

MONITORING OF IWMP WATERSHED PROJECTS USING GEO-INFORMATION SUMMARY REPORT

IWMP-Batch-IV

**KURNOOL -58/2012-13
Andhra Pradesh**

**Submitted to NRSC, Balanagar, Hyderabad
December-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

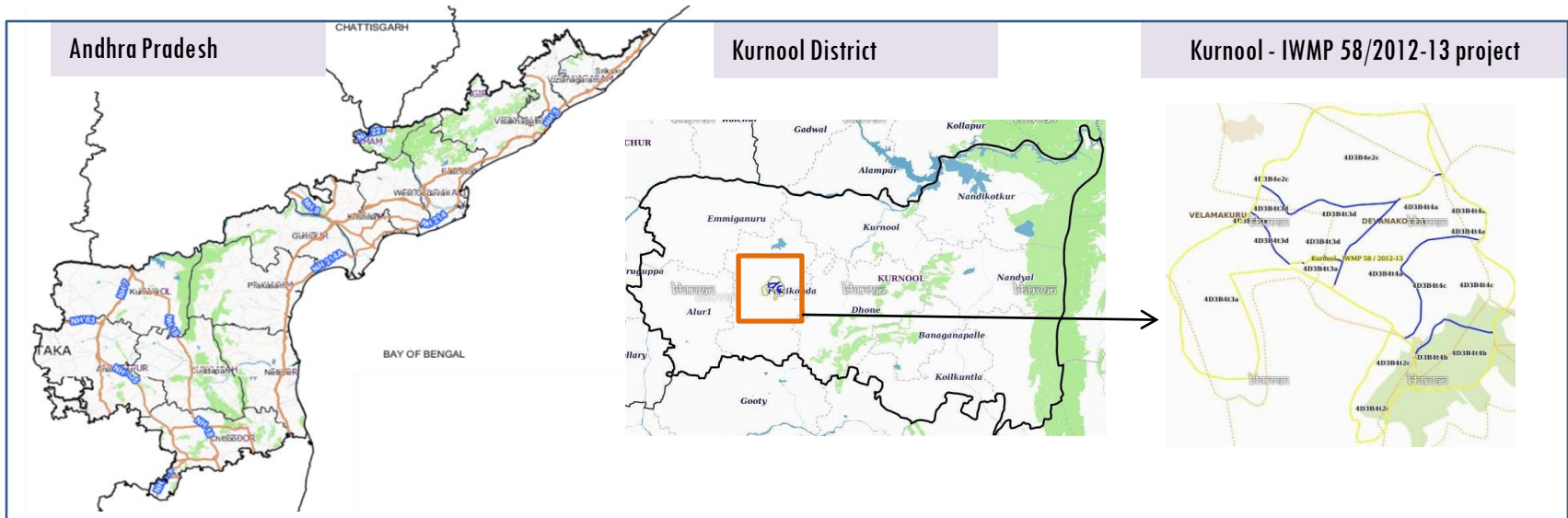
EXECUTIVE SUMMARY

- 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-58/2012-13, Kurnool District of Andhra Pradesh. The total geographical area of the project is 5,277 ha. It comprises of 08 micro watersheds.
- In the project area 395 Drishti photos were uploaded showing checks & plugins, Field bunds and remaining showing others.
- Water bodies have shown an increase by 46 ha , which correspond to the other land use classes that have been converted into various water bodies in this period.
- Major percentage i.e. 75 % is covered by the agriculture, 12 % is covered by forest, 9 % is covered by scrubland area and remaining by other land use classes.

PROJECT : KURNOOL - IWMP-58/2012-13

DISTRICT : KURNOOL , STATE : ANDHRA PRADESH

- The study area falls in Devanakonda Mandal of Kurnool district of Andhra Pradesh state. The total geographical area of the project is 5,277 ha. It comprises of 08 micro watersheds. Location Map of the study area is shown in Figure below. Analysis is done for 2012-13 (T0) period (*Batch -1*) projects taking 2020-21 (T5) period satellite images



- The climate is tropical with temperatures ranging from 26 °C to 46 °C in the summer and 12 °C to 31 °C in the winter. The average annual rainfall is about 705 millimeters (28 in).
- The average annual rainfall of the district is 665.5mm, which ranges from nil rainfall in January and December to 139.6 mm in September. August and September are the wettest months. The mean seasonal rainfall distribution is 459.1mm in southwest monsoon (June September), 133.7mm in northeast monsoon (Oct-Dec), 1.9 mm rainfall in Winter (Jan Feb) and 70.8 mm in summer (March-May).

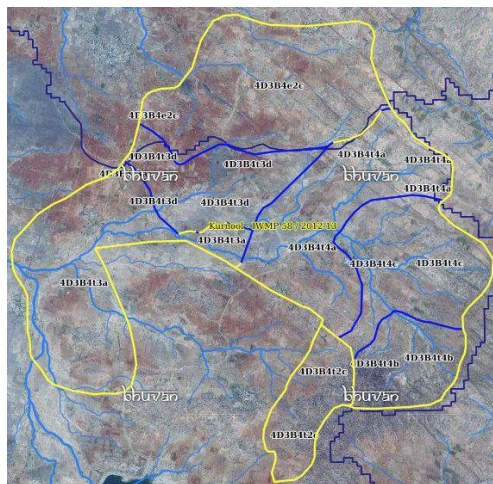
Satellite Data and Ancillary Data

Satellite data*	T0-A**	T0-B**	T5
	2012-13	2011-12	2020-21
LISS IV	2012-13		
SCENE 1			25/02/2021
SCENE2			
SCENE 3			
SCENE 4			
CARTO	2012-13		
SCENE 1			25/02/2021
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	395
4	Detailed Project Report		

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



Legend



Drainage (1:10000 Scale)

