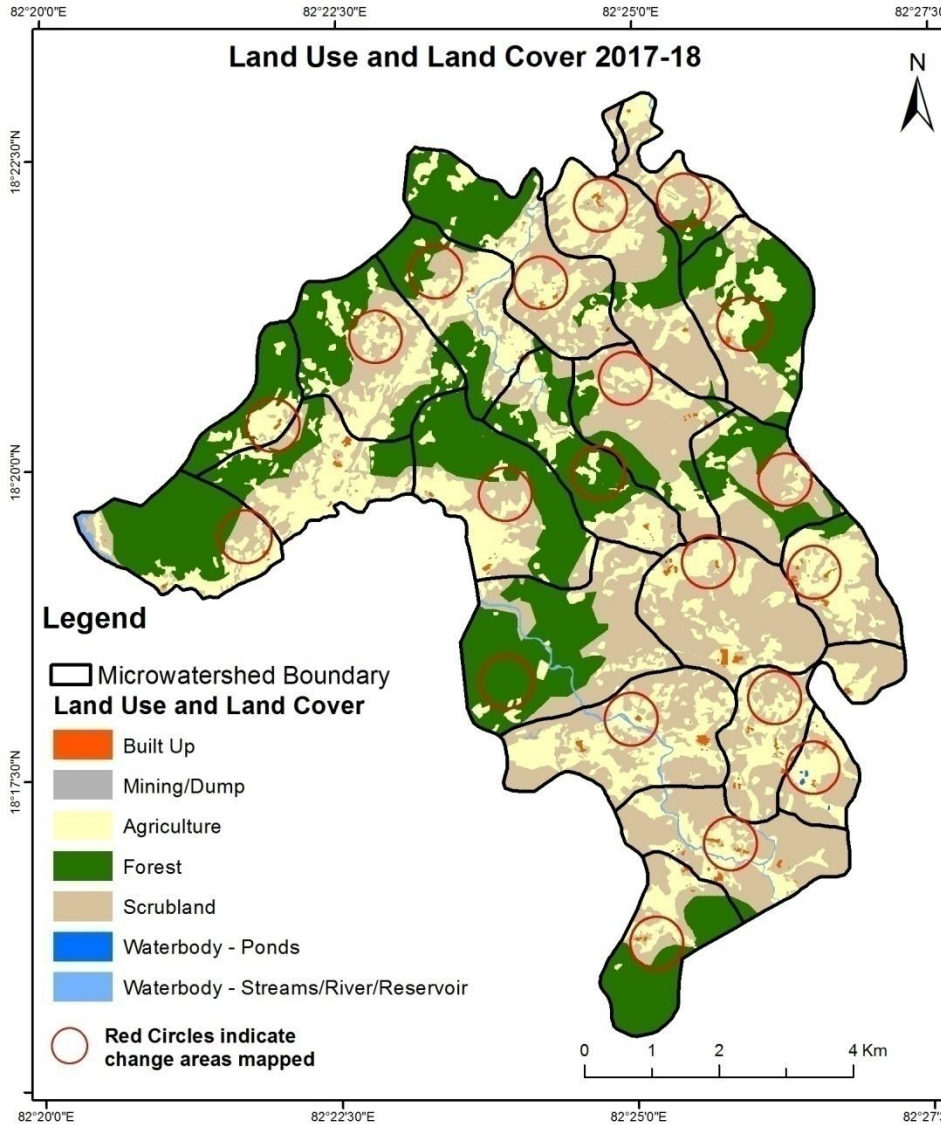
Comparative assessment of Land Use and Land Cover for Pre and Post IWMP implementation (2013-14 to 2017-18)

