

MONITORING OF IWMP WATERSHED PROJECTS USING GEO-INFORMATION

SUMMARY REPORT

ANANTAPURAMU -45/2011-12
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

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-45/2011-12, Anantapuramu District of Andhra Pradesh. The total geographical area of the project is **4,916** ha. It comprises of 5 micro watersheds.
- In the project area 229 Drishti photos were uploaded showing check dams/Rock fill dam, livelihood activities, and remaining showing other activities.
- Water bodies have shown an increased by 40 ha , which correspond to the other land use classes that have been converted into various water bodies in this period.
- Major percentage i.e. 70.7 % is covered by the agriculture, 15.7 % is covered by Scrub land, 6.4 % is covered by plantation and remaining by other land use classes.

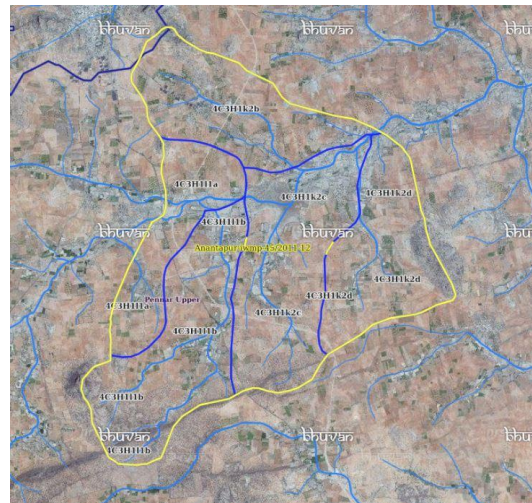
Satellite Data and Ancillary Data

Satellite data*	T0-A**	T0-B**	T5
	2011-12	2013-14	2019-20
LISS IV	2011-12		
SCENE 1			19-Feb-20
SCENE2			
SCENE 3			
SCENE 4			
CARTO	2011-12		
SCENE 1			19-Feb-20
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	229
4	Detailed Project Report		

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



Legend



Drainage (1:10000 Scale)

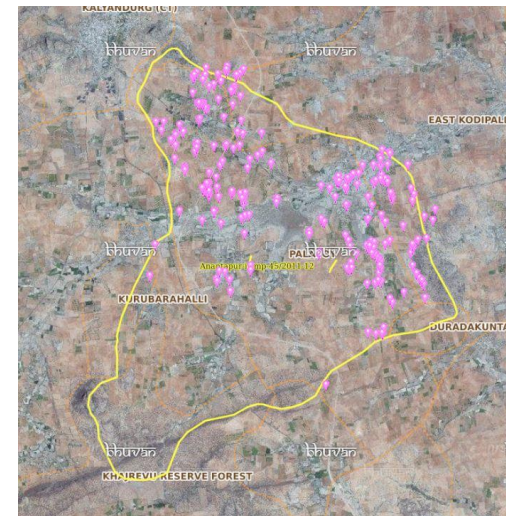


MWS Boundary



Project Boundary

Natural Color Composite overlaid with Drishiti Points



Drishiti Upload Status

Classification of the Activities

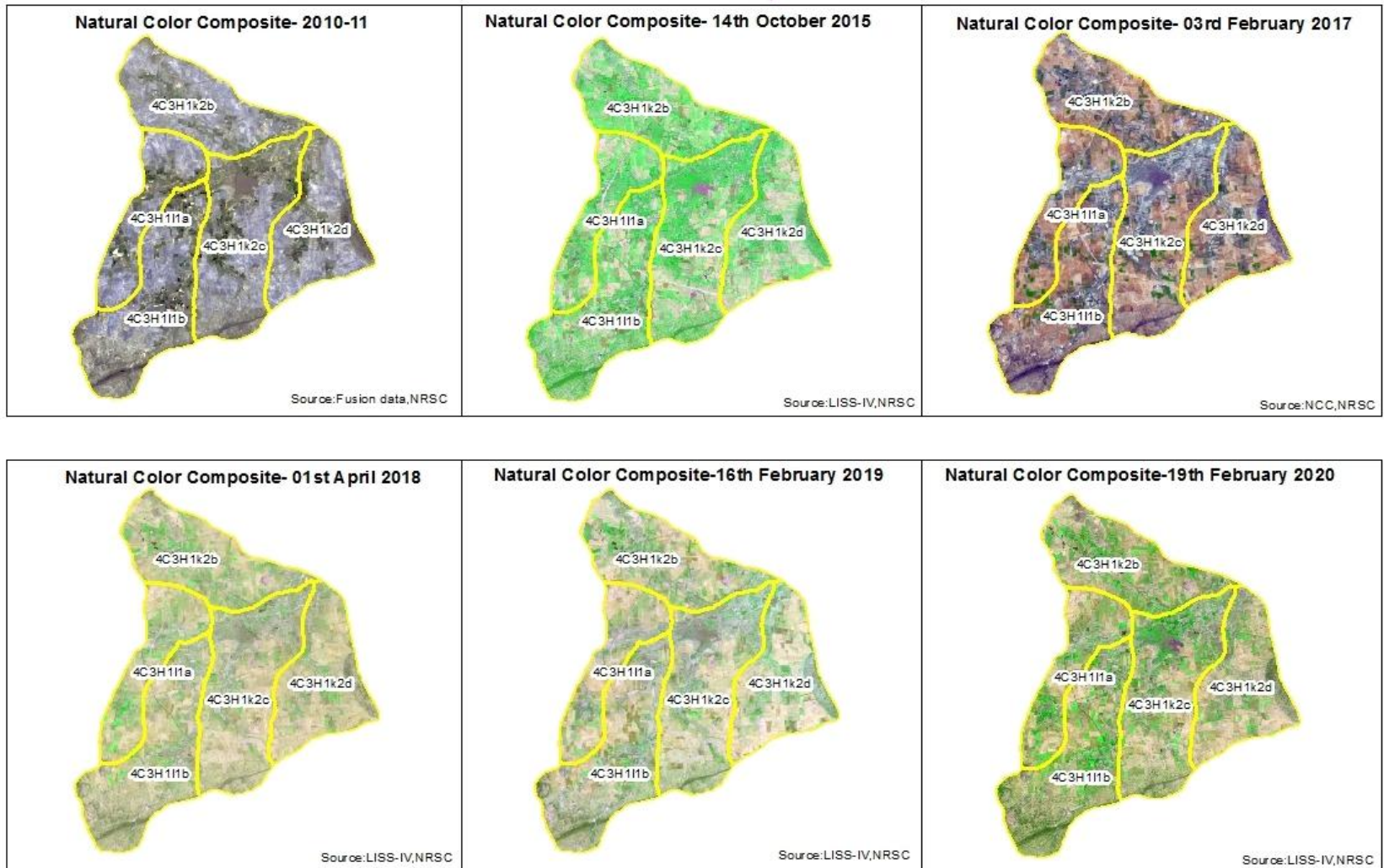
Sr. No	Activity	Drishti Photo	Visible on satellite
1	Afforestation	0	0
2	Horticulture	0	0
3	Agriculture	0	0
4	Pasture	0	0
5	Trench	0	0
6	Field Bunds	0	0
7	Terrace	0	0
8	Checks & Plugs	17	17
9	Gabion structure	0	0
10	Farm ponds/Dug out pit	9	9
11	Civil work-Check dams/Rock fill dam	55	55
12	Nallah Bunds/Drainage 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	1	1
16	Capacity Building Activities	0	0
17	Entry Point Activity	0	0
18	Others	160	147
	TOTAL	242	229