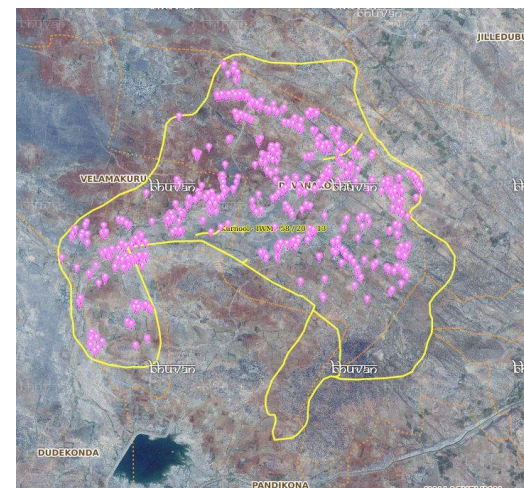


MWS Boundary



Project Boundary

Natural Color Composite overlaid with Drishiti Points



Drishiti Upload Status

Classification of the Activities

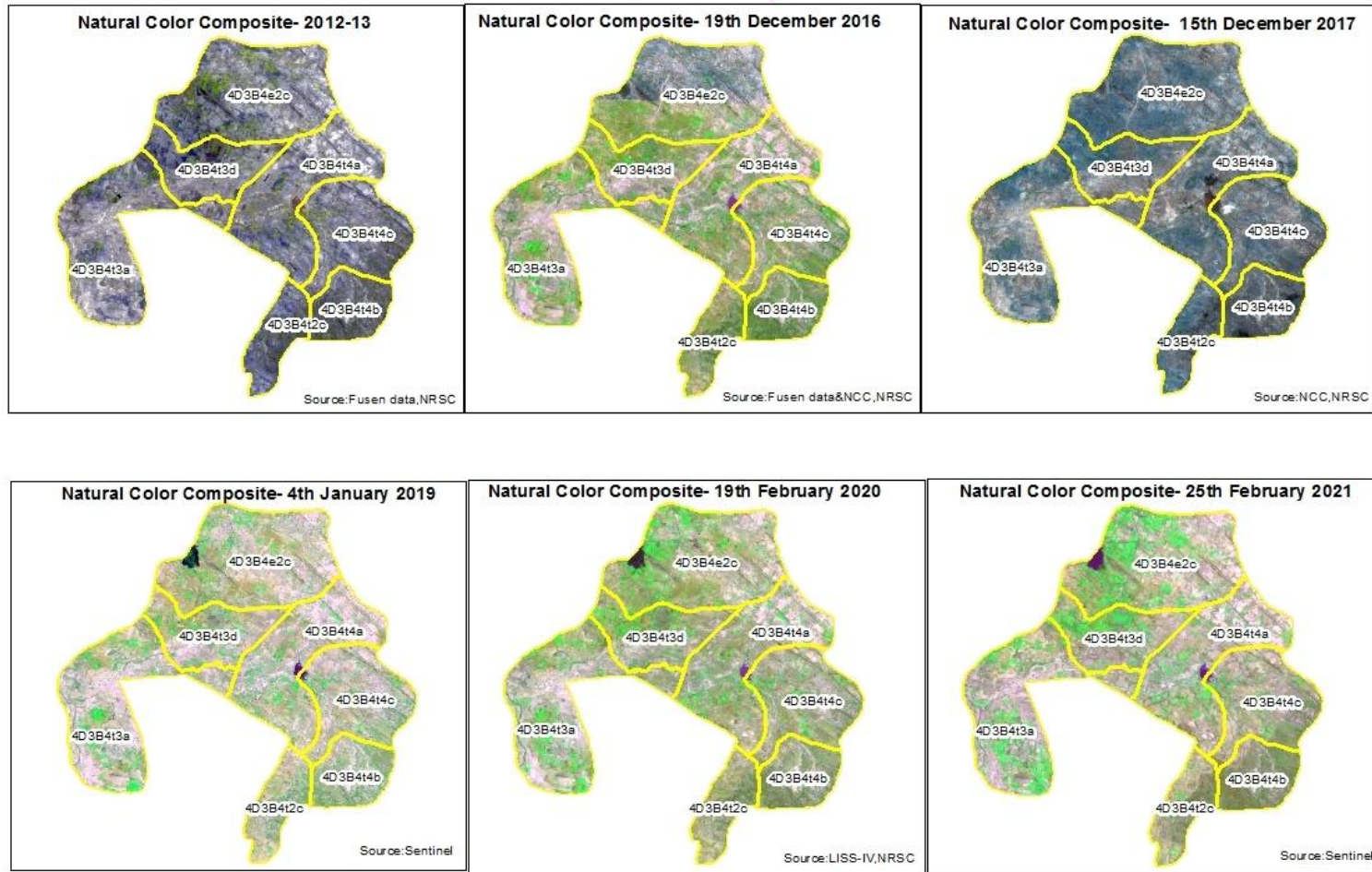
Sr. No	Activity	Drishti Photo	Visible on satellite
1	Afforestation	35	35
2	Checks & plugins	130	120
3	Agriculture	0	0
4	Blockplanting	0	0
5	Bund planting	0	0
6	Drainage Treatment	0	0
7	Farm ponds/Dug out pit	62	40
8	Check dams (Civil work)	29	20
9	Field bunds	0	0
10	Om (Other measurement)	0	0
11	LM (Livelihood Measures)	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	36	30
16	Capacity Building Activities	0	0
17	Entry Point Activity	0	0
18	Others	383	150
	TOTAL	675	395

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 (2010-11) and T5 is 2020-21 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 Color Composite



