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ARTICLES

ECONOMICS OF UTILISATION OF CANAL WATER IN DRY AGRICULTURAL REGIONS*

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Agricultural development in India depends heavily on the availability of irrigation. However, water for irrigation appears to be potentially in short supply in the country. In 1980-81 49.585 million hectares (ha.) of crop land, constituting only about 28 per cent of the total crop land (28.61 per cent of the gross cropped area and 27.66 per cent of the net sown area) was irrigated. The ultimate irrigation potential from all sources, surface and underground, is estimated to be 113.5 million ha. of gross irrigated area. Assuming the present intensity of irrigation, this implies that nearly 60.6 per cent of the gross cropped area, or about 63.3 per cent of the net cropped area in the country, can ever be irrigated (refer Appendix 1).

This all-India picture also does not highlight the wide regional variation in this context. The ultimate irrigation potential in the Indo-Gangetic plains, the Brahmaputra valley, as well as in the large river delta regions in the eastern coast is very high, nearly 100 per cent. As against this, in the plateau region of India, starting with Rajasthan in the north to Tamil Nadu in the south, the ultimate irrigation potential is severely limited. In the case of many of the States, falling mainly within the plateau region, the ultimate irrigation potential from major and medium surface irrigation projects does not appear to be more than 40 per cent; the overall would be about one-third of the total crop area.[1] And, unlike in the Indo-Gangetic plains, the possibilities of underground water availability is very limited and uncertain. Maharashtra's situation may be presented to illustrate the point.

ASSESSMENT OF IRRIGATION POTENTIAL

The total irrigation potential created by June 1982 from sources of flow irrigation in Maharashtra, measured in terms of gross irrigable crop area, was 2.16 million ha., constituting about 12 per cent of the total net sown area of the State. In the ultimate analysis, another 4 million ha. are expected to be added to this, when all the flow irrigation potential is fully worked out, making this equal to 33 per cent of the present net sown area (refer Appendix 2). Within the State also there is great regional variation. The districts of Dhule, Nashik, Ahmednagar, Pune, Solapur, Sangli, Osmanabad, Beed, Aurangabad, Buldhana, Akola and Amravati have a lower ultimate potentiality than the State average. No firm estimates are available about the potentiality of irrigation from undergound water, which, in any case, is very limited and uncertain in these districts. Therefore, the flow irrigation

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* This paper is based on a study of the subject, conducted in the Gokhale Institute of Politics and Economics, Pune, awaiting publication.

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1. Compare the ultimate irrigation potential of all medium and major irrigation schemes, given in Annexure 3.2 of the Seventh Five Year Plan, 1985-90, Vol. II, Planning Commission, Government of India, New Delhi, 1985 with the latest available data on net sown/gross cropped area of the concerned States.

potentiality indicates the serious limits to the availability of water for irrigation in large parts of Maharashtra.

Indeed, the above method of estimating irrigation potentiality has a limitation that makes these figures non-comparable among districts (or States). The irrigated crop area consists of different crops, in varying proportions in different districts, and the future potential is estimated by assuming the present pattern of cropping under irrigation to hold for the newer irrigated areas as well. Since different crops require different quantities of water for irrigation, the total irrigated crop areas in different districts cannot give a correct indication of the difference in the quantities of water available for irrigation among the districts. In order to make these areas comparable in terms of what the Maharashtra State Irrigation Commission (1962) termed as 'standard crop area', the Fact Finding Committee on Regional Imbalance in Maharashtra, with the help of the information provided by the State Irrigation Department, have expressed, in their Report (April 1984), the ultimate potential (as well as the present created potential) irrigated area in terms of 'Irrigated Rabi Jowar' area equivalent. These are presented in Appendix 3. The data show that if irrigation water were to be given for only *rabi* jowar crop, the total potentially available water from flow sources will be able to irrigate about 64 per cent of the net sown area in the State. In the 11 districts mentioned above, this percentage is lower, in some cases much lower than the State average.

These data go to demonstrate the potential scarcity of water for irrigation in large parts of the State, where rainfall is also on the low side. Indeed, it is clear that the input which is potentially in shortest supply, relative to all other inputs for agriculture, is water for irrigation. Elementary economic logic and commonsense suggests that in such a situation the other inputs, including land, should be so used in conjunction with water that, in the ultimate analysis, the net return per unit of water (*not* per unit of irrigated land) shall be the maximum. Any individual farmer, faced with such a situation, would take decision along this line. When a whole region is faced with such a situation, and the State is the supplier of the scarcest factor, water, the policy of water use and management should be so designed as to maximise the net return per unit of water. This is important, because if this care is not taken, it is conceivable that individual farmers faced with unlimited (or very large) supply of water in relation to their limited land area would try two maximise the return per unit of irrigated land, while the rationale at the social level would require the opposite. It is, therefore, necessary to examine if the pattern of canal water utilisation, that is, the cropping pattern under irrigation, in these water-scarce dry agricultural regions leads to the maximisation of net return per unit of water.

