

MONITORING OF IWMP WATERSHED PROJECTS USING GEO-INFORMATION

SUMMARY REPORT

ANANTAPURAMU -02/2009-10

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-02/2009-10, Anantapuram District of Andhra Pradesh. The total geographical area of the project is 6,101.11 ha. It comprises of 08 micro watersheds.
- In the project area 173 Drishti photos were uploaded showing 16 check dams, 38 Farm ponds, 10 Land Development ,18 Drainage treatment, 24 soil moisture conservation and remaining dristi photos were in others.
- Project area as per image analysis has witnessed distinguishable increase in farm ponds, showing 38 new farm ponds or dug out ponds with 15.68 ha increase in the area.
- Major percentage i.e. 56% is covered by the agriculture, 33% is covered by scrub land , 5.38 % by water bodies and remaining by other land use classes.

Classification of the Activities

Sr. No	Activity	Drishti Photo	Visible on satellite
1	Afforestation	1	1
2	Horticulture	0	0
3	Agriculture	10	6
4	Pasture	0	0
5	Trench	0	0
6	Field Bunds	0	0
7	Soil moisture conservation	0	0
8	Checks & Plugs	87	60
9	Gabion structure	0	0
10	Farm ponds/Dug out pit	32	20
11	Checkdam & Rock fill dam-(civil work)	10	8
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	2	2
16	Capacity Building Activities	0	0
17	Entry Point Activity	0	0
18	Others	11	10
	TOTAL	153	107

