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AGRICULTURAL DEVELOPMENT IN MAHARASHTRA: HIGHLIGHTS OF GROWTH PATTERNS AND POLICY IMPLICATIONS

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Abstract: The growth performance of agriculture in Maharashtra was highly impressive is the early part of the green revolution period but deteriorated after 1980-81. the severe set back to growth in yield per hectare of cereals and sugarcane, in particular and decline in total factor productivity growth, in general, were the major forces behind the post-1980 deceleration. Reversing of these trends calls for significant reforms in the irrigation the sector and a substantial rise in investment in technology and broad-based infrastractural development for agriculture, ensuring efficient access of farmer to technology, markets and education.

AGRICULTURAL DEVELOPMENT IN MAHARASHTRA
Highlights of Growth Patterns and Policy Implications*

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AGRICULTURAL DEVELOPMENT IN MAHARASHTRA
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1. Introduction

Maharashtra is one of the most industrialised and urbanised states in India. The share of its agricultural sector in the net state domestic product declined sharply from 36% in 1961-62 to less than 19% by 1992-93. The fall has been much steeper for Maharashtra than that for the national economy. Yet, paradoxically, its rural economy continues to be highly dependent on agriculture with 83% share of agricultural workers in the rural labour force in 1991, higher than the corresponding average for rural India.

It is against the above scenario that we analysed • agricultural growth experience of Maharashtra in the green revolution (henceforth GR) period (1967 to 1993) by focusing on trends, sources and spacial i.e. inter-district and inter-regional patterns of growth in our study. We undertook comparative assessment of output growth and its characteristics for the crop sector of Maharashtra in two phases of the GR period namely the early phase (i.e. period I: 1967-80) and the latter phase (i.e. period II: 1980-93). Bifurcation of the entire GR period at 1980-81 coincides with the optimal point of break in the time trend for Indian agriculture (Dholakia and Dholakia,

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1993). We further investigated factors responsible for differential performance of agriculture during the two phases at the state, regional and district level. In addition, we covered three more aspects of growth in crop sector of Maharashtra, namely, (i) inter-regional and inter-district patterns of output instability, (ii) inter-district disparity in output expansion and input use in 1970's vs. 1980' s and (iii) determinants of productivity growth in crop sector

The present paper reproduces a few selected results of the above mentioned study and its conclusions. It is organised in five Sections. Section 2 describes briefly the coverage and methodology of the study. Section 3 highlights a few salient characteristics of the agricultural economy in Maharashtra in order to provide a backdrop to the discussion that follows. Section 4 presents trends in the inter-crop and inter-regional growth patterns in agriculture and comments on their implications. Section 5, the final Section, lists U£ the conclusions emerging from the anlysis of various aspects of agricultural growth in Maharashtra.

2. Coverage and Methodology

Analysis at the disaggregate level covered seven administrative divisions (henceforth "divisions' only) and twenty five districts of Maharashtra (excluding Greater Bombay district) as they existed in the year 1980-81. As per the terms of reference of our study agriculture' refers to crop sector. The

Only exception to this statement is the net state domestic product in agriculture (SDPA) which includes both the subsectors of agriculture, namely, crop and livestock as the SDPA series are not available separately for the two sub-sectors.

The state level analysis covered twenty six crops 3eparately in addition to four crop categories namely (i) cereals, (ii) pulses, (iii) oilseeds and (iv) all crops (refer Appendix). All crop category as evolved in the study represents gross value of output of 26 crops at 1980-81 prices. Alternatively, the official series of index numbers of area, production and average yield were also used for assessing growth in all crop output at the state level.

Analysis of growth performance of crops and crop aggregates was based on compound annual growth rates referred as just growth rates' in the text, computed from the time series in various variables such as area, production and yield of crops, SDPA etc. They were derived mainly from the estimates of a semi-log trend function (i.e. log $Y = a + bT$ where T represents time variable) fitted to the three-year moving averages of the relevant variables with intercept and slop dummies introduced in the trend function to distinguish between the estimates for the two separate periods namely, period I and period II. In addition, the state level analysis provided alternative growth rates such as rainfall adjusted growth rates, growth rates based on non-drought years etc. for the four crop categories. The state level weighted rainfall index evolved for this purpose was

constructed by using monthly rainfall data for 125 raingauge stations in Maharashtra for the years from 1967-68 to 1990-91.

The district/division level analysis of growth and output instability was, however, restricted to only four crop categories. Estimates of growth rates for them too were based on mainly the three year moving average series.

The study of determinants of growth in aggregate productivity of crops per hectare was based on (i) multiple regression analysis of the state level and the state and district level pooled data and (ii) case studies of a few specially selected districts.

3. Agriculture in Maharashtra: A Few Selected Aspects Rainfall

Rainfall received in different parts of Maharashtra shows extreme inter-district disparity with minimum average normal rainfall of 579 m.m. in Ahmednagar district to the maximum of 3306 m.m. in Ratnagiri district.

Shares of low rainfall (upto 749 m.m.), medium rainfall (from 750 m.m. to 1149 m.m.s) and high rainfall (1150 m.m.s and above) districts in the state's net sown area are 37%, 43% and 20% respectively.

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                          Table 1
          District wise Average Normal Rainfall And Percentage
                      of Irrigation
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District	Average Normal Rainfall (mms)	Percentage of net irrigated area to net sown area		
		1970-71	1930-81	1990-91

1).Low-rainfall(upto 749.m.m)

1. Ahmednagar	578.8	13.1	15.6	24.5
2. Solapur	584.3	10.2	10.8	17.0
3. Sangli	624.8	9.3	11.3	15.2
4. Beed	568.4	5.7	11.6	21.8
5. Dhule	674.0	9.7	9.7	10.6
6. Aurangabad	725.8	4.8	9.0	12.9
7. Jalqaon	740.7	10.1	12.2	17.0

2)Medium-Rainfall (750 to 1149 m.m)

8. Buldhana	802.8	1.6	4.2	5.2
9. Satra	803.2	13.9	18.0	23.7
10. Osmanabad	809.9	5.3	5.3	7.4
11. Parbhani	821.0	1.7	6.2	11.8
12. Akola	846.5	1.0	2.5	2.4
13. Amaravati	877.3	2.0	4.6	4.5
14. Nanded	901.1	2.3	5.2	8.2
15. Yavatnal	99).6	0.8	2.7	4.0
16. Nashik	1022.0	10.6	10.4	19.8
17. Wardha	1090.3	2.!	4.2	4.6

3)High-rainfall (1150 m.m & above)

18. Pune	1150.3	12.2	17.0	20.5
19. Nagpur	1175.0	7.8	7.9	10.2
21. Chandrapur	1397.6	16.7	17.9	18.4
21. Bhandara	1446.4	34.4	38.2	43.7
22. Kolhapur	1931.5	11.9	15.0	19.4
23. Thane	2258.6	1.7	1.5	1.7
24. Raiqad	2966.3	2.6	. 5.1	5.1
25. Ratnagiri	3305.7	3.5	2.9	6.3
Maharashtra	–	7.6	10.8	14.4

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Note:1)The figure are simple average of the rainfall from all the
       raingange station of the district and are based on 50 year
       data of 1901-1950.as per standard norms used for rainfall
       classification
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Ultimate irrigation potential for the state is estimated to be about 84 lakh hectares. This is in fact the higher side estimate and implies that at least 60 per cent of area under crops in Maharashtra would remain dependent totally.on rainfall even after exploiting the entire irrigation potential. This apart, the extent of exploitation of the potential is hardly 40% covering only about 15% of the area presently under crops. Thus, the need for stepping up investment in irrigation and simultaneously economising the use of water lor crops and in addition extending the benefits of watershed development to balk of the net sown area that is likely to remain under rainfed farming, is more than evident.

