

# MONITORING OF IWMP WATERSHED PROJECTS USING GEO-INFORMATION SUMMARY REPORT

**IWMP-Batch-IV**

Prakasam-59/2012-13  
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**

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04. CONCLUSIONS

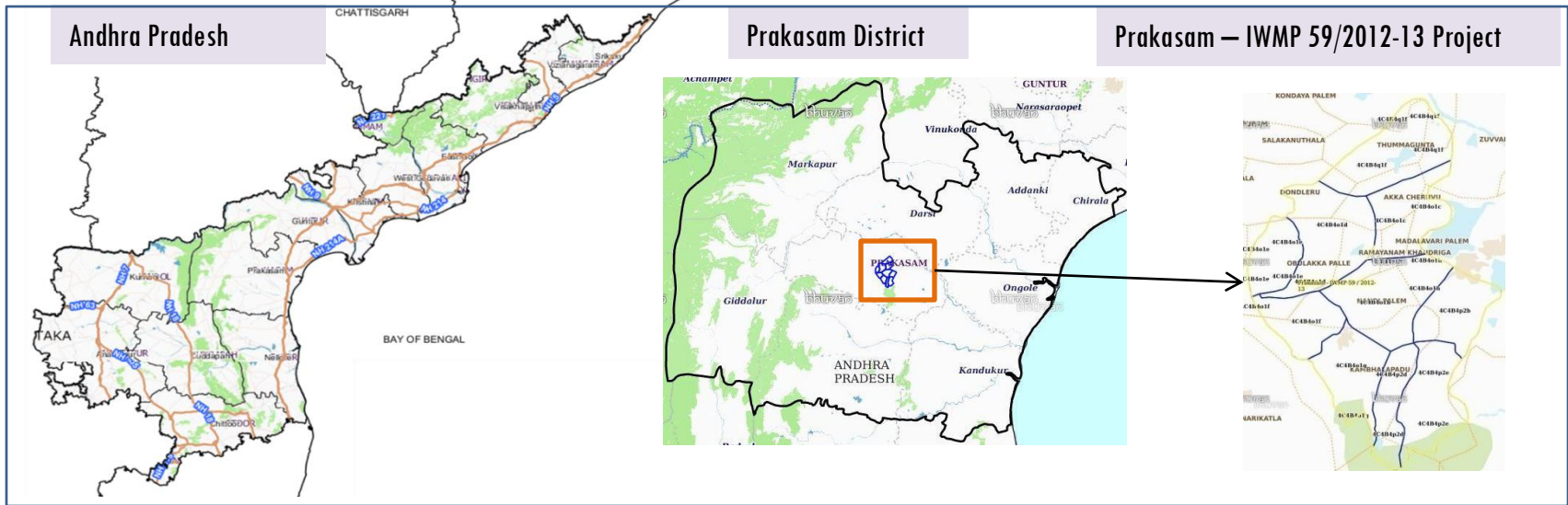
## EXECUTIVE SUMMARY

- 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-59/2012-13, Prakasam District of Andhra Pradesh. The total geographical area of the project is **6,228** ha. It comprises of 10 micro watersheds.
- In the project area 570 Drishti photos were uploaded showing check dams/Checks & plugins, Farm ponds/Percolation tanks, livelihood activities, Afforestation, and others.
- Project area as per image analysis has witnessed distinguishable increase in farm ponds, showing new farm ponds or dug out pits with 36 ha increase in the area.
- Major percentage i.e. 78.5 % is covered by the agriculture, 8.3 % is covered by scrub land, 3.1 % by water body area and remaining by other land use classes.

# PROJECT : PRAKASAM - IWMP-59/2012-13

## DISTRICT : PRAKASAM , STATE : ANDHRA PRADESH

- The study area falls in Podili Mandal of Prakasam district of Andhra Pradesh state. The total geographical area of the project is 6,228 ha. It comprises of 10 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.



- Project area witnesses tropical wet and dry climate characterized by year round high temperatures. Prakasam has a record of reaching more than 46°C.
- The average annual rainfall of the district is 798.6 mm, monthly rainfall ranges from nil in March to 182.9 mm in October. October is the wettest month of the year. Southwest monsoon contributes significant rainfall in southern part of the district and Northeast monsoon contributes more than 70% of the rainfall.
- December is the coldest month with normal mean maximum temperature of about 27.1°C and mean minimum temperature of 19.2°C. Temperature begins to rise after February. May is the hottest month with mean daily maximum temperature of about 36.1°C and the mean daily minimum temperature of about 27.7°C. During May and early June the maximum temperature rises occasionally to 46°C and with the onset of SW monsoon by about second week of June, temperature begins to drop rapidly.

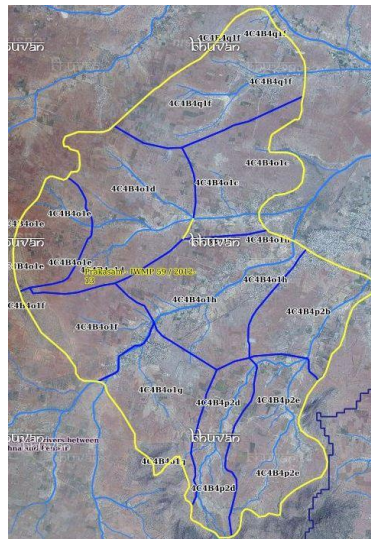
# Satellite Data and Ancillary Data

Satellite data*	T0-A**	T0-B**	T5
	2012-13	2011-12	2020-21
LISS IV	2012-13		
SCENE 1			30-Oct-20
SCENE2			
SCENE 3			
SCENE 4			
CARTO	2012-13		
SCENE 1			30-Oct-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	570
4	Detailed Project Report		

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



## Legend



Drainage (1:10000 Scale)

