Agricultural Growth and Irrigation in Telangana

A Review of Evidence

This paper studies the state of agriculture and irrigation in Telangana, especially from the point of view of agricultural growth corresponding to growth in irrigation. There has been growth in irrigation levels in Telangana, during the past three decades, although the perception that the region suffers from insufficiency of irrigation resources may still be valid. Most of this growth however has come from expansion of well irrigation using private capital, which has adverse implications for groundwater levels and is also contributing to the immiserisation of small and marginal peasants.

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Agriculture in Telangana has attracted considerable attention in the past few years, mostly because of the suicides of hundreds of cotton farmers during the 1997-98 agricultural year [e g, Parthasarathy and Shameem 1998, Chowdhary et al 2002]. Two perceptions have dominated the conventional wisdom. First, it is argued that agriculture in Telangana has long been both backward and stagnant [Simhadri and Rao 1997]. Second, it is argued that Telangana suffers from a serious insufficiency of irrigation resources, due to neglect of the region by the Andhra Pradesh government [Simhadri and Rao 1997]. This latter is regarded as one of the causes of the lack of agricultural growth.

This paper examines these two aspects of agricultural development in Telangana. I present growth rates[1] at the district level between 1970 and 2001, and decompose these to throw light on the respective contributions of cropping pattern, yield, and area to agricultural growth[2]. I also present data on the instability of agricultural output in Telangana. The results challenge the conventional wisdom on Telangana's agricultural performance. I then examine data on irrigation. Despite the fact that Telangana has been neglected by the state government in the development of canal irrigation area, there have been substantial increases in groundwater irrigation. With the rapid spread of groundwater irrigation, Telangana districts have been witnessing high agricultural growth.

Groundwater irrigation needs a significant amount of private capital, which is not readily available to small farmers. This has two implications. First, since agricultural growth draws on groundwater irrigation, small farmers have to borrow to be able to compete and survive. Depending on the amount of capital that is required to dig wells and then deepen them, the farmers have to divert significant resources to servicing their debt [Revathi 1998]. Second, the long-run sustainability of irrigation is in peril because of the precipitous fall in groundwater levels in districts that depend almost exclusively on well irrigation. For these reasons, it is perhaps not surprising that the districts that have registered the highest growth rates in agriculture and irrigation have also seen the highest suicide rates among farmers.

The data used to compute the district level growth rates are available in the 'Statistical Abstracts and Season and Crop Reports' published by the Directorate of Economics and Statistics of the Andhra Pradesh government. Official data sources invite criticism of various kinds – lack of methodological rigour, lack of carefulness in collecting data, bias of different kinds, and a lack of accurate presentation of the collected data. Notwithstanding these criticisms, these are the only available data collected on such a massive scale at the district level. The World Agricultural Census that collects quinquennial data allows for cross-checking via comparisons in terms of gross cropped area and net sown area.

The agriculture section in the statistical abstracts provides data on crop output, crop area, crop productivity and prices for several crops at the district, regional and state levels. Using these data, the aggregate agricultural output figures for each district are computed and summed across the relevant districts to get the output at the regional level as well as at the state level. A limitation of this approach is that since agricultural prices are not available for minor commodities, these are not included in this exercise. This methodology is reasonable, however, given that the principal commodities selected by this procedure have consistently covered more than 92 per cent of the gross cropped area of Telangana[3]. The principal crops in Telangana and AP are paddy, jowar, bajra, ragi, maize, bengalgram, redgram, greengram, blackgram, sugarcane, tobacco, cotton, chillies, turmeric, groundnut, sesamum and castor. As can be observed, these include food and non-food crops. District level data on the total area covered by various irrigation sources are also provided in the statistical abstracts.

Table 1 compares the gross cropped area and net sown area as reported in the two sources – agricultural census and statistical abstracts – for 1970-71, 1980-81, 1990-91 and 1995-96.

