

# Crop Diversification and Agricultural Labour in India

R S Deshpande, Pradeep Mehta and Khalil Shah

Institute for Social and Economic Change  
Bangalore

E-Mail: [deshpande@isec.ac.in](mailto:deshpande@isec.ac.in)

## Abstract

*Recent concern about stagnation in agricultural productivity and plummeting growth rate of the sector has called in a search for new forces of growth. The Indian economy is poised to grow at more than nine per cent per annum during the 11th five-year plan and a prerequisite of such growth rate is the maintenance of at least four per cent per annum growth rate in the agricultural sector. In order to achieve this rate of growth in agriculture, one of the strategies indicated and discussed very strongly in policy circles is diversification in crop enterprise and a dose of new-technology (second green revolution). Notwithstanding the impact on growth of such a strategy, it is quite possible that the welfare of the agricultural labourer may get out of sight in this pursuit. We cannot neglect the reality that agricultural labour in itself constitutes the majority of the workforce dependent on agriculture, as well as it is this group where poverty is densely located. Therefore, any policy instrument that does not take notice of the concerns of agricultural labour as a sector may cause detrimental impact on this important link in the agricultural production process. This paper analyses the process of diversification in the agriculture sector in India during the last three decades and tries to locate its impact on the agricultural labourer as a group. Recognising fully that connecting diversification directly to the welfare of agriculture labour is difficult in the absence of field level primary data, we tried to put forward circumstantial evidence which clearly indicates that during the last three decades diversification has progressed significantly in selected states and there has been welfare loss in these regions. We conclude with a warning that if neglected, these may have significant welfare losses for the most vulnerable component in the current process of economic growth.*

## Introduction

Recent changes in the economic policy have unintentionally bypassed agricultural labour on the policy front despite the fact that it is a crucial component of the agrarian economy. The recent discussions and debates on the farm sector distress largely focused on the cultivators, least recognising the fact that agricultural labour sector is the final incidence of such distress. It is also found that poverty is densely located among the agricultural labourers (Subramanian, 2006) and more so in the areas that have experienced severe distress in the recent past. Further, no restatement is needed about the declining share of agriculture in the GDP at a faster pace than the shift in the labor force out of this sector, pointing to a distorted process of agricultural transformation in the

economy. But rarely the severe impact of this process on the labour absorption and wages is discussed. The recent stagnation in the productivity of major crops along with imperceptible movement of labor out of the agricultural sector raised concerns about its potential to increase income and labor productivity. Distress in the wage labour sector does not take the ugly turn as in the farm sector since most of those labours surviving on the margins have over generations accepted this strenuous way of life. Policy makers are now looking for the avenues to improve the growth of the agricultural sector and pegged it at 4 % to provide better income to the farmers as well as finding ways to improve the labor productivity, and in that context diversification of the crop economy is identified as a policy tool with little attention to the implications on the agricultural labour sector. We focus this analysis on that component.

The term “crop diversification” is used in different contexts. While defining diversification in a purely economic term - it is treated from two analytical perspectives; first, as a process of establishing, at given prices, the optimal crop mix on a production possibility frontier; and second as a mechanism for incorporating risk aversion into a farmer’s decision making process in which crop specialization may lead to highly unstable income due to variance in yield, production, or price for the particular crop (World Bank, 1988). In either case, diversification is highlighted due to two purposes- increases the income and decrease the risk- both aspects of the quality and quantity of diversification. The argument is that farmers must be in a position to produce high value crops and secondly with increase in commercialization must also be able to maintain the diversity in the cropping pattern in order to deal with the risk in this sector.

During mid 60s, crop diversification was seen more as a strategy to deal with risk and to meet food self-sufficiency from peasant farming. Technological change during that decade proved to be structural break to the agricultural sector in terms of change in the cropping pattern, as well as increasing commercialization in Indian agriculture. However, the euphoria could not be sustained and the economy experienced plunge in agricultural growth rate during 90s. Table 1 indicates that the growth of the agricultural sector fell sharply in the late 90s whereas the growth of non-agricultural sector continues to remain

in the trajectory of high growth. Low momentum of shift of labor from agricultural to non-agricultural sector raises the need to find avenues of improving the situation of agricultural laborers as well. Many arguments emerged regarding the source of stagnation in agricultural growth including technology fatigue, policy fatigue, incomplete agricultural transformation, and higher levels of specialization. Diversification once again came to the fore as a policy agenda to tackle or improve the situation of the agricultural sector. It is now becoming an important tool, especially because of several key developments in the economy that include, booming economy, changing consumption pattern towards non-staple crops, both in the rural and urban area, trade liberalization and declining public support etc. Hence, in the present context, diversification is seen not merely as a mean to increase the income and get fully into the process of commercialization by strengthening the markets but also to accounts for the stability and changes in the comparative advantages of crops overtime.

**Table 1: Growth rates in output of economy and agriculture sub sectors at 1993-94 prices**

<i>Period</i>	<b>GDP</b>				<i>Value of Output</i>			
	Total	Non-Agriculture	Agriculture	Fishing	Live-stock	Crop sector	Fruit/veg	Crops other than Fruits/veg
1970-71 to 1979-80	3.45	4.72	1.94	2.90	3.92	1.79	2.88	1.55
1980-81 to 1989-90	5.38	6.78	3.13	5.82	4.99	2.47	2.36	2.48
1990-91 to 1999-00	6.19	7.40	3.28	5.46	3.82	2.99	5.97	2.26
1990-91 to 1995-96	5.56	6.63	3.16	7.49	4.25	2.65	4.93	2.13
1996-97 to 2001-02	5.53	6.85	1.75	2.72	3.47	1.28	4.55	0.34

