INDIA'S AGRICULTURAL DEVELOPMENT: A REGIONAL PERSPECTIVE

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1. INTRODUCTION

Regional differences in growth performance have always attracted considerable attention in academic writing as well as in popular imagination. The fact that different regions and nations have followed different growth trajectories is a stylised fact in development economics. What is perhaps more serious is the consideration that such diverse trajectories has resulted in widening the gap between regions in terms of economic and social opportunity of their people. Hence, we need to look closely at how regional differences shape *regional inequalities* and result in growth processes that are polarising, exploitative and undesirable. While some regions have seen substantial improvements in living standards, backwardness is still concentrated in a few regions. While the indicators of the levels of living in some southern states like Kerala and Tamil Nadu are comparable to many developed countries, those in large, densely populated, northern states like Uttar Pradesh, Rajasthan, Odisha and Madhya Pradesh are closer to that of the poorest parts of the world, such as sub-Saharan Africa (Shankar and Shah, 2012). The concern is also often expressed in scholarly literature that regional inequality in India (in fact, all over the world) has been increasing in recent years and that regions which are already unequal in terms of poverty, income levels, consumption expenditure and access to basic services have further drifted apart over time. To bridge this gap, governments have periodically formulated various policies and direct public investment as an instrument to remedy the situation.

In this paper, we attempt to provide an overview of the regional differences in agricultural growth during the last four decades (1962-2008), using datasets compiled by GS Bhalla and G Singh (2012). Using this data and clubbing district units into broad agrarian regions within each state, we attempt to examine what are the key drivers of regional differentiation in India, the question asked by the first generation of development economists in India (Bharadwaj, 1982). Given the growing tendency for bigger states to break up into smaller units and the growing prominence of the so-called "regional parties" in national politics, we would argue that re-opening this classical question is of immense contemporary relevance. The paper is divided into four sections. In the first section, we provide a few general considerations to show how regional differences go way back into history. In the second section, we provide an overview of the contrasting experiences of agricultural growth across regions. In the third section, we follow a few selected regions in detail to understand the dynamics of change within the rural economy. In the fourth and concluding section, we bring together some of the results of the previous section to bear upon analysis of and policy on regional inequalities in India.

2. REGIONS IN INDIAN HISTORY

Regional identities were already fairly formed in different parts of what we now know as India even before colonialism. These regions were defined by their territoriality, geographical boundaries, agro-ecological settings and administrative control by the state. Through the interaction between the physiography and social processes, regional identities got crystallised towards the end of 18th century. Within each region, unique configuration of social classes, caste groups, production technology, commodity movement, labour circulation, state formations and cultural exchanges developed. For example, in some regions, crops such as cotton, tobacco and sugarcane were grown fairly extensively even before the advent of British rule, since they commanded a higher price compared to that of foodgrains (Raj, 1985). As Dharma Kumar has shown, the system of wage labour existed even before the colonial rule, with the big peasants cultivating their holdings based on wage labour drawn from the "menial castes", estimated at between a fifth to a quarter of the rural population at that time (Kumar, 1965). Various forms of agricultural labour prevailed in South India ranging from free wage labour to absolute and complete slavery. Clearly, there were sharp differences between regions in these key features.

Colonialism encountered these and selectively conquered and integrated regions into its fold. While doing so, the structure of the society that underlay the regional systems were also largely reconstituted. The changes were brought in through a) changes in land tenure and creation of private property on land; b) introduction of new technologies such as railways; c) opening up new markets; and d) public investment in irrigation. The impact of these varied across regions and different social classes responded to it differently. For instance, the regional distribution of public investment in irrigation was markedly uneven, with the "canal colonies" of Punjab receiving substantially higher amounts compared to the Eastern UP (Bharadwaj, 1982). Ludden describes that from here onwards two contradictory movements are visible, especially in the rural areas: first, that which selectively integrates different regions to the global economy through commodity chains and markets (what has been termed as the "commercialisation of agriculture"), thereby strengthening regional identities; and second, that integrates these by drawing them together into one national fabric and national identity, thereby breaking down regionalism.

This dual process is also visible in the snapshot picture of regions around 1930, developed by Daniel Thorner (Thorner, 1996). Considering the importance of this classic work, I feel Thorner's atlas of the ecological and agrarian regions of India could be the starting point of the study of agrarian regions in India. Though he primarily demarcated agrarian regions in terms of "topography, water supply, crop system, land system and general economic development", Thorner was quick to point out that the relationships among people, resources, the market and the state are at the core of the "agrarian problem". Physical space provides the *terra firma* in which these relationships are built and changed over time. Thorner also insightfully points out that by comparing these regions, defined as physical spaces, over

time with the original snapshot, we could get an idea how the dynamics of change has operated within each region. In Section 3, we will adopt this comparative method.