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 (2011-12) and T5 is 2019-20 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)



Monitoring of activities in Anantapuram Dt Andhra Pradesh. IWMP-45/2011-12



T0:2011-12

T1: 01 November 2016

Drishti SI no. 2437861 MWS : 4C3H1k2d

Farm pond



T0:2011-12

T1: 01 November 2016

Drishti SI no. 2473808 MWS : 4C3H111a

Farm pond

Monitoring of activities in Anantapuram Dt Andhra Pradesh. IWMP-45/2011-12



T0

T0:2011-12



T1

T1: 01 November 2016



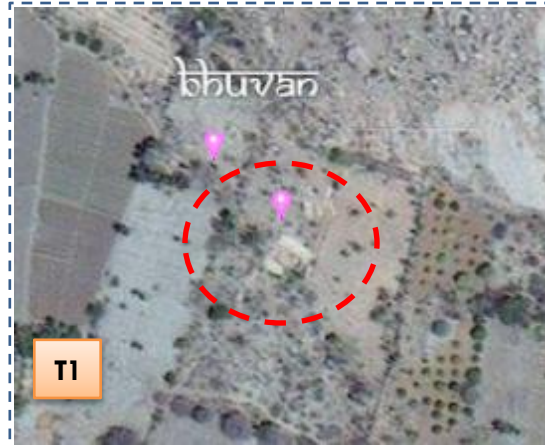
Drishti Sl no. 2486149 MWS : 4C3H1k2c

Farm pond



T0

T0:2011-12



T1

T1: 01 November 2016



Drishti Sl no. 2499107 MWS : 4C3H1k2b

Farm pond

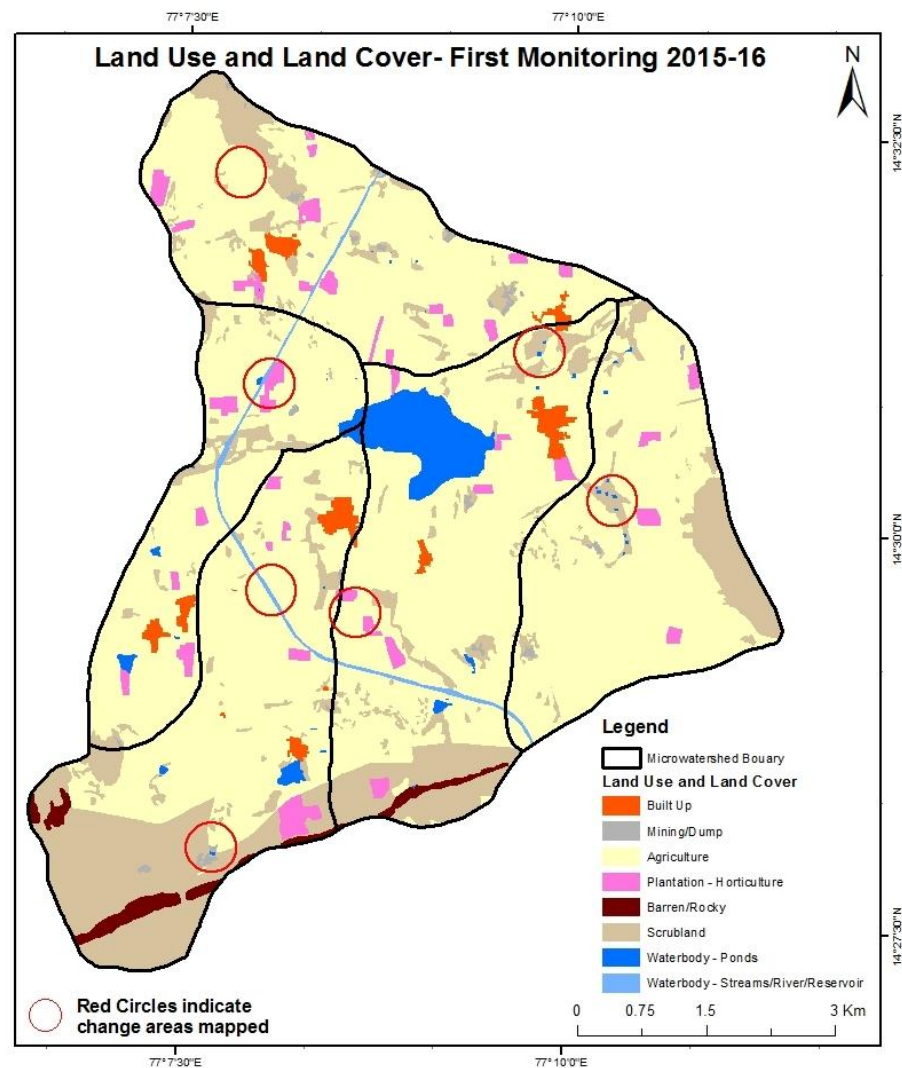
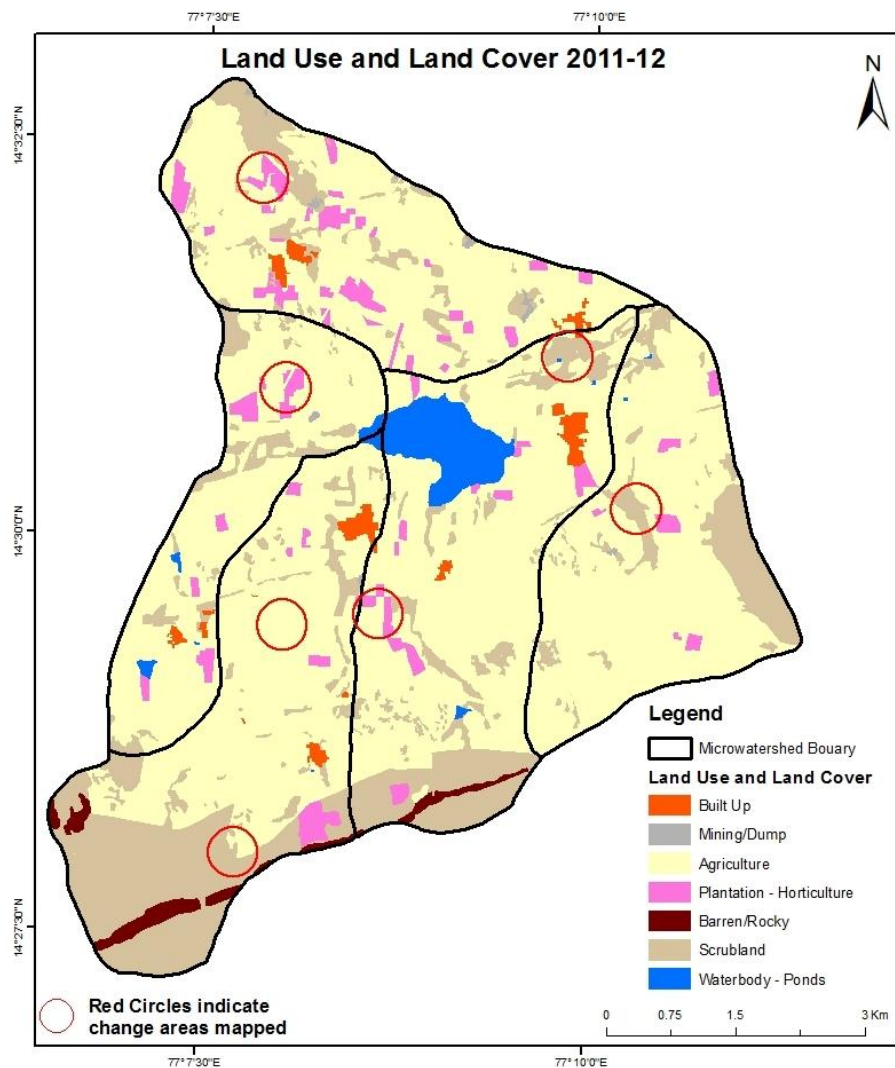
MONITORING IN THE PROJECT AREA