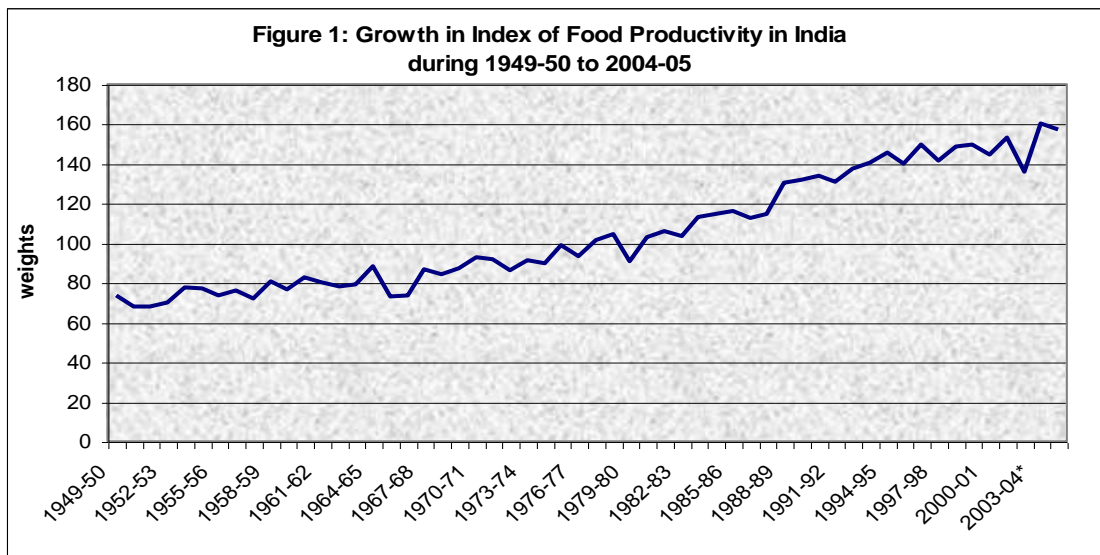
Source: Chand Ramesh, 2004

In all these proceedings, agricultural labour as a sector is taken for granted. In this paper, we analyse the pace and pattern of diversification in the country in the pursuit of higher growth. The analysis in this paper covers the experience of diversification and its externalities with respect to agricultural labour in the last decades. Recognising the difficulty in establishing direct relationship between diversification and the externality to the agricultural labour in the absence of primary data, we have built the circumstantial evidence here. Parallel to the understanding of changing forces of diversification, we have looked into the changes in the agricultural labour sector. This certainly puts a limitation of connecting the two directly but one can only challenge the magnitude of

elasticity of such changes and not the direction. Finally we conclude with a few policy leads.

### Crop Output Growth in India

Green revolution in the decade of 60s proved a successful experiment in increasing the level of food production. The post green revolution period saw diversification of the agricultural sector towards the crops that have experienced higher growth in the yield, which was characterized as technology-led diversification. Much of the area was diverted towards high value food-grain crops including rice, wheat and maize. This has led to emerging scenarios of specialization in many states of the country. The panic button was pressed as yields of many foodgrains started showing stagnancy in its growth in the recent years (Figure 1).



Source: Agriculture Statistics at a Glance 2006, Ministry of Agriculture, Government of India

Surprisingly, not only the agricultural growth slowed down in 90s but also agricultural production remained highly volatile compared to the 80s. Annual real rates of gross capital formation declined sharply between the early and late 90s and during the same time, the public investment in the agriculture sector has witnessed a declining trend (from 33 to 22 %). In addition, many concerns were emerged regarding the traditional food baskets, which favored rice-wheat combination and resulted specialization pattern in the cropping pattern. These concerns are mainly related to the increased risk of farmer's

income and related to the negative externalities it generated in terms of environment degradation and regional disparities<sup>1</sup>. On the one hand, the contribution of agriculture to the GDP is declining overtime whereas the number of people engaged in agriculture and its allied activities are still in large numbers raising concerns of both land and labor productivity. Consequently, the policy makers started emphasis on changing the way agriculture sector works in order to tackle negative externalities it creates and at the same time find ways to remove inconsistencies and achieve better levels of food security for poor and malnourished people. This calls for alternative production systems or opportunities that can generate new employment, growth and enhances incomes (Barghouti et al. 2004).

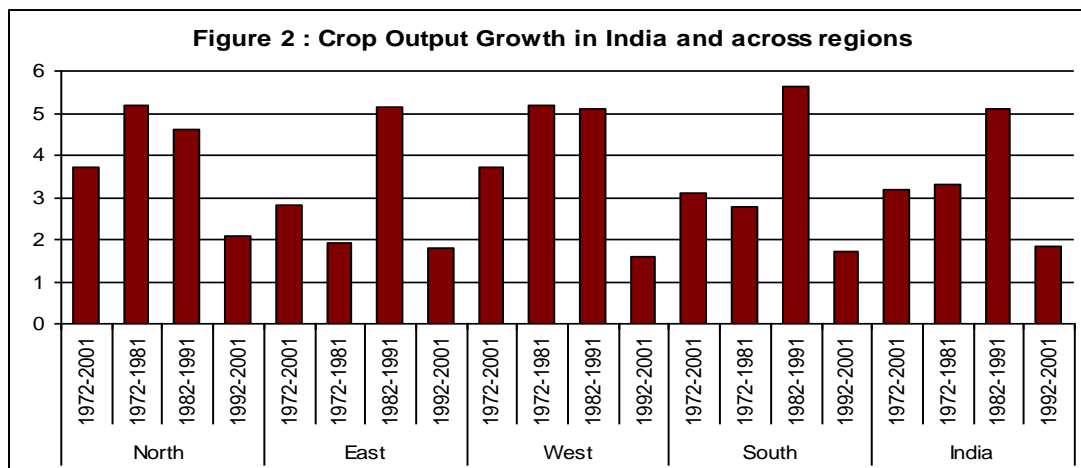
On this backdrop, the diversification of agriculture towards high value commodities (HVCs) like fruits, vegetables, diary, poultry, meat and fish products etc. is suggested as a viable solution to stabilize and raise farm income, enhance agricultural growth, increase employment opportunities and conserve natural resources (Vyas 1996; Joshi 2004). A partial sorry state of agriculture, which calls for a change, is supplemented by the structural changes in the economy that provided further impetus to agricultural diversification. The Indian economy has experienced a spurt in the economic growth and per capita level of income in the last two decades. In addition, there has been an increasing trend towards urbanization. These factors directly affected the consumption pattern of the population, which is changed, and moved towards HVCs from staple food such as rice, wheat and coarse cereals (Joshi et al. 2003). This is primarily because people, especially in the urban areas, have increasingly getting concerned towards better nutrition and health and this is leading to higher demand for highly nutritious diets, which can be provided by the HVCs.

