

MONITORING OF IWMP WATERSHED PROJECTS USING GEO-INFORMATION

SUMMARY REPORT

KURNOOL -05/2009-10
Andhra Pradesh

Submitted to NRSC, Balanagar, Hyderabad
January-2021

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-05/2009-10, Kurnool District of Andhra Pradesh. The total geographical area of the project is 10405 ha. It comprises of 17 micro watersheds.
- In the project area 27 Drishti photos were uploaded showing 9 drainage treatment, 14 Farm ponds 1 check dams, 1 New activities like Horticulture, Plantation and remaining showing others.
- Project area as per image analysis has witnessed distinguishable increase in farm ponds, showing 47 new farm ponds or dug out pits with 0.56 ha increase in the area.
- Major percentage i.e. 85.47% is covered by the agriculture, 10.61 % is covered by Scrub land, and remaining by other land use classes.

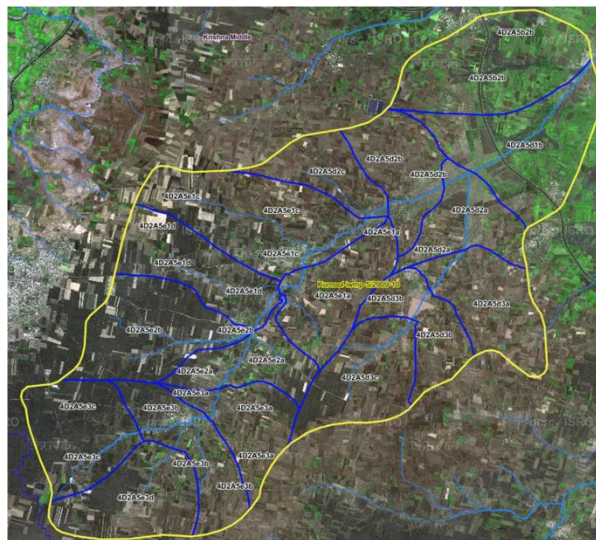
Satellite Data and Ancillary Data

Satellite data*	T0-A**	T0-B**	T5
	2009-10	2011-12	2017-18
LISS IV	2009-10		
SCENE 1			26-Mar-18
SCENE2			
SCENE 3			
SCENE 4			
CARTO	2009-10		
SCENE 1			26-Mar-18
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	27
4	Detailed Project Report	

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



Legend



Drainage (1:10000 Scale)

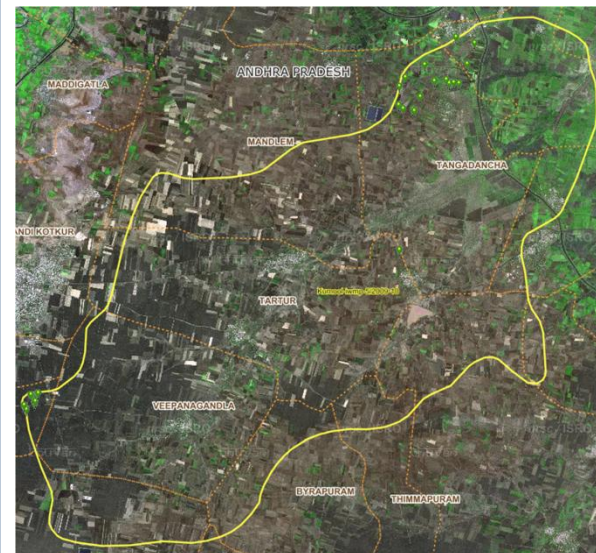


MWS Boundary



Project Boundary

Natural Color Composite overlaid with Drishti Points



Drishti Upload Status

Classification of the Activities

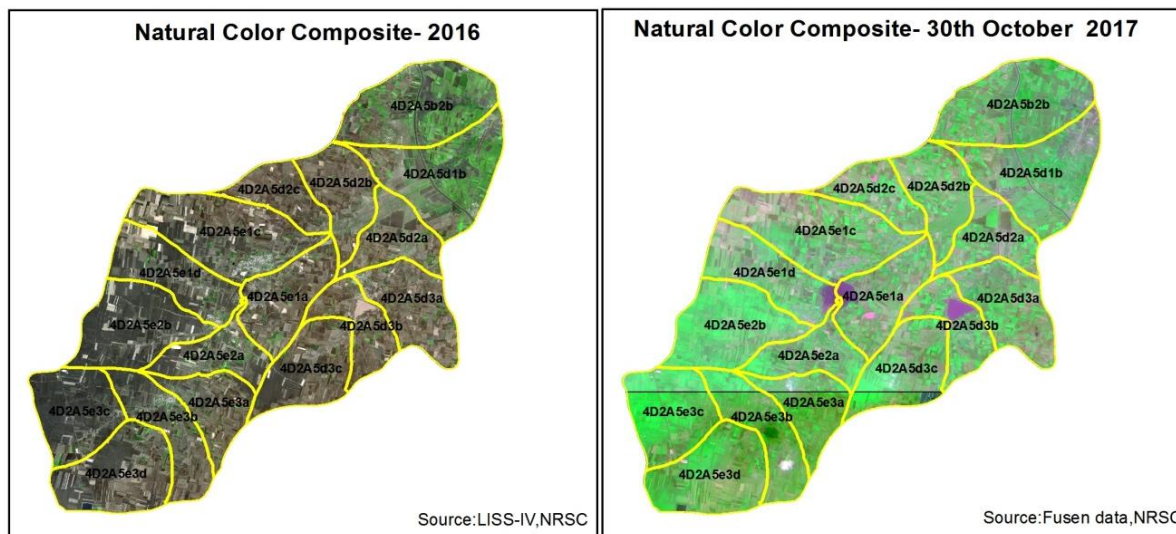
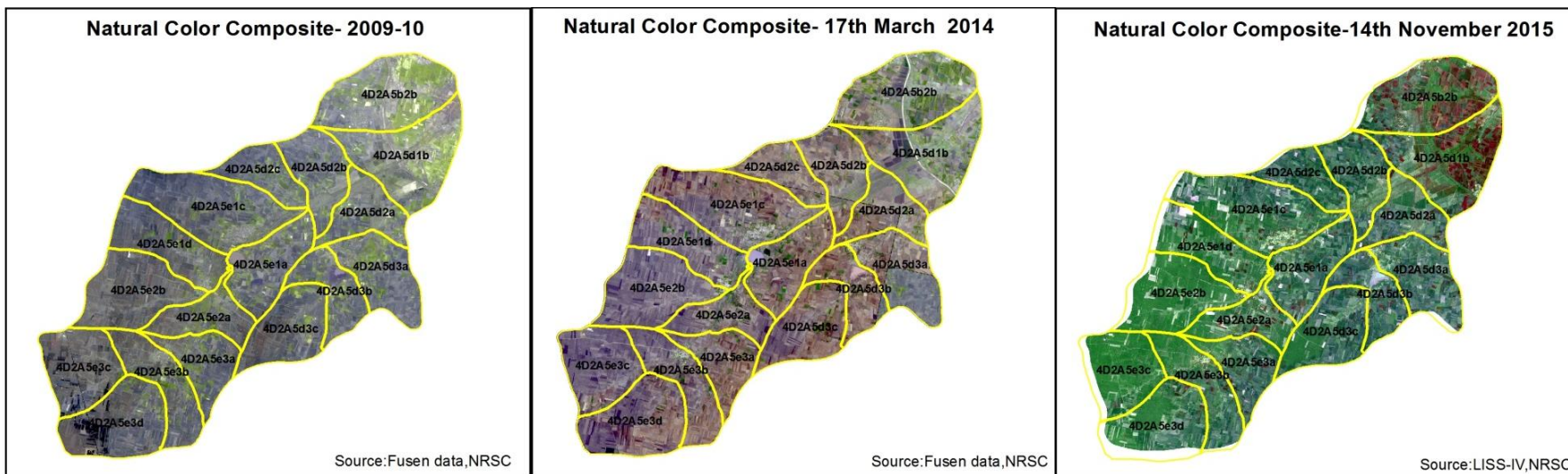
Sr. No	Activity	Drishti Photo	Visible on satellite
1	Afforestation	0	0
2	Horticulture	0	0
3	Agriculture	0	0
4	Blockplanting	0	0
5	Bund planting	0	2
6	Drainage Treatment	0	0
7	Farm ponds/Dug out pit	17	14
8	Check dams (Civil work)	1	1
9	New Activity	1	1
10	Om (Other measurement)	2	1
11	LM (Livelihood Measures)	0	0
12	Nallah Bunds/Drainage treatment	14	9
13	Percolation tanks / Ground water recharge structure	0	0
14	Production System and Micro-Enterprises	0	0
15	Livelihood Activities	0	0
16	Capacity Building Activities	0	0
17	Agronomic measure	1	1
18	Others	0	0
	TOTAL	38	27