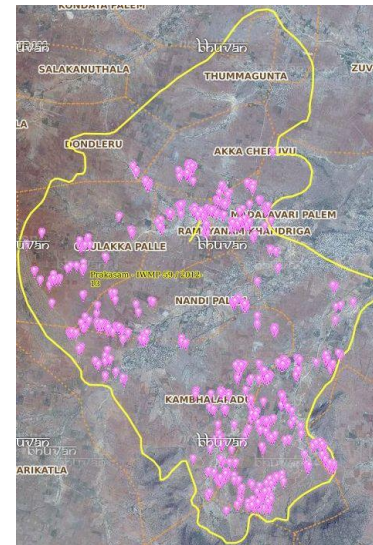


MWS Boundary



Project Boundary

# Natural Color Composite overlaid with Drishiti Points



## Drishiti Upload Status

## Classification of the Activities

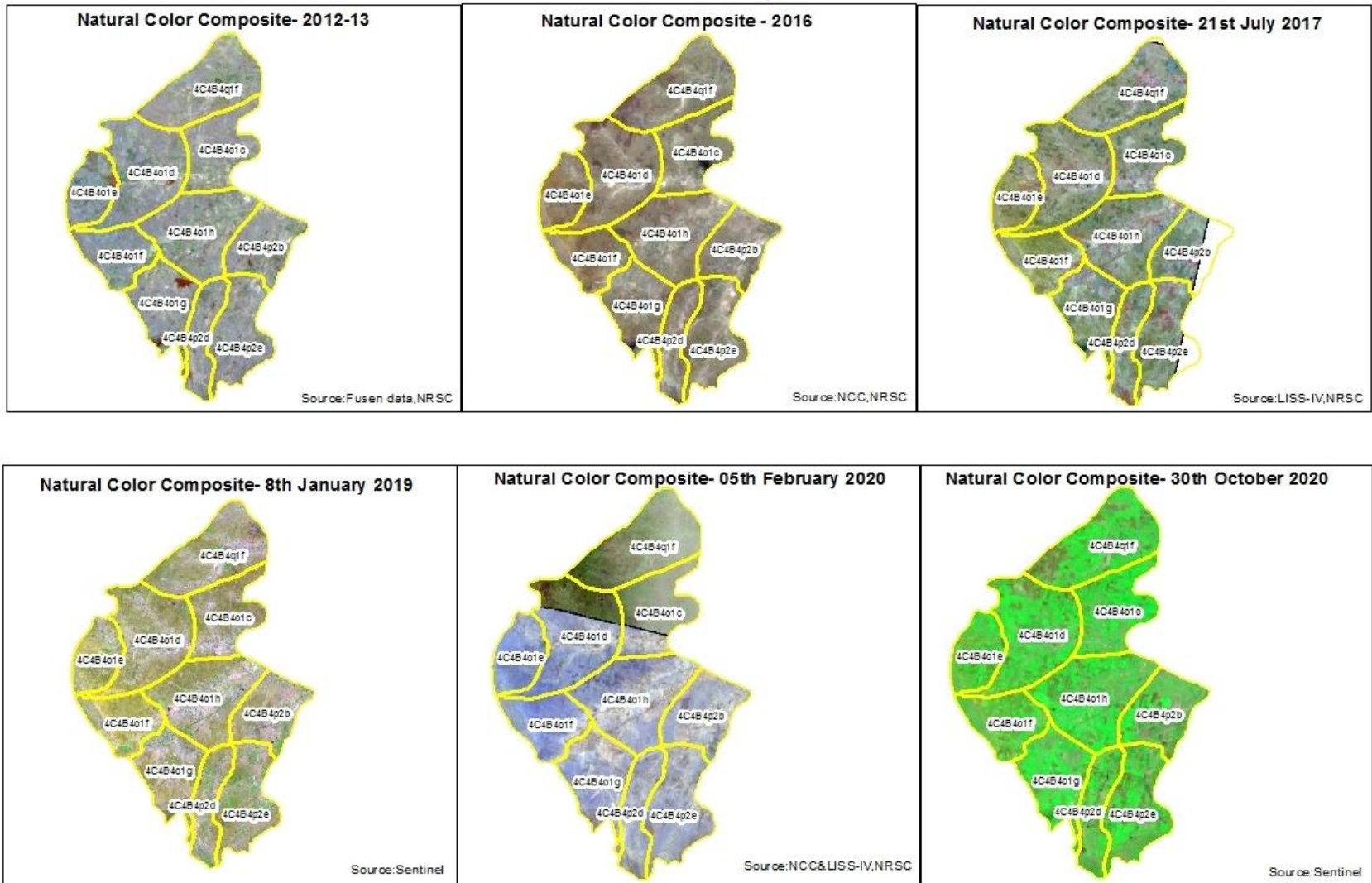
Sr. No	Activity	Drishti Photo	Visible on satellite
1	Afforestation	71	50
2	Horticulture/Agriculture	0	0
3	Block planting	0	0
4	Pasture	0	0
5	Trench	0	0
6	Field Bunds	0	0
7	Terrace	0	0
8	Checks & Plugs	275	250
9	Gabion structure	0	0
10	Farm ponds	0	0
11	Check dams	185	150
12	Nallah Bunds	0	0
13	Percolation tanks / Ground water recharge structure	0	0
14	Production System and Micro-Enterprises	0	0
15	Livelihood Activities	0	0
16	Production system and Micro-Enterprises	205	120
17	Entry Point Activity	0	0
18	Others	0	0
	<b>TOTAL</b>	<b>739</b>	<b>570</b>

## 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 (2012-13) 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 (NCC)





