

A REGIONAL ANALYSIS OF LABOUR TRENDS IN THE SOUTH AFRICAN SUGAR INDUSTRY

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Abstract

A regional analysis of time series data trends (1972/73 to 2007/08) in Number of Labour Units, Labour Productivity and Real Wages within the South African sugar industry initially displays a counterintuitive result. Economic Literature proposes that increasing labour market rigidities will result in an increase in transaction and wage costs with resultant decrease in employment. The results show an increase in employment in the industry, since the bundle of labour legislation was first extended to agriculture. This increase is explained by an increase in the Area under Cane. Reasons for the increased Area under Cane are complex and are an avenue for further research.

Keywords: regional analysis, labour productivity, real wages, market rigidities, labour legislation

Introduction

The Basic Conditions of Employment Act 3 of 1983 (BCEA) and the Unemployment Insurance Act 30 of 1966 (UIA) were extended to agriculture in 1993. These pieces of legislation were followed by the Agricultural Labour Act 147 of 1993 (ALA), forming the beginnings of the 'lump of legislation' (Murray and van Walbeek, 2007, 116) through which farmers have to navigate.

Time series data (1972/73 to 2007/08) derived from the South African Cane Growers Association's Labour Utilisation and Cost Survey includes Number of Labour Units, Labour Productivity and Real Wages within the South African sugar industry. This data provides an opportunity to investigate the impact of the extension of labour legislation to agriculture.

Economic theory

Economic theory suggests that a perfect market will reach an optimal outcome at equilibrium. Labour market equilibrium will occur where the quantity of labour demanded meets the quantity of labour supplied. The price at which equilibrium occurs is the market clearing wage. This is the wage at which all individuals seeking employment and all firms seeking employees meet.

If the cost of labour is raised (through higher transaction¹ or wage costs) more individuals are willing to work but fewer firms are willing to employ at that wage. If the marginal cost of labour exceeds labour's marginal productivity, firms reduce employment. In South African agriculture the cost of labour has been raised by both higher transaction and wage costs, resulting in a steady decline in employment.

¹ Transaction costs refer to those (information and search) costs that are associated with an economic transaction.

Newman *et al.* (1997:74) expected labour legislation to have a 'significant effect on labour transaction and wage costs'. Payne *et al.* (1990: 408) report that there has been an annual decline in agricultural employment of 1.15% for the 20 years preceding 1990. The Department of Labour shows that one in five workers in agriculture lost their jobs between 1990 and 1996 (Conradie, 2003, quotes Department of Labour, 2001).

Payne *et al.* (1990) go on to show that, associated with a decrease in employment, is an increase in real wage earnings (2.6%) for those employees who remain employed. With an increase in real wages one would expect to find an associated increase in labour productivity. In theory, the farmer would set the marginal cost of each additional employee against the marginal productivity of that employee. If the marginal cost is increasing then so should the marginal productivity.

Data

The data is derived from the annual Labour Utilisation and Cost Survey conducted by the South African Cane Growers' Association (SACGA) which comprises a sample of about 300 growers every year. The data is of a time series nature and in some cases runs from the 1963/64 season to the 2007/08 season.

The Labour Utilisation and Cost Survey is extracted from the Cane Productivity Survey, which is completed by a sample of large scale growers and then returned to the industry. The response to the survey is about 40% and represents between 18% and 20% of the total population of growers in each region². Individual responses are grouped by mill area and then into regions which comprise more than one mill area. These are confidential publications with only some sections of the survey available for general distribution; the greater part of the data has never been used outside the South African Cane Growers' Association.

Methodology

The methodology used is simple and consistent. The wage and productivity data, derived from the Labour Utilisation and Cost Survey has been manipulated in order to reflect the general definitions of real wages and labour productivity. The wage data has been made real by deflating it by the CPI and is set in terms of constant 2000 Rand. The wage data is a cash wage; as such the published wage ignores the non-wage benefits that the employees might receive, such as housing and rations.

The SACGA standard with productivity data is to publish the data in terms of number of labour units needed to produce 1000 tons of sugar cane. The problem with this is that any improvement in productivity is illustrated as a decrease, which causes problems when doing further analysis. The data is therefore inverted in line with the general definition of productivity. The data is shown as tons of Sugar Cane produced per labour unit.