In the post independence period, the developmental state undertook the mission of balanced regional development. Public investment was seen as one of the principal vehicle for homogenisation of regions and transforming the rural areas. The state also passed legislations for changing outmoded rural institutions such as land tenurial relations (land reforms) and committed itself to re-structuring rural society on new principles ("community development"). The growing consolidation of the national market and the rising power of the national capitalist class were the key drivers in homogenisation.

Processes of democratisation and social movements from the margins for equality and rights overturned old hierarchies and thus also strived towards a more inclusive society. But, interestingly, the same set of factors can also be seen in specific regional contexts, working in the opposite direction, contributing creating more regional differentiation. It is well-known that public investment flows often accentuated pre-existing regional differences by discriminating between regions. For example, the "tribal areas" of the North East consolidated as a region with this differential flow of public investment. Public investments in irrigation discriminated between hills and valleys, rain-fed and irrigated agriculture and hilly, rain-fed regions again emerged as pockets of backwardness. Democratisation led to identity politics and consolidation of regions around identities created on the basis of caste and community. This created region-specific dynamics of inclusion and exclusion.

The need to speak of typology of regions follows from this. First, regional identities seem to survive homogenisation efforts of the developmental state. They also at times re-assert strongly in the form of demand for a separate nationhood (North East) or statehood (Jharkhand, Chhattisgarh, Telangana, Vidarbha) (Tillin, 2014). Second, the pace of rural transformation is uneven across regions and the same set of factors produce different results depending on the initial conditions. Regional differences are closely linked to the processes of accumulation within each region, its natural resource endowments and the social relationships of power, domination and resistance. For policy, it is important to be tuned to these regional typologies for the obvious reason that the approach of 'one-size-fits-all' will not work. However, the reason perhaps not so obvious is that as much as policies make regions, regions make policies as well. Emergence and consolidation of new regions requires changes in policy to accommodate their needs and aspirations. New regions also force old policies to be imagined in different ways. For example, when public procurement and price support policies are extended outside the Green Revolution areas (Punjab) to rainfed areas (Madhya Pradesh), this necessarily implies that the policy has to be re-imagined to suit the new context. Moreover, the dynamics of transformation of regional typologies show operation of the underlying power structure and social relations which contribute to making and unmaking of policies. Hence, policy change can be seen as an outcome of these forces acting together and acquiring strong political articulation.

Further, while there are some observable differences in regional characteristics, many of these seem to be moving in tandem. Since available data is organised in terms of administrative units like districts, we take these as our basis for calculations as well. Scanning the data on 613 districts for which information is available from different sources, we find that 59 of these (9 per cent) are highly urbanised and hence do not give a clear idea of the processes of rural change. In the remaining 554 "rural" districts (with rural population >60%), we observe some common features:

- Districts with a higher irrigation percentage have high land productivity, high share of urban population, higher proportion of the work force engaged in non-farm occupations, high proportion of non-food crops in their cropping system, higher female literacy and lower share of SC+ST population in total population.
- Districts with higher share of rural work force in total (i.e., with less non-farm employment) are associated with those with less irrigation, lower land productivity, low female literacy and a higher concentration of SC+ST in total population.
- Districts with relatively greater incidence of SC+ST population are associated with those which have lower urbanisation, less irrigation, lower land productivity, less diversified cropping pattern and somewhat lower female literacy.

A spatial mapping of the districts would reveal their spread across regions. Districts with more urbanisation and greater diversity in employment are more likely to be found in the northwest, south and some parts of western India. Districts with less urbanisation, lesser diversity in employment, lower land productivity and less irrigation are clustered in the central, east and north east regions. Within these, the tribal regions with low irrigation and land productivity are concentrated in central and eastern regions.

3. AGRARIAN REGIONS: A COMPARATIVE PICTURE

We now compare the performance of different regions within India in terms of agricultural development. We have the long period dataset compiled by GS Bhalla and G Singh (2012). In this dataset, the original district boundaries as at early 1960s are kept constant and the current districts are re-configured to these original districts. The dataset estimates triennium averages of crop area, irriaged area, value of production, agricultural workers and inputs (fertilisers, pumpsets and tractors) over the period spanning 1962-65 to 2005-08. The value output calculations are made taking into account the area and production of 35 major crops at constant 1990-93 prices. This methodology has the advantage of allowing overtime comparisons in agricultural growth across districts and states in India. However, it has several limitations. First, it takes into account only 35 major field crops (covering roughly 90-95% of the gross cropped area) and hence is likely to be biased against districts which have sizeable area under tree crops and plantations. Second, this dataset excludes some districts, most notable being the north east states other than Assam. Third, it does not take into account the value of livestock production, which is increasingly becoming

an important source of value in rural India. Fourth, the use of constant price ignores the effect of relative price movements, which again could be a major contributor to growth in many parts of India (the paper will discuss more on this later). Even with all these limitations, this dataset still remains an important source for over time comparison of agricultural growth in India.