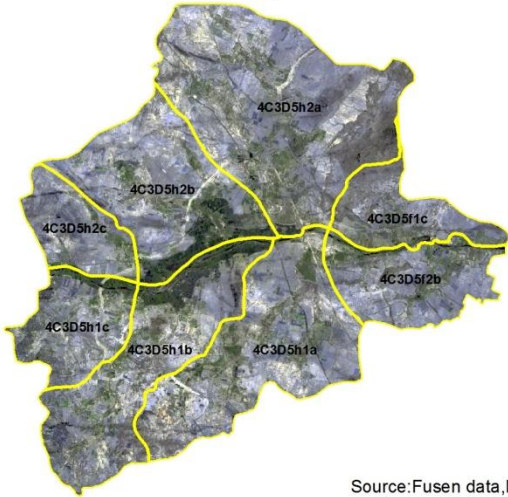
MONITORING IN THE PROJECT AREA

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

Natural Color Composite- 2009-10



Source:Fusen data,NRSC

Natural Color Composite- 22nd February 2014



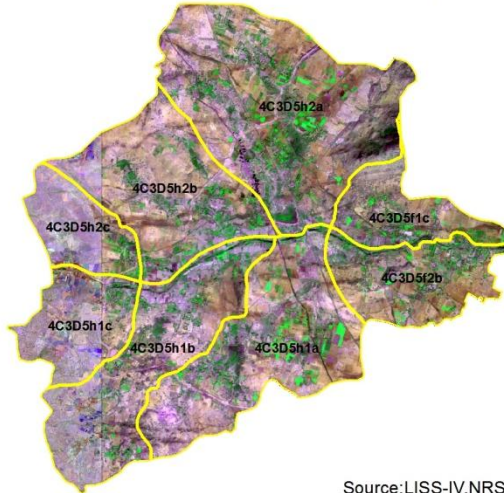
Source:Fusen data,NRSC

Natural Color Composite- 24th December 2015



Source:LISS-IV,NRSC

Natural Color Composite- 05th January 2017



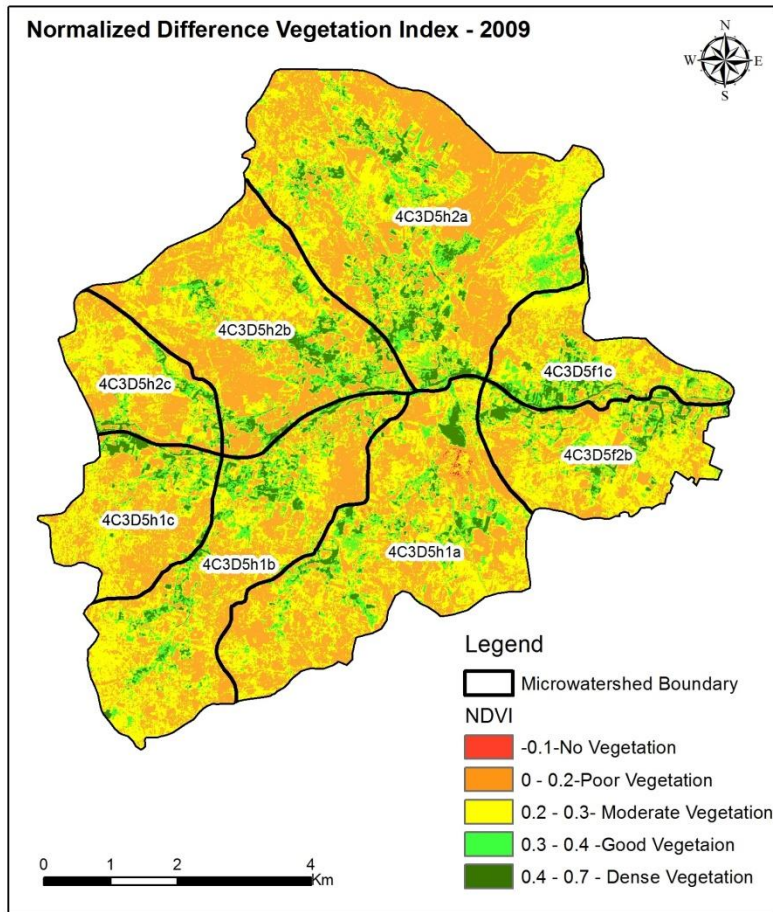
Source:LISS-IV,NRSC

Natural Color Composite- 20th October 2017

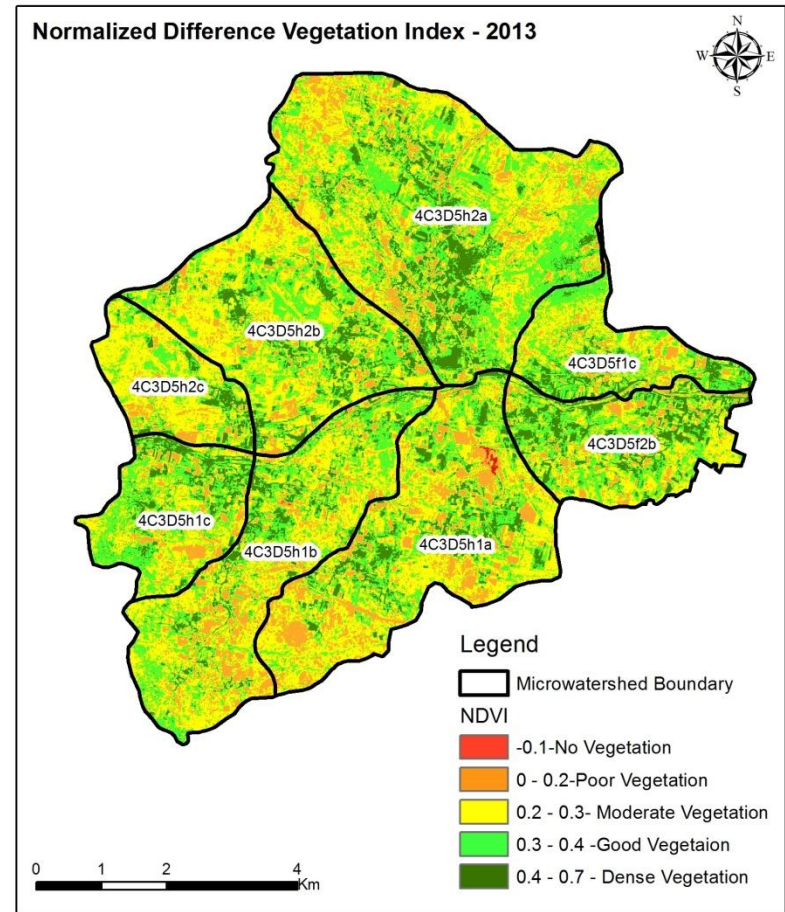


Source:LISS-IV,NRSC

Changes in Vegetation Cover

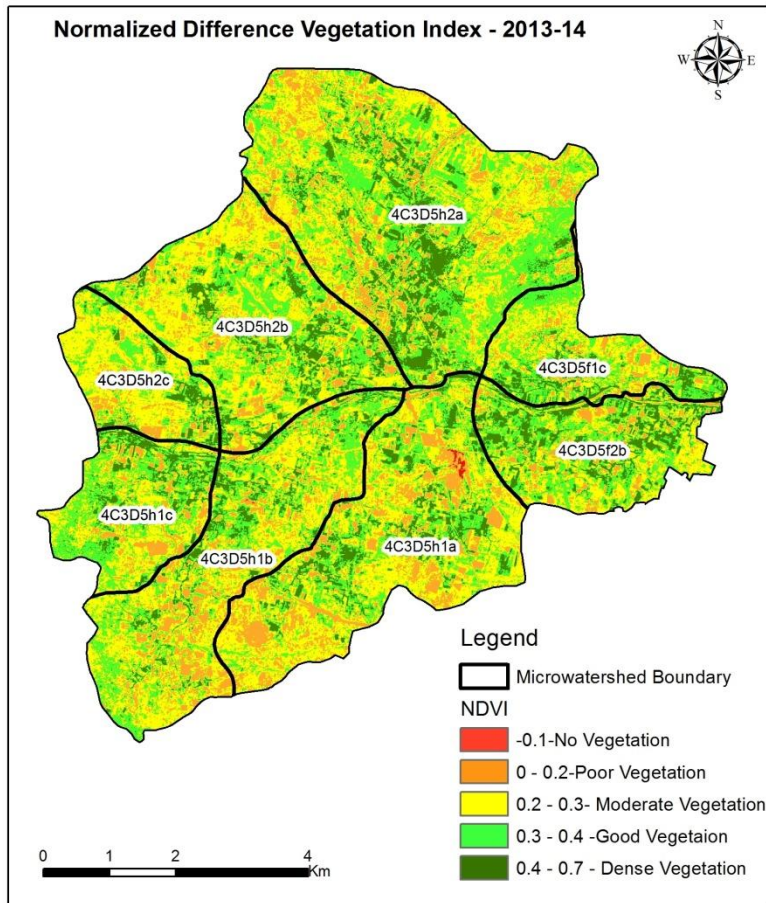


NDVI (2009-10)

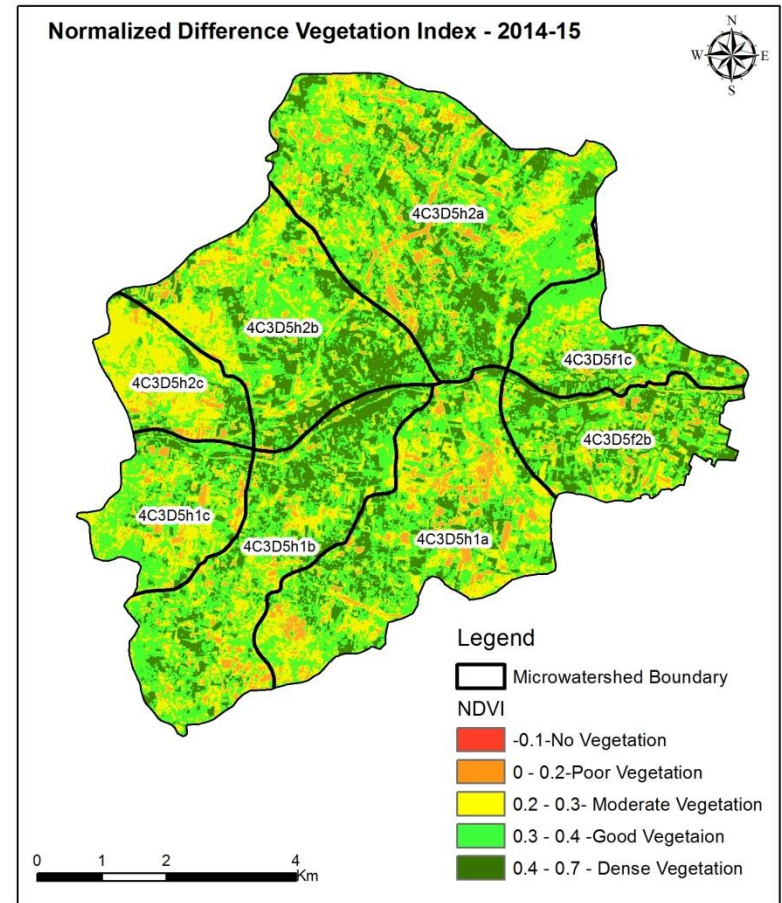


NDVI (12 October 2015)

Changes in Vegetation Cover

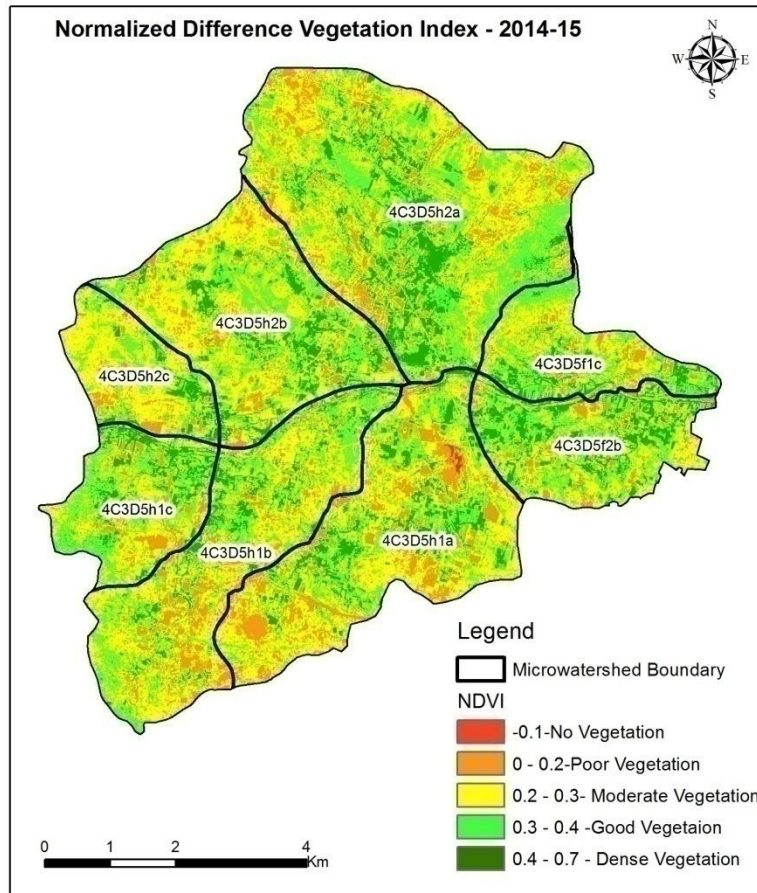


NDVI (2013-14)

