Trends in Rural Wage Rates: Whether India Reached Lewis Turning Point

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ABSTRACT

After liberalisation of Indian economy in early 1990s, India's GDP growth rates have been picked up and there is a sign of speeding up of structural transformation in Indian economy with the share of agriculture in GDP reduced to 12%. However, still about 50% of the labor force depends on agriculture, which shows that the structural transformation in employment is slower and productivity differences between agriculture and non-agricultural sector is growing. Some studies that the high economic growth has not been able to translate itself into increase in the wages and earnings of the workforce. Some other studies find that the majority of the labor benefited from the increased growth rates in GDP through its effects on the raising wage rates and productivity gains mainly in urban centres, however the trickle down effects of these benefits to rural areas is questionable. Many observe that since last decade, labor shortages in rural India have become an issue. Farmers in rural areas blaming it on employment guarantee scheme MGNREGA, but there is no concrete evidence to prove this, some are also claiming that the faster growth of the economy and non-farm sector are the main reasons, which is in fact is a good sign. However, there are no studies specifically test the theoretical and empirical issues of rising wage rates in India. In this paper, trends in rural wages are assessed along the Lewis continuum through wage rates data. Our results show a clear rising trend in real wage rates since 1995, and then accelerated from 2007 onwards at least in developed states like Punjab, Haryana and Tamil Nadu. Less participation in public works program in Punjab and Haryana also indicates no surplus labor. This confirms that at least developed states in India crossed the Lewis Turning Point. The acceleration of real wages even in slack season indicates that the era of labor shortage is started in rural areas especially in developed states like Tamil Nadu, Haryana, Punjab and Andhra Pradesh, which needs to be tackled through labor saving technology and wide scale farm mechanisation. On the other hand it appears that the underdeveloped states like Madhya Pradesh, Uttar Pradesh and Bihar are not reached the LTP and needs to develop policies to increase productivity of rural labor in these backward states.

Keywords: lewis model, labor market, rural, India

1. INTRODUCTION

Structural transformation in an economy shift labor from agriculture to non-agricultural sectors and from rural to urban areas. In the initial stage of development, most people remain in rural areas, engaged in agricultural production. Most of these rural and agricultural workers are underemployed and their marginal productivity is almost zero. The urban and industrial sector can absorb this surplus labor without upward pressure on rural wages and until surplus labor is exhausted. Therefore there is a period of urban and industrial growth at the ongoing wage rates. This happens in the initial years of the development. However, as the urban and industrial sector develops to the point where the supply of labor from the rural and agricultural sectors becomes limited, urban and industrial wages begin to rise quickly, with

its spill over effects on rural and agricultural wages resulted in rising wage rates in rural areas. Based on the past experience of developed countries, Lewis (1954) first conceptualized this progression of economic transformation. The structural change from an excess supply of labor to one of labor shortage is documented in progress of many developed and developing countries as Lewis Turning Point (LTP).

Since the 1990 economic reform, India has experienced rapid economic growth, the traditional Hindu rate of growth (3% per annum) is the past, now it is growing at about 8% per annum mostly driven by service and industrial sectors (Figure 1A). The growth of agricultural sector is now about 3 to 4% per annum, where as the growth of industry and service sectors is about 10-12% per annum. Share of agricultural sector reduced from 41% in 1973 to 14% in 2012, with consequent raise in non-agricultural sector from 59% to 86% of the GDP. The share of labor dependent on agriculture decreased from 74% to 50% and share of labor dependent on non-agriculture increased from 26% to 50% during the same period. The wage gap between non-agriculture and agriculture further increased from 3.5 to 4.0 to about 6.3 during the same period (Figure 1B). As a result, a large number of laborers moved from the agricultural to the non-agricultural sectors. The growth is concentrated in urban sector; this resulted in wide scale migration of labor force from rural areas to urban areas.

As a result of increased rural-urban migration, many villagers perceive labor shortages which adversely effects rural economy. As labor became more costly, many farmers are abandoning agriculture agricultural production and some are shifting to wide scale farm mechanisation. These structural changes increases demand for high skilled labor even in rural areas with higher premium on skilled laborers.

Figure 1A. Sectoral composition of GDP

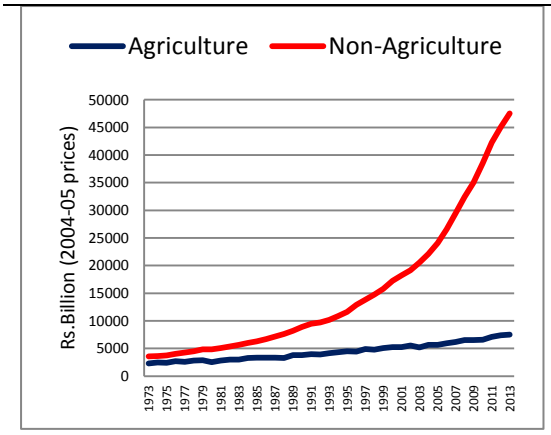
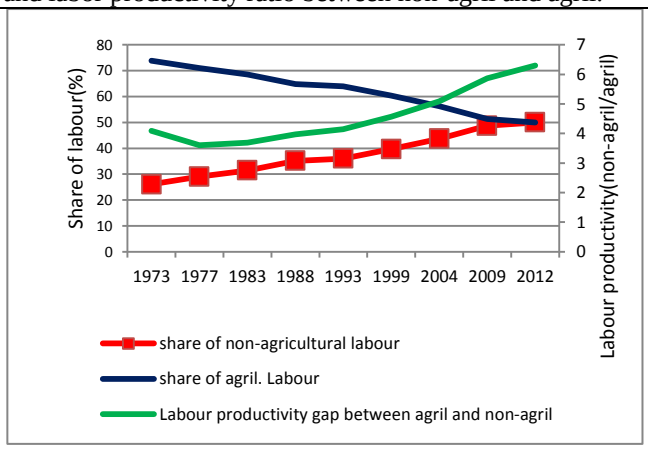


Figure 1B. Share of labor in agriculture and non-agriculture and labor productivity ratio between non-agril and agril.



The hypothesis of labor shortage, if confirmed, will have important implications for income distribution. The labor shortage will give workers more bargaining power, resulting in a more rapid rise in wages. Higher rural wages will likely reduce gap between rural–urban labor productivity. Higher rural wages and productivity increase local demand. Labor shortage in rural areas also require to adopt new polices for increased farm mechanisation, facilitation of migration, skill development to increase labor productivity. Hence it is important to test whether labor shortage in India is a wide spread phenomenon and whether India reached the LTP across the sates. At present there were no studies addressed this important issue at macro as well as micro level. Our results show a clear rising trend in real wages since 1995 more particularly from 2007 especially in the developed states like Punjab, Haryana, Tamil Nadu

and Andhra Pradesh. And the acceleration of this rising trend since 2007, even in slack seasons, indicates that the labor shortage is a permanent phenomenon and era of surplus labor is over. This finding has important policy implications for India's future development.

This paper is organized as follows. Section 2 provides a conceptual framework for testing the LTP and a review of the related literature. Section 3 describes the data and methodology followed. Section 4 presents results and discussions which describes the wage patterns at all India level and also at state level for different types of rural works and also presents a wage equation to further test the LTP by controlling for local factors. The paper concludes in Section 5.

2. CONCEPTUAL FRAMEWORK AND LITERATURE REVIEW

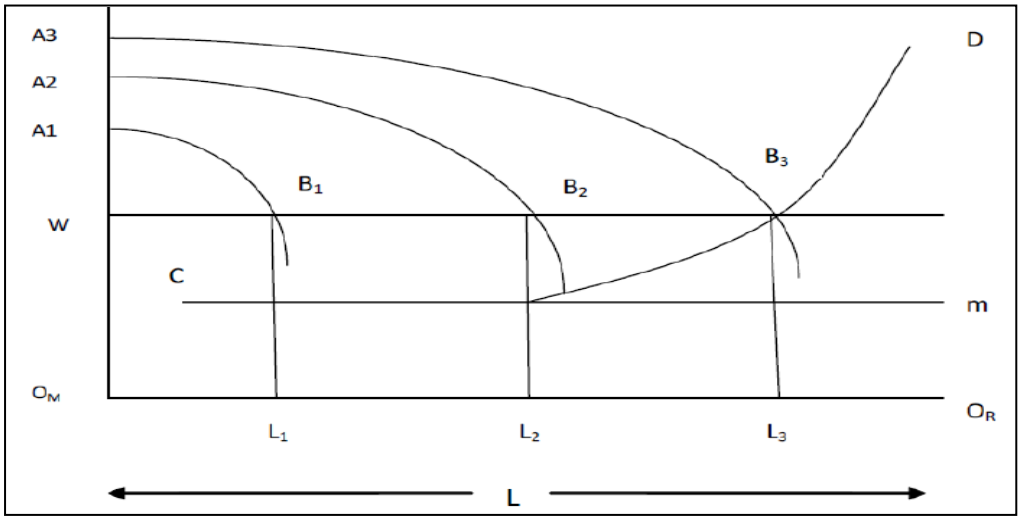
Following Basu (2000), Figure 1 illustrates the basic idea of the Lewis hypothesis in the transition from unlimited to limited labor supply during the process of economic growth. For simplicity, assume that a closed economy has an agricultural and an industrial sector. In rural areas, there is an oversupply of labor for agricultural production. Therefore the marginal product of labor is equal to the subsistence wage, m. In the industrial sector, however, employers have to pay a higher wage, w, for several reasons. First, the cost of living in cities, where most industrial activity occurs, is usually higher than in rural areas. Second, because migrant workers in the industrial sector must bear the psychological cost of separation from their families, higher wages must be offered to compensate them (Lewis 1954). There are other explanations for the wage gap between the two sectors. For example, Harris and Todaro (1970) argue that the higher urban wage is largely due to higher unemployment rates in urban areas, as a worker must be physically present in the city to look for a job there. It is noted from the figure 1B, that the non-agricultural productivity (incomes) is about 6 times higher than that of the agricultural productivity and the gap is increasing in recent years.

Conceptual model of LTP

L is the total size of the labor force (aside from population growth), with OR representing origin in the rural sector and OM origin in the urban sector. The curve CD represents the marginal product of labor in the agricultural sector, being flat over a wide range. The marginal product of labor in the industrial sector is represented by AB, which is higher than that in the agricultural sector and exhibits a downward slope.

The process of economic development can be divided into three stages. The first stage is between points B_1 and B_2 , with the initial marginal output of labor in the urban sector being represented as A_1B_1. With corporate profit maximization as the goal, the marginal output of labor will be set equal to the wage level (w), which would be represented at equilibrium in B_1. Corresponding to this, total urban employment is shown as O_ML_1, whereas the rural labor force is represented by O_RL_1 at the subsistence wage level (m). As entrepreneurs earn a profit and reinvest some of it in production, the total stock of capital increases. More capital stock means a higher marginal product of labor. This is reflected by the rightward shift of the marginal product of labor in the urban sector from A_1B_1 up to A_2B_2. The transfer from rural to urban areas is composed only of surplus rural labor, which has no impact on wage levels. The rural workers are paid at the fixed subsistence wage level (m), and the urban wage remains constant at w. This phase is one in which there is an unlimited supply of rural labor.

Figure 2. Lewis Turning Point



At point B_2, the marginal product of rural labor starts to exceed the subsistence wage level (m); from then on, therefore, the rural wage rises. The urban wage will remain at w until the marginal product of urban labor shifts to B_3. The range between B_2 and B_3 is the second stage. In this phase, only the rural wage rises while urban wage remains constant. After B_3, economic development enters the third phase: labor shortages become a national problem, with wage levels going up in tandem in both sectors. If one focuses only on the rural sector, the LTP is at B_2. For the economy as a whole, the turning point occurs later, at B_3. According to this model, the real wage rate rises first in rural areas and second urban areas. Therefore a sudden upward shift in the rural wage is likely to predict a national labor shortage down the road.

This conceptual model offers some insights into the measurement and testing of the LTP. First, it is necessary to look at a long time horizon to gauge the LTP. Suppose, in examining only the first stage of development (B_1B_2) as shown in Figure 1, one were unable to identify the turning point. By examining the economic development process of Taiwan and South Korea over a long period ranging from the colonial era to the phase of export-oriented development, Fei and Ranis (1975) showed that these economies achieved a gradual shift in labor from rural to urban areas, with wage patterns consistent with the predictions of the Lewis model. The rapid economic transformation of India over the past three decades provides another ideal setting to test the LTP.