In this paper, we have tried to identify agrarian regions, broadly defined as groups of districts sharing common topographic, agro-climatic, social and economic characteristics. For the purpose of identifying regions, we have made use of the classification of states into NSS regions (NSSO, 2012), without strictly adhering to the NSS grouping of districts[1]. This breaking up the states into 54 relatively homogenous groups of districts helps arrive at some aggregate features of the development process at a considerably higher level than that of the district. Annexure 1 gives the details of the regions with region codes (derived from not strictly comparable to the NSS region codes) and the current districts included in each region.

The analysis of agricultural productivity, value of production and other variables was carried out at three time points, 1962-65, 1980-83 and 2005-08. Table 1 presents the list of regions with relatively high agricultural land productivity[2] at three time-points.

TABLE 1

COMPARATIVE PRODUCTIVITY LEVELS (RS/HA) OF AGRARIAN REGIONS

A. RANKING OF REGIONS, 1962-65			
Rank	**Region Code**	**State-Region**	**Productivity (Rs/Ha)**
1	322	KERALA – SOUTH	11462
2	321	KERALA – NORTH	10352
3	181	ASSAM – EAST	8289
4	331	TN – COASTAL	6880
5	291	KTAKA – COASTAL	6857
6	332	TN – SOUTH	6532
7	333	TN – INLAND	6392
8	182	ASSAM – BARAK VALLEY	6085
9	281	AP – COASTAL	5548
10	32	PUNJAB – SOUTH	5490
B. RANKING OF REGIONS, 1980-83			
Rank	**Region Code**	**State-Region**	**Productivity (Rs/Ha)**
1	322	KERALA – SOUTH	12074
2	321	KERALA - NORTH	10930

[1] In addition to being too detailed, the NSS regional classification also creates problems as the definitions keep changing between successive rounds of NSS. Hence, we have used the grouping into regions as per the latest NSS survey and clubbed districts accordingly.

[2] Agricultural land productivity refers to the value of production per hectare, which is derived by dividing the value of production of 35 crops with the cropped area under 35 crops in each region.

3	291	KTAKA – COASTAL	10302
4	32	PUNJAB- SOUTH	10009
5	181	ASSAM - EAST	9684
6	333	TN – INLAND	9633
7	31	PUNJAB- NORTH	9227
8	331	TN – COASTAL	8661
9	95	UP - HIMALAYAN	8471
10	12	J & K VALLEY	8461
C. RANKING OF REGIONS, 2005-08			
Rank	**Region Code**	**State-Region**	**Productivity (Rs/Ha)**
1	322	KERALA – SOUTH	21911
2	333	TN – INLAND	21793
3	321	KERALA – NORTH	21214
4	244	GUJ – SAURASHTRA	15795
5	291	KTAKA – COASTAL	15786
6	331	TN – COASTAL	15630
7	32	PUNJAB – SOUTH	15262
8	332	TN – SOUTH	14329
9	281	AP –COASTAL	13726
10	31	PUNJAB - NORTH	13542

Source: Calculated from Bhalla and Singh, 2012

What is striking about the above table is that many region names seem to be repeating at the top of the productivity ranking table. In fact, there are at least 6-7 regions out of 10 regularly seem to appear among the top 20% of high productivity districts during the 45 year period under consideration. The same holds true at the bottom of the hierarchy as well (Table 2).

TABLE 2

Best and Worst Agricultural Regions in terms of Agricultural Land Productivity

AGRICULTURAL PRODUCTIVITY - BEST REGIONS (TOP 20%)				
	STATE	**1962-65**	**1980-83**	**2005-08**
1	KERALA	KERALA - SOUTH	KERALA - SOUTH	KERALA – SOUTH
		KERALA - NORTH	KERALA - NORTH	KERALA – NORTH
2	TAMIL NADU	TN - COASTAL	TN - COASTAL	TN – COASTAL
		TN - INLAND	TN - INLAND	TN – INLAND
		TN - SOUTH		TN - SOUTH
3	ANDHRA PRADESH	AP - COASTAL	AP - COASTAL	AP – COASTAL
4	KARNATAKA	KARNATAKA - COASTAL	KARNATAKA - COASTAL	KARNATAKA – COASTAL
5	MAHARASHTRA	MAH - KONKAN		
6	ASSAM	ASSAM - EAST	ASSAM - EAST	
		ASSAM - BARAK VALLEY		