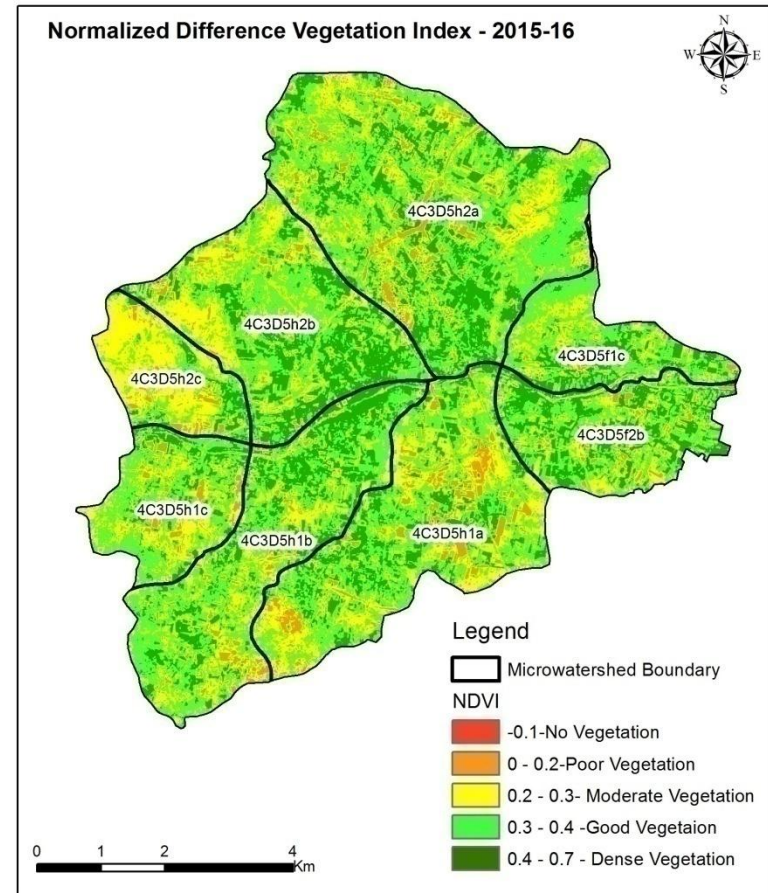


NDVI (2014-15)

Changes in Vegetation Cover



NDVI (2014-15)



NDVI (2015-16)

Monitoring of activities in Anantapuram Dt Andhra Pradesh. IWMP-02/2009-10



T0

T0:2009-10



T1

T1: 22 February 2014



Drishti SI no. 586859

MWS :4C3D5f2b

Check dam



T0

T0:2009-10



T1

T1: 22 February 2014



Drishti SI no.568964

MWS : 4C3D5h2b

Percolation tank

Monitoring of activities in Anantapuram Dt Andhra Pradesh. IWMP-02/2009-10



T0

T0: 2009-10



T1

T1: 22 February 2014



Drishti SI no. 564858 MWS :4C3D5h2c

Checkdam



T0

T0: 2009-10



T1

T1: 22 February 2014



Drishti SI no. 139107 MWS :4C3D5h1b

Farm pond

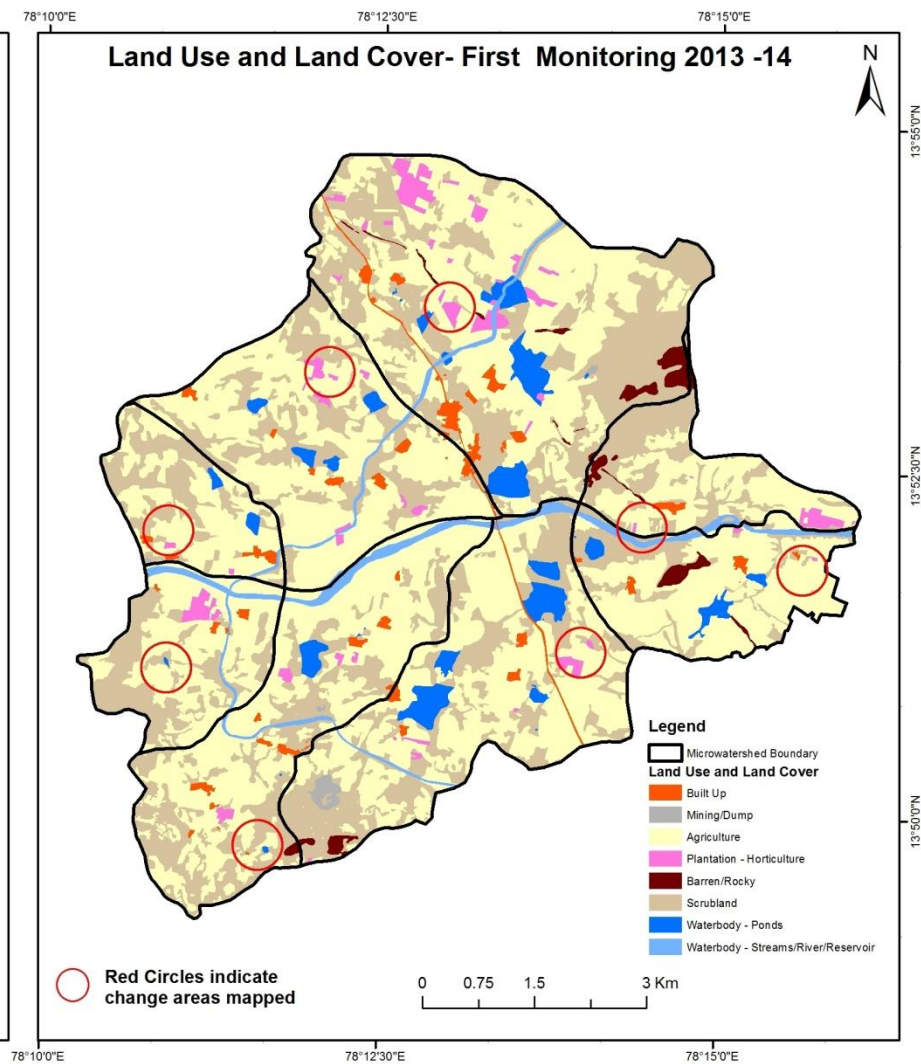
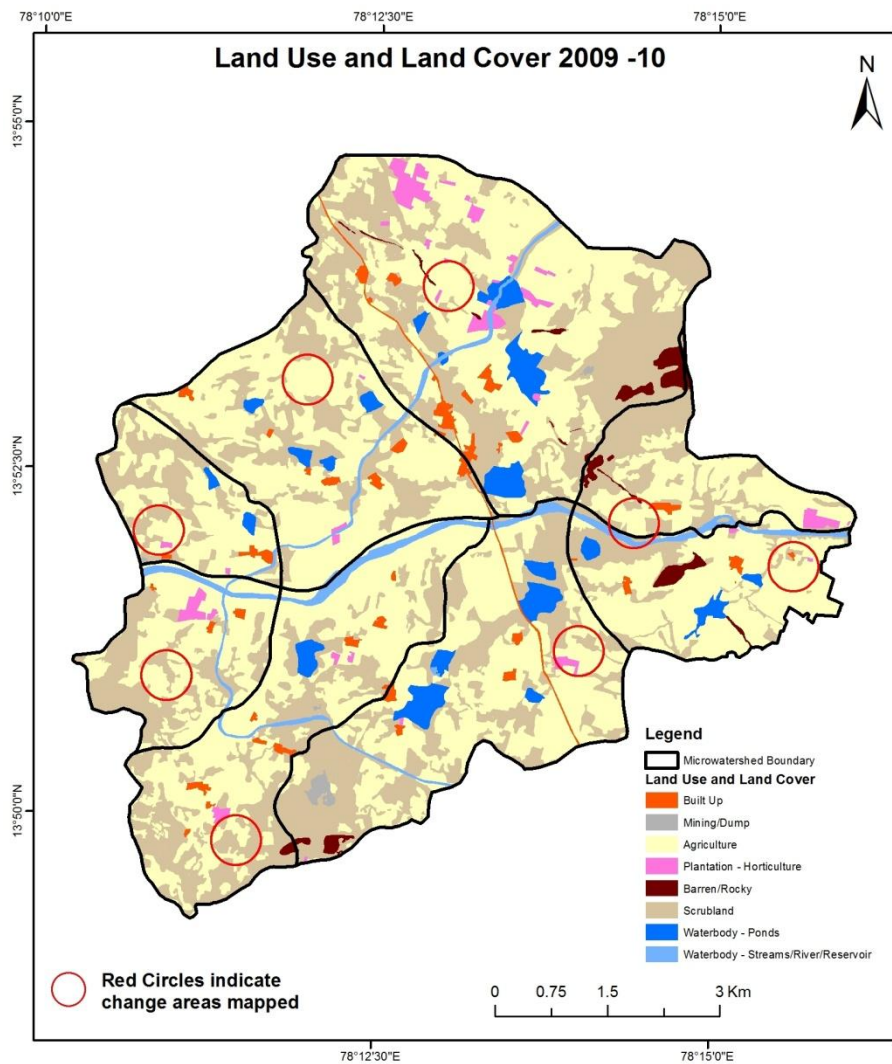
MONITORING IN THE PROJECT AREA

