CHAPTER 1
INTRODUCTION

1.1 Background

Notwithstanding a radical transformation of the Indian economy, the majority of India’s population continues to be heavily dependent on the agricultural sector for employment and income. Nearly 72 per cent of the country’s population lives in rural areas. Agricultural workers form the bulk of the workforce in the Indian economy where agriculture contributes more than 15 per cent to the gross domestic product (GDP). Thus the performance of the agricultural sector is important from the point of view of economic growth as well as for the food security of majority of the population. High growth in the agricultural sector is generally expected to be reflected in higher remuneration to agricultural workers.

During the last five and half decades, Indian agriculture has witnessed immense change. From a bulk importer of food, India has emerged as exporter even in select items besides becoming self-sufficient in food production and on occasion enjoyed mountains of food surplus. Continuous and concentrated efforts and adoption of careful planning and policies in the agricultural sector have helped India in emerging as one among the few largest nations in developing agricultural research activities. Investment in agricultural research and development activities accounts for nearly three-fourths of the increase in productivity. Agricultural growth, measured as the annual rate of growth in the component of net domestic product, increased from 1.9 per cent per annum before the Green Revolution period (1950-51 to 1966-67) to 2.3 per cent during the initial phase of the Green Revolution (1966-67 to 1980-81). It accelerated even further to 3.1 per cent during the second phase of the Green Revolution (1980-81 to 2000-01).

Despite the domination of the services sector in the country’s GDP, agriculture and allied activities contribute 15.7 percent of the GDP at constant (2004-05) prices in
2008-09. Agriculture, which was largely left to the private sector, has been one of the main success stories of independent India. Dependence on food import during the early 1960s led to the agricultural sector being accorded top priority. Accordingly, until mid 1960s, the government concentrated on expanding cropped area. Rapid growth in population, however, demanded exponential increase in food production via intensive cultivation. This led to a major breakthrough in Indian agriculture in the form of the launch of a technological revolution, namely the Green Revolution, in the mid-1960s. This eventually enhanced agricultural production and productivity. This was accomplished not only by bringing additional area under cultivation but by introducing double cropping on existing farms and using irrigation facilities and improved high-yielding varieties of seeds. