

POLITICAL ECONOMY OF IRRIGATION DEVELOPMENT AND PATTERNS OF SPATIAL INEQUALITIES ACROSS AGRO-CLIMATIC REGIONS OF KRISHNA DISTRICT

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ABSTRACT

This article is a systematic documentation and analysis of events that motivated development of irrigation in Madras Presidency in general and Krishna district in particular. In Krishna district, when the anicut was built in 1855, the phase-wise excavation of canals determined the phases of development of irrigation (1855-1900; 1900-1965 and 1965-2001) leading to three agro-climatic regions in the district viz., delta, moderate and dry regions (taluks). An analysis of impact of irrigation in terms of gross sown area, cropping intensity, extent of irrigation, type of irrigation and cropping pattern revealed that during the colonial period, the delta region had a clear-cut edge over the moderate and dry regions. However, the gap diminished during the post-colonial period due to the commencement of new irrigation projects in moderate and dry regions that were sponsored by the state. The paper concludes that with a pro-active role of the state by focusing on the less developed regions with appropriate policies one can successfully bring down spatial inequalities across regions.

Introduction

Most development issues in India can be successfully addressed by understanding the regions from a historical perspective, in terms of region specific influences exerted by natural resources, economic geography, social organisation and demography. Each region adds something to the agrarian history of India as a whole (Ludden, 1994: 18). The study of Krishna district in terms of development of irrigation and the patterns of spatial inequalities is one such modest attempt in the above framework.

In nutshell, the work of Krishna *anicut* commenced in 1853 and was completed in 1855. While the phase-wise excavation of canals in Krishna district determined the phases of development of irrigation in the region, the benefits of assured irrigation reflected in sharp rise in area cultivated and irrigated, changes in cropping pattern from the low-value crops to high-value crops, cropping intensity from mono-crops to double crops and the growth of agro-processing units. However, the whole story is not this simple. While tracing and analysing the agricultural development of the region, we came across

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The author is indebted to Vijayendra Rao, Lead Economist, the World Bank for his constant support and encouragement. He is grateful to G.N.Rao, K.Nagaraj, D.Narasimha Reddy and David Ludden for sparing their invaluable time and constructive comments. The usual disclaimers follow.

issues of political economy of irrigation and spatial inequalities which we have discussed and documented in various portions of this article.

This article is divided into three parts i.e., Part A, B & C. In Part A, some of the issues like why and when did the British consider the proposal of building an *anicut* across river Krishna near Vijayawada (erstwhile Bezwada)? While answering these questions in a larger context of South India, we have documented how the British realised the important link between expenditure on irrigation and revenues. Then, we specifically discussed aspects of initiation of Krishna anicut across river Krishna and how a simultaneous change in land settlement system from the Zamindari system to Ryotwari system being responsible for several changes in the region. In part B, we analysed the phase-wise development of irrigation and patterns of rainfall across the three broad regions (Delta, Moderate and Dry taluks) of Krishna district. In part C, we analysed the spatial inequalities in terms of area sown, cropping intensity, irrigation intensity, type of irrigation, and cropping pattern in the context of phase-wise development of irrigation across the three broad agro-climatic regions. This in turn explains the implications of irrigation works in a much larger context.

Data and Methodology

The questions pertaining to Part A are approached primarily from the perspective of economic history, relying on archival data collected for this purpose. The questions pertaining to Part B and C are addressed from the development perspective, making use of archival material and secondary published sources such as census data and district handbooks.

The methodology used in categorising all 10 taluks¹ of the district into three broad categories viz., Delta, Moderate and Dry taluks

(regions) is as follows: Machilipatnam, Divi, Gudivada and Kaikalur taluks form the Delta taluks of the district. Vijayawada and Gannavaram taluks fall under the moderate category since these taluks constitute both delta lands and uplands. The rest four taluks namely Nuzvid, Tiruvur, Nandigama and Jaggayyapet are dry taluks having uplands. In 1983, after Telugu Desam Party has come into power the 'taluk system' was replaced by the 'mandal² system' as a part of decentralised administration. The district was divided into 50 mandals. In order to analyse the long-term trends across three broad regions viz., Delta, Moderate and Dry taluks, we have reconstructed the mandals into the erstwhile taluks of the district. By doing so, Delta, Moderate and Dry regions, respectively constituted 21, 11 and 18 mandals of the district.