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)

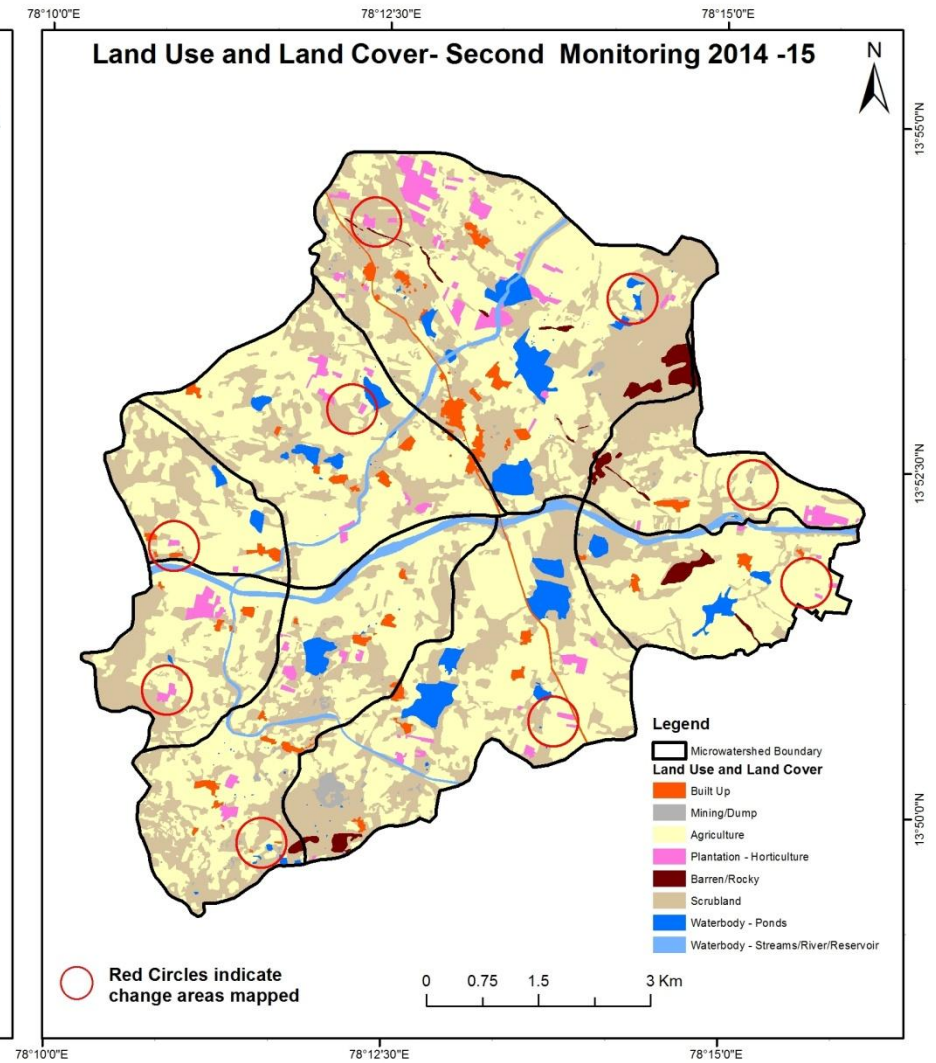
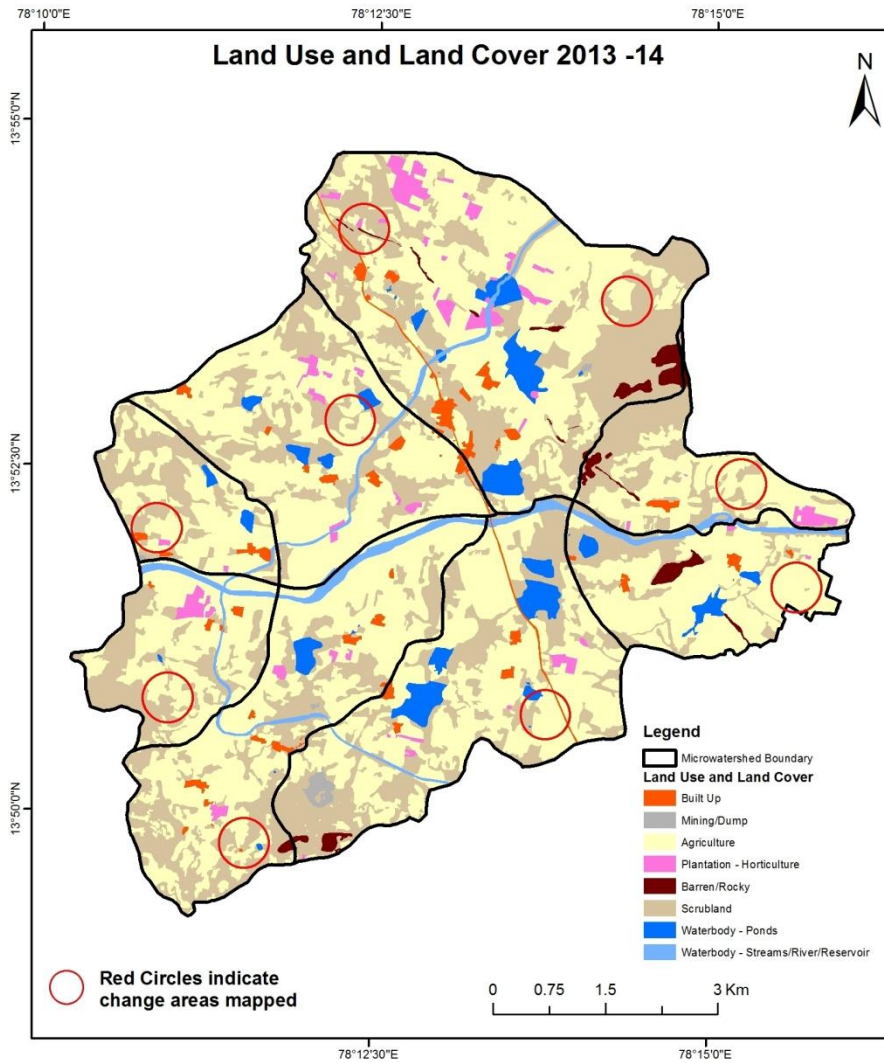
Comparative assessment of Land Use and Land Cover for Pre and Post IWMP implementation (2009-10 to 2013-14)