Monitoring of activities in Kurnool District Andhra Pradesh. IWMP-58/2012-13



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. 826377

Farm pond

Monitoring of activities in Kurnool Dt Andhra Pradesh. IWMP-58/2012-13



T0:2012-13

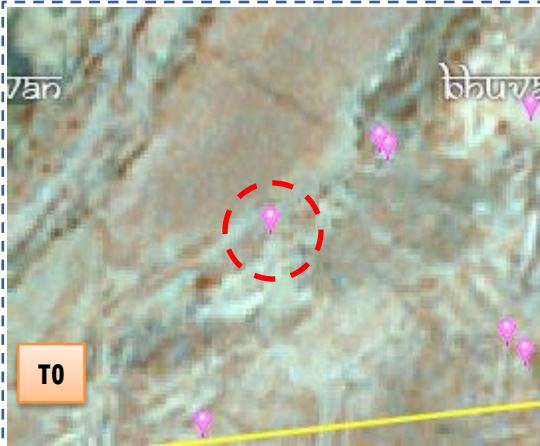


T1: 09 November 2016



Drishti Sl no. 829245 MWS : 4D3B4t4a

Check dam



T0:2012-13



T1: 09 November 2016



Drishti Sl no. 135052 MWS : 4D3B4t3a

Dug out pond

Monitoring of activities in Kurnool Dt Andhra Pradesh. IWMP-58/2012-13



T0

T0: 2012-13



T1

T1: 09 November 2016



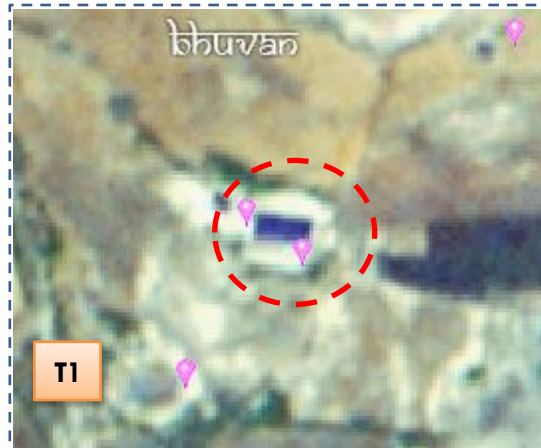
Drishti Sl no. 1754270 MWS : 4D3B4t4a

Farm pond



T0

T0: 2012-13



T1

T1: 09 November 2016



Drishti Sl no. 1952179 MWS : 4D3B4t3a

Farm pond

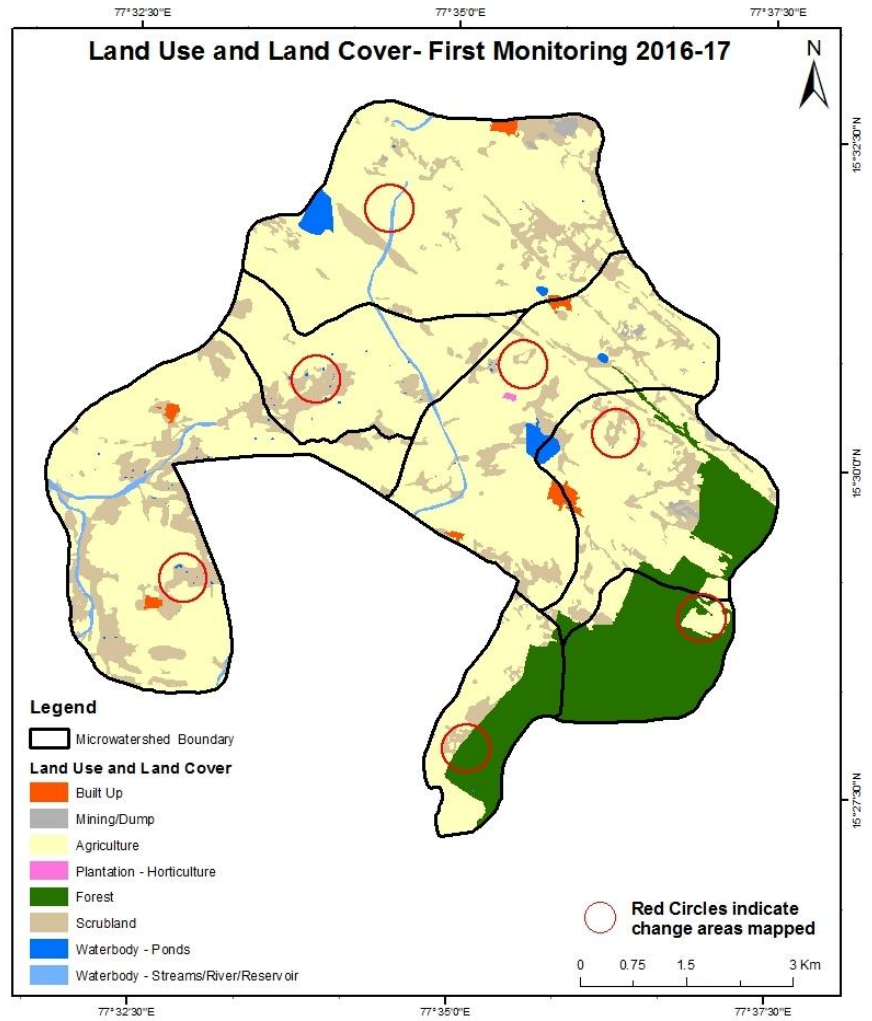
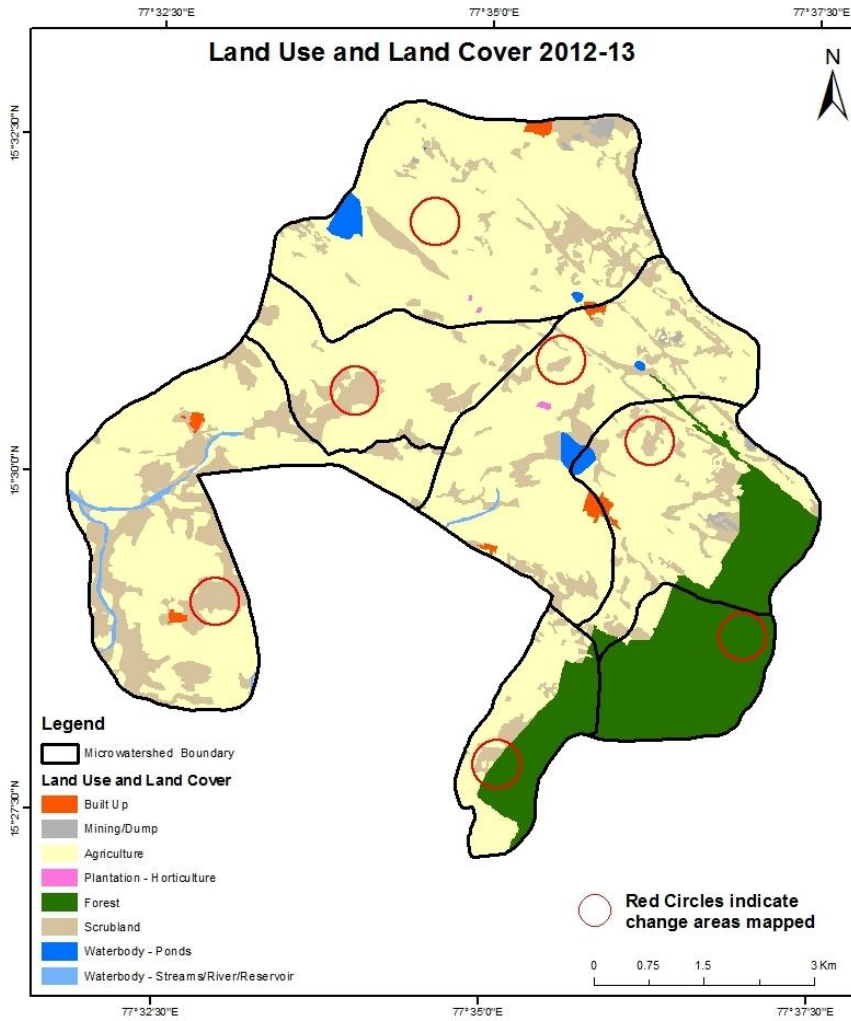
MONITORING IN THE PROJECT AREA

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 (2012-13) and row represents the T5 (2020-21)