# Monitoring of activities in Srikakulam Dt Andhra Pradesh. IWMP-59/2012-13



T0 Satellite data 2010



T1 Satellite data 2013



T2 Satellite data 2016



T3 Satellite data 2017



T4 Satellite data 2019

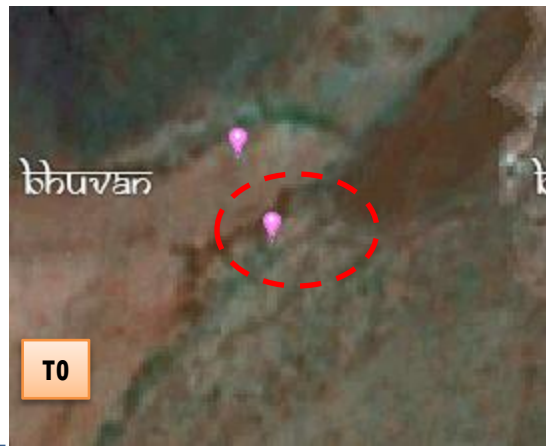


T5 Satellite data 2020



Drishti Id. 2531227

Monitoring of activities in Prakasam District Andhra Pradesh. IWMP-59/2012-13



T1:2012-13



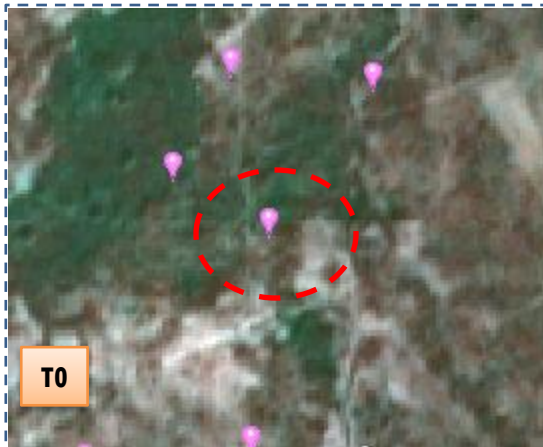
T2: 22 January 2017



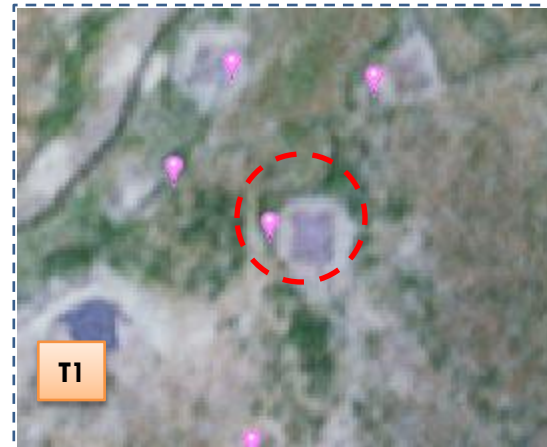
Drishti SI no. 1443594

MWS :4C4B4p2e

Farm pond



T1:2012-13



T2: 22 January 2017



Drishti SI no. 1446237

MWS :4C4B4p2e

Farm pond

Monitoring of activities in Prakasam District Andhra Pradesh. IWMP-59/2012-13



T0

T0: 2012-13



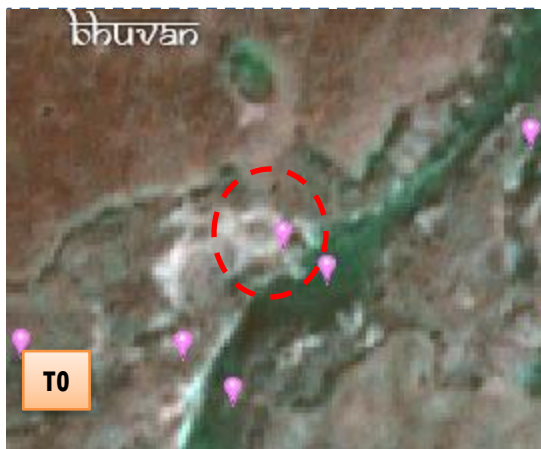
T1

T1: 22 January 2017



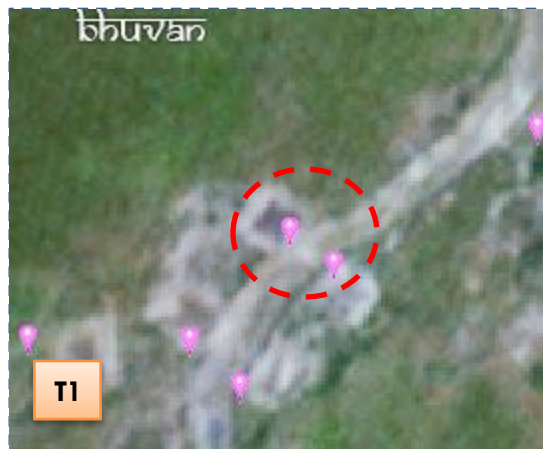
Drishti SI no. 1446470 MWS :4C4B4p2e

Farm pond



T0

T0: 2012-13



T1

T2: 22 January 2017



Drishti SI no. 1446561 MWS :4C4B4p2e

Farm pond

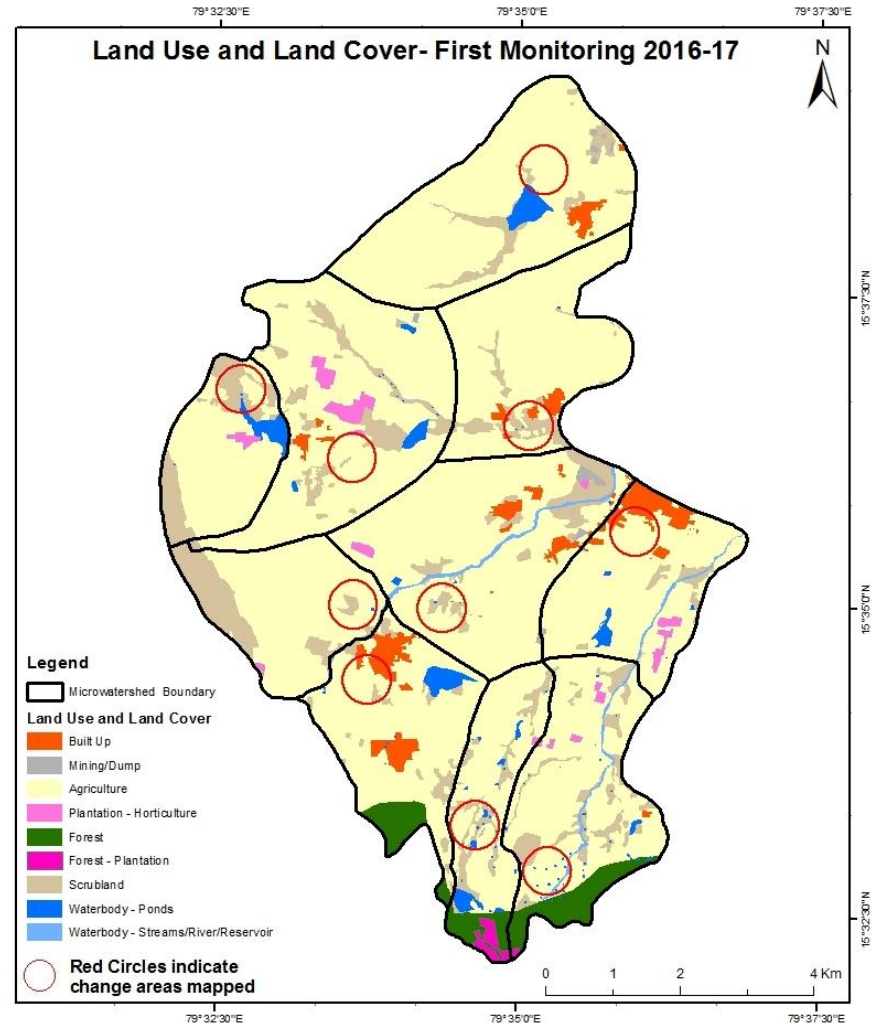
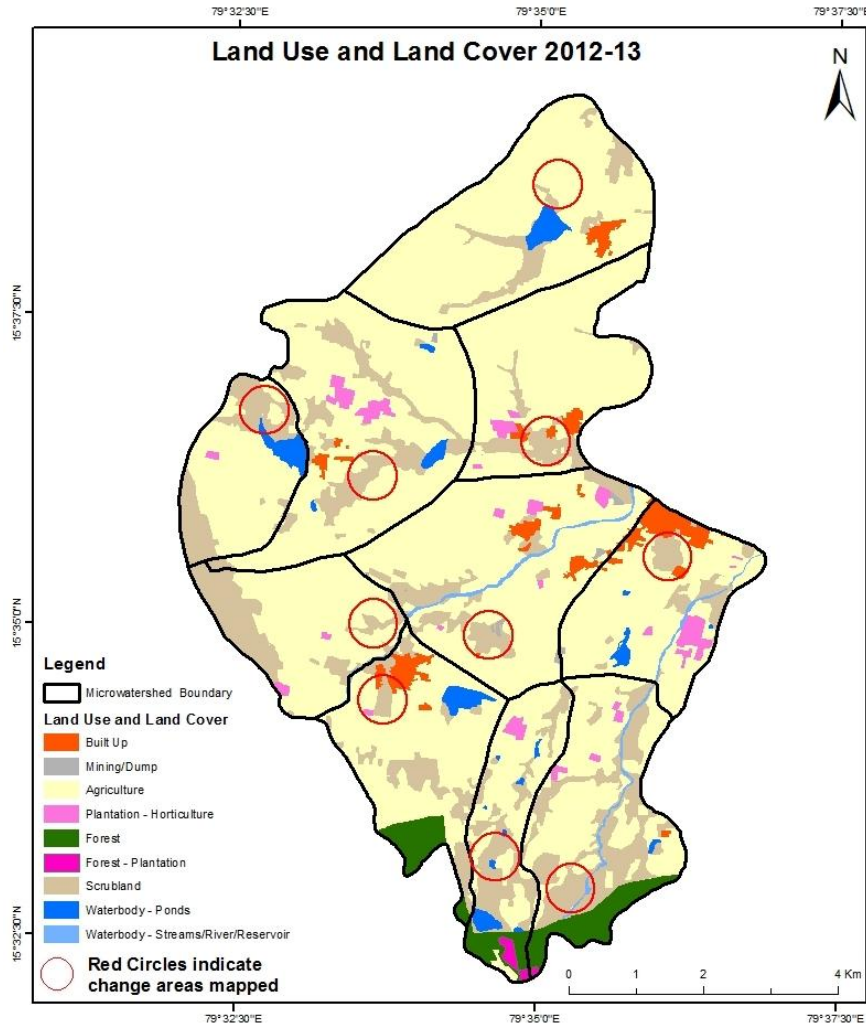
## MONITORING IN THE PROJECT AREA

### 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 pre implementation period as T0 (2012-13) and row represents the post implementation period as T5 (2020-21).

