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11

Water Policy Research

Highlight

Understanding Underdevelopment in Vidarbha

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Comprising of eleven districts in eastern Maharashtra, Vidarbha is significantly underdeveloped compared to the rest of Maharashtra and India. Popular sentiment attributes this underdevelopment to the step-motherly treatment by the state. However, there are significant variations in levels of development *within* the region itself which cannot be explained by state action alone.

Analysis shows that differential development in Vidarbha is also a function of natural endowments and social ecology. High income areas are the 'mainland areas' with lower tribal population which make more intensive use of their natural endowments.

Dependability of source of irrigation is very critical to income generation; in the absence of that, mere inclusion in a command area means nothing.

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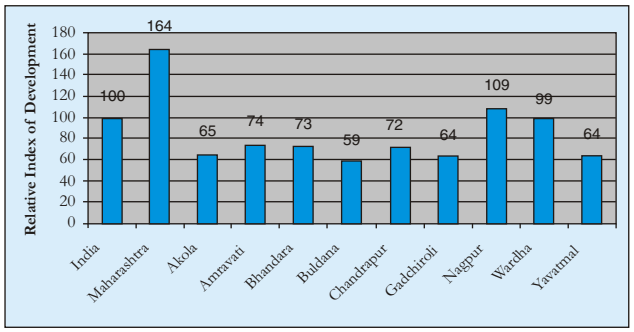
Understanding Underdevelopment in Vidarbha[1]

RESEARCH HIGHLIGHT BASED ON A PAPER TITLED:

"UNDERSTANDING UNDERDEVELOPMENT: CHARACTERIZING REGIONAL DEVELOPMENT IN VIDARBHA WITH SPECIAL FOCUS ON WATER USE"

Vidarbha comprises eleven districts on the eastern end of Maharashtra. The region is underdeveloped in both absolute and relative terms. A comprehensive development index evolved by CMIE showed that, with the exception of Nagpur, all districts in Vidarbha are significantly underdeveloped when compared to the rest of Maharshtra or India (Figure1).

Figure 1: Levels of (Under) Development in Districts of Vidarbha



Source: CMIE, Profiles of Districts, October 1993
Note: Bhandara has been sub-divided into Bhandara and Gondia districts. Similarly, Akola has been sub-divided into Akola and Washim districts. As such, the current number of districts in Vidarbha is 11.

There is a popular feeling in Vidarbha that this underdevelopment is a result of deliberate neglect on the part of the state government and has often led to repeated demands for a separate statehood for Vidarbha. Yet the figure clearly brings out significant variations in levels of development *within* Vidarbha. Such differences cannot be explained by facile attribution to a callous state. This paper seeks to push this analysis one step further and attempts to answer the following questions:

- Are there sharp differences in levels of development at the *tehsil* level in Vidarbha?
- What factors seem to be the most likely causes of differential levels of development?
- In particular, how is access to and use of water associated with differential regional development?

The paper is based on secondary data collected from state and central government sources. It uses in the main two major databases: the District Census Abstracts brought out by the Census Commissioner and the District Statistical Profiles brought out by the Directorate of Economics and Statistics, Government of Maharashtra. In addition to these two, the study team has gathered detailed status reports on minor and medium irrigation for all the districts of Vidarbha.

AGRO-CLIMATIC CHARACTERISTICS OF VIDARBHA

Vidarbha itself is agroclimatically heterogeneous. The iastern Vidarbha districts of Gondia, Bhandara, Gadchiroli, and Chandrapur have high rainfall (upwards of 1500 mm annually), coming from the Bay of Bengal arm of the monsoon. This region is bounded in the north by Satpura hills but the rest of the region is relatively flat. Barring alluvial tracts riparian to Chulband and Vainganga, the soils in the rest of the region are largely lateritic. Subsoil formations have primary porosity but little permeability. Thousands of tanks dot the landscape, particularly in Bhandara and Gadchiroli districts. Paddy is the main crop here. This region is also rich in forests and has a much higher tribal population.

Western Vidarbha covering Buldhana, Washim, Akola and Amarawati districts is much dryer, as it

[1]The research covered by this IWMI-Tata Research Highlight was carried out with generous support from Sir Ratan Tata Trust, Mumbai under IWMI-Tata Water Policy Programme. The research paper can be downloaded from the IWMI-Tata Website http://www.iwmi.org/iwmi-tata.

borders the rain-shadow districts of central Maharashtra. With rainfall varying between 650mm in Buldhana and 850 mm in Amarawati, paddy is grown only in the northern hilly regions of Dharani and Melghat (which also receive much more rains). Soils are mostly deep black cotton. Subsoil stratum comprises the hard rock of the Deccan trap. Sorghum, pigeon pea, and cotton have been the main crops of this region for a century, with pockets of pearl millets and minor pulses in the western tehsils being observed.