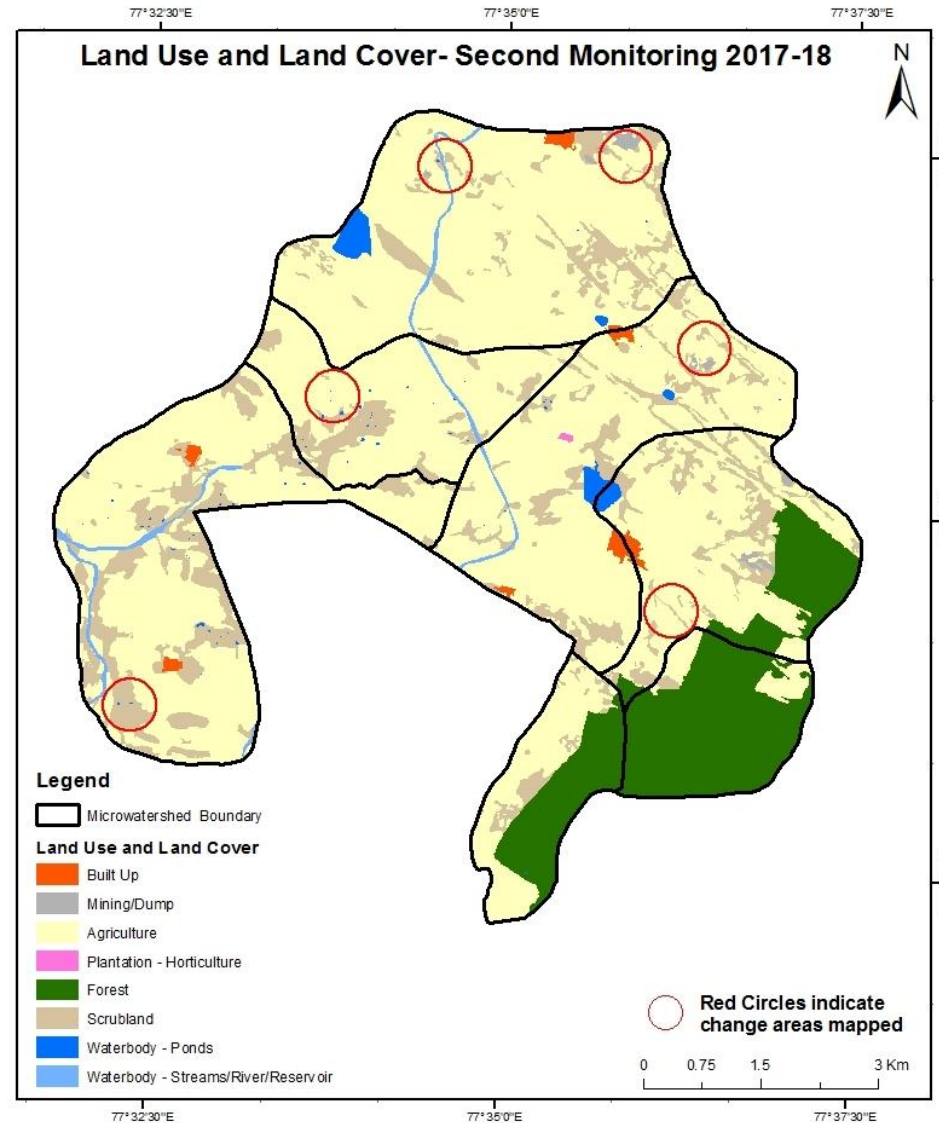
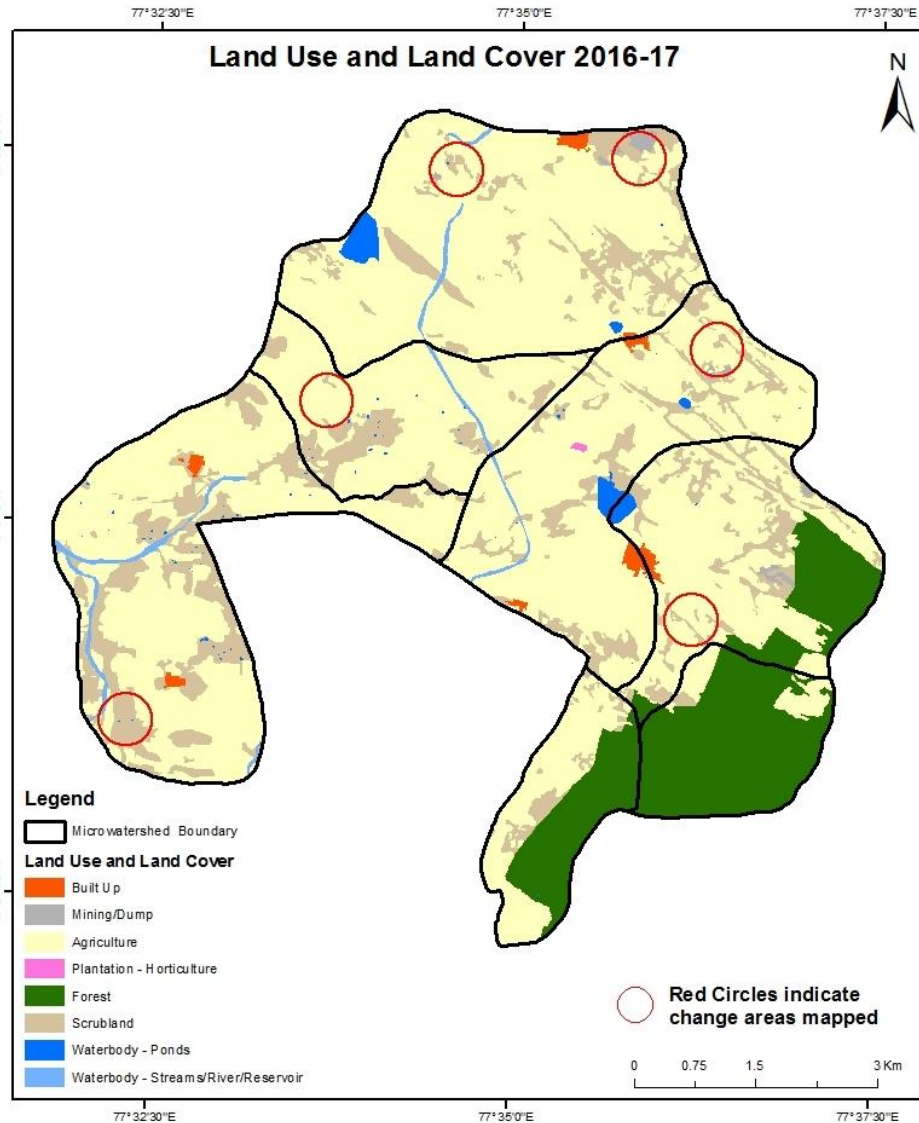
Comparative assessment of Land Use and Land Cover for Pre and Post IWMP implementation (2012-13 to 2016-17)