It can be seen that in general the statistical abstracts report lower acreage estimates than the census. Moreover, the discrepancy between the two sources tends to grow larger over time. This implies that, if anything, the agricultural growth figures that are reported below, based on the data from the statistical abstracts are biased downward.

Growth at Regional/State Level

The three decades between 1970 and 2001 have been significant for Telangana in terms of agricultural growth performance.[4] In this section, I present the exponential growth rates of agriculture in Telangana and Andhra Pradesh, computed according to the following formula: Log (output) = a + bt, where

output is the agricultural output calculated at constant 1980-81 prices; t is the crop year; b is the exponential growth rate, and a is the y-intercept.

The results are presented in Table 2. As can be observed, growth rates in Telangana agriculture have been higher than those of the non-Telangana districts as well as those for the whole of Andhra Pradesh. But several observations are needed here. First, the growth rates of the non-Telangana region are lowered by the inclusion of some backward regions in the northern coastal areas as well as the south-western (non-coastal) part of the state. Second, the growth rate of Telangana has been high partly because the starting level of agricultural output was low. In spite of these caveats, it is quite an impressive performance by Telangana, especially during 1986-2001. As a result, the proportion of Telangana's output in overall AP agricultural production rose from around 30 per cent in 1970 to nearly 37 per cent in 2001.

I should point to one apparent anomaly in the above presentation of growth rates: for the Telangana region as a whole, the estimated growth rate over the entire period is lower than the estimated growth rates over the two sub-periods. This is due to the fact that output in the mid-1980s actually falls and then picks up again later. In order to address this problem, I also computed kinked-exponential growth rates, in which the trend lines of the two sub-periods are forced to meet at the midpoint that divides the sub-periods. When, as is the case here, the sub-periods are of equal length the overall growth rate is just the average of the reestimated growth rates during the two sub-periods. This practice has been implemented earlier in the literature [Boyce 1987]. The equation that is used to estimate the kinked exponential growth rates is as follows:

Log (output) = $a + b_1D_1t+b_2D_2t$,

where a is the common intercept at the breakpoint between the two periods;

D_1 is a dummy variable that takes on a value of 1 in the first sub-period and a value of 0 in the second sub-period;

D_2 is a dummy variable that takes on a value of 1 in the second sub-period and a value of 0 in the first sub-period;

t is renormalised so that it is 0 at the break point;

b_1 is the growth rate during the first sub-period; and b_2 is the growth rate during the second sub-period.

The kinked-exponential growth rates of Telangana and AP are reported in Table 3. As can be seen, the rate of growth rose significantly between the first sub-period and the second.

Growth at District Level

Table 4 presents the exponential growth rates for individual Telangana districts during the period under study, and Table 5 presents the corresponding set of kinked-exponential growth rate estimates.

The results suggest that some of the northern Telangana districts (Adilabad, Khammam, Karimnagar and Warangal) have tended to surge ahead in terms of agricultural growth compared with the southern districts, especially in the later period, that is, 1986-2001.[5] Nizamabad, the other northern district, already had relatively high

Table 2: Exponential Growth Rates (1970-2001)
(In per cent)

Region	1970-2001	1970-1985	1985-2001
Telangana	3.6	3.8	4.7
	(0.00)	(0.01)	(0.01)
Non-Telangana	2.5	2.7	2.3
	(0.00)	(0.01)	(0.00)
Andhra Pradesh	2.8	3.0	3.0
	(0.00)	(0.01)	(0.00)

Note: Standard errors in parentheses corrected to two decimal points.

Table 3: Kinked Exponential Growth Rates in Telangana and AP
(In per cent)

Region	1970-2001	1970-1985	1986-2001
Telangana	3.6	3.2	3.9
	(0.00)	(0.01)	(0.01)
Non-Telangana	2.5	2.7	2.2
	(0.00)	(0.00)	(0.00)
AP	2.8	2.8	2.8
	(0.00)	(0.00)	(0.00)

Note: Standard errors in parentheses corrected to two decimal points.