Inter-regional inequity in irrigation potential and further in distribution of incremental benefits of irrigation is yet another characteristics of agriculture in Maharashtra. We examined it in a very simplified framework and found that the share in incremental gross irrigated area between 1960-61 and 1990-91 was lowest for Konkan division followed by Amravati and Nagpur divisions. For these three divisions shares in increased irrigated area were far below their shares in cropped area (Table 2). Share of Aurangabad division i.e. Marathwada region was medium and proportionate to its share in cropped area and relatively higher than proportionate to their area shares for Nashik, Pune and Kolhapur divisions i.e. for Western

Maharashtra.Within the regions of course, there has been further inequity across the districts.

Table 2

Division Extent of Irrigation and share in incremental irrigation

Division	Extent of gross irrigated area to gross cropped area				% Share in increased gross irrigated area between				% Share in gross cropped area
	1961-62	1970-71	B80-&1	1990-91	1960-61	970-71 & 1980-81	1980-81 & 1990-91	1960-61 & 1990-91	1978-81
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Konkan	2.35	2.73	3.88	4.39	0.12	1.4	1.44	1.20	4.31
Nashik	5.73	12.44	13.96	16.97	44.91	2	12.07	16.10	13.54
Pune	11.42	13.52	18.04	21.16	16.30	7.74	19.29	20.30	18.3
Kolhapur	10.16	13,01	16.97	20.60	4.14	22.26	8.76	8.90	8
Aurangabad	2.65	4.38	9.97	15.22	15.51	11.27	46.84	37.10	8.84
Amravati	0.89	1,46	4.34	5.13	5.23	36.03	5.79	7.80	27.05
Nagpur	11.70	13.50	17.42	18.75	13.79	11.06	5.80	8.60	16.37
Maharashtra	4.46	8.38	12.29	15.18	160.0 (359)	10.22 100.00	100.90 (9044)	100.00 (21085)	11.51 100.0

Note: Figures in parentheses denote the increased gross irrigated area in hundred hectares.

Agriculture in the Economy of Maharashtra

Table 3

. Sector wise Growth Bates in State Domestic Product (1967-93)

Period	Agriculture	Manufacturing	Tertiary	Total SDP
I; 1967-80	4.65* (0.88)	5.57 (0.99)	5.70* (0.99)	4.53 (0.99)
II: 1990-94	3.02*	6.60	8.46*	5.88*
Acceleration/ Deceleration/ between I & II	Acceleration*		Deceleration*	Acceleration*

Statistically significant at 5% level of probability.

Agriculture's (crop and livestock sector combined) growth record in

Maharashtra was highly impressive during the early

phase (1967-80) of the GR period vis-a-vis its near total stagnation prior to 1967-68. Pace of growth, however, decelerated in the latter period (1980-93). In contrast, growth was not only higher in other sectors like manufacturing and tertiary sectors in Period I but accelerated significantly after 1980-81 (Table 3). Result was sharp fall in the share of agriculture in the state's income during the 80's. Moreover, slowing down of growth in agriculture in the post 1980-81 period represented a contrast to upward movement in growth in Indian agriculture during the same period (Sawant & Achuthan, 1995).

Changes in Crop Pattern:

In the early phase of the GR period (1967-80) cropping pattern in terms of shares of major crop groups such as cereals, pulses and oilseeds, sugarcane and cotton did not undergo a significant change (Table 4). During the latter phase, with increased shares of crops grown mainly for market Bale i.e. of oilseeds, pulses and other crops (fruits, vegetables etc.), but significantly reduced share of cereals, crop pattern moved towards more high-value and non-substience crops by 1990-91 and thus revealed a gradual trend towards commercialisation and diversification of agriculture in Maharashtra.

Two more points deserve attention in this context. One, the sugarcane crop experienced unabeted expansion in area through 70's and 80's, more so in the latter decade, though its share

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remained low at about 2% in the state's cropped area till the early 90'a. Secondly, unlike the seventies the share of fruits and vegetable combined moved up from 1.3% in 1980-81 to 3.4% in 1990-91. Yet, in the overall agricultural economy of the state they still continue to be the minor crops.

Table 4
Cropping Pattern for the Triennia ending 1970-71,
1980-81 and in Maharashtra

Crop/Crop Group	Triennia Ending		
	1970-71	1980-81	1990-91
Total Cereals	56.35	57.05	51.34
Total Pulses	12.76	13.91	15.19
Total Oilseeds	9.10	9.67	12.63
Sugarcane	1.09	1.21	1.76
Cotton	14.49	13.05	12.30
Total Other Crops*	6.21	5.11	6.78
All Crops	100.00	100.00	100.00

* This category includes crops other than cereals, pulses, oilseeds, sugarcane and cotton.

Trends In Absorption of Inputs:

Table 5

Input Expansion in agriculture in Maharashtra

		1967-68	1970-71	1980-81	1990-91
1) Land	a) net sown area	183	177	180	179
	(Lakh hectares)			(0.17)	(.06)
	b) gross Sown area	193	187	196	211
	(Lakh hectares)			(0.48)	(0.77)
	c) Cropping intensity	106	106	109	118
2) Irrigation	a) net irrigated area	12.8	13.5	18.4	26.7
	(Lakh hectares)			(3.6)	(4.5)
	b) gross irrigated area	14.8	15.7	24.2	33.2
	(lakh hectares)			(5.4)	(3.7)
3) Current inputs	a) Fertiliser (NPK)	1.81	1.99	4.23	13.2
	(lakh tones)			(11.3)	(21.2)
	b) Area under HYVs/hybrid	4.7	14.1	43.5	76.3
				(20.9)	(7.5)
	c) Pesticides (liquid material only; lakh N.tones)			0.06	4.3 (707)
	d) Electricity (GWA)	155	357	1723	6604
				(38.2)	(28.3)
4. a) Pump Sets* ('000)		38	251	466	942
				(8.6)	(20.4)
b) Tractors		3.27	6.20	21.45	33.83
				(24.6)	(11.5)

Note: Figures in parentheses denote percentage change per annul duple average) during   the preceding decade. * Relate to 1966, 1972, 1982 and 1987 respectively

i)   Rate of expansion in gross sown area accelerated after 1980-81 though net sown area remained by and large constant since 1970-71 thus there was relatively rapid increase in the overall intensity of land use in Maharashtra during the 80's

ii)   Net irrigated area expanded at a faster rate in the eighties ie
        4,5 per cent per annum) vis-a-vis its lower rate of expansion
        i.e. 3.6% per annum in the seventies. It was the result of
        rapidly accelerated expansion area under well irrigation but
        slowing down in the growth of surface irrigation after 1980-81.
        This implies that private investment in irrigation must have
        picked up during the eighties while growth in public investment
        slowed down.