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<sup>1</sup> It is generally accepted that mainly the large farmers benefited from the process and also the benefits were mostly restricted to the few pockets that constitute the favored climatic zones of India.

In India, we have four different zones<sup>2</sup> that are relatively more or less homogenous in the agro-climatic feature, and these have shown distinct pattern of growth in crop output and diversification in the past three decades. The Northern region has diversified towards rice and wheat, Eastern zones remained more or less specialized on rice, Western and Southern zones have diversified mostly towards many non-food grains like oilseeds and few food grains including pulses.

At the national level, the growth of the crop output sector has been highest in the decade of 80s and the growth rate has declined in the post 1990 period (Figure 2). The trend of decline of the growth rate of output is noticed in all the regions of the country. The northern region, which has benefited enormously from green revolution and followed a specialization-led growth, has also experienced poor growth in the 90s. On the other hand, the southern region, recognized as a model of diversified region by many, has also not able to experience higher growth in 90s. In the next section, we try to estimate the impact of diversification on growth through both the static and dynamic effects in order to identify the reasons for such a trend in the growth by examining the components of growth.



Note: North region includes Haryana, Himachal Pradesh, Punjab, J&K and UP. East region comprises of Bihar, Assam, West Bengal and Orrisa. West region consists of Rajasthan, Gujarat, MP and Maharashtra and South region includes AP, Karnataka, Kerala and Tamil Nadu

Note: Computed on the basis of data from Agricultural Statistics in India

<sup>2</sup> Northern region includes Haryana, Himachal Pradesh, Punjab, J&K and UP. Eastern region comprises of Bihar, Assam, West Bengal and Orrisa. Western region consists of Rajasthan, Gujarat, MP and Maharashtra and Southern region includes AP, Karnataka, Kerala and Tamil Nadu

## **Crop Diversification: The Process**

In the agricultural economics literature, diversification is termed to be a response to specific opportunities, or a response to threat or a general strategy for growth (Chand and Chauhan, 2002). In the development context, crop diversification has become a very important option to attain several objectives of agriculture sector. Broadly, the rationale for crop diversification emanates from the opportunities it offers to reduce production and price risks, increasing yields, natural resource sustainability, ecological balance, increasing flexibility, and sustain productivity and growth. Not only this, it creates opportunities for more employment and higher incomes through more efficient use of resources and exploitation of comparative advantage (World Bank, 1990). On a whole, crop diversification is a process, which on the one hand help the growers to improve their per capita income and diffuse risk and on the other hand provides more diversified food items to consumers. It minimizes the risk associated with production of single crop and helps the farmers to liberate from poverty trap. It contributes to sustainable agricultural development by preventing the degradation of land, water and environment. It also provides employments and prevents excessive migration and helps in earning foreign exchange (Mruthyunjaya and Chauhan, 2003). Several studies and experiences around the world prove that crop diversification promotes sustainable economic growth of a country. It is also found that “practically all developing countries can achieve 4 to 6 percent growth rates in agriculture because of the major potentials in the production of high-value agricultural commodities (by Mellor, 1997 as quoted in Mruthyunjaya and Chauhan, 2003). The recent experience in Asia, particularly, South East Asia, Middle East and North Africa also indicate that crop diversification has proved important in improving the growth rate and food security situation (Petit and Barghouti, 1992).

Here, we endeavor to identify the contribution of area, yield and change in cropping pattern on the gross crop income across regions is computed by using the data of 41 crops for 17 states. This is done in order to locate the sources of growth across its components. Further a decomposition analysis for the period 1972-2001 and separately for three decades is attempted to track the changes in these sources. The results of the sources of growth (table 2) suggest that diversification has indeed become an important

source of growth in the post-liberalization period, and technological development made the largest contribution to the output growth in the previous two decades. The contribution of crop area as a source of growth is showing a declining trend in its share to boost aggregate output over the period of time. But region-wise picture revealed that the area expansion is still the major contributor to the growth of the Eastern region of the country. Expansion of area or intensive cultivation have been the major source of growth of output and crop pattern change, which is a cause for concern as it is less viable and less sustainable in the long run. Crop pattern shift has a very minimal role in the growth of output in this region due to a continued diversification was observed towards the already highly specialized crop, i.e., rice. Both the southern and western regions are experiencing declining contribution of area in their output growth and its contribution become negative in the 90s as the total area under cultivation decreased in the 90s. Decline in the area under cultivation was compensated through the increased diversification towards high value crops rather than by the productivity growth, which resulted in high diversification effect. In the northern zone, though the role of crop pattern shift is increasing over time, the contribution of the same is still very less. But this region has recorded the highest growth in the shift of cropping pattern. The reason for getting low diversification effect has been that change in the cropping pattern has resulted in the increased specialization towards food grain crops. At the same time, the yield of those crops increased many-fold which resulted in increased role of yield<sup>3</sup>.