Scale: 1:10000



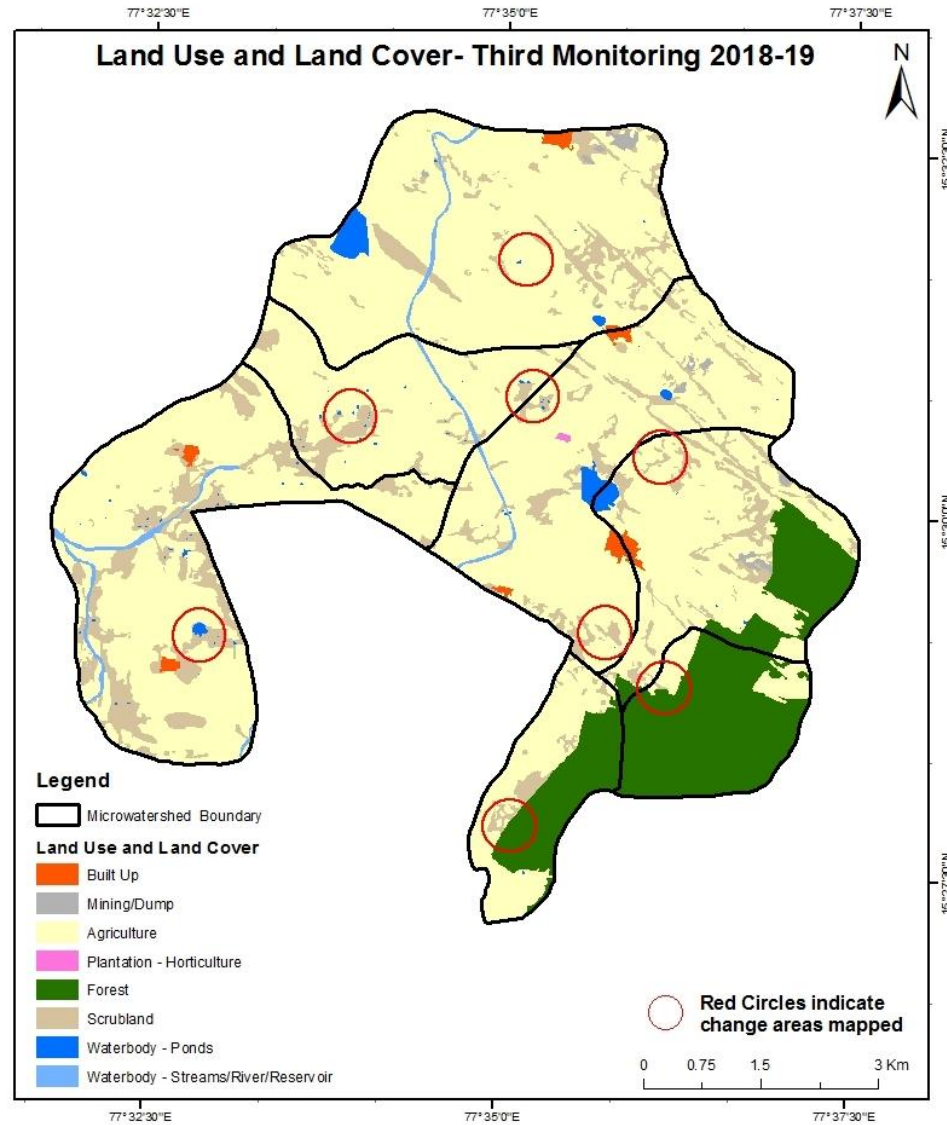
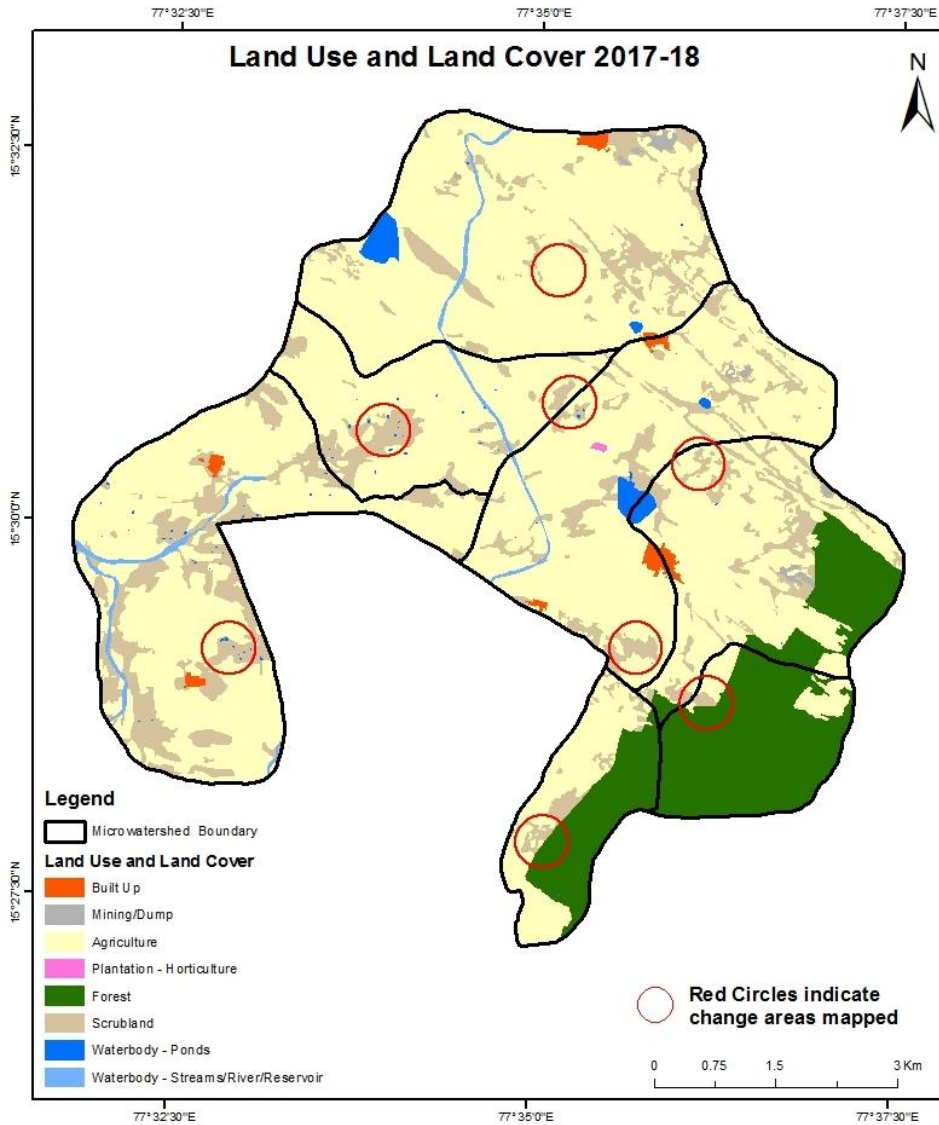
Comparative assessment of Land Use and Land Cover for Pre and Post IWMP implementation (2016-17 to 2017-18)

