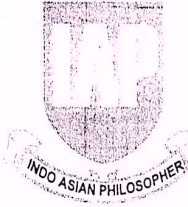


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Research Paper

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Geography

Geographical Study of Watershed Development in Marathwada Region

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ABSTRACT

Watershed conservation can be achieved through top-down approaches or by means of participatory approaches, where local communities actively participate in the conservation efforts. This paper explores which approach is more effective in achieving conservation in four semi-arid regions in India, and analyses what factors explain project success. We find that the bottom-up participatory approach favored by NGOs is more effective in inducing households to invest in soil and water conservation (SWC) than the government-led, top down approach. Contextual factors like market integration and resource scarcity play a crucial role - watershed conservation in subsistence economies with high aridity is more difficult to achieve than in low aridity, market integrated zones. We also find that if no explicit attention is paid to long-term maintenance in the long run, participatory approaches do not ensure household commitment to SWC maintenance. This threatens the sustainability of participatory watershed development.

With relatively poor resource endowments and low and erratic rainfall, the uncertainty of agricultural production in India's semi-arid regions is high. Soil fertility and water scarcity are major constraints for agricultural production and the average productivity of dry land agriculture is low. With the intensification of

agriculture, groundwater depletion and soil erosion have become serious threats. Technological development and investments in rural infrastructure (electricity, roads) did improve living standards through access to markets, inputs and groundwater irrigation (Fan et al., 1999), but with less than half of the households having access to irrigation, water scarcity and rainfall insecurity remain crucial constraints for most (Ryan and Spencer, 2001).

Keywords: Sustainable Approach, watershed development, water conservation

Introduction:

Watershed development is one of the main strategies for rural development in India's semi-arid regions. Over the last decades the Government of India annually invested approximately \$ 500 million (Government of India, 2000). In the beginning, investments were rather technical and implementation mostly top-down. The success of the bottom-up approach of nongovernmental organizations (NGO) (Kerr et al., 2000) caused the program to evolve towards participatory watershed development, decentralizing the planning, implementation and management of soil and water conservation (SWC) to local user groups at the village scale. The NGO approach of participatory watershed development has proven difficult to scale up. The long-term commitment of NGO's combined with their context specific approach has been hard to replicate and the number of professional NGO's is too small to implement watershed development at a much larger scale. Also, household management of land and water resources in the watershed has in many cases turned out to be unsustainable. Households are hardly taking responsibility for the operation and maintenance of conservation structures and the allocation of stored water resources is not done in a sustainable way.

Although a lot of research has been done to analyze the impacts of participatory vs non-participatory WSD approaches on the productivity of resource use and distribution of benefits the importance of contextual variables in explaining project results and long-term impact of project interventions on soil and water conservation has been insufficiently addressed. An important reason is the 'case study approach' most studies have taken, which does not allow for a systematic comparison of the relative importance of factors explaining project success

Objective of this paper

The objective of this paper is to analyze the expected short and long-term impacts of

watershed development projects on soil and water conservation with specific attention for the importance of external factors in explaining project results.

Methodology and Data base:

The present investigation is based on primary and secondary data from Statistical Office, Census hand book. Values were obtained by tabulating the data and presented by cartography like maps, graphs and charts.

Result and Discussion:

When the socioeconomic conditions of the remote watersheds are characterized as subsistence economy, the integrated watersheds are typified as cash economies. Similarly, aridity in the watersheds with very low rainfall is notably higher than aridity in the watersheds with higher rainfall. The characteristics of the four watersheds are shown in Table 1.

Table No. 1 Category wise watershed in Marathwada (2011)

| Sr. no. | Type of watershed | Range | Marathwada | Total State |
|---------|------------------------------------|-------------------------------------|------------|-------------|
| 1 | Safe | Low exploitation. of watershed 70 % | 292 | 1242 |
| 2 | Semi critical | 70 – 90 % | 32 | 163 |
| 3 | Critical | Above 90 % | 2 | 20 |
| 4 | Over exploited | Overexploitation of annual recharge | 6 | 76 |
| 5 | Pure quality (without classify) | - | 0 | 4 |
| Total | | | 332 | 1505 |

Source: State Economic Abstract of Maharashtra. 20054

Hence, The Government of Maharashtra had divided 1505 watersheds throughout the state. Out of 1505 watersheds 76 water sheds areas had been over exploited the ground water.3its effect is that the ground water level is decreasing.