Table 4: Exponential Growth Rates of Telangana Districts
(In per cent)

District	1970-2001	1970-1985	1986-2001
Adilabad	2.8	1.0	5.0
	(0.00)	(0.00)	(0.01)
Hyderabad[a]	5.8	5.8	NA
	(0.03)	(0.02)	
Karimnagar	5.2	5.2	6.0
	(0.00)	(0.01)	(0.01)
Khammam	5.0	4.3	4.2
	(0.00)	(0.01)	(0.01)
Mahboobnagar	2.0	2.8	3.9
	(0.00)	(0.01)	(0.01)
Medak	3.3	4.3	4.9
	(0.00)	(0.01)	(0.01)
Nalgonda	2.9	3.8	2.8
	(0.00)	(0.01)	(0.01)
Nizamabad	2.2	3.7	4.1
	(0.00)	(0.01)	(0.01)
Rangareddy[b]	2.8	NA	NA
	(0.00)		
Warangal	4.8	31	6.5
	(0.00)	(0.01)	(0.01)

Notes: a – Hyderabad district was partitioned in 1978 to cede much of the agricultural area to Rangareddy region. So, the growth rate for Hyderabad is confined to the period 1970-1978.
b – The growth rate for Rangareddy district is confined to the period 1980-2001.

Table 1: Gross Cropping Area (GCA) and Net Sown Area (NSA) in Telangana and Andhra Pradesh
(Area in hectares)

	1970-71		1980-81		1990-91		1995-96	
	Census	Statistical Abstracts	Census	Statistical Abstracts	Census	Statistical Abstracts	Census	Statistical Abstracts
GCA								
Telangana	64	55	49	49	55	50	55	46
AP	136	134	122	123	139	132	142	130
NSA								
Telangana	50	50	45	45	49	44	47	40
AP	110	117	108	107	120	110	119	107

productivity levels by 1970, which partly explains its slower growth rate. Karimnagar, Khammam and Warangal achieved the highest growth rates of almost 5 per cent during the entire period if the largely urban district of Hyderabad is excluded from the analysis. Medak and Nalgonda follow with growth rates near 3 per cent. Adilabad and Rangareddy had growth rates above 2.5 per cent; Nizamabad had a growth rate of over 2 per cent. Mahboobnagar is the only district with just about 2 per cent growth rate during the period as a whole. Looking at the two sub-periods, from among the fast growers in the earlier period only Karimnagar, Khammam and Medak retain their high growth rates. Of the districts that were growing somewhat slowly during the earlier period, Adilabad and Warangal pick up pace. It is interesting to note that in all districts that witnessed high agricultural growth, there has been a massive increase in production for the market.[6]

According to Rao and Storm (2003), in the 1990s world agricultural growth was around 1.1 per cent. Agricultural growth in the developing economies has been 1.5 per cent and that in advanced economies has been 0 per cent. Agricultural growth in Andhra Pradesh has been around 2.8 per cent. In comparative terms, in a context of general agricultural recession, the growth story in Telangana is quite spectacular.

Growth Decomposition in Telangana and AP

Growth decomposition is a technique through which the growth rate is decomposed into its yield, cropping pattern and area components (for methodology, see Boyce (1987)). Table 6 presents the results of such a decomposition of the exponential output growth rates for Telangana and Andhra Pradesh.

Yield Component

Much of the growth can be attributed to the yield component. This reflects improvements in the use of HYV seeds, fertilisers, irrigation, and technological implements. I will first discuss changes in inputs other than irrigation and deal with changes in irrigation use in detail later in the essay.