Scale: 1:10000



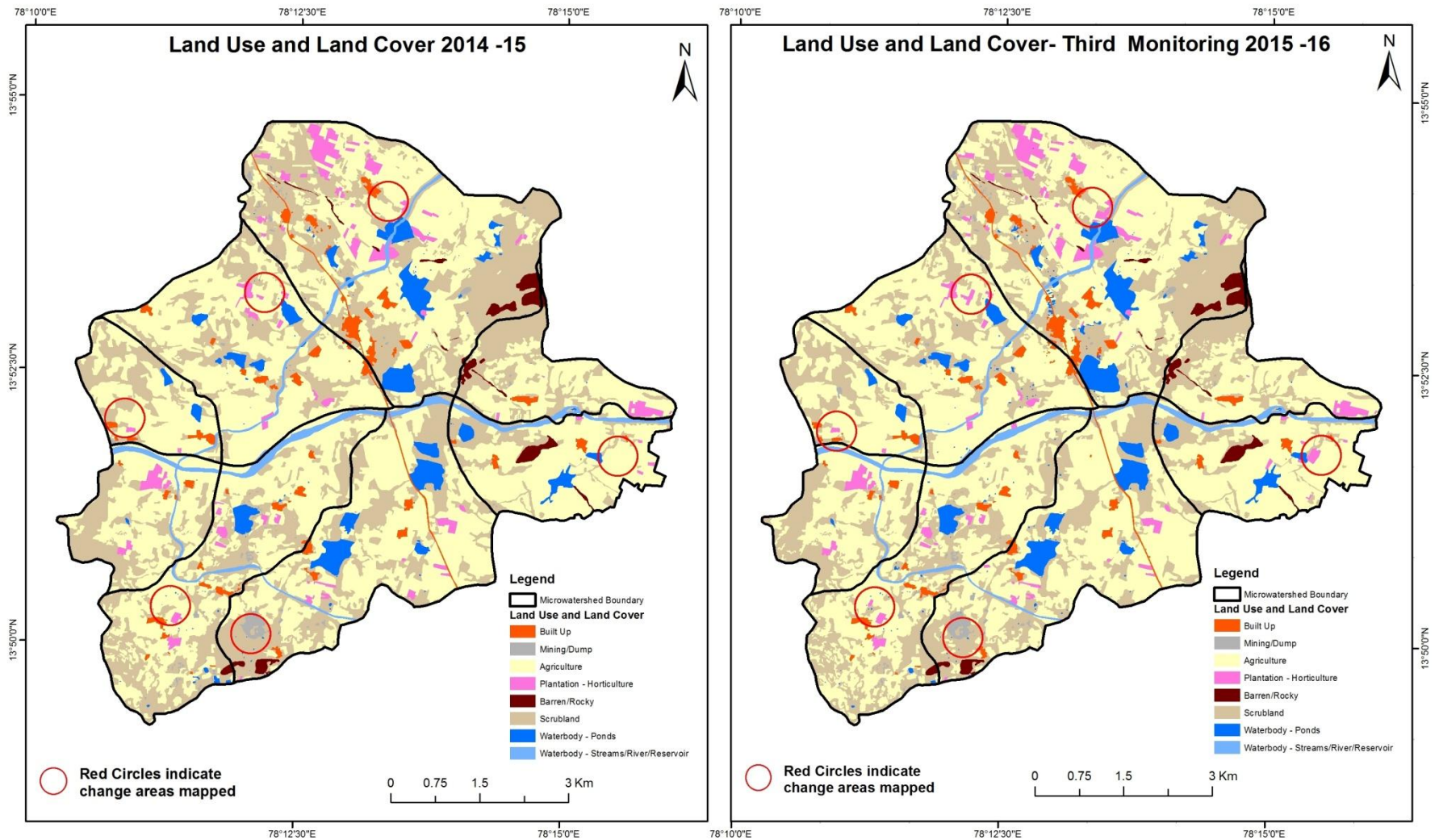
Comparative assessment of Land Use and Land Cover for Pre and Post IWMP implementation (2013-14 to 2014-15)