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 (2011-12) and row represents the T5 (2019-20)

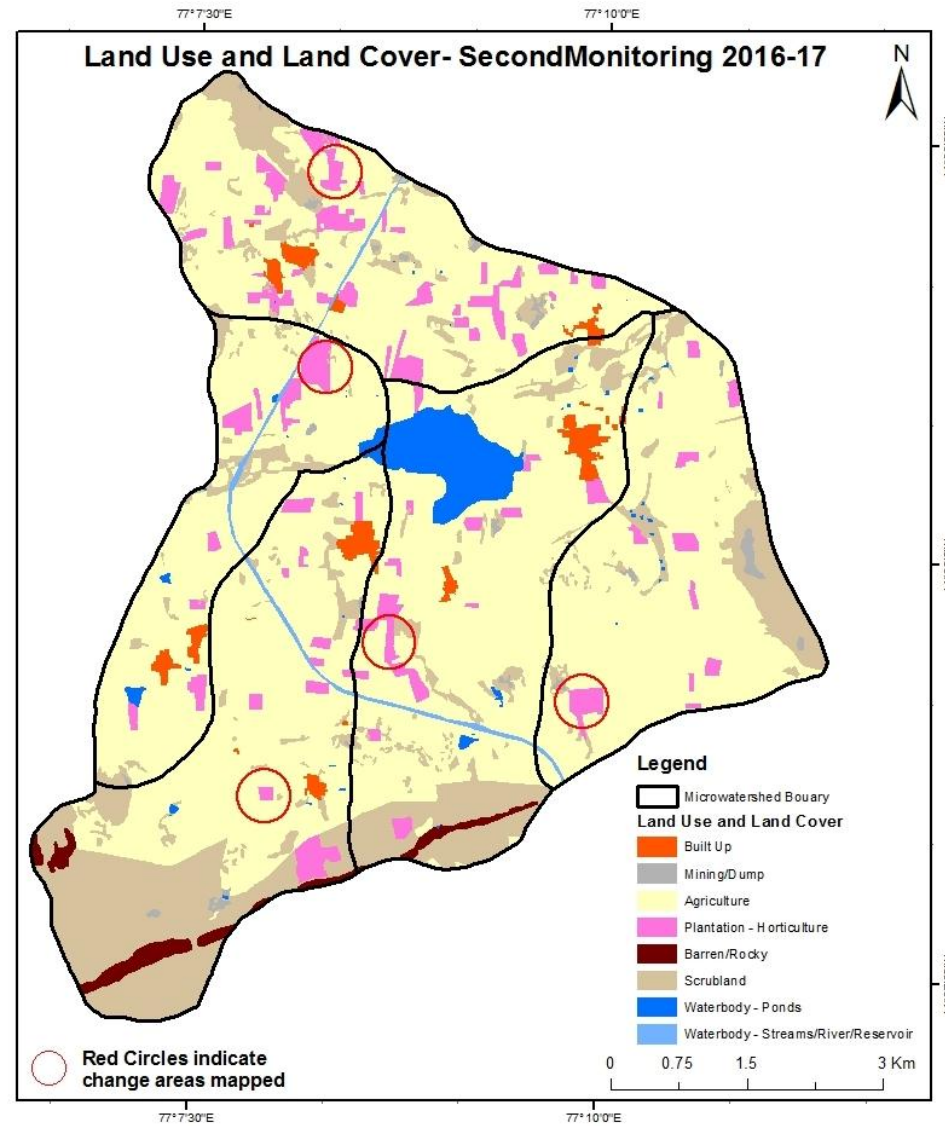
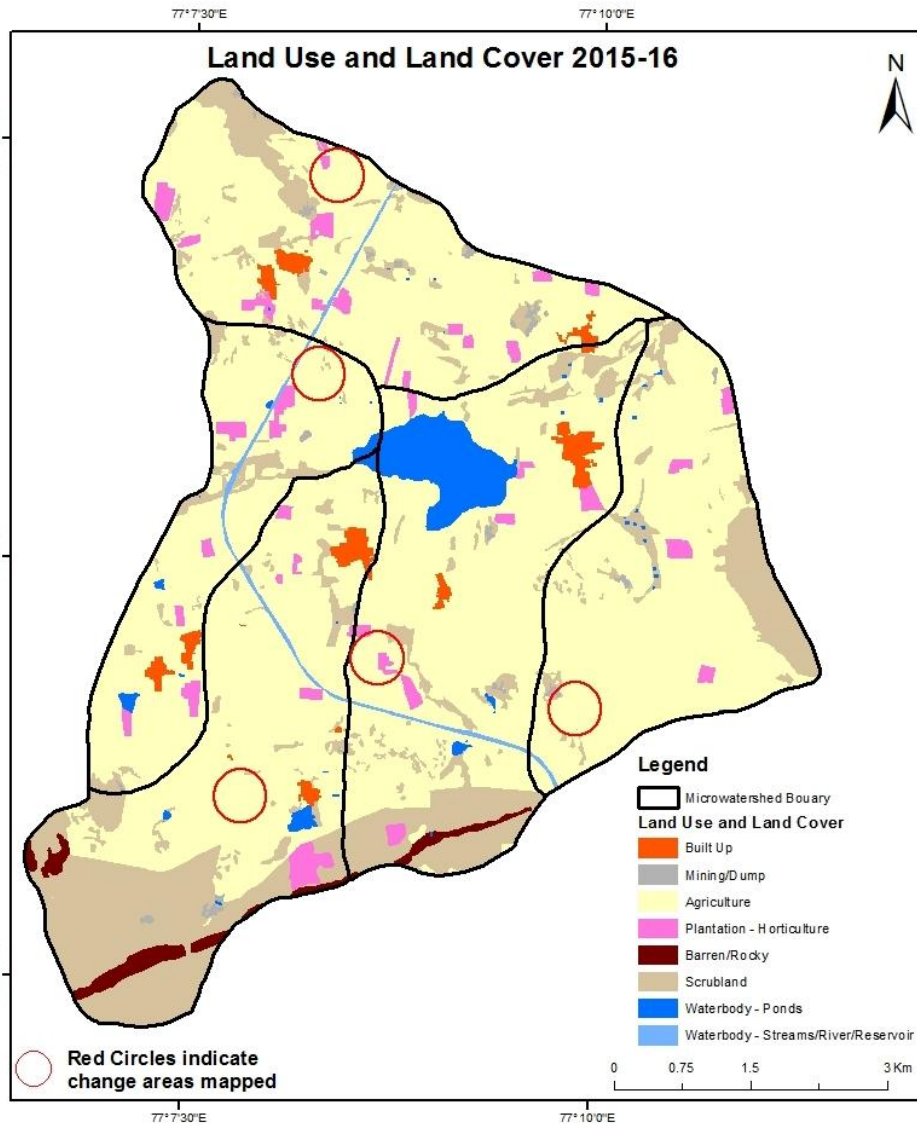
Comparative assessment of Land Use and Land Cover for Pre and Post IWMP implementation (2011-12 to 2015-16)