Seeds, fertilisers and pesticides: There has been a rapid increase in the use of HYV seeds, synthetic fertilisers and pesticide use in Telangana. First, from the mid-1980s onwards, there has been a shift away from the practice of buying HYV seeds from last year's crop to that of buying seeds from the market. Second, the use of pesticides was virtually absent till 1980 in the villages surveyed. This has been transformed with about 10-15 per cent of the input costs in production now arising due to pesticide use in the commercial crops. Third, on fertiliser use, for example, the usage of nitrogenous fertilisers has increased from 26,393.4 metric tonnes in agricultural year 1969-70 to 5,40,775 metric tonnes in 1999-2000. The usage of phosphate fertilisers has increased from 8012.2 metric tonnes in 1969-70 to 2,31,103 metric tonnes in 1999-2000 in Telangana (from 'Season and Crop Reports' of the state of Andhra Pradesh).

Technology: Telangana has been witnessing a modest increase in the use of new technologies. Agricultural production is largely labour-intensive as earlier, though there have been some changes especially in ploughing and transportation. While before 1980, there was little use of tractors, there has been an increase in their use in place of the bullock. The per capita use of tractors is still low, but people with tractors rent their services to those who do not have the machines and this practice has caught on especially

Table 5: Kinked Exponential Growth Rates in Telangana Districts
(In per cent)

District	1970-2001	1970-1985	1986-2001
Adilabad	2.8	0.5	4.8
	(0.00)	(0.01)	(0.01)
Karimnagar	5.2	4.9	5.5
	(0.00)	(0.01)	(0.01)
Khammam	5.0	5.3	4.7
	(0.00)	(0.01)	(0.01)
Mahboobnagar	2.0	1.6	2.3
	(0.00)	(0.01)	(0.01)
Medak	3.3	3.1	3.4
	(0.00)	(0.01)	(0.01)
Nalgonda	2.9	3.5	2.4
	(0.00)	(0.01)	(0.01)
Nizamabad	2.2	2.0	2.5
	(0.00)	(0.01)	(0.01)
Warangal	4.8	3.2	6.3
	(0.00)	(0.01)	(0.01)

Note: I did not do this exercise for Hyderabad and Rangareddy districts because of the reasons stated above in the paper.
Standard errors in parentheses.

Table 6: Growth Decomposition of Telangana and AP
(In per cent)

	1970-2001	1970-1985	1986-2001
Telangana			
Area	–0.3	–0.2	–0.2
	(0.00)	(0.00)	(0.00)
Yield	2.6	2.4	3.5
	(0.00)	(0.00)	(0.00)
Cropping pattern	1.3	1.6	1.3
	(0.00)	(0.00)	(0.00)
Growth rate	3.6	3.8	4.7
AP			
Area	0.1	–0.2	0.6
	(0.00)	(0.00)	(0.00)
Yield	2.1	2.6	1.9
	(0.00)	(0.00)	(0.00)
Cropping pattern	0.6	0.6	0.5
	(0.00)	(0.00)	(0.00)
Growth rate	2.8	3.0	3.0

Note: Standard errors in parentheses corrected to two decimal points.

Table 7: Total Number of Tractors in Telangana

Year	Number of Tractors
1977	2847
1993	18177
1999	31295

Table 8: Irrigation Technologies between 1977 and 2001

	1977	1993	1999
Diesel pumps	102263	79047	55654
Electric pumps	137492	579504	712624

Table 9: Annual Growth Rates of Crop-Area
(In per cent)

	1970-85	1985-01	1970-1972 (Average Per Cent Gross Cropped Area)	1999-2001 Average Per Cent Gross Cropped Area)
Paddy	0.3	3.3	16.9	29.2
Jowar	–1.3	–3.7	31.0	11.2
Bajra	–2.1	–4.3	4.3	0.9
Maize	1.7	3.1	4.7	7.8
Groundnut	0.5	–1.9	7.7	5.8
Cotton	3.9	17.2	2.0	13.4
Chilli-peppers	1.2	2.6	1.4	2.2

in the areas where I did field research. Employment of technology such as tractors in the time of rising real wages has been documented for this region in earlier studies [Binswanger 1978]. This change may not be universal across the region, and the data in Table 7 throws light on the broad trends in the region.