PART - A

Motivation of Irrigation Works in Madras Presidency

Land revenues during the first quarter of the 19th century, were falling in almost all parts of the Madras Presidency. The concern over falling revenue³ in the Madras Presidency had triggered enquiries and debates into the issue. In this context, Mr. C. R. Cotton was appointed as a commissioner, in July 1838, to report on the causes of revenue decline in Madras Presidency. In his report, he pointed out that the neglect of irrigation works was the primary cause for declining revenues in the Presidency (Government of Madras, 1852: 136).

After a serious discussion on this issue, the colonial government started to spend some money on repairs and maintenance of the existing irrigation systems in the Presidency. Also, they initiated some new projects like the Careloon project in Tanjore (Tanjavur) district of the Presidency. A summary of the rate of return on irrigation works

undertaken in the Presidency is presented in Table 1. It is self-evident that there exists a strong positive correlation between the amount spent on irrigation works, and their respective returns by way of revenues. This

was how the idea of spending money on irrigation works in terms of maintenance and repairs, and new projects gained momentum in the Presidency.

Table 1 : Rates of Return (in Rupees) on Some of the Irrigation Works in Madras Presidency, 1836-1849

District	Work	First Cost (1)	Average yearly outlay In repairs (2)	Average increase in Revenue (3)	Average net increase in (3)-(2) = (4)	% of (4) on (1)
Rajahmundry	Samuleottah Channel	13472	2840	13289	10449	77.56
Rajahmundry	Boopiah Calway	19259	136	18975	17613	91.45
Masulipatnam	Pulleru Channel	13713	1759	27600	25841	188.44
Masulipatnam	Apparo Channel	8756	577	23287	22710	259.37
Guntoor	Cochinapoody Channel	366	459	1181	722	197.27
Guntoor	Vellatoor Channel	7087	723	7013	6290	88.75
Nellore	Veoroor River Channel	1751	83	2393	2310	131.92
South Arcot	Lower Coleroon Anicut	74234	2855	101641	98786	133.07
Tanjore	Upper Coleroon Anicut	83401	18159	138861	120702	144.72
Coimbatore	Pillloor Tank	6511	248	5862	5614	86.22
Madura	Small anicut on Vygay River	2466	470	2681	2211	89.66
Tinnevelly	Teeroovengadanad-pooram Tank	643	-	1048	1048	162.99
Tinnevelly	Autoor Tank	3242	623	3684	3061	94.42
Total		234901	28932	347515	317357	135.10

Source : Government of Madras (1852), "First Report of the Madras Public Works Commissioners", Government Press, Madras, p.132.

Genesis of Irrigation System in Krishna Delta

Masulipatnam (present Krishna district) and Guntur districts were part of the Northern Circars and were ceded by the Nizam to the

British in 1766. At that time these districts were in a fairly prosperous state, but by the end of the century due to disrepair of irrigation channels, the overall financial status of the district and its people had diminished

(Government of Madras, 1853). In 1792, Major Beatson, Inspector General of Civil Estimates, proposed the construction of an *anicut* across the river Kistna (hereafter Krishna) at Vijayawada (erstwhile Bezavada). The colonial government did not pay any attention to his proposal until 1835 due to its engagement in numerous wars.

The terrible effects of the Guntur famine of 1832-33 associated with the drastic decline in population and revenues drew the attention of the officials. In 1831, the population of Guntur district was 512,000; in the following year it was only 357,038, and by 1833 it further declined to 255,511, less than half of what it was two years earlier. The average land revenue proceeding the six years of famine was ₹ 13, 94,168, and in the following two years of famine it declined sharply to ₹ 6, 71,654 and ₹ 5, 11,593 (Government of Madras, 1853: 92).

In 1839, Captain Buckle, Civil Engineer-Second Division, recommended once again Major Beatson's proposal of 1792. He submitted a report to the government on 30 May 1840 and mentioned that an *anicut* at Bezavada might convert the Machilipatnam (present Krishna district) into yet another Tanjore (Government of Madras, 1858: 88). In 1847, Colonel A. Cotton and Captain Lake, Civil Engineers, submitted a joint report on the proposed *anicut* and on the scheme of irrigation of the Krishna Delta. The construction of the *anicut* commenced in 1853 and was completed in 1855.

