

# Impact Assessment of Watershed Activities in Donganala Village, Korba District of Chhattisgarh State

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**Abstract** — The study area was selected for change assessment analysis of settlement, agricultural and drain line area of the Donganala village of Korba district, Chhattisgarh. For the change assessment Land-SAT and Google Earth image was used. It observed that the agricultural area of Donganala village, is increased by 57.74 acres along with the population during twelve year span of time and settlement area is also increased. After construction of the Dam in Donganala village, the villagers are not satisfied with the benefits obtained from the Dam.

**Index Terms** — Land SAT, Acr-GIS, RS, GIS.

## I. INTRODUCTION

The remote Sensing technique is important for acquiring useful data from the earth surface by sensors and collected data are analysed to obtain information about the objects, areas or phenomena being investigated [4]. Also it includes the analysis and interpretation of the acquired data and imagery, which are the most important aspects for environmental scientists to provide information for monitoring earth resources [3]. Remote sensing techniques help in studying changes in vegetation cover. Geographic information system is powerful method for earth sciences and their study.

Watershed management programmes are not only help in the economic up-liftment of rural people but also help to conserving degradation of natural resources and improve the environmental conditions in the watershed.

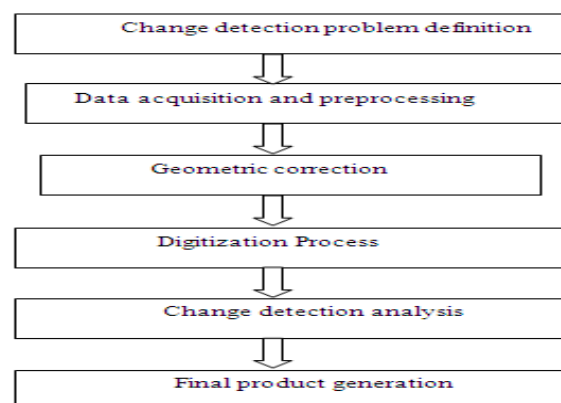
After establishing the Chhattisgarh state various watershed development programmes were started. Donganala watershed project was started on 1980 and completed on 1994. This study was designed to identify the socio-economic development of Mungadih and Donganala villages with the specific objectives as:

1. To determine the status of changes in agricultural field pattern and settlement area in Donganala village during 2001-2013 by remote sensing and G.I.S.
2. To determine the drain area of Doganala watershed by remote sensing and G.I.S.
3. To study the benefits obtained from the Doganala watershed project by the villagers.

## II. MATERIALS AND METHODS

Donganala village of Korba district in Chhattisgarh state is selected for present study. The Land-SAT (2001) and Google Earth images (2013) were used for change assessment. The Land-SAT images had spatial resolution of 30 by 30 meters, while the Google Earth images had spatial resolution of 10 by 10 meters. The GIS vector data source was also used for change analysis. Other parameters including GPS points for field verification, toposheet of the area, Arc-GIS software, ERDAS Imagine software were used. To measure the benefits obtained by villagers the data was collected through personal interview by pre tested interview schedule and the data was analyzed by using appropriate statistical method.

### A. Steps taken for analysis of change detection in Donganala



## III. RESULTS AND DISCUSSION

During last decades our agricultural area have been used for establishment of infrastructure facilities i.e. road, houses, industrial sectors, and rapid urbanization. Increasing demand of wood for energy, housing structures, furniture's and other materials, the deforestation activities were increased in last decades. Due to deforestation activity the forest land is converted into the agriculture land and use for some other purpose.