When measuring labour productivity it is difficult to draw comparisons between regions, given their different yields. Mpumalanga and the South Coast have significantly different average yields, which influence comparisons in labour productivity between the regions when using either labour units per 1000 tons or tons per labour unit. Another measure of labour productivity is labour units per hectare under cane, which may assist in comparison between

² The regions include: Midlands, South Coast, North Coast, Zululand and Mpumalanga.

regions. A labour unit is defined as a worker employed for twelve months, or approximately three hundred working days, including annual and sick leave.

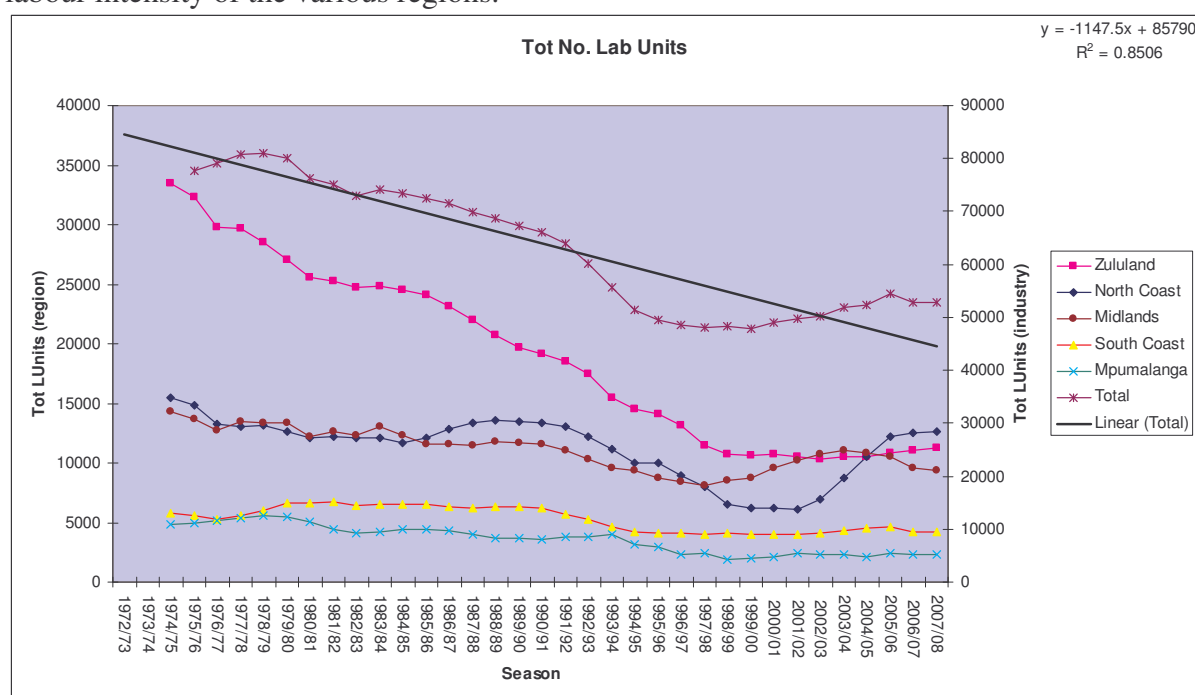
The Illovo mill's designation changed from the South Coast to Midlands (Eston) in 1995 after the mill was moved in order to be closer to its cane supply. For this reason, it is not possible to display labour productivity as labour units per hectare as the total area under cane in the Midlands and South Coast are impacted by the move.

A three year moving average is used to remove the seasonal fluctuations evident in the data while accurately displaying the trend. The three year moving average for each region is plotted to facilitate a regional analysis. The weighted average total industry trend is displayed as a summary of industry wide changes.

Analysis is made of the slope of the three year moving average in order to analyse the rate of change evident in the data. A simple linear function ($y(t) = \beta_1 + \beta_2 t$) for the slope coefficient (β_2 value) provides the rate of change of each of the variables over each time period.

Number of Labour Units

The growing sector of the South African sugar industry, like most agricultural industries, has been shedding labour over the past three decades at about 1% annually. Evidence of labour shedding is displayed in Figure 1. A regional analysis of the total number of labour units employed in each region reflects more the amount of land under sugar cane³ than a relative labour intensity of the various regions.