PART - B

Development of Irrigation and Distributional Effects

In Part B, we shall analyse the changes that were brought about by irrigation in the Krishna district. The network of canals was built in phase-wise manner and could be traced through developments in agriculture. This is

verified for the differences in area sown, crop intensity, irrigation intensity, type of irrigation, cropping pattern, densities of population, and other aspects of development across the regions. These developments themselves have a bearing on the socio-political and economic aspects of respective regions in general, and agrarian markets - land market in particular. However, the latter aspects are not covered since they are beyond the scope of this paper. The details on these aspects are available in Dasari (2004).

Phases of Irrigation Works in Krishna District

Phase-wise irrigation works in Krishna district are traced across the three broad regions of the district. For a quick recapitulation, the three broad regions are: delta taluks (delta region), moderate taluks (moderate region) and dry taluks (dry region). Of the delta taluks, Gudivada taluk forms the head region of the delta to a larger extent and Kaikalur taluk to some extent whereas the Machilipatnam (Bundur) and Divi taluks form the tail-end regions of the delta. Both Vijayawada and Gannavaram taluks form the moderate region of the district while the Nuzvid, Tiruvur, Nandigama and Jaggayyapet taluks form the dry region of the district.

Broadly, development of irrigation in Krishna district can be divided into three phases. The first phase (1855-1900) was characterised by canal irrigation in the head taluks of the Krishna district (especially Gudivada). During the second phase (1900-1965), the benefits of irrigation percolated to the tail-end taluks of the Krishna district. Simultaneously, some parts of moderate taluks underwent an expansionary phase in irrigation in this period. During the third phase waters from Nagarjuna Sagar project benefited all the three regions, however with varying degrees. The major beneficiaries during this phase were the delta and dry taluks, whereas the

moderate taluks received marginal benefits. In this context, it is useful to locate the changes taking place in the three distinct regions of the district under these three phases of irrigation development, and link them with various other aspects of developments in these respective regions.

First Phase (1855-1900): The canal works in the Krishna district proceeded very slowly and unsatisfactorily even though the *anicut* was completed by 1855. In 1862, the Government of India requested a complete and comprehensive scheme of the work that remained to be done in the Krishna Delta (both Eastern and Western Deltas). Major Anderson, District Engineer, Krishna district, was deputed

to report on the delta works, and submit estimates for all expenditure required to complete them. In 1862-63, he proposed an expenditure of ₹16,17,166 for the completion of delta works.

In 1877, Colonel Anderson's plan was revised downwards from ₹16, 17, 166 to ₹ 9, 08,013. In the revised plan, several major modifications were made by reallocating the funds and neglecting the tail-end taluks of the district like Divi and Machilipatnam. A summary of the benefits received by the taluks of the district is given in Table 2. The lion's share of benefits of irrigation went to Gudivada taluk (head region of the delta taluks). Other regions hardly received any benefits.

Table 2 : Irrigated Area in the Krishna District in 1897-98

Canal	Length (in Miles)	First Crop (acres)	Second Crop (acres)	Taluks Benefited
Ellore	39.6	48166	32	Vijayawada, Gudivada
Ryves	22.6	45467	11	Gudivada
Masulipatnam	49.07	42667	5	Gudivada, Machilipatnam
Bank	-	-	-	-
Pulleru	26.64	116783	15	Gudivada
Polaraj	26.4	26465	96	Kaikalur
Bantumilli	26.15	21524	264	Gudivada, Machilipatnam

Source : Walch J. George (1899), "The Engineering Works of the Kistna Delta", Government Press, Madras, Vol.II, p.136.

Second Phase (1900-1965) : During the second phase (1900-1965), some of the pending works regarding the extension of canals to the tail-end region of the delta taluks as well as the remaining works in the head region were undertaken and completed. For instance, in 1936, an *aqueduct* (bridge) at Puligadda of Divi taluk (tail-end taluk) was

completed. As a result, 1, 25,096 acres were irrigated (Rajagopal, 1977: 147).

The moderate and dry taluks that were neglected during the first phase (1855-1900) benefited from some of the minor irrigation and lift irrigation schemes during the second phase (1900-1965). The details of these developments are as follows: The Tiruvur taluk

(dry taluk) by 1965 benefited from Muniyru project, Ippalavagu scheme, Kattaleru anicut and Chinnampeta scheme. All these schemes put together accounted for 17,555 acres of irrigated area. Munnuluru scheme that benefits Nandigama taluk (dry taluk) irrigated an extent of 1090 acres by 1965. Likewise, Patamata pumping scheme and the other schemes in Vijayawada taluk (moderate taluk) irrigated 9308 acres. Thus, the extent of land brought under irrigation via minor and lift irrigation in both moderate and dry taluks were quite marginal in the second phase (1900-65).