ECONOMIC APPRAISAL OF PRESENT PATTERN OF USE OF SURFACE IRRIGATION WATER

In Maharashtra, particularly in the dry plateau region of Western Maharashtra, the dominant crop under canal irrigation, not in terms of area, but in terms of share of total irrigation water used, is sugarcane. In the State as a whole, sugarcane accounts for about one-ninth of the gross irrigated crop area; but it uses around 60 per cent of the total irrigation water. Take the Pravara Left Bank Canal, a 60-year old major irrigation system, in Ahmednagar district. It has a culturable command area of 85 thousand acres; but the actual irrigated area (in 1978-79, for example) is only about 30 per cent (25,000 acres). Thus, 70 per cent of the cultivated land within the command area of the system is not able to get any canal water during the year. Nearly 20 per cent of the irrigated land is under sugarcane block, and a further 3,000 acres of sugarcane land under wells receive supplementary water from canal in summer season. Sugarcane, therefore, does not account for a very large percentage of the gross irrigated crop area. But sugarcane is a heavy water-using crop. Various official estimates of irrigation water use/requirement of different crops in the region as well as some statistical exercises relating the total water supply to irrigated crop acreages, give us reasonable estimates of the actual supply of water, at the distributary head, to various crops in the region. These are presented in col. 2 of Table I. It appears that an acre of sugarcane takes at least eight times as much irrigated water as seasonal crops like jowar and bajra, and six times that of other seasonal crops. The important question to ask in this connection

TABLE I. IRRIGATION WATER REQUIREMENT OF CROPS AT DISTRIBUTARY HEAD AND THE NET FARM BUSINESS INCOME PER UNIT OF WATER USED (1978-79)

Name of the crop	Water requirement (acre-inch)	Area that can be irrigated per mcft. of water (acres)	Net farm business income per acre (Rs.)	Net farm business income per mcft. of water (Rs.)
(1)	(2)	(3)	(4)	(5)
1. Sugarcane (*Adsali, i.e.,* 18 months)	175	1.55	1,515	2,348
2. Sugarcane (*suru, i.e.,* 12 months)	136	2.00	1,195	2,390
3. Bajra (HYV-*kharif*) ...	20	13.80	441	6,086
4. Bajra (local)	20	13.80	251	3,464
5. Groundnut (HYV-*kharif*)	24	11.50	525	6,038
6. Groundnut (local-*kharif*)	24	11.50	340	3,910
7. Cotton (HYV-*kharif*) ...	24	11.50	649	7,463
8. Maize (local-*kharif*) ...	20	13.80	435	6,003
9. Hybrid jowar (*kharif*) ...	15	18.40	485	8,924
10. Jowar (local-*rabi*) ...	22	12.50	317	3,962
11. Wheat (HYV)	30	9.20	492	4,526
12. Wheat (local)	30	9.20	243	2,235
13. Onion (*rabi*)	36	7.65	1,060	8,109
14. Gram (*local*)	18	15.30	290	4,437
15. Onion (hot weather) ...	42	6.55	1,060	6,943
16. Maize (hot weather) ...	36	7.65	435	3,328
17. Cotton L. S. (hot weather)	42	6.55	760	4,978
18. Groundnut (hot weather)	36	7.65	485	3,710

is whether a cropping pattern under irrigation with sugarcane having the place in it that it has today, leads to the most profitable use of irrigation water, in the sense that it maximises net return per acre-inch of irrigation water.

In order to answer this question we must first ascertain the farm business income per acre of different irrigated crops in the region (that is gross value of produce minus all out-of-pocket expenses, which leaves the return to family labour and owned land with the cultivator). The yield rates of different crops and their by-products, the physical inputs for the various crops relate to the Pravara and Nira Left Bank Canal regions and are based on the cost of production surveys conducted by the Government of India since 1972 as well as by the Gokhale Institute of a sample of farmers specially studied for the purpose. The yield and price data have been examined for trends as well as changes in relative prices of both outputs and inputs. the calculations refer to the year 1978-79, but are adjusted to be consistent with trends in relative prices and yields. The net farm business incomes per acre of various irrigated crops in this region are given in Table I, col. 4.