(iii)   Among all the current inputs the most remarkable expansion
        occurred in the use of fertilisers during the recent decade of
        1980s vis-a-vis the seventies. Consumption of fertilisers moved
        up from 2 lakh tonnes in 1970-71 to around 4 lakh tonnes in
        1980-81 and then jumped to more than 13 lakh tonnes in 1990-91.

(iv)   In respect of pesticides almost entire expansion occurred in
        1980'a from a very negligible level of use in 1980-81. Unlike
        fertilisers rate of expansion in area under HYVs was higher in
        1970 's and not in 1980' s though expansion in absolute area
        was around 30 lakh hectares in both the decades.

(vi)   Higher annual rate of increase (i.e. 38%) in use of electricity
        between 70-71 and 80-81 was due to a very low initial base. In
        fact, much larger expansion was realised between 80-81 and 90-
        91.

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(vii) With regard to investment in capital assets, namely tractors and pumpsets, trends, in the rates of expansion were opposite. Rate of increase was greater for tractors in 1970's when compared £o 1980's where as both relative and absolute expansion in number of pumpsets owned was very high during the five years from 1982 to 1987 vis-a-vis that in the entire decade of 1970's. We believe that this accelerated increase in ownership of pumpsets must have continued beyond 1987 too. Huge expansion in the use of electricity in agriculture as also in area irrigated by wells between 1981 and 1991 support our contention.

(viii) To sum up, the pace of absorption for majority of the key inputs in agriculture had been either sustained or even stepped up during the latter part of the OR period in Maharashtra. This was also supported by the fact that the rate of private investment in agriculture was maintained during the eighties at its pre-1981 level. Therefore the inference, that total factor productivity growth in Maharashtra's agriculture must have slowed down during the 80's vis-a-vis rising trend in it for Indian agriculture in the same period (Dholakia & Dholakia, 1993).

4. Growth Patterns and Prospects

Growth in sector (1967-93):trends and sources

Table 6

Growth rate in index number of area production and yield

Maharashtra

period	Area	Production	Yield
1967-80	0.46*	5.01*	3.33*
1980-91	0.86*	2.53'	1.20*
R-square	0.80	0.92	0.85
Significance of Acc/Dec	Acceleration in growth significant	Deceleration in growth significant	Deceleration in growth significant

Type all growth;*statistically significant at 5%level

i)   Performance of crop sector in Maharashtra was highly
     commendable during the early phase with high growth in crop
     output at the rate of 5% per annum. The major source of
     growth in production was yield growth during this period
     (Table 6).

ii) Aggregate output growth in the crop sector decelerated
     significantly from its impressive performance in the early
     phase to moderate growth at 2.5% rate in the latter phase of
     the green revolution period (Table 6). The main source of
     deterioration in output growth was fall in the aggregate
     yield growth.

iii) Degree of deceleration in aggregate output growth was however
     contained to some extent by continued expansion in cropped
     area and a shift in crop pattern in the second period   in
     favour of crops   enjoying   the

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advantages of high price rise (e.g. pulses) or high productivity along with high prices such as summer groundnut, sunflower, soyabean etc.

(iv) Comparison of output growth rates reveal contrasting trends in growth over the crop groups and crops (Column 4, Table 7). Growth rate declined drastically for cereals output from 6.76% in the early phase to 1.25% in the latter. Similarly, sugarcane an important high value crop too showed a distinct decline in output growth from 6.24% in period I to 2.09% in the period II. In contrast, growth rates in production of pulses and oilseeds registered upward movement between the two sub-periods. Rise in growth rate was from 3.37% to 4.45% for pulses and from low level of about 2% to high growth rate of 4% for oilseeds. Cotton, a major traditional crop of the state, registered sustained growth in output at the rate of about 2% through out the GR period.

(v) In the early phase of the GR period high rate of expansion in cereals output was mainly due to expansion in yield per hectare at the rate of 5.92% per annum. (Column (5), Table 7). It was also accompanied by a small positive growth i.e. 0.92% per annum in area under cereals, The situation changed remarkably in the latter phaae with steep fall in yield growth from 5.92% to 1,75% and replacement of positive area growth rate (i.e. 0.92%) by the low negative rate of -0.53% in the

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Table 7

Growth rates in area, Production and Yield Per Hectare For major Crops/Crop Groups la Maharashtra

Crop/ Crop group	Period	Area	Production	Yield	Whether acceleration or deceleration is significant (!es/No) for:		
					Area	Production	Yield
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Cereals (45.05)	I	0.92*	6.76*	5.92'	Yes	Yes	Yes
	II (R)	-0.53* (0.47)	1.25* (0.74)	1.75* (0.77)	(Dec)	(Dec)	(Dec.)
Pulses (110.44	I	2.15	3.37*	1.27	Ho	Yes	Yes
	II	1.868 (0.81)	4.45* (0.79)	2.50* (0.73)	(Dec)	(Ace)	(Ace.)
Oilseeds (110.54)	I	1.64*	2.18	0.62	Yes	Yes	No
		2.98* (0.90)	4.12* (0.82)	1.07 (0.64)	(Ace)	(Ace)	(Ace.)
Sugarcane (21.64)	I	2.39*	6.24*	3.82*	Do	Yes	Yes
		3.89« (0.86)	2.54* (0,91)	-1.33* (0.91)	(Ace)	(Dec)	(Dec.)
Cotton ((8.4)	I	-1.76*	2.08	3.77*	No	Ho	No
		-0.10 (0.45)	2.09* (0.62)	2.221 (0.58)	(Ace)	(No Change)	(Dec.)