MONITORING IN THE PROJECT AREA

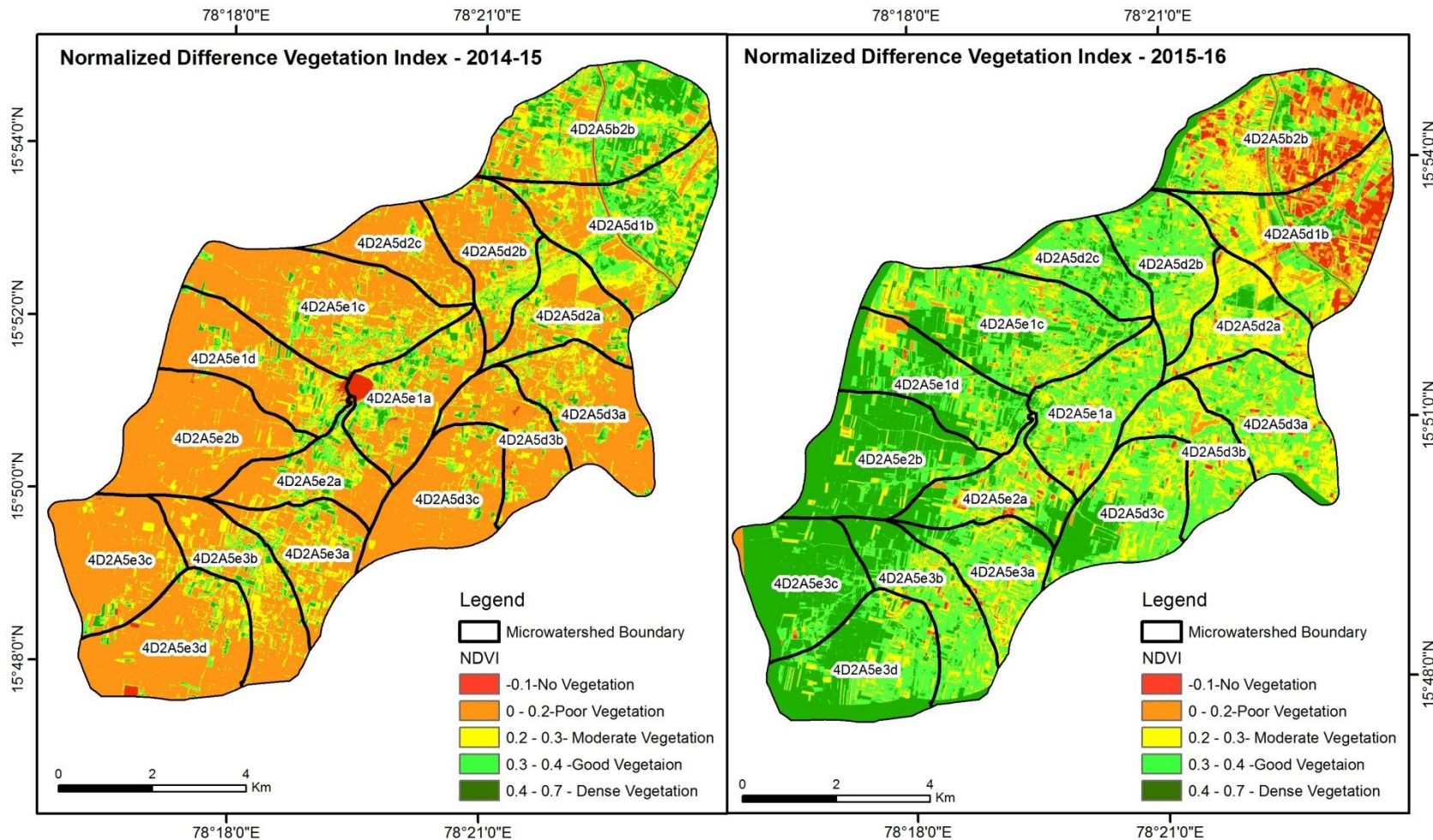
Site Wise Changes in the Project

- Impacts of the activities carried out are presented through combination of Drishti and Srishti captures.
- T0 is the baseline period before implementation (2009-10) and T5 is 2017-18 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 – 2009-10 to 2017-18



Changes in Vegetation Cover



NDVI (2014-15)

NDVI (06 April 2015)

Monitoring of activities in Kurnool Dt Andhra Pradesh. IWMP-05/2009-10



T0

T0:2009-10



T1

T1: 21 December 2013



Drishti SI no. 82775 MWS :4C3E2j1c

Check dam



T0

T0:2009-10



T1

T1: 21 December 2013



Drishti SI no.144310 MWS : 4D2A5e3c

Drainage treatment (Loose boulder)