Scale: 1:10000



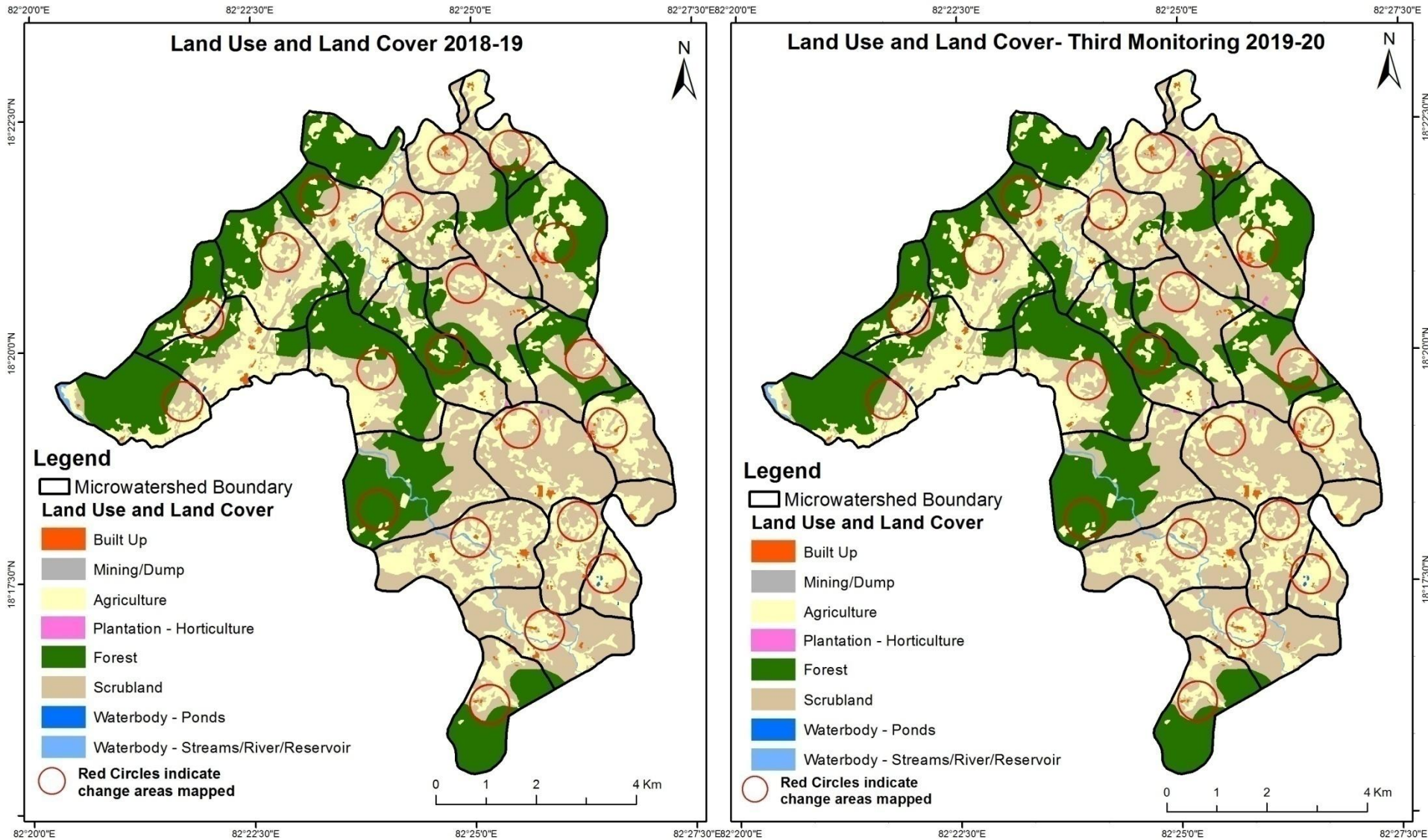
Comparative assessment of Land Use and Land Cover for Pre and Post IWMP implementation (2017-18 to 2018-19)