The data show that sugarcane gave the highest farm business income per acre, much higher than all other seasonal crops. If irrigation water were plentiful compared to the land awaiting irrigation, a sugarcane-centred irrigated cropping system would appear to be the most appropriate. But it is not so. Therefore, it is useful to examine the value of the net farm business income that will be generated by using one million cubic feet (mcft.) of irrigation water in different crops. Col. 3 of Table I gives the area under different crops that can be irrigated with one mcft. of water, and the last column in that table gives the total net farm business income that can be generated with the help of one mcft. of irrigation water in the case of every crop. The data show that the lowest net income generated with one mcft. of water is from sugarcane (except in the case of the local variety wheat which shows an even lower net income). This clearly demonstrates that an irrigated crop system, in which sugarcane features as a crop, is sure to lead to a lower generation of net total income, than an irrigated cropping system without sugarcane. A number of such cropping systems, with seasonal crops other than sugarcane, can be worked out, keeping rotational requirements in view. (These are not being presented here, to avoid too many details.)

The important point to note in this connection is that if any of the many seasonal crop combinations/rotations are adopted in place of sugarcane, not only will the net total income from the given quantum of water be higher; it will cover a wider net irrigated area than sugarcane as well. If seasonal crops are to cover the field for all the time for which sugarcane stands on the field (that is, 18 or 12 months depending on the variety), meaning, if a piece of irrigated land is to be under one or another seasonal crop in all the three seasons of the year, then the net irrigated area with only seasonal crops will be 50 to 90 per cent more than the area under sugarcane. If, however, irrigation is confined to only two seasons, (*i.e.*, roughly 8 months) *kharif* and *rabi*, and no water is provided for any summer crop, the net irrigated area shall be more than three times what sugarcane will cover, for the same quantity of irrigation water. In brief, it means this changed pattern will cover a much larger cultivated area with irrigation than a system based on sugarcane. It was seen in the beginning that based on the present pattern of cropping under irrigation, no more than 34 per cent of the cultivated land in the State is likely to be irrigated. A changed pattern of cropping can increase this to more than 50 per cent of the total cultivated area. This would bring many more farmers within the fold of irrigation. And it would render greater stability to the agriculture of the State which has seen very little of it till now.

RATIONALE FOR SUGARCANE-BASED IRRIGATION SYSTEM

The question may be raised: why has the sugarcane-based irrigation system developed in the State over this century? Why do farmers prefer sugarcane to other seasonal crops under irrigation? Turning to the first question first, it is worth recalling that the earlier canal system in dry Western Maharashtra was the Nira Canal system. This, and the later ones, were originally designed to provide irrigation water to the traditionally grown seasonal crops. But, experience showed very poor use of the water by the farmers for the purpose, except in years of severe drought. The reason, as the late Shri M. Visweswaraya pointed out at that time, was that while these seasonal crops yielded more under irrigated condition, their costs of production under irrigation were also proportionately higher, leaving no more farm business income than under unirrigated condition.[2] Because of this disincentive, the sugarcane 'block' system, with assurance of water to the block for a number of years at a time, was introduced to persuade the farmer to use irrigation water. Besides other factors, this was the most important reason for the adoption of the sugarcane-based irrigation system. But in recent years the situation has changed. The new varieties of seasonal crops and the relative price situation have made it possible for the farmers in this region to earn a much larger farm business income from even seasonal crops like jowar and bajra under irrigation, than under unirrigated condition.

Nevertheless, the present day farmers in the irrigated areas give other reasons for their preference for sugarcane. There is much less fluctuation in both yield and the price of sugarcane, than of other seasonal crops, due to both weather, and pests and diseases. While this is generally true, it does not appear that lower yield rates of seasonal crops, or much higher relative prices of sugarcane, would give rise to a higher farm business income from sugarcane than a proper combination of seasonal crops, grown with the help of a given quantity of water. Sensitivity analysis by assuming the lowest yield rates for seasonal crops, and highest relative price of sugarcane, observed over the past decade (not presented here) bear this out. Of course, it is true that the seasonal crops are subject to greater price fluctuations than sugarcane. But a part of the reason is the inadequate provision to implement the support price policy in the local markets at the appropriate time, a failure not noticed in the case of sugarcane, thanks to the factories ensuring the minimum support price for the farmers.