Scale: 1:10000



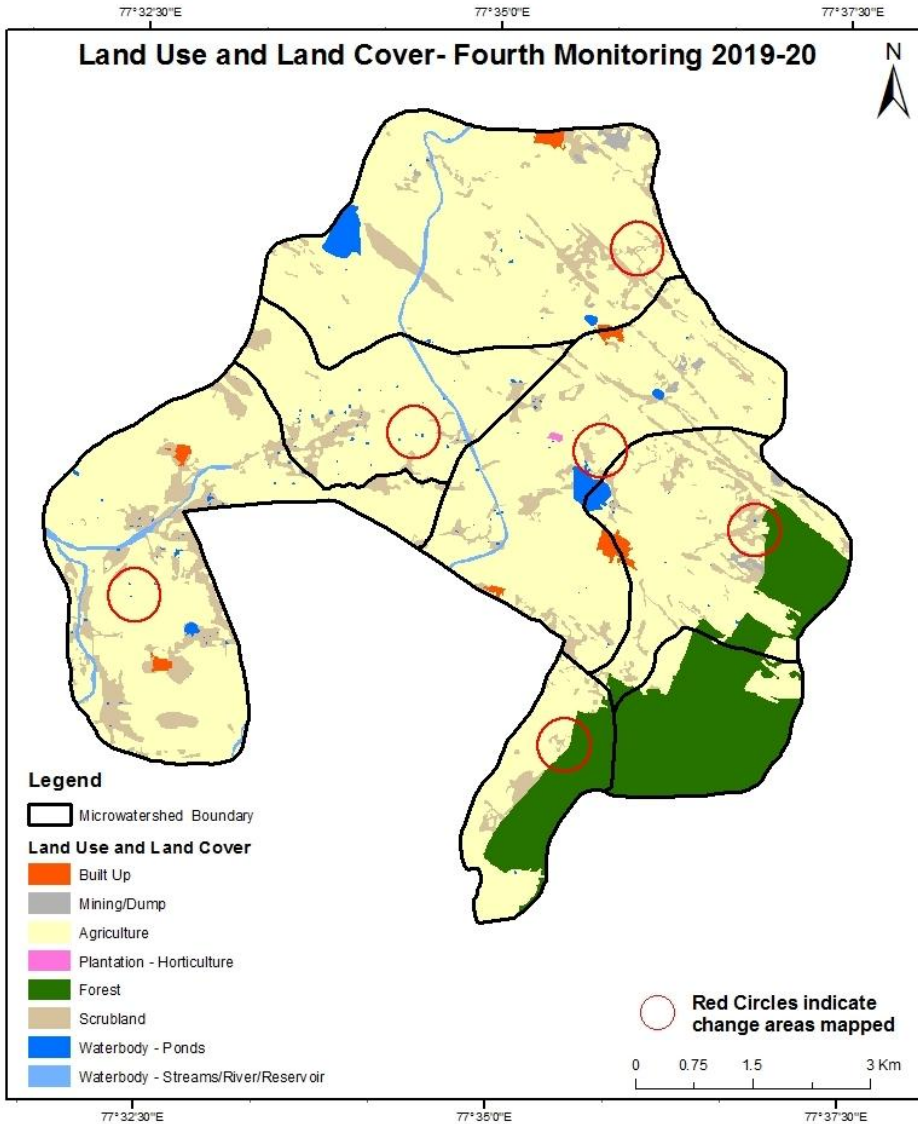
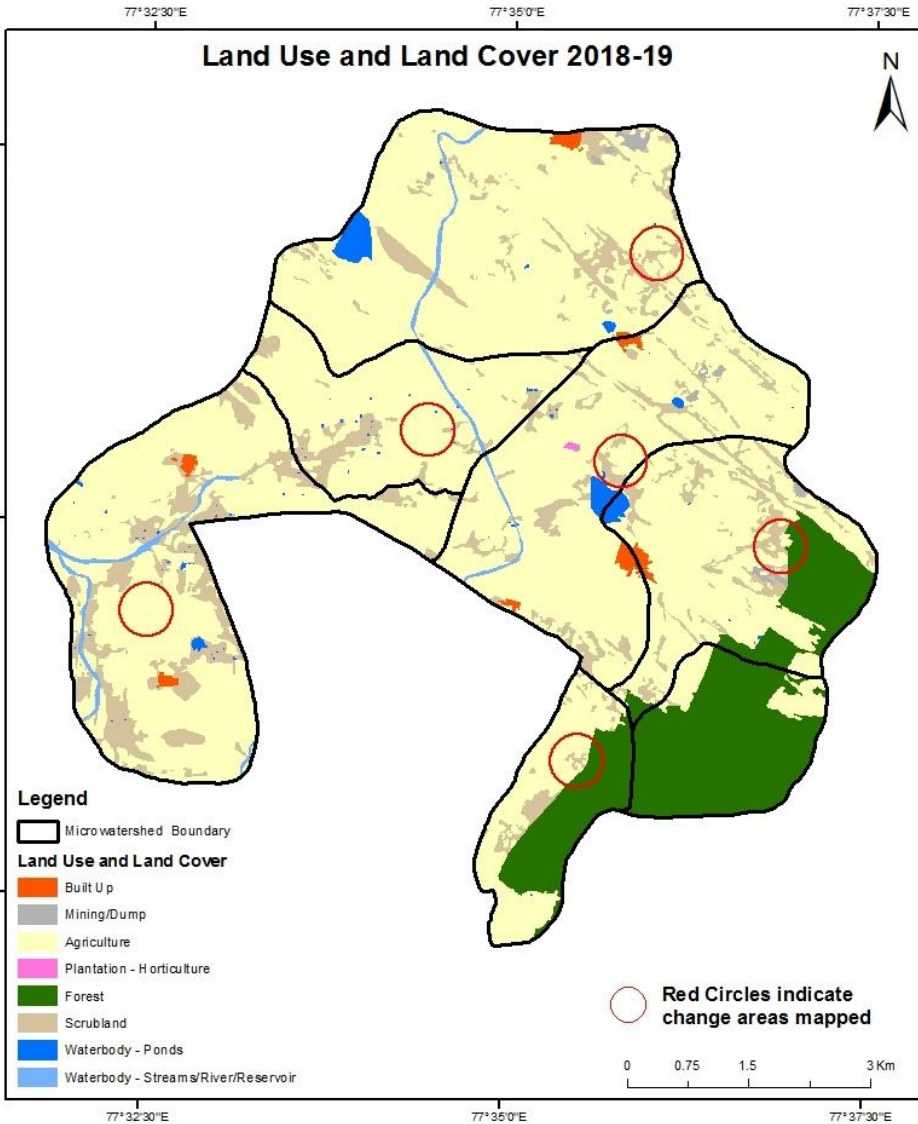
Comparative assessment of Land Use and Land Cover for Pre and Post IWMP implementation (2017-18 to 2018-19)