Scale: 1:10000



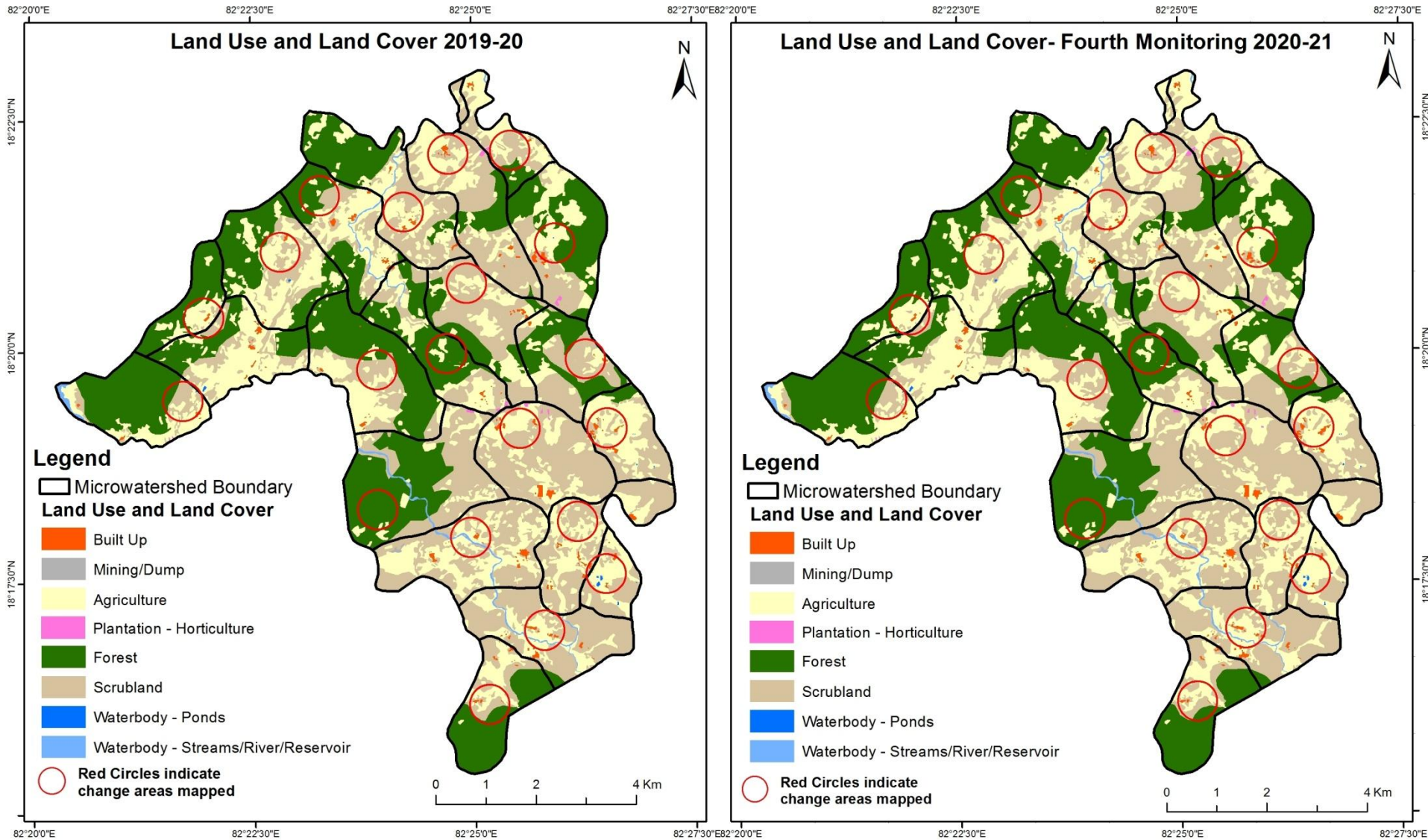
Comparative assessment of Land Use and Land Cover for Pre and Post IWMP implementation (2018-19 to 2019-20)

Scale: 1:10000



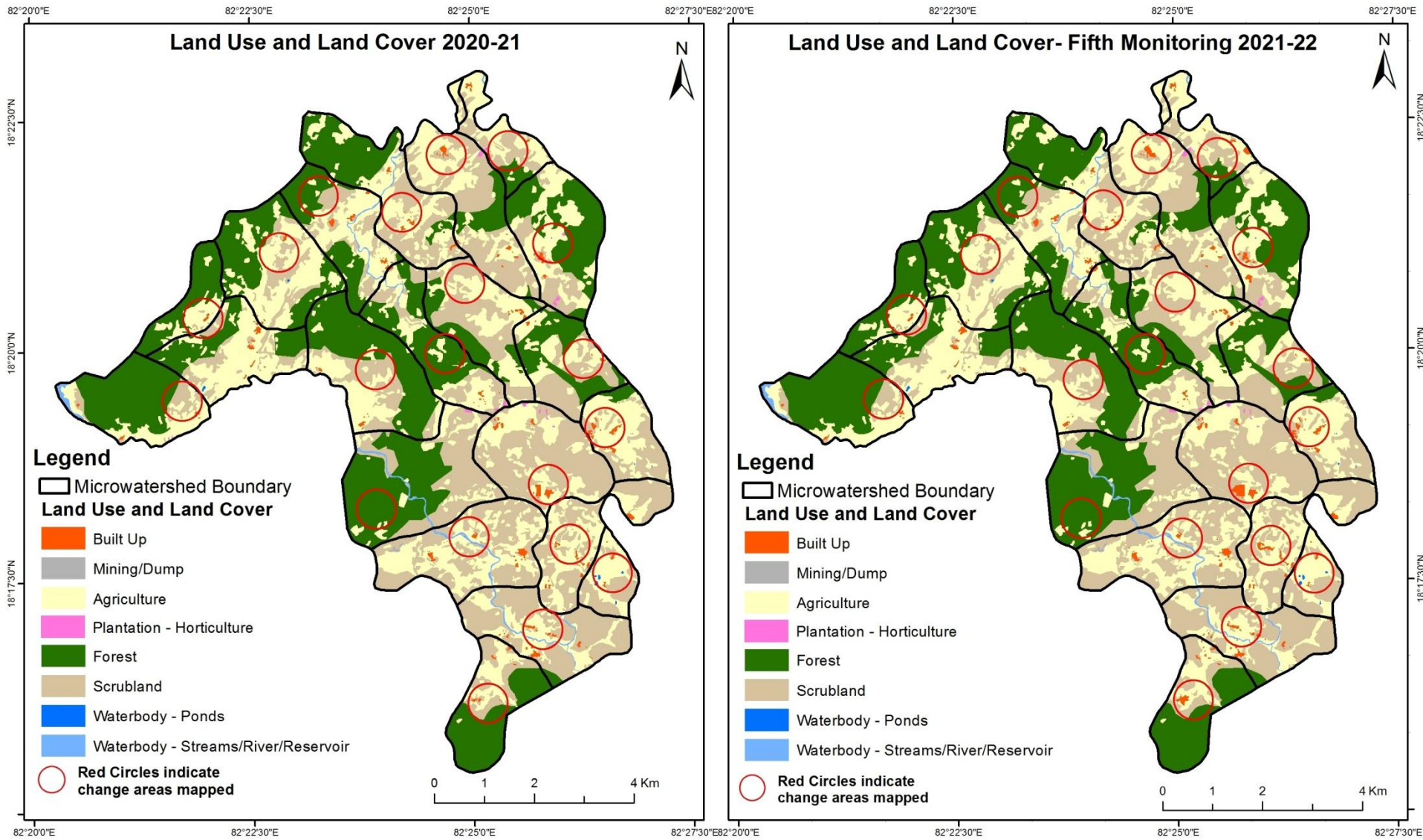
Comparative assessment of Land Use and Land Cover for Pre and Post IWMP implementation (2019-20 to 2020-21)