Increasing importance of any of the individual components provides the static effect of the components, whereas the dynamic effect, i.e., interaction effects, helps to reveal whether over the period of time, the shifts of the cropping pattern takes place towards those crops which have also experienced higher technological development. For instance, if the cropping pattern shifts towards the crops, which do not experience positive growth in the productivity, we will get the negative interaction term for that crop/crop group and vice versa. If this trend is spread high over the relatively high value

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<sup>3</sup> Yield effect is given by  $\Delta y$ , which signifies that yield effect increases as the yield of the specialized crops increases faster. This is because the change in per unit yield of crop is weighted by the relative weight of that crop in the total cropping pattern. Accordingly, diversification effect which is given by  $\Delta dy$  will be higher if cropping pattern shifts more towards the crops which commands relatively high per unit yield.



crops of the region, we get the negative interaction term for the region as a whole. The results of the interaction terms revealed that northern region is the only one, which through all the decades has been able to improve the crop pattern towards the crops, which have also experienced better technological growth. Whereas, all other regions have shown mixed trend over the period of time. Interestingly, Eastern region have been able to achieve positive growth in the productivity of the crops towards which they have diversified only in the 1990s, unlike previous two decades. Western and Southern region has experienced negative interaction effect in the 90s, raising the concerns of the lack of technological development in the enterprises that contributes high to the cropping pattern and growth of output of the region. Though, there has been increased growth in the crop pattern shift towards high value crops in 90s, the growth rate of those yields declined dramatically during the same period, which has resulted in the growth-depressing effect of diversification in the Western and Southern regions. This points out that diversification towards high value per se is not sufficient for increasing growth but it is also important that these crops remain to be remunerative over the period of time, through proper technological and market development, otherwise the gains from diversification will be meager.

In a nutshell, technological development continues to be the major component of growth for the northern region, but the effect of the same is declining over the period of time. This is primarily due to decline in the yield of the specialized crops. For eastern region, area expansion is the major source of growth in the absence of much technological development and crop shifts. For both the southern and western region, diversification has become an important component for growth primarily due to declining area for cultivation and less technological development but its negative interaction with yield points to the growth depressing effect and raises the need for intervention in the technological front for those crops.

**Table 2: Decomposition of Output Growth in India during 1980-2000**

Region	Period	Area Effects	Inter-Crop Shift effects (Static)	Aggregate Yield effects	Inter-Crop Shift effects (Dynamic)
<b>North</b>	1970s	30.97	6.87	55.96	6.2
	1980s	7.48	10.07	78.61	3.83
	1990s	31.36	19.22	46.9	2.53
	1972-2001	20.46	8.93	63.11	7.5
<b>East</b>	1970s	42.98	32.34	28.15	-3.47
	1980s	21.28	7.19	73.4	-1.87
	1990s	46.26	7.17	45.4	1.17
	1972-2001	13.1	12.07	74.55	0.29
<b>West</b>	1970s	18.41	22.98	58.73	-0.12
	1980s	15.56	20.7	62.88	0.87
	1990s	-23.87	95.69	39.08	-11.74
	1972-2001	21.95	24.86	51.7	1.49
<b>South</b>	1970s	-21.94	29.04	89.87	3.02
	1980s	5.35	29.57	61.81	3.25
	1990s	-23.57	90.34	36.03	-2.8
	1972-2001	-4.02	39.34	68.59	-3.91
<b>India</b>	1970s	20.79	13.21	65.12	0.86
	1980s	12.2	17.43	71.42	-1.05
	1990s	10.31	59.71	28.96	1
	1972-2001	16.37	23.68	64.2	-4.26

Note: Computed on the basis of data from Agricultural Statistics in India

### **Pace and Pattern of Diversification**

The pace and pattern of diversification is looked into at through the growth in the area, production and yield of crops, the changing compositions of crops in terms of area and value and by the diversification indices.

It is found that rice and wheat are the major foodgrains that have been experiencing better growth in area. The area under wheat is doubled during 1967-2005 (table 3). The declining trend in area is observed in case of coarse cereals and pulses only. The area under oilseeds crops has increased in 80s and in the last five years from 2000-01 to 2004-05. The actual growth in area under oilseeds was observed in the post 1980 period, when the government introduced the Oilseed technology mission in 1987. But the comparative advantage created by technology in case of oilseed was soon overpowered by the comparative disadvantage created by the price decline due to trade liberalization and hence the period of 1990s has seen major decline in the area under

oilseeds. However, the trend of decline in area under oilseeds reversed from the year 2000 along with increased growth in its productivity. Overall, the non-foodgrain sector is growing but the negative growth in its area in the recent period (2000-01 to 2004-05) is a point of concern. The picture of extent of dominance of few sectors in Indian agriculture slightly changes when we consider the case of changing contribution of crops in the total area and value of agricultural output. Though the contribution of rice and wheat is the total area and value is increasing overtime, the contribution of foodgrains in the aggregate cultivated area has declined from around 75% in 1970-71 to 65% in 1999-2000, whereas its contribution to the aggregate value output has declined merely from around 45% to 40% during the same period (Table 4).

**Table 3: Growth performance in major crops: 1967-68 to 2004-05**

Crops	1967-68 to 2004-05*			1990-91 to 2000-01			2000-01 to 2004-05*		
	Area	Prod	Yield	Area	Prod	Yield	Area	Prod	Yield
Rice	0.54	2.57	2.06	0.68	2.02	1.34	-1.74	-0.49	1.27
Wheat	1.28	4.02	2.70	1.72	3.57	1.83	0.60	0.57	-0.11
Coarse Cereals	-1.45	0.54	1.84	-2.12	-0.02	1.82	-0.37	3.20	3.06
Cereals	-0.06	2.57	2.19	0.04	-0.02	1.59	-0.70	0.33	1.11
Pulses	-0.09	0.84	0.86	-0.60	0.59	0.93	0.63	4.12	2.79
Food Grains	-0.07	2.35	2.02	-0.07	2.02	1.52	-0.44	0.68	1.20
Oilseeds	1.19	3.12	1.56	-0.86	1.63	1.15	2.59	8.40	4.86
Non Foodgrains	1.20	3.03	1.56	1.18	2.69	1.09	-0.03	3.06	3.07
All Crops	0.25	2.61	1.83	0.27	2.29	1.33	-0.33	1.64	1.96

Note: \*- Provisional for non-foodgrains and All Crops, based on Fourth revised estimates.