In terms of irrigation-related technology, the number of diesel pumps has come down significantly while that of electric pumps has increased significantly. It is a result of a growing dependence on well irrigation in this region (Table 8).

Cropping Pattern

The second important contributor to growth in Telangana has been the cropping pattern component. This is also evident from various reports written about the region in the past few years [Parthasarathy and Shameem 1998, Chowdhary 2002]. The shift from production for the household to that for the market has entailed a movement away from the production of coarse foodgrains to rice and cotton. Table 9 shows the acreage growth in Telangana under some of the important crops between 1970 and 2001.

Gross Cropped Area

Lastly, total gross cropped area has contributed little to growth rates in the past 30 years. Not much new land has been brought under cultivation, nor has much been done to increase gross cropped area by innovating in multiple cropping.[7] This may not be very surprising, largely because the lands that could be brought under cultivation were already being cultivated by 1970. Hence, growth progresses through improvements in yields and changes in cropping patterns.

Output Instability

During times of intense agrarian change, like that which Telangana seems to be going through right now, it is reasonable to expect that instability of output might increase. It is important to examine if this has actually been the case. There are various procedures followed in the literature to measure the instability of output. I have used one method (also used in Boyce (1987)) that is described below.

The trend lines that are obtained in estimating the growth rates represent smooth versions of the growth process. The difference between the actual value of output and the predicted value from the trend line can be expressed as a percentage of the predicted value. This value, in its absolute or squared form, can be regressed against time. If the estimated coefficient is positive, then instability has increased over time; if negative, it has decreased.

|Z| = (Actual output-Predicted output)/(Predicted output)

Applying this method to Telangana and AP for 1970-2001, I obtain the results presented in Table 10. As can be seen, there is little evidence of increased agricultural instability during this period. Not only are the t-values low, but in case of Telangana the estimated coefficients are actually negative.

Irrigation Issues

Observers of Telangana and political activists in the region often argue that the state government has not invested enough for irrigation in the region. The sparse investment that has gone into Telangana is contrasted with the lavish investment that has gone into irrigation in coastal Andhra, which was already a more developed region when the state of Andhra Pradesh was formed. While it was not possible for me to obtain data on public investment in irrigation in the state, I did gather data on the actual area covered by irrigation through different sources. These data are analysed below.

Table 10: Instability Using Exponential Growth Rates for Entire Period

Region	|Z|	t-Value	Z-Square	t-Value
Telangana	-0.0001	-0.06	-0.00005	-0.1
AP	0.0008	0.77	0.0003	1.03

Table 11: Irrigated Area/Net Sown Area

(In per cent)

Region	1971	1985	2001
Telangana	17	23	38
Rayalaseema	17	19	22
Coastal Andhra	51	56	56
Andhra Pradesh	28	34	40

Table 12: Irrigation as a Percentage of Net Sown Area, according to Sources of Irrigation

	1971	1985	2001
Telangana			
Canals	4.5	7.2	6.8
Tanks	9.1	6.8	6.1
Tube wells	0.0	0.3	10.5
Other wells	3.5	7.7	13.3
Others	0.5	0.9	1.4
Total	17.5	22.8	38.0
Rayalaseema			
Canals	5.2	5.9	4.5
Tanks	5.1	3.7	2.0
Tube wells	0.0	0.5	9.4
Other wells	5.8	8.3	6.0
Others	0.7	0.6	0.5
Total	16.7	18.9	22.4
Coastal Andhra			
Canals	31.3	36.4	31.0
Tanks	13.3	10.6	10.0
Tube wells	1.7	4.4	8.5
Other wells	2.6	3.2	3.3
Others	1.8	1.7	3.1
Total	50.7	56.2	55.5
AP			
Canals	13.5	17.1	14.7
Tanks	9.5	7.4	6.5
Tube wells	0.6	1.8	9.5
Other wells	3.8	6.2	7.9
Others	1.0	1.1	1.8
Total	28.2	33.6	40.4