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Table No. 2 District wise No. of Watersheds in Marathwada (2011)

| District | Major | Sub | Mini | Micro |
|------------------|-------|-------|-------|-------|
| Aurangabad | 52 | 226 | 0 | 1190 |
| Jalna | 52 | 191 | 385 | 1299 |
| Beed | 48 | 104 | 322 | 2132 |
| Aurangabad Div. | 152 | 521 | 707 | 4621 |
| Osmanabad | 41 | 151 | 291 | 935 |
| Latur | 39 | 117 | 211 | 806 |
| Nanded | 49 | 123 | 256 | 1307 |
| Parbhani/Hingoli | 51 | 246 | 506 | 1541 |
| Latur Div. | 180 | 637 | 1264 | 4589 |
| Total | 332 | 1158 | 1971 | 9210 |
| State | 1505 | 5773 | 9853 | 44185 |
| % To State | 22.06 | 20.06 | 20.00 | 20.86 |

Source: Watershed in Maharashtra, Abraham Samuel, pune134

Above table shows the classification watershed highest number of major and sub watershed have observed in Aurangabad and Jalnadistrict, whereas highest number of mini watershed of Jalna and Beed district on the other hand Beed district is first rank of micro watershed and Nanded in second rank. Total 332 major 637 sub, 1264 mini and 4589 micro watershed are observed in Marathwada region generally it is 20% to state.

Table No.3 Division wise Watershed Programme in DPAP

| Division | No of Watershed | PIA | WS | Cost of project |
|------------|-----------------|-------|-------|-----------------|
| Aurangabad | 82 | 6 | 42 | 1413.36 |
| Latur | 89 | 5 | 35 | 1728.59 |
| Total | 171 | 11 | 77 | 3141.95 |
| State | 856 | 53 | 334 | 15944.9 |
| % to state | 19.98 | 20.75 | 23.05 | 19.71 |

Source - G.S.D.A.Pune

Under the drought prone area Programme the government of Maharashtra treated watershed work for 856 watershed. 171 watershed are Marathwada region. 11 project implanting agencies had work out of 171 watershed 77 watershed developed by different project implementing agencies in study area. 3141.95 Crore amount has expended for these



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Table No.4 Programme of watershed development in 50% EAS

| Division | Completed W/S | Government | | NGO | | Project cost |
|------------|---------------|------------|-------|------|-------|--------------|
| | | PIA | WS | PIA | WS | |
| Aurangabad | 107 | 3 | 71 | 5 | 36 | 1915.396 |
| Latur | 182 | 5 | 41 | 14 | 141 | 3654.17 |
| Total | 289 | 8 | 112 | 19 | 177 | 5570.39 |
| State | 1582 | 55 | 816 | 136 | 766 | 30848.90 |
| % to state | 18.27 | 14.55 | 13.73 | 13.9 | 23.11 | 18.06 |

Source - G.S.D.A.Pune

Above table shows 289 watershed work out completed by government and NGO. Out of total watershed 112 has been completed by government under project implanting agencies, whereas 177 watershed development had been completed by various NGO's under implanting agencies. The cost of all these project have section 5570.39 crores rupees. It is 18.06% to the state. Hence completed watershed imbalanced between Aurangabad and Laturdivision.

Table No 5 District wise Drought Prone Areas in Marathwada (00'ha)

| District | Geographical Area | DP Area | % of DP area |
|------------------|-------------------|---------|--------------|
| Aurangabad | 1008 | 802 | 80 |
| Jalna | 773 | 188 | 24 |
| Beed | 1069 | 823 | 77 |
| Osmanabad | 749 | 317 | 42 |
| Latur | 716 | 488 | 68 |
| Nanded | 1033 | 470 | 46 |
| Parbhani/Hingoli | 1097 | 126 | 11 |
| Total | 6445 | 3206 | 43.50 |
| State | 30738 | 15923 | 52 |
| % to state | 20.97 | 20.13 | 83.65 |

Source: GoM, Agro-climatic zone, 2011

Above table clearly shows that highest percentage of drought prone areas has Aurangabad and Beed district where as below 50% of drought prone areas are found in Osmanabad, Nanded, Parbhani and Hingoli district. Hence 20.13% drought prone area of the state.