Scale: 1:10000



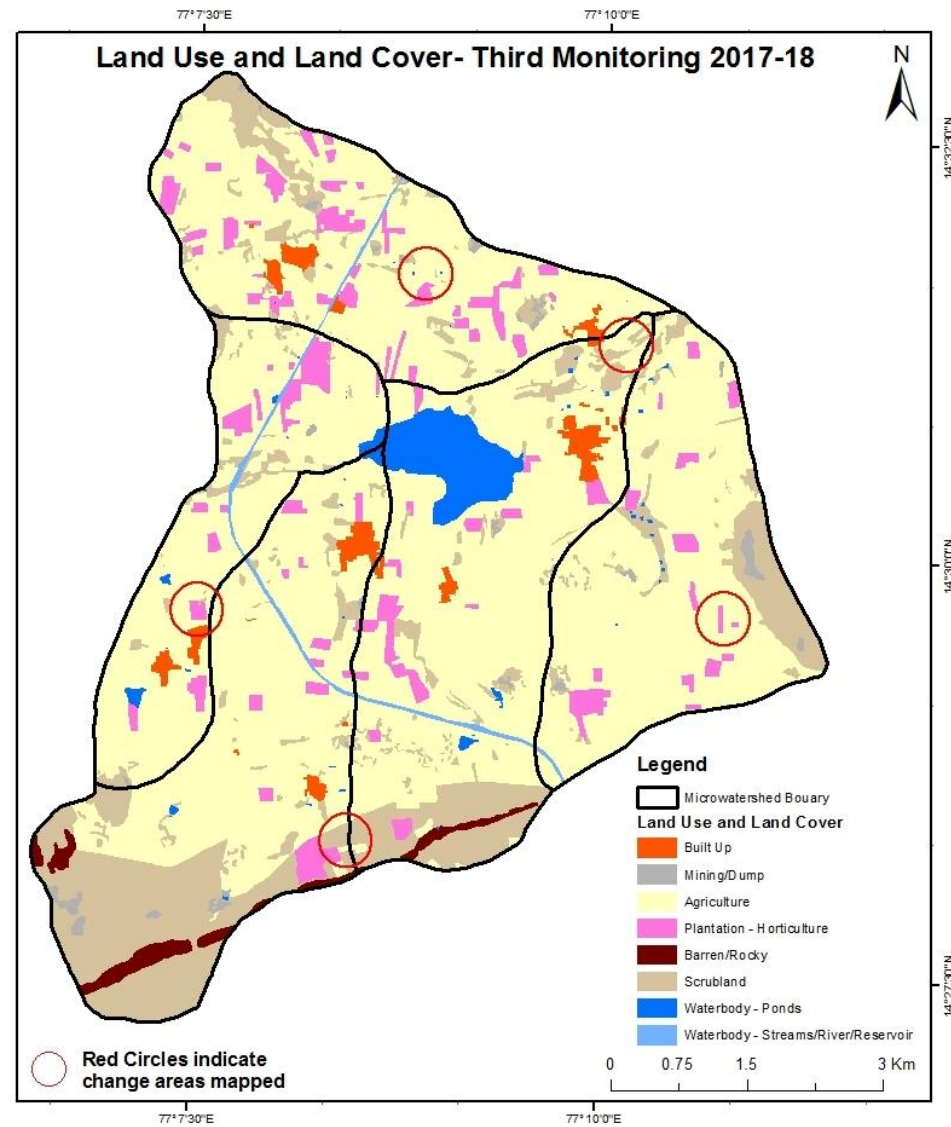
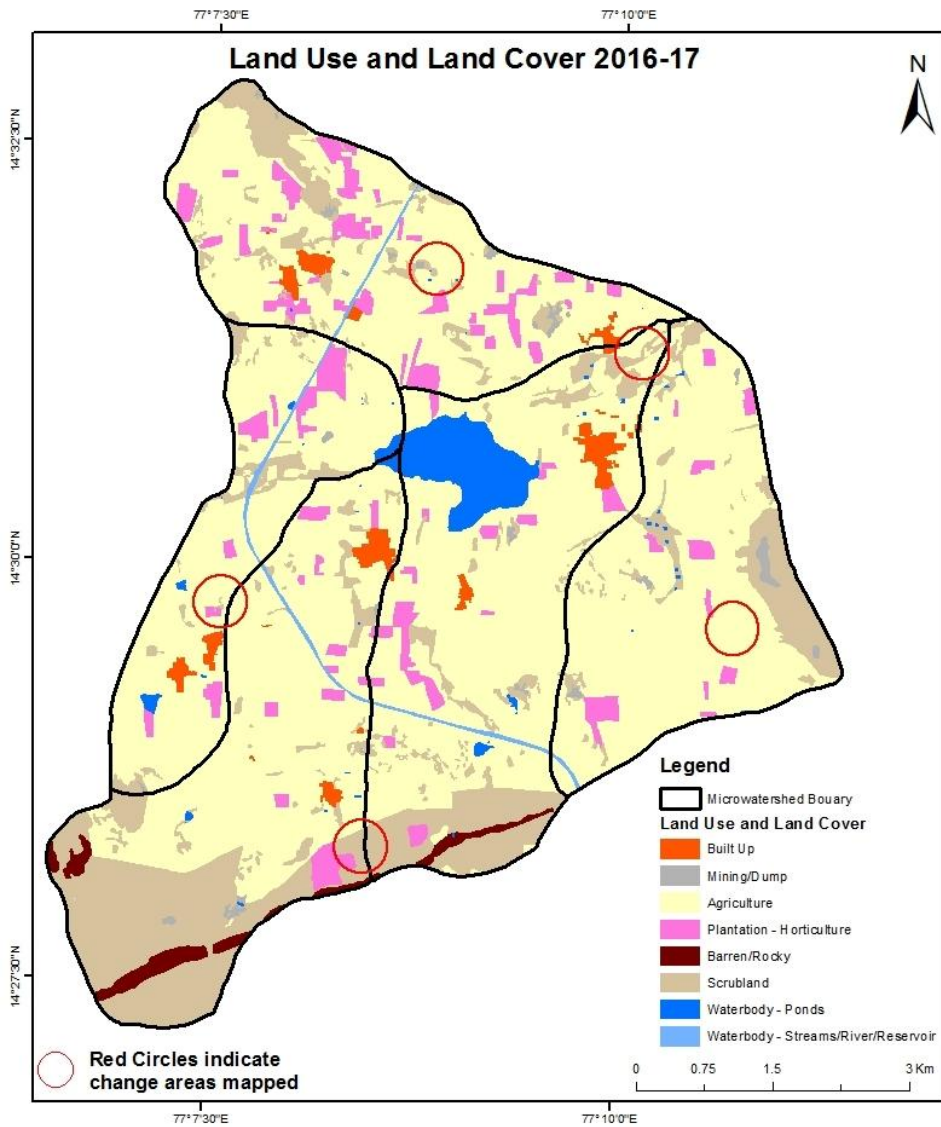
Comparative assessment of Land Use and Land Cover for Pre and Post IWMP implementation (2015-16 to 2016-17)