			PUNJAB - NORTH	PUNJAB – NORTH
7	PUNJAB		PUNJAB - SOUTH	PUNJAB – SOUTH
8	UP		UP - HIMALAYAN	
9	GUJARAT			GUJARAT – SAURASHTRA
AGRICULTURAL PRODUCTIVITY - WORST REGIONS (BOTTOM 20%)				
		1962-65	**1980-83**	**2005-08**
		RAJ – WEST	RAJ - WEST	RAJ – WEST
		RAJ - NORTH	RAJ - NORTH	RAJ – NORTH
1	RAJASTHAN	RAJ - NORTH EAST		
2	GUJARAT	GUJ - DRY AREAS		
		MAH - MARATHWADA	MAH - MARATHWADA	MAH - MARATHWADA
3	MAHARASHTRA	MAH - VIDARBHA	MAH - VIDARBHA	
		MP - MADHYA BHARAT	MP - MADHYA BHARAT	MP - MADHYA BHARAT
		MP - VINDHYACHAL	MP - VINDHYACHAL	MP – VINDHYACHAL
			MP - MALWA	
	MADHYA PRADESH		MP - NARMADA	
			MP - MAHAKOSHAL	MP – MAHAKOSHAL
4			MP - CHHATTISGARH	MP – CHHATTISGARH
5	KARNATAKA	KARNATAKA - NORTH		
6	J&K	J&K – HILLS		J&K – HILLS
				BIHAR – NORTH
7	BIHAR			BIHAR – SOUTH

The shaded cells in the above table shows regions which are repeated across time points selected. At the bottom of the productivity chart, again, as many as 6-7 regions out of 10 are common between the different time points. The relatively unchanging (or slow-changing) ranking of regions in terms of their land productivity probably shows the effect of the initial conditions of the region on its future growth prospects. What this would mean is that the better you are at the starting point, the better you are likely to perform and vice versa.[3] This, however, needs more careful analysis.

This, by no means, is the whole story. What is even more interesting is that there is another group of regions which have been in the low productivity category for a long time but which have now managed to break out of that group. They have managed to raise levels of both the value of production as well as productivity per hectare of land cultivated. Along with them, the regions which have grown slowly is also provided. Not surprisingly, most of these slow-growing regions still figure in the list of "Worst Regions" given above. The list of both sets of regions is given in Table 3.

[3] The latter, indeed, is the familiar story in development economics of the "low level equilibrium trap" and the need for a "big push" to get out of this trap. The experience of backward regions in India bears witness to the distilled wisdom of this insight.

TABLE 3

RATE OF GROWTH OF PRODUCTION AND PRODUCTIVITY IN AGRARIAN REGIONS, 1962-2008

1. RELATIVELY FAST GROWING REGIONS				
State	**Region Code**	**Region**	**Rate of Growth % p.a.**	
			Value of Production	**Productivity (Rs/Ha)**
Gujarat	243	DRY AREAS	4.23	3.99
Andhra Pradesh	282	TELANGANA	3.53	3.47
Gujarat	244	SAURASHTRA	3.84	3.43
Rajasthan	84	NORTH	3.96	3.13
Tamil Nadu	333	INLAND	2.32	2.89
Haryana	62	WEST	3.67	2.79
Rajasthan	81	WEST	3.76	2.79
Haryana	61	EAST	3.67	2.53
Rajasthan	82	NORTH EAST	3.12	2.49
Punjab	32	SOUTH	3.69	2.41
2. RELATIVELY SLOW GROWING REGIONS				
State	**Region Code**	**Region**	**Rate of Growth % p.a.**	
			Value of Production	**Productivity (Rs/Ha)**
Bihar	102	CENTRAL	0.93	1.40
Odisha	211	COASTAL	1,12	1.29
Assam	182	WEST	1.66	1.28
Bihar	103	SOUTH	0.77	1.20
Uttar Pradesh	94	SOUTH	1.75	1.14
Madhya Pradesh	231	VINDHYACHAL	1.89	1.03
Odisha	212	SOUTH	1.59	0.98
Assam	182	BARAK VALLEY	1.44	0.91
Bihar	101	NORTH	0.97	0.88
J&K	12	JK VALLEY	(-) 0.55	0.81

Source: Calculated from Bhalla and Singh, 2012

This list of fast growing regions is interesting not only because it includes many of the hither-to backward regions but also because most of these regions have exhibited dynamism only in recent years, especially after 1990. The strong push given by the state governments could have been one of the major reasons behind their growth. This would apply especially to regions located in states with significant share of rainfed agriculture, such as Rajasthan, Gujarat, Andhra Pradesh and Tamil Nadu (Planning Commission, 2013).

Before moving further, it is instructive to check how these "best" and "worst" regions listed above (in terms of land productivity) fare in terms of their levels of consumption expenditure and rates of poverty (Dubey & Srivastava, 2007; Mishra, 2014). The results show that many of the low productivity regions also are low in terms of their Monthly per

Capita Consumption Expenditure (MPCE) and poverty ratios, there is no one-to-one overlap between these groups[4]. This indeed shows that the conclusions drawn only on the basis of agricultural productivity could be wrong, especially in recent years non-farm incomes have been contributing a significant share of household incomes even in rural areas (IHDS, 2010). In fact, the separation of the rural and the agricultural is particularly visible in the more advanced of the agrarian regions rather than in backward agrarian regions (Section 2 above).