*Statistically significant at 10% or lower level

*coefficient of either time or slope dummy significant at 10% or lower level

*weight in all crop production index (1967-70= 100)

(vi) Similarly, deterioration in yield growth during the second period was equally serious for the sugarcane crop. Growth rate in its yield per hectare declined from 3.82% in the early period to -1.33% in the latter, though the rate of expansion in area under sugarcane accelerated simultaneously from 2.39% per annum to 3.89% in period II. Thus, it is the steep fall in yield growth rate for sugarcane that explains decline in its output growth rate in the second eriod. It is highly pertinent to emphasis in this context that out of 9 lakh hectares of total additions, to irrigated area in each of the decades of 1970's and 1980's progressively higher proportion was diverted to sugarcane (i.e.13% in 1970's & 23% in 1980's).

(vii) Unlike cereals and sugarcane, increased pace of yield growth between the two periods (i.e. from 1.27% to 2.50%) played major role in pushing output growth rate for pulses though expansion in their area slowed down marginally from 2.15% in period I to 1.86% in period II. In contrast, faster expansion in area under oilseeds i.e. from 1.64% to 2.98% was mainly responsible for their accelerated output growth rate over the period.

(viii) Growth in cotton production was at almost the constant rate of about 2% throughout the GR period as positive growth rates realised in its yield per hectare i.e. 3.77% and 2.22% in the early and the latter part of

the GR period more than compensated for the corresponding low negative growth rates in area.

(ix) Thus, the analysis of sources of growth clearly indicates that barring an exception of rise in yield per hectare of pulses as a group for no other crop or group of crops yield growth could be stepped up in the second period. On the contrary, it significantly decelerated for cereals and sugarcane and could hardly be maintained for cotton. In other words, it implies "non-performance' of Maharashtra in sustaining the level of yield growth for majority of the crops achieved in the early phase of the GR period beyond 1980-81.

Why Decline in Aggregate Productivity Growth After 1980-81?

The observed trend of deceleration in productivity growth in the post 1980-81 period can be attributed to unfavourable changes or deterioration in factors like climatic variations, technology development and extension, irrigation development, investment in griculture, etc. Elaborate investigation was undertaken in the study to examine this issue. Major conclusions emerging from this exercise are reported below.

(i) Deceleration in aggregate productivity growth in general and yield growth for cereals and sugarcane in particular after 1980-81 had been partly weather induced, there being a few other factors contributing to the process of deceleration.

(ii) New break-throughs in seed technology ensuring significant enhancement in yield potentials of the existing HYVs/hybrids were by and large absent during the eighties particularly for rice, rabi jowar and maize or they might not have reached the farmers.

Similarly, research needed to be undertaken in the state for varietal improvement for sugarcane has been either neglected in the past or at least its benefits could not percolate to the farmers.

(iii) There has been no indication of wider distribution of the benefits of irrigation water across the crops in the eighties, either through reduced emphasis on sugarcane cultivation or through economising the use of water for it. On the contrary, area under sugarcane registered accelerated growth during the eighties depriving the benefits of irrigation to many other crops.

(iv) Prospects of yield growth in respect of wheat and maize (crops with minor shares in the state's cereal production) were adversely affected by a pronounced shift in the farmers' preference in allocation of incremental irrigation in favour of non-cereals during the eighties. It was the result of decisively better prices and improved market environment for the non-cereals like oilseeds, pulses etc. This was obviously, in addition to the preferential allotment to the

sugarcane crop.

V)   On-farm water and nutrient management for sugarcane crop suffered severely due to neglect of organisational efforts needed to direct research and extension to improve it (Dorge S.K., 1993). The state's co-operative sugarcane processing sector failed to provide constructive leadership to sugarcane growers in this respect.

vi)   Lastly, decline in the operational efficiency of the irrigation systems in the state might also have put downward pressures on irrigated crop yields by reducing dependability of irrigation water supply and consequently on-farm water use efficiency.

Regional Growth Pattern

Table 8

Division wise Growth Rates in Gross Value of Output

Period		Konkan Division	Nasik Division	Pune Division	Kolhapur Division	Aurangabad Division	Amravati Division	Nagpur Division	Maharashtra
1967-80									
	G.R	2.93*	5.82*	5.56*	4.80*	6.5?	4.08*	3.65*	
	Rank	R-7	R-2	R-3	R-4	R-1	R-5	R-6	
1980-91									
	G.R	1.810	2.24*	1.02	2.31*	2.91	4.381	2.731	
	Rank	R-6	R-5	R-7	R-4	R-2	R-1	R-3	
R-square		(0.87)	(0.74)	(0,68)	(0.93)	(0,67)	(0.84)	(0.82)	

- Statiscally significant at 10% level; G.R:growth rate
- Coefficient of slope dummy variable not significant
- Modified growth rate for 1980-90 when grapes, orange and cashew nut are included in the CVO

(i) Konkan division remained at the bottom of the growth ladder throughout the GR period in comparison with all the other divisions of the state. Growth in all crop output was moderate (about 3%) in the early phase and declined significantly after 1980-81 in Thane and Raigad districts but continued at almost the same pace in Ratnagiri district. Negligible benefits of irrigation, poor state of land and infrastructural development must have been the major constraints on growth in this part of the state.

(ii) Aurangabad division was at the top in period I and close to it'" in period II despite significant deterioration in its growth performance and high level of instability in its agricultural sector. Output growth was highest in this region in period I (rate exceeding 6.5?") but thereafter growth rate was maintained only at the moderate level (3%) in three districts and decreased significantly in the other two, namely, Nanded and Osmanabad districts.

(iii) Nasik and Pune divisions particularly the Nasik district from the former and Ahmednagar from the latter registered unsteady pattern of growth between the two periods. In period I, growth record of these two divisions was very impressive and next to Aurangabad division but they registered low growth (<2%) in all crop output in the period II. This was mainly due to a significant fall in growth in Nasik district and severe set back to growth in

Ahmednagar district.

iv) Kolhapur division occupied the median rank among all the divisions with sustained, moderate and relatively more stable growth through 70's and 80's. Output growth rates decelerated after 1980-81 in two of its districts namely Kolhapur and Sangli but not in Satara. Set back to growth was severe only in Sangli district.

v) Amravati division from the Vidarbha region was outstanding among all the division in displaying steady performance throughout the GR period with growth rate exceeding 4%, accrual of negligible benefits of irrigation Not with standing. From among its four districts performanceof Akola and Amravati was distinctly superior to many other districts of the State.

vi) Nagpur division though registered moderate growth in the neighborhood of about 3% or more in both the periods could not repeat the pattern of growth in the Amravati division mainly due to asymmetric growth behaviour between the Bhandara and Chandrapur districts on the one hand and Nagpur and Wardha districts on the other.The latter two, registered sustained high growth in the range of 3% to 5% like the districts in Araravati division while in the former two, namely Bhandara and Chandrapur,growth was moderate in period I and declined to low level in period II. That was why Nagpur division remained at the lower end of the growth ladder just above the Konkan division throughout the GR period.

Instability in Crop Output:

(i) At the aggregate level, instability in crop output did not increase significantly in the latter phase of the GR period though trends in output instability were different across the crops and crop groups.

