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Growth and Diversification Patterns in Indian Agriculture: District Level Analysis

K.J.S. Satyasai* and Sohan Premi

Department of Economic Analysis and Research (DEAR), National Bank for Agriculture and Rural Development (NABARD), Mumbai-400 051, Maharashtra

Abstract

This paper has examined the growth patterns across districts for different sectors and sub-sectors of agriculture using data on GDP at district levels. It has measured the extent of diversification across districts and has tested if there is convergence across districts. Covering a 13- year period from 2001-02 to 2013-14, the study has observed a significant increase in the average GDP level of a district in absolute terms as well as on per capita basis. The growth in livestock GDP per capita seems to have contributed to the growth and stability of the overall agriculture sector. A higher proportion of districts have registered higher growth rates over time. The proportion of resource-poor districts that have registered very high growth rates (12 % and above) is higher than that of better-off districts for GDP from sub-sectors. The shares of livestock and crop production in agricultural GDP have improved over time. There has been a decline in diversification levels over time across sectors as well as within the agriculture sector and the decline is statistically significant too. The better-off districts have shown a significantly higher level of diversification compared to the resource-poor districts. There seems to be beta convergence in GDP from different sectors/sub-sectors. Specifically, industry, agriculture, crop production, livestock and fisheries have shown convergence over time. Given the statistical significance of the intercept terms in all but a few cases, there seems to be conditional beta convergence which requires exploring other factors and interventions that need to be taken to induce convergence.

Key words: Growth pattern, convergence, agricultural diversification, GDP, per capita income, resource-poor districts, inter-sectoral linkages, India agriculture

JEL Classification: E01, O13, P24, P48, R11 and R12

Introduction

Inter-sectoral linkages and growth patterns have been of interest to researchers as well as policymakers as they help in finding which regions grew faster, which lagged behind and why. This understanding is valuable for policy and other interventions to push backward regions ahead on the development path. The literature is replete with studies on regional patterns in development across states and districts in the country. Most studies have analysed the regional pattern with state as the basic unit (Satyasai, 1992; Birthal *et al.*, 2011) while some studies have analysed the pattern based on district-wise data taking the value of output from agriculture (Bhalla and Singh, 2010, Chand *et al*., 2011). Studies covering growth and diversification patterns across sectors and sub-sectors of agriculture in a broad sense have not been much attempted due to lack of information on Gross Domestic Product at the district level. Such an analysis would answer questions like: How have the districts been distributed according to the shares of different sectors in their GDP? How many districts have achieved higher growth rates and how many need attention? What proportion of districts

* Author for correspondence
Email: dr.satya@outlook.com

have reported diversification across sectors and what proportion of them have attempted diversification within the agriculture across its sub-sectors? What patterns have been depicted by the service and industry sectors across districts? Whether there is a convergence across districts in respect of per capita income or not? This paper has attempted to answer a few such questions. More specifically, the paper has examined the distribution of districts according to levels of total GDP and per capita GDP, overall as well as sectoral level growth pattern across districts, extent of diversification within the agriculture sector as a whole and across broad sectors. It has also attempted to examine if the districts could converge on the per capita GDP.

Methodology and Data

A district being the basic planning and administrative unit in India, it is important to find the pattern in income levels and the growth thereof across districts. The analysis will also reveal which sub-sectors of agriculture grew faster and the pattern of this growth across the districts. 'Agriculture' in this study has been taken in a broader sense to comprise crop production including horticulture, livestock, forestry and fisheries sub-sectors. For a comparison at two end points in time, triennial averages have been used.

For this study, time series of GDP at district level for 13 years from 2001-02 to 2013-14 have been used for working out growth rates using the exponential form:

$$Y_t = Y_0 e^{rt} \quad \ldots(1)$$

where, Y_t and Y_0 are the GDP in the year t and the initial year, r is the growth rate, t is the time period, and e is the base of natural logarithm.

The diversification in the economy across agriculture, industry and services sectors or within the agriculture across sub-sectors has been measured as the difference of Herfindahl index of concentration from unity, using expression (2):

$$DI = 1 - \Sigma p_i^2 \quad \ldots(2)$$

where, DI is the diversification index across sectors and p_i is the share of each sector (sub-sector) in the total GDP (GDP from agriculture).