To understand the dynamic factors contributing to agricultural growth and structural changes (or the lack of them) in these regions, we need to carefully follow each specific region and understand their growth trajectory. We intend to take up this question in the following section.

4. AGRARIAN REGIONS: PATHWAYS OF CHANGE

4.1. Telangana

Canal irrigation has historically been concentrated in the Coastal Andhra region within Andhra Pradesh. This had led to severe irrigation inequality within the state. For instance, in 1962-65, 60% of Andhra Pradesh's irrigated area was in Coastal Andhra region, compared to 27% in Telangana region (Vakulabharanam, 2004). The picture has completely changed with the growth of groundwater irrigation in Telangana region. As a result, by 2005-08, 48% of the cropped area in Telangana was irrigated. Nearly two third of this irrigation in Telangana was sourced from groundwater. Share of Telangana in total irrigated area of Andhra Pradesh went up to 40%. Along with this, there was a shift in the cropping pattern away from millets and pulses towards paddy, cotton and other high value crops. Along with the rise of irrigation, cropping pattern in Telangana has been dominated by crops which have a strong market component. In 2005-08, Telangana contributed nearly 40% of the total value of output of Andhra Pradesh, compared to 27% in 1962-65 (Bhalla and Singh, 2012).

The adoption of new agricultural technologies such as seeds and irrigation equipment had a strong caste base in Telangana (Motiram and Vakulabharanam, 2014). They argue that the exodus of traditional upper caste elite from rural Telangana, emergence of the TDP and creation of mandal administrative structures created a strong OBC consolidation in the Telangana rural areas. This group was able to improve agricultural growth signifi cantly, with the green revolution and tube well irrigation up to late 1990s. The caste composition of this community of groundwater irrigators (middle peasants who were mainly OBC) in Telangana is different from that in Coastal Andhra (traditional dominant castes). While groundwater thus raised agricultural growth in Telangana and contributed to further strengthening the regional identity (finally leading to the formation of a separate state in 2014), this growth has also been 'immiserising' in nature. Telangana witnessed enormous agrarian distress,

[4] For example, in 2009-10, Inland Tamil Nadu among the high agricultural productivity regions had a low MPCE level whereas Northern Rajasthan, among the low productivity regions had a comparatively higher MPCE level. Income from non-farm activities like construction sector and remittances from migrants may have contributed to this.

manifested in a large number of farmer suicides that started in the late 1990s and continuing even now. The distress is associated on the one hand with the dominance of informal credit in the rural economy and, on the other, with increasing market orientation of agriculture.

4.2. Saurashtra, Gujarat

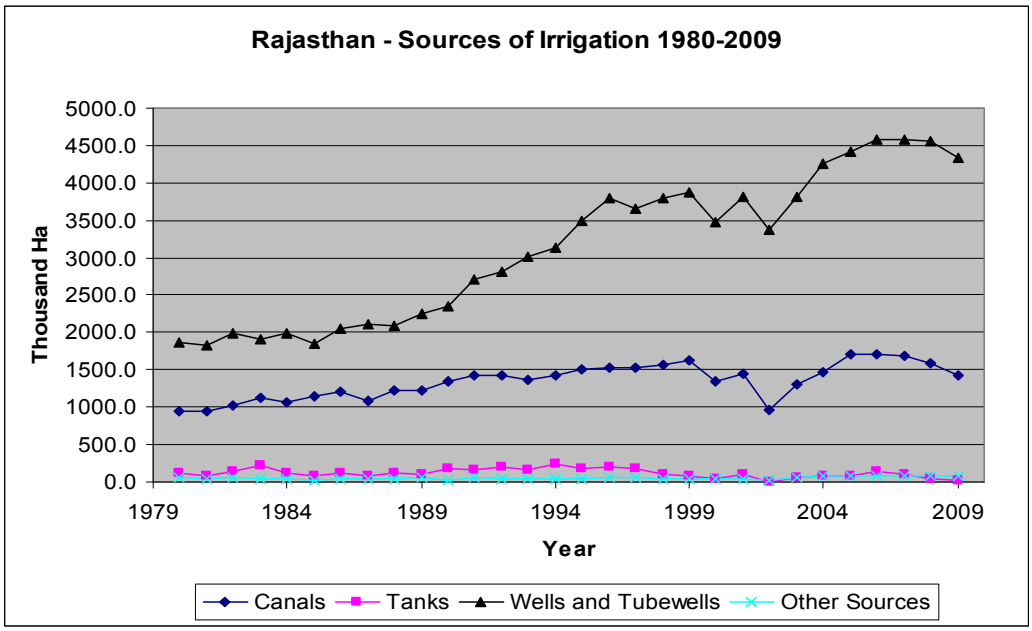
For many years, Saurashtra in Gujarat was one of the poorest regions of India. The region was ruled by 200 odd princely states till independence. The rule of regressive institutions continued even afterwards, with much of the region being under zamindari land tenure system with myriad intermediaries between the government and peasants (Shah, 2014). Only about 15% of the cropped area of the region was under irrigation in 1990. As late as 1991, Saurashtra has been described as part of the Poor Periphery surrounding the rich heartland in Gujarat (Patel, 1991). However, within a decade, agricultural growth picked up in the region and it has become one of the main agricultural growth centres of Gujarat. The average value of production per cropped area went up by three times between 1990-93 and 2005-08. This change has been brought about by several factors. Being a semi-arid region, agriculture in the area is possible only with considerable state support to irrigation and infrastructure development. The region had one of the largest water conservation programmes in India, with considerable state support. The Sardar Patel Sahbhagi Jal Sanchay Yojana reportedly liberally helped village communities in constructing hundreds of thousands of community-managed groundwater recharge structures for recharge of groundwater. Equally important, the region seems to have also benefited from the electricity reforms under Jyotirgram Yojana, where feeders supplying power to borewells and domestic use have been separated. Between 2000-01 and 2007-08, though the number of groundwater wells and tube wells in Saurashtra registered no major increase, the gross area irrigated by groundwater wells increased nearly three times (Shah, 2014). Active state support is also visible in the promotion of cash crops like cotton, chillis, cumin and vegetables. Price support to cotton and other crops has helped shift the terms of trade in favour of agriculture, giving a further boost to the agrarian economy. While these claims are yet to be validated through systematic research, it is indeed true that agricultural growth in Saurashtra has picked up in recent years and has changed the region considerably. Like in the case of Telangana, the middle peasantry (patidars) seems to have been at the forefront of agrarian transformation of this region.