(ii) Among the seven administrative divisions of Maharashtra, Aurangabad, Amravati and Nagpur divisions i.e. Marathwada and Vidarbha regions had comparatively higher degree of output instability. Konkan, Nasik and Pune divisions revealed moderate degree of instability while Kolhapur division was exceptional in maintaining lowest level of output instability throughout the period.

(iii) Pattern of instability across districts and divisions demonstrates that the irrigation development in Maharashtra has by and large failed to impart stability to crop output.

Concentration in Output Growth and Input Expansion:

(i) Inter-district disparity in output growth has not widened further in the latter phase of the GR period. But this is no reason for complacency as inequality in terms of per worker income growth has accentuated in the recent period.

Iii) Centers of high and moderate growth did not remain constant over 1970's and 1980's, though there were a few exceptions like Aurangabad district which continued to remain at the top. Similarly, at the lower end were the Nagpur and Konkan divisions in the descending order which

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could not improve their position and remained at the lower end. As against this, there was significant reshuffling of the relative positions of some of the districts from the top and the middle groups.

iii) The fact that almost all the districts in Nagpur and Konkan divisions remained at the bottom of the growth ladder throughout the post green revolution period, implies continued neglect of the constraints operating on agricultural growth in these relatively backward districts.

iv) Among all the districts, Akola district from Amravati division registered highest improvement in its growth performance in 1980's, despite a decade of unfavourable weather for the state as a whole and a very negligible base o irrigation. Amravati, Solapur and Satara followed Akola with second best growth performance during the eighties.

v) There has been a wider diffusion of technology across the crops with extension of irrigation and seed-fertiliser technology in favour of hitherto neglected crops such as pulses and oilseeds in addition to many minor vegetables and fruits.

vi) Inter-district disparity in irrigation, use of fertilisers and HYV seeds declined from the seventies to the eighties. Hut the decline was significant only in respect of expansion of HYVs.

vii) Output concentration had not been necessarily associated with simultaneous concentration of irrigation, fertilisers And HYV see in high or moderate growth district in both

the periods. Thin implies that there cannot be a unique strategy of agricultural growth for all the regions. Policies and programmes to be followed in future must be based on region-specific resource endowments and the level of resource developments.

Productivity Growth in Agriculture and Role of Technology:

(i) Expansion in irrigation and the use of HYV seeds helped greatly in accelerating output growth under favourable weather conditions for cereals in the early phase but gains in productivity associated with expansion in these; two inputs deteriorated in the latter phase.

(ii) While pace of development of irrigation would certainly influence the prospects of agricultural growth in future, further gains in productivity from irrigation would be crucially subjected to improvements in the operational efficiency of the public irrigation systems, on-farm water use efficiency and the degree of dispersion of irrigation benefits across the crops in the state.

(iii) With more extensive use of fertilisers across the districts and crops, fertilisers have certainly played a key role in influencing productivity per hectare in the second period. however, there are indications that the productivity gains from fertilisers have not been optimal and sufficient scope exists to exploit unrealised potential of seed fertiliser technology by improving on

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farm use-efficiency and management of these inputs along with water. A case of sugarcane crop provides a clear evidence in this respect. Positive yield growth in the early period for sugarcane was replaced by an emergence of significant decline in per hectare yields in all the major sugarcane growing districts of the state except one district.

iv) Sustained high growth in output and productivity per unit of land in the rainfed agriculture of Akola district . establishes the supremacy of the development strategy which integrates economically viable soil and water conservation techniques with new seed-fertiliser technologies and the appropriate cropping and cultivation practices. A key role of location specific research in devising and diffusing such technology packages for different rianfed farming areas of the state hardly needs to be stressed in this context.

Region wise Growth Constraints And Prospects

We indicate broadly future prospects of growth in agriculture in different divisions/regions of the state and constraints needed to be overcome to exploit their growth potential. Our assessment in this regard is based on insights lined from the preceding analyses particularly, the region wise 1st performance in growth, the extent of gap between the irrigation potential and present level of irrigation, growth potential of the technologies presently available (and are likely to be in the pipeline for immediate diffusion) and

Possibilities of their further transferability or reliability within the region. We also presume that the regions and the districts within the regions which have received lowest benefits from the past irrigation and infrastructural development will receive highest priority in their future expansion in the state.

Vidarbha Region:

Among all the divisions of the state, potential for growth in crop sector, particularly covering the output of pulses, cotton cereals and oilseeds is highest in Amravati division of the state. This is also true for Wardha and Nagpur districts of Nagpur division which resemble closely the agro-ecological conditions and growth potentialities of Amravati division. This optimistic assessment is linked to the promising potentialities of the integrated package of the dry farming technologies and the new seed fertiliser technologies, which were successfully utilised in some parts of Akola and Amravati districts as also to the impressive seed technology development for cotton during the eighties both through private and public sector research. In addition, it also relies on an expectation that future expansion in irrigation, rural credit and agro-processing units (especially for processing of soyabean, sunflower, orange, etc.) would be targeted to the Vidarbha region besides the Konkan and Marathwada region.

Marathwada Region

Aurangabad' division (i.e. Marathwada region) is next to Amravati division in potential for growth in crop sector particularly covering the crops like oilseeds, pulses and cotton. This is because we believe that the prospects of adaptive development and transferability of dry farming technology packages similar to those, which proved to be successful in parts of Akola and Amravati districts, are promising in the Marathwada region too.We also expect that in addition to the Konkan and Amravati division, priority in irrigation, credit and infrastructural expansion would be given to Aurangabad division to enable it to exploit growth potentiality in its crop sector. However, caution needs to be taken that there would be much I rider dispersal of irrigation benefits across the crops and the benefits are not appropriated mainly by the sugarcane crop. Adoption of water-economising devices for irrigating sugarcane should be promoted if necessary,even by using the coercive policies and methods to achieve it Major constraint on growth in cereal production in this region however,would be seed technology development for irrigated crops like rabi jowar and maize.

Diversification of agriculture towards dry land horticulture and livestock production is already under progress Jin the districts like Aurangabad in this division.It would be desirable to encourage this trend in the other districts of the

region too so that agricultural growth would become increasingly sustainable and stable.

Pune, Kolhapur and Nasik Divisions:

Pune, Kolhapur and Nasik divisions have not only enjoyed benefits of the above average development of irrigation but part of this region is expected to benefit further from Krishna Valley Irrigation development programme in the near future. Cereals being the most dominant group of crops in this region absence of significant strides in seed technology development for unirrrigated rabi jowar, bajra, maize, etc. would be the major constraint on the prospects of cereal production growth. Hence, future growth in crop sector excluding of course the horticultural crops is likely to be very modest in the absence of new breakthroughs in seed technology and significant enhancement in irrigation benefits. Even if, irrigation expands its wider dispersal across the crops would hold a key to further growth in crop sector in this part of Maharashtra.