The resource-poor regions/districts may grow faster and catch up with the economically strong districts over time, as the literature on regional disparities suggests which is known as convergence (Villaverde and Maza, 2009; Birthal *et al*., 2011). There are two types of convergence, *viz*, beta convergence, which measures if economically weak regions grew faster to catch up with economically strong regions, and sigma convergence, which is a measure of inequality or dispersion.

In this paper, sigma convergence was measured by coefficient of variation (CV) which is the ratio of standard deviation to mean expressed in percentage. The beta convergence is measured using the following expression (Villaverde and Maza, 2009):

$$(1/T) \ln (Y_{ti}/Y_{0i}) = \alpha + \beta \ln (Y_{0i}) + \mu_i \quad \ldots(3)$$

where, Y_{ti} and Y_{0i} are GDP in the year t and the initial year, respectively, for the normal district, α is a constant and μ_i is the error-term; β is a coefficient representing convergence or divergence and T is the time period. If β in Equation (3) is negative, it indicates convergence. The speed of convergence, b, is given by Equation (4)

$$b = -\ln(1 - \beta T)/T \quad \ldots(4)$$

since

$$\beta = -(1 - e^{-bt})/T \quad \ldots(5)$$

The districts were classified into better-off districts and resource poor districts. The districts covered under the Desert Development Programme (DDP) or Drought Prone Area Programme (DPAP) and/or those with less than 30 per cent area under irrigation were classified as resource poor districts and the others as better-off districts.

We have considered the data for 610 districts of the country, excluding the metro cities and districts with zero or negligible GDP form agriculture. The data on district-wise GDP from different sectors were taken from the series calculated by *Indicus Analyticus* following the methodology adopted by the Central Statistical Organisation (CSO), Government of India. The series are in constant prices (2004-05 as base).

Results and Discussion

Level of GDP – District-wise Pattern

Table 1 gives the triennial averages of average GDP from different sectors and sub-sectors and the coefficients of variation. The overall GDP per district

Table 1. Average gross domestic product (GDP) and coefficient of variation (CV) across different sectors and sub-sectors, Triennial averages

Sector/ sub-sector	Average GDP (in million ₹ at constant prices)			CV (%)		
	TE 2003-04	TE 2013-14	Ratio of 2013-14 and 2003-04	TE 2003-04	TE 2013-14	Ratio of 2013-14 and 2003-04
Overall GDP	32249	73146	2.27	122	139	1.14
Industry	9148	20709	2.26	161	172	1.07
Service	16431	39843	2.42	141	161	1.15
Agriculture (including allied sectors)	6670	12593	1.89	83	92	1.11
Crop production	3871	7743	2.00	93	108	1.17
Livestock	1388	2990	2.15	95	114	1.19
Forestry	998	1191	1.19	86	79	0.92
Fisheries	413	669	1.62	323	341	1.05

Table 2. Average per capita GDP, overall GDP and sector-wise GDP, TE 2003-04 to 2013-14

Sector/ sub-sector	Average per capita GDP (in ₹ at constant prices)			CV (%)		
	TE 2003-04	TE 2013-14	Ratio of 2013-14 and 2003-04	TE 2003-04	TE 2013-14	Ratio of 2013-14 and 2003-04
Overall GDP	19668	37615	1.91	55	59	1.07
Industry	5579	10584	1.90	95	95	1.00
Service	10021	20423	2.04	57	63	1.11
Agriculture & allied sectors	4068	6608	1.62	72	81	1.13
Crop production	2361	4064	1.72	71	99	1.39
Livestock	846	1558	1.84	102	104	1.02
Forestry	609	626	1.03	269	230	0.86
Fisheries	252	360	1.43	163	166	1.02

grew 2.27 times, from ₹ 32249 million in TE 2003-04 to ₹ 73146 million in TE 2013-14. The coefficient of variation (CV) rose by 17 per cent points during this period from the initial level of 122 per cent. The GDP from agriculture in an average district almost doubled during the reference period. The crop production is the major sub-sector in agriculture followed by the livestock. In all the sectors/sub-sectors, except forestry, the CV increased.

Table 2 presents the average value of per capita GDP which is ₹ 37615 in TE 2013-14, just less than double the level of ₹ 19668 in TE 2003-04. The average per capita income from agriculture and allied sectors was ₹ 6608 in TE 2013-14, which grew 1.62-times the level in TE 2003-04 (₹ 4068). The major source of agricultural GDP is crop production which has shown the highest increase in dispersion, 39 per cent over the first triennium. This enhanced inequality was neutralized to a large extent by the per capita income from livestock sub-sector which maintained the same level of inequality across districts over the time period studied. The services sector GDP grew faster compared to all the sectors and sub-sectors in both absolute terms as well as per capita basis.