The central Vidarbha districts include Nagpur, Wardha, and Yavatmal. Undulating terrain and heterogeneous soils mark this region. There are several pockets of sandstone stratum that have been explored for coal deposits in the Wardha valley. Soils vary from lateritic in the eastern Nagpur district to black cotton soils in Wardha and Yavatmal. This region has rainfall varying between 900 mm and 1300 mm. Cotton, paddy, red chillies, sorghum, soyabean, etc. are the principal crops of the region.

Irrigation Development in Vidarbha

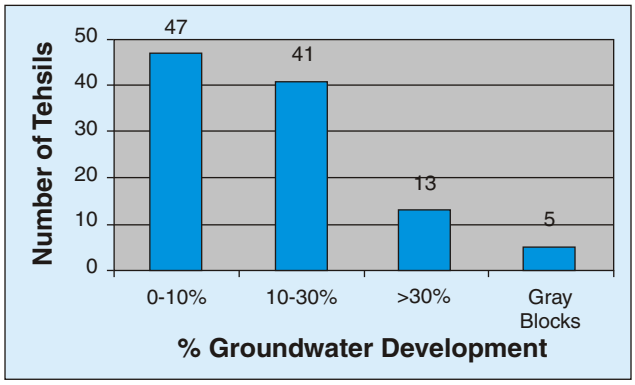
Of the 5.2 million gross cropped area, 600,000 ha (13%) is classified as irrigated; 360,000 ha from surface sources and 240,000 ha from groundwater sources. Of the 360,000 ha area irrigated by surface sources, 343,000 ha is in the command of some 11,900 minor irrigation schemes (average of 29 ha per scheme). The well density in Vidarbha is 4.3.

While there is significant unexplored groundwater in soil-basalt trap regions, access would appear to be difficult and expensive. As a result, overall groundwater development (that is, annual drawal of water as percentage of annual recharge) is low at about 15 percent. In fact of the 537 micro-watersheds in Vidarbha, only 5 are classified as dark, another 7 as grey, and the rest are classified as white zones for purposes of groundwater development. When carried out at the level of *tehsils*, the analysis reveals that most of the *tehsils* have groundwater development of less than 30 percent. The *tehsil*-level picture is shown in Figure 2.

Regional Development Issues

The study attempted to answer the questions using a three-tier analysis using *tehsil*-level secondary data. In the first stage, *tehsils* were classified into two categories of high rural per capita income and low rural per capita income based on farm income. High income *tehsils* were compared to low income *tehsils* on other development indicators.

Figure 2: *Tehsil*-wise Groundwater Development in Vidarbha



In the second stage, *tehsils* were classified according to their cropping pattern and different groups were compared. Finally, we present an overall picture of spatial correlates among different relevant facets of development.

Sixty-seven *tehsils* reported income below the universe mean while 39 reported above mean.

High income *tehsils* are essentially "mainland" areas and not the forest-and-hills kind of tribal dominated *tehsils*. This reinforces greater association of tribals with poverty.

Tehsils that reported higher per capita income than the universe mean were compared with *tehsils* that had lower income than the universe mean.

Social and Demographic Differences

High income *tehsils* report lower sex ratio and lower child ratio. High income *tehsils* also show greater population of scheduled castes and smaller population of schedule tribes. This association indicates that high income *tehsils* are essentially "mainland" type *tehsils* and not the forest-and-hills kind of tribal dominated *tehsils*. This also reinforces the greater association of tribals with poverty.

Intensity of Resource Use

Higher income *tehsils* have smaller forest cover, greater land use for agriculture, higher cropping

intensity, and surprisingly high (cultivated) land-man ratio. The tribal regions have smaller population density but much smaller cultivated land per household. This seems to be a major reason for their poverty. Cropping intensity in high income *tehsils* is also substantially high, though quite modest on an absolute scale. On the whole, high income *tehsils* use their natural endowments more intensively.

Cropping Pattern

Paddy dominated areas show typical signs of backwardness. Cotton too has become a harbinger of poverty and deprivation in recent years and low income *tehsils* have marginally high area under cotton.

Three dominant cropping patterns can be discerned in Vidarbha: paddy dominated (37 *tehsils*), cotton dominated (36 *tehsils*), and diversified (33 *tehsils*). High income *tehsils* show much lower area under paddy, about the same area under cotton, and higher area under *tur* (pigeon-pea) and horticultural crops (banana, orange). The paddy dominated areas show typical signs of backwardness: higher child ratio, higher sex ratio, higher proportion of main workers in the population, and higher population density. Paddy in Vidarbha is largely rainfed. Average yields are quite low (around 1500 kg/ha) and there is a great deal of rain induced variation in the yield. Cotton too has become a harbinger of poverty and deprivation in recent years and low income *tehsils* have marginally high area under cotton.