Scale: 1:10000



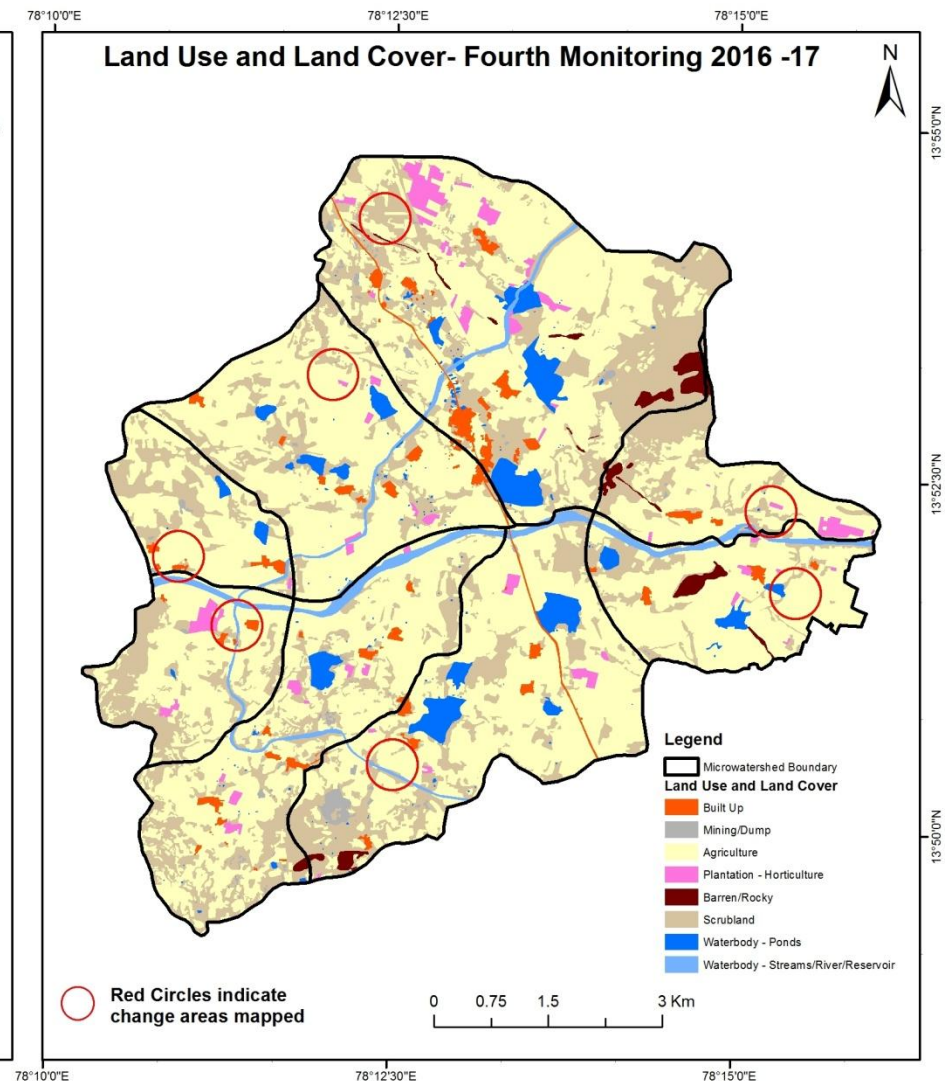
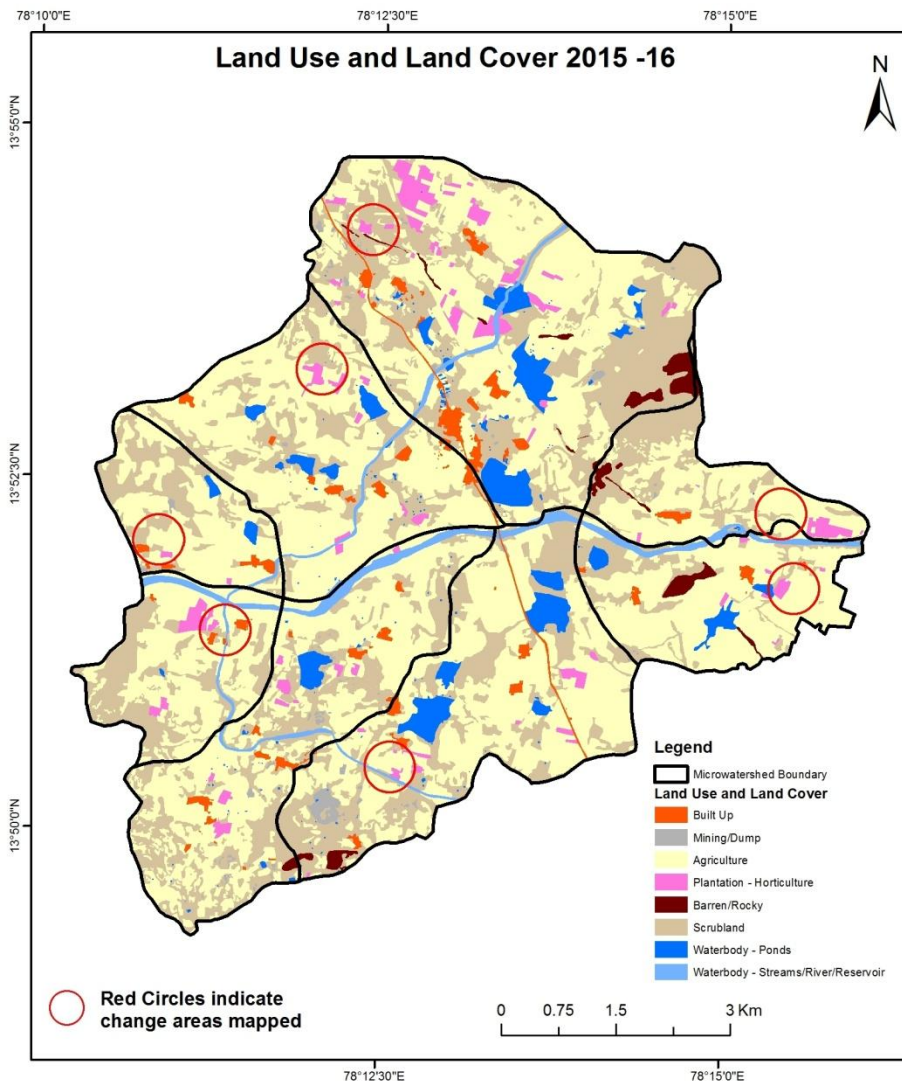
Comparative assessment of Land Use and Land Cover for Pre and Post IWMP implementation (2014-15 to 2015-16)