The Government of Maharashtra implementation the development of watershed by different programme. There are in around 44.85 micro watershed programmers followed by

DDAP (189) EABC (360) AGY (199), IGWDP (40) RVP (32) NWDPR (235) and IWDP (4957). In this implementation number of NGO's are involved. Highest percentage of watershed programme is implemented in Latur division of Marathwada. Aurangabad division mostly implemented the programme under Indo-German watershed programme.

Table No 6 Detail of Watershed Programme in Marathwada (2011)

| Programme | | Aurangabad Div. | Latur Div. | Total | State | % To State |
|-----------|-----|-----------------|------------|-------|-------|------------|
| DPAP | W/S | 79 | 110 | 189 | 909 | 20.79 |
| | % | 23 | 23 | 23 | 19 | |
| EAS | W/S | 164 | 196 | 360 | 1549 | 23.24 |
| | % | 18 | 4 | 11 | 14 | |
| AGY | W/S | 47 | 152 | 199 | 645 | 30.85 |
| | % | 15 | 13 | 14 | 16 | |
| IGWDP | W/S | 28 | 12 | 40 | 102 | 39.22 |
| | % | 11 | 8 | 9.5 | 28 | |
| RVP | W/S | 00 | 32 | 32 | 114 | 28.07 |
| | % | 00 | 44 | 22 | 52 | 42.31 |
| NWDPR | W/S | 101 | 134 | 235 | 917 | 25.63 |
| | % | 78 | 78 | 78 | 70 | |
| WGDP | W/S | 00 | 0 | 0 | 0 | 0 |
| | % | 00 | 0 | 0 | 0 | 0 |
| IWMP | W/S | 2133 | 2824 | 4957 | 2232 | 22.33 |
| | % | 49 | 63 | 56 | 32 | |
| CBA | W/S | 11 | 13 | 24 | 78 | 30.77 |
| | % | 7 | 5 | | | |

Sources: commission ate of Agriculture, GoM, Pune, Page 142 6062

(DPAP-Drought Prone Area Programme, EAS-Employment Assurance Scheme, AGY-Adarsh Gaon Yojna, IGWDP -Indo-German Watershed Programme, RVP-River Valley Project, NWDPR- National Watershed Development Programme For Rain fed Areas, WGDP- Western Ghat Development Programme, IWMP- Integrated Watershed Management Planning, CBA-Cost benefit Analysis)