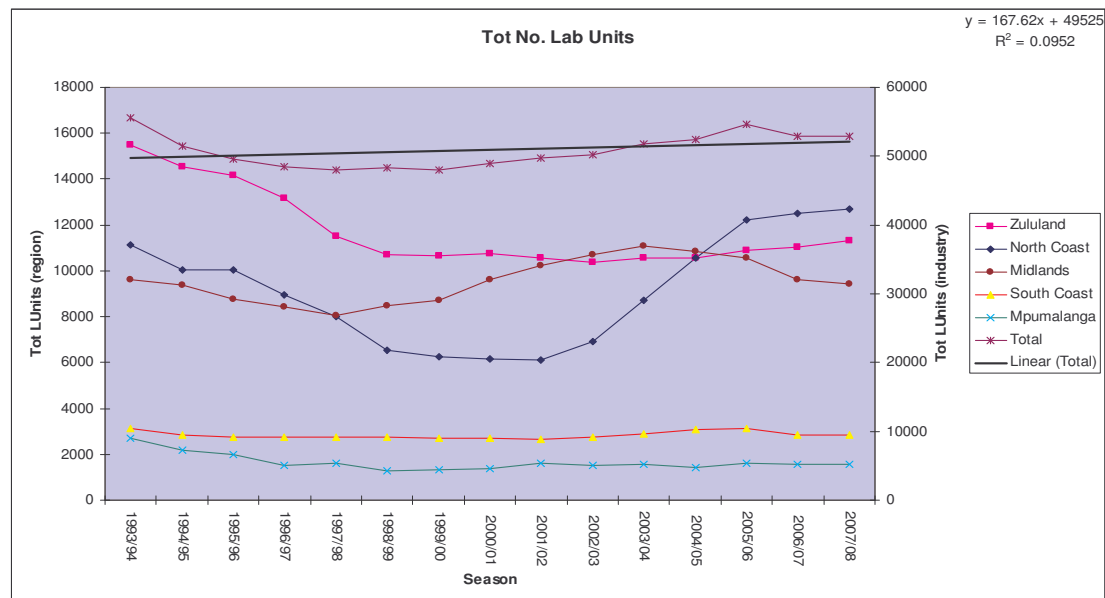


Source: SA Cane Growers' Association, Labour Utilisation and Cost Survey, Number of Labour Units 1972/73-2007/08.

Figure 1. Number of Labour Units.

³ As of April 1 2003, Mpumalanga's total area under cane was 46 674 ha as opposed to Zululand (78 266 ha), North Coast (94 779 ha), Midlands (88 584 ha) and South Coast (72 668 ha) (SA Cane Growers' Association, Statistical Data 1994/95-2003/04, Summary of Areas Under Cane and Areas Harvested by Mill: 2003/04).

Zululand employs the highest number of labour units and Mpumalanga the least. Zululand has also shed labour units fastest as indicated by the steep decline of the three year moving average plotted in Figure 1. It is interesting to note that the number of labour units employed increased post 1993/94. This is most evident on the North Coast and is a counterintuitive result which is clearly displayed in Figure 2.



Source: SA Cane Growers' Association, Labour Utilisation and Cost Survey, Number of Labour Units 1993/94-2007/08.

Figure 2. Total number of Labour Units.

In the period post-1993/94 after the extension of labour legislation to agriculture, theory suggests an accelerated decline in employment. While the linear function added to the total industry employment trend line in Figure 2 displays a poor fit, it does not display the expected accelerated decline in employment and this requires investigation.

A theoretical explanation for the increase in employment could be a decrease in real wages accompanied by an increase in labour productivity. Real Wages and Productivity usually display a direct relationship. If Real Wages increase, labour productivity should display an accompanying increase. If the marginal cost of labour declined but the marginal revenue of labour (productivity) increased firms may increase employment. This is an unlikely result and analysis of regional Real Wage costs and Labour Productivity may therefore provide an explanation of the increased employment.