Another reason for the reluctance of farmers to grow seasonal crops in preference to sugarcane, is the uncertainty of water supply from canals and the longer gap

2. Refer to Minutes of Evidence: Bombay Presidency (of the Indian Irrigation Commission), Office of Superintendent, Government Printing, Calcutta, 1902. Donald W. Attwood on the history of the Deccan Canals in his paper "Irrigation and Imperialism: The Causes and Consequences of a Shift from Subsistence to Cash Cropping", awaiting publication in *Journal of Development Studies*, 1986.

between two waterings than what some seasonal crops would appropriately need. Here, again, sugarcane can stand these uncertainties better than most seasonal crops. It is expected that the Rotational Water Supply System now being gradually extended under the Command Area Development projects, will take care of this aspect of the problem.

ALTERNATIVE APPROACH TO THE USE OF SURFACE IRRIGATION WATER

The preference of the farmers for sugarcane is due to the lesser risks involved and the lesser continuous attention required than for other seasonal crops. The farmers sum it up by referring to sugarcane as the 'idleman's crop'. It is difficult to correct this attitude except by adopting a policy such that a farmer can choose to grow sugarcane only at significantly higher cost to himself. This can be done if the total quantity of irrigation water that can be made available per acre in the command area is first calculated on the basis of the cropping pattern(s) likely to generate the highest income per unit of water. Then, depending upon the total cultivated land with a farmer in the command area, his quota of water may be decided, and only so much is assured to him under the Rotational Water Supply System. A farmer who with this given quantum of water, chooses to grow sugarcane, cannot irrigate most of his land under command, and would receive a lower total income than otherwise. Farmers would learn, sooner or later; it is not desirable, nor practicable to enforce a particular cropping pattern on the farmers. Of course, the pattern of cropping under any particular minor canal or water-course (covering a *chak* of about 20 acres) cannot vary widely during a season; for, operation of the system would, in that case, become difficult and wasteful. But this is a problem common to any pattern of water use, and has to be independently handled.

Attention may be turned to two other aspects of this alternative approach to the use of irrigation water in the type of farming in regions like the plateau region of Western Maharashtra. The alternative use pattern discussed above would cover a much larger net irrigable command area than otherwise. This would require longer canal, distributaries, etc., involving both greater capital cost and proportionately larger loss of water through seepage. (On the other hand, confining irrigation to only the eight months of the *kharif* and *rabi* seasons would mean prevention of considerable loss of water through evaporation in summer.) This would increase the cost of water and one has to take that factor into account in estimating the overall benefits and costs. While we have not done such an exercise (in the case of the Pravara canal system or similar older systems, a part of the additional capital cost may not be necessary since the carrying channels of the past may exist, though in a run-down condition due to want of use), there is evidence to believe that despite this extra capital cost the benefit-cost ratio will be higher than in the case of the sugarcane-based system.[3]

Finally, a question may be raised about the implication of refusing canal water for sugarcane under the flow irrigation schemes in the whole of the Deccan plateau. This, it may be argued, would lead to a reduction, or at least non-increase (if the

3. For an examination of this question, see V. M. Dandekar, D. Deshmukh and V. R. Deuskar: Interim Report of the Committee to Study the Introduction of Eight Monthly Supply of Water on Irrigation Projects in Maharashtra, Government of Maharashtra, Bombay, 1979.

policy is followed only in the new irrigation project areas) in the area under sugarcane in the region. And this is sure to affect the relative price of sugar (and sugarcane) pushing it upwards. The whole logic based on a given relative price of sugarcane may then indicate a reversal of the policy. Now, this view is logical; but whether the changing relative price of sugarcane will warrant a reversal of the policy implied here will depend on the extent to which the relative price of sugarcane may rise as a result of this. As we have noted earlier, sensitivity exercises using a much higher relative price of sugarcane, almost 15 to 20 per cent higher than assumed in the above exercise, could not justify the use of irrigation water for sugarcane.

However, to conclude that effective denial of canal water for sugarcane would result in no cultivation of the crop in and near the command area, appears unwarranted. A significant part of the sugarcane in the region is grown with water from wells. These wells are sunk not only adjacent to the canal irrigated area, but also in some projects, like the non-perennial portion of the Nira Left Bank Canal, within the irrigable command area itself, to tap and recycle the water seeping underground from the canals as well as the fields. Indeed, the Maharashtra Irrigation Commission (1962) had advocated a policy of permitting and persuading farmers to sink wells in the command area of canal irrigation projects to supplement the irrigation water from canals for crops like sugarcane, and restricting the supply of a flow irrigation water to only a limited number of irrigations required for seasonal crops. The experience in the Deccan suggests that this is possible, and sugarcane can be grown in a significant measure with the help of wells largely recycling water seeped from canals. It would also lead to a more economical use of the total canal water an objective that must be pursued to the maximum extent possible in this region deficient in water. It is possible that cultivation of sugarcane only under wells in, and around canal areas would lead to a dispersion of its cultivation over the wider irrigable area, as against the present pattern of concentrated cultivation of sugarcane. There is no reason to believe that this will raise the cost of production of sugar; if anything, it might reduce it. And, to the extent this happens, the upward pressure on the relative price of sugar and sugarcane will be lessened.