The distribution of districts according to per capita incomes from agriculture and crop production are plotted in Figure 1, which shows improvement in the distribution of income from agriculture and crop

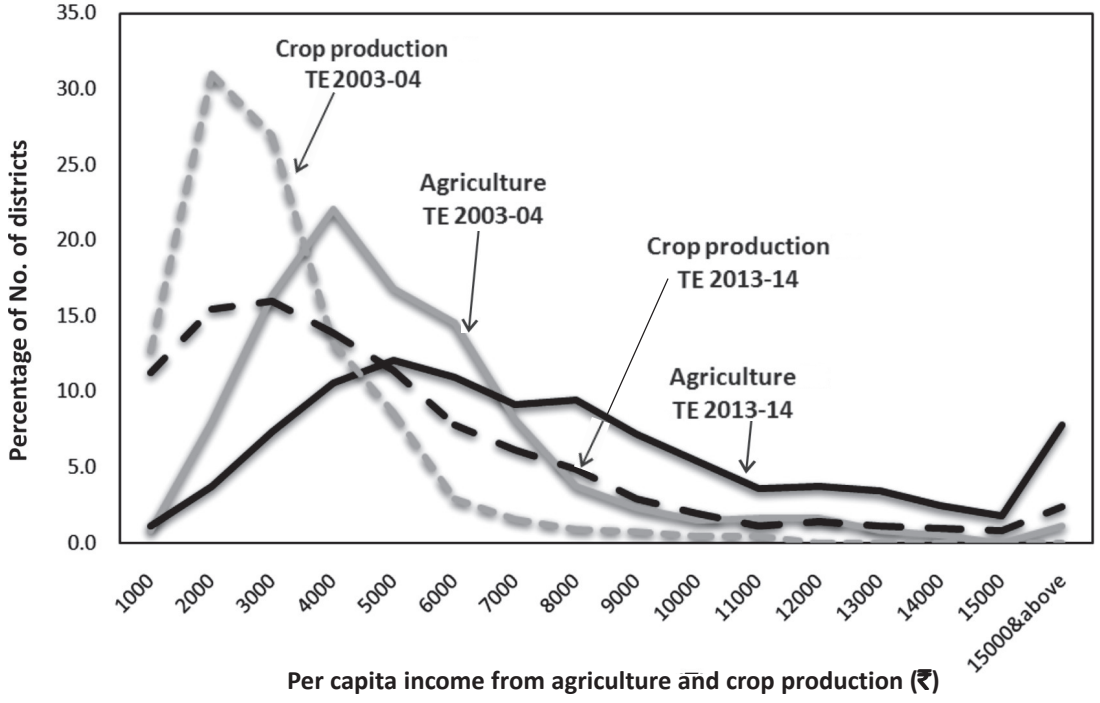

Figure 1. Distribution of districts according to per capita income from agriculture and crop production