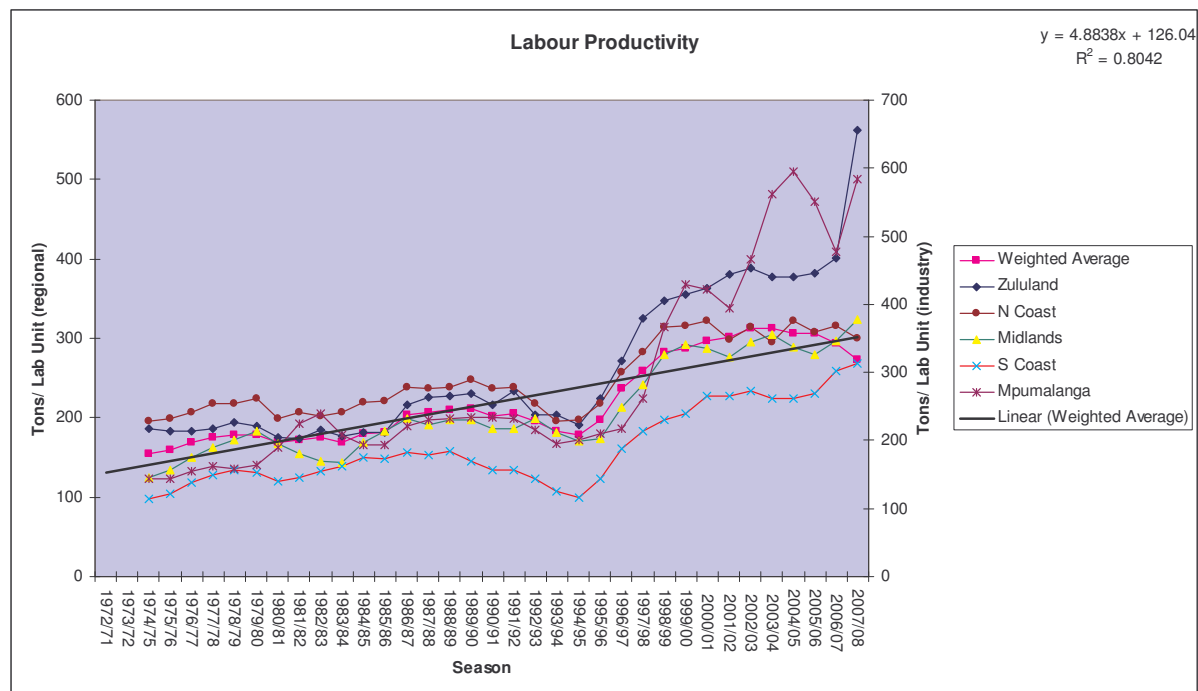
Labour Productivity in the South African sugar industry

Identifying and commenting on labour productivity trends is difficult. Apart from the difficulties posed by differences in regional production trends the increasing use of contractors also influences survey results. The use of labour contractors for the most labour intensive low value tasks may overstate productivity and understate employment. Figure 3 displays the total number of labour units⁴ and, while the result is impacted by the use of

⁴ Total number of labour units is inclusive of: Drivers, General Staff, Cutters and Stackers, Other Harvesting Staff, Harvesting Staff out of season, Permanent Field Workers, Seasonal Field Workers and Other Staff.

contractors, it is the trend that is important. The measure is consistent and any trends evident in the data are able to inform the thesis.

Figure 3 indicates that Mpumalanga and the North Coast are the two regions with the most productive labour. The slope of the function plotting Mpumalanga labour productivity inclines with the greatest gradient, indicating that Mpumalanga growers have increased their labour productivity considerably. Most of the improvement occurs post 1993/94.



Source: SA Cane Growers' Association, Labour Utilisation and Cost Survey Number of Labour Units per 1000 Tons Cane in the various Labour Categories (Changed) 1972/73-2007/08.

Figure 3. Labour productivity.

These results are as expected. Mpumalanga and the North Coast have increased employment at the greatest rate. The South Coast has the least productive labour. There is a universal increase in productivity over time displayed by weighted average labour productivity in Figure 3.