Monitoring of activities in Kurnool Dt Andhra Pradesh. IWMP-05/2009-10



T0

T0: 2009-10



T1

T1: 21 December 2013



Drishti Sl no. 1669660 MWS :4D2A5b2b

Checkdam



T0

T0: 2009-10



T1

T1: 21 December 2013



Drishti Sl no. 164784 MWS :4D2A5b2b

Farm pond

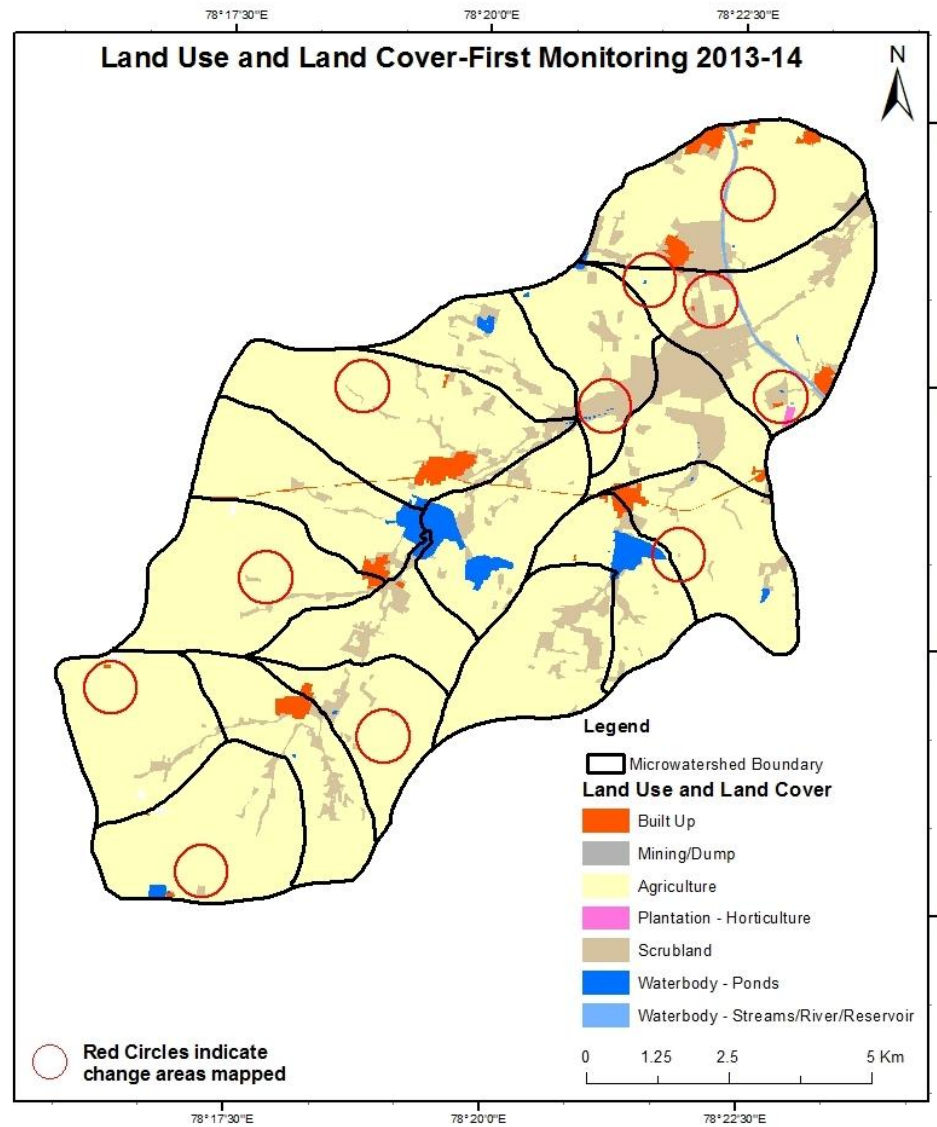
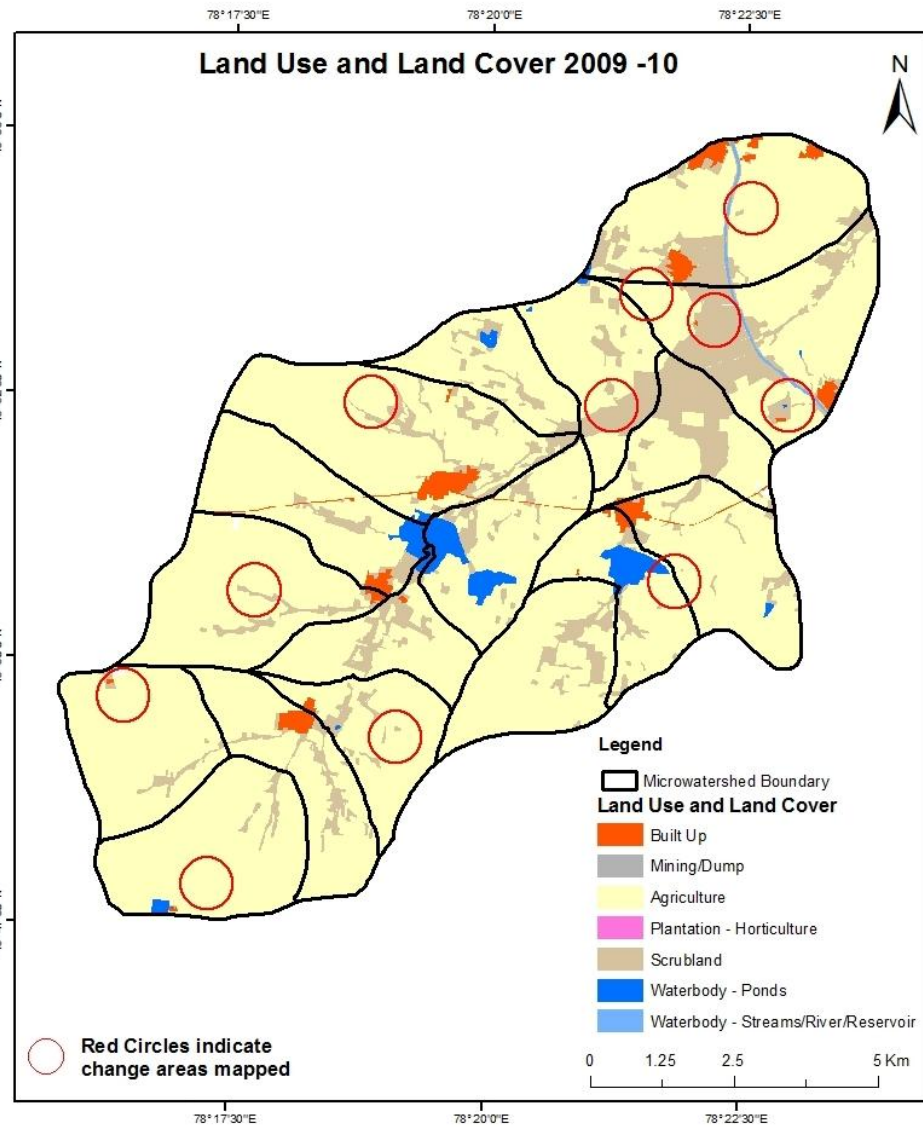
MONITORING IN THE PROJECT AREA

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 (2009-10) and row represents the T5 (2017-18)