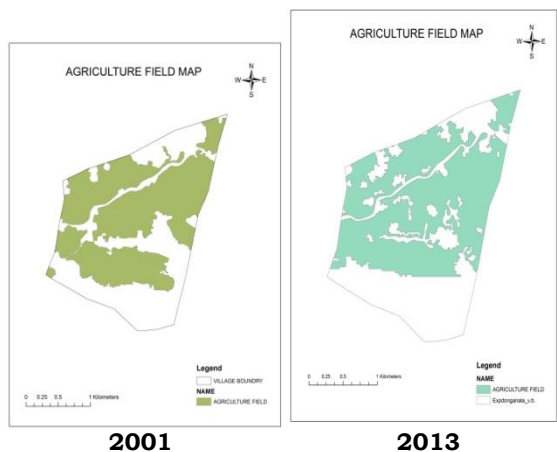


Figure 1: Agriculture Area of Donganala Village

Table 1: Agricultural Area of Donganala Village

S. NO	Class	Area in Acres	
		Year 2001	Year 2013
1.	Agriculture Field	746.38	804.12
	Total	746.38	804.12

The data shows in the Table-1 indicate that in 2001 the total agricultural area of Donganala village was 746.38 acres and in the year 2013 the total agricultural area is 804.12 acres. It clearly indicates that the agricultural area of Donganala village is increased by 57.74 acres during last thirteen years span of time. The similar types of result were found by [1] [5] [6] [8].

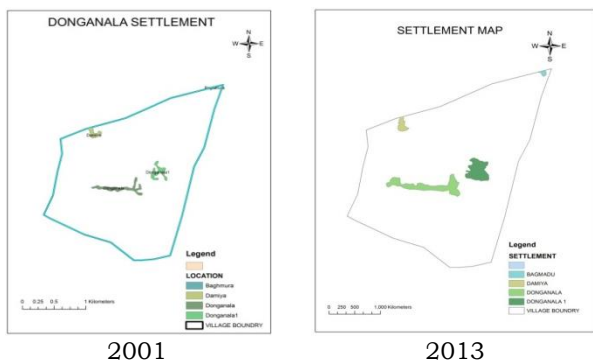


Figure 2: Change Detection in Settlement Area of Donganala Village

The image-2 was developed by using Land SAT and Google Earth image of digitization method. The data shows that the settlement area of Donganala village has increased up to double during thirteen years span of time. Due to rapid growth of population in Donganala village the settlement area of Donganala village is increased. The similar results were observed by [2] [8].

Table 2: Settlement Area of Donganala Village

S. No	Name of Place	Area in Acres	
		Year 2001	Year 2013
1.	BAGMADU	0.49	1.30
2.	DAMIYA	4.63	4.78
3.	DONGANALA 1	8.12	19.85
4.	DONGANALA	12.50	27.25
	TOTAL	25.74	53.18

The Table 2 shows the settlement area of Donganala Village, the data reveals that in year 2001, settlement area of Bagmadu was (0.49 acres), Damiya (4.63 acres), Donganala 1 (8.12 acres) and Donganala (12.50). Whereas 2013 the settlement area of Bagmadu is (1.30 acres), Damiya (4.78 acres), Donganala 1 (19.85 acres) and Donganala (27.25). The data clearly indicates that the settlement area of Donanala Village is increased from 25.74 acres to 53.18 acres.

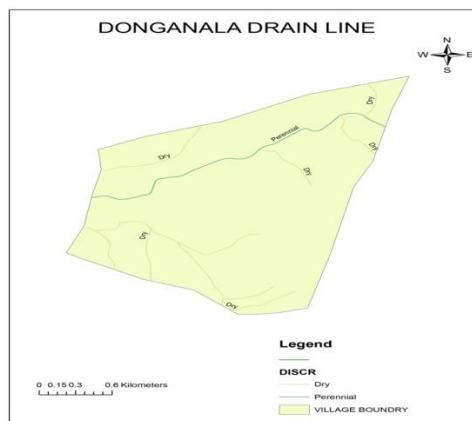


Figure 3: Drain Line Area of Donganala Village

Table 3: Drain Line Area of Donganala Village

S.No.	Class	Length in K.M.
1.	Dry (Seasonal)	8.04
2.	Perennial	2.97
	Total	11.02

The data shows drain line area of Donganala village in in the Table-3 that the Dry (Seasonal) area of Donganala village is 8.04 K.M., Perennial line area is 2.97 K. M. and the total Drain line area is 11.02 K. M.

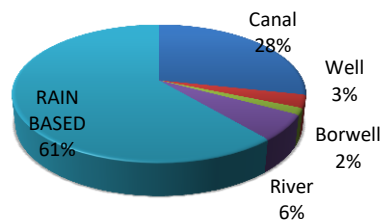


Figure 4: Distribution of respondent as per their availability of irrigation sources

The data show in the Figure: 4 that, the maximum agricultural area (61.00%) of the Donganala village is rain based, whereas 28.00 per cent of the respondents have used cannel for irrigation purpose, 6.00 per cent used river, 3.00 per cent respondents have well and rest of 2.00 per cent respondents have Bore well in their field for irrigation.