4.3. North and North West Rajasthan

Rajasthan has for very long been part of the BIMARU category of states. Over 2/3rd of the state is desert; 60 per cent of India's desert blocks are in Rajasthan. Agriculture in the state comprises crop-livestock mixed farming system for livelihoods. But even with such a harsh and arid-semi arid landscape, many parts of Rajasthan, especially the north and north east regions, have moved into a vibrant agrarian economy based on food grains, oilseeds and dairying, between 1995 and 2010. The northern region of the state (comprising Hanumanthgarh, Ganganagar and Sikar districts) benefited from the Indira Gandhi Nahar Project (IGNP). Nearly 70% of the area in Hanumanthgarh and Ganganagar is irrigated from

IGNP. The major reason for rapid agricultural growth in rest of the state seems to be an aggressive exploitation of groundwater. Groundwater accounts for about 75% of the net irrigated area in Rajasthan as a whole. The rapid growth of groundwater irrigation in Rajasthan is shown in the graph below (Graph 1).

Graph 1



Source: Indian Agricultural Statistics, various issues

The data periodically compiled by the Central Groundwater Board (CGWB) provides information on the annual recharge of groundwater and annual extraction rates. A comparison of the CGWB estimates from 1995 to 2009 show that the groundwater balance has alarmingly worsened in Rajasthan (CGWB, 2009). The Stage of Groundwater Development (ratio of annual groundwater extraction to annual replenishment) fell alarmingly from 59% in 1995 to 135% in 2009, indicating that the state is in the "overexploited" category. Of the 236 blocks in the state, 164 (69%) were in this category in 2009 (Table 4 & Map 1). From the map we can see that excepting the north region (irrigated from surface water) and the extremely arid western region, rest of the state is intensively exploiting its water resources leading to severe sustainability issues.