Scale: 1:10000



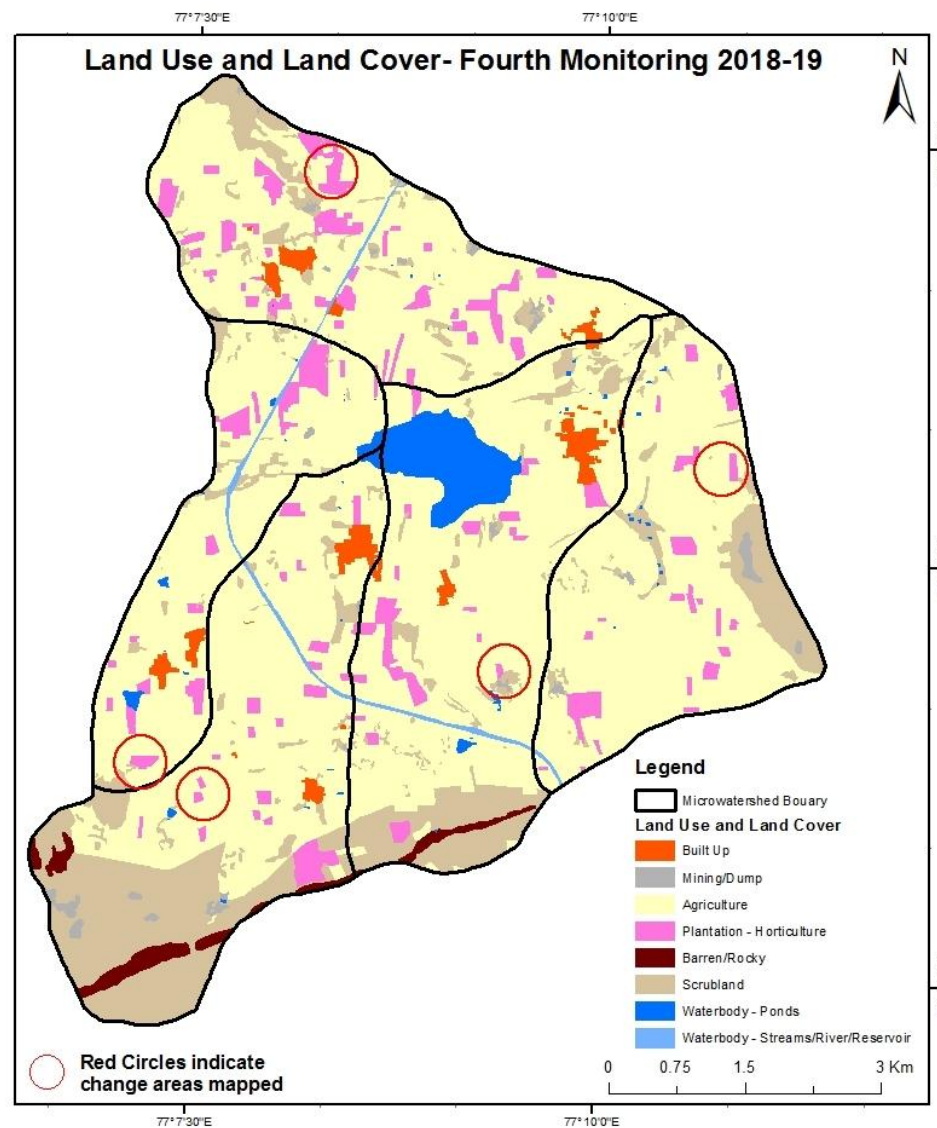
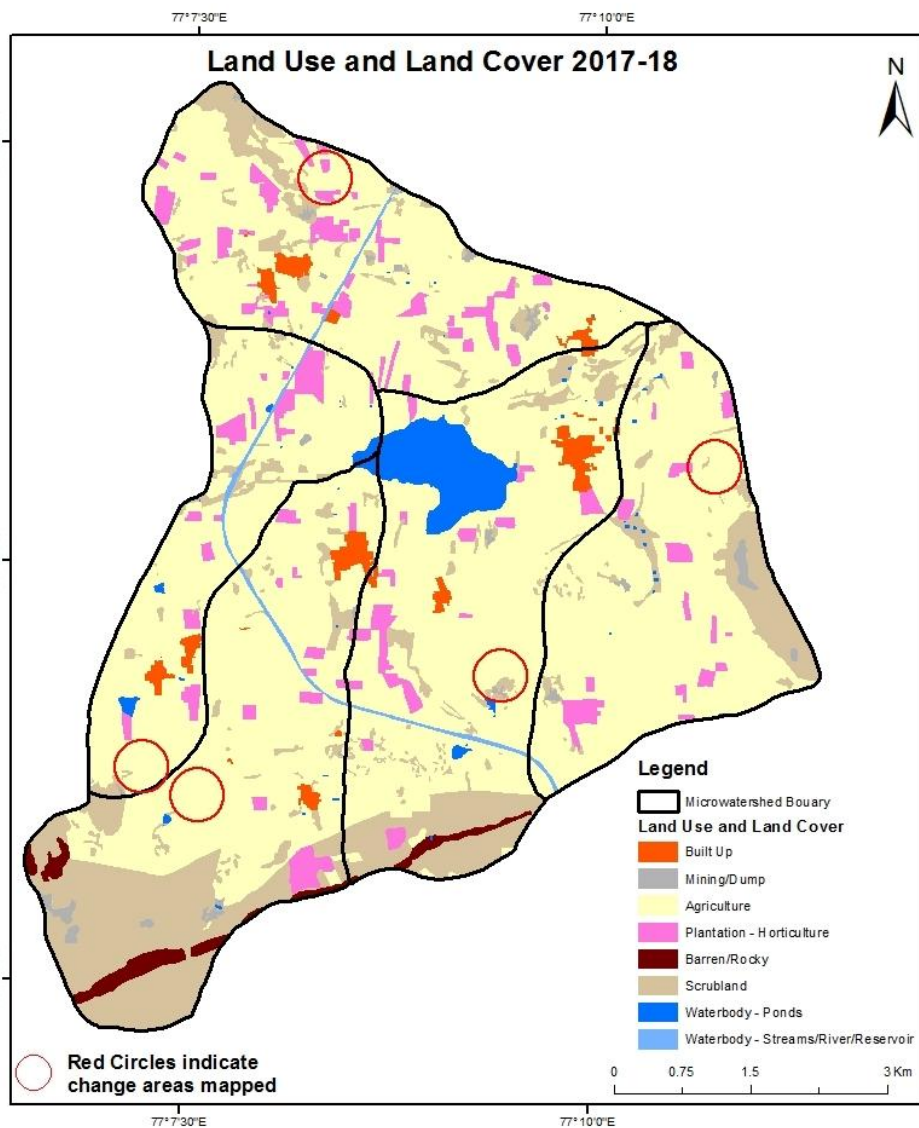
Comparative assessment of Land Use and Land Cover for Pre and Post IWMP implementation (2016-17 to 2017-18)