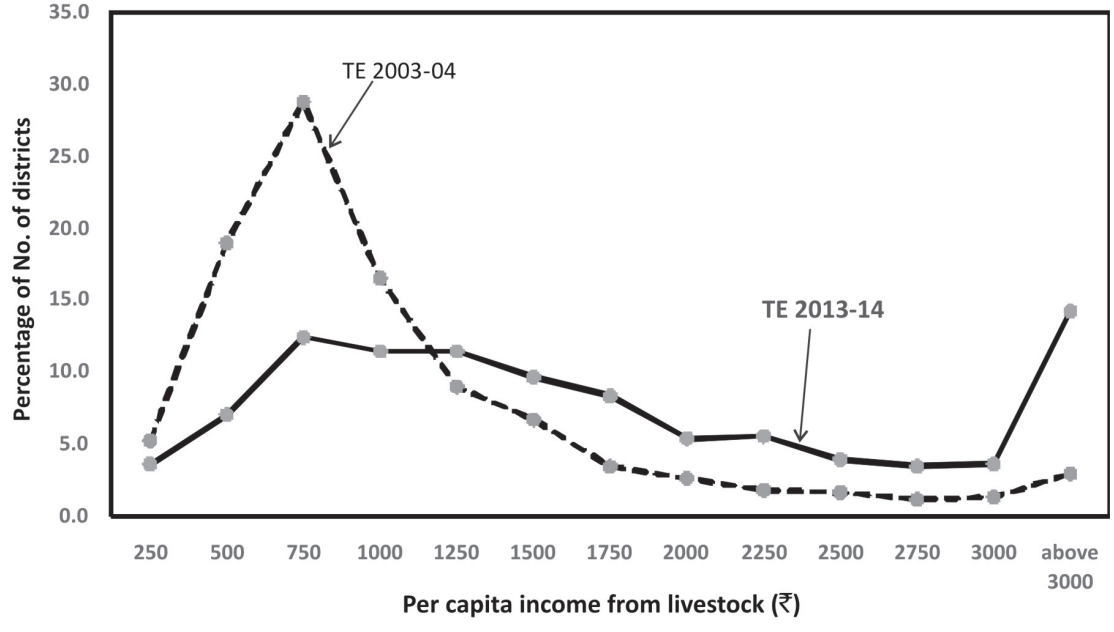

Figure 2. Distribution of districts according to per capita income from livestock rearing

production in the two triennia. The peak has shifted to the right in both agriculture and crop production, denoting that districts improved their per capita income levels relative to other districts. The modal value increased from ₹ 4000 (22 % districts) to ₹ 5000 (11 % districts) for agriculture and ₹ 2000 (30 % districts) to ₹ 3000 (16 % districts) for crop production.

The distribution of per capita income from livestock too has shown a similar pattern (Figure 2). The modal value for per capita income from livestock, however, remained ₹ 750. In the first triennium, about 29 per cent districts had per capita income of ₹ 750, while the proportion was mere 12.4 per cent districts in the second triennium. During the second triennium,

the districts are distributed around ₹ 1000 level with around 35 per cent of them cluttering around ₹ 750 ± 250. The proportion of districts falling above the modal class has increased from 47 per cent to 77 per cent between the triennia which denotes improvement in income distribution.

Growth in GDP from Different Sectors — Pattern across Districts

It has been found that, in case of agriculture GDP, the districts followed a near-bell shaped pattern but flatter distribution across different growth slabs with a little peaking around 4 to 5 per cent slab (Table 3). The distribution of resource-poor districts is similar to the above. The better-off districts followed much flatter distribution. The distribution of districts for growth rates in GDP from industry and services is concentrated towards higher growth rate classes upwards of 6 per cent. The better-off districts did well in industry GDP growth, while the resource-poor districts did well in the services sector GDP, of course, in a relative sense. In respect of overall GDP, the better-off districts showed a skew towards higher growth rate classes though peaked between 5 and 10 per cent with modal class being 8 to 9 per cent. One-tenth of the districts have recorded a negative growth during the 13-year period. Counter-intuitively, this proportion is a bit lower across resource-poor districts compared to the better-off districts.

The negative growth in GDP from sub-sectors of agriculture other than fisheries, was more prevalent among one-fifth to one-sixth of the districts, as the estimates presented in Table 4 revealed. For GDP from crop production and livestock, the trend is still interesting with a little below one-fifth of the districts recording a growth rate of 12 per cent and above for crop production and a little below one-fourth for livestock sector. The remaining districts are more or less evenly distributed across different classes in case of GDP from crop production and livestock rearing. About 65 per cent of the districts registered less than 4 per cent growth in GDP from forestry in addition to about 21 per cent showing a negative growth. For GDP from fisheries, the growth rate was between 2 and 7 per cent for most districts. The GDP from crops and livestock is distributed similarly across better-off districts and resource-poor districts, with the difference that proportion of resource-poor districts registering very high growth (12% and above) is higher compared to better-off districts. The proportion of districts

Table 3. Distribution of districts according to compound annual growth rate (CAGR) of GDP from different sectors of the economy