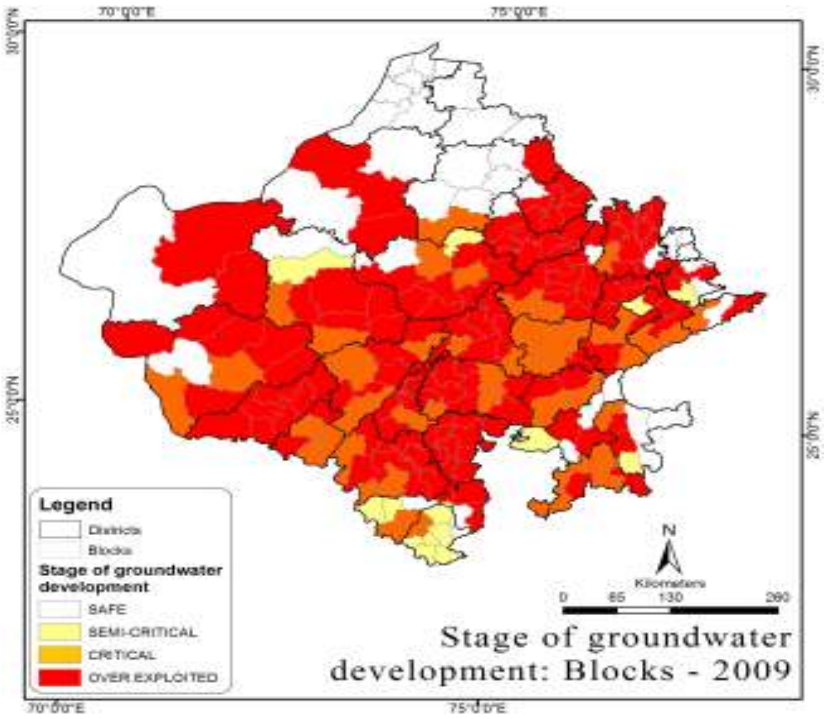
TABLE 4

Estimated Volume of Groundwater Resource (BCM), CGWB Data

		1995	2004	2009
RAJASTHAN				
1	Gross Groundwater Recharge	13.16	11.56	11.86
2	Irrigation	9.09	11.60	12.86
3	Domestic and Industrial	0.70	1.39	1.65
4	Gross Draft (2+3)	9.78	12.99	14.52
5	Groundwater Balance (1-4)	3.38	(-) 1.43	(-) 2.66

6	Level of GW Development (4/1)	59	125	135

MAP 1: OVEREXPLOITED BLOCKS OF RAJASTHAN



4.4. Malwa Region, Madhya Pradesh

The Malwa region in Western Madhya Pradesh is located in a comparatively low rainfall regime, with an annual rainfall of 800 mm. Since this region has hardly any large perennial streams, groundwater is the backbone of Malwa's agrarian economy, accounting for 85% of the gross irrigated area. Open dugwells and tanks have traditionally been the modes of irrigation in this area. In 1970-71, the cropping pattern of this area was dominated by rainfed crops with only 6% of the gross cropped area under irrigation. It was largely millet and pulses-growing area, with jowar, red gram and cotton as the main crops. The region has deep black soils which allowed raising an unirrigated wheat crop after keeping the land fallow in kharif. Compared to traditionally wheat-growing areas of Narmada valley, the productivity of agriculture on the whole was low. Agriculture in Malwa region underwent a dramatic transformation with the introduction of tube wells in early 1980s. The growth of groundwater structures (dugwells and tubewells) over successive Minor Irrigation censuses is given in the table below (Table 5).

TABLE 5

Number of Groundwater Structures ('000) used in Irrigation in Malwa Region, 1986-2011

MI Census	Year	Dugwell	Shallow Tubewell	Deep Tubewell	Total	Annual Rate of Growth

						%
1st Census	1986-87	272.93	11.84	2.06	286.82	--
2nd Census	1993-94	386.10	65.04	8.30	459.44	6.06
3rd Census	2000-01	438.84	129.50	15.47	583.80	3.48
4th Census	2006-07	445.37	134.77	26.65	606.79	0.65

Source: MoWR, Report of Minor Irrigation Census, various years

There are, on an average, 18 groundwater structures per 100 hectare of net sown area in Malwa in 2010-11. As the table shows, the most remarkable fact to be noted is the expansion in the number of tubewells. In 1986-87, the whole of Malwa region had about 13000 tubewells used for irrigation purposes, which went up to 75000 by 1994 (2nd Minor Irrigation Census) and stood at 1.61 lakh tube wells in 2010-11 (4th Minor Irrigation Census). With such intensive tapping of groundwater, cropping intensity (Gross Cropped Area / Net Sown Area) in the region rose from 109 in 1970-71 to 166 in 2010-11 and area under irrigation recorded a nine-fold increase. Nearly 33% of the gross cropped area is currently irrigated, mostly from groundwater. There has also been a substitution of un-irrigated and low irrigation-intensive varieties with high irrigation-intensive varieties in wheat and chickpea, the two main irrigated crops. Nearly all of the wheat in Malwa is irrigated and half the area under chickpea also needs irrigation. Therefore, the expansion in irrigated area has been accompanied by a rise in the "irrigated delta" or depth of irrigation. The combined result has been a larger scale of groundwater withdrawal[5].

Along with expansion of irrigation, the land use pattern of the area underwent a radical change. Soybean was introduced in the area as a new crop in early 1980s and was heavily promoted with state support in the area. The mechanism of minimum support price was utilised to promote the crop and industries were encouraged to set up processing facilities in towns like Indore, which created a ready market for the crop. Though soybean is a kharif crop grown without irrigation, its introduction coincided with the irrigation revolution in Malwa egion. This is because as a short-duration crop it facilitated cultivation of wheat as second crop even on soils which were otherwise kept fallow earlier. Due to the coincidence of these circumstances, Malwa region's diverse cropping system was replaced with an annual crop cycle of soybean-wheat. There is no doubt that rapid expansion of groundwater irrigation has raised agricultural productivity of Malwa in relation to the MP average (Bhalla and Singh, 2012) and made Malwa a relatively prosperous region. While raising the overall land productivity of Malwa region (and, of course, moving many small

[5] It is a mistake often made to put the entire burden of expansion of tubewell irrigation on private investment. While farmers may have invested in their own money in irrigation equipment, what indeed facilitated the expansion of such irrigation has been the public investment in rural electrification in the region. Electrification of villages in Malwa goes back to 1980s and seems to have preceded the introduction of tubewells.

and marginal farmers out of poverty), this cycle not only eliminated all other crops but put an enormous strain on the limited water resources of the region.