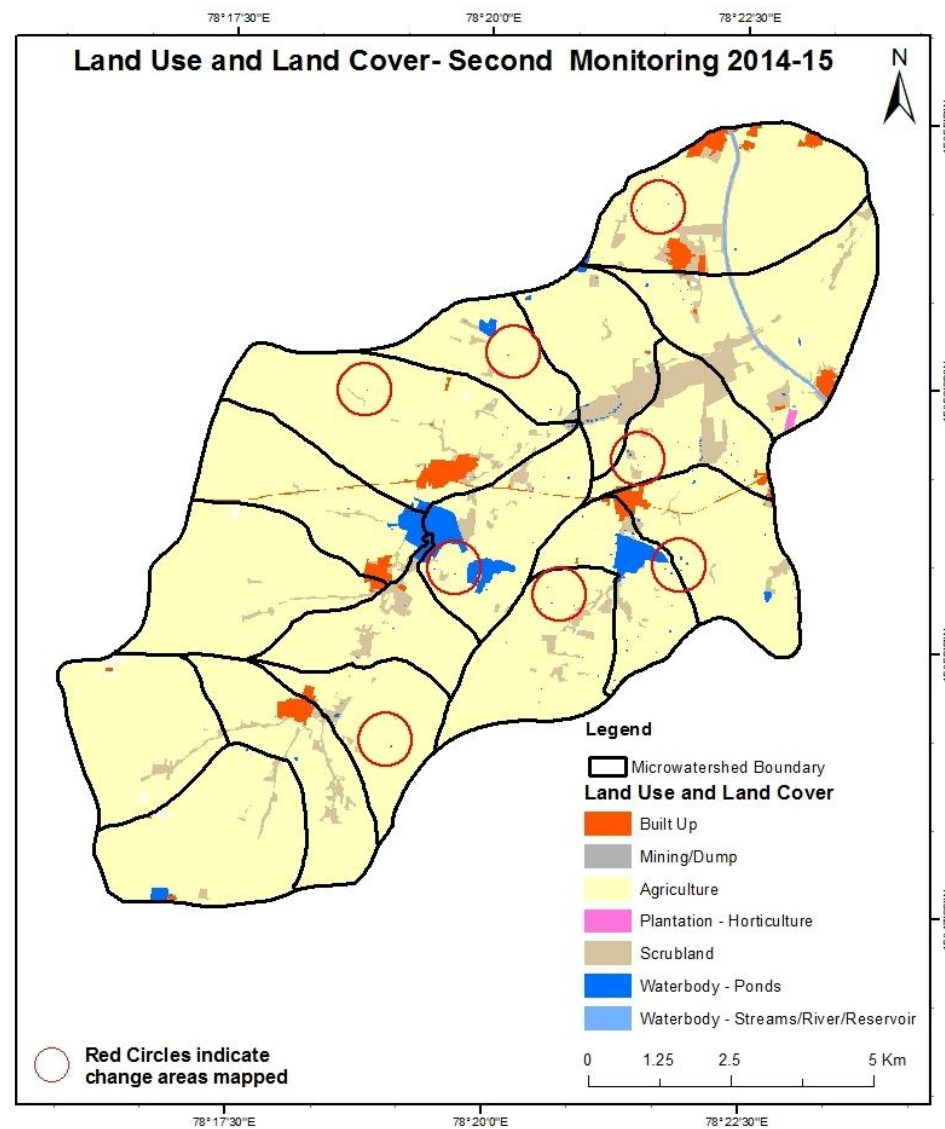
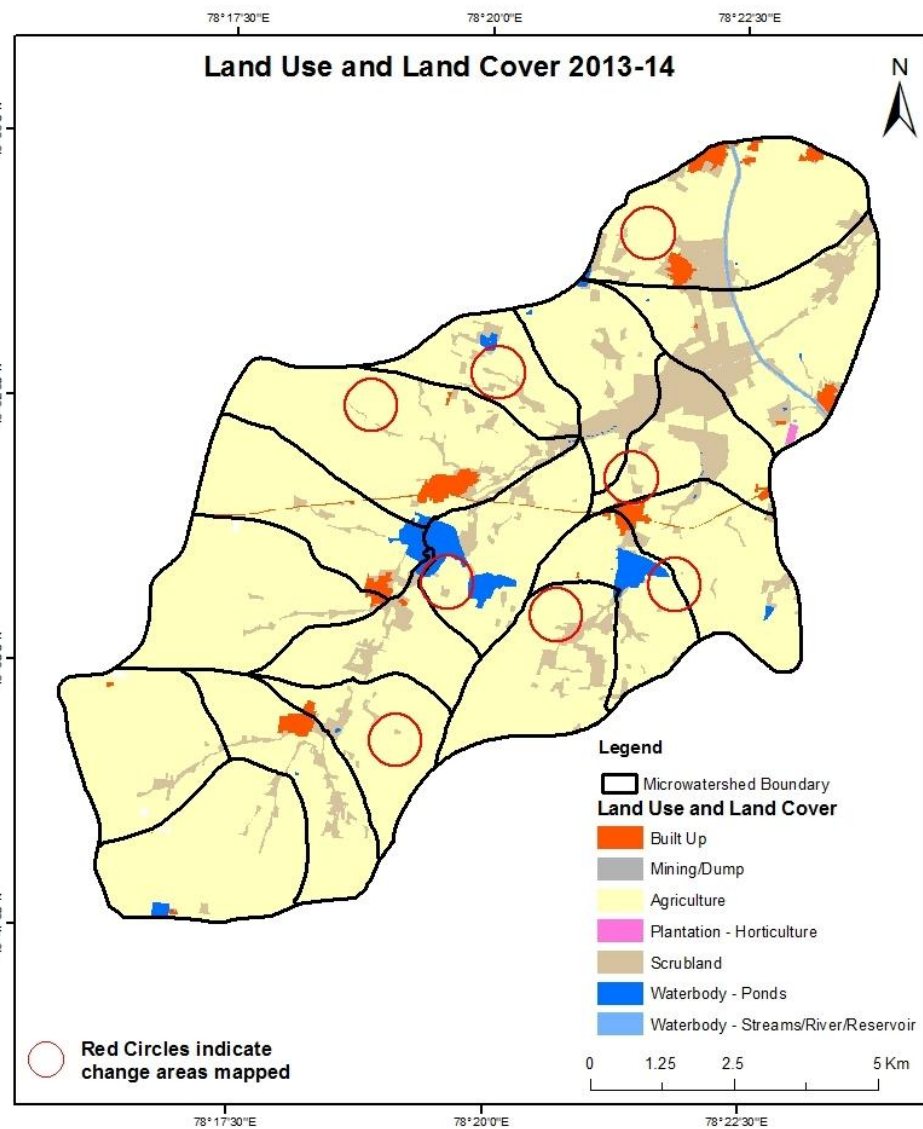
Comparative assessment of Land Use and Land Cover for Pre and Post IWMP implementation (2009-10 to 2013-14)