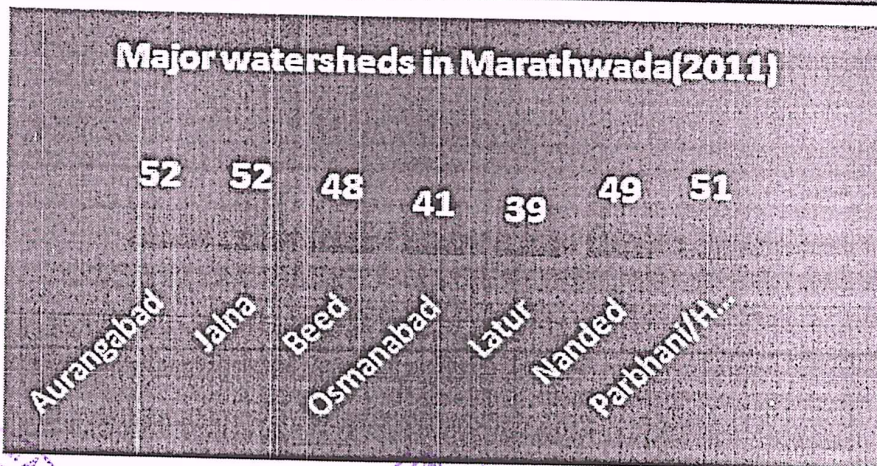
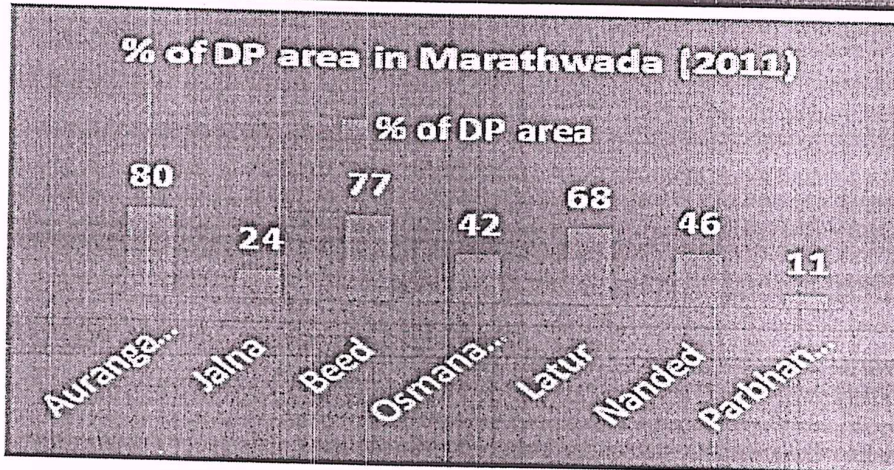
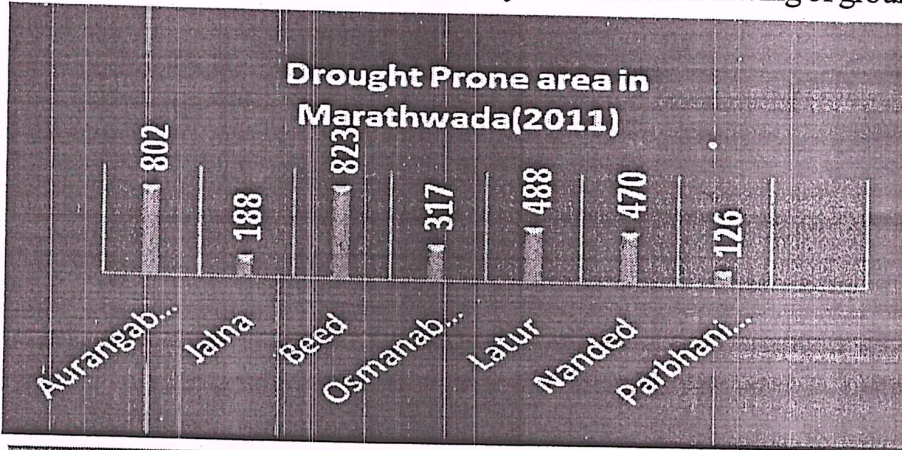
Conclusion:

1. Due to increasing completion of ground water, the water table has dropped by over 300 feet observed in many villages in Osmanabad, Beed and Latur district.
2. Every year some part of this study area is affected by several water scarcities. Mostly drought affected talukas observed in major part of Marathwada.

The high density of irrigation wells is found in Aurangabad and Latur districts. During the period of under review district as a whole has only 0.40 percent positive change in



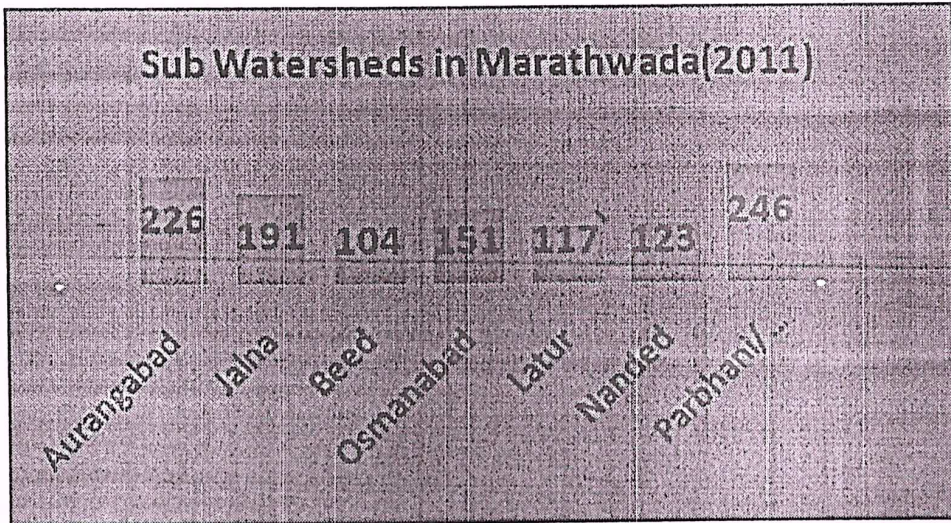
percentage of well irrigated area which suggest that there is need of artificial recharge of groundwater and use of drip irrigation. The negative change in well-irrigated area in Osmanabad and Beed district is a result of scarcity of rainfall and lowering of ground water.