The social context of the region also supported adoption of new crops and new irrigation technologies. The average size of holdings in Malwa is bigger compared to other parts in Madhya Pradesh. The prominent landowning communities, mainly Rajputs, Gujjars and Patidars, who owned relatively large landholdings enjoyed political patronage and took to farming innovations in a major way. Among the regions of Madhya Pradesh, except North MP, Malwa has the least concentration of tribal population. Rich farmers in the region have fostered farmer organisations which strongly undertake lobbying for their demands with political parties and other fora.

In recent years, the state in Madhya Pradesh has been implementing a huge farmer support programme, which includes assured supply of inputs (including electricity) and massive public procurement of wheat. Madhya Pradesh has become the second largest contributor of wheat to the public procurement system, surpassing Haryana (Krishamurthy, 2014). With the strong nexus observed between electricity pricing, supply and groundwater as well as an assured market for groundwater-irrigated crops, it is likely that groundwater availability in the predominantly agricultural Malwa will further reduce.

4.5. And Those Lagging Behind…

We have discussed above a few agrarian regions which have been able to break out of their "low level equilibrium trap" and raise their agricultural productivity and record high rates of growth. A set of favourable circumstances have enabled this movement, which also have resulted the economy stretching the natural ecological limits at least in a few cases. The question would then arise as to why some other regions, equally poor and almost in a similar situation to those described above till a few years ago, have remained at that level. Detailed explanation would again require getting into the specific situation of each of these regions.

One general observation can be made that at least half of the currently "backward" regions have high incidence of tribal population (Bakshi, 2014)[6]. Examples of backward agrarian regions with high concentration of tribal population are: Jharkhand (Bihar South), Odisha South, Madhya Pradesh regions, Chhattisgarh and the North East region (even though they are not covered in this paper). "Being Tribal", hence, seems to explain at least 50% of the low productivity of agrarian regions in India. The unique feature of tribal demography in India is that outside the North East, most tribal communities live in district and sub-dsitrict units where they are a minority. This very distinctive 'enclavement' of the tribes is a result of long drawn out historical encounters involving the subjugation of the tribes by more dominant communities. This enclavement provides objective basis for the marginalisation

[6] This work is part of the re-working done by the Planning Commission for identifying criteria for ranking blocks in terms of their backwardness. This would enable them receiving additional support under the Backward Regions Grant Fund (BRGF). A complete list of the districts and blocks ranked on these criteria is available at www.planningcommission.org.

and exploitation of tribal communities through interlocked modes of exchange where commodity, credit and input markets are closely interlinked (Bardhan, 1989; Bardhan and Rudra, 1978; Olsen, 1996). These markets often function in a highly exploitative manner and become a vehicle for the exercise of power relations for surplus extraction (Bhaduri, 1983). We suggest that this model, initially proposed for backward agriculture in general, is still valid in the case of the tribal contexts that we encounter in backward regions of India.

Moreover, tribes have been driven over centuries, further and further away from the alluvial planes and fertile river basins to the "refuge zones"- the hills, forest, arid and semi arid tracts. The undeniable fact is that they do inhabit some of the harshest ecological regions of the country today and constitute a marginalsed and highly splintered vulnerable group without voice in India today. Even here, the search for valuable natural resources such as forests, minerals etc., lead to a new situation of extractive institutions coming up in tribal areas, supported by the state. This situation of state-supported "development by dispossession" led by corporate capital inevitably calls upon the resistance by the people, at times even with armed struggle. Many tribal dominated regions are in ferment now.

But this explains probably only half of the phenomenon of backwardness. The other half, in regions such as Bihar North, Uttar Pradesh South (Bundelkhand) or Uttarakhand calls out for a different explanation.

5. WHAT DOES ONE MAKE OF THIS?

Focusing on the agrarian regions below the state level, this paper has attempted to understand the factors contributing to regional differentiation and growing inter-regional inequalities in India. While the coexistence of these variables in spatial clusters is only indicative of the dynamic processes at work, greater empirical explorations are needed to unravel aspects of these transformations in specific contexts. Sensitivity to regional differences and growing regional inequalities and the way they shape and are in turn shaped by people's imagination and aspirations has a crucial bearing not only on development theory but also on democratic and inclusive growth. .

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