Source: Agricultural Statistics at a Glance, 2005, Ministry of Agriculture.

**Table 4: Area allocation & value of output from agriculture at 1993-94 prices (%)**

	1950-51		1960-61		1970-71		1980-81		1990-91		1999-00	
	Area	Value	Area	Value	Area	Value	Area	Value	Area	Value	Area	Value
Rice	23.6	17.1	22.3	20.5	22.6	19.3	23.3	19.9	23.0	20.3	23.9	19.2
Wheat	7.6	4.0	8.5	4.7	11.0	7.9	12.8	9.6	12.9	10.8	13.8	11.6
Cereals	61.1	29.8	60.2	33.6	61.4	35.6	60.7	36.0	55.4	36.4	54.3	34.8
Pulses	15.6	12.3	15.5	12.4	14.0	9.1	13.0	6.9	13.5	6.7	11.3	5.1
Oilseeds	8.3	10.0	8.3	9.6	8.9	10.1	9.2	7.9	13.5	11.0	13.5	9.9
F&V	1.8	14.8	1.7	11.3	2.2	17.3	2.8	18.4	2.9	17.7	4.5	22.7

Source: Agricultural Statistics at a Glance and National Account Statistics, Various issues

### **Regional pattern of crop diversification**

At the state-level, it is revealed that two crops, i.e., rice and wheat, are the major sources of specialization. The regions are either showing high specialization with rice or with rice-wheat combination. The major rice dominated states include West Bengal (WB), Assam, Orissa and Bihar. The states with higher specialization in rice-wheat combination includes Punjab, Haryana, and UP, which, over the period of time, are becoming increasingly specialized in these crops whereas WB, Orissa, Bihar and Assam are remaining stagnant in specialization in rice crop, showing poor diversification. MP has now turned to more specialization with three crops i.e., rice, wheat and Soybean, that constitute more than 50% of the area. Though in some cases, the proportions of rice and wheat are declining but throughout all regions have been showing only positive or at most stagnant growth in area under rice and wheat. This raises the questions regarding the concerns about the nature of the diversification that is taking place in India. The diversification that has been taking place in the crop sector is mainly through the replacement of other inferior cereals. The picture that emerged is that regions continue to exhibit the picture of increasing or remaining specialized in rice and wheat with increasing movements towards non-foodgrains by replacing other cereal or pulses crops. States like Gujarat, AP and Karnataka, which were never been, showing higher level of specialization, have continued to remain diversified regions and are shifting within crops in a balanced manner.

Changes in the crop relevance in terms of their composition in the total area and value are given in table 5. It is found that Tamil Nadu and Kerala are moving away dramatically from horticultural sector. HP is moving towards fruits and WB is showing improvement in both fruits and vegetable sector. Gujarat, MP and Rajasthan are increasingly shifting towards oilseeds, which were one of the major sectors of these states. Few regions in the southern zone including Karnataka and Tamil Nadu is shifting away from cotton whereas sugarcane is becoming an important crop in both the western and southern states. Diversification towards Plantation crops and fibers is restricted mainly to southern zone only.

**Table 5: Changes in crop compositions in 2003-05 relative to 1973-75**

Crops/Crop Groups	States reporting increasing area/Importance under crops	States reporting loosing area/Importance under crops
Pulses	MP, Maharashtra	
Fruits	HP, WB, Maharashtra, AP, Karnataka	Kerala
Vegetables	WB, AP, Karnataka, Maharashtra, UP and Orissa	Tamil Nadu, Bihar, J&K, Kerala
Sugarcane	Gujarat, Karnataka, Maharashtra, Tamil Nadu and UP	
Cotton	AP, Gujarat, Maharashtra	Karnataka, Punjab, Tamil Nadu
Oilseeds	Gujarat, MP, Rajasthan	AP
Tea/coffee, Rubber	Tamil Nadu, Kerala	
Fibers	AP, Tamil Nadu	

Note: Computed on the basis of data from Agricultural Statistics in India

For measuring the level of specialization or diversification, we have used Herfindahl Index. It is important to note that diversification index here captures the change in the level of spread and concentration overtime. It is improbable that regions would experience any major change in terms of increasing or decreasing number of crops over the last three decades, however due to changes in the factors ranging from economic, geographic to policy etc. is expected to change the crops relevance and hence the aggregate level of concentration of the region. The diversification index used here is to indicate whether any region has experienced any difference in the overall concentration or spread in the cropping sector. Higher the concentration is expected to increase the variance in the income and may prove detrimental to the growth of the region. The Herfindahl index is defined as follow:

$$H = 1 - \sum_{i=1}^n (P_i)^2$$

$$\text{Where } P_i = \frac{A_i}{\sum_{i=1}^n A_i}$$

Where  $A_i$  = share of crop  $i$  in gross cropped area and  $\sum A_i$  is the total gross cropped area of the region. The value of the index ranges from 0-1 where 0 means complete specialization and 1 means the upper limit of diversification.

The regional dimensions of diversification bring to the fore an uneven pattern of crop specialization and diversification across states in India (Table 6). We have

categorized them into four distinct patterns. In the first pattern, we have states/regions that have been exhibiting constantly higher specialization in food grains over the period of time. In the second pattern, we have states, which are moving towards specialization in food grains from a diversified situation initially. In the third category, we have regions that are continuing to exhibit higher diversification levels and in the fourth pattern we have regions that are diversifying from food grains to other crops or enterprises and exhibiting higher levels of diversification.