This review of the economics of the present pattern of use of surface irrigation water in the potentially water-short dry agricultural regions of the Deccan plateau, suggests that the water is not being used in a manner that can yield the maximum net income per acre-inch of water. Sugarcane is the smallest income generating crop. Use of canal water for seasonal crops would lead to generation of higher aggregate income from the given amount of water. At the same time, it would lead to larger areas of land being brought under irrigation than is possible under the present pattern of use. This increase would be very considerable if irrigation is confined to only the *kharif* and *rabi* seasons. A much larger proportion of farmers in the State will automatically become beneficiaries of irrigation. The agricultural economy of the State will see greater stability in terms of year to year variations. And, conjunctive use of surface and ground water would promote economic use of scarce water while permitting cultivation of crops like sugarcane (and paddy, where appropriate). Until now, the formulation and/or evaluation of the economics of irrigation projects in India, in published form, do not appear to contain an examination of the question of the most economic use of water under different crop systems. For the water-scarce plateau region of peninsular India this is particularly important. It is high time policy is oriented to this end in the interest of generation of higher incomes from irrigation and its more equitable distribution among the rural population.

APPENDIX 1

PRESENT (1980-81) AND ULTIMATE POTENTIAL IRRIGATED AREA (GROSS AND NET), AS PROPORTION OF THE ESTIMATED TOTAL CROP AREA (GROSS AND NET) IN INDIA

1. Gross cropped area	(1980-81)	173.324 million ha.
2. Net cropped area	(1980-81)	140.270 million ha.
3. Gross irrigated area	(1980-81)	49.585 million ha.
4. Net irrigated area	(1980-81)	38.805 million ha.
5. (3) as per cent of (1)		28.61%
6. (4) as per cent of (2)		27.66%
7. (4) as per cent of (3)		78.26%
8. Ultimate potential irrigated area (gross)		113.5 million ha.
9. (8) minus (3)		63.915 million ha.
10. Net irrigated area out of the additional gross irrigated area (9) × (7)		50.020 million ha.
11. Ultimate potential net irrigated area (4) plus (10)		88.825 million ha.
12. Ultimate potential gross cropped area (1) plus (9) minus (10)		187.219 million ha.
13. Potential gross irrigated area as per cent of total gross cropped area		60.6%
14. Potential net irrigated area as per cent of total net cropped area		63.23%

Source: Data relating to 1980-81 are taken from Indian Agriculture in Brief, 20th Edition, Directorate of Economics and Statistics, Ministry of Agriculture and Rural Development, Government of India, New Delhi, 1985, and the ultimate potential figures are taken from Seventh Five Year Plan, 1985-90, Vol. II, Planning Commission, Government of India, New Delhi, Table 3.1.

APPENDIX 2

PRESENT (1982) AND ADDITIONAL POTENTIAL IRRIGATED CROPPED AREA IN MAHARASHTRA FROM STATE SECTOR SURFACE IRRIGATION SOURCES

(area in '000 ha.)