Second, wages are a good barometer for testing the LTP. Cai and Wang (2008) were showed that China has begun to face labor shortages. They first estimated the remaining labor force based on the labor needs of various production activities in rural areas. They then subtracted migrants and the required agricultural workers from the total rural labor force to obtain the available surplus labor, which they estimated at about 107 million. However, owing to lack of systematic statistics on migrant workers, this estimate depends upon several underlying assumptions. It follows that differences in underlying assumptions may translate into large discrepancies in the supposed amount of surplus labor. Hence testing LTP by using wage rates is much more superior and not suffering from any methodological problems as that of based on supply and demand for labor

Several studies hold opposing views. Green (2008) argues that the tightening labor force in the cohort of 20–30 years old is temporary and will reach 190 million in 2010 and 215 million in 2015. He estimates that China's surplus labor force in rural areas in 2006 was on the order of 0.5 to 0.85 billion. Based on income data in rural and urban areas, Knight (2007) also challenges the view of the arrival of the LTP. He argues that from 1989 to 2005, average annual per capita real income in rural areas grew by only 5.8 percent, compared with the 8 percent growth rate of the annual urban real wage. He attributes the recent substantial increase in per capita income in rural areas not to a structural labor shortage but to favorable government policies, such as infrastructure investment and the abolition of agricultural taxes.

A report by the World Bank (2008) also dismisses the idea that China has reached the LTP, mainly in the following three respects. First, the wage escalation in the coastal region reflects an adjustment from a previously very low wage level. Second, the widespread use of mechanization and other labor-saving technologies released labor from agricultural production and enlarged the surplus labor force. Finally, the official reports of double-digit wage increases are based mainly on surveys of workers in state-owned and large private enterprises. The real wage increase among unskilled laborers may have been much lower.

Authors own studies examined the interlinkages between agriculture and labour markets in Andhra Pradesh and India (Reddy and Kumar 2006; Reddy 2010; Reddy 2011; Reddy and Kumar 2011; Reddy and Bantilan (2013); Reddy, 2013; Reddy (2004); Reddy (2006); Reddy (2009a); Reddy (2009b); Reddy (2010b); Reddy (2011a); Reddy et al., (2011))

3. DATA AND METHODOLOGY

There are only few studies to test LTP in the developing countries mostly concentrated in China and East Asian countries. There no study specifically examining the LTP in the Indian context. Given that the estimates of labor supply and demand vary according to methodology and source of the data, there is a valid reason to use only rural wage rates to test the LTP (B_2). Hence, we examined the evolving patterns of rural wages based on the data collected by buero of labor, government of India in major states of India. The study covers detailed information on wage rates for the period of 1995–2012. To our knowledge, this is one of the first quantitative empirical studies based on long-term rural wage data to analyze the LTP. As shown in the conceptual model, it is possible to test the LTP using rural wages only. The study is conducted with the following objectives (i) To test whether rural wage rates started increasing, (ii) to test the pattern of wage rates across sectors and states (iii) to assess the causes for increasing wage rates.

The data on wage rates are published by the Labor Bureau on a regular monthly basis in its monthly publication Indian Labor Journal. Wage rate data is collected in respect of three agricultural and four non-agricultural occupations entailing manual work under the common framework of data collection of retail prices for Consumer Price Index (CPI) for Agricultural and Rural Laborers across major states, namely, Andhra Pradesh, Bihar, Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal. The selected occupations for which daily wage rates are collected every month are: (a) Agricultural Occupations - (i) ploughing, (ii) sowing, (iii) harvesting; (b)

Non-agricultural Occupations – (iv) carpenter, (v) mason(skilled construction worker), (vi) tractor driver, (vii) unskilled labor (un-specified).

The average wage rates at all-India level are derived by dividing the sum total of wages of all the 13 major states by the number of quotations collected by the Labor Bureau. State-wise averages are estimated only for those occupations where the number of quotations is five or more. However, for working out all-India averages, all state level quotations are taken into account to arrive at total number of quotations at all-India level. At the all-India level also, the number of quotations for working out occupation-wise averages are restricted to five or more. The data is deflated by using monthly Consumer Price Index for Agricultural Laborer to get constant prices of 2011. All our analysis is at constant prices of 2011. The simple mean, compound annual growth rates, regression analysis is used to test the changes in the trends of the wage rates and factors influencing them. A wage equation is estimated the coefficients on time variables after controlling for regional and work type variables.

4. RESULTS AND DISCUSSION

Given that the starting point of LTP is raising rural wage rates due to shortage of labor in rural areas and migration of surplus labor from rural to urban areas, figure 3 depicts decadal growth in population and migration trends at national level. It is interested to see that the decade 1961-71 recorded the highest growth in rural population, then after there is a deceleration. While in urban areas the decade 1971-81 recorded highest growth then after there is a decline. The decrease in decadal growth in population started early in rural than urban India. A steady increase in internal migration has been witnessed in the post reform era from 24.8 percent in 1993 to 28.5 percent in 2007/08; mostly from rural to urban areas might be the reason for decline in rural population (Kundu and Gupta, 1996). Given India's large geographical diversity across states, each state is at different demographical and economic transition stages, which is reflected in huge differences in net in migration from each state(Figure 3A). For example the developed states, Gujarat, Haryana, Karnataka, Punjab, Tamil Nadu and Maharashtra reported in migration, while underdeveloped states like Bihar, Orissa, Uttar Pradesh and Madhya Pradesh reported significant outmigration. So it is important to test LTP across states. It is also to be noted that Indian rural sector is dominated by small and marginal farm holdings (less than 2 ha), which are not amicable to wide scale farm mechanisation, which is also one of the reason for steady labor demand for agricultural sector for casual laborer even at higher wage rates.

Figure 3 A. Decadal growth rate of population (%)

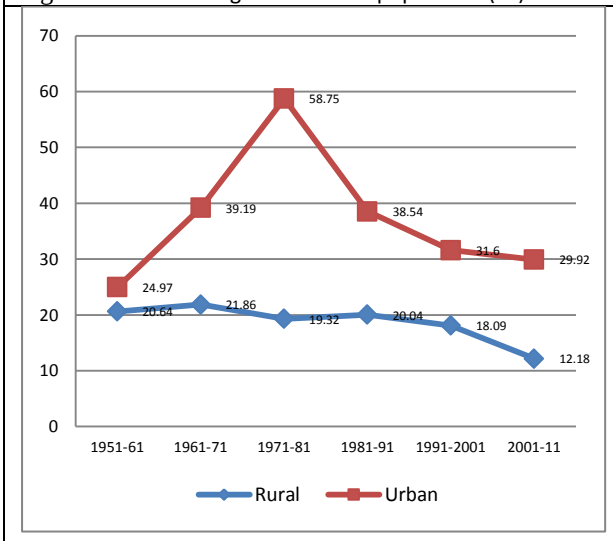
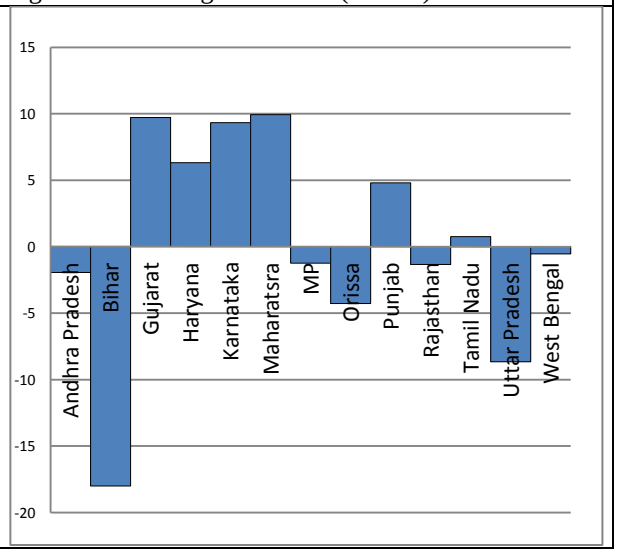


Figure 3B. Net migration rates (2007/8)



As shown in the conceptual model in Section 2, a shortage of rural labor should be reflected by an increase in real wages. A national labor shortage is likely, eventually, to trickle down to remote poor areas. Therefore examining the evolving patterns of real wages in rural India across developed and developing states should help to reveal whether India has reached the LTP nationwide.

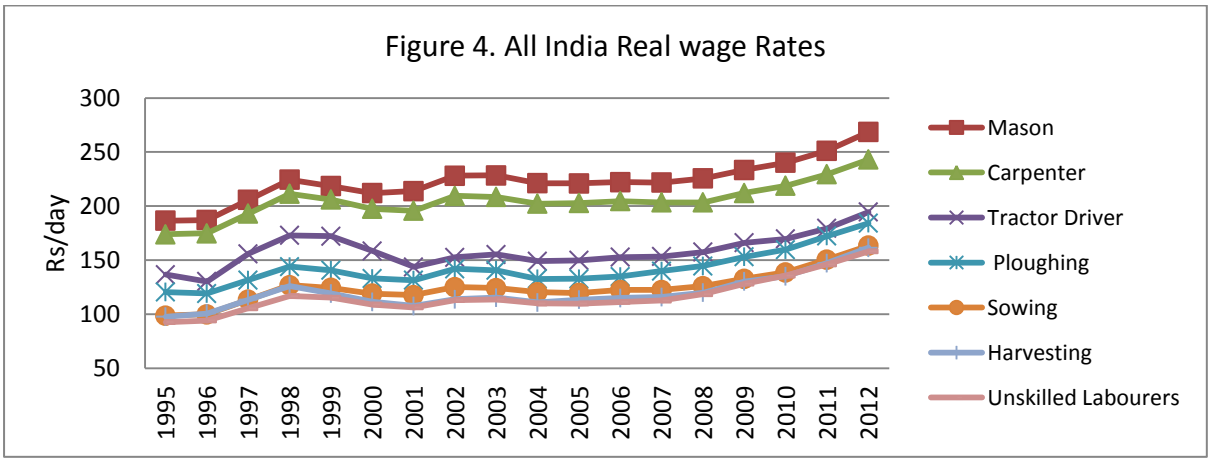
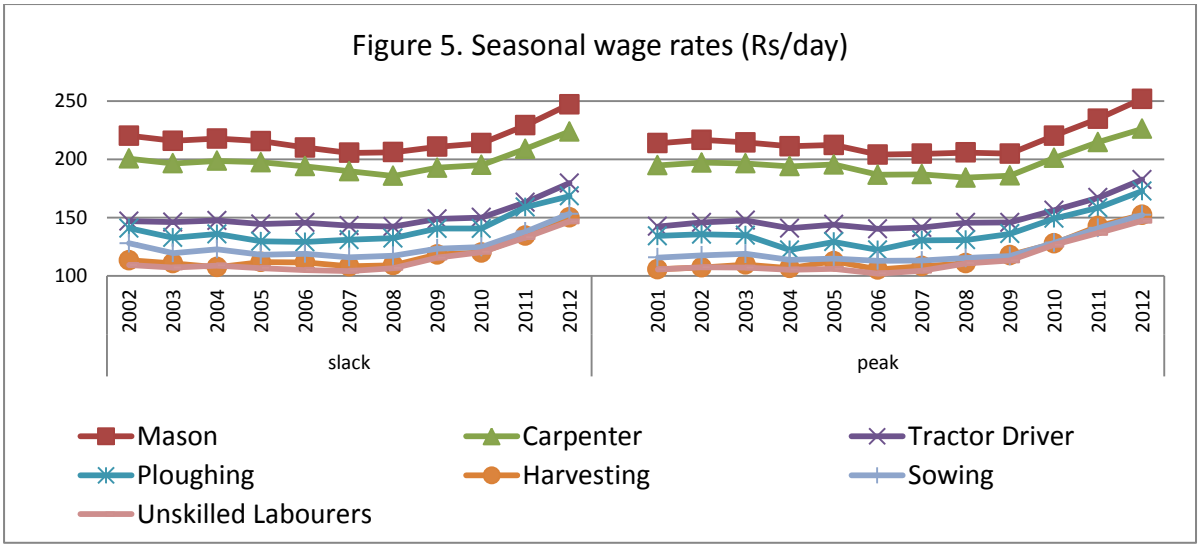


Figure 4 depicts the real wage rates of selected work types in rural India from 1995 to 2012. At all India level, there is an upward movement in wage rates since 2006 onwards. The wage rates for mason and carpenter are much above all other wage rates, as both these require specialised skills, then followed by tractor driver. Among agricultural wage rates, ploughing occupy highest wages followed by sowing, harvesting and the lowest recorded among unskilled laborer. It is interesting to see that from 1995 to 2005 there is almost no trend in wage rates among all work types, in confirmation with Lanjouw and Murgai (2009).