**Table 6: The trends in specialization/diversification in India**

	TE 1975	TE-1985	TE 1995	TE 2005
Stagnation in Specialization				
Bihar	0.57	0.58	0.54	0.53
Assam	0.39	0.41	0.41	0.39
WB	0.48	0.46	0.43	0.48
Orrisa	0.50	0.52	0.55	0.56
J&K	0.56	0.56	0.55	0.54
HP	0.56	0.53	0.59	0.60
Increased Specialization				
Punjab	0.53	0.49	0.45	0.42
Haryana	0.69	0.67	0.62	0.59
UP	0.65	0.64	0.61	0.58
Stagnation in Diversification				
MP	0.77	0.77	0.75	0.74
Rajasthan	0.73	0.75	0.75	0.69
Tamil Nadu	0.79	0.81	0.83	0.79
Kerala	0.70	0.69	0.68	0.65
Increased Diversification				
AP	0.74	0.73	0.76	0.82
Karnataka	0.82	0.84	0.89	0.91
Maharashtra	0.73	0.79	0.81	0.87
Gujarat	0.82	0.85	0.87	0.88

Note: Computed on the basis of data from Agricultural Statistics in India

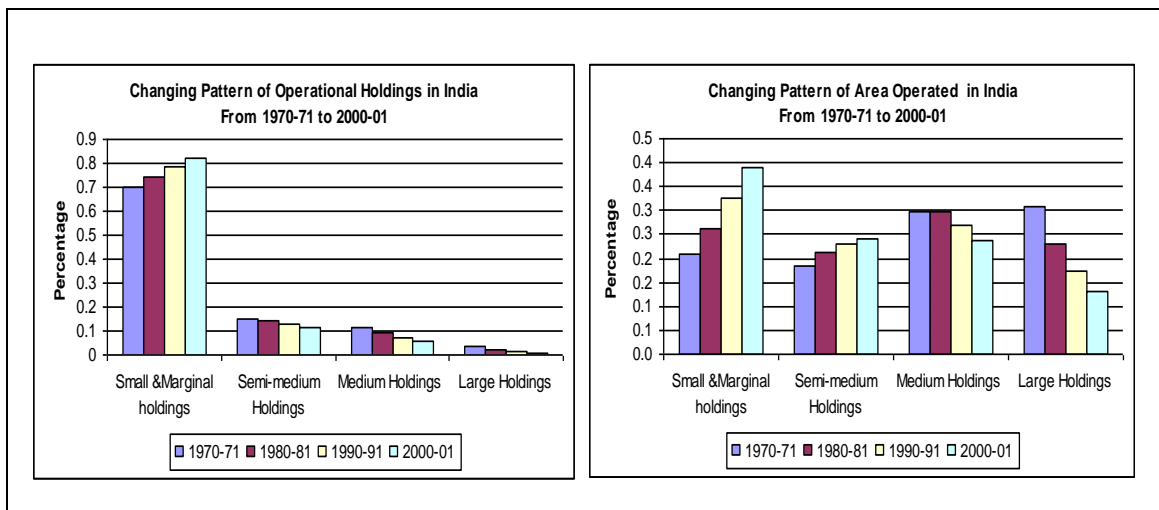
On the whole, the major specialized zones include Assam, Bihar, Orissa, WB, J&K and HP, which is primarily because of rice for the first four states and due to wheat and maize combination in J&K and HP. Punjab, Haryana and UP are becoming increasingly specialized in rice and wheat combination. As expected, AP, Karnataka, Gujarat and Maharashtra has been showing higher level of change in diversification.

### **Agricultural labour in the context of diversification**

Indian agriculture has been known for its density of small and marginal farms. According to Agricultural Census 2000-01, we have 76 million marginal holdings and about 22.81 million smallholdings and that constitute about 82 percent of the holdings. Their significant density in the farm sector dictates the income trends in the sector. In addition to this, the preponderance of the small and marginal holdings with low-income generating capacity has a telling effect on the wages of agricultural laborers. The impact is two pronged. First, the small and marginal farmers under income stress enter the labor market as agricultural laborers and exchange laborers. Second, their labor demand gets reduced significantly as the replacement of family labor takes place in the position of hired labor.

Besides, the forces of commercialization are also impacting the crop constellations and that changes the labor demand function. It gets altered in terms of quantity of labor, the skills and wage rates. That has a telling effect on the group of agricultural labors but they do not take the extreme step of suicides like the distressed farmers as they have resigned themselves to the situation.

**Figure 3: Changes in Land holding Pattern in India**



Source: Online database, Agriculture Census Division, Ministry of Agriculture.

Among the major constraints faced by the sector prominent is the low average size of holdings as a base for production and high density of uneconomic holdings. About 99 million small and marginal farmers inhabit the sector with only a small proportion of farmers generate some marketable surplus. During the last five decades the rural population has grown about 2.49 times but the number of agricultural laborers has grown more than that (almost by 3.91 times) (Table 7). That increased their density in rural sector. The market conditions in factor as well as product markets are far from satisfactory; and finally India never had a sustained presence in the international trade to participate pro-actively in the process of globalization. Besides these, the gains from trade hardly percolate to the agricultural labor. These overt constraints provoked the uses of terminology like ‘level playing field’ while analyzing comparative performance of India vis-à-vis its trading partners. Therefore, the significant question crops up whether agriculture and agricultural laborer will always be at the receiving end? How this should be avoided, is a major policy issue to wrestle with.