CAGR (%)	Overall GDP			Industry			Services			Agriculture		
	Better-off districts	Resource-poor districts	All districts	Better-off districts	Resource-poor districts	All districts	Better-off districts	Resource-poor districts	All districts	Better-off districts	Resource-poor districts	All districts
Negative	-	-	-	-	1.6	1.0	-	-	-	12.4	8.9	10.3
0-1	-	-	-	0.4	1.1	0.8	-	-	-	3.3	4.0	3.8
1-2	-	-	-	-	1.9	1.1	-	-	-	7.5	6.7	7.0
2-3	-	1.3	0.8	0.8	1.1	1.0	-	0.3	0.2	5.8	8.4	7.4
3-4	1.2	2.7	2.1	0.8	4.0	2.8	2.1	0.8	1.3	8.7	10.5	9.8
4-5	1.2	7.0	4.7	3.7	6.2	5.2	0.8	3.2	2.3	7.5	11.6	10.0
5-6	12.4	7.3	9.3	7.5	8.1	7.8	2.5	4.3	3.6	10.0	8.1	8.8
6-7	15.4	15.1	15.2	10.0	11.1	10.6	11.6	9.4	10.3	6.2	6.7	6.5
7-8	19.5	17.8	18.5	20.7	16.4	18.1	16.6	18.3	17.6	9.1	6.7	7.7
8-9	21.2	18.1	19.3	16.6	15.4	15.8	17.8	14.8	16.0	10.0	5.4	7.2
9-10	12.4	16.4	14.9	12.0	14.0	13.2	19.5	14.0	16.2	5.8	4.6	5.1
10-11	7.5	6.5	6.9	8.7	8.6	8.7	14.5	14.3	14.4	2.9	5.9	4.7
11-12	3.3	4.6	4.1	4.1	5.4	4.9	6.6	10.8	9.2	2.9	3.2	3.1
12 & above	5.8	3.2	4.2	14.5	5.1	8.8	7.9	9.7	9.0	7.9	9.2	8.7

Table 4. Distribution of districts according to compound annual growth rate of GDP from different sub-sectors of agriculture

CAGR (%)	Crop production			Livestock			Forestry			Fisheries		
	Better-off districts	Resource-poor districts	All districts	Better-off districts	Resource-poor districts	All districts	Better-off districts	Resource-poor districts	All districts	Better-off districts	Resource-poor districts	All districts
Negative	20.3	19.7	19.9	15.8	14.3	14.9	27.4	16.4	20.8	1.3	2.6	2.1
0 -1	3.3	3.0	3.1	2.5	2.7	2.6	15.4	16.2	15.8	1.3	4.4	3.2
1 -2	5.8	4.3	4.9	4.1	3.2	3.6	16.6	17.0	16.8	4.0	9.6	7.4
2 - 3	7.1	5.9	6.4	5.4	3.8	4.4	17.8	17.3	17.5	7.9	11.7	10.2
3 - 4	3.7	5.7	4.9	5.4	5.1	5.2	10.8	14.6	13.1	18.5	10.2	13.5
4 - 5	3.7	4.9	4.4	5.4	5.4	5.4	6.6	10.2	8.8	21.1	16.1	18.1
5 - 6	6.2	5.7	5.9	4.6	6.2	5.6	4.6	3.2	3.8	8.8	8.8	8.8
6 - 7	6.6	7.0	6.9	7.9	4.3	5.7	-	1.9	1.1	25.6	11.7	17.2
7 - 8	5.8	5.9	5.9	5.0	8.9	7.4	0.4	0.3	0.3	6.2	7.0	6.7
8 - 9	8.3	4.0	5.7	7.9	5.7	6.5	-	1.1	0.7	2.2	4.4	3.5
9 -10	5.0	4.0	4.4	6.6	4.3	5.2	-	0.5	0.3	0.9	4.4	3.0
10 -11	3.3	4.0	3.8	7.5	6.5	6.9	-	0.3	0.2	-	0.6	0.4
11 - 12	4.6	4.3	4.4	4.1	3.5	3.8	-	0.3	0.2	0.4	0.6	0.5
12 & above	16.2	21.6	19.4	17.8	26.1	22.9	0.4	0.8	0.7	1.8	7.9	5.4

registering a negative growth in forestry GDP has been found higher across better-off districts than among resource-poor districts.

Extent of Diversification across Districts

Shares of Different Sectors and Sub-sectors

Diversification happens when the shares of different sectors/sub-sectors of the economy are well distributed, that is, the income is broad-based. Diversification as a strategy helps risk mitigation and is a desired one. Across the districts, on an average, the services sector GDP had contributed more than 50 per cent to the total GDP in TE 2003-04 (Table 5); the share increased to about 55 per cent during TE 2013-14. The Industry sector followed with its contribution to the tune of about 28 per cent to GDP in both the triennia. The agriculture sector had a share of a little below 21 per cent during TE 2003-04, which declined to 17.22 per cent by the end of the period. Within the

Table 5. Relative shares of sectors and sub-sectors in GDP, Triennial averages

Sector/sub-sector	Share of sectors/sub-sectors in respective GDP (%)			
	TE 2003-04		TE 2013-14	
	Share in overall GDP	Share in GDP from agriculture	Share in overall GDP	Share in GDP from agriculture
Overall GDP	100		100	
Industry	28.37		28.31	
Services	50.95		54.47	
Agriculture & allied sectors	20.68	100	17.22	100
Crop production	12.00	58.0	10.59	61.5
Livestock	4.30	20.8	4.09	23.8
Forestry	3.09	14.9	1.63	9.5
Fisheries	1.28	6.3	0.91	5.2

Table 6. Distribution of districts according to diversification index, TE 2003-04 and TE 2013-14

Diversification index	Diversification across sectors		Diversification within agriculture	
	TE 2003-04	TE 2013-14	TE 2003-04	TE 2013-14
0.2	0.0	0.0	0.0	1.3
0.3	0.2	0.2	1.0	6.4
0.4	0.3	2.1	6.7	11.1
0.5	5.1	9.5	23.4	19.4
0.6	37.7	43.6	32.4	31.7
0.7	56.7	44.6	35.0	27.3
above 0.7	0.0	0.0	1.6	2.8
Average value of index	0.596	0.578*	0.549	0.517*
Coefficient of variation (CV) %	8.15	11.03	17.44	24.17

Note:*Difference is highly statistically significant.

agriculture sector, the shares of crops and livestock are 58 per cent and 20.8 per cent, respectively. Further, the shares increased by the second triennium (TE 2013-14).

Extent of Diversification

The index of diversification across sectors, measured as difference of Herfindahl index from unity has been found to be 0.578 during TE 2013-14. It has declined from 0.596 during TE 2003-04. The index of diversification within the agriculture sector declined from 0.549 to 0.517 during this period. In both cases, the difference in the index value between the two points in time is statistically significant at 1 per cent level of significance. This means that there is a lesser degree of diversification in the recent period. The distribution of districts also point to the fact that among a larger proportion of districts, the degree of diversification had declined over time. Also, the dispersion of the index increased during TE 2013-14 compared to TE 2003-04.

The distribution of resource-poor and better off districts according to diversification levels too has shown a similar pattern (Table 7) as above. There has been a decline in index value between the triennial periods across sectors as well as within the agriculture sector and the decline is statistically significant throughout the period. The dispersion, as measured by CV also increased over time. The diversification across sectors between better-off districts and resource-poor districts is of the same magnitude. However, the average index of diversification within the agriculture sector is higher across better-off districts than resource-poor districts for any given triennium. The decline is statistically significant at 2.2 per cent during TE 2013-14 and at a higher level (13.0%) of significance during TE 2003-04.

The districts which had higher level of diversification index during TE 2003-04, displayed a tendency to have a higher index during 2013-14 as the scatter plot and estimated trend line showed (Figure 3). The relation is almost one-to-one with the current level of index being about 91 per cent of the initial level at the margin. A similar relation between terminal and initial time points is relatively weak in the case of diversification within the agricultural sector (Figure 4). The one unit increase in initial level of diversification is associated with 0.67 units of the terminal value. That is, more and more districts have registered a decline in diversification levels during the second triennium than in the first one.

Is There Convergence across Districts?

When districts grow over time in terms of GDP or any other measure, some will grow faster and some will grow slower and there is a possibility of convergence over time. During earlier discussions in this paper it was observed that sigma convergence, as measured in terms of CV, increased over time which shows that the inequalities across districts increased during TE 2013-14 compared to those during TE 2003-04. This sigma convergence may not preclude beta convergence which can occur with resource poor districts growing faster than the richer districts. Table

Table 7. Distribution of districts according to diversification index, across categories of districts