Scale: 1:10000



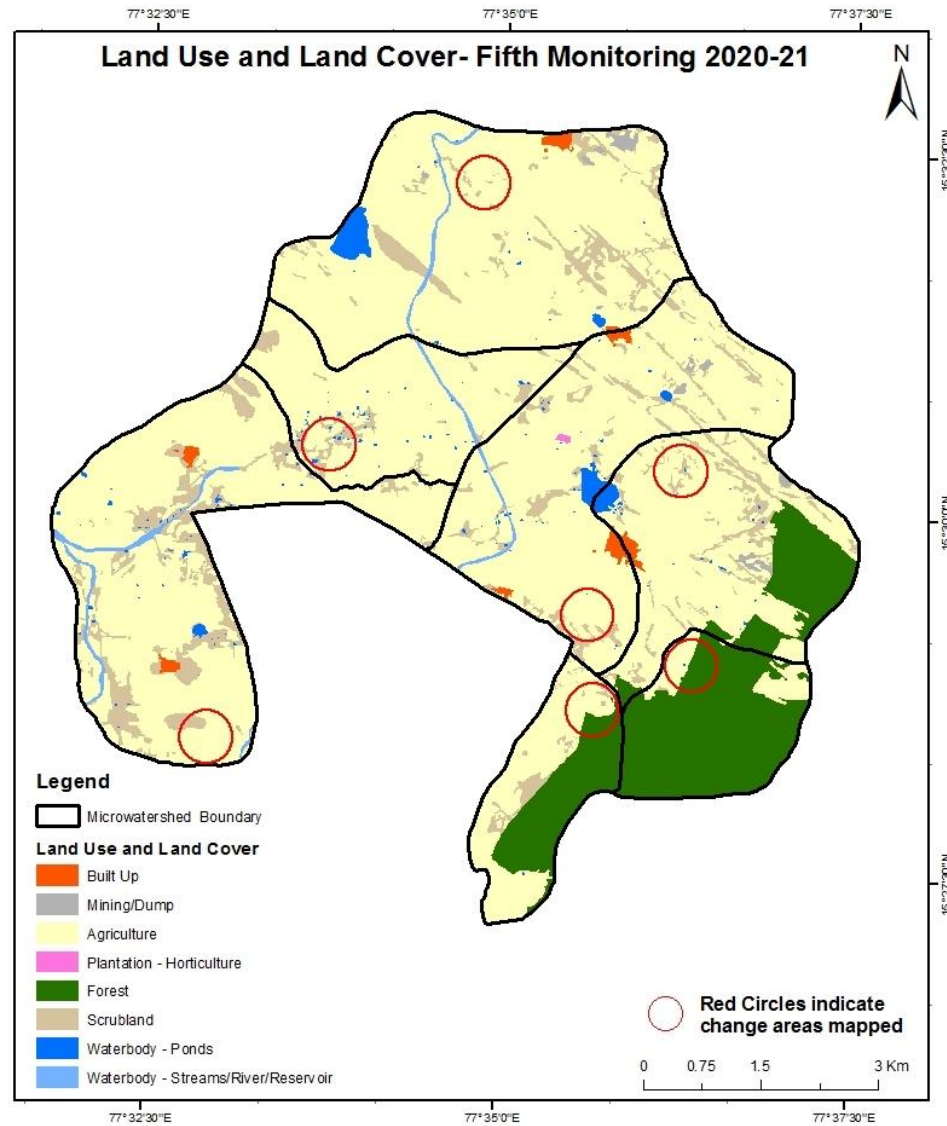
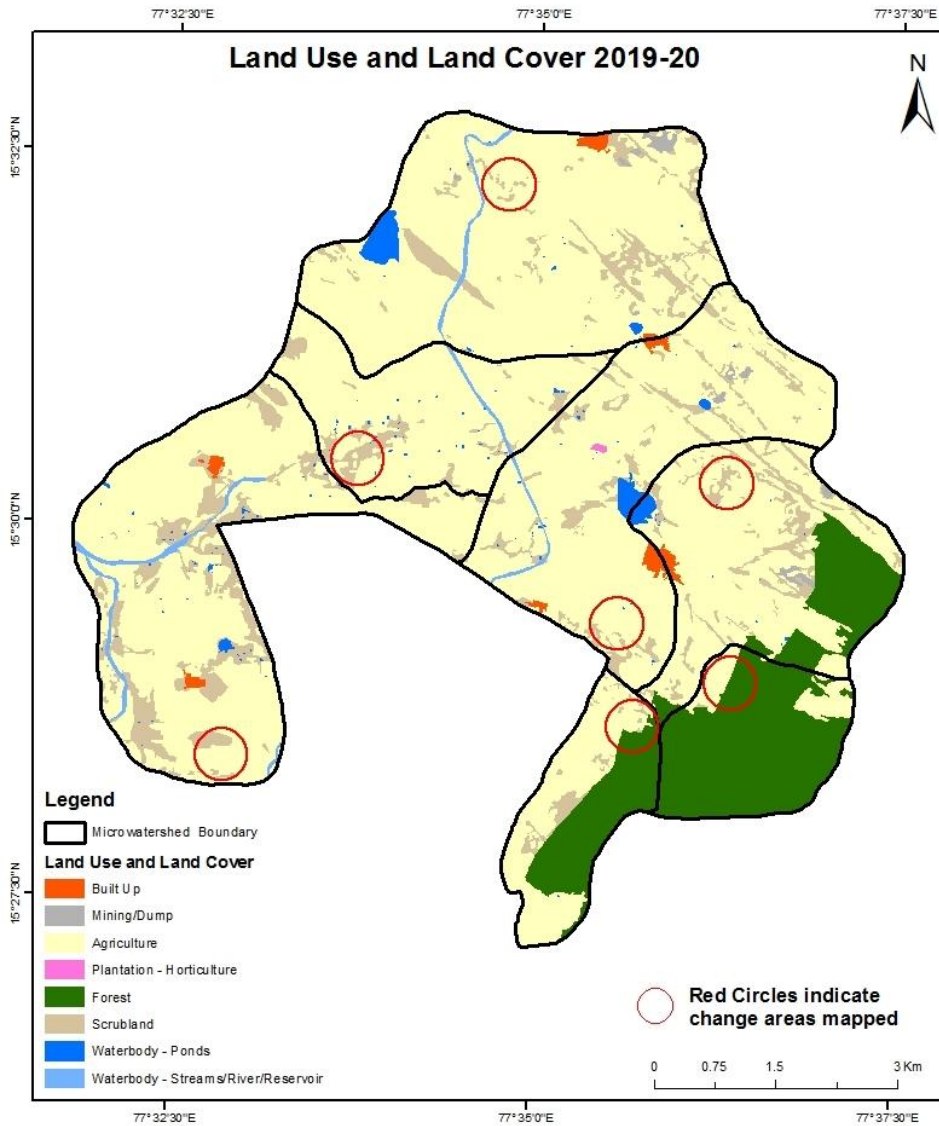
Comparative assessment of Land Use and Land Cover for Pre and Post IWMP implementation (2018-19 to 2019-20)

Scale: 1:10000



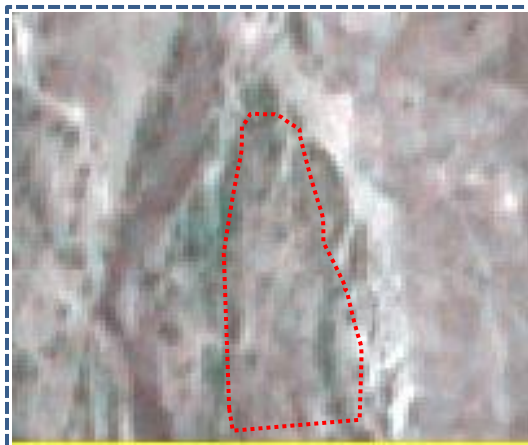
Comparative assessment of Land Use and Land Cover for Pre and Post IWMP implementation (2019-20 to 2020-21)

Scale: 1:10000



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

Scrub to Agriculture



T0: 2012-13(77°32'12.244"E 15°28'49.369"N)



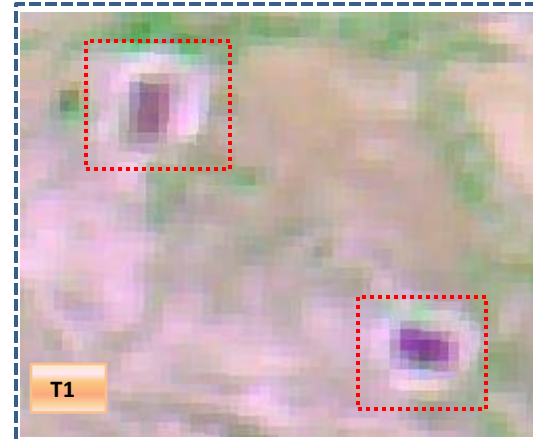
T1: 09 November 2016

Scrub to Farm pond



T0

T0: 2012-13(77°33'27.86"E 15°30'23.563"N)