Scale: 1:10000



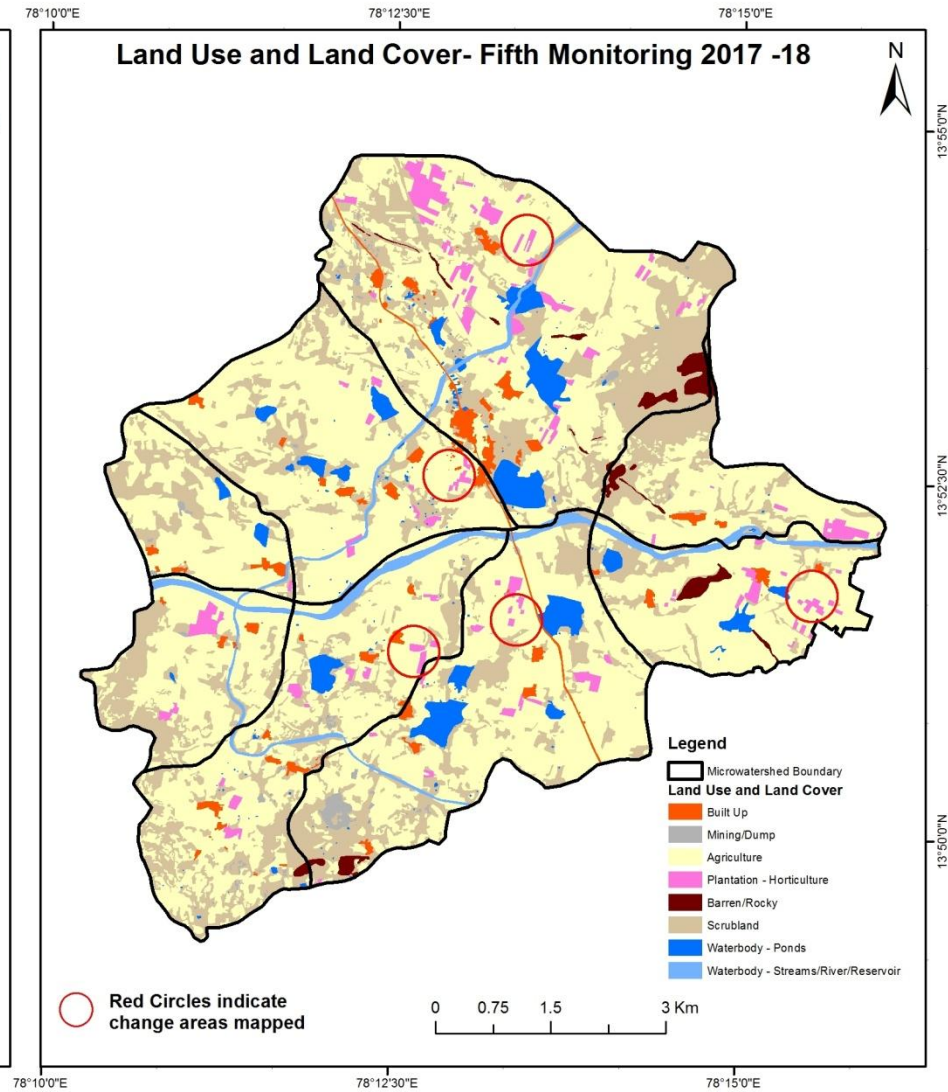
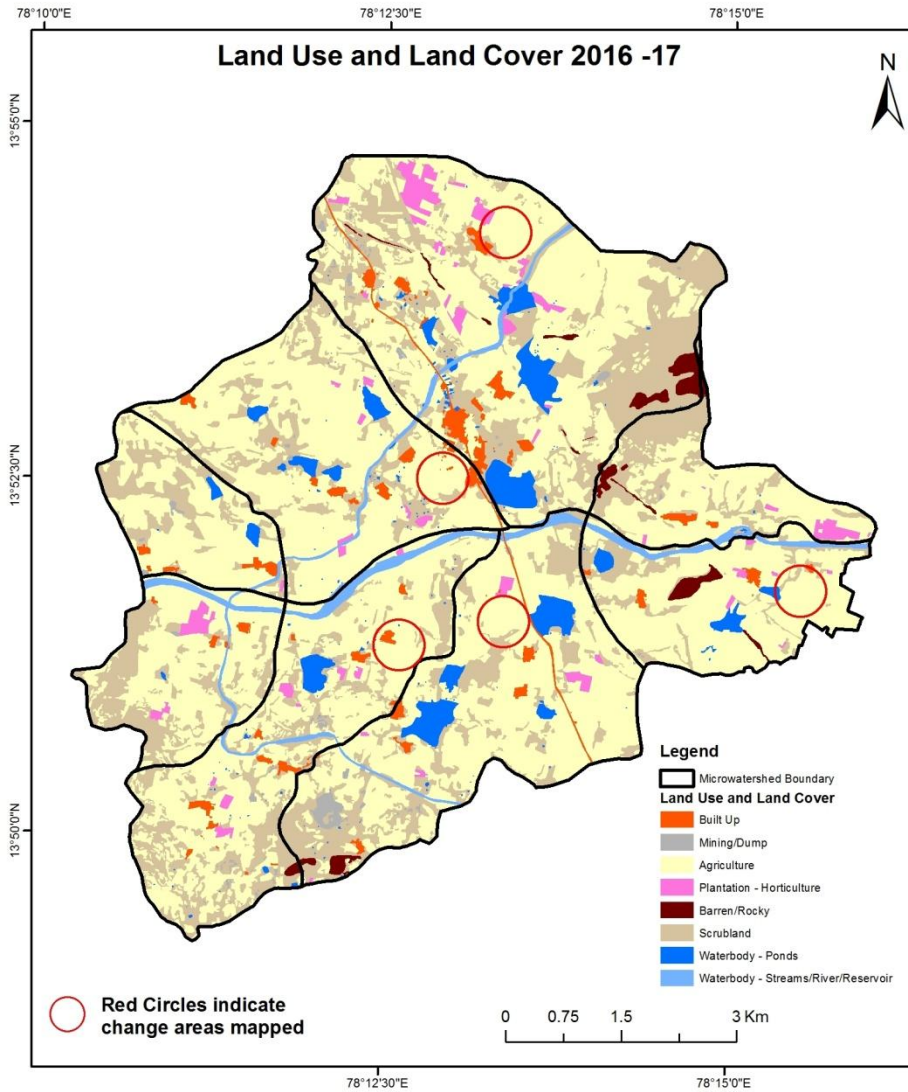
Comparative assessment of Land Use and Land Cover for Pre and Post IWMP implementation (2015-16 to 2016-17)