Scale: 1:10000



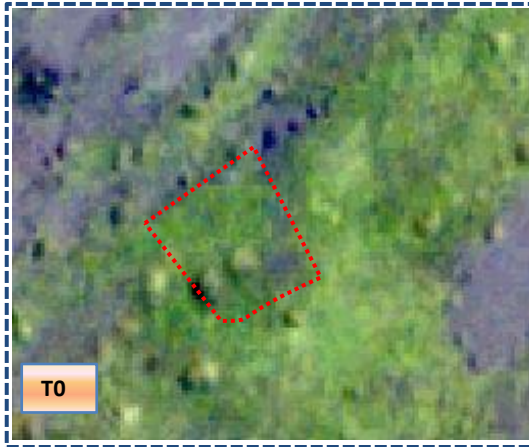
Comparative assessment of Land Use and Land Cover for Pre and Post IWMP implementation (2020-21 to 2021-22)

Scale: 1:10000



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

Scrub to Agriculture



T0: 2013-14 (82°22'10.819"E 18°20'27.232"N)

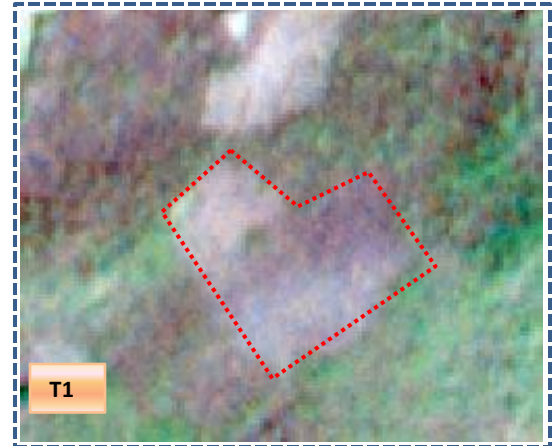


T1: 10 January 2017

Scrub to Agriculture



T0: 2013-14 (82°25'14.607"E 18°18'0.31"N)



T1: 10 January 2017

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

Forest to Agriculture



T0: 2013-14 (82°21'29.009"E 18°20'17.03"N)



T1: 10 January 2017

Forest to Agriculture



T0: 2013-14 (82°22'47.222"E 18°20'3.386"N)