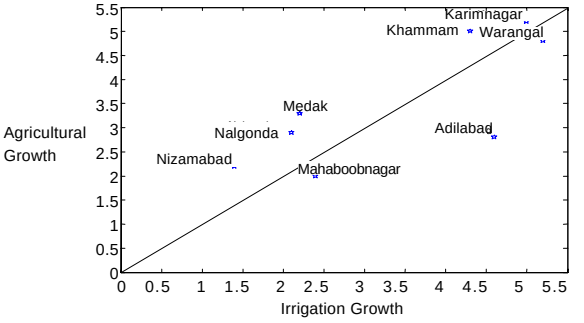
Table 13: Overall Average Annual Irrigation Growth at District Level

(*In per cent*)

District	1971-2001	1971- 1985	1985-2001
Nizamabad	1.4	1.5	1.1
Medak	2.2	1.8	2.2
Mahboobnagar	2.4	–1.9	9
Nalgonda	2.1	1.6	2.2
Warangal	5.2	1.3	7.6
Khammam	4.3	0.5	7.6
Karimnagar	5	2.9	5.1
Adilabad	4.6	1.1	7
Rangareddy*	–	–	**5.9**

Notes: * Did not exist in 1971.
– Hyderabad is excluded from analysis for reasons stated above.

Figure : Irrigation and Agricultural Growth, 1970-2001



First, I present the data on irrigated area as a percentage of the net sown area in Telangana as well as Andhra Pradesh at three points in time – 1971, 1985 and 2001 (Table 11). As can be observed, coastal Andhra has consistently had a much higher percentage of its net sown area irrigated. But what is significant for the current essay is that is that there has been considerable growth in irrigation in the Telangana area too. From a total irrigated area of less than 10 per cent of total sown area in 1945 [Qureshi 1947],[8] there has been an increase up to 38 per cent in 2001.

Table 12 disaggregates growth in irrigation into different irrigation sources. A few interesting observations can be made. First, in terms of canal irrigation, there has been little growth in Telangana. The proportion of canal-irrigated area of the total set sown area is far lower in Telangana than in coastal Andhra[9]. Second, the proportion of area under tank irrigation has fallen by almost 50 per cent. This could be due to multiple reasons. Telangana has traditionally depended upon tank irrigation [Qureshi 1947 and Pavier 1981], but the region may be going through a phase wherein the old collective systems of tank maintenance are collapsing with newer forms of organisation yet to emerge. Third, farmers are increasingly resorting to groundwater irrigation via bore wells, tube wells, and open wells. The well-irrigated area constituted less than 4 per cent of the net sown area in 1971, but now accounts for about 24 per cent.

Certain interesting observations can be made if the irrigation growth rates in various districts are viewed alongside agricultural growth rates. Table 13 presents the growth rates of irrigated acreage at the district level, and Table 14 presents irrigated area/cultivated area ratios at the district level for 1971, 1985 and 2001.

From Table 13 it can be seen that Nizamabad, Warangal, Khammam and Karimnagar have the highest percentages of irrigation in their net sown area. It is also important to note that in all the other districts, irrigation percentages are less than 40 per cent. This points to a somewhat uneven development of irrigation in this region. But this is also partially explicable because some of the low-irrigated districts have poor groundwater potential and somewhat lower average rainfall than the other districts.

The Figure shows the correlation between the exponential agricultural growth rates and irrigation growth rates. Districts with high growth rates in irrigation also tended to witness high agricultural growth rates. The relation between high irrigation growth and high agricultural growth is probably mutually reinforcing. High agricultural growth can feed into irrigation growth, as irrigation growth can contribute to agricultural growth. The r-value for the correlation between the two is 0.78. Warangal, Karimnagar and Khammam, which have had the highest agricultural growth rates, have also had the highest irrigation growth rates.