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

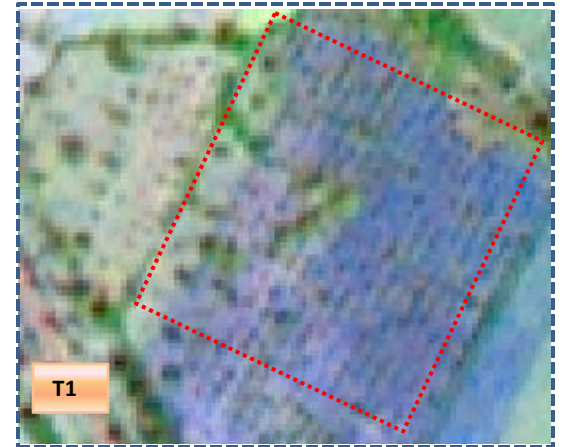


Land Use and Land Cover changes for Pre and Post treatment dates

Agriculture to Plantation



T0: 2009-10



T1: 22 February 2014

Agriculture to Plantation



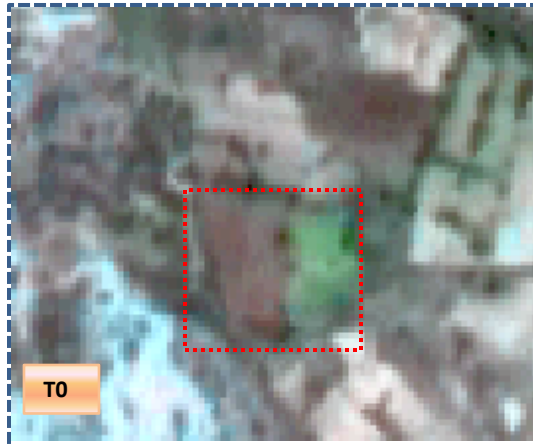
T0: 2009-10



T1: 22 February 2014

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

Agriculture to Mining dump



T0

T0: 2009-10



T1

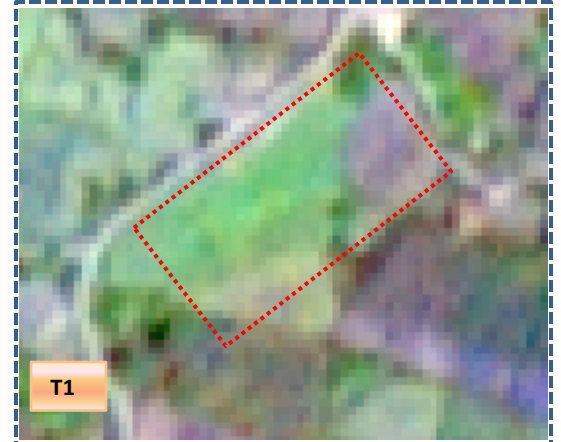
T1: 22 February 2014

Scrub to Agriculture



T0

T0: 2009-10



T1

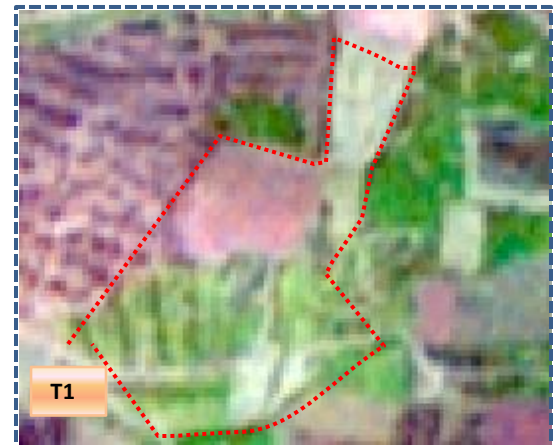
T1: 22 February 2014

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

Scrub to Agriculture



T0: 2009-10

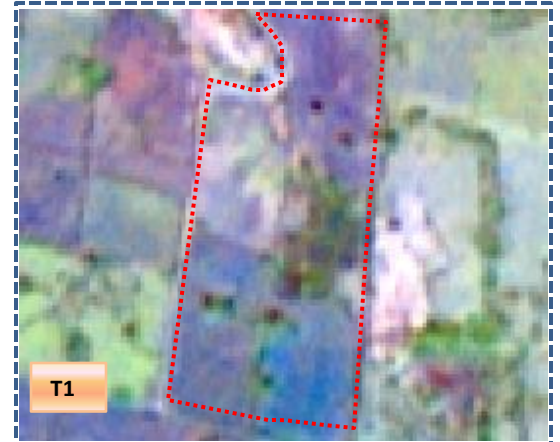


T1: 22 February 2014

Scrub to Agriculture



T0: 2009-10



T1: 22 February 2014

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	Scrubland	Water body - Streams/River	Water body - Ponds	Grand Total
Built up	101.20										101.20
Mining/dump		12.80									12.80
Agriculture	3.73	1.02	3321.11	24.27				1.83		0.12	3352.08
Plantation Horticulture			0.51	82.86							83.37
Forest											
Forest Plantation											
Barren Rocky							65.30				65.30
Scrub	3.79	1.17	102.89	9.14				2034.78		4.92	2156.70
Waterbody- Streams/River			0.96						142.34		143.30
Waterbody – Ponds										186.36	186.36
Grand Total	108.72	14.99	3425.47	116.27			65.30	2036.62	142.34	191.40	6101.11

- 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 30.97 ha of agriculture are decreased and it is converted into built up, mining/dump, plantation, scrubland and water body in T1.
- In T1 104.36 ha of agriculture are increased from plantation, scrubland and waterbody 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- 2013-14 to 2014-15

Land cover	Monitoring period (T2)										
	Units in Hectares										
T1	Built up	Mining/dump	Agri culture	Plantation Horticulture	Forest	Forest Plantation	Barren Rocky	Scrub	Waterbody-Streams/River	Water body Ponds	Grand Total
Built up	108.72										108.72
Mining/dump		14.99									14.99
Agriculture	5.58	2.92	3230.16	27.41				150.56		8.84	3425.47
Plantation Horticulture			1.67	114.17						0.43	116.27
Forest											
Forest Plantation											
Barren Rocky							65.30				65.30
Scrub	11.89	15.04	131.92					1867.21		10.56	2036.62
Waterbody-Streams/River									142.34		142.34
Waterbody – Ponds										191.40	191.40
Grand Total	126.20	32.94	3363.74	141.58			65.30	2017.77	142.34	211.23	6101.11

- 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 195.31 ha of agriculture are decreased and it is converted into built up, mining/dump, plantation, scrubland and water body in T2.
- In T2 133.58 ha of agriculture are increased from plantation and scrubland of T1.
- The additional agriculture are 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										
T2	Built up	Mining/ dump	Agri culture	Plantation Horticulture	Forest	Forest Plantation	Barren Rocky	Scrub	Waterbody- Streams/ River	Water body Ponds	Grand Total
Built up	126.20										126.20
Mining/dump		32.81								0.13	32.94
Agriculture	1.68	1.18	3346.41	12.21						2.25	3363.74
Plantation Horticulture			6.14	135.41						0.04	141.58
Forest											
Forest Plantation											
Barren Rocky							65.30				65.30
Scrub	0.38	1.19	118.91	0.50				1883.16		13.62	2017.77
Waterbody- Streams/River									142.34		142.34
Waterbody – Ponds	0.04		2.18	0.23						208.78	211.23
Grand Total	128.31	35.18	3473.64	148.36			65.30	1883.16	142.34	224.82	6101.11

- 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 17.32 ha of agriculture are decreased and it is converted into built up, mining/dump, plantation and water body in T3.
- In T3 127.23 ha of agriculture are increased from plantation, scrubland and water body of T2.
- The additional agriculture are 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										
T3	Built up	Mining/ dump	Agri culture	Plantation Horticulture	Forest	Forest Plantation	Barren Rocky	Scrub	Waterbody- Streams/ River	Water body Ponds	Grand Total
Built up	128.31										128.31
Mining/dump		35.17								0.01	35.18
Agriculture	4.25	1.42	3457.44	7.80				1.72		1.01	3473.64
Plantation Horticulture			41.85	106.51							148.36
Forest											
Forest Plantation											
Barren Rocky							65.30				65.30
Scrub	1.34	2.90	317.73					1560.94		0.24	1883.16
Waterbody- Streams/River									142.34		142.34
Waterbody – Ponds	0.28	0.13	18.70	0.02						205.69	224.82
Grand Total	134.18	39.62	3835.72	114.34			65.30	1562.66	142.34	206.95	6101.11

- 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 16.21 ha of agriculture are decreased and it is converted into built up, mining/dump, plantation, scrubland and water body in T4.
- In T4 378.28 ha of agriculture are increased from plantation, scrubland and water body of T3.
- The additional agriculture are 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 (T4)										
	Units in Hectares										
T3	Built up	Mining/ dump	Agri culture	Plantation Horticulture	Forest	Forest Plantation	Barren Rocky	Scrub	Waterbody- Streams/ River	Water body Ponds	Grand Total
Built up	134.18										134.18
Mining/dump		39.62									39.62
Agriculture			3785.33	50.39							3835.72
Plantation Horticulture			0.74	113.56						0.04	114.34
Forest											
Forest Plantation											
Barren Rocky							65.30				65.30
Scrub			1.17	0.62				1560.69		0.18	1562.66
Waterbody- Streams/River									142.34		142.34
Waterbody – Ponds								0.10		206.85	206.95
Grand Total	134.18	39.62	3787.24	164.57			65.30	1560.79	142.34	207.07	6101.11

- 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 50.39 ha of agriculture are decreased and it is converted into plantation in T5.
- In T5 1.92 ha of agriculture are increased from plantation and scrubland of T4.
- The additional agriculture are 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 19.75 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 73.39, 109.90 & 362.08 Hectares From T0-T1, T2-T3 & T3-T4 respectively and overall increase of 435.16 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 595.91 Hectares in Scrubland area as compared between 2009-10 (T0) & 2017-18 (T5) years.
6. Farm ponds (20) is visible on IWMP Bhuvan Srishti portal out of Bhuvan Drishti photo of Farm ponds (32) verified from the portal.