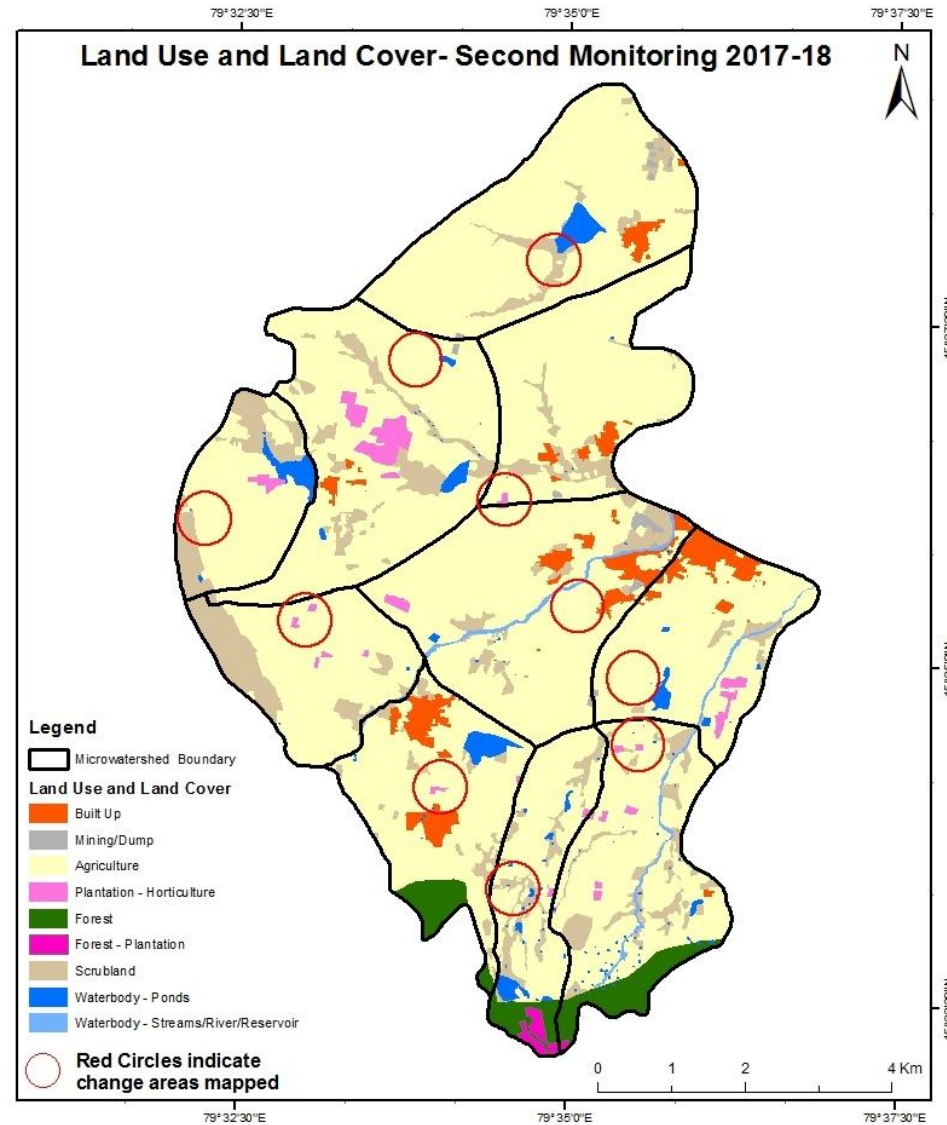
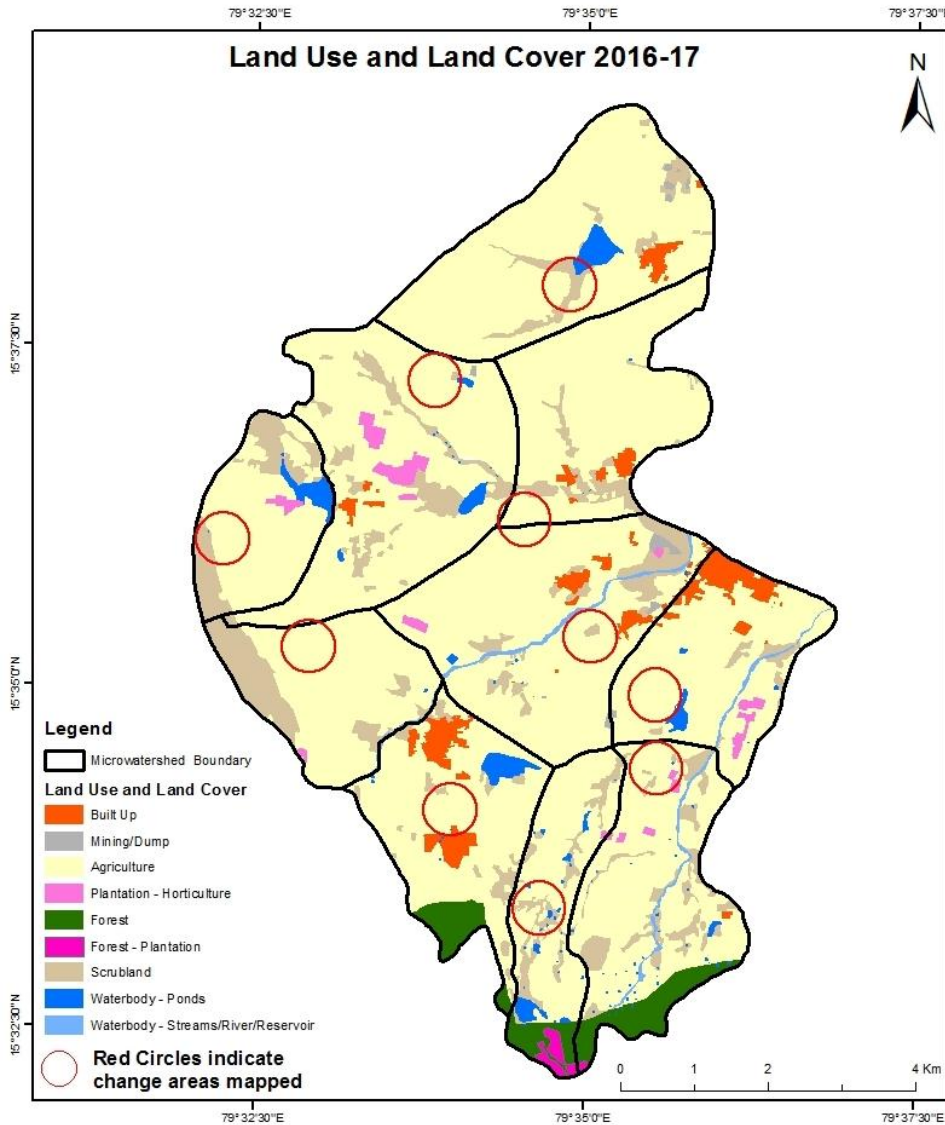
# Comparative assessment of Land Use and Land Cover for Pre and Post IWMP implementation (2012-13 to 2016-17)