Work type and wage rates in peak and slack seasons

In rural India, agricultural production is highly seasonal. During peak (harvest time) periods, the local demand for labor is much higher than it is during slack periods. A short-term labor shortage in harvest season does not necessarily means a chronic shortage of labor at other times. Therefore it is necessary to distinguish seasonal from permanent labor shortages. A LTP means that there is a labor shortage even in slack seasons. The wage rates in both clack and peak seasons were depicted in figure 5. It is confirmed from the figure that in slack season also wage rates increased steeply after 2007 onwards for all the categories of the work. However, from 1995 to 2006 the wage rates in both slack and peak seasons have not increased. Again the gap between non-agricultural and agricultural wage rates is much higher in both the periods.



Variation in wages across different categories is more distinctive among farm and nonfarm activities. It is observed that the real wages are highest for Mason followed by carpenter and lowest for the herdsmen and sweeper (Table 1). Over the years, the real wage rates for the activities such as well digging, Tractor driver and black smith has been increasing steeply. It is clearly evident that, the unskilled labor in non-farm activities is being paid more than many of the farm activities like picking, weeding, transplanting and threshing. The highest paid farm activity is ploughing, which is the most common field operation for almost all the crops. Again it is interesting to see that the annual growth rates are much higher during 2007-2012, while during 1995 to 2006 there is mixed picture, with some work types show negative growth.

Table 1. Annual Compound Growth rate of wage rates in slack and peak seasons

Work type	Mean 2012 (Rs/day)	Annual growth rates			
		Slack		Peak	
		2001-07	2008-12	2001-07	2008-12
Mason(construction)	269	-1.3	4.5	-0.9	5.4
Carpenter	243	-0.9	4.5	-0.8	5.5
Well digging	231	-0.4	8.5	-0.7	10.3
Tractor Driver	194	-0.5	5.6	-0.4	5.9
Blacksmith	186	-1.7	4.9	-1.4	6.2
Ploughing	184	-1.4	6.1	-1.2	7.1
Sowing	163	-1.6	6.5	-0.7	7.4
Cane crushing	162	1.5	6.3	0.5	8.2
Harvesting	161	-0.5	7.7	0.2	8.3
Unskilled Laborers	158	-0.9	7.8	-0.5	7.6
Threshing	158	-1.3	8.8	-0.2	7.3
Transplanting	151	0.2	7.2	0.4	7.2
Winnowing	149	0.4	6.8	0.8	7.4
Picking	148	-0.3	8.1	-0.7	7.2
Weeding	145	-0.1	6.9	0.1	7.2
Cobbler	131	-1.4	3.9	-1.1	5.2
Sweeper	112	-1.9	5.7	-1.7	6.2
Herdsman	101	-2.3	8.0	-2.2	8.4

Inter-state differences in wage rates in peak and slack seasons during 2005-2012

Given that the visual data shows that the raising wage rates started in the mid 2000s, the growth rates have been presented from 2005 to 2012 for all the states by work type in both peak and slack seasons in table 2. There is a significant variation across the states in growth of wage rates. In Tamil Nadu and Andhra Pradesh wage rates have been increased steeply (more than 5% per annum) across all categories of the works in both peak and slack seasons during 2005-12. States like Karnataka, Maharashtra and Rajasthan were also showed significant increase in wage rates in some work types. In most of the state's growth rates for wage rates for harvesting, sowing and unskilled work showed more than 5% increase per annum. Even Orissa, Uttar Pradesh and Madhya Pradesh also showed higher growth in harvesting and unskilled works during peak seasons. Some states like Andhra Pradesh, Haryana, Punjab, Karnataka, Rajasthan, West Bengal and Orissa exhibited higher growth in slack season than peak season for some work types. This indicates, although there is a strong seasonality in wage rates, the seasonality wakening in some states for some work types. Overall the trend indicates that the growth rates of wage rates after 2005 have been much higher in states like AP, TN, Haryana, Punjab, Karnataka and Maharashtra. Even Orissa is picking up and wage rates increased more than 6% per annum for many work types even in

slack season. However, Gujarat, MP and WB showed slower growth in wage rates during 2005-12.

Table 2. Annual compound growth rates of wage rates (2005-12),

Year	Mason	Carpenter	Tractor Driver	Ploughing	Sowing	Harvesting	Unskilled Laborers
	High wage rate states						
Tamil Nadu (P)	7.8	7.8	7.1	6.4	6.9	7.8	7.1
Tamil Nadu(S)	6.7	6.3	6.2	5.4	5.8	7.1	6.6
Andhra Pradesh(P)	5.7	5.7	6.9	9.6	9.4	8.7	8.2
Andhra Pradesh(S)	5.6	5.9	5.5	10.2	7.7	9.0	8.4
Haryana(P)	1.6	3.3	3.7	6.3	4.8	3.3	5.0
Haryana(S)	1.4	3.4	3.0	4.3	4.1	3.5	5.3
Punjab(P)	2.5	2.3	7.3	4.8	4.7	7.3	6.0
Punjab(S)	1.3	1.5	5.5	4.5	5.6	5.5	4.6
	Medium wage rate states						
Karnataka(P)	2.5	3.2	3.4	8.2	6.9	7.8	6.2
Karnataka(S)	2.1	3.0	4.1	5.7	6.2	7.0	5.7
Maharashtra(P)	2.6	2.2	4.4	6.3	6.2	7.0	5.5
Maharashtra(S)	1.3	1.4	3.5	4.8	5.1	5.0	4.0
Rajasthan(P)	3.3	3.0	2.9	3.3	4.4	7.9	6.5
Rajasthan(S)	3.3	2.1	2.0	4.8	0.4	7.0	6.6
West Bengal(P)	1.2	0.7	1.0	1.8	4.1	4.0	4.3
West Bengal(S)	0.3	-0.3	0.8	2.5	4.0	4.1	3.9
Gujarat(P)	0.3	-1.5	-1.5	0.5	-0.4	0.8	1.4
Gujarat(S)	-1.0	-2.5	-1.7	-0.3	-1.3	-0.3	0.6
	Low wage rates states						
Uttar Pradesh(P)	2.9	1.9	3.7	4.1	4.3	4.1	5.2
Uttar Pradesh(S)	1.7	0.6	2.9	2.1	3.4	3.2	4.0
Bihar(P)	1.9	1.3	2.0	4.5	4.1	3.1	4.6
Bihar(S)	1.0	0.3	1.7	4.1	2.8	2.1	3.7
Orissa(P)	1.6	0.8	-0.9	6.8	5.3	5.8	6.8
Orissa(S)	0.7	-0.1	-1.2	6.6	7.0	6.7	6.5
MP(P)	-0.6	-0.5	3.3	3.8	4.2	5.2	4.1
MP(S)	-4.8	-1.0	1.8	2.2	2.2	2.5	3.6
All India(P)	2.5	2.3	3.4	4.5	4.1	5.0	5.2
All India(S)	1.8	1.6	2.7	3.8	3.4	4.0	4.7

Note: P=peak season; S=slack season

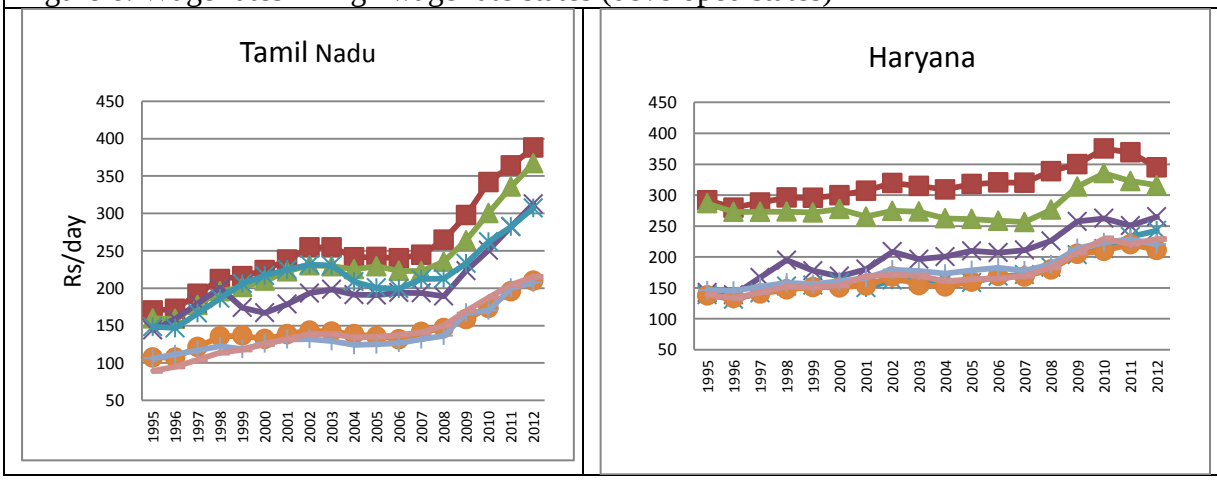
Wage rates across the states

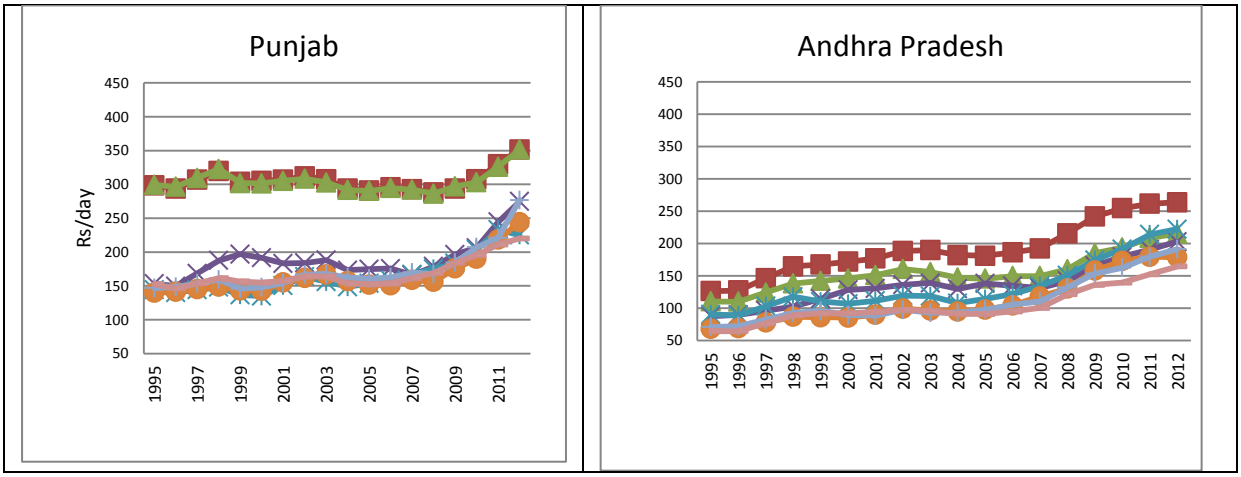
We have grouped the states in to high wage rate states, medium wage rate states and low wage rate states for the analytical purpose based on the level of wage rates. The high wage rate states are TN, Haryana, Punjab and AP where the wage rates are higher than other states

in 2012. The medium wage rate states are Rajasthan, WB, Karnataka, Maharashtra and Gujarat. The low wage rate states are Bihar, Orissa, UP and MP.

In TN, until 2006 wage rates are low, but sudden steep rise in wage rates lead by the non-agricultural sector (mason and carpenter) wages occurred then after, spill over effects of higher wage rates in non-agricultural sector leads to increase in agricultural wage rates also. In the state the gap between non-agricultural and agricultural wage rates are highest among all states. The TN economy recently undergone higher urbanisation along with steep increase in non-agricultural sector growth resulted in higher growth in non-agricultural wage rates even in rural areas. Further in TN the urbanisation is lead by small towns and cities, unlike Maharashtra, where it is lead by only one city Mumbai. Unlike TN in Punjab and Haryana wage rates are already at higher level for both agriculture and non-agricultural sectors, however, the gap is much higher (non-agricultural sector at Rs.300/day, while agricultural sector is about Rs.150/day). Until 2007 the same wage rates are exists in both the states, but suddenly increased from 2007 onwards. The rate of increase of agricultural wages is much higher than non-agricultural wages, resulted in narrowing gap between agricultural and non-agricultural wage rates. The high wage rates in Punjab and Haryana is mainly due to higher per capita incomes in these two states even before 1995 mostly lead by prosperous agricultural sector. Andhra Pradesh picture is quite different; its wage levels are much lower in 1995 both in agriculture and non-agriculture. But the steady rise in agricultural wages started before all the states that is 1995 onwards, but accelerated after 2006 mainly driven by steady growth in the economy and good governance and also wider adoption of public works program Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) Lagrange and Ravallion (2012).