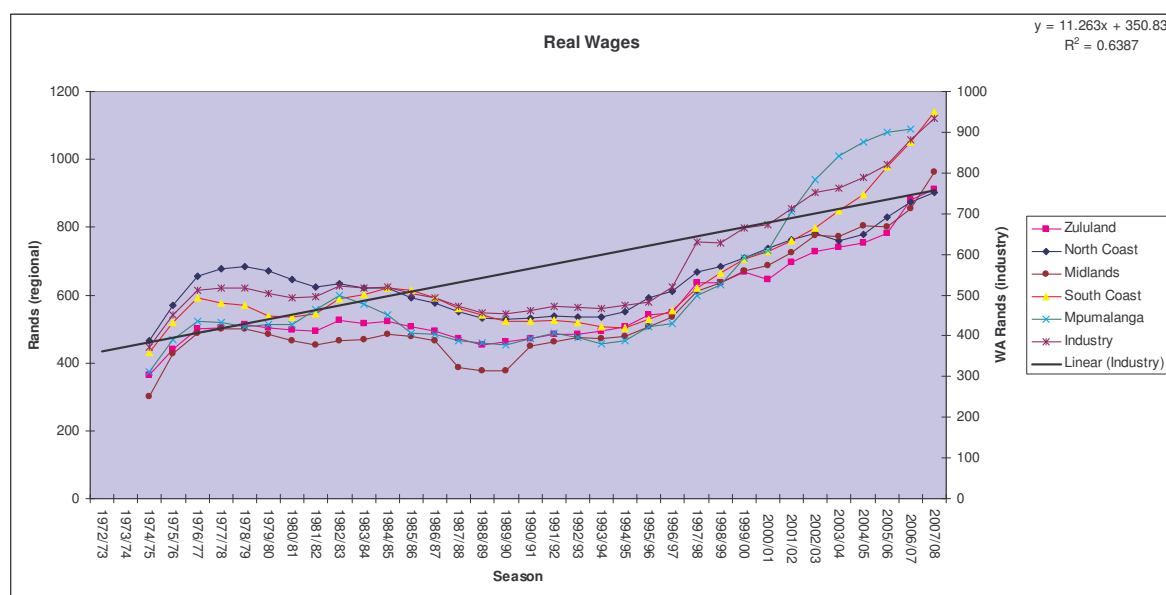
Improved labour productivity as illustrated in Figure 3 could be a result of the training of labour and improvements in technology and techniques over time. Vehicles used for field work and haulage are of a greater power, chemicals are more efficient and management and supervision techniques improve with time.

The increase in labour productivity is, however, gradual. There is no large jump in labour productivity or structural break evident in the data that may explain the increase in the Number of Labour Units employed as illustrated in Figures 1 and 2. The data indicates that although employment has increased it is accompanied by an increase in labour productivity. Analysis of real wage data could contribute to an understanding of the labour trends evident in the South African sugar industry.

Real wages in the South African sugar industry

Figure 4 plots the weighted average monthly real wage rate for each region. The weighted average is achieved by weighting the wage rate by the Number of Labour Units in each labour category for each region.

North Coast growers have historically paid the highest wage and Mpumalanga growers the lowest. Post 1993/94 Mpumalanga growers' wages have accelerated faster than other regions. This is as expected, considering the improved labour productivity achieved in the region and the direct relationship that exists between wages and labour productivity.



Source: SA Cane Growers' Association, Labour Utilisation and Cost Survey, Wage Earnings for Various Categories of Labour 1972/73-2007/08.

Figure 4. Real wages.

Figure 4 shows that there has been an increase in the real wage paid in all regions. The Real Wage data represents a cash wage and bonus, up to the 1997/98 season. The wage reported post 1997/98 includes rations, housing and other non-cash benefits.

Although there is a considerable increase in the Real Wage in each Region post 1993/94, a portion of that increase could be a result of the data reflecting the entire remuneration package.

Figure 5 displays the Real Wage cost per ton and per hectare. The real wage cost per ton does not decline significantly over time and the real wage cost per hectare increases. This is further evidence that the real wage costs have not fallen over time in absolute or per unit of production terms.

Although the real wage cost does include the cost of non-wage benefits, it does not represent the total cost of labour. The total cost of labour includes the cost of additional management resulting from compliance with various legislation. The increased cost of labour could be as a result of increased labour legislation (Coffee, 1969; Goedeke and Ortmann, 1993; Newman *et*

al., 1997) or more specifically the introduction of minimum wage legislation⁵ in 2002. (Castillo-Freeman and Freeman, 1992; Partridge and Partridge, 1999; Zavodny, 2000; Rama, 2001; Gindling and Terrel, 2005).



Source: SA Cane Growers' Association, Labour Utilisation and Cost Survey, Average Annual Cash earnings 1972/73-2007/08.

Figure 5. Real wage cost.