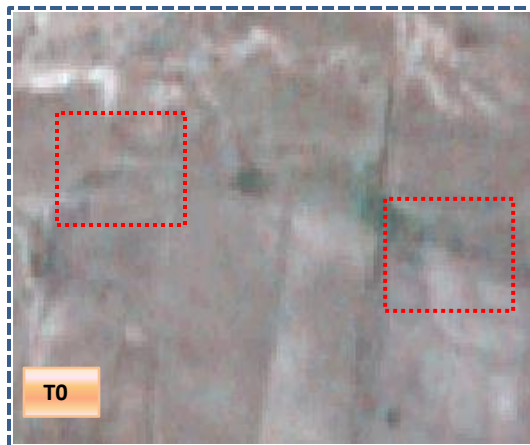


T1

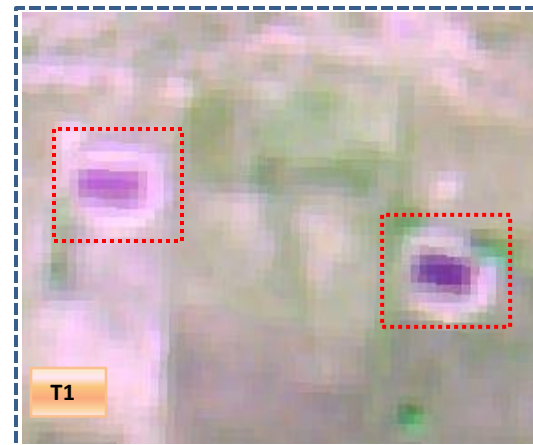
T1: 09 November 2016

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

Agriculture to Water body

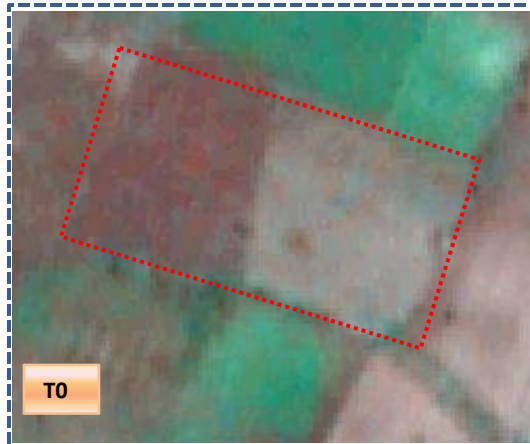


T0: 2012-13(77°34'5.762"E 15°30'28.4"N)

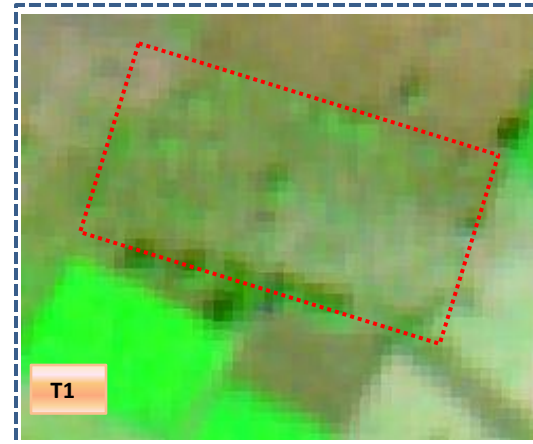


T1: 09 November 2016

Agriculture to Horticulture



T0: 2012-13(77°35'25.873"E 15°30'32.731"N)



T1: 09 November 2016

Table showing change matrix depicting Land cover transitions during study period-2012-13 to 2016-17

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		
Built up	32.73												32.73
Mining/dump		19.36											19.36
Agriculture	2.12		3511.95					0.85	19.75	1.46			3536.12
Plantation Horticulture			0.80	1.52									2.32
Forest			56.12		652.64					0.09			708.85
Forest Plantation													
Barren Rocky													
Scrub	0.08		89.16					812.45	1.71	3.36			906.76
Waterbody- Streams/River									29.47				29.47
Waterbody – Ponds										42.02			42.02
Grand Total	34.93	19.36	3658.03	1.52	652.64			813.30	50.93	46.92			5277.64

- In matrix table diagonal elements represent the both periods in the same class and off diagonal elements represents change in between the classes.
- In T0 24 ha of the agriculture area has decreased and it is converted into Built-up, scrubland and water body in T1.
- In T1 146 ha of the agriculture area has increased from plantations, forest and scrubland area of T2. The additional agriculture are coming from waterbody in T1 represents seasonal agriculture.

Table showing change matrix depicting Land cover transitions during study period-2016-17 to 2017-18

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	35.10										35.10	
Mining/dump		18.46	0.90								19.36	
Agriculture	0.04		3654.66					1.75	0.12		3656.56	
Plantation Horticulture				1.52							1.52	
Forest					652.63						652.63	
Forest Plantation												
Barren Rocky												
Scrub	0.10		40.70					771.58	0.93		813.31	
Waterbody- Streams/River								50.92			50.92	
Waterbody – Ponds										46.92	46.92	
Grand Total	35.23	18.46	3696.26	1.52	652.63			771.58	53.59	47.04	5277	

- 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 1.9 ha of the agriculture area has decreased and it is converted into Built-up and water body in T2.
- In T2 41 ha of the agriculture area has increased from mining/dump 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-2017-18 to 2018-19

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	35.23												35.23
Mining/dump		18.46											18.46
Agriculture			3694.35								1.92		3696.26
Plantation Horticulture				1.52									1.52
Forest			12.74		639.89								652.63
Forest Plantation													
Barren Rocky													
Scrub		1.74	144.18					623.05			2.61		771.58
Waterbody- Streams/River									53.59				53.59
Waterbody – Ponds											47.04		47.04
Grand Total	35.23	20.20	3851.26	1.52	639.89			623.05	53.59		51.57		5277

- 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 1.9 ha of the agriculture area has decreased and it is converted into water body in T3.
- In T3 156 ha of the agriculture area has increased from forest and 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-2018-19 to 2019-20

Land cover	Monitoring period (T4)										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	35.23												35.23
Mining/dump		20.20											20.20
Agriculture	0.13		3847.55							3.59			3851.26
Plantation Horticulture				1.52									1.52
Forest			2.50		637.38								639.89
Forest Plantation													
Barren Rocky													
Scrub	0.15		80.71					539.77			2.43		623.05
Waterbody- Streams/River									53.59				53.59
Waterbody – Ponds											51.53		51.57
Grand Total	35.51	20.20	3930.76	1.52	637.38			539.77	53.59		57.55		5276.32

- 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 3.7 ha of the agriculture area has decreased and it is converted into Built-up and water body in T4.
- In T4 83 ha of the agriculture area has increased from forest 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-2019-20 to 2020-21

Land cover	Monitoring period (T5)										Units in Hectares		
	Built up	Mining/ dump	Agriculture	Plantation Horticulture	Forest	Forest Plantation	Barren Rocky	Scrub	Waterbody- Streams/River	Water body Ponds	Grand Total		
T4													
Built up	35.34												35.34
Mining/dump		20.20											20.20
Agriculture	0.43		3928.62								3.22		3932.27
Plantation Horticulture				1.52									1.52
Forest			2.32		635.07								637.40
Forest Plantation													
Barren Rocky													
Scrub	0.04		55.67					480.48			3.57		539.76
Waterbody- Streams/River									53.60				53.60
Waterbody – Ponds											57.56		57.56
Grand Total	35.80	20.20	3986.62	1.52	635.07			480.48	53.60		64.34		5277.64

- 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 3.6 ha of the agriculture area has decreased and it is converted into Built-up, mining/dump and water body in T5.
- In T5 58 ha of the agriculture area has increased from forest 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 increase of 46 Hectares in Reservoir / Tanks area as compared between baseline LU/LC data 2012-13 (T0) & 2020-21 (T5) years.
4. There is an increase of 121, 39, 155, 79 & 54 Hectares from T0-T1, T1 to T2, T2-T3, T3-T4 & T4-T5 respectively and overall increase of 450 Hectares in Crop land area as compared between baseline LU/LC data 2012-13 (T0) & 2020-21 (T5) years.
5. There is a decrease of 426 Hectares in Scrubland area as compared between 2012-13 (T0) & 2020-21 (T5) years.
6. Farm ponds (40) is visible on IWMP Bhuvan Srishti portal out of Bhuvan Drishti photo of Farm ponds (62) verified from the portal.