Figure 6. Wage rates in high wage rate states (developed states)





For analytical purposes, the entire period is divided in to period-I (1995-2004) and period-II (2005-2012) and estimated growth rates of wage rates for period-I and II and also overall and presented in table 3. The growth rates in period-I are mostly below 5% per annum, while during period-II are more than 5% in many states for most of the work types. In period-II, wage rates for unskilled workers and ploughing increased by more than 5% per annum in high wage states. In harvesting except Haryana in all these states wage rates increased by more than 5% per annum. The growth of wage rates are somewhat lower for other work categories, but still recorded much above the period-I. It is interesting to see the public works program created a few work days in both Punjab and Haryana, but more in both AP and TN to meat steady labor supply by providing stead demand for labor in slack season. In line with our hypothesis, during period-II, growth in wage rates are higher in all states for all work types. The low level of participation in guaranteed employment programs (public works program) in both Punjab and Haryana indicates that there is almost no surplus labor in both these states, as they are developed and all labor is absorbed either in productive agriculture and non-agriculture.

Table 3. Annual compound growth rates of wage rates in high wage rate states (developed states)

State	Period	AP	Punjab	Haryana	TN	All India
Unskilled	P-I	3.5	5.0	0.7	2.6	3.6
	P-II	7.1	7.4	5.8	5.8	5.1
	Over all	2.9	4.3	1.7	2.9	2.9
Ploughing	P-I	2.5	1.0	2.1	5.1	1.3
	P-II	10.3	6.3	6.4	6.5	4.7
	Over all	4.7	2.7	3.0	3.0	1.7
Harvesting	P-I	3.0	2.0	2.4	1.3	1.0
	P-II	10.3	8.1	4.1	7.2	5.1
	Over all	5.2	3.1	2.6	2.5	1.8
Sowing	P-I	5.1	3.1	1.8	1.7	2.1
	P-II	4.2	6.8	4.9	6.9	4.3
	Over all	2.2	2.8	2.7	2.3	1.9
Tractor	P-I	3.2	3.9	1.9	2.5	3.7
	P-II	2.5	4.0	6.6	7.5	4.5
	Over all	2.2	3.4	1.9	3.0	3.0
Mason	P-I	1.2	0.1	2.5	4.6	2.0
	P-II	2.1	2.4	3.5	7.8	2.7
	Over all	1.5	0.2	1.4	4.0	1.4
Carpenter	P-I	-0.5	4.3	-0.2	4.5	4.2
	P-II	4.0	2.8	2.4	7.6	-1.4
	Over all	0.8	1.5	0.2	3.9	0.8
MGNREGA works days per HH*		35.2	12.2	17.7	31.6	26.5

Note: *Average person days of Employment per Household (2007-12); P-I from 1995 to 2004 (pre-MGNREGA) and P-II (post-MGNREGA) is from 2005 to 2012.

Wage rates in less developed states

In compared to high wage rate states, in less wage rate states (Bihar, Orissa, UP and MP) wage rates are lower in 1995 both for non-agriculture and agriculture. The increase in wage rate is not also less compared to high wage rate states except UP. These four states are predominantly agrarian states with less urbanisation. The growth in wage rates in Orissa in UP are somewhat higher than MP and Bihar for the whole period. As in these low wage rate states, there much surplus labor available even now due to their high population density, some states also reported reverse migration during period-II, mainly due to picking up of the economy and wage rates. These four states are suffered from historical low economic growth until recently due to historical and geographical reasons. Hence the people used to migrate to other states like Punjab, Haryana and cities like Delhi and Mumbai in search of employment. However, growth in these states also picked up after 2005, resulted in reduction of out migration and there are some reports the reverse migration picked up. But given the huge surplus pool of labor force, these states take much longer time to pass LTP. In fact in MP the wage rates in all

work types are almost stagnant during period-II, which indicates that the economic growth is not able to absorb surplus rural labor and labor productivity is almost stagnant.

Figure 7. Wage rates in low wage rate states (less developed states)

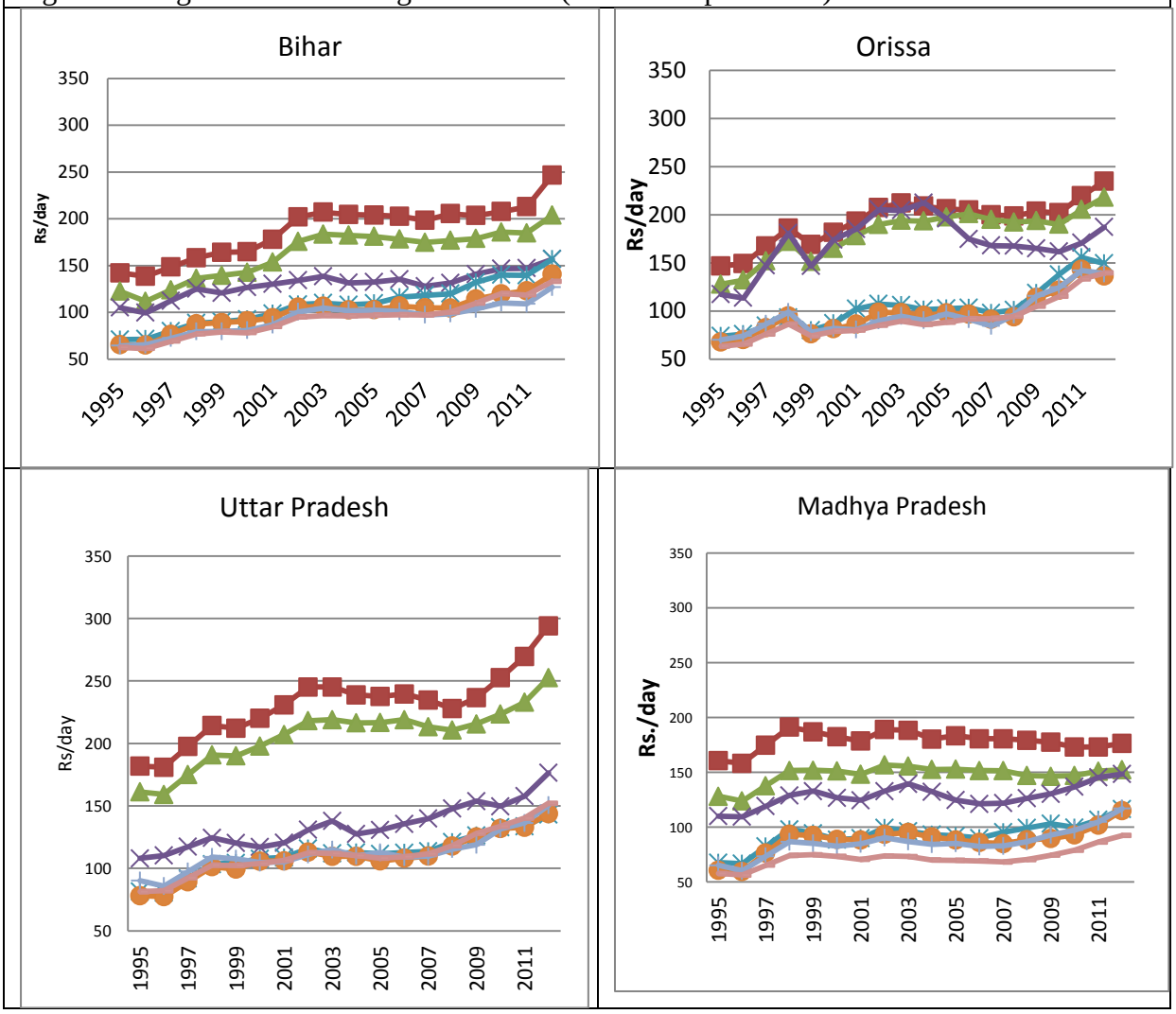


Table 4 presents the growth rates wage rates in low wage rate states. It indicates that most of the work categories reported less than 5% per annum growth rates in both period-I and II in these states. There is no significant increase in growth rates in period-II compared to period-I in most of the states and work types. In both MP and UP there are many work types which recorded deceleration in growth rates during period-II, which indicates that in these states economic growth, structural transformation and government public works program put together are not able to accelerate the rural wage rates. Hence, for these states ((Bihar, Orissa, MP and UP), we reaching LTP takes much longer time. It is to be noted that the public works program (MGNREGA) is also not able to pick up in the surplus labor states like Bihar is an indication of lack good governance rather than the absence of surplus labor as in the case of Punjab and Haryana.

Table 4. Growth rates of wage rates in low wage rate (less developed) states

State	Period	Bihar	Orissa	MP	UP
Unskilled	P-I	5.4	4.5	2.4	4.1
	P-II	4.7	5.3	4.3	1.6
	Over all	3.9	3.1	1.6	1.5
Harvesting	P-I	2.6	2.2	2.1	3.5
	P-II	4.4	7.2	0.7	4.7
	Over all	2.2	3.2	0.9	2.3
Sowing	P-I	4.2	5.7	4.7	4.4
	P-II	4.5	4.0	3.5	-0.2
	Over all	2.8	3.5	2.1	1.8
Tractor	P-I	3.0	2.1	4.5	2.3
	P-II	4.5	3.7	-0.6	3.0
	Over all	2.8	2.4	1.8	1.0
ploughing	P-I	5.3	4.1	3.7	4.0
	P-II	4.8	7.0	3.2	3.7
	Over all	4.2	3.6	2.1	2.7
Mason	P-I	4.8	4.2	1.5	3.8
	P-II	2.0	1.6	-0.7	1.3
	Over all	2.8	2.0	0.2	1.8
Carpenter	P-I	5.4	4.0	2.3	3.7
	P-II	3.5	6.3	-0.2	0.8
	Over all	2.5	3.2	0.6	1.7
MGNREGA works days per HH*		16.8	21.7	27.6	29.0

Wage rates in medium wage rate (medium developed) states

The trends in wage rates in medium wage rates states (Rajasthan, WB, Karnataka and Maharashtra) presented in figure 8. Among these states except WB, all other states recorded increase in wage rates especially during period-II. In Rajasthan the wage rates are increased during 1995 to 2003, but then after a slight decline are seen up to 2006, again from 2007 wage rates picked up. In Rajasthan the gap between non-agriculture and agricultural wage rates are higher than other states. The high wage rates in Rajasthan may be attributed to its low density of population and increased migration to large urban centres like Delhi for search of employment. The wide gap between non-agriculture and agricultural wage rates is an indication of lack skilled manpower to do non-agricultural works like mason and carpentry. On the other hand, the stagnating wage rates in both agriculture and non-agriculture in WB may be due to prolonged stagnation in economic growth and slower rate of structural transformation of the state. Both non-agricultural sector and agricultural sectors are stagnant in the state during the regime of the left party rule due to the inward looking policies and slow pace of economic liberalisation in the state. In contrast, both Karnataka and Maharashtra showed a steady rise in age rates, but the rise in wage rates are steeper in Maharashtra than Karnataka. Again the gap between non-agricultural wage and agricultural wages are less in these states. These two states experienced steady progress of the non-agricultural sector one is lead by Bangalore city which is information technology hub for the country and other is

lead by the largest urban conglomerate and business centre in India (Mumbai). This boosts the non-agricultural sector in these two states. Further due to wealth effects of large cities in these states and the large inflow of remittance money in to the villages, the reservation rate of the workers in the villages rapidly increased during the period-II.