Pune, Kolhapur and Nasik divisions in the descending order have been the leaders in the state in diversification of agriculture towards horticultural and livestock production. The trend is likely to get accelerated further in the environment of liberalised trade in agricultural commodities. It would be certainly desirable and deserves all the encouragement. But enduring progress in this direction would crucially depend upon adequate and qualitatively much better infrastructural support

for marketing and trading in high value products both the conventional and the new ones. The state's role in promoting and encouraging investment in infrastructure for this purpose would most vital. Though some of the drought prone areas from this region (such as parts of Dhule and Solapur districts) may still need a direct support of public investment for promoting growth In agriculture, by and large diversified agricultural growth in le non-drought prone parts of these divisions may be left entirely to the private initiative of the agriculturists from his region, which have proved to be the most enterprising farmers in Maharashtra.

Konkan Division (Bhandara and Chandrapur Districts):

The Konakn division and especially the two districts from Nagpur division, namely, Bhandara and Chandrapur have suffered from relatively low growth resulting from the continued neglect of the basic constraints inhibiting development of these areas. limitations on their agricultural growth became much more acute during the eighties as the progress in seed technology development for unirrigated rice was almost negligible after 1980-81 (Pray C.E., 1991). In future too, potential for agricultural growth is likely to remain low in these- areas in view of the growth restraining factors listed below.

The major constraints on growth in these areas have been: (i)heavy dependence of their agricultural economy on rice crop in the absence of any progress in crop diversification in the

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last two decades (ii) gross under-development and low quality of infrastructure (mainly transport, power and communication) in rural areas of this region, (iii) lower levels of literacy of cultivators compared to the other parts of the state and (iv) predominance (about 75%) of small and marginal holdings producing mainly rainfed rice crop. An additional impairment to growth in the Konkan region came from negligible development of irrigation combined with poor state of land development. In respect of Bhandara and Chandrapur districts, low growth and high output instability despite high proportion of irrigated area, clearly imply gross and accumulated neglect of repairs and maintenance of the existing irrigation systems. Moreover, Thane district from the Konkan division and Chandrapur (including Gadchiroli) district from Nagpur division have a higher percentage (35%) of scheduled caste and scheduled tribe operational holdings compared to the other districts of the state.

Past low growth performance of these areas must be viewed on the backdrop of the above mentioned crippling constraints on growth.

If the process of development in future is not to bypass the majority of the small and marginal farmers of these districts, agricultural sector's diversification by promoting the production of oilseeds (for instance, groundnut in the Konkan region), pulses, fruit or vegetable plantation, fisheries etc is the only solution. But efforts for diversification cannot yield results without (i) substantial boost to irrigation and land

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development including watershed and khar land development, (ii) creation of efficient marketing channels along with the adequate storage facilities and (iii.) establishment of agro-processing units within rather than outside the region. Initially thin call for a qualitatively better and higher expansion of Infrastructure like roads, power, markets, ports, etc. That is why, Konkan region along with two districts of Nagpur division deserves special attention in the state's development policies in general. Such an emphasis on the overall development including of course land and water resource development would lead to environmentally sustainable development of these areas.

Lastly, we would like to highlight implications of the Accelerated growth in the agricultural sectors of Vidarbha and Marathwada regions. Planning higher expansion of irrigation, rural credit and infrastructure in Vidarbha and Marathwada regions is desirable for more than one reasons. A development strategy which aims at higher expansion in irrigation.
Infrastructure and technology induced multiple cropping in rainfed areas would certainly be more land and labour intensive. to that extent resulting agricultural growth would be more participatory and benefit the agricultural labourers too through expansion in agricultural employment and faster improvement in their real wages in these regions. The latter i.e. rise in real wage would be induced more through the expansion in non-farm employment for processing, transporting and trading in increased volumes of marketed production of oilseeds, cotton and pulses

Followed by cereals.

In this context, it is pertinent to draw attention to the fact that the Vidarbha and Marathwada regions together account for 60% of agricultural labourers in the state. Proportion of agricultural labourers in the agricultural workers is fairly large and above the state average in almost all the districts of these regions. For instance, it is nearly 65% in Amravati division against the overall average proportion of 45% for Maharashtra. Pulses and oilseeds are mainly grown for market sale, in addition to obviously the cotton crop, in these areas. In other words, accelerated agricultural growth in these two regions would serve the multiple goals of sustaining high growth in the states crop sector. raising real incomes at the I cultivators and achieving simultaneously sustained reeducation in incidence of poverty in the state.

Policy Implications:

Performance of agricultural growth in Maharashtra has been mixed and uneven in the past. Contributions made by the public sector research and extension organisations so far to development and diffusion of new technologies and remarkable responsiveness of the state's farmers in adopting them are certainly laudable. Nevertheless, it is true that productivity growth in agriculture could not be put on a sustained and stable path. Large parts of agriculture in Maharashtra still remain sensitive to vagaries of weather, resources spent on expanding irrigation facilities,

soil conservation and land development in the past three decades of the GR period notwithstanding.

While growth had been almost pervasive and impressive in the early phase, it decelerated significantly in the latter phase despite increased intensity of input use in agriculture. For many reasons, therefore, agricultural policies followed in the past need reorientation especially keeping in view their implications for aggregate productivity growth and input use efficiency in agriculture, inter-regional disparity in growth and poverty alleviating impact of growth. Our comments in this respect would be limited mainly to three major policy areas, namely irrigation development, technology development and extension and infrastructural development for agriculture.

It is our contention that in view of persistence of low productivity of crops in Maharashtra - notable exceptions of few areas and crops apart - and heavy dependence of the rural economy on agriculture, technology led high growth supported by appropriate land,water-resource and infrastructure development would be highly desirable for the state. Prospects, of pushing up growth in aggregate land productivity with the help of such a strategy are promising too. We believe that it would ensure non-inflationary growth to the extent that it promotes increasingly cost-effective technologies for majority of the crops augmenting real productivity of land.

Irrigation:

Progress of agricultural growth in Maharashtra is undoubtedly linked to the pace of development of irrigation in future. But gains in productivity from expansion in irrigation and its output stabilising impact would inextricably depend upon the degree of its dispersal across the crops and operational efficiency of the irrigation systems. Experience of the past, however, has been very unsatisfactory in this context.

Water supply from irrigation had been progressively diverted to sugarcane crop particularly during the eighties with simultaneous fall in its yield per hectare in almost all the sugarcane growing areas. Operational efficiency of the public irrigation systems too deteriorated with significant reductions in the expenditures on repair and maintenance of the systems (S. Mahendra Dev, 1994, Dhawan B.D., 199b).