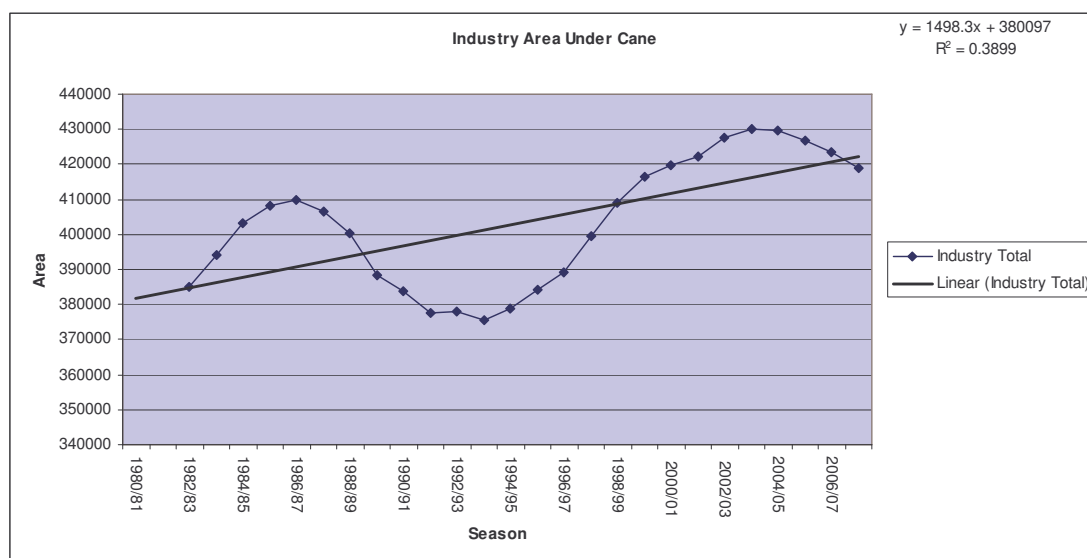
Real wages and labour productivity display a direct relationship. Both labour productivity and real wages increase over the 1972/73 to 2007/08 period. Neither labour productivity nor real wages display any structural break post 1993/94 and therefore the increase in employment displayed in Figures 1 and 2 requires further explanation.

Area under Cane

Analysis of industry Area under Cane (AUC) provides insight into the increased employment displayed in Figures 1 and 2. Drawing a direct correlation between Area under Cane and employment on a regional basis is difficult. Total employment fluctuates on a regional basis and is influenced by a number of exogenous factors including rainfall and competitive industries' labour demand. Area under Cane is more stable as changes require significant capital input, which creates significant barriers to entry as well as exit. An additional factor is the movement of the Eston mill to its current location in 1995 which resulted in the areas for both the South Coast and the Midlands changing. For these reasons, analysis of regional Area under Cane was not included.

Figure 6 displays the industry AUC and suggests a clear answer for the increase in employment post 1993/94. A clear structural break is evident in the industry AUC post 1993/94. As AUC increases it is expected that total employment would increase despite the extension of labour legislation to agriculture. Additional labour is required to cultivate the increased area. The improvement in labour productivity and associated increase in real wages are consistent with Payne *et al.* (1990) findings and are expected in a market with an increasing cost of labour.

⁵ Sectoral Determination for Farm Workers (Department of Labour, 2002).



Source: SA Cane Growers' Association, Statistical Data, 1980/81 – 2007/08.

Figure 6. Industry Area under Cane.

The reason for the increased Area under Cane involves a number of complex interactions which are a suitable topic for further research.

Conclusion

Newman *et al.* (1997: 73), in a survey of commercial farmers in KwaZulu-Natal, found that farmers perceived 'increased transaction and wage costs in farming' as a result of labour legislation. Literature suggests that the increased cost of labour results in firms reducing employment. Labour legislation was first extended to South African agriculture in 1993/94.

The South African Cane Growers Association (SACGA) conducts the Labour Utilisation and Cost Survey annually which provides total employment, labour productivity and real wage data for the growing sector of the South African industry. The data runs from the 1963/64 season to the 2007/08 season.

The data provides the opportunity to investigate whether the extension of labour legislation to agriculture did result in reduced employment in the industry. The expected accelerated decline in employment after the extension of Labour Legislation to agriculture in 1993/94 is not evident. Rather an increase in employment is evident. Analysis suggests that, along with increasing employment, improving labour productivity and increasing real wages are evident. No structural breaks that may explain the increasing employment are evident in the data.

In order to explain the increased employment, analysis of industry Area under Cane is required. Area under Cane has increased post 1993/94 and is a likely explanation for the increased employment in the industry. As area increased, the demand for labour increased despite the increasing cost of that labour. Identifying the reasons for the increased Area under Cane requires further research.

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