Figure 8. Changes in wage rates in medium wage states (medium developed states)

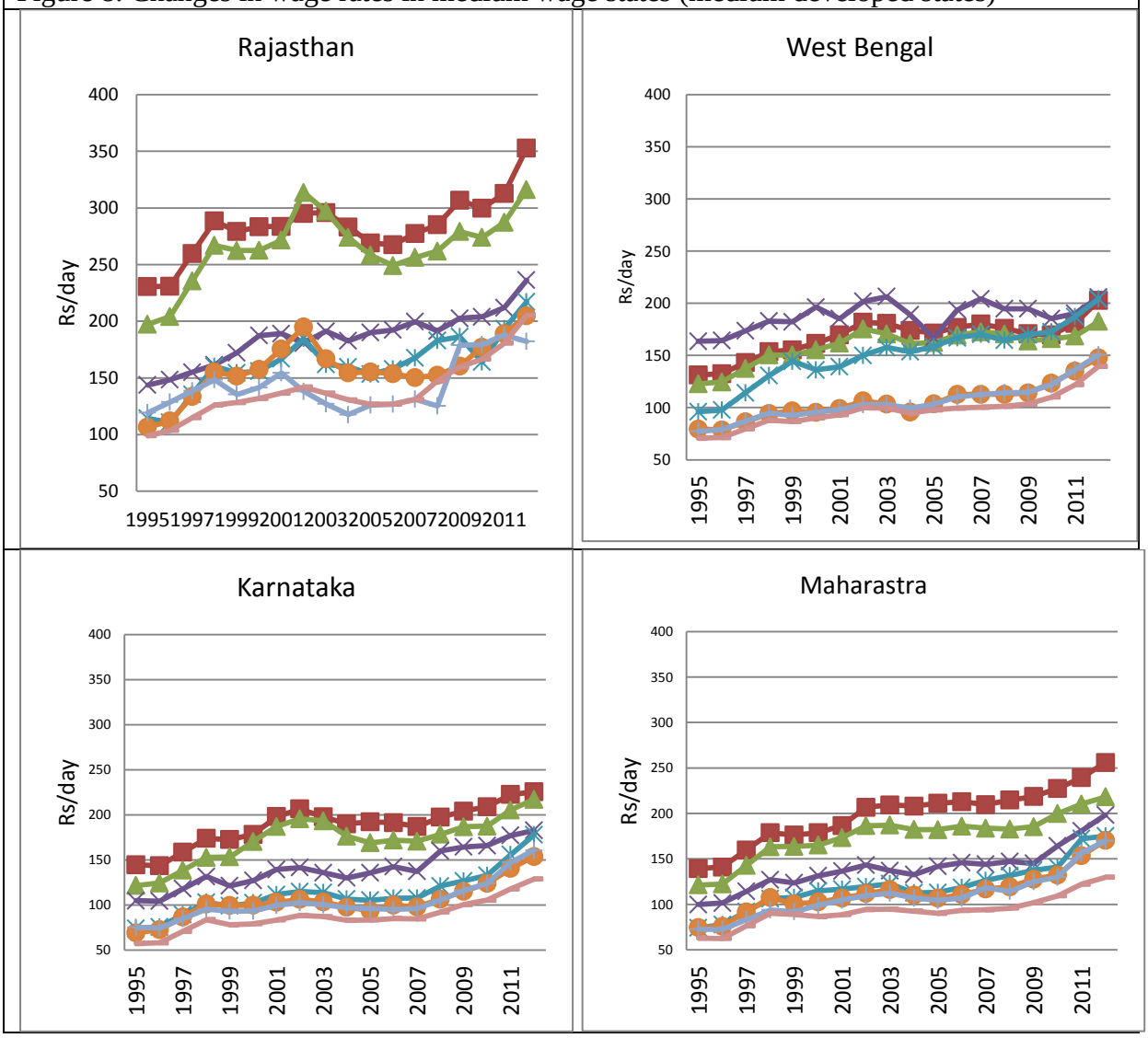


Table 5 presents growth rate of wages in medium wage rate states (Gujarat, Rajasthan, WB, Karnataka and Maharashtra). Overall, growth rates for unskilled wages are higher in Rajasthan, followed by Maharastra, Gujarat, WB and lowest in Karnataka during period-II. While ploughing wage rates are higher in Karnataka followed by Maharashtra, WB, Rajasthan and the least in Gujarat. Many medium wage rate states also reported 5% or above growth rate in wages in both period-I and II. But interestingly, the growth rates of non-agricultural wages (mason, carpenter and tractor driver) is less in period-II than period-I in all these medium wage rate states, indicating that there is an improved supply of skilled labor in these states in rural areas in these states, but it is to be noted that still there is large gap between wage rates of non-agriculture and agricultural sectors. Among these states, Rajasthan having significant public works programs running in the villages, followed by Karnataka and Maharashtra. Public works programs are not picked up in WB state even

though wage rates are quite low and growth of the economy is also low. This indicates that the public works programs are not able to increase the demand for works in low wage rate states as claimed by many studies. Overall, in rural areas in medium wage rate states, we are not able to conclude that the LTP is reached from the above trends in wage rates, except that there is a short term increase in wage rates in Rajasthan, Maharashtra and Karnataka. We can conclude that in the WB it take long time to reach LTP.

Table 5. Growth of wage rates in medium developed states

State	Period	Gujarat	Rajasthan	WB	Karnataka	Maharashtra
Unskilled	P-I	4.4	4.4	1.7	3.8	3.2
	P-II	6.5	9.0	5.4	4.5	6.9
	Over all	3.5	4.6	2.1	2.9	3.7
Harvesting	P-I	5.7	0.0	5.0	3.3	3.1
	P-II	2.8	6.9	6.8	7.9	4.7
	Over all	3.3	1.6	3.9	3.2	3.1
Sowing	P-I	3.7	4.0	4.6	4.0	2.9
	P-II	6.4	9.8	6.4	7.1	4.4
	Over all	3.4	5.6	3.5	3.0	2.9
Tractor	P-I	3.3	2.3	5.6	0.7	6.9
	P-II	2.5	1.3	6.6	3.5	-0.7
	Over all	1.9	0.8	4.2	1.0	1.5
Ploughing	P-I	4.6	4.5	5.5	4.7	5.2
	P-II	0.6	4.0	2.9	7.4	6.3
	Over all	2.4	2.5	3.6	3.6	3.8
Mason	P-I	3.9	3.6	3.9	4.6	4.7
	P-II	2.7	2.8	0.3	6.3	2.6
	Over all	2.1	2.0	0.9	3.9	3.0
Carpenter	P-I	5.6	3.8	1.7	4.7	4.9
	P-II	1.4	1.8	2.5	0.9	2.6
	Over all	3.0	2.0	1.2	2.5	2.7
MGNREGA works days per HH*		20.0	32.0	16.4	25.4	23.4

Wage rates in agricultural works and machine hours

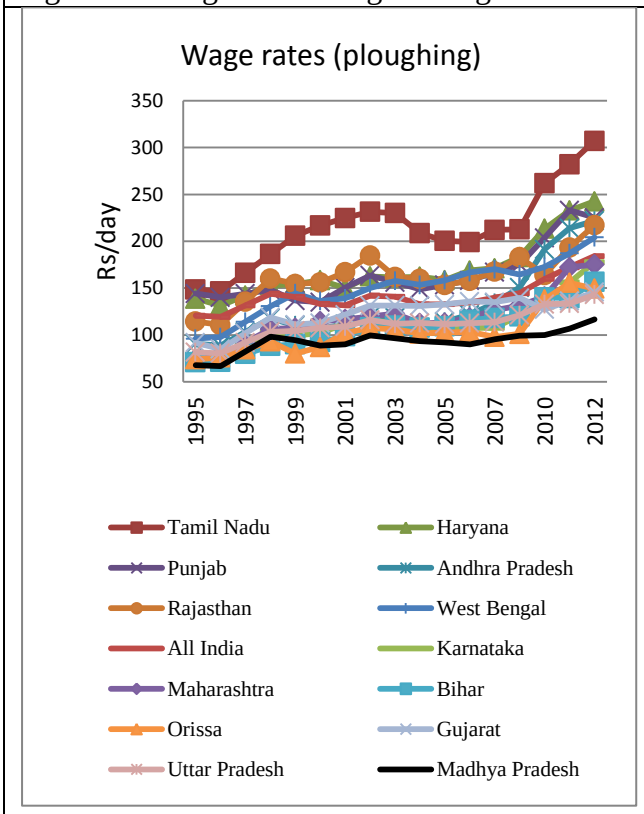
The difference in real wages to a large degree reflects the difference in demand for specific type of work in different states. In rural areas, most farming and local non agricultural jobs require heavy physical work, thereby placing a wage premium on hard work. It is interesting to see that the wage rates among different states for same type of work are more or less moving in the same direction, this shows some degree of integration of labor markets across the states. This is mostly facilitated by the large scale contract migration work, which is recent phenomenon in rural India. Wage rates for skilled laborer (ploughing and tractor driver) for various states are presented in Figure 9A. Wage rates for ploughing is higher than national average in TN, Haryana, Punjab, AP, Rajasthan and WB while lower in Karnataka, Maharastra, Bihar, Orissa, Gujarat, UP and MP. Wage rates for tractor driver also shows

more or less similar pattern. Wage rates for lower end works (unskilled laborer and sowing) were presented in figure 9B. The wages for unskilled workers are higher than national average in Haryana, Punajb, TN, Rajasthan and AP, but lower in UP, WB, Orissa, Bihar, Maharastra, Karnataka, Gujarat and MP. Wage rates for sowing are higher than national average in Punjab, Haryana, TN, Rajasthan, AP and Maharashtra, while lower in Karnataka, WB, UP, Bihar, Orissa, Gujarat and MP.

Wage rates in non-farm works

Wage rates for non-farm work (meson and carpenter) were given in figure 10. The wage rates for mason is higher than national average in TN, Rajasthan, Punjab, Haryana, UP and Gujarat, while lower in AP, Maharashtra, Bihar, Orissa, Karnataka, WB and MP. Wage rates for carpenter were higher than national average in TN, Punjab, Rajasthan, Haryana and UP, while lower in Gujarat, Orissa, Maharashtra, Karnataka, AP, Bihar, WB and MP. It is to be noted that wage for non-agricultural works are highest in TN (most urbanised state) and lowest in MP (least urbanised state). Wages for both agriculture and non-agricultural sector are higher in both Punjab and Haryana where the per capita agricultural productivity is highest. This indicates the integration of both agriculture and non-agriculture sectors in labor market to a large extent.

Figure 9A. wage rates in high end agricultural work



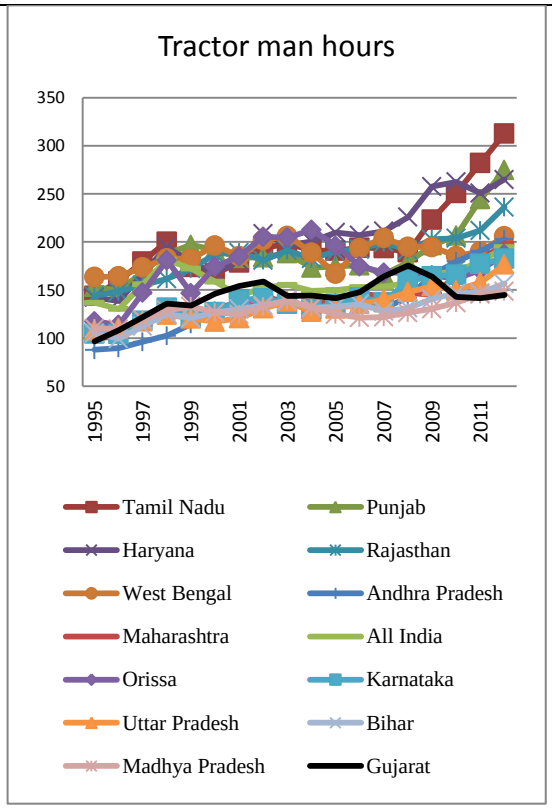
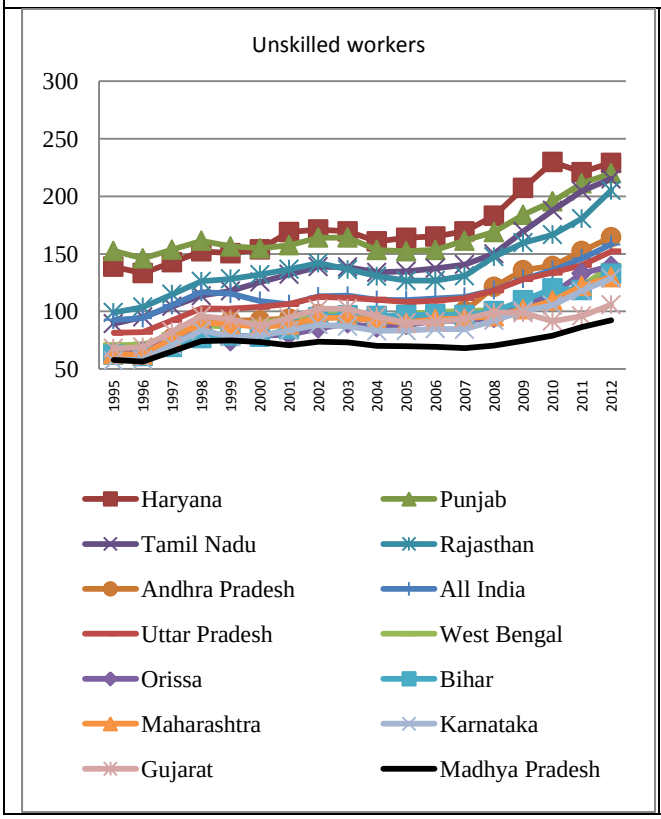