T1: 10 January 2017

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

Land cover	Monitoring period (T1)										Units in Hectares		
	Built up	Mining/ dump	Agriculture	Plantation Horticulture	Forest	Forest Plantation	Barren Rocky	Scrub	Waterbody- Streams/River	Water body Ponds	Grand Total		
T0													
Built up	35.38		0.06										35.44
Mining/dump													
Agriculture	6.26		1716.99						1.46	0.08			1724.79
Plantation Horticulture													
Forest	0.30		143.08		2288.83								2432.21
Forest Plantation													
Barren Rocky													
Scrub	0.73	1.80	253.18					2853.22	0.06				3108.98
Waterbody- Streams/River										61.95			61.95
Waterbody – Ponds													
Grand Total	42.67	1.80	2113.31		2288.83			2853.22	1.52	62.02			7363.37

- 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 7.7 ha of the agriculture area has decreased and it is converted into Built-up and water body in T1.
- In T1 396.2 ha of the agriculture area has increased from built-up, forest 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		
	Built up	Mining/ dump	Agriculture	Plantation Horticulture	Forest	Forest Plantation	Barren Rocky	Scrub	Waterbody- Streams/River	Water body Ponds	Grand Total		
T1													
Built up	42.67												42.67
Mining/dump		1.80											1.80
Agriculture	13.36		2099.44					0.28		0.19			2113.27
Plantation Horticulture													
Forest					2288.83								2288.83
Forest Plantation													
Barren Rocky													
Scrub	6.35		107.68	3.57				2734.95		0.71			2853.26
Waterbody- Streams/River									62.02				62.02
Waterbody – Ponds										1.52			1.52
Grand Total	62.38	1.80	2207.12	3.57	2288.83			2735.23	62.02	2.42			7363.37

- 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 13.8 ha of the agriculture area has decreased and it is converted into Built-up, scrub and water body in T2.
- In T2 107.6 ha of the agriculture area has increased from 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	
	Built up	Mining/ dump	Agriculture	Plantation Horticulture	Forest	Forest Plantation	Barren Rocky	Scrub	Waterbody- Streams/River	Water body Ponds	Grand Total	
Built up	59.79		2.60								62.38	
Mining/dump		1.80									1.80	
Agriculture	0.48		2206.55						0.09		2207.12	
Plantation Horticulture				3.57							3.57	
Forest					2288.83						2288.83	
Forest Plantation												
Barren Rocky												
Scrub	0.57		11.23	5.02				2718.41			2735.23	
Waterbody- Streams/River									62.02		62.02	
Waterbody – Ponds			0.19							2.23	2.42	
Grand Total	60.83	1.80	2220.57	8.59	2288.83			2718.41	62.02	2.32	7363.37	

- 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 0.57 ha of the agriculture area has decreased and it is converted into Built-up and water body in T3.
- In T3 11.42 ha of the agriculture area has increased from scrubland and water body 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	58.94		1.89									60.83
Mining/dump		1.80										1.80
Agriculture	1.08		2218.78	0.50						0.21		2220.57
Plantation Horticulture				8.59								8.59
Forest					2288.83							2288.83
Forest Plantation												
Barren Rocky												
Scrub	1.25		236.40					2480.77				2718.41
Waterbody- Streams/River									62.02			62.02
Waterbody – Ponds										2.32		2.32
Grand Total	61.27	1.80	2457.06	9.09	2288.83			2480.77	62.02	2.53		7363.37

- 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 1.7 ha of the agriculture area has decreased and it is converted into built-up, plantations and water body in T4.
- In T4 236.4 ha of the agriculture area has increased from built-up 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	61.27											61.27
Mining/dump		1.80										1.80
Agriculture	5.81		2451.26									2457.06
Plantation Horticulture			0.38	8.71								9.09
Forest					2288.83							2288.83
Forest Plantation												
Barren Rocky												
Scrub	7.53		42.72					2430.51				2480.77
Waterbody- Streams/River									62.02			62.02
Waterbody – Ponds										2.53		2.53
Grand Total	74.61	1.80	2494.36	8.71	2288.83			2430.51	62.02	2.53		7363.37

- 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 5.8 ha of the agriculture area has decreased and it is converted into built-up in T5.
- In T5 43.1 ha of the agriculture area has increased from plantations and scrubland 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 2.6 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 388, 93, 13, 236 & 37 Hectares from T0-T1, T1-T2, T2-T3 & T3-T4 respectively and overall increase of 769 Hectares in Crop land area as compared between baseline LU/LC data 2013-14 (T0) & 2021-22 (T5) years.
5. About 8.7 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 678 Hectares in Scrubland area as compared between 2013-14 (T0) & 2021-22 (T5) years.
7. Farm ponds (0) is visible on IWMP Bhuvan Srishti portal out of Bhuvan Drishti photo of Farm ponds (0) verified from the portal.