Index	Diversification across sectors				Diversification within agriculture sector@			
	Better-off districts		Resource-poor districts		Better-off districts		Resource-poor districts	
	TE 2003-04	TE 2013-14	TE 2003-04	TE 2013-14	TE 2003-04	TE 2013-14	TE 2003-04	TE 2013-14
0.2	0.0	0.0	0.0	0.0	0.0	0.4	0.0	1.9
0.3	0.4	0.4	0.0	0.0	2.1	4.1	0.3	7.8
0.4	0.8	1.7	0.0	2.4	7.5	11.6	6.2	10.8
0.5	4.6	7.9	5.4	10.5	18.3	17.8	26.7	20.5
0.6	39.4	44.4	36.7	43.1	30.3	33.2	33.7	30.7
0.7	54.8	45.6	58.0	43.9	39.4	29.0	32.1	26.1
Above 0.7	0.0	0.0	0.0	0.0	2.5	3.7	1.1	2.2
Average value of index*	0.593	0.576	0.597	0.577	0.557	0.530	0.545	0.508
Coefficient of variation (CV) %	9.07	11.14	7.48	10.96	18.72	21.07	16.45	25.99

Notes: *Difference across triennia is statistically highly significant throughout
@difference in diversification index between better-off districts and resource-poor districts is statistically significant at 13.0 per cent during the first triennium and significant at 2.2 per cent during the second triennium.

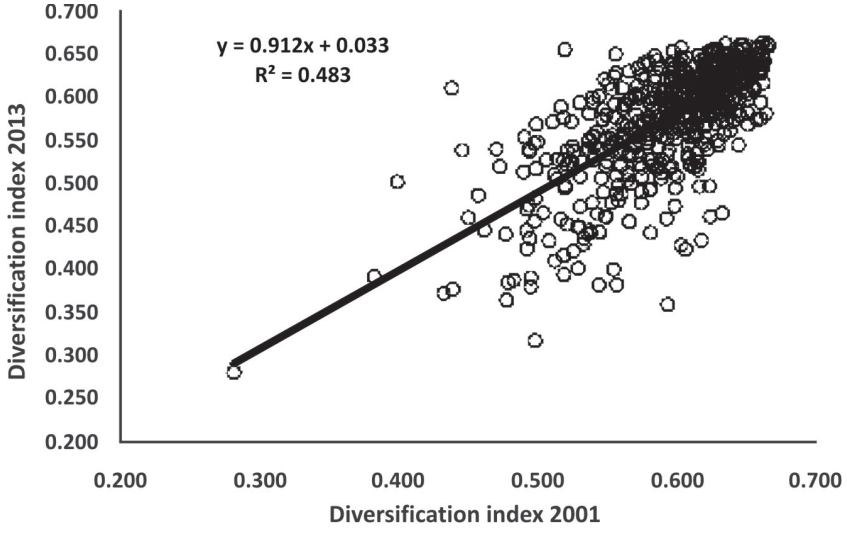

Figure 3. Relation between current levels of diversification across sectors to initial levels

8 gives the estimates of regression used to test beta convergence in GDP from various sectors. A negative beta indicates convergence[1]. There is a strong beta convergence in GDP from industry and agriculture among sectors and crop production, livestock and fisheries among sub-sectors of agriculture. The speed of adjustment, b, is highest at 2.80 for livestock GDP, followed by a little less than one per cent for GDP from industry and crop production. The overall GDP showed beta convergence across better-off districts but divergence across resource-poor districts. The same is true for GDP from industry. The livestock GDP has

[1] However, this reflects only absolute beta convergence. There can be conditional convergence where we introduce additional variables that can account for differences across districts in terms of factors responsible for growth path of a given district. We did not estimate conditional convergence here.