Third Phase (1965-2001) : One of the important developments that characterised this phase is the completion of Nagarjuna Sagar project in 1965. Its benefits reached dry taluks as well as delta taluks by 1975.⁴ The dry taluks witnessed an extension of irrigation, whereas

the delta taluks witnessed an increase in irrigation intensity which we shall document in the subsequent sections.

Besides the Nagarjuna Sagar *anicut*, several minor and lift irrigation schemes were executed in the dry and moderate taluks extending irrigation to nearly 108,749 acres in 1988-89 of which 82,976 acres were irrigated through the minor irrigation tanks and 25, 823 acres were irrigated through lift irrigation. Of these benefits, the lion's share went to the dry taluks (Table 3). Also, the benefits through minor tanks and lift irrigation were much higher in this phase (1965-2001) than the earlier phase (1900-1965). The major beneficiaries in terms of minor and lift irrigation were the dry taluks in comparison with moderate taluks.

Table 3 : Irrigated Area through Minor Irrigation Tanks and Lift Irrigation, 1988-89

Taluk	Area Irrigated (in acres)	
	Minor Tanks	Lift Irrigation
Delta Taluks	0	0
Moderate Taluks	16393	9918
Dry Taluks	66583	15855
Total	82976	25773

Source : Government of Andhra Pradesh (1991), "Handbook of Statistics, Krishna District, 1988-89" Novelty Press, Machilipatnam.

PART – C

Agriculture and Spatial Inequalities: 1902/03, 1930/31, 1965/66 & 1992/93

In Part C, the impact of phases of irrigation development across the regions of the district is assessed. This impact is analysed in terms of gross sown area, cropping intensity, extent of irrigation, type of irrigation, and cropping pattern. An analysis of changing gross sown

area, cropping intensity, extent of irrigation, type of irrigation, cropping pattern was carried out at different time points, 1902-03, 1930-31, 1965-66 and 1992-93.

Extent of Cultivation

Between 1902/03 and 1930/31 the district registered rapid extension of cultivation namely, a simple growth rate of 147.4 per cent in terms of gross sown area

(hereafter GSA). It was 25.7 and 17.2 per cent for the subsequent periods i.e., 1930/31-1965/66 and 1965/66-1992/93 (Table 4). The trends in the three broad regions (delta, moderate and dry taluks) of the district do not follow the pattern of the district.

In 1902/03, the delta taluks accounted for the lion's share (50 per cent) of GSA of the district. Of the three broad regions, the moderate taluks experienced the highest annual growth rate in GSA while the dry taluks experienced the lowest growth rate between 1930/31 and 1965/66. On the other hand,

between 1965/66 and 1992/93, the dry taluks registered the highest growth rate in GSA while the moderate taluks registered the lowest annual growth rate. Thus, we observe different patterns of growth in GSA across the broad regions at various time points. In sum: (1) Delta taluks more or less exhibit the broad trends of the district; (2) Moderate taluks exhibit relatively higher growth rates till 1965/66 and then slow down between 1965/66 and 1992/93; (3) Dry taluks exhibit relatively poorer growth rates till 1965/66 and then pick-up during the post-1965 period (Table 4).

Table 4 : Percentage Distribution and Simple Growth Rates of Gross Sown Area by Broad Regions in Krishna District, 1902/03, 1930/31, 1965/66 & 1992/93

Period	Delta	Moderate	Dry	District
1902-03	50.4	15.3	34.2	100 (496631)
1930-31	46.2	18.8	35.0	100 (1228593)
1965-66	46.9	27.5	25.6	100 (1543900)
1992-93	48.4	20.1	31.5	100 (1809399)
Simple Growth Rate of Gross Sown Area				
1902-1930	126.8	202.8	152.8	147.4
1930-1965	27.5	84.2	-8.2	25.7
1965-1992	21.0	-14.3	44.2	17.2

Note: 1. Figures in parentheses are the respective GSA in acres for district.

Sources : Government of Madras (1905), "Madras District Gazetteers, Statistical Appendix for Kistna District," Government Press, Madras.

Government of Madras (1934), "Madras District Gazetteers, Statistical Appendix for Kistna District," Government Press, Madras.