Table 2: Comparison between High and Low Income *Tehsils* on Various Parameters

Attribute	High per capita income group (39 *tehsils*)	Low per capita income group (67 *tehsils*)	't' value of difference of means
Social and Demographic Indicators			
Sex ratio	945	966	-2.6
Child ratio	16.7	17.8	-3.7
percent of SC in total population	16	12	3.3
percent of ST in total population	15	23	-2.3
Resource Use Intensity			
Forest cover (as percent of GA)	11.96	22	-2.59
Land used for agriculture (percent)	66	49	4.0
Cropping intensity (percent)	121	111	3.8
Land-man ratio (ha/capita)	0.38	0.30	2.8
Area per tractor (ha)	1084	2240	2.5
Pumps per well	0.58	0.59	Not significant
Gross value per ha (Rs.)	14336	11338	2.95
Gross value per capita (Rs.)	8697	4089	5.5
Cropping Pattern			
Area under paddy as percent of kharif area	14	32	-2.65
Area under tur as percent of kharif area	10.2	5.34	4.49
Area under cotton as percent of kharif area	29	31	Not significant
Area under horticulture as percent of cropped area	6.0	1.6	4.03
Irrigation Development			
Irrigated area (percent)	13.6	30	Not significant
Well density	7.17	4.1	2.85
percent of surface irrigation in total irrigated area	5.5	26.0	-1.9
Well ratio	2.0	4.39	-3.39
Ground water development (percent)	23	10	4.5

Role of Irrigation

High income *tehsils* use water resources much more intensively than low income *tehsils*. We find that high income areas have much smaller irrigated area than low income *tehsils*. This is indeed peculiar and, while the difference is statistically not significant, it is noticeably large. We also find that the proportion of surface irrigation in total irrigated area is much smaller for high income *tehsils* than for low income *tehsils*. We argue that this is a paradoxical situation created by the way the data are collated and recorded. It appears that if a village land is under the command of an irrigation scheme, it is deemed to be irrigated irrespective of the certainty and dependability of irrigation to that land. By contrast, we find lands on which wells exist are still classified as unirrigated for reasons convenient to farmers. But the data also show that the well density (the number of wells per square kilometer) is much higher for high income *tehsils*. Most clinchingly, the data show that groundwater utilization (proportion of annual withdrawal as proportion of net groundwater balance) in high income *tehsils* is double of that in low income *tehsils*.

Three inferences are inescapable and are of crucial importance:

- Dependability of source of irrigation is very critical to income generation; in the absence of that, mere inclusion in a command area means nothing
- Dependability of surface irrigation sources in Vidarbha is very low compared to groundwater sources; despite much lower proportion of irrigated area in these *tehsils*, high income *tehsils* report high cropping intensity.
- Finally, while groundwater exploitation is possibly a strong determinant of the income in these regions and while there is scope to increase utilization very significantly, people in low income *tehsils* suffer from poverty.

Analysis of correlates of socio-economic development combined with the above analysis reveals a complex reality. At the moment what seems to determine the total irrigated area for *tehsils* is mainly the surface irrigated area. But by themselves surface sources are unreliable. Groundwater irrigation is proceeding more by proliferation of dug wells rather than increasing command under one tubewell as seems to happen elsewhere. Groundwater utilization appears to be increasing in *tehsils* with higher land pressure. Gross value of crops per hectare rises with fall in cultivated area. Gross crop value per capita moves with groundwater development, as that seems to be the driver of prosperity in Vidarbha.

Conclusion

In summary, we find that there is significant variation in per capita income across *tehsils* in Vidrabha. This variation is associated with composition of communities in the *tehsils*, crop mix and most crucially with the extent of groundwater use. What appears clear is that nominal status of an area by no means reflects the reliability with which people there would in fact be able to practice irrigated agriculture. For reasons perhaps of reliability, surface water sources have much smaller income effects. In part this is explained by high tribal population, high population density and high forest cover (and hence) low cultivated land per head. While abundant ground water seems to exist in some of the most backward *tehsils*, their exploitation is discouraged both by demand and supply factors. Supply restrictions occur on account of cost of constructing a dug well and energizing it as well as risk associated with choosing the right site for a well. Demand is restricted by the prevalence of cotton crop.

High Income Tehsils have

- **Relatively low sex ratios and lower proportion of children in the population**
- **Greater SC population and smaller ST population**
- **Lower forest cover**
- **Higher cropping intensity**
- **Higher cultivated land man ratio**
- **Much higher groundwater utilization and lower surface irrigation**

IWMI-Tata Water Policy Program

The IWMI-Tata Water Policy Program was launched in 2000 with the support of Sir Ratan Tata Trust, Mumbai. The program presents new perspectives and practical solutions derived from the wealth of research done in India on water resource management. Its objective is to help policy makers at the central, state and local levels address their water challenges – in areas such as sustainable groundwater management, water scarcity, and rural poverty – by translating research findings into practical policy recommendations.

Through this program, IWMI collaborates with a range of partners across India to identify, analyse and document relevant water-management approaches and current practices. These practices are assessed and synthesised for maximum policy impact in the series on Water Policy Research Highlights and IWMI-Tata Comments.

The policy program's website promotes the exchange of knowledge on water-resources management, within the research community and between researchers and policy makers in India.

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