Scale: 1:10000



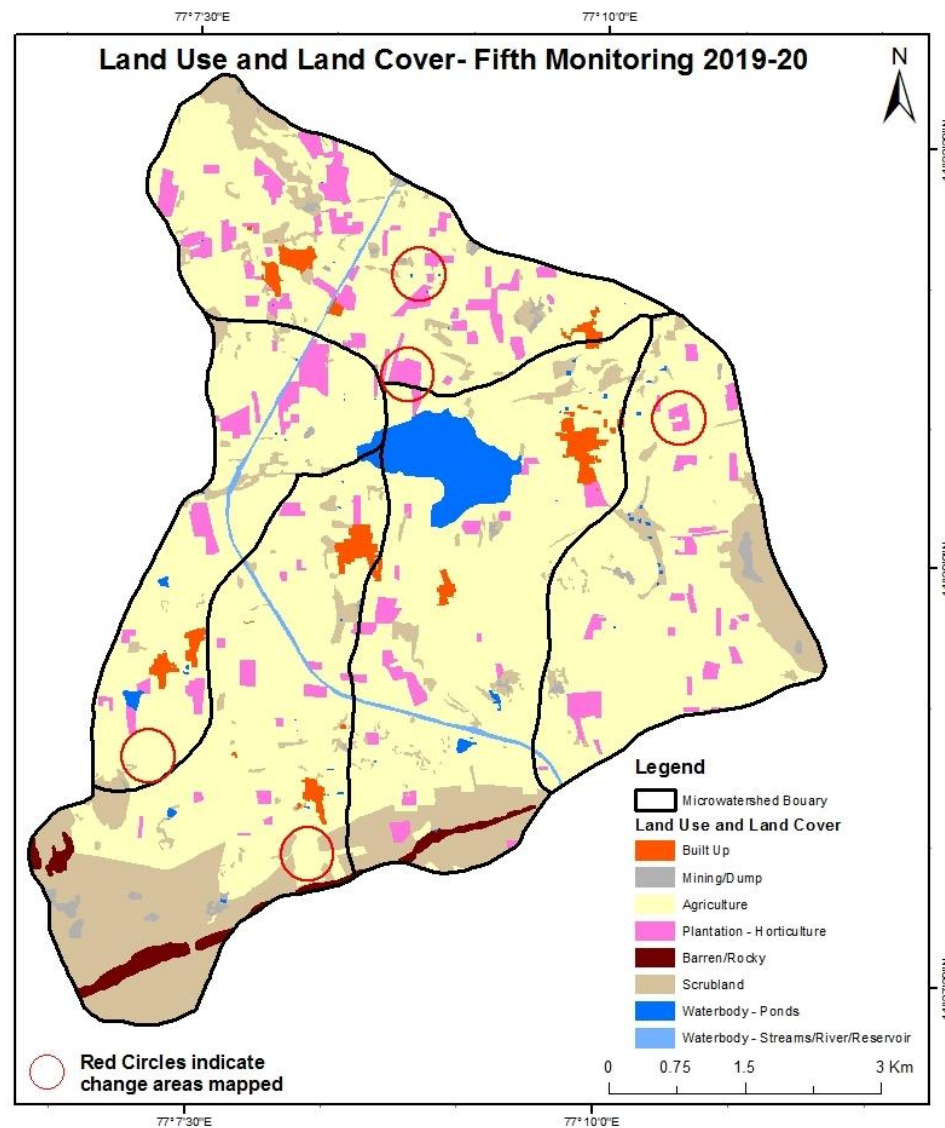
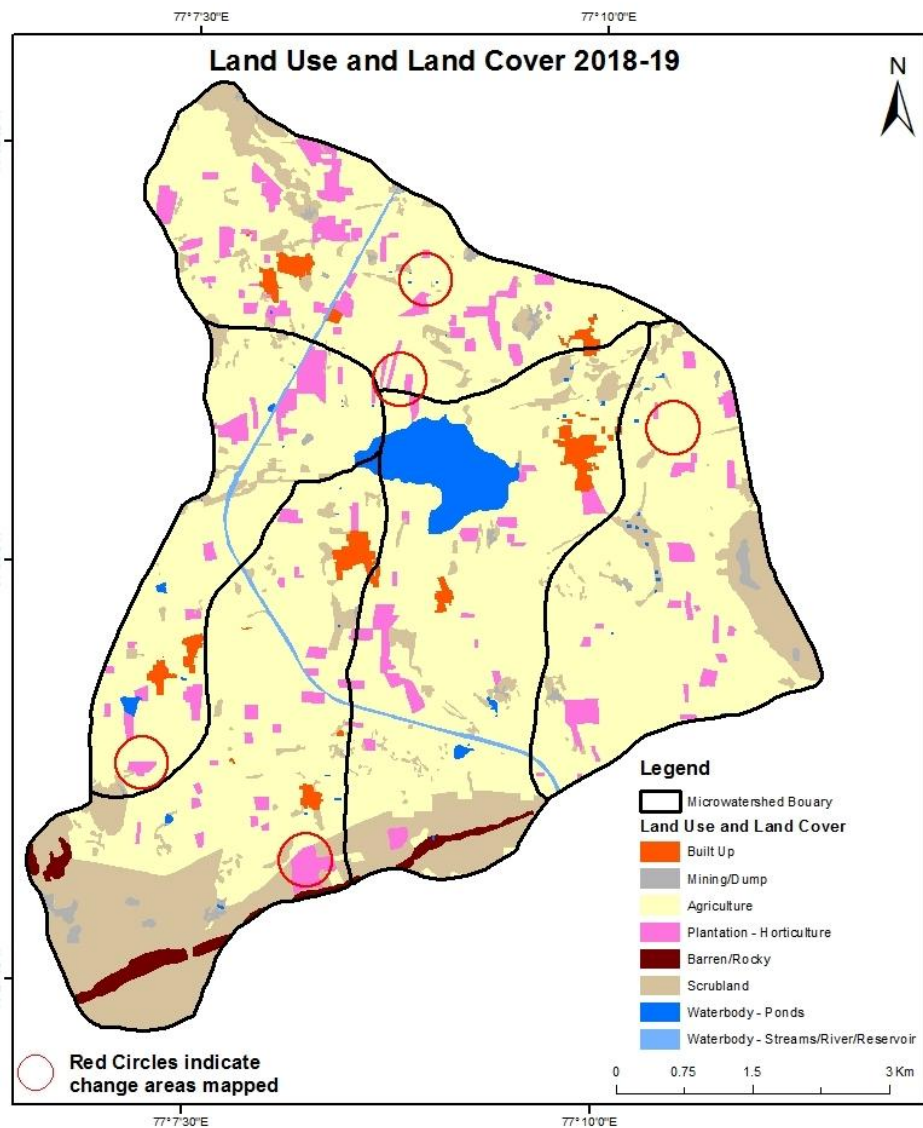
Comparative assessment of Land Use and Land Cover for Pre and Post IWMP implementation (2017-18 to 2018-19)