While this correlation is to be expected, it is also important to raise certain important questions. What is the decomposition of this growth in irrigation in terms of different sources of irrigation? What are the possible welfare effects of the particular kind of irrigation in this region? Farmers, regardless of landholding size, have been increasingly resorting to digging wells and this entails considerable private expenditure [Revathi 1998]. Sometimes the digging process fails because the predictions of the scientists about the presence of water at a certain spot turn out to be mistaken. In case of marginal and small farmers, well expenditure is sometimes enough to push them into a long-term debt trap.

The growth of well irrigation also seems to have caused significant reductions in groundwater levels. While no data on the regional level are available to me, my fieldwork data in four

Table 14: Irrigated Area/Net Sown Area

(In per cent)

District	1971	1985	2001
Nizamabad	40	51	68
Medak	17	23	29
Mahboobnagar	10	10	20
Nalgonda	20	26	40
Warangal	24	34	58
Khammam	19	21	44
Karimnagar	24	40	71
Adilabad	6	7	15
Rangareddy*	–	**12**	**27**

Table 15: Irrigation Growth according to Sources (1971-2001)

(In per cent)

Region	Canals	Tanks	Wells	Others	Total
Nizamabad	–1.0	–1.9	27.4	–1.0	1.4
Medak	–2.3	–2.2	18.6	0.9	2.2
Mahboobnagar	–0.7	–2.2	15.6	1.9	2.4
Nalgonda	0.0	–2.1	16.0	8.3	2.1
Warangal	–2.6	–0.2	31.2	27.0	5.2
Khammam	11.2	–0.1	15.5	9.9	4.3
Karimnagar	13.3	–1.5	20.3	19.6	5.0
Adilabad	2.2	0.3	48.0	18.7	4.6
Telangana	1.2	–1.3	17.0	8.0	3.1
Rayalaseema	–0.6	–2.0	5.0	0.0	0.4
Coastal Andhra	0.0	–0.7	6.1	1.0	0.9
AP	0.1	–1.5	9.5	3.3	1.2

Table 16: Irrigation Growth according to Sources (1971-85 and 1985-01)

(In per cent)

	Canals		Tanks		Wells		Total	
	1970-85	1985-01	1971-85	1985-01	1971-85	1985-01	1971-85	1985-01
Nizamabad	2.8	–3.3	–2.3	–5.2	9.5	20.4	1.4	1.1
Medak	0.6	–4.5	–0.3	–2.2	8.2	11.7	1.7	2.1
Mahboobnagar	-3.1	2.8	-3.5	-4.0	3.8	13.1	-1.7	8.4
Nalgonda	2.3	-1.6	-3.0	-1.9	6.5	3.4	1.5	2.1
Warangal	-6.0	7.2	-1.8	-2.1	17.5	2.2	1.3	7.2
Khammam	12.0	3.5	-3.7	1.7	6.1	17.9	0.5	7.1
Karimnagar	12.8	4.4	-2.0	7.6	11.3	-2.6	2.7	4.8
Adilabad	2.9	0.9	-1.7	-1.4	9.1	41.4	1.1	6.7
Rangareddy	NA	-1.7	NA	-2.6	NA	7.2	NA	5.6
Telangana	2.7	-0.2	-2.3	-0.5	6.6	7.1	0.9	4.4
Rayalaseema	-0.2	-0.9	-2.5	-2.5	1.9	2.8	-0.2	2.0
Coastal Andhra	0.7	-0.5	-1.6	0.2	4.4	10.6	0.4	0.5
AP	0.9	-0.5	-2.0	-0.4	4.3	7.1	0.4	1.8

Note: NA - Rangareddy district did not exist in 1971.

Telangana villages shows that about one-third of the farmers deepen their wells every five years. This can only suggest that groundwater levels have been falling. This in turn has an adverse equity effect, as the farmers need to expend more capital in the deepening process.