Scale: 1:10000



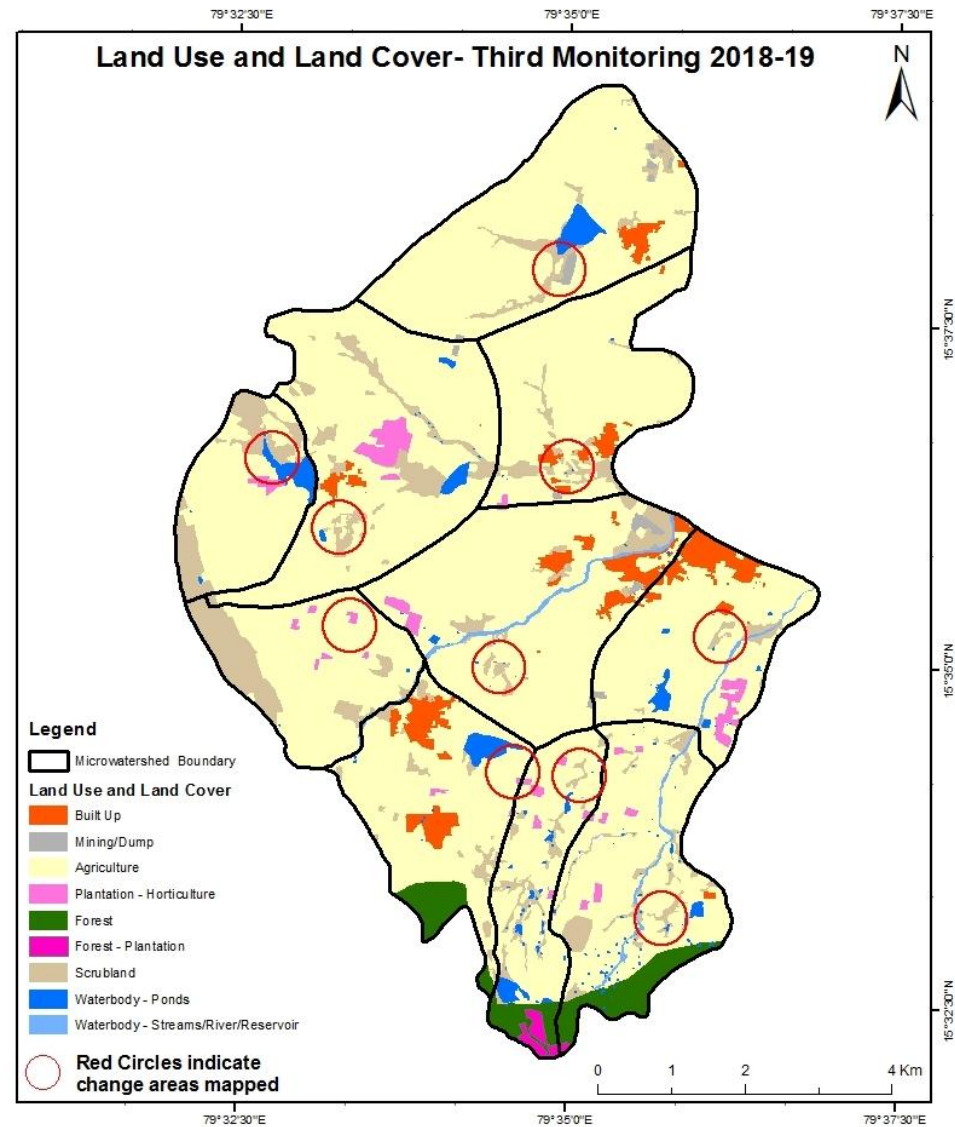
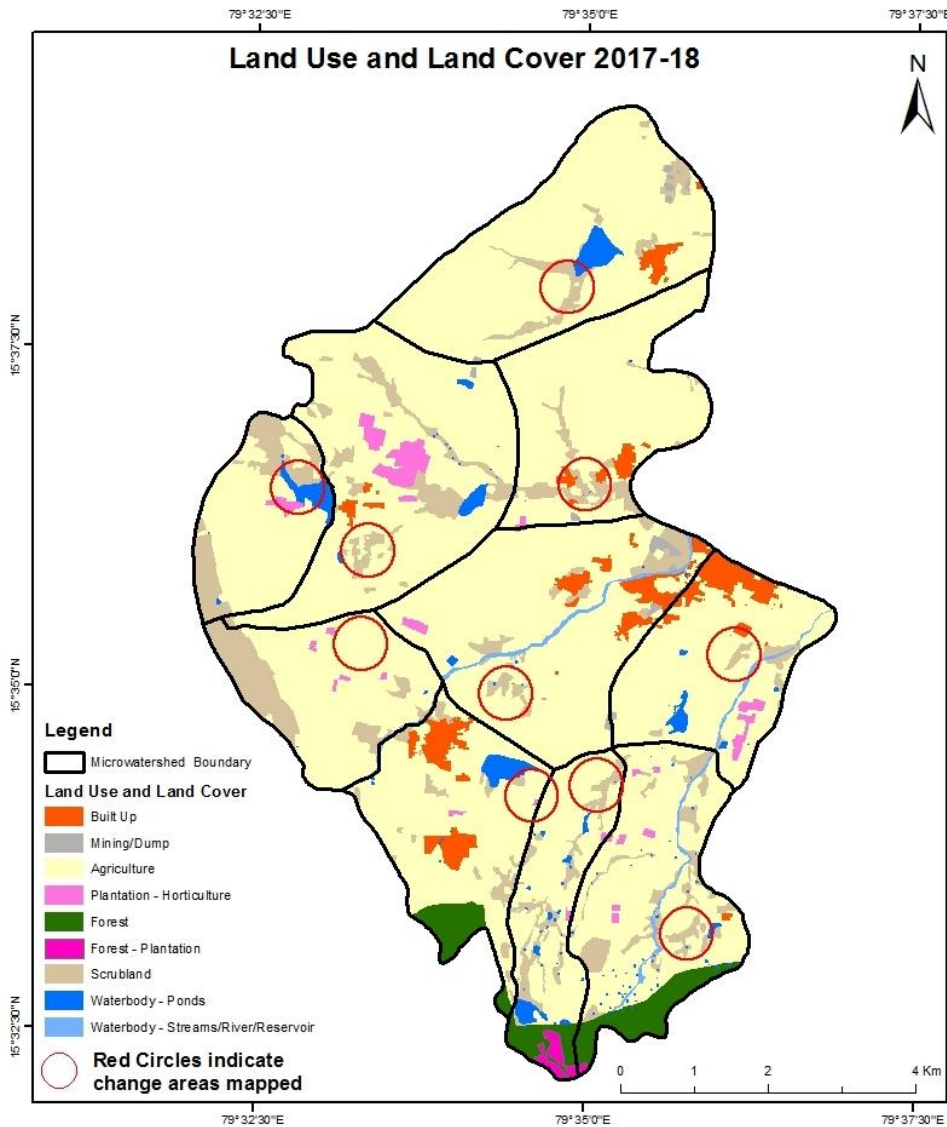
# Comparative assessment of Land Use and Land Cover for Pre and Post IWMP implementation (2016-17 to 2017-18)