Employment on ‘usual status’ basis registered a growth rate of 1.38 percent per annum during 1983 to 1993-94, and showed a meagre growth rate of 0.18 percent during 1993-94 and 1999-00 (Table 8). Real agricultural wages has also noticed to have



increased at a lower growth rate in 1990s compared to 80s. Wage rates of female casual labour in agriculture increased by 3.09 percent in 80s and 2.93 percent in 90s (Jha Brajesh, 2004). There are differences across states in the growth of real wages. While Kerala and Tamil Nadu registered highest growth (7.9% and 6.7%) between 1990 and 2000, Assam and Rajasthan registered negative growth rate of -0.7 and -0.8 percent respectively (Table 9).

**Table 7: Population, Cultivators and Agricultural Labours in India**

Year	Total Population (In Millions)	Annual Expo. Growth rate (%)	Rural Population (In Millions)	Agricultural Workers (In Millions)		
				Cultivators	Agricultural Labours	Total
1951	361.1	1.25	298.6	69.9	27.3	97.2
			(82.7)	(71.9)	(28.1)	(100.0)
1961	439.2	1.96	360.3	99.6	31.5	131.1
			(82.0)	(76.0)	(24.0)	(100.0)
1971	548.2	2.22	439.0	78.2	47.5	125.7
			(80.1)	(62.2)	(37.8)	(100.0)
1981	683.3	2.20	523.9	92.5	55.5	148.0
			(76.7)	(62.5)	(37.5)	(100.0)
1991	846.4	2.14	628.9	110.7	74.6	185.3
			(74.3)	(59.7)	(40.3)	(100.0)
2001	1028.7	1.95	742.6	127.3	106.8	234.1
			(72.2)	(54.4)	(45.6)	(100.0)

Note: Figures in parenthesis represent percentage.

Source: Agricultural Statistics at a Glance 2005, Ministry of Agriculture, Govt. of India.

**Table 8: Growth of Employment in Agriculture (Usual Status) in India**

Period		Growth of Employment in Agriculture
1983-1993-94	Rural	1.38
	Urban	1.54
1993-94 to 1999-00	Rural	0.18
	Urban	-3.4

Source: Jha Brajesh (2004).

It is clearly borne out in tables that employment has not been increasing in agricultural sector despite expectations. In addition, the experience of the last decade brings out that the growth in the agricultural sector has been generating more casualisation of employment and the trends in casualisation are quite bold across the country. These trends are sharper in the agriculturally lagging regions. That leads us to

the question of the quality of growth in the agricultural sector in the wake of globalization in addition to the location of growth across regions. At the same time one cannot deny the influence of the quality of growth in the non-agricultural sector also.

The real wages of agricultural labourers also indicate near stagnancy across the states except in the case of Kerala. Distress among the farmers in the country is a fact and such situation is quite depressing in a few States including Karnataka, Maharashtra, Rajasthan, Orissa, and Assam. Though one cannot draw any one to one correspondence between distress in the farm sector and the present spate of suicides in some of the States, the farm and farm related activities have a large stake in explaining the unfortunate occurrences. The loss of welfare to the farmer as a group is consistent and continued and that may affect the economy soon, if not arrested. In a broader economic perspective the farmers who are entrepreneurs and tried to adopt new ventures are likely to be discouraged.

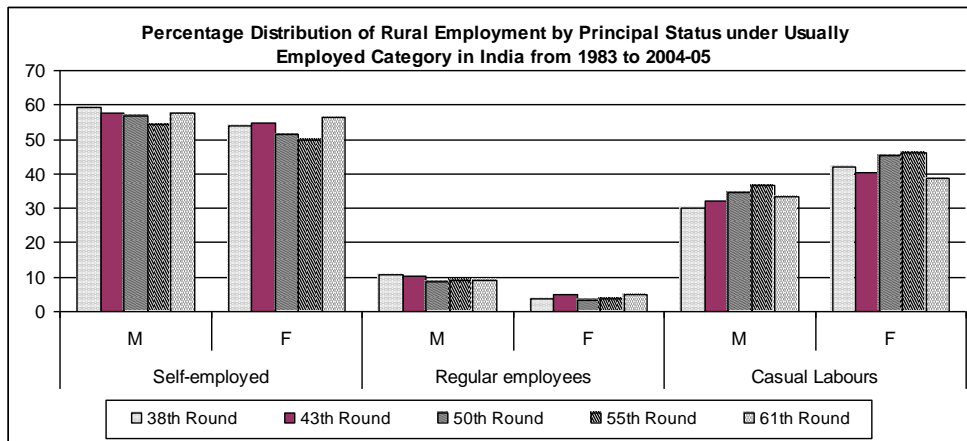
**Table 9: Growth rates of Real Agricultural Wages across the States between 1990 and 2000.**

State	Growth rate (%)
Andhra Pradesh	1.3
Assam	-0.7
Bihar	0.3
Gujarat	5.1
Haryana	2.7
Karnataka	3.2
Kerala	7.9
Madhya Pradesh	1.8
Maharashtra	1.6
Orissa	0.7
Punjab	-0.8
Rajasthan	2.8
Tamil Nadu	6.7
Uttar Pradesh	2.5
West Bengal	1.6
All India	2.5

Source: Dreze and Sen (2002)