Scale: 1:10000



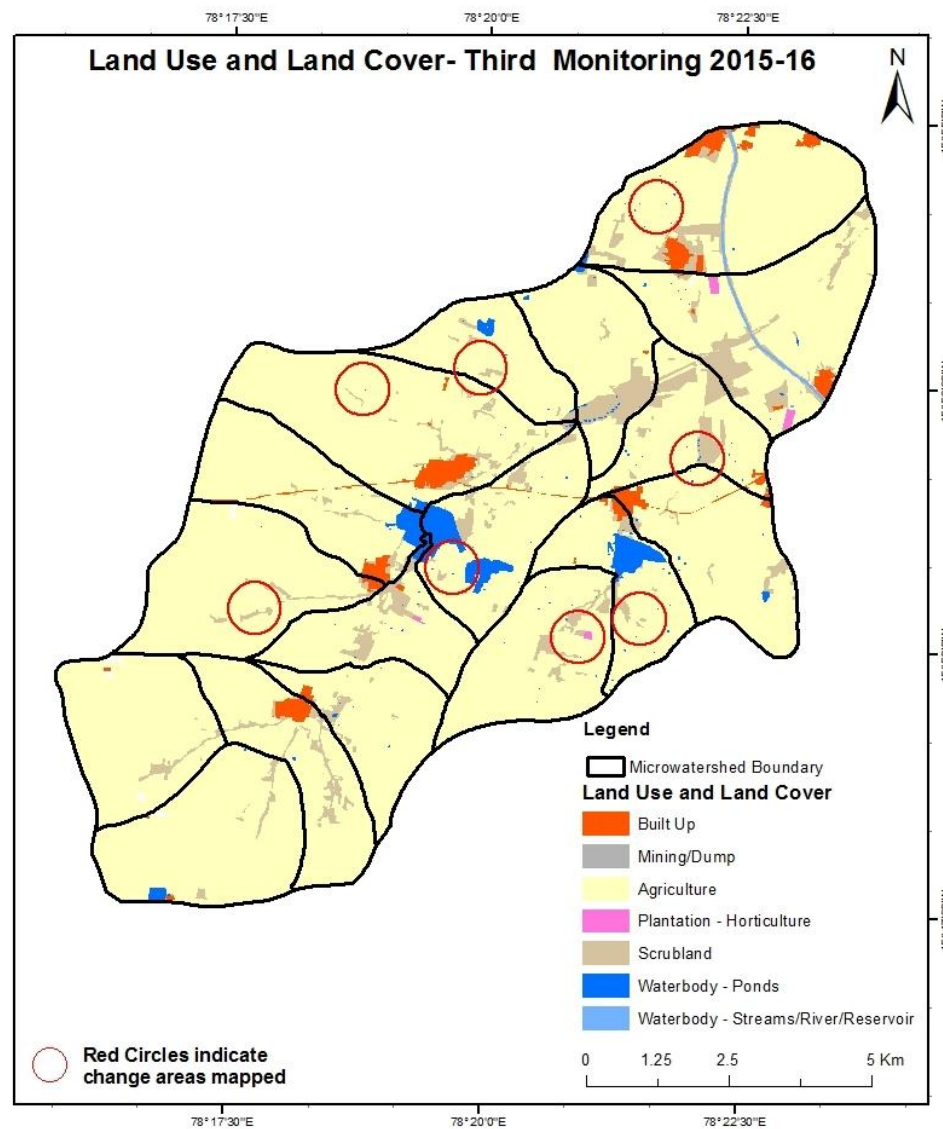
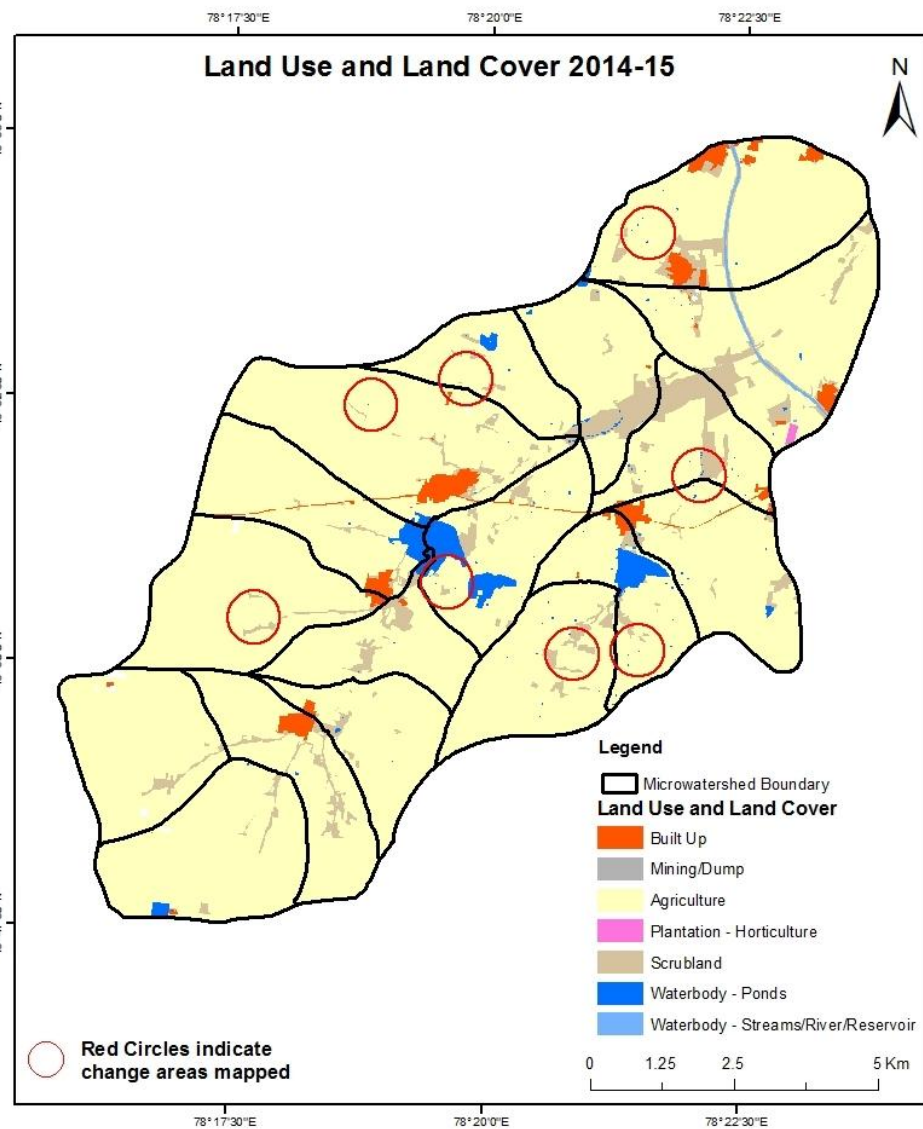
Comparative assessment of Land Use and Land Cover for Pre and Post IWMP implementation (2013-14 to 2014-15)