Scale: 1:10000



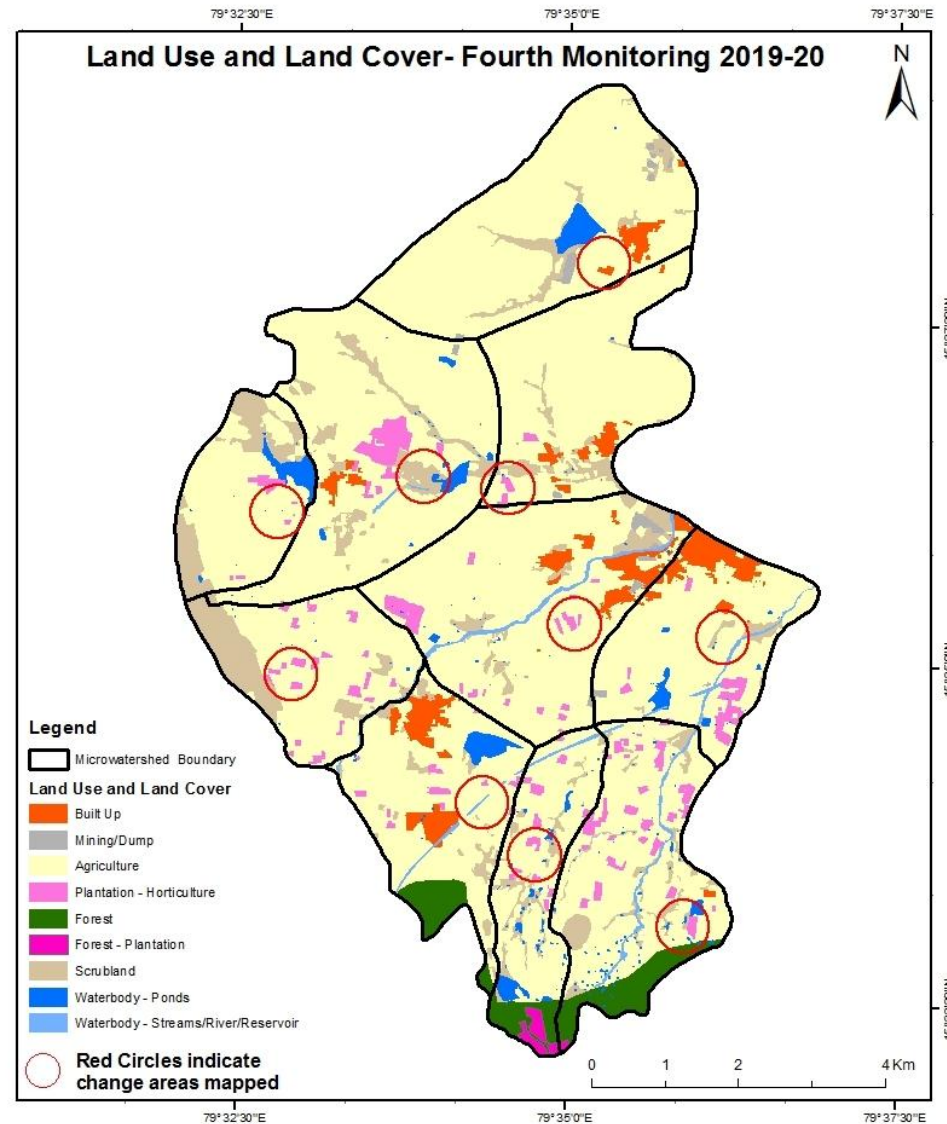
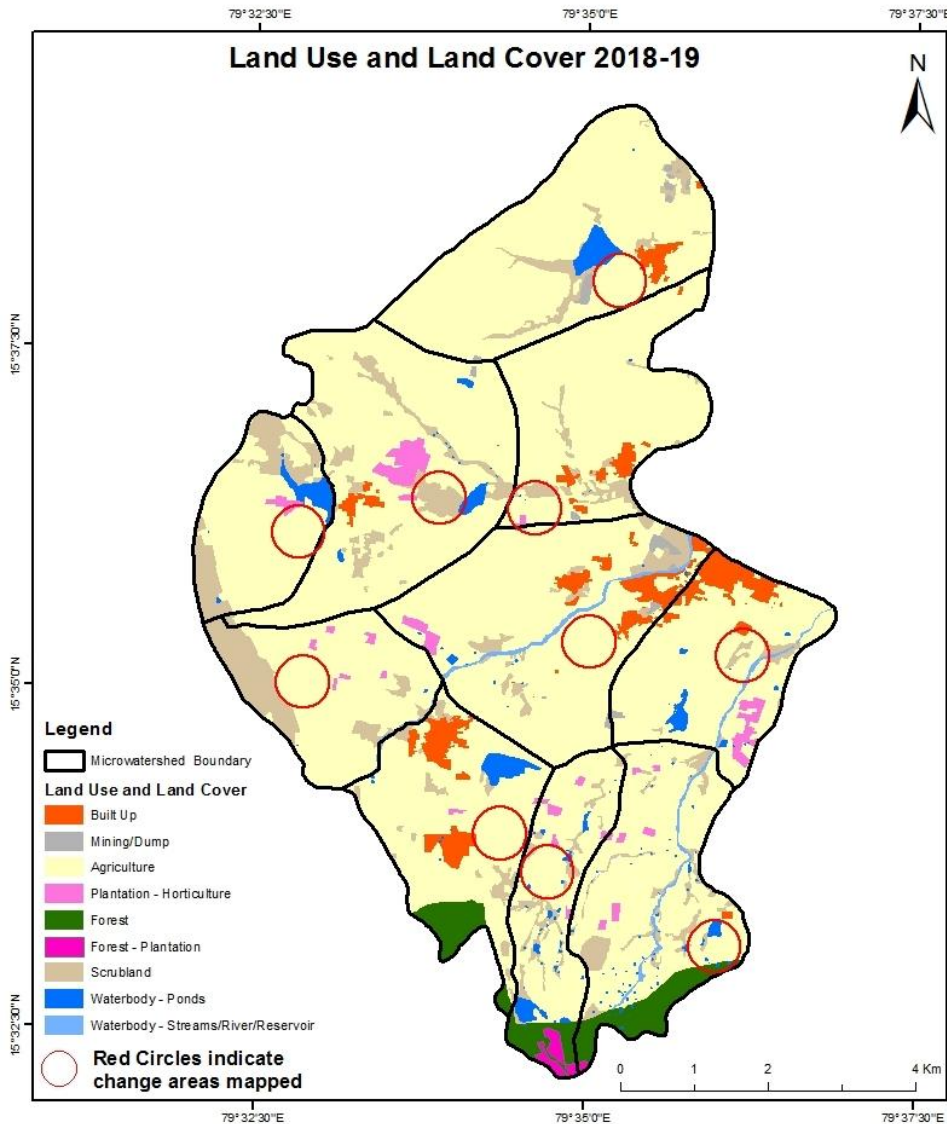
# Comparative assessment of Land Use and Land Cover for Pre and Post IWMP implementation (2017-18 to 2018-19)