Table 15 presents district level data on the growth in Telangana irrigation by source. Well irrigation outpaced other irrigation sources in every district. Table 16 splits the data present in Table 15 into two separate periods – 1971-85 and 1985-2001 – in order to better understand which of the two periods witnessed growth of irrigated area under different sources. Area under canal irrigation decelerated in the later period. Area under tank irrigation decreased mostly in the first period. Area under well irrigation accelerated in the later period in Telangana. Districts that have been witnessing high groundwater irrigation growth in the later period have also been going through shifts in their cropping pattern towards production for the market during the same period [Reddy 2002]. The welfare and sustainability issues raised in this section are intertwined with the shift in the cropping pattern.

Conclusions

From the above discussion, it is clear that the perception that Telangana agriculture has remained backward and stagnant is not borne out by evidence. The perception that the region has suffered from an insufficiency of irrigation resources is closer to the truth, but misses some important changes. Insofar as advances have been made in the area of irrigation, they have primarily come through private initiatives. In itself, this is not necessarily problematic, but viewed alongside two other facts, it is a matter of concern. Firstly, coastal Andhra has received considerable attention from the state government in irrigation. Secondly, the fact that the advances made are in groundwater irrigation is a matter of concern due to the adverse effects already discussed.

Telangana's agricultural growth has been accompanied by an increase in rural poverty as well as a significant decline in the consumption levels of both marginal peasantry and agricultural labourers during the last decade, as NSS 55th round[10] data suggest [Vakulabharanam 2003]. These developments suggest that a process of immiserising growth is taking place in this region. While agricultural globalisation policies contribute partially to this tragic phenomenon, the rapid growth of well irrigation is also responsible for the immiserisation of small and marginal peasantry. Significant policy remedies have to be undertaken in irrigation in order to counter the welfare losses of the poorest cultivators in the region. EPW

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Notes

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1 While growth rates at the regional level in Andhra Pradesh have been computed in a different work [Krishna Rao and Subrahmanyam 2002], district level disaggregation and growth decomposition details have not been worked out.

2 The choice of the time period 1970-2001 makes sense because of two reasons. This is the time when the effects of the green revolution began to become visible in areas such as coastal Andhra. Telangana is not a direct beneficiary of the green revolution but there are processes of diffusion that begin around this time. Secondly, though Telangana merged with coastal Andhra and Rayalaseema regions to form the state of Andhra Pradesh in 1956, it is around 1970 that there is a strong emergence of a separate Telangana consciousness. I choose this year as the starting point. This is also the time when the Naxalite movement begins to make its presence felt in this region.

3 It is not possible to compute the share of the total value that is covered precisely because the prices of some of the commodities are not available.

4 I select the year 1985 as the breakpoint in my analysis. The rationale is that Telangana started rapidly commercialising in the mid-1980s. I wish to provide a contrast for this period by looking at the previous 15 years.

5 It is interesting to note that the districts that have done relatively well have also seen considerable political activity in the form of the guerrilla communist armed struggle over the last three decades. Making a causal connection between political activity and economic growth, however, might be hazardous at this stage as I feel that it will involve doing a lot more analysis and several careful field studies. I refrain from this analysis in this paper.

6 Apart from growth in paddy for the market in these districts, there is also a rapid growth of other commercial crops such as cotton, chillies, turmeric and so forth.

7 The popular claim in the mainstream media as well as among certain sections of the government, that there has been a significant reduction in the cropping area over the last 15 years due to the contestation between the Naxalites and the landlords, is not borne out by these results. It is true that there are slight increases in fallow lands in the region but this claim is vastly exaggerated.

8 Qureshi says that 5.2 per cent of the total net sown area was irrigated in the total Hyderabad state in 1940. But in this irrgated area, 80 per cent was in Telangana. The value for Telangana separately would be around 10 per cent.

9 This makes the case for discrimination against Telangana by the state government especially compared with the treatment meted out to coastal Andhra, which has been fed almost exclusively by the state government in terms of canal irrigation.

10 After making the adjustments of Deaton (2003) for the Telangana region.

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