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

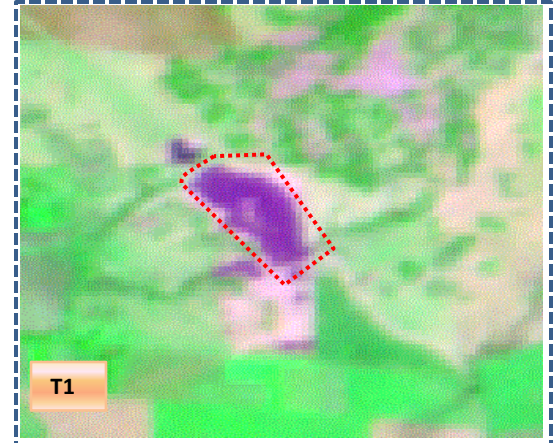


Land Use and Land Cover changes for Pre and Post treatment dates

Agriculture to Water body

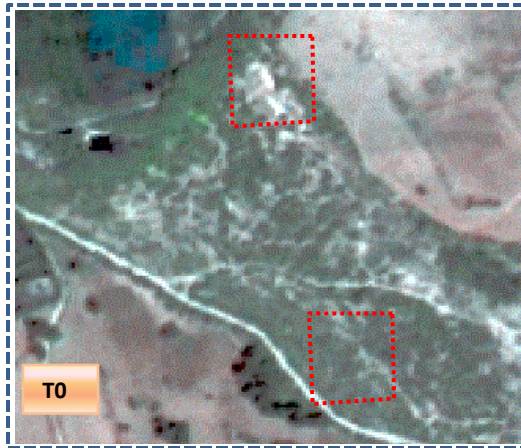


T0: 2011-12 (77°9'21.181"E 14°29'12.525"N)

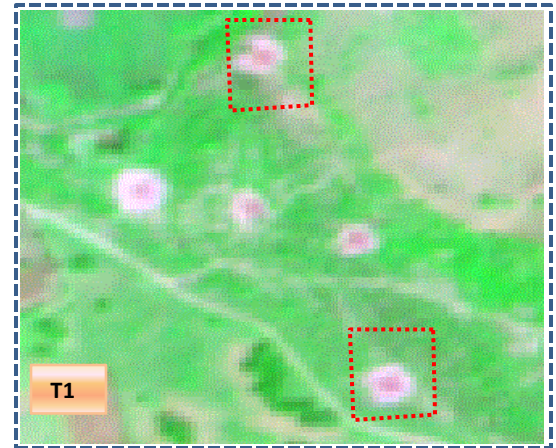


T1: 14 October 2015

Scrub to Water body



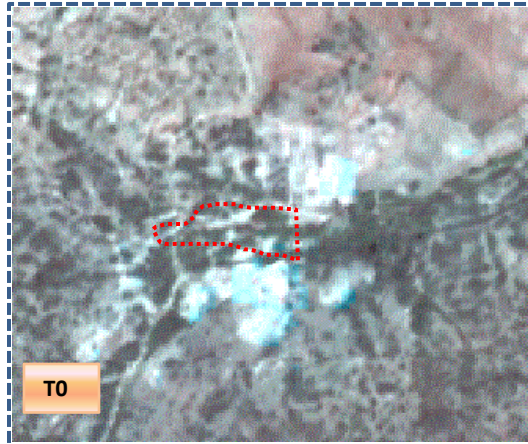
T0: 2011-12 (77°10'14.745"E 14°30'14.732"N)