Scale: 1:10000



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

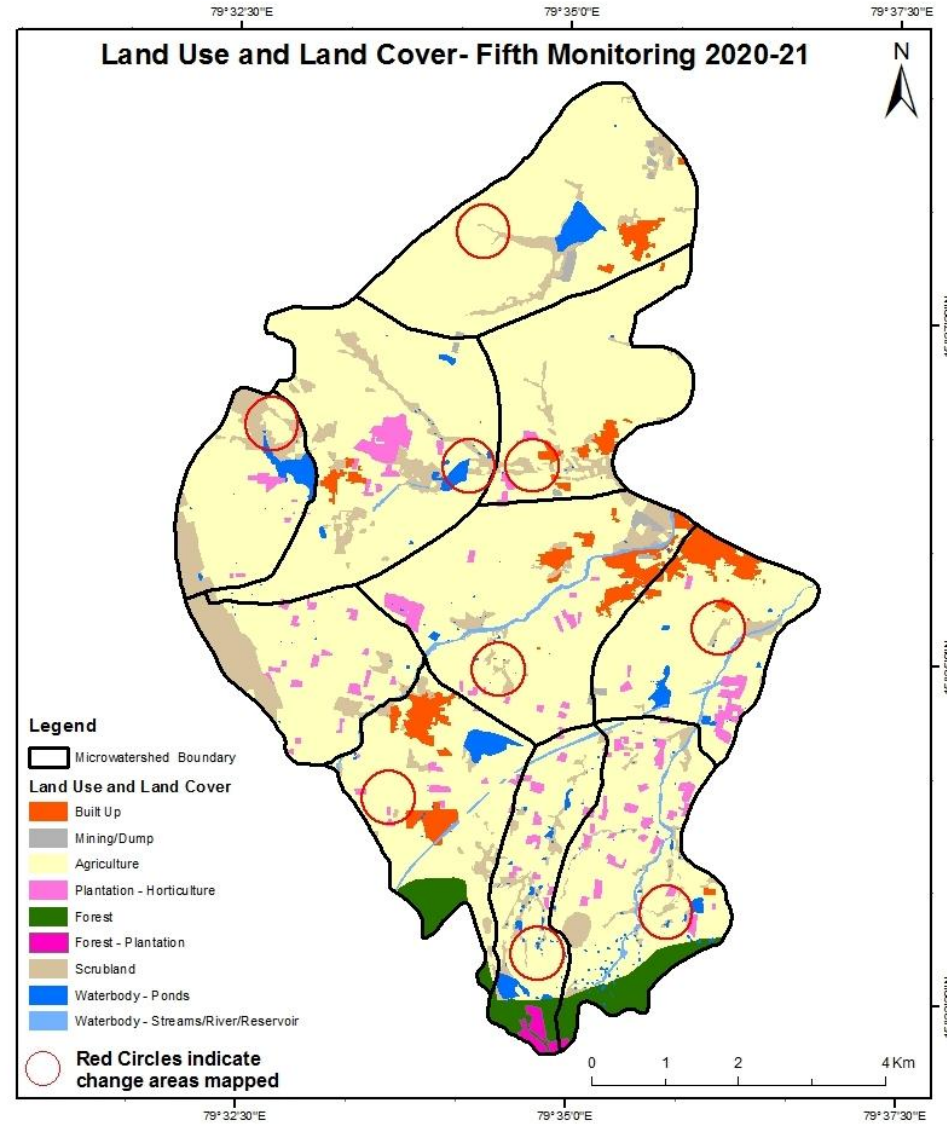
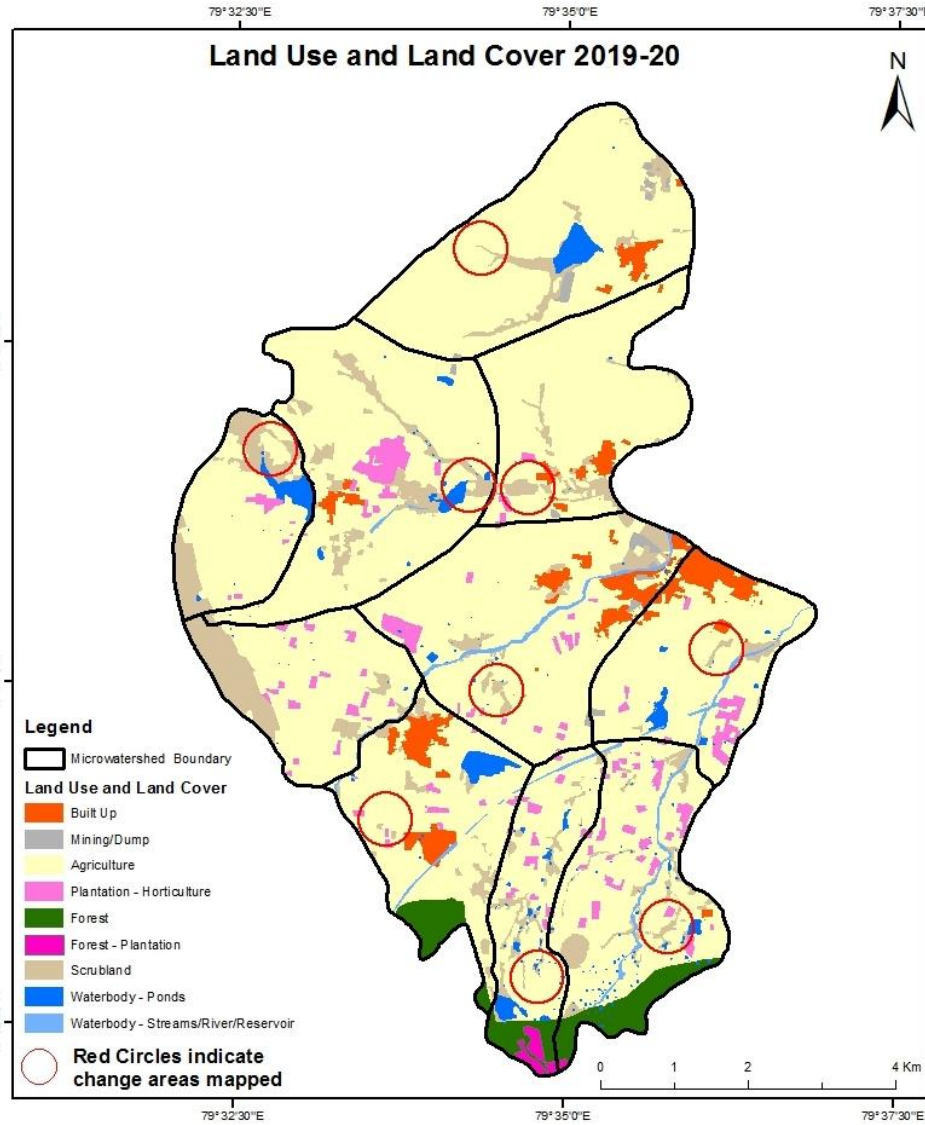
Scale: 1:10000





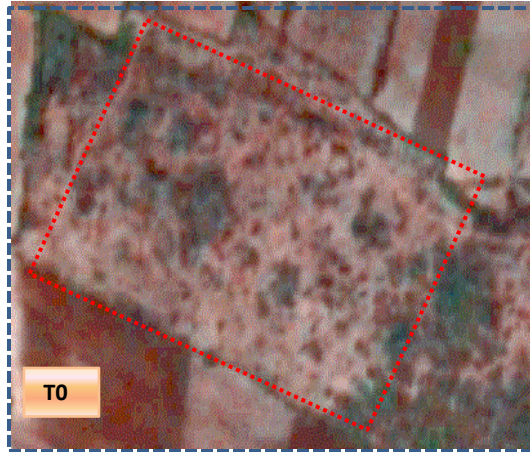
# Comparative assessment of Land Use and Land Cover for Pre and Post IWMP implementation (2019-20 to 2020-21)

Scale: 1:10000



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

### Scrub to Plantation

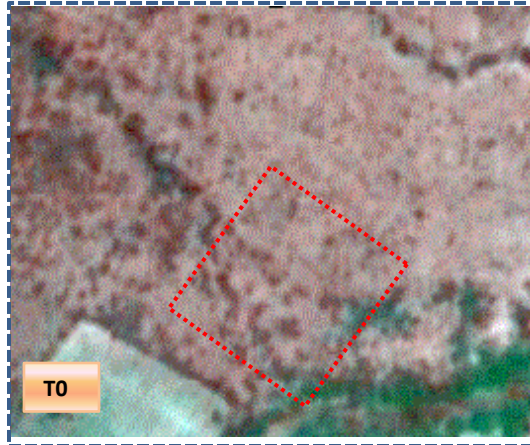


T0: 2012-13 (79°33'42.995"E 15°35'25.255"N )