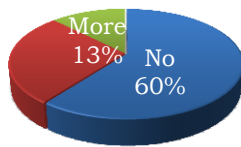


Figure 5. Distribution of respondent as per their response about water availability for irrigation

This figure 5 shows that the response of Donganala villagers about the water availability for irrigation purpose. It is found that the majority of the respondents (60.00%) said that after construction of Dam they did not get water for irrigation from dam, followed by 27.00 per cent of the respondents said that they get less water for irrigation, while 13.00 percent of the respondents said that they get more water for irrigation from the dam.

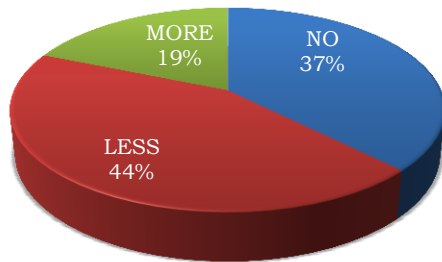


Figure 6. Distribution of respondents as per their perception related to increase in ground water level enhancement

The Figure 6 shows that perception of Donganala villagers regarding increasing the ground level water after construction of Dam in village area. It can be seen from the figure 6 that the 44.00 per cent of the respondents perceived that the ground level of water is less increased in their village area, whereas 37.00 per cent of the respondents perceived that ground water level is not increased and only 19.00 per cent of the respondents perceived that the ground water level is more increased in their village area.

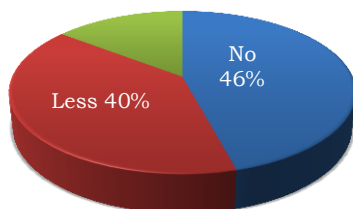


Figure 7. Perception regarding Increase Agricultural Production

The figure 7 shows the perception of respondents regarding increasing agriculture production level in Donganala village. The data indicated that 46.00 per cent of the respondents perceived that the agricultural production in Donganala village is not increased after construction of Dam in the village, whereas 40.00 per cent of the respondents perceived that agricultural production is less increased and

rest 14.00 per cent of the respondents perceived that the agricultural production level is more increased after construction of dam in village area. So the overall agricultural production is not changed in Donganala village after construction of Dam in the village area.

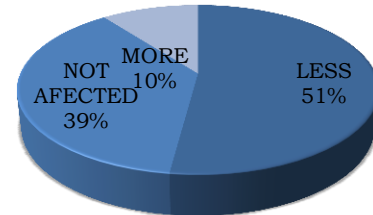


Figure 8. Perception of respondents regarding their increasing agriculture income

The Figure 8 shows that the perception of respondents regarding their increasing agricultural income after construction of Donganala Dam in village area. It is found that majority of the respondents (51.00%) perceived that their agricultural income is less increased after construction of Dam in the village area, whereas 39.00 per cent of the respondents perceived that their agricultural income is not affected and only 10.00 per cent of the respondents have perceived that their agricultural income is increased after construction the Dam in the Donganala village area.

#### IV. CONCLUSION

It can be seen from the result that the agricultural area of Donganala village is increased by 57.74 acres. Increasing population demanded more food for their livelihood. So there is a great pressure in our field for producing more and more crops in the specific land area. But it is difficult because changing the climatic condition, lack of irrigation facilities and increasing rate of agriculture input *etc.* affect the agriculture production. During last few decades our agricultural area are using for establishing the infrastructure facilities *i.e.* houses and rapid urbanization. Increasing demand of wood for energy, housing structures, furniture's, and other materials force human population for deforestation activities. After deforestation activity the forest land is converted into the agriculture land and use for some other purpose. So we can conclude that due to deforestation activity the agricultural field of Donganala village is slightly increased. In the village Donganala, the population has increased up to double within the twelve year span of time. Due to increasing the population of Donganala village the settlement area in the village is increased. Breaking structure of society and economic upliftment has also affected the settlement pattern of Donganala village. Dry line area and Perennial line area of Donganala village is not changed since 2001. The result also concludes that the respondents are not able to increase their agricultural produce. So the agricultural income is not increased accordingly after construction of the Dam in Donganala village area.

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