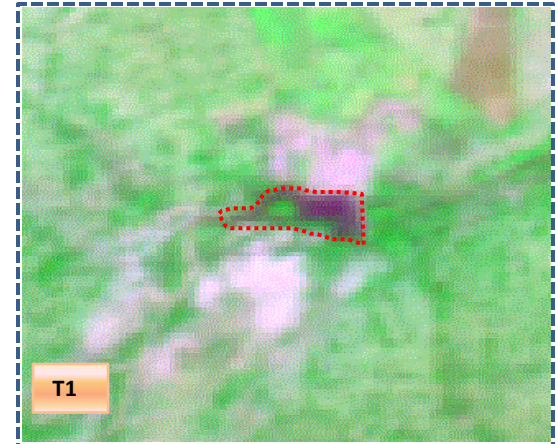
T1: 14 October 2015

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

Scrub to Water body



T0: 2011-12(77°7'41.495"E 14°27'56.301"N)

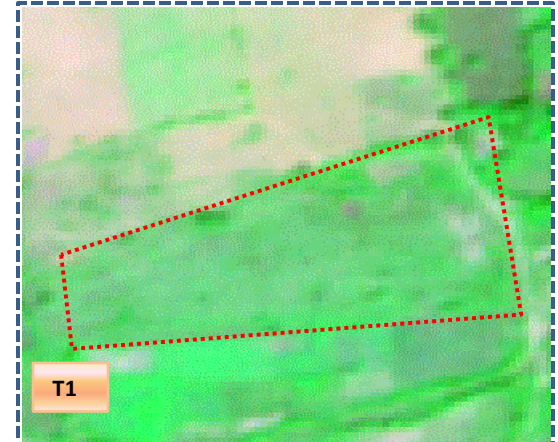


T1: 14 October 2015

Scrub to Agriculture



T0: 2011-12(77°8'21.784"E 14°30'39.561"N)



T1: 14 October 2015

Table showing change matrix depicting Land cover transitions during study period-2011-12 to 2015-16

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	57.85										57.85	
Mining/dump		8.63									8.63	
Agriculture	11.08	0.41	3420.39	1.18					34.02	8.60	3475.67	
Plantation Horticulture			52.29	137.92						0.07	190.28	
Forest												
Forest Plantation												
Barren Rocky							56.71				56.71	
Scrub	6.47	11.93	77.56					901.89		3.13	1000.98	
Waterbody- Streams/River												
Waterbody – Ponds			0.52							125.73	126.25	
Grand Total	75.40	20.96	3550.75	139.10			56.71	901.89	34.02	137.53	4916.35	

- 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 55 ha of the agriculture area has decreased and it is converted into Built-up, plantation and water body in T1.
- In T1 130 ha of the agriculture area has increased from plantations, scrubland and water body 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-2015-16 to 2016-17

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	75.40										75.40	
Mining/dump		20.96									20.96	
Agriculture	4.93		3401.50	143.91						0.41	3550.75	
Plantation Horticulture			3.58	135.51							139.10	
Forest												
Forest Plantation												
Barren Rocky							56.71				56.71	
Scrub		7.60	8.46					885.69		0.13	901.89	
Waterbody- Streams/River									34.02		34.02	
Waterbody – Ponds			5.92							131.62	137.53	
Grand Total	80.33	28.56	3419.47	279.42			56.71	885.69	34.02	132.16	4916.35	

- 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 149 ha of the agriculture area has decreased and it is converted into Built-up, plantation and water body in T2.
- In T2 17 ha of the agriculture area has increased from plantations, scrubland, and water body 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-2016-17 to 2017-18

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	80.33												80.33
Mining/dump		28.56											28.56
Agriculture	3.83		3391.69	23.81							0.14		3419.47
Plantation Horticulture			26.72	252.70									279.42
Forest													
Forest Plantation													
Barren Rocky							56.71						56.71
Scrub	0.19	7.81	54.50	0.43				822.77					885.69
Waterbody- Streams/River									34.02				34.02
Waterbody – Ponds											132.16		132.16
Grand Total	84.35	36.37	3472.91	276.93			56.71	822.77	34.02		132.30		4916.35

- 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 27 ha of the agriculture area has decreased and it is converted into Built-up , plantations and water body in T3.
- In T3 81 ha of the agriculture area has increased from plantations 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-2017-18 to 2018-19

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		
T3													
Built up	84.35												84.35
Mining/dump		36.37											36.37
Agriculture	0.71		3426.08	46.11									3472.91
Plantation Horticulture			20.05	256.88									276.93
Forest													
Forest Plantation													
Barren Rocky							56.71						56.71
Scrub		1.13	23.61					798.02					822.77
Waterbody- Streams/River									34.02				34.02
Waterbody – Ponds											132.30		132.30
Grand Total	85.06	37.51	3469.74	303.00			56.71	798.02	34.02		132.30		4916.35

- 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 46 ha of the agriculture area has decreased and it is converted into Built-up and plantations in T4.
- In T4 43 ha of the agriculture area has increased from plantations 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-2018-19 to 2019-20

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	85.06										85.06	
Mining/dump		37.51									37.51	
Agriculture	0.22		3401.32	67.64						0.55	3469.74	
Plantation Horticulture	0.07		55.37	247.53						0.04	303.00	
Forest												
Forest Plantation												
Barren Rocky							56.71				56.71	
Scrub	1.81	0.62	19.99					775.59			798.02	
Waterbody- Streams/River									34.02		34.02	
Waterbody – Ponds			0.42							131.88	132.30	
Grand Total	87.17	38.13	3477.10	315.17			56.71	775.59	34.02	132.47	4916.35	

- 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 68 ha of the agriculture area has decreased and it is converted into Built-up, plantations and water body in T5.
- In T5 75 ha of the agriculture area has increased from 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 increase of 40 Hectares in Reservoir / Tanks area as compared between baseline LU/LC data 2011-12 (T0) & 2019-20 (T5) years.
4. There is an increase of 75, 53 & 07 Hectares from T0 to T1, T2-T3 & T4-T5 respectively, there is a decrease of 131 & 03 hectares from T1-T2 & T3-T4 and overall increase of 7.3 Hectares in Crop land area as compared between baseline LU/LC data 2011-12 (T0) & 2019-20 (T5) years.
5. There is an increase of 12 ha of the Plantation/Horticulture area has been increased between 2011-12 (T0) & 2019-20 (T5) years.
6. There is a decrease of 22 Hectares in Scrubland area as compared between 2011-12 (T0) & 2019-20 (T5) years.
7. Farm ponds (9) is visible on IWMP Bhuvan Srishti portal out of Bhuvan Drishti photo of Farm ponds (9) verified from the portal.