District	Irrigation potential created (upto June 1982)	Additional potential irrigated crop area	Total (2+3)	Total irrigated area as per cent of net sown area (1978-79)
(1)	(2)	(3)	(4)	(5)
1. Greater Bombay ...	—	—	—	—
2. Thane	8.39	129.83	138.22	52.14
3. Raigarh	23.32	138.21	161.53	82.50
4. Ratnagiri	4.70	139.97	144.67	40.60
Konkan	36.41	408.01	444.42	54.38
5. Nashik	113.36	68.23	181.59	20.41
6. Dhule	64.55	51.47	116.02	16.46
7. Jalgaon	106.31	232.97	339.28	41.86
8. Ahmednagar ...	206.56	126.08	332.64	27.38
9. Pune	133.86	77.10	210.96	21.07
10. Satara	97.63	127.77	225.40	38.47
11. Sangli	75.41	115.48	190.89	30.98
12. Solapur	142.61	156.03	298.64	26.26
13. Kolhapur	59.53	192.83	252.36	59.56
Western Maharashtra ...	999.82	1,147.96	2,147.78	29.09
14. Aurangabad ...	101.69	143.23	244.92	20.17
15. Parbhani	135.01	150.52	285.53	28.35
16. Beed	73.23	139.75	212.98	26.31
17. Nanded	87.56	205.87	293.43	40.31
18. Osmanabad ...	69.96	88.51	158.47	14.21
Marathwada	464.45	727.88	1,192.33	24.46
19. Buldhana	32.77	65.95	98.72	14.48
20. Akola	43.41	40.25	83.66	10.19
21. Amravati	14.25	119.76	144.01	19.92
22. Yavatmal	40.88	291.22	332.10	38.86
23. Wardha	27.62	155.54	183.16	41.44
24. Nagpur	68.11	261.52	329.63	58.29
25. Bhandara	132.56	325.90	458.46	118.06
26. Chandrapur ...	79.39	462.13	451.52	78.39
Vidarbha	438.94	1,722.27	2,161.21	41.83
Maharashtra	1,939.62	4,006.12	5,945.74	32.59

Source: Col. 2 from Table 7.4; col. 3 calculated on the basis of data in Tables 7.4 (col. 2), 7.5 (col. 2) and 7.7 (cols. 3 and 4); col. 5 is col. 4 expressed as a percentage of data in col. 5 of Table 7.3 of the Report of the Fact Finding Committee on Regional Imbalance in Maharashtra, Government of Maharashtra, Bombay, April 1984.

APPENDIX 3

PRESENT (1982) AND ADDITIONAL POTENTIAL IRRIGATED AREA IN TERMS OF RABI (JOWAR) EQUIVALENT

(*area in '000 ha.*)

District	Irrigation potential under construction and future	Upto June 1982	Total (2+3)	Net sown area (1978-79)	Col. (4) as per cent of col. (5)
	(*Rabi* jowar equivalent)				
(1)	(2)	(3)	(4)	(5)	(6)
1. Greater Bombay ...	—	—	—	6.60	—
2. Thane	261.52	16.90	278.42	265.10	105.40
3. Raigarh	283.60	47.85	331.45	195.80	169.28
4. Ratnagiri	252.24	8.47	260.71	356.30	73.17
Konkan	797.36	73.22	870.58	817.20	106.53
5. Nashik	113.11	187.93	301.04	889.60	33.84
6. Dhule	94.21	118.15	212.36	705.00	30.12
7. Jalgaon	481.55	219.74	701.29	810.50	86.53
8. Ahmednagar ...	256.65	420.48	677.13	1,214.90	55.74
9. Pune	165.49	287.34	452.83	1,001.00	45.24
10. Satara	277.05	211.74	488.79	585.90	83.43
11. Sangli	299.76	195.75	495.51	616.10	80.43
12. Solapur	345.92	316.17	662.09	1,137.40	58.21
13. Kolhapur	798.28	246.44	1,044.72	423.70	246.57
Western Maharashtra ...	2,837.79	2,203.74	5,041.53	7,384.10	68.28
14. Aurangabad ...	258.89	183.81	442.70	1,214.00	36.47
15. Parbhani	376.35	337.57	713.92	1,007.30	70.87
16. Beed	237.07	124.23	361.30	809.50	44.63
17. Nanded	424.43	180.52	604.95	727.90	83.11
18. Osmanabad ...	144.32	109.18	253.50	1,115.00	22.74
Marathwada	441.06	935.31	2,376.37	4,873.70	48.75
19. Buldhana	130.68	64.93	195.61	681.90	28.69
20. Akola	80.94	87.30	168.24	820.70	20.50
21. Amravati	202.38	24.08	226.46	722.90	31.33
22. Yavatmal	601.82	84.48	686.30	854.60	80.31
23. Wardha	307.20	54.55	361.75	442.00	81.84
24. Nagpur	402.21	104.75	509.96	565.50	90.18
25. Bhandara	420.36	170.98	591.34	388.30	152.29
26. Chandrapur ...	547.34	93.97	641.31	690.80	92.84
Vidarbha	2,713.90	684.74	3,398.64	5,166.70	65.78
Maharashtra	7,790.11	3,897.01	11,687.12	18,241.70	64.07

Source: Tables 7.5, 7.6 and 7.7 of the Report of the Fact Finding Committee on Regional Imbalance in Maharashtra, *op. cit.*