Scale: 1:10000



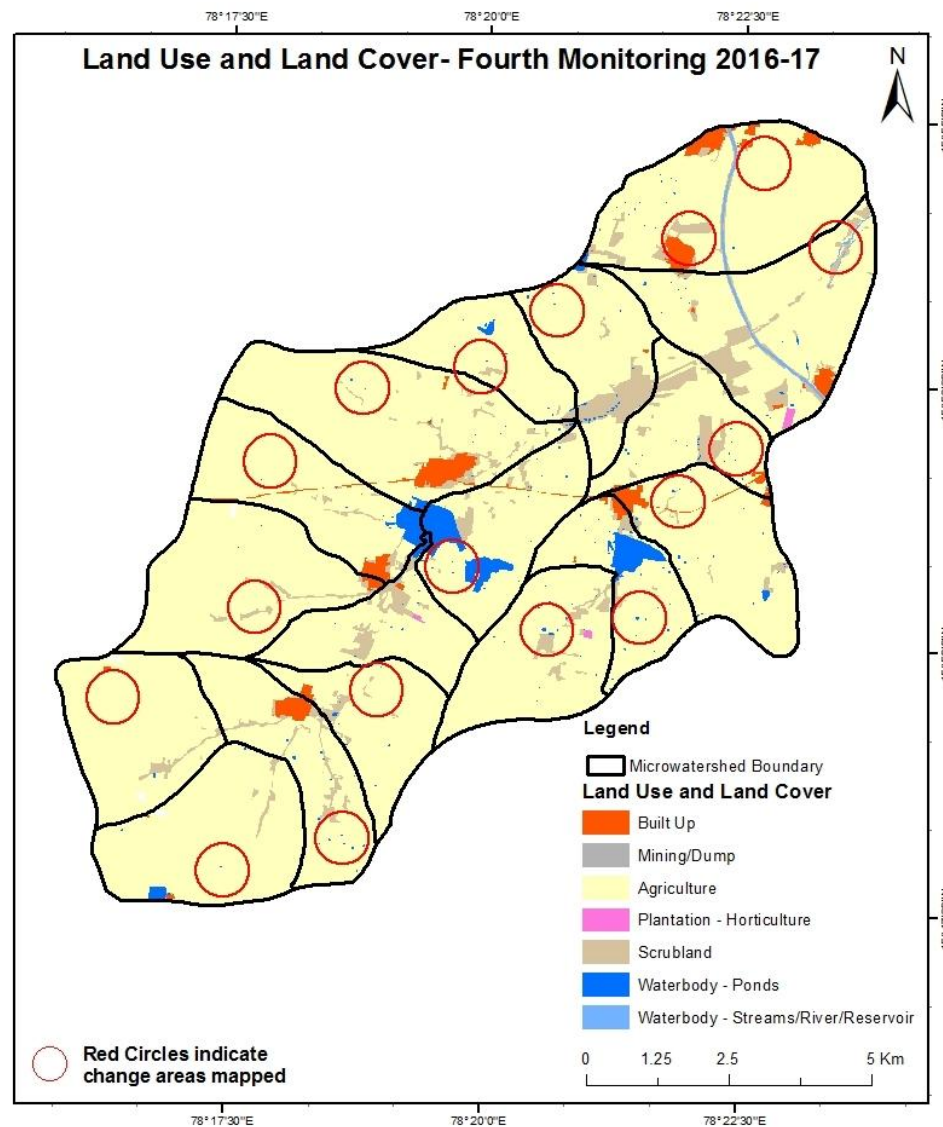
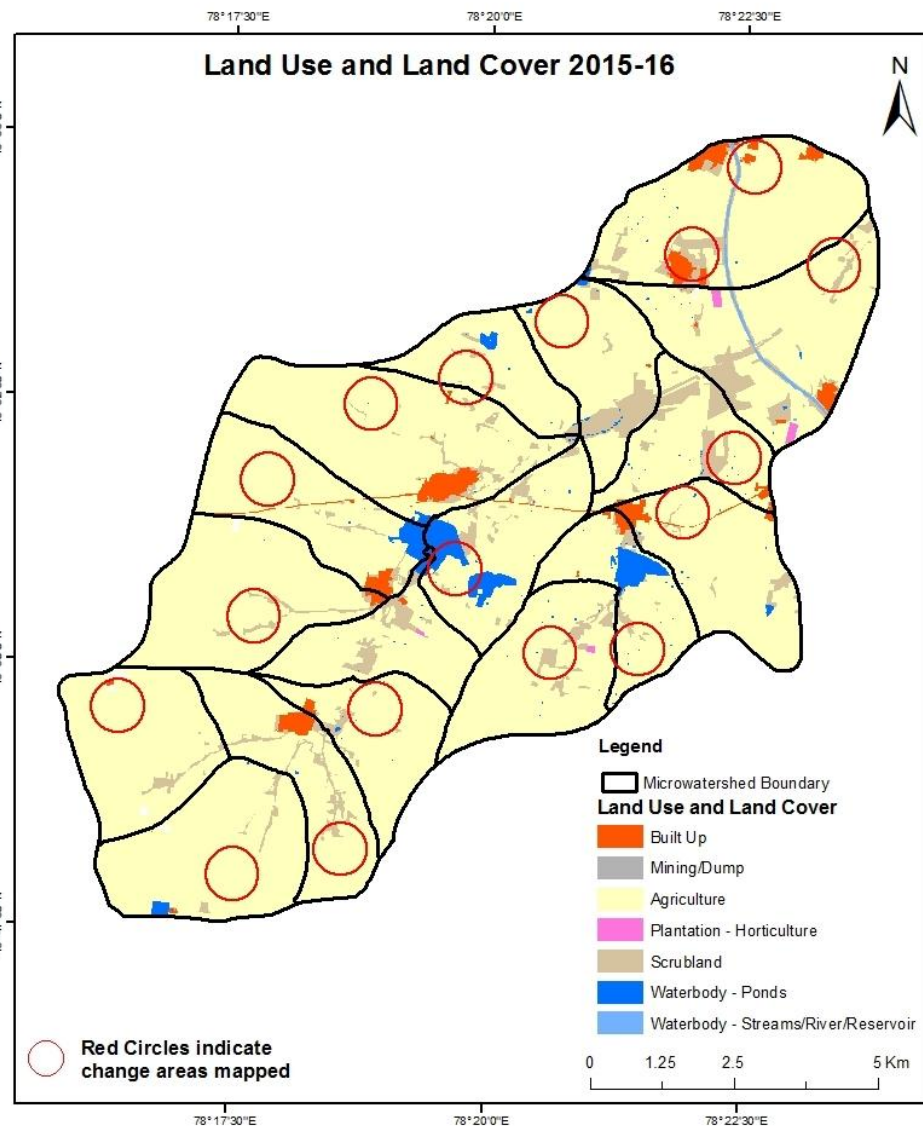
Comparative assessment of Land Use and Land Cover for Pre and Post IWMP implementation (2014-15 to 2015-16)