Rajagopal M.V. (1977), "Andhra Pradesh District Gazetteers, Krishna," Government Secretariat Press, Hyderabad.

Government of Andhra Pradesh (1996), "District Handbook of Statistics, Krishna District, 1992-93 & 1993-94," Andhra Art Press, Machilipatnam.

Cropping Intensity

The district experienced a rapid expansion of cultivation between 1902/03 and 1930/31 (Table 4), whereas the period between 1965/66 and 1992/93 was characterised by intensification of cultivation (Table 5) due to the benefits accrued from the Nagarjuna Sagar project around the mid 1970s. However, the district scenario is not applicable for all the three broad regions.

Until 1930, the second crop was uncommon across all the three broad regions

of the district. By 1965-66, the delta and moderate taluks had shown a remarkable rise in cropping intensity (Table 5). This rise was partly due to the translation of benefits of Nagarjuna Sagar water to the delta and moderate taluks around mid 1970s. Even though the dry taluks experienced extension of cultivation between 1965/66 and 1992/93, there was not much change in cropping intensity. To sum up, the delta and moderate taluks experienced a definite advantage over the dry taluks in terms of second crop during the post-1965.

Table 5: Pattern of Cropping Intensity in Krishna District, 1902/03, 1930/31, 1965/66 & 1992/93

Year	Delta Taluks	Moderate Taluks	Dry Taluks	District
1902-03	1.18	1.19	1.04	1.13
1930-31	1.19	1.11	1.03	1.12
1965-66	1.44	1.25	1.12	1.29
1992-93	1.89	1.63	1.14	1.52

Note : Cropping intensity is calculated as gross sown area/net sown area.

Source : Same as in Table 4.

Extent of Irrigation

The gross irrigated area (hereafter GIA) in the district increased by 159, 58 and 24 per cent respectively, in the periods : 1902/03 to 1930/31; 1930/31 to 1965/66 & 1965/66 to 1992/93 (Table 6). The lion's share of increase in irrigation during all the three periods was in the delta taluks. About 58, 58 and 60 per cent of increase in GIA of the district were respectively, taken away by the delta taluks in the following periods: 1902/03 to 1930/31; 1930/31 to 1965/66 & 1965/66 to 1992/93 (Table 6). About 27, 26 and 1 per cent of the increase in GIA of the district were respectively, taken away by moderate taluks

in the following periods: 1902/03 to 1930/31; 1930/31 to 1965/66 & 1965/66 to 1992/93. About 15, 16 and 39 per cent of increase in the GIA of the district were respectively taken away by the dry taluks in the following periods: 1902/03 to 1930/31; 1930/31 to 1965/66 & 1965/66 to 1992/93. In sum, the delta taluks received maximum share of increase in irrigation during all the time periods. Interestingly, the dry taluks have improved their share of irrigation in the overall increase in the district irrigation by 39 per cent between 1965/66 and 1992/93 whereas the moderate taluks improved their share only by a meagre 1 per cent during the same period.

Table 6 : Percentage Distribution of Gross Irrigated Area in Krishna District, 1902/03, 1930/31, 1965/66 & 1992/93

Year	Delta Taluks	Moderate Taluks	Dry Taluks	District
1902-03	86.9	9.4	3.7	100 (211678)
1930-31	69.2	19.9	10.9	100 (547894)
1965-66	65.1	22.0	12.9	100 (867178)
1992-93	64.1	18.0	17.9	100 (1073487)

Note : Figures in parentheses are the respective row totals in acres.

Source : Same as in Table 4.

Type of Irrigation

The type of irrigation is one of the determining factors of cropping pattern and cropping intensity. Irrigation type embodies some important characteristics such as quality and certainty. These characteristics in turn determine the cropping pattern and cropping intensity. All this converges to development of agriculture. Thus, type of irrigation is one of the important forces that determine agricultural development.