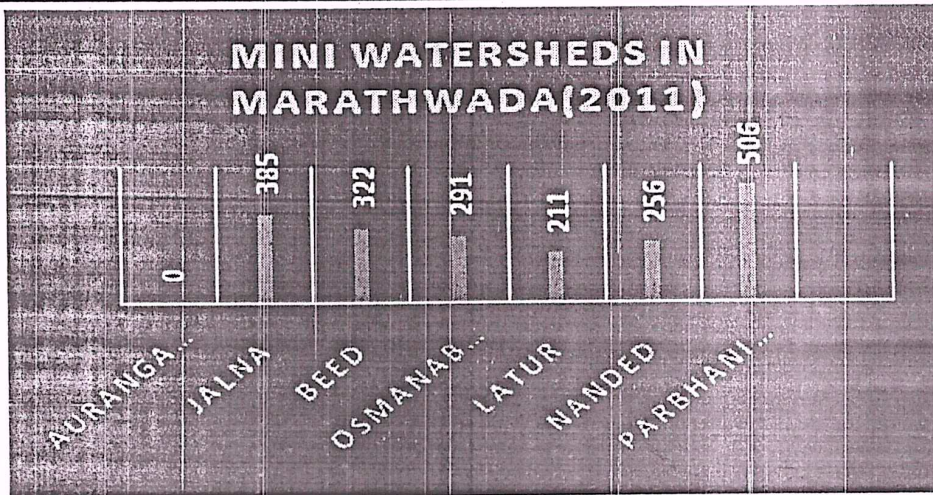
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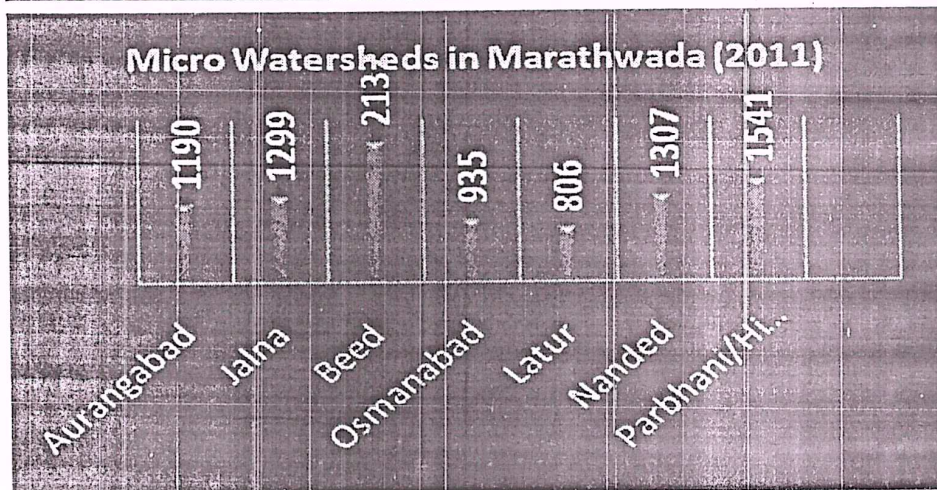
Sub Watersheds in Marathwada(2011)



MINI WATERSHEDS IN MARATHWADA(2011)



Micro Watersheds in Marathwada (2011)



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