Scale: 1:10000



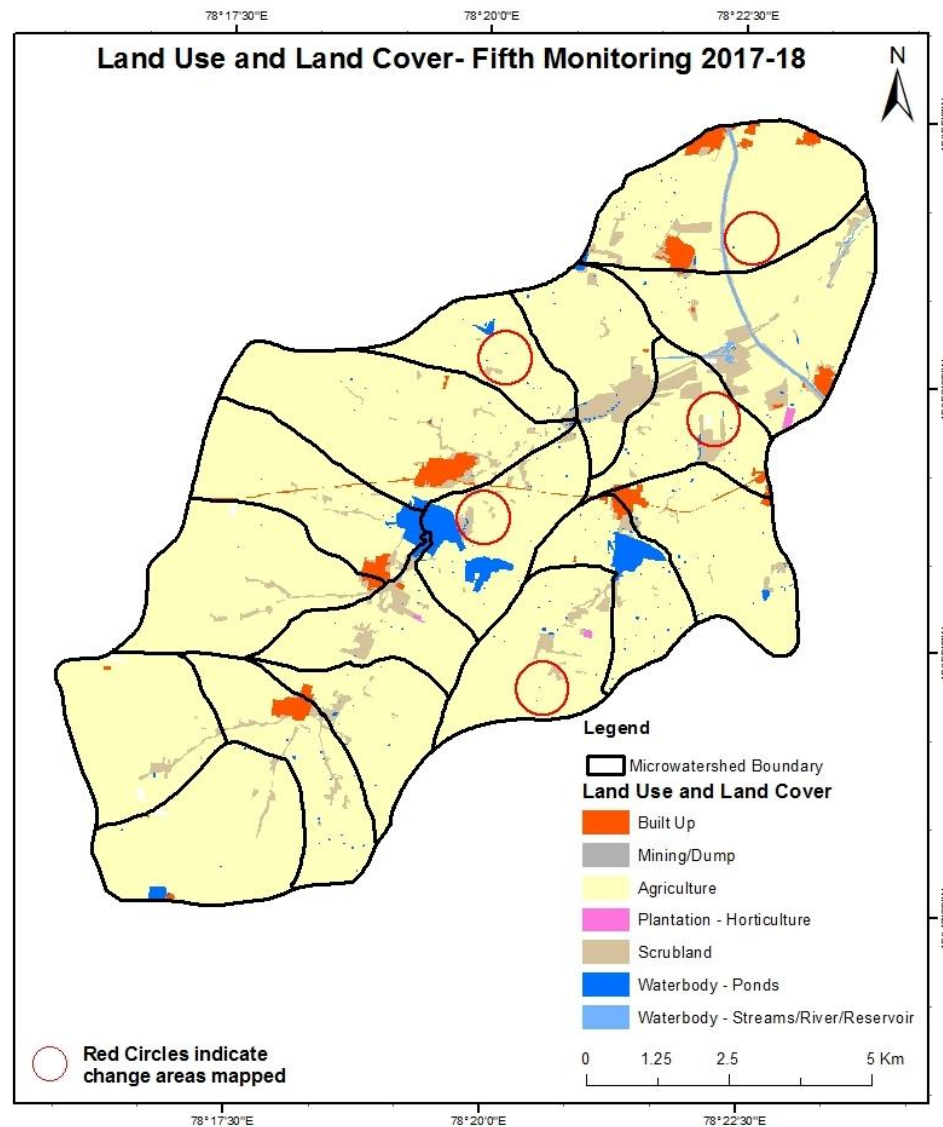
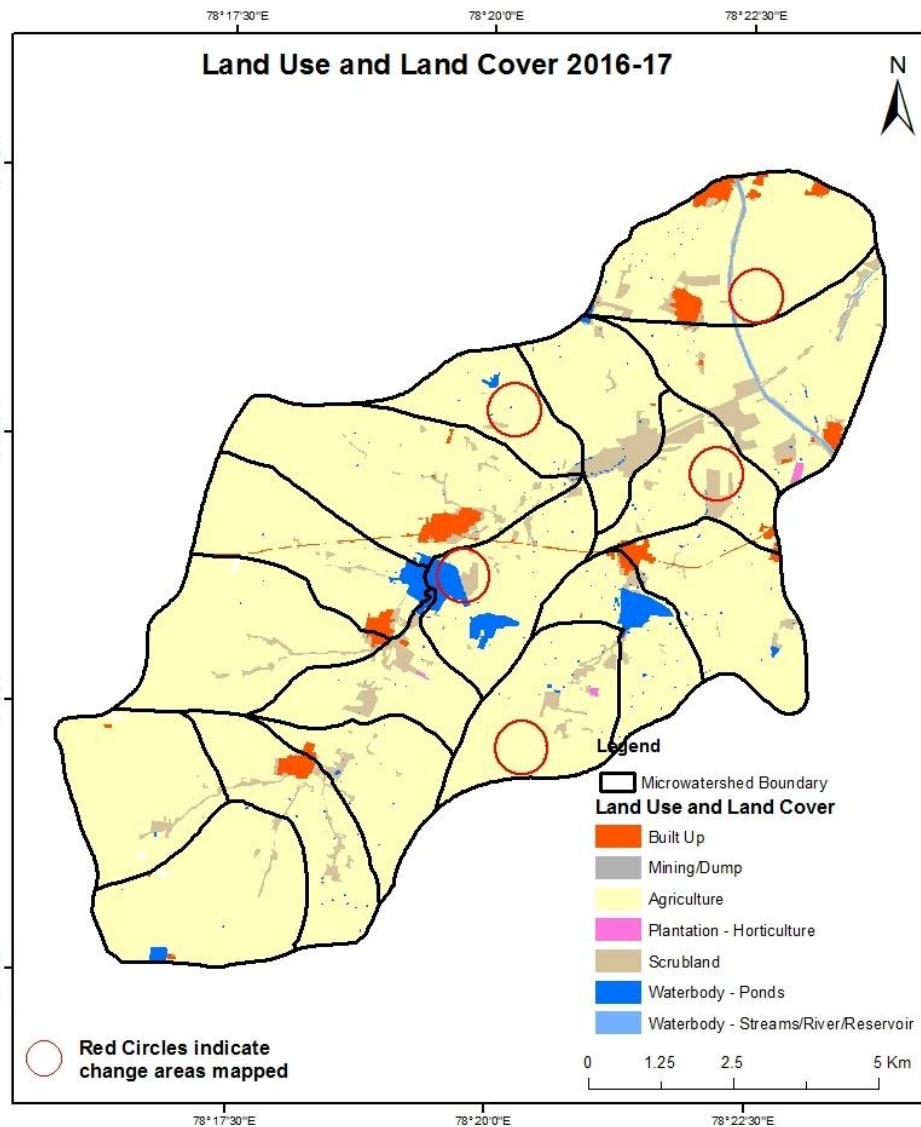
Comparative assessment of Land Use and Land Cover for Pre and Post IWMP implementation (2015-16 to 2016-17)

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



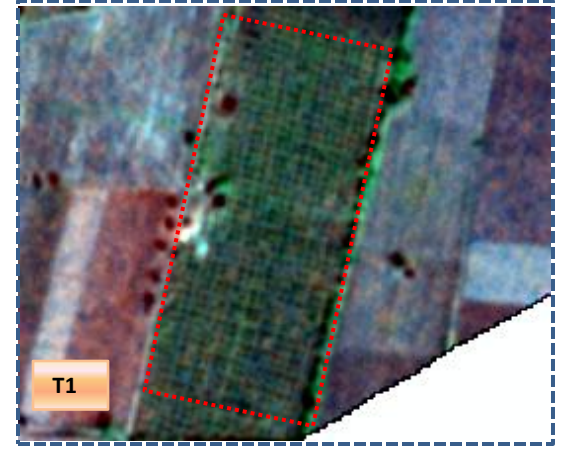
Land Use and Land Cover changes for Pre and Post treatment dates