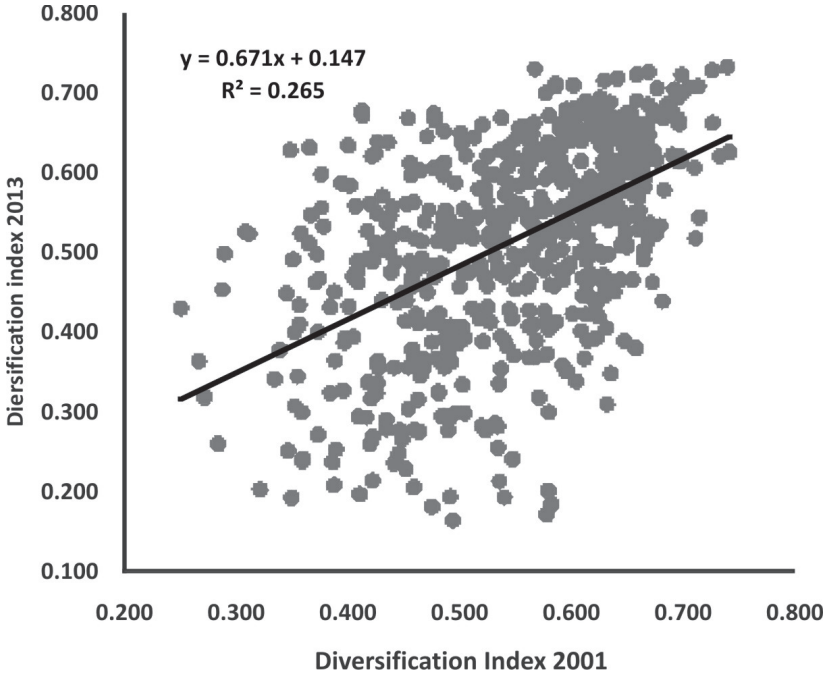

Figure 4. Relation between current levels of diversification within agriculture sector to initial levels

Table 8. Beta convergence coefficient (β) and speed of adjustment (b)

Sector/sub-sector	All districts			Better-off districts			Resource-poor districts		
	β	t-value	b	β	t-value	b	β	t-value	b
Overall GDP	-0.00061	-0.39	0.061	-0.00508	-2.32*	-0.495	0.005287	2.27*	0.5432
Industry	-0.01009	-6.63*	-0.961	-0.01926	-9.55*	-1.761	0.003184	1.45	0.3236
Service	-0.00218	-1.44	-0.215	0.000704	0.30	0.0707	-0.00418	-2.15*	-0.409
Agriculture & allied sectors	-0.00634	-1.93*	-0.615	-0.00538	-1.30	-0.228	-0.00773	-1.46	-0.745
Crop production	-0.01009	-1.96*	-0.961	-0.01289	-1.56	-0.527	-0.00805	-1.22	-0.336
Livestock	-0.03237	-8.20*	-2.804	-0.02122	-4.81*	-1.924	-0.04225	-6.67*	-3.524
Forestry	-0.00158	-1.29	-0.068	-0.00288	-1.52	-0.123	0.000267	0.16	0.0116
Fisheries	-0.00325	-3.80*	-0.319	-0.00207	-1.19	-0.205	-0.00461	-5.37*	-0.451

Note: *Statistically significant

convergence across both better-off districts and resource-poor districts with a higher speed of adjustment across the latter. Interestingly, convergence is observed across resource-poor districts for services sector and fisheries sub-sector. The statistical significance of intercept terms in all but a few, reveals that there are other factors that influence convergence and hence certain interventions are needed to induce convergence (Birthal *et al*., 2011). That is, there is conditional convergence.

Summary and Conclusions

This paper has analysed the district level GDP – overall and from different sectors and sub-sectors of agriculture over a 13-year period from 2001-02 to 2013-14. The findings suggest that there has been a significant increase in the average GDP level of a district in absolute terms as well as on per capita basis. The services sector has shown the best performance. The growth in livestock GDP per capita seems to have

contributed to the growth and stability of the overall agriculture sector, neutralizing the increase in inequality in the GDP from crop production. The distribution of districts according to the levels of per capita GDP from agriculture, crop production and livestock have shown a rightward shift, indicating a higher proportion of districts falling in higher class intervals.

In terms of annual compound growth rates, the distribution of districts has shown a near-bell shaped but flatter distribution for GDP from agriculture across growth classes with a peaking between 4 and 5 per cent. A sizeable proportion of districts have registered a negative growth in GDP from agriculture, more so among better-off districts. The proportion of resource-poor districts that have registered very high growth rates (12 % and above) is higher than of better-off districts for GDP from sub-sectors.

The average shares of agriculture and services sectors have changed only a little over time. The shares of livestock and crop production in agricultural GDP have improved over time. There has been a decline in diversification levels over time across sectors as well as within the agriculture that too statistically significant. The better-off districts have shown a significantly higher levels of diversification compared to resource-poor districts. There seems to be beta convergence in GDP from different sectors/sub-sectors. Specifically, industry, agriculture, crop production, livestock and fisheries have shown convergence over time. Given the statistical significance of the intercept terms in all but a few cases, there seems to be conditional beta convergence which requires exploring other factors and interventions that need to be taken to induce convergence.

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