The canal irrigation in 1902/03 accounted for 94 per cent of total irrigation in the delta taluks. Tank irrigation that accounted for 4.9 per cent in 1902/3 but by 1930/31 it had totally disappeared. The share of canal irrigation to total irrigation between 1902/03 and 1930/31 in moderate taluks increased from 66.8 to 88.2 per cent simultaneously; there was a sharp decline in the share of tank irrigation from 30.3 to 8.4 per cent. Moderate taluks witnessed an increase in the share of well irrigation from 4.9 to 19.3 per cent and a simultaneous decline in tank irrigation by nearly 8 percentage points between 1965/66 and 1992/93. This was because some of the upland regions of the moderate taluks opted for well irrigation. Moreover, the free power supply announced during the Telugu Desam government after 1983 spurred on this process. By 1992/93, lift irrigation also

accounted for 6.3 per cent of the region's irrigation. Moderate taluks can be characterised as having diversified types of irrigation; however, most of their needs in 1992/93 were met by canal irrigation (71.5 per cent), followed by wells (19.3 per cent) and lift irrigation (6.3 per cent).

The dry taluks experienced different changes with a decline in the share of canal irrigation from 62.1 to 15.1 per cent between 1902/03 and 1930/31. During the same period, tank irrigation dramatically improved from 37.6 to 68.7 per cent, entirely a different phenomenon from that of the delta and moderate taluks. Thus, the extension of irrigation that we have seen in dry taluks between 1902/3 and 1930/31 predominantly comes from the rise in tank irrigation, not canal irrigation. Between 1965/66 and 1992/93, canal irrigation increased by about 30 per cent of total irrigation due to the Nagarjuna Sagar project while the tank irrigation declined drastically by 40 percentage points. Well irrigation accounted for a rise of 14 percentage points. Thus, both canal and well irrigation replaced tank irrigation in the region between 1965/66 and 1992/93. By 1992/92, 48 per cent of the total irrigation in the dry taluks came from canal irrigation while the wells, tanks and lift irrigation accounted for the balance 52 per cent. The latter are not as assured forms of irrigation as the former (Table 7).

Table 7: Sources of Irrigation in Krishna District in 1902/03, 1930/31, 1965/66 & 1992/93

Region	Source of Irrigation	1902-3	1930-31	1965-66	1992-93
Delta Taluks	Canals	93.9	98.2	97.3	98.5
	Tanks	4.9	-	-	-
	Wells	-	-	0.4	1.0
	Lift Irrigation	-	-	-	0.2
	Others	1.1	1.8	2.3	0.3
	GIA	100	100	100	100
		(183880)	(379334)	(564237)	(687802)
Moderate Taluks	Canals	66.8	88.2	78.6	71.5
	Tanks	30.3	8.4	10.1	2.2
	Wells	2.1	1.4	4.9	19.3
	Lift Irrigation	-	-	-	6.3
	Others	0.9	1.9	6.4	0.7
	GIA	100	100	100	100
		(19965)	(108825)	(191099)	(193305)
Dry Taluks	Canals	62.1	15.1	19.4	48.2
	Tanks	37.6	68.7	57.5	16.3
	Wells	-	4.8	15.0	28.8
	Lift Irrigation	-	-	-	4.7
	Others	0.3	11.5	8.2	2.0
	GIA	100	100	100	100
		(7833)	(59735)	(111842)	(192380)

Note: 1. In the moderate taluks, tube wells form major constituents of the wells accounting for 18 per cent of total irrigation, whereas in the dry taluks tube wells irrigate only 8 per cent of gross irrigated area in 1992-93.

2. Figures in parentheses are the respective gross irrigated areas (GIA) in acres.

Source: Same as in Table 4.

Cropping Pattern

Farmers in delta taluks specialised in the cultivation of paddy from the early 20th

century. The cultivation of coarse cereals has been disappearing over the years. Also, the cash crops had shown a remarkable decline between 1902/03 and 1930/31. Pulses formed

a substantial portion of GSA, namely 13 and 18 per cent in 1965/66 and 1992/93 (Table 8). This was due to the fact that in the regions where the canal water was released for a single crop (*Khariif*) it generally went for pulses during the *Rabi* season. Thus we notice that cropping intensity of delta taluks was as high as 1.89 in 1992/93 (Table 5). Over time, the delta taluks have almost become a mono-crop economy. Importantly, in the delta taluks the crop diversification declined over the years.

Even though the moderate taluks tended to exhibit the characteristics of the delta taluks

in terms of expansion of irrigation, cultivation, and cropping intensity, the cropping pattern of the moderate taluks differed remarkably. This is due to the distinct irrigation types available in this region. The specialisation in paddy cultivation in the moderate taluks was not pronounced like that of the delta taluks. Prior to 1930-31, rice occupied around 25 per cent of the cropped area. After 1930-31, it fluctuated between 40 to 50 per cent. The coarse cereal cultivation in the region accounted for a substantial proportion till 1965/66 and almost disappeared by 1992/93 (Table 8).