Figure 9B. wage rates in low end work



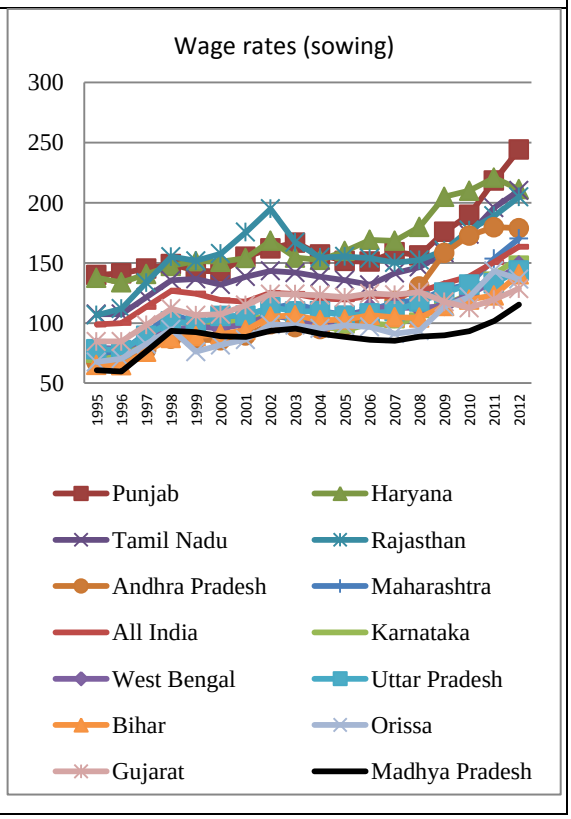
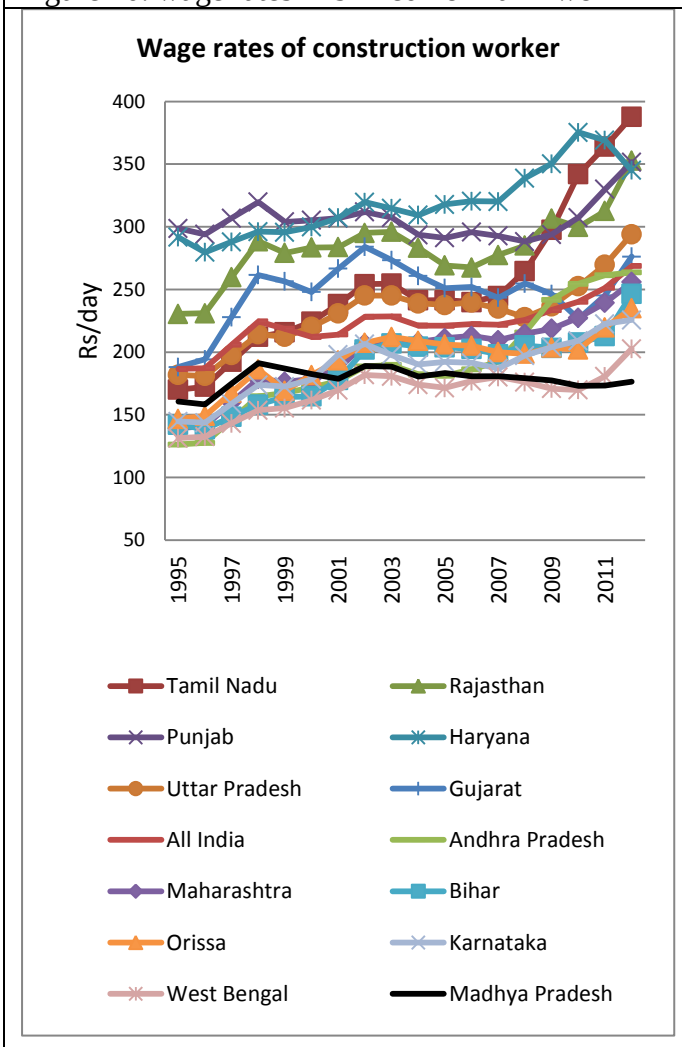
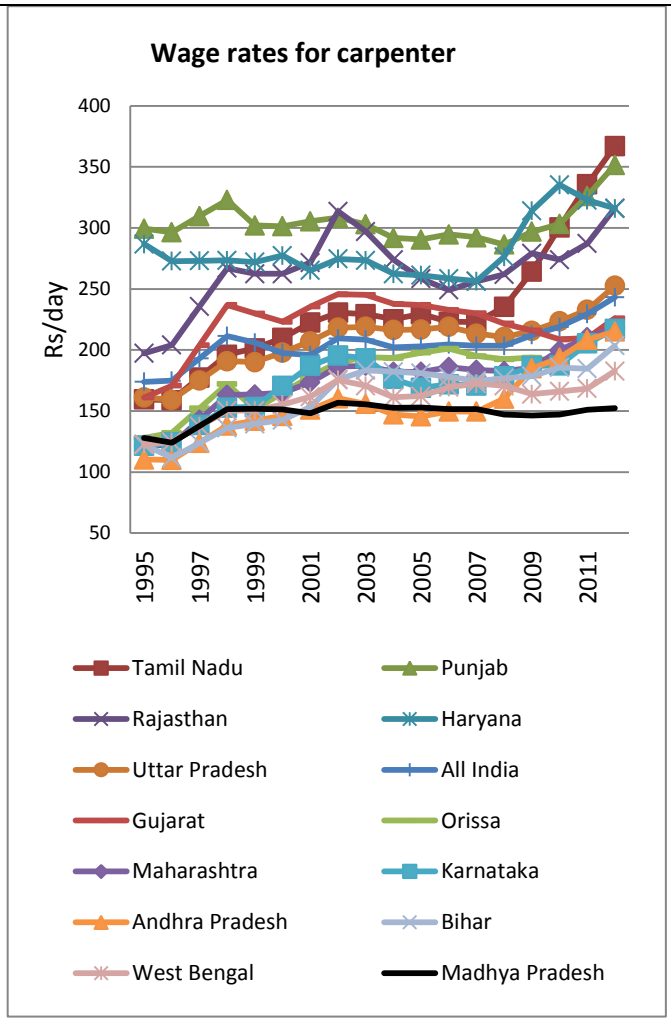


Figure 10. wage rates in skilled non-farm work





Wage gap between non-agriculture and agricultural wage rates

Figure 11 presents the ratio of non-agricultural wages to agricultural wages. This indicator provides the gap between non-agricultural and agricultural wage rates. The wage gap between non-agriculture and agriculture is higher in UP, followed by Gujarat, Rajasthan, Bihar, Orissa, Punjab, MP and Maharashtra than the national average, while lower in Haryana, Karnataka, TN, AP and WB. In most of the state and at national level the wage gap is reducing in rural areas. At national level the wage gap increased from 1995 to 2005, then after decreased. At all India level it increased from 1.5 in 1995 to 1.7 in 2005, then declined to again 1.5 in 2012. For UP the ratio decreased from 2.2 in 1995 to 2.1 in 2012, the maximum decline faced by MP from 2.4 in 1995 to 1.5 in 2012. For WB the ratio reduced from 1.1 to 1.0 during the same period. Overall, it shows that the convergence of wages in rural areas between non-agriculture and agricultural sectors as the surplus labor in agricultural sector exhaust in all the states. The results are also confirming there is a significant gap between non-agricultural and agricultural wage gaps (Haggblade *et al*., 2010)

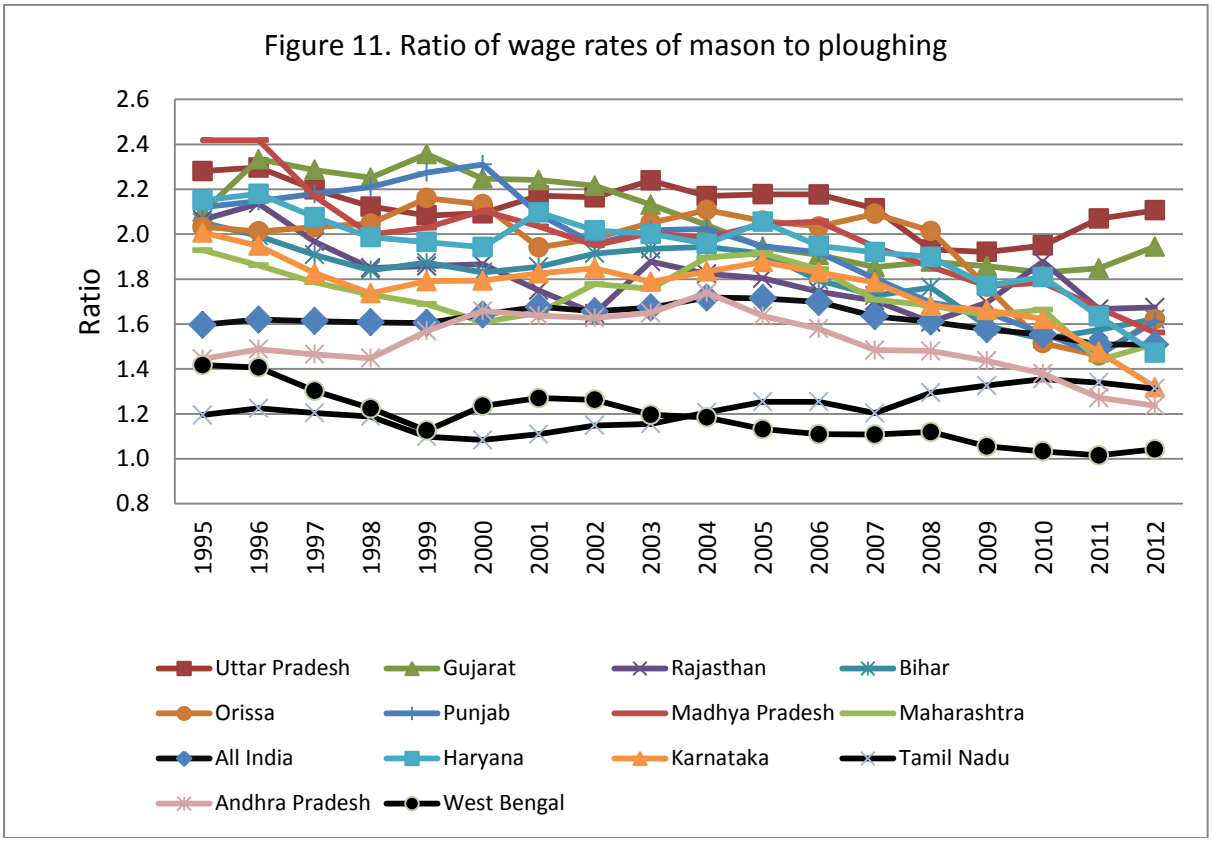


Table 6 present regression results of wage rates upon the state and work type dummies to know the influence of the state and work type on the wage rates. Most of the state and work type dummies are significant, hence we can conclude that the state and work type are significant factors in influencing the wage rates. The coefficient (β) explains relationship between dependent variable wage rates (Rs/day) and independent variables. If it is positive there is positive relation between depended variable (wage rates) and independent variables. In the polled regression Punjab, Rajasthan and TN state dummies are having significant positive association with wage rates. But all other states except Uttar Pradesh and Gujarat are having negative association with wage rates. It means wage rates are more in Punjab, Haryana, Rajasthan and TN and less in all other states. In the year 1996, state dummies for AP, Bihar, MP, Maharashtra, Orissa and WB were having significant negative association with wage rates; hence the wage rates in these states are significantly less than other states in the year 1996. The work types (tractor operator, mason and carpenter) were having significant positive association with wage rates in 1996. In the year 2012 wage equation, wage rates were significantly lower in Bihar, Gujarat, Madhya Pradesh, and Maharashtra. Wage rates in Punjab, Haryana, Rajasthan and TN were significantly higher in all three years (1996, 2004 and 2012), while only MP showed significant lower wage rates in all three years. In the recent year 2012, Gujarat wage rates are significantly lower than national average, may be due to the neglect of the rural sector at the cost of encouraging large scale industrialisation in urban areas. Among different work categories, mason, carpenter were earning significantly higher wage rates, while unskilled workers were earning significantly lower wage rates compared to workers engaged in ploughing in all the three years. It is interesting to see that the state and work type are explaining near about 85% of variation in wage

rates. Overall, the results are confirming the earlier findings that the Punjab, Haryana, TN and Rajasthan are having much higher wage rates compared to national average and MP is having lower wage rates. These results confirming that at least Punjab, Haryana and TN crossed LTP, while it takes much more time for MP to cross LTP. Again the results confirming that the wage rates of non-agricultural skilled workers are much higher even in rural areas.