Deficiencies in operational performance of irrigation systems are also linked to non-compatibility of the distribution systems with the schedules of water requirements of crops grown in the command areas. The latter, many a times is the result of weak coordination between irrigation and agriculture departments of the state especially during the stage of project formulation and the engineering-oriented programmes of CADA. Besides, inefficiency in power supplies (e.g. frequent power failures and load fluctuations) in many rural areas has adversely affected efficiency in use and management of water supplies from the

privately owned wells and privately and collectively operated lift irrigation systems. Therefore, there is an urgency to correct the situation. On the one hand adoption of coercive policies such as denying flood irrigation to sugarcane farms or at least restricting significantly their access to water supplies and making use of water economising devices like drip sets or sprinklers etc. compulsory especially for water intensive crops has become all the more inevitable. On the other hand, concurrent and significant improvements in dependability of water and power supply and in quality of the associated services are also called for.The problem is, without financial sustainability of the systems the latter i.e. improvement in their operational efficiency cannot be achieved.

There is yet another major problem of the large backlog of the existing irrigation projects in the state. Indeed, backlog is reported to be highest in Maharashtra among all the states (S.Mahendra Dev, 1994). Completion of these projects is equally important as commencement and execution of new projects. In respect of both,i.e. ongoing and the new projects, the regions which have received negligible benefits from the past irrigation development should receive preferential treatment. Secondly,as regeneration of water resources is fundamental for their increased utilisation whether for agriculture or other purposes in many water scarce areas of the state, development of watershed and location specific water conservation techniques must progress simultaneously with the development of irrigation compatible with

the former. This implies integrated planning and concurrent investment in both. In other words, financial support needed to accelerate development of irrigation and improve performance of irrigation sector would be stupendous though increased finance alone would not be enough. Therefore, three types of significant adjustments in the policies must be initiated.

One, allocation of public resources for agricultural development and alongwith it for irrigation and watershed development deserve to be stepped up progressively. This represents a clear departure from the near-stagnancy of public investment in agriculture in Maharashtra in the eighties. Secondly, a phased programme of increases in water charges whether for agriculture or other purposes must be implemented without delay, while ensuring concurrent improvements in management of the systems and increased allocations for their operation and maintenance.

Thirdly, to improve overall performance of the irrigation sector, farmers' collective participation in distribution and management of water in the public irrigation systems and private investment in future development of irrigation must be encouraged to the extent possible.

Technology Development and Extension:

Having exploited major gains of target oriented extensive diffusion of new seed-fertiliser technologies for a few crops,

the future tasks of development and extension of technologies for Agriculture in Maharashtra are now more complex and challenging.

On the one hand HYVs/hybrids developed so far either at the national or state level are more suited to and provide high yield under irrigated or more assured rainfall situation. Even In respect of these areas yield growth has tapered off and further enhancements in the genetic yield potentials of the existing HYVs are likely to be much less dramatic than that in the past (for instance wheat and kharif jowar in Maharashtra).in any case there are no new significant breakthroughs in the pipeline for immediate diffusion (for instance rice, rabi jowar, etc. in Maharashtra). This implies that on irrigated areas already covered by the existing HYVs/hybrids, future increases in yield can be brought mainly through reduction in gap between the on-farm yields and their potential yields i.e. by attaining higher levels of efficiencies in use of new seeds and all the associated inputs like fertilisers, water etc. Moreover, it has to be achieved on all farms including the small and marginal. flow of returns to resources invested in research and extension, for this purpose would obviously be gradual and its size small.

Seed technology development for unirrigated areas of the state too now awaits more difficult tasks, for instance, it includes devising of varieties for more harsh and variable environments i.e. areas with much less assured rainfall or with more frequent and high levels of moisture stress or varieties

with multiple resistance to pests/diseases as also higher moisture stress tolerance. Jowar hybrid for rabi season is an illustration of the former while rice varieties or hybrids suited to unirrigated areas is an example of the latter. Besides, enhancement in yields is also likely to be modest under these conditions.

A superior alternative is to evolve cropping sequences crop mixes and practices suited to varying rainfall situations in a specified region along with the appropriate seed-technology development for them and integrate the two in order to ensure much higher growth in aggregate land productivity (as successfully attempted in parts of Akola district) rather than aiming at large increases in yield of a single or a few crop with progressive intensification of inputs like fertilisers. In this context, location specific character of research would be obviously much more stronger compared to that involved in developing technologies for irrigated areas. In other words, not only is the research task involved more difficult but its benefits would remain restricted to a limited geographical area. To that extent, both the size and volume of research efforts to be put in for developing technologies for unirrigated areas with higher climatic variability would be large. Obviously, private investment is unlikely to flow in developing technologies for them and the public sector research organisations have to take the lead and concentrate resources for developing technologies suited to them. For instance, while R & D unit of a private seed

producing company may concentrate more on developing rice hybrids for irrigated areas for tapping a much larger national market the state agricultural university in a rice producing region may have to concentrate on developing rice hybrid suited to rainfed farming areas of the state.

There is an additional important dimension to technology development that is needed for the state in future. Development as to be more broad-based covering many crops than only a few as in the past. Benefits of yield raising seed technology development were restricted mainly to cereals in the early phase. Technology development further covered a few pulses, oilseeds and cotton after 1980-81, though rise in the yield potentials or at least realised growth in yields for them under unirrigated conditions was relatively modest. As the process of commercialisation and diversification of agriculture is expected to gather momentum in future, demand for technology development would widen further across the crops.

To sum up, the agenda for research is much larger. It has to cover many crops, varied environments (mainly more difficult environments) as also the diverse fields of research such as evolution of input-efficient practices of cultivation suited to irrigated and unirrigated areas, different types of farms and rainfall situations, and development of cropping systems, crop sequences or mix-cropping practices for rainfed farming areas etc. This is unlike the past, when concentration was on only

The seed-centred technologies for a few crops. Thus, the complexity of the tasks involved and their multiplicity would be much higher in future.

What is said about research, equally holds for extension sector. On the one hand array of technologies to be taken to the farmers is much larger and their nature more complex. The target is no longer merely to cover larger areas by the new seeds and increase the intensity of the use of other inputs like fertilisers and pesticides but to improve efficiency and management of all the resources including seeds, fertilisers, water etc. Use of chemical fertilisers per hectare in the state has already reached the national average despite proportion of irrigation being hardly half the overall average for Indian agriculture. Hence, what is more urgent is to improve efficacy of fertilisers by integrating their use with organic manures, bio-fertilisers etc. and linking it with the soil nutrient status in different areas. Yet another unfinished task is to reach all the small and marginal farmers rather than only the resourceful sections of the farming community which is generally the case at present. A private sector cannot be entrusted with this task unless majority of the farmers in agriculture reach a certain threshold level of technical competence to adopt and practice technologies on their own in an efficient way.