Agriculture to Plantation



T0

T0: 2009-10



T1

T1: 21 December 2013

Agriculture to Water body



T0

T0: 2009-10



T1

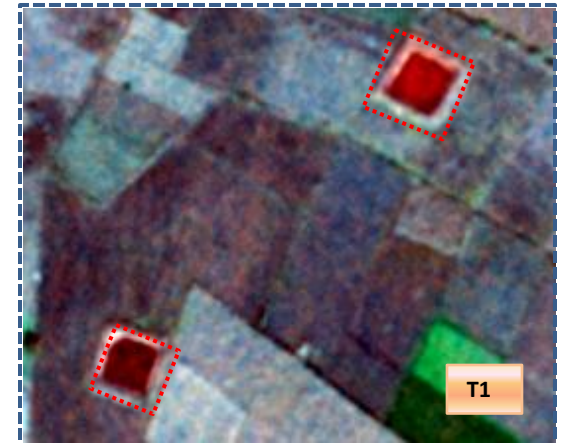
T1: 21 December 2013

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

Agriculture to Water body



T0: 2009-10

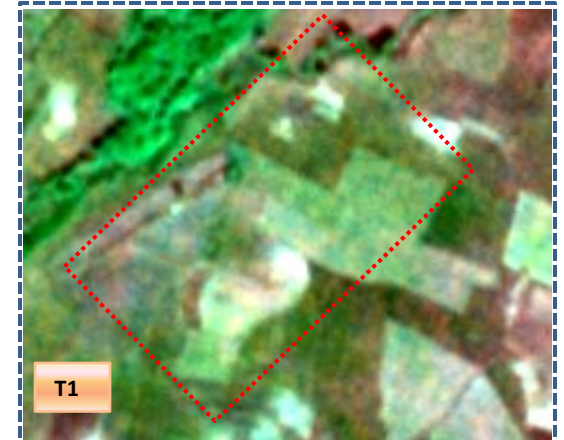


T1: 21 December 2013

Scrub to Agriculture



T0: 2009-10



T1: 21 December 2013

Table showing change matrix depicting Land cover transitions during study period-2009-10 to 2013-14

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	197.00										197.00
Mining/dump		9.29									9.29
Agriculture	0.12	4.56	8622.19	4.99				13.20	0.30	1.01	8646.38
Plantation Horticulture											
Forest											
Forest Plantation											
Barren Rocky											
Scrub	2.23		240.09					1100.58		2.27	1345.16
Waterbody- Streams/River									25.58		25.58
Waterbody – Ponds			8.50							173.14	181.65
Grand Total	199.34	13.85	8870.78	4.99				1113.78	25.88	176.42	10405.06

- 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 24.19 ha of the agriculture area has decreased and it is converted into built up, mining/dump, plantation, scrubland and water body in T1.
- In T1 248.59 ha of the agriculture area has increased from scrubland and water body of T0. The additional agriculture are coming from water body in T1 represents seasonal agriculture.

Table showing change matrix depicting Land cover transitions during study period-2013-14 to 2014-15

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	202.91												202.91
Mining/dump		10.29											10.29
Agriculture	2.79	2.91	8857.71					2.18			5.19		8870.78
Plantation Horticulture				4.99									4.99
Forest													
Forest Plantation													
Barren Rocky													
Scrub	9.09	2.83	458.38					639.84			3.63		1113.78
Waterbody- Streams/River									25.88				25.88
Waterbody – Ponds			3.41								173.02		176.42
Grand Total	214.79	16.04	9319.50	4.99				642.03	25.88		181.84		10405.06

•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 13.07 ha of the agriculture area has decreased and it is converted into Built-up, mining/dump, scrubland and water body in T2.

• In T2 461.79 ha of the agriculture area has increased from scrubland and water body of T1.

• The additional agriculture area coming from water body in T2 represents seasonal agriculture.

Table showing change matrix depicting Land cover transitions during study period-2014-15 to 2015-16

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	214.77									0.01	214.79	
Mining/dump		16.04									16.04	
Agriculture	0.55		9239.84	6.95				70.18		1.98	9319.50	
Plantation Horticulture				4.99							4.99	
Forest												
Forest Plantation												
Barren Rocky												
Scrub	2.21		37.72	1.94				600.15			642.03	
Waterbody- Streams/River									25.88		25.88	
Waterbody – Ponds										181.84	181.84	
Grand Total	217.53	16.04	9280.14	13.88				670.34	25.88	183.84	10405.06	

- 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 79.66 ha of the agriculture area has decreased and it is converted into Built-up, plantation, scrubland and water body in T3.
- In T3 37.72 ha of the agriculture area has increased from scrubland of T2.
- The additional agriculture area coming from water body in T3 represents seasonal agriculture.

Table showing change matrix depicting Land cover transitions during study period-2015-16 to 2016-17

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	213.49										213.49	
Mining/dump		14.00									14.00	
Agriculture	0.71		9258.76					13.70	3.04	7.41	9283.61	
Plantation Horticulture			5.53	8.35							13.88	
Forest												
Forest Plantation												
Barren Rocky												
Scrub	5.17		85.18					576.15	2.25	1.57	670.34	
Waterbody- Streams/River									25.58	0.30	25.88	
Waterbody – Ponds			5.12							178.74	183.84	
Grand Total	219.37	14.00	9358.30	8.35				589.85	30.87	188.02	10405.06	

• 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 24.85 ha of the agriculture area has decreased and it is converted into Built-up, scrubland and water body in T4.

• In T4 95.83 ha of the agriculture area has increased from plantation, scrubland and water body of T3.

• The additional agriculture area coming from water body in T4 represents seasonal agriculture.

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

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	
Built up	219.37										219.37	
Mining/dump		10.29									10.29	
Agriculture	0.20	0.71	9334.54					18.37	1.57	2.90	9358.30	
Plantation Horticulture				8.35							8.35	
Forest												
Forest Plantation												
Barren Rocky												
Scrub	3.22	5.62	15.13					556.50	6.96	2.42	589.85	
Waterbody- Streams/River									30.87		30.87	
Waterbody – Ponds										188.02	188.02	
Grand Total	222.79	16.62	9349.67	8.35				574.88	39.40	193.35	10405.06	

• 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 23.76 ha of the agriculture area has decreased and it is converted into Built-up, mining/dump, scrubland and water body in T5.

• In T5 15.13 ha of the agriculture area has increased from scrubland of T4.

• The additional agriculture area coming from water body 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 25.52 Hectares in Reservoir / Tanks area as compared between baseline LU/LC data 2009-10 (T0) & 2017-18 (T5) years.
4. There is an increase of 224.40, 448.71 & 78.16 Hectares From T0-T1, T1-T2 & T3-T4 respectively and overall increase of 751.28 Hectares in Crop land area as compared between baseline LU/LC data 2009-10 (T0) & 2017-18 (T5) years.
5. There is a decrease of 770.29 Hectares in Scrubland area as compared between 2009-10 (T0) & 2017-18 (T5) years.
6. There is a increase of 8 Hectares in Plantation/Horticulture area as compared between 2009-10 (T0) & 2017-18 (T5) years.
7. Farm ponds (14) is visible on IWMP Bhuvan Srishti portal out of Bhuvan Drishti photo of Farm ponds (17) verified from the portal.