T2: 22 January 2017

### Scrub to Water body



T0: 2012-13 (79°34'1.773"E 15°35'12.292"N )



T2: 22 January 2017

**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		
<b>Built up</b>	144.5		0.49										<b>144.99</b>
<b>Mining/dump</b>		8.25	2.89										<b>11.14</b>
<b>Agriculture</b>	8.88		4414.07	35.92		6.51		41.26		2.11			<b>4508.75</b>
<b>Plantation Horticulture</b>		4.07	65.73	26.45									<b>96.25</b>
<b>Forest</b>			4.15		165.72					1.01			<b>170.88</b>
<b>Forest Plantation</b>						11.79							<b>11.79</b>
<b>Barren Rocky</b>													
<b>Scrub</b>	24.07	3.8	468.3	1.05				622.04		7.1			<b>1126.36</b>
<b>Waterbody- Streams/River</b>									53.08				<b>53.08</b>
<b>Waterbody – Ponds</b>			4.93							100.07			<b>105</b>
<b>Grand Total</b>	<b>177.45</b>	<b>16.12</b>	<b>4960.56</b>	<b>63.42</b>	<b>165.72</b>	<b>18.3</b>		<b>663.3</b>	<b>53.08</b>	<b>110.29</b>			<b>6228.24</b>

- 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 94.6 ha of the agriculture area has decreased and it is converted into Built-up, plantation, forest plantation, scrub and water body in T1.
- In T1 546 ha of the agriculture area has increased from built-up, mining/dump, plantations, forest, scrubland and water body 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		
<b>Built up</b>	177.44												<b>177.44</b>
<b>Mining/dump</b>		16.13											<b>16.13</b>
<b>Agriculture</b>	11.30	2.24	4912.57	26.31				6.49			2.21		<b>4961.12</b>
<b>Plantation Horticulture</b>			6.77	56.65									<b>63.42</b>
<b>Forest</b>					165.75								<b>165.75</b>
<b>Forest Plantation</b>						18.31							<b>18.31</b>
<b>Barren Rocky</b>													
<b>Scrub</b>	13.88	1.32	15.28					631.93			0.91		<b>663.32</b>
<b>Waterbody- Streams/River</b>									53.07				<b>53.07</b>
<b>Waterbody – Ponds</b>											110.33		<b>110.33</b>
<b>Grand Total</b>	<b>202.62</b>	<b>19.68</b>	<b>4934.62</b>	<b>82.96</b>	<b>165.75</b>	<b>18.31</b>		<b>638.42</b>	<b>53.07</b>		<b>113.45</b>		<b>6228.89</b>

- 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 48 ha of the agriculture area has decreased and it is converted into Built-up, mining/dump, plantations, scrubland and water body in T2.
- In T2 22 ha of the agriculture area has increased from plantations 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		
<b>Built up</b>	202.62												<b>202.62</b>
<b>Mining/dump</b>		19.68											<b>19.68</b>
<b>Agriculture</b>	7.42	7.08	4897.19	21.44					1.49				<b>4934.62</b>
<b>Plantation Horticulture</b>			10.65	72.31									<b>82.96</b>
<b>Forest</b>			0.34		165.06				0.35				<b>165.75</b>
<b>Forest Plantation</b>						18.31							<b>18.31</b>
<b>Barren Rocky</b>													
<b>Scrub</b>	2.08		75.75					555.78	4.82				<b>638.42</b>
<b>Waterbody- Streams/River</b>										53.07			<b>53.07</b>
<b>Waterbody – Ponds</b>									113.45				<b>113.45</b>
<b>Grand Total</b>	<b>212.11</b>	<b>26.76</b>	<b>4983.93</b>	<b>93.75</b>	<b>165.06</b>	<b>18.31</b>		<b>555.78</b>	<b>119.19</b>	<b>53.07</b>			<b>6228.89</b>

- 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 37 ha of the agriculture area has decreased and it is converted into Built-up, mining/dump, plantations and water body in T3.
- In T3 86 ha of the agriculture area has increased from plantations 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		
T3	Built up	Mining/ dump	Agriculture	Plantation Horticulture	Forest	Forest Plantation	Barren Rocky	Scrub	Waterbody- Streams/River	Water body Ponds	Grand Total		
Built up	210.82								1.30				<b>212.11</b>
Mining/dump		26.76											<b>26.76</b>
Agriculture	3.02	2.03	4856.90	104.57				0.63	13.22	3.56			<b>4983.93</b>
Plantation Horticulture				93.75									<b>93.75</b>
Forest			0.35		164.56				0.10	0.04			<b>165.06</b>
Forest Plantation						18.31							<b>18.31</b>
Barren Rocky													
Scrub	1.49		15.57					534.83	1.98	1.90			<b>555.78</b>
Waterbody- Streams/River			0.61						52.46				<b>53.07</b>
Waterbody – Ponds									0.30	119.81			<b>119.19</b>
<b>Grand Total</b>	<b>215.33</b>	<b>28.80</b>	<b>4873.43</b>	<b>198.32</b>	<b>164.56</b>	<b>18.31</b>		<b>535.47</b>	<b>69.36</b>	<b>124.38</b>			<b>6228.89</b>

- 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 127 ha of the agriculture area has decreased and it is converted into Built-up, mining/dump, plantation, scrubland and water body in T4.
- In T4 16 ha of the agriculture area has increased from forest, scrubland and water body 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		
<b>T4</b>													
<b>Built up</b>	215.38												<b>215.38</b>
<b>Mining/dump</b>	2.04	26.76											<b>28.8</b>
<b>Agriculture</b>	2.1		4876.17	1.21									<b>4879.48</b>
<b>Plantation Horticulture</b>				191.23									<b>191.23</b>
<b>Forest</b>					164.53								<b>164.53</b>
<b>Forest Plantation</b>						18.3							<b>18.3</b>
<b>Barren Rocky</b>													
<b>Scrub</b>	0.07		14.21					521.17					<b>535.45</b>
<b>Waterbody- Streams/River</b>									69.35				<b>69.35</b>
<b>Waterbody – Ponds</b>										125.72			<b>125.72</b>
<b>Grand Total</b>	<b>219.59</b>	<b>26.76</b>	<b>4890.38</b>	<b>192.44</b>	<b>164.53</b>	<b>18.3</b>		<b>521.17</b>	<b>69.35</b>		<b>125.72</b>		<b>6228.24</b>

- 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 3.3 ha of the agriculture area has decreased and it is converted into Built-up, plantations in T5.
- In T5 14.2 ha of the agriculture area has increased from p scrubland area 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 36 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 451, 49 & 10 Hectares from T0-T1, T2-T3 & T4-T5 and there is a decrease of 26 & 110 Hectares from T1-T2 & T3-T4 respectively and overall increase of 381 Hectares in Crop land area as compared between baseline LU/LC data 2012-13 (T0) & 2020-21 (T5) years.
5. **About 96 Hectares of plantation/horticulture area has been increased** in during the monitoring period of 2012-13 (T0) to 2020-21 (T5).
6. There is a decrease of 605 Hectares in Scrubland area as compared between 2012-13 (T0) & 2020-21 (T5) years.
7. Farm ponds (13) is visible on IWMP Bhuvan Srishti portal out of Bhuvan Drishti photo of Farm ponds (13) verified from the portal.