There is also an additional problem of taking extension Services to women cultivators, which deserves immediate

attention. This is because participation of women in agriculture has not only been higher in Maharashtra vis-a-vis the other states but it has further increased during the eighties in general in all the areas (Sawant S.D. and Dewan Ritu, 1991). The problem can be solved by involving women increasingly in extension work through special emphasis on their education and raining in this field.

credit Expansion and Infrastructural Development:

Intensive cultivation of land through progressive adoption of new technologies requires continued support of the adequate and unhindered flow of credit to agriculture. This need will become increasingly crucial as the trend towards commercialisation and diversification of agriculture intensifies in future.

The flow of aggregate agricultural credit to Maharashtra has been more or less adequate in the past as the state's share in all India agricultural credit has been maintained close to or above its share in all India net sown area, apart from inter-year fluctuations. The more disturbing issue is, however, of the significant inter-regional disparity in the flow of credit.

Table 9

Division Share in Institutional Credit

Division	Division Wise % Share in			
	Oustanding Credit of Scheduled Commercial Bank for Agriculture(90-91)	Fresh advance from agriculture and Multipurpose Credit Societies (90-91)	Loan outstanding of agriculture and Multipurpose credit societies (90-91)	The net Sown area (90-91)
(1)	(2)	(3)	(4)	(5)
Konkan	6.4	1.6	1.9	4.5
Nasik	11.9	21.1	23.8	13.8
Pune	24.7	22.7	24.2	18.1
Kolhapur	14.4	20.0	14.6	8.7
Aurangabad	15.2	24.2	23.3	26.8
Amravati	11.1	6.2	7.4	17.1
Nagpur	10.6	4.2	4.7	11.0
Maharashtra	100.0	100.0	100.0	100.0

Till 1990-91 shares of Vidarbha, Konkan and Marathwadi regions
in the institutional credit continued to be below their shares in
net sown area. The problem of inadequacy in credit appears to be
more serious for Vidarbha region particularly the Amravati
division. Future expansion in agricultural credit therefore must be
targeted more towards these regions as far as possible. There too,
the care has to be taken that the small an4 marginal farmers are
not deprived off their due share in the aggregate credit flow. This
is because in addition to inter regional inequity an equally
important and a more general issue-of the constrained access to
agricultural credit of the small and marginal farmers must be
tackled satisfactorily. It is possible,

that this problem may get neglected as newly emerging corporate farm, farm houses of the elite urban residents and the Resourceful farmers appropriate increasing proportion of the total agricultural credit particularly from the commercial banks future. It is necessary to reiterate, therefore, that special policies need to be devised to ensure easy and timely access of the small and marginal producers to the institutional credit without in any way resorting to the populist measures such as loan waivers".

Given the appropriate irrigation and technology development is the efficient infrastructure particularly good roads, communication and markets which create an enabling environment in which farmers receive their due share in prices paid by the ultimate consumers. Situation in this respect in many rural areas of Maharashtra is far from satisfactory. The producers of not only more perishable products like vegetables, fruits, flowers, etc. but many a times even of others receive in justifiably low prices for their produce and are not assured of even the minimum stable returns over their cost of production. It is true that collective or cooperative marketing on the part Of the producers would greatly help in improving the situation. but we believe that the poor state of rural infrastructure is the major hindrance in many areas in this respect. If a gradual trend towards commercialisation and diversification of agriculture that has emerged in the eighties needs to be sustained and promoted, rural infrastructure supporting trade in

Farm, products and inputs and processing of the produce must be strengthened with an emphasis on its quality.

It is thus evident that the resource needs for technology-led high growth based on land intensive and resource efficient agriculture is tremendous. But keeping in view its desirable impact on rural incomes and farm and non-farm employment and thereby its increasingly positive contribution to the goal of growth with equity and attainability it deserves priority over other investments by the state. Private sector's participation should also be encouraged, to the extent feasible, particularly in the relatively more developed and agriculturally progressive rural areas requiring less state intervention. Lastly, we reiterate that concurrent improvements in the quality of state intervention are equally important as the size of investment.

Issue of Small and Marginal Farmers

Finally, a special reference to an important issue of the small and marginal farmers and the associated problem of enhancing productivity and efficiency of their farms is inevitable. This is because 74% of ownership holdings and 63% of operational holdings are marginal and small' in Maharashtra and they control about 20% of owend/operated area (NSSO, 48th Round, 1992). Though the rate of marginalisation of both the ownership and operational holdings has slowed down in the eighties compared to the seventies, the process of marginalisation is likely to continue in view of continued demographic pressure on a fixed

land base which may even erode in future and in absence of significant increase in non-farm employment in the immediate, futute.

Land is not only a major income generating asset in rural areas but entitles at least a minimum bargaining power to the marginal and small owners. The entitlement to land has assumed an additional importance in view of the fact that the relatively poor state of human development in many rural areas of Maharashtra (Vyas V.S. & Vidya Sagar, 1993) has deprived the small producers and the agricultural labourers the skills required to attain a reasonable standard of living through non-farm employment. This is the result of neglect of rural education, health and infrastructure in the past four decades, in addition to social stratification in the past four decades, in addition to health and infrastructure in the past four decades, in additional to social stratification in a rural society. That is why, any tampering with the existing land ceiling act would be grossly contradictary to the goal of social justice. The existing legislation would check at least further deterioration in inquality in land ownershiop. An additional reason for not increasing the ceilings is that it would aggravate land-inequality without any appreciable gains in productive efficiency in agriculture (C.H.H. Rao, 1996).

Besides, we are optimistic that the successful implementation of a technology development strategy proposed earlier combined with promotion of high value and high productivity crops and livestock production may enable many small farms to cross the threshold of economic viability. A further support to them may also come from the

expansion in the rural non-farm employment opportunities especially in trading of farm inputs and services and trading and processing of farm produce associated with accelerated expansion in the volume of marketable surplus. We believe that this would provide much needed respite to the small and marginal farmers before they eventually move out of the farm sector for getting absorbed in mare productive and paying activities.

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Appendix

I) Crops and crop group included in the state level Analysis

1. Rice
2. Jowar (Kharif)
3. Jowar (Rabi)
4. Bajra
5. Maize
6. Ragi
7. Wheat
8. Other Cereals (other than 1-7)
9. Gram
10. Tur
11. Other Pulses
12. Groundnut
13. Sesemum
14. Linseed
15. Niger deed
16. Safflower
17. Soybean
18. Sunflower
19. Sugarcane
20. Cotton
21. Mesta
22. Potato
23. Chillies
24. Onion
25. Banana
26. Tobacco
27. Cereals (1 to 8 combined)
28. Pulses (9 to 11 combined)
29. Oilseeds (12 to 18 combined)
30. All Crops (1 to 26 combined)

II. Crops and Crop Group Included in the District Level Analysis

1. Sugar cane
2. Cotton
3. Cereals
4. Pulses
5. Oil seed
6. All crops