Table 8 : Cropping Pattern in Krishna District, 1902/03, 1930/31, 1965/66 & 1992/93

Region	Crop	1902-3	1930-31	1965-66	1992-93
Delta	Rice	67.0	68.3	74.5	78.2
	Coarse Cereals	3.9	2.0	1.2	0.0
	Pulses	14.1	8.1	13.0	17.9
	Cash Crops	9.7	3.5	2.4	1.8
	Others	5.2	18.1	8.9	2.1
	GSA	100	100	100	100
		(250351)	(567861)	(723820)	(875649)
Moderate	Rice	25.1	48.7	40.3	39.0
	Coarse Cereals	32.7	19.9	23.4	0.3
	Pulses	20.5	9.5	15.1	32.2
	Cash Crops	6.9	5.0	7.3	16.1
	Others	14.9	16.9	13.8	12.5
	GSA	100	100	100	100
		(76231)	(230829)	(425258)	(364500)
Dry	Rice	4.5	13.3	24.0	28.5
	Coarse Cereals	53.6	52.4	16.2	0.4
	Pulses	13.0	12.0	21.2	21.9
	Cash Crops	24.9	10.5	8.4	17.1
	Others	4.0	11.8	30.2	32.1
	GSA	100	100	100	100
		(170049)	(429903)	(394822)	(569250)

Note : Figures in parentheses are the respective totals of gross sown area in acres.

Source : Same as in Table 4.

In the dry taluks, the area under paddy cultivation increased from 4.5 to 28.5 per cent between 1902-3 and 1992-93. About 50 per cent of GSA area was under the coarse cereals till 1930-31 (Table 8). By 1992-93, coarse cereals almost disappeared. The share of cash crops had been fluctuating over the years perhaps due to the risk involved. The cropping pattern in dry taluks diversified over time in contrast to that of the delta taluks.

In sum, delta taluks specialising in paddy cultivation exhibited the characteristics of commercialisation of agriculture from the early 20th century.⁵ The dry taluks, which predominantly had coarse cereals and low value crops, suggested a more subsistence-based agriculture. However, the dry taluks were shifting from the low to high value crops over time though they were far behind the delta taluks.

Conclusion

In conclusion, during the colonial period, the delta taluks had a clear-cut edge over the

moderate and dry taluks in terms of cropped area, irrigation, type of irrigation and cropping pattern. Even though, the moderate and dry taluks improved their conditions in agriculture over time in terms of cropped area, irrigation and cropping pattern, they still lagged very much behind delta taluks. However, the gap diminished during the post-colonial period due to state intervention by way of its emphasis on minor and lift irrigation projects in moderate and dry taluks. During post-1983 period subsidised power to agriculture acted as a catalyst in the development of agriculture in moderate and dry taluks. The subsidised power also contributed to a shift in the source of irrigation from tank to well irrigation in moderate and dry taluks. Last but not the least, this article emphasises the importance of probing into historical and contemporary aspects of a region in understanding development issues and locating reasons for patterns of spatial inequalities. Such a prelude of probable agents of change in a regional perspective is important while undertaking a detailed micro-level analysis.

Notes

1. Administrative sub-division of district. Taluk is also referred as 'taluka' or 'taluq'.
2. Mandal' is a revenue-cum-developmental administrative unit of a district, comprising on an average about 25 villages.
3. In the two southern taluks of Manrgood and Chillumbrum of South Arcot district, it was found that due to the neglect of repair works of lower Coreloon the annual revenue collections for the period 1824-1834 declined from ₹ 2,00,000 to ₹ 1,24,000 (GOM, 1852 : 115).
4. The studies conducted in Nagarjuna Sagar region aimed at looking at the situation before and after the construction of the dam revealed that the economic benefits accrued to command areas of the project while the non-command areas noticed no significant changes. Assured irrigation ensured inter-sectoral linkages in the command areas and thus led to development of agriculture (Prasada Rao and Mohana Rao, 1984; Hanumantha Rao, 1985). These studies have also pointed out that the region witnessed spatial inequalities in terms of yields and agricultural modernisation between the command and non-command areas of the project.
5. Rao (1985) has traced the commercialisation process of the Krishna-Godavari Deltas and highlighted the specialisation in paddy cultivation by the early twentieth century; paddy was grown for the market rather than for home consumption.

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