Table 6. Wage equation: Influence of work category (dependent variable wage rates Rs/day)

	pooled data from 1996 to 2012		1996 year		2004 year		2012 year	
State	β	t	β	t	β	t	β	t
Andhra Pradesh	-21.4*	-3.9	-40.7*	-3.9	-28.6*	-2.8	9.2	0.8
Bihar	-30.6*	-5.6	-42.0*	-4.0	-17.2	-1.7	-30.0*	-2.6
Gujarat	-6.8*	-1.3	-15.2	-1.4	6.9	0.7	-33.0*	-2.9
Haryana	68.7*	12.6	46.9*	4.5	53.4*	5.2	65.1*	5.7
Karnataka	-26.1*	-4.8	-36.2*	-3.4	-23.7*	-2.3	-18.2	-1.6
Madhya Pradesh	-42.2*	-7.7	-38.8*	-3.7	-34.6*	-3.3	-65.0*	-5.7
Maharashtra	-20.1*	-3.7	-36.1*	-3.4	-14.5	-1.4	-8.0	-0.7
Orissa	-22.2*	-4.1	-32.2*	-3.1	-8.4	-0.8	-24.2*	-2.1
Punjab	50.0*	9.2	58.5*	5.6	47.7*	4.6	81.5*	7.1
Rajasthan	35.3*	6.5	18.9	1.8	36.5*	3.5	48.7*	4.2
Tamil Nadu	33.6*	6.2	6.4	0.6	30.9*	3.0	90.5*	7.9
Uttar Pradesh	-10.5	-1.9	-18.6	-1.8	-3.0	-0.3	-8.7	-0.8
West Bengal	-16.7*	-3.1	-22.6*	-2.2	-11.3	-1.1	-20.0	-1.7
Work category								
Tractor	20.3*	5.2	25.6*	3.4	27.7*	3.8	15.7	1.9
Mason	86.1*	22.3	83.0*	11.1	97.0*	13.2	86.7*	10.7
Carpenter	64.8*	16.8	65.6*	8.8	76.2*	10.4	58.0*	7.1
Harvesting	-20.7*	-5.4	-4.3	-0.6	-18.9*	-2.6	-21.3*	-2.6
Sowing	-18.7*	-4.9	-8.6	-1.2	-14.1	-1.9	-22.7*	-2.8
Unskilled	-27.6*	-7.2	-14.6*	-2.0	-23.6*	-3.2	-32.5*	-4.0
Ploughing								
Constant	140.8*	30.5	108.5*	12.2	128.9*	14.7	184.2*	19.0
Adj R^2	0.59		0.85		0.87		0.88	

Note: * indicates significant at 5% level of significance

Table 7. Wage equation: Influence of time and state dummies

	Ploughing		Sowing		Harvesting		Carpenter		Mason		Tractor		Unskilled	
State	β	t	β	t	β	t	β	t	β	t	β	t	β	t
Andhra Pradesh	-9.0	-0.3	-14.0*	-4.4	-8.1*	-2.4	-49.9*	-9.5	-31.9*	-5.8	-23.3*	-4.9	-13.6*	-4.8
Bihar	-34.0	-1.3	-24.9*	-7.8	-26.2*	-7.7	-41.9*	-8.0	-34.8*	-6.3	-28.8*	-6.0	-23.7*	-8.4
Gujarat	-18.6	-0.7	-10.7*	-3.4	-18.2*	-5.3	15.8*	3.0	24.6*	4.5	-16.3*	-3.4	-24.4*	-8.7
Haryana	104.4*	3.9	42.7*	13.4	59.6*	17.4	76.6*	14.5	95.9*	17.5	44.8*	9.3	56.3*	19.9
Karnataka	-29.6	-1.1	-20.8*	-6.5	-16.6*	-4.8	-32.8*	-6.2	-34.4*	-6.3	-18.9*	-4.0	-29.7*	-10.5
Madhya Pradesh	-48.9	-1.8	-36.6*	-11.4	-33.6*	-9.8	-57.3*	-10.9	-44.4*	-8.1	-30.5*	-6.4	-44.5*	-15.7
Maharashtra	-22.2	-0.8	-11.8*	-3.7	-10.2*	-3.0	-29.8*	-5.7	-24.3*	-4.4	-19.2*	-4.0	-23.6*	-8.3
Orissa	-37.8	-1.4	-27.7*	-8.7	-23.3*	-6.8	-24.5*	-4.7	-28.8*	-5.3	12.2*	2.6	-25.3*	-8.9
Punjab	-4.3	-0.2	39.1*	12.2	52.9*	15.5	99.4*	18.9	82.7*	15.0	29.6*	6.2	50.6*	17.9
Rajasthan	20.4	0.8	33.7*	10.5	24.1*	7.0	59.8*	11.3	60.6*	11.0	26.7*	5.6	22.1*	7.8
Tamil Nadu	73.1*	2.7	19.4*	6.1	18.2*	5.3	27.6*	5.2	30.3*	5.5	42.4*	8.8	23.9*	8.5
Uttar Pradesh	-30.3	-1.1	-15.6*	-4.9	-7.4*	-2.2	1.7	0.3	8.3	1.5	-25.1*	-5.2	-5.2	-1.8
West Bengal	8.5	0.3	-19.4*	-6.1	-14.6*	-4.3	-45.8*	-8.7	-55.4*	-10.1	29.0*	6.0	-19.4*	-6.9
Year														
1995	-21.2	-0.7	-28.9*	-8.0	-22.7*	-5.9	-42.4*	-7.1	-45.6*	-7.3	-36.5*	-6.7	-24.5*	-7.6
1996	-22.6	-0.7	-28.1*	-7.8	-21.3*	-5.5	-42.9*	-7.2	-46.3*	-7.4	-35.6*	-6.6	-24.4*	-7.6
1997	-9.0	-0.3	-15.9*	-4.4	-11.9*	-3.1	-25.7*	-4.3	-28.5*	-4.6	-19.9*	-3.7	-13.7*	-4.3
1998	4.6	0.2	-3.6	-1.0	-2.4	-0.6	-8.9	-1.5	-10.9	-1.7	-4.1	-0.8	-3.3	-1.0
1999	3.4	0.1	-6.4	-1.8	-7.6*	-2.0	-12.3*	-2.1	-14.6*	-2.4	-9.6	-1.8	-4.7	-1.5
2000	4.5	0.2	-5.8	-1.6	-6.4	-1.6	-8.8	-1.5	-11.8	-1.9	-5.6	-1.0	-4.1	-1.3
2001	106.6*	3.5	-0.9	-0.2	-3.1	-0.8	-2.2	-0.4	-3.4	-0.5	-3.0	-0.6	-0.5	-0.2
2002	19.0	0.6	7.8	2.2	2.7	0.7	11.1	1.9	10.2	1.6	5.7	1.1	5.2	1.6
2003	5.6	0.2	4.5	1.2	2.1	0.5	9.2	1.5	9.1	1.5	6.1	1.1	5.0	1.6
2004	11.1	0.4	-0.1	0.0	-2.2	-0.6	1.2	0.2	1.3	0.2	0.1	0.0	0.4	0.1
2006	14.9	0.5	2.6	0.7	1.3	0.3	0.3	0.1	1.2	0.2	2.1	0.4	1.5	0.5
2007	19.4	0.6	4.2	1.2	2.9	0.7	-1.0	-0.2	0.4	0.1	2.7	0.5	3.9	1.2
2008	13.4	0.4	8.5*	2.3	7.1	1.8	1.2	0.2	6.9	1.1	8.0	1.5	11.1*	3.5
2009	35.6	1.2	19.0*	5.2	22.4*	5.8	10.9	1.8	14.9*	2.4	17.6*	3.2	21.6*	6.7
2010	42.4	1.4	27.1*	7.5	29.5*	7.6	17.7*	3.0	22.1*	3.6	21.5*	4.0	29.8*	9.3
2011	59.2	1.9	40.2*	11.1	42.6*	11.0	27.9*	4.7	33.9*	5.4	31.9*	5.9	39.1*	12.2
2012	70.2*	2.3	50.5*	13.9	54.6*	14.1	42.4*	7.1	50.4*	8.1	47.3*	8.7	50.6*	15.8
Constant	122.4*	4.3	120.6*	35.9	114.8*	31.9	206.2*	37.2	223.5*	38.7	157.2*	31.1	111.4*	37.5
/sigma_u	0	5.1	0	0.6	0.0	0.6	0.0	1.0	0.0	1.0	0.0	0.9	0.0	0.5
/sigma_e	81.00*	3.6	9.6	0.4	10.3	0.5	15.8	0.7	16.5	0.7	14.4	0.6	8.5	0.4
log likelihood	-1464.98		-927		-944		-1053		-1063		-1029		-896.3	

Note: * indicates the significant at 5% level; wage rates of specific work type are dependent variable in each regression equation.

In the table 7, we have presented regression results for different categories of work types with state and time dummies to know the influence of state and time dummies on wage rates. The results indicates that Punjab, Haryana, TN and Rajasthan having significant positive coefficients, hence these

states are having higher wages compared to national average wages for all work types. Again WB, Karnataka, Madhya Pradesh, Maharashtra, AP and Bihar were having significant negative coefficient for all work type equations except ploughing, hence we can conclude that in these states wage rates are significantly lower than the national average. Gujarat, Orissa and UP showed mixed picture. It is to be noted that only Haryana and TN states ware having significant positive association with wage rates in ploughing. It means in Haryana and TN states wage rates for ploughing are significantly higher than other states. In same lines year 2001 and 2012 were also having significant positive association with wage rates for ploughing. It means in the year 2001 and 2012 the wage rates for ploughing are significantly higher than other types of wages. The coefficients on the time dummies showing significant upward movement of wages as time period increases, with the early year 1995, 1996 and 1997 having significant negative coefficient, while the last years 2009, 2010, 2011 and 2012 are having significant positive coefficients. The years between 1998 and 2008 the coefficients are not significant. These results also confirming the some states like Punjab, Haryana, TN reached LTP, while for other states it take much time to reach.

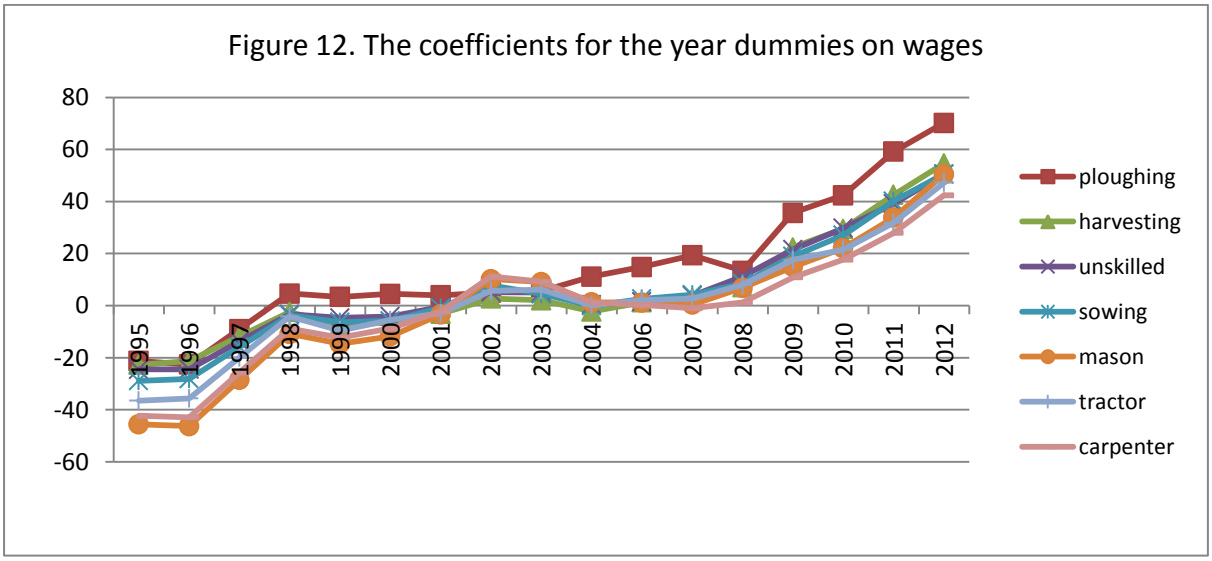


Figure 12 depicts the regression coefficients on the time dummies in the above equation from 1995 to 2012. It indicates that year on year there is an increase in the magnitude of the regression coefficients for all types of work categories. It indicates that over the period from 1995 to 2012 there is a significant increase n wage rate for all types of works. This is strong evidence for the rising trends in the wage rates from 1995 onwards and for India reaching the LTP.

Reasons for differences in wage rates across states

Table 8 depicts the rank in the growth rate of wages in ploughing and other influencing factors like migration, share of agriculture in GDP, urbanisation of the state (% of population) and MGNREGA work days per household. AP ranks first in growth of wage rates followed by Karnataka, Orissa, TN, Haryana Maharashtra and Punjab. While the less growth rate in wages were observed in Gujarat, WB, MP, UP, Rajasthan and Bihar. As expected in migration is higher in Maharashtra, Gujarat, Karnataka, Haryana, Punjab and TN. For Maharashtra, Gujarat and Karnataka in migration is mostly to work in urban industrial sector with little impact on rural labor markets, while in migration to Haryana and Punjab to work on agricultural fields in rural areas, which is also an indication of shortage of labor in rural areas. In TN employment creation is spread across small towns and hence most of the inmigrants also due to the shortage of rural workers in the state. Further there is no string

correlation between share of agriculture in GDP and growth in wage rates, indicating rural wage rate may be induced by expansion of urban (non-agricultural sector) sector in states like TN, Karnataka and Maharashtra or by expansion of agricultural sector as that in AP, Haryana and Punjab. But at least one of the sectors needs to be stronger in creating employment to cross the LTP. Urbanisation is also playing an important role in increasing wage rates through upward push in rural labor markets as seen in TN, Karnataka, Maharashtra and Haryana. There is also some possible positive influence of public works program (MGNREGA) on wage rates as in AP and TN which ranked first and second in public works program and also growth in wage rates.