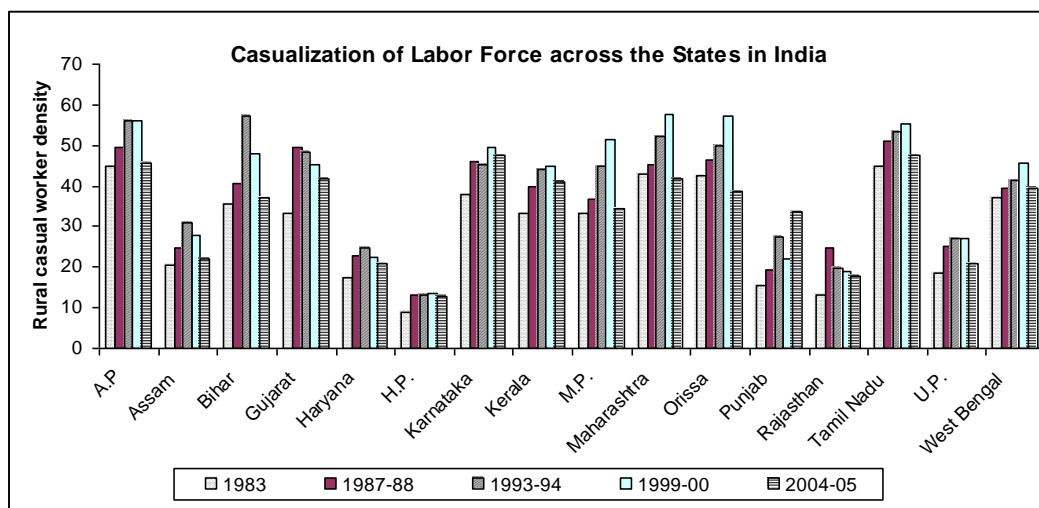
The absence of safety nets should not crush this entrepreneurial spirit. This phenomenon of inherent discrimination will have more difficult outcome for the sector in future if not dealt with squarely. Therefore, the State must come out with a strong safety net programme, market reforms and protecting the farm income. The recommendations go a long way in this direction

**Figure 4: Rural Employment by Principal Status under Usually Employed Category in India from 1983-2004-05**



Source: Government of India (2006): “Employment and Unemployment Situation in India 2004-05”, NSSO Report No. 515 (Part-I).

**Figure 5: Casualisation of Rural Workforce across the States in India**



Source: Based on the data from Bhalla et al (2004) p. 83-84 and “Employment and Unemployment Situation in India 2004-05”, NSSO Report No. 515 (Part-I).

## **Crop Diversification and Agricultural Labour in India**

It has been widely established that small and marginal farmers are more prone and vulnerable to weather and market induced risk due to their inability of producing either more number of crops or high remunerative crops. At the same time, increased specialization in foodgrains makes them more unviable especially when the economy is experiencing stagnancy in its yield with ever-increasing cost of production. With the lack of movement of labor out of agricultural sector, providing better and stable income to farmers becomes one of the major policy agenda. Diversification through shifting farmers towards crops that commands higher value for both land and labor becomes one of the most viable options in front of the policy makers to achieve this target. High value crops are found to be carrying great potential for broadening their income base and provide them employment for more number of days (due to HVCs being labor-intensive crops). There are instances of such impact in India. For example, it was estimated that one hectare shift in area from wheat to potato would generate 145 additional man-days. Similarly, one hectare from coarse cereals to onions would generate 70 man-days of employment. There is not only a direct impact on income and employment by diversification but also indirect effects are also present. Increase in the importance of High value crops, especially fruits and vegetables, results in increased development of processing industry that demands labor for packaging, processing and other high value activities.

The rank correlation across states show trends in likely impact of diversification on labor absorption, real wages and casualisation of rural work force, especially in the 1990s. Early eighties the relationship was negative and it has changed the sign, mainly due to the process in a few states. But the labour absorption in the non-agricultural sector has an inverse relationship with the diversification in the across-states context. The influence on real wages is insignificant, but the process of casualisation of rural workforce is increasing. Above all the crop diversification has not brought in the desired growth effect.

**Table 10: Rank Correlation between diversification and variables relating to agricultural laborers**

Labour absorption Agriculture		Labour absorption Non-Agriculture		GR of Real Agricultural Wages 1990s	Rural Casual Worker Density	
1980s	1990s	1980s	1990s		1980s	1990s
-0.217	0.372	0.22	-0.28	0.18	0.017	0.096

Source: Calculations are based on the data by Chadha, G.K. & Sahu P. P. (2004), Bhalla et al (2004) p. 83-84 and data from Agricultural Statistics in India

## Conclusions

The decade of 90s witnessed stagnation in productivity, prices and consequent net agricultural income of the farmers. The distress was acute in some of the regions of the country and following elaborate debate in the National Development Council the PM declared a package to revise the agricultural sector and the Planning Commission decided that the sector should grow at 4 per cent per annum. The PM also underscored the stagnation by calling it as a technological fatigue and opted to revive the sector by introducing a new Green Revolution. In this context, diversification of agriculture featured as the main policy plan. The discussion on the process and implications of diversification began thereafter. On the positive side, it is felt that if the small and marginal farmers diversify into high density and high value crops and thereby improve their net farm income. The promise of exportable crops is also assume in this context. There are a few states in which diversification has been taking place in favour of the commercial crops but more in favour of rice and wheat. This trend is more perceptible during 90s as compared to 80s. On the negative side, diversification leads to thinly spreading the resources and mis-directing the engine of growth. More than that, it can have a detrimental effect on food economy if the commercial crops dominate in the process. In the Study above, we located that the crops and regions where more diversification has taken place, the growth effect has been depressing due to lack of technological support.

Diversification has an unintended externality on the labour market and labour welfare. In the process of economic reforms, the agricultural labour sector remains bypassed despite the fact that this is the most vulnerable among the population dependent

on agriculture. The growth in national income has very clearly indicated that the share of agricultural sector in the national income has been shrinking at a faster rate than the density of agricultural workers. As a consequence, the carrying capacity of agricultural sector has been increasing and faster during 90s. In the process of diversification, the labour absorption has been slowing down and casualisation of the labour force is increasing. The labour absorption experienced a detrimental impact and so also the growth in real wages. All these observations unanimously point out to the fact that diversification may have a depressing effect on the welfare of agricultural labourers and hence a proper safety net programme need to be organized if we cannot direct the growth process in the crop economy.

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