Table 8. Growth rate of wage rate in relation to other

State	Growth in wage	Migration rate	Share of Agril in GDP	Urbanisation	MGNREGA works days per HH*
AP	10.3(1)	-2.0(10)	24(4)	33(7)	35(1)
Karnataka	7.4(2)	9.33(3)	17(10)	39(4)	25(6)
Orissa	7.0(3)	-4.3(11)	21(8)	17(12)	22(8)
TN	6.5(4)	0.76(6)	13(12)	48(1)	32(2)
Haryana	6.4(5)	6.32(4)	20(9)	35(6)	18(10)
Maharashtra	6.3(6)	9.94(1)	10(13)	45(2)	23(7)
Punjab	6.3(7)	4.8(5)	31(1)	37(5)	12(13)
Bihar	4.8(8)	-18.0(13)	23(6)	11(13)	17(11)
Rajasthan	4.0(9)	-1.3(9)	22(7)	25(10)	32(3)
UP	3.7(10)	-8.7(12)	28(2)	22(11)	29(4)
MP	3.2(11)	-1.2(8)	27(3)	28(9)	28(5)
WB	2.9(12)	-3.7(7)	24(5)	32(8)	16(12)
Gujarat	0.6(13)	9.72(2)	16(11)	43(3)	20(9)

Note: Figures in parenthesis are rank of the state in the specific indicator

There was a substantial upward shift in real wages in 2007 onwards in all the work types and also across the geographical areas. The rapid economic growth in Haryana, Punjab and TN generated a high demand for rural laborers, as reflected in the relatively higher growth rate of wages in these states from 1995 to 2012. From 2005 onward, real wages began to rise substantially and simultaneously in all the states regardless of their development level. This illustrates that labor scarcity has become a nationwide issue. The evidence presented above shows, at the aggregate level, an accelerating trend toward increasing wages in recent years. However, the analysis masks important idiosyncratic differences at the state level.

Impact of public works program (MGNREGA) on wage rates

The figure 13A depicts state average of work days per households under MGNREGA(public works program) for the period 2006 to 2012 on horizontal axis and growth in wages for the common low-end agricultural activities (ploughing, harvesting, unskilled works and sowing) on vertical axis. There is a significant positive association among the growth in wages of ploughing and harvesting with average days under MGNREGA. The growth of wages for sowing is having negative association with public work days, while growth rate of unskilled labor wage rates do not have any significant association with public work days in the states. Over all, there is no concrete evidence that there is a

positive association between agricultural wages and employment days created by public works program across the states. The results are in line with Jha et al., 2008.

The figure 13B shows that there is a significant positive association between MGNREGA work days and growth in wage rates for mason, but there is negative association between MGNREGA works and wage rates for tractor operators. Growth rate of carpenter wage rates are not having any significant association with MGNREGA. Again here also we cannot conclude that the public works are the reason for increasing real wage rates across the states.

Figure 13A. Relation between MGNREGA works and wage rates in agriculture (2006-12)

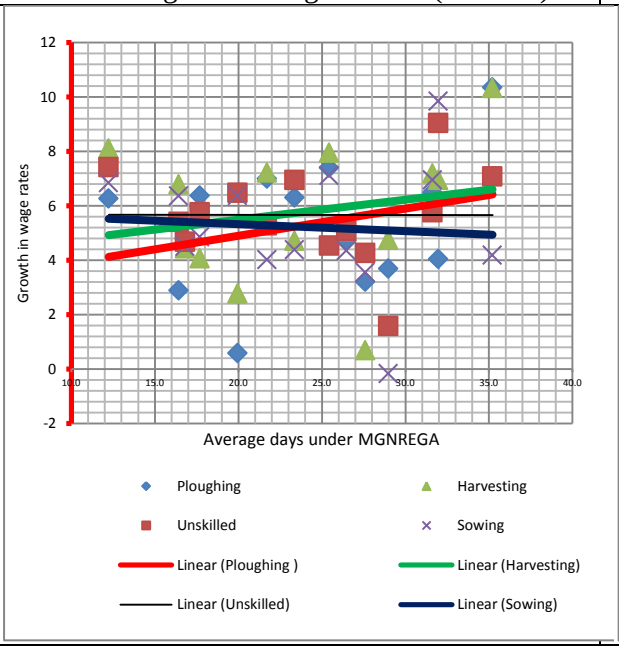
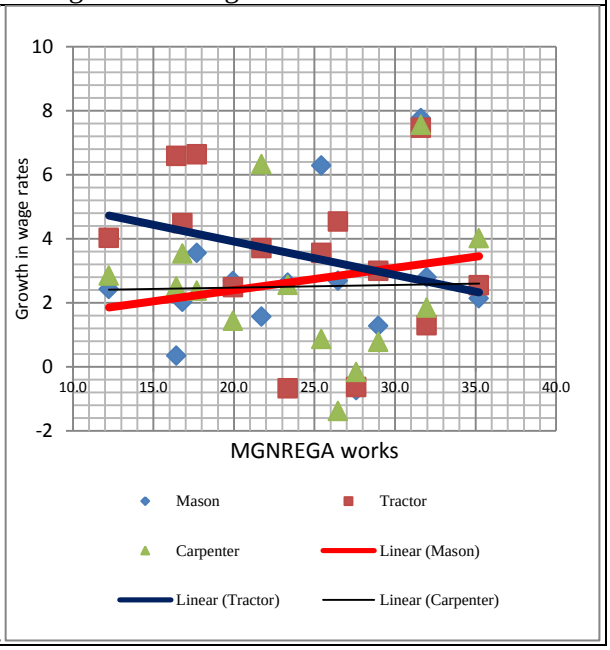


Figure 13B. MGNREGA works and growth in non-agriculture wage rates



5. CONCLUSIONS

The paper examined the trends in rural wage rates in India across the states with the objective of testing whether India crossed the Lewis Turning Point or not. From 1995 to 2005, growth rate of wage rates is negligible and mixed with some of the states in some work types registered even negative growth. But from 2005 to 2012 the growth rates are positive and for many types of works it is much higher than 5%. There is an abrupt increase in growth rate recorded from 2008 onwards for all the states. Given Indian agriculture is seasonal, we have also examined the seasonal variation in the growth of wage rates. The overall pattern for the slack seasons closely mirrors the pattern observed during peak times. Overall, the sluggish real wages of 1995 to 2005 suggest an excess of rural labor force prior to 2005. However, the subsequently dramatic increase in real wages, even in slack seasons, signals a new paradigm of labor scarcity since 2007.

The growth in wage rates is much higher in Tamil Nadu, Haryana, Punjab, Andhra Pradesh and Rajasthan, while less in Madhya Pradesh, Uttar Pradesh, Gujarat, Orissa and Bihar. One interesting thing is that wage rates are moving in the same direction in most of the states and for most of the work types, indicating the integration of labor markets across states and work

types. The surplus labor available for migration had begun to shrink in the poorer states and consequently in poorer states also wages start rising in rural areas. The rising wage rates across the states also benefit landless labourer (Rosenzweig 1978; Foster and Rosenzweig, 2004).

In order to determine the broad picture of real wages at the regional level, we grouped these states into high wage (developed) states, low wage (less developed) states and medium wage (medium developed) states. Apparently real wages in TN, Haryana, Punjab, Rajasthan and AP were higher than Orissa, Bihar, MP throughout the period. TN, Haryana and Punjab stand high in wages in all work types mainly these states have strong growth engines in terms of either high productive agricultural sector or vibrant non-agricultural sector. All the states show the same pattern: from 2005 to 2012, real wages rose at a much faster rate than from 1995 to 2004. In the wage equation, the magnitude of coefficients on state dummies is much higher (significant and positive) for TN, Haryana, and Punjab compared to other states over the period of 2005–2012, suggesting a more rapid increase in demand for laborers in these states than other states. This indicates that at least TA, Haryana and Punjab already crossed the Lewis turning point by the year 2005. In comparison, the real wages in MP, Orissa remained almost unchanged, hence these states take much longer time to cross the Lewis Turning Point.

The economic reform and "opening up" policy since the late 1990s have greatly promoted India's economic growth. Rapid industrialization in some of the states has generated vast employment opportunities, absorbing surplus labor from rural areas. Using macro level data, this paper shows that the era of unlimited labor supply has already passed and that the LTP in rural India arrived in 2007 at least in some states like TN, Haryana and Punjab. Real wages both in the peak and slack seasons have begun to rise substantially, foretelling a nationwide labor shortage barring few under developed states like MP, UP and Bihar. Interestingly, the turning point in rural wages occurred a few years earlier than the labor shortages in the urban areas. This is consistent with the prediction of the Lewis model that the turning point for rural areas can be observed ahead of that for urban areas.

Because India is entering a new era of labor shortage at least in some developed states, India's labor-intensive agricultural sector will gradually lose its competitive advantage especially in Punjab, Haryana and AP. India will have to reorient its development strategy toward labor practices that are more capital intensive and based on laborers' skills and farm mechanisation. The success of the new development model hinges upon on a strategy for the development of skills required in the labor shortage economy with more emphasis on labor productivity rather than land productivity. As industries become more capital and skill intensive, the need of the day is to increase appropriate skill set among youth. However, in many rural areas, the educational system is not oriented to develop required skill sets and only focusing on higher education without knowing what skills is demand in labor shortage economy.

Of course the current shortfall does not mean that there is no remaining flexibility in the labor supply. Still there are many educated unemployed youth in the rural economy. Most of the women hitherto not participating in labor markets might be willing to join labor force with the economic development, this releases large chunk of hidden labor force in rural India Jensen (2012). In addition, promoting land rental market development would help to consolidate fragmented land and make it more suitable for large-scale farm mechanisation. The increase in the use of agricultural machinery would thereby release much of the rural labor force, alleviating shortages.

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Appendix 1. Annual compound growth rate of wage rates (2000 to 2012)

Year	Mason	Carpenter	Tractor Driver	Ploughing	Sowing	Harvesting	Unskilled Laborers
				Peak season			
All India	0.86	0.76	1.60	1.93	1.87	2.84	2.63
AP	3.04	2.24	2.99	5.40	6.00	5.76	4.35
Bihar	0.97	0.79	0.41	2.96	2.03	1.65	2.68
Gujarat	-1.34	-1.77	-1.01	0.50	-0.26	-0.13	-0.44
Haryana	0.61	1.01	2.72	3.19	2.67	1.75	2.28
Karnataka	0.53	0.29	1.90	3.14	2.35	2.94	2.70
MP	-0.96	-0.90	0.31	1.29	0.95	1.91	1.03
Maharashtra	1.48	0.91	1.97	2.49	2.80	3.48	2.21
Orissa	0.26	0.56	-2.19	2.31	2.59	3.35	3.83
Punjab	0.00	0.10	2.47	3.04	1.28	3.22	2.47
Rajasthan	0.55	-0.58	1.00	0.19	-0.96	3.25	2.22
Tamil Nadu	3.46	3.33	3.46	1.47	2.61	3.16	3.38
Uttar Pradesh	0.70	0.46	2.29	1.45	1.59	2.06	2.18
West Bengal	0.00	-0.18	-0.53	1.98	2.30	2.39	1.94
				Slack season			
All India	0.63	0.59	1.39	1.73	1.44	2.36	2.55
AP	2.95	2.21	2.61	6.03	5.24	6.05	4.07
Bihar	0.77	0.87	0.33	2.86	1.49	1.09	2.65
Gujarat	-1.46	-1.64	-0.63	0.42	-0.43	-0.36	-0.44
Haryana	0.98	0.83	2.70	2.06	2.49	1.96	2.49
Karnataka	0.49	0.18	2.15	2.23	1.96	2.84	2.50
MP	-2.67	-1.07	-0.09	0.74	-0.44	0.24	0.60
Maharashtra	1.25	0.72	1.89	2.33	2.06	2.17	1.69
Orissa	0.25	0.52	-1.67	3.12	3.27	3.42	3.58
Punjab	-0.31	-0.24	1.14	3.54	2.99	1.89	1.46
Rajasthan	0.28	-0.59	0.47	1.15	-1.50	2.55	2.14
Tamil Nadu	3.03	2.87	2.93	1.00	1.96	3.03	3.18
Uttar Pradesh	0.49	0.18	2.05	1.12	1.22	1.68	1.79
West Bengal	-0.15	-0.36	-0.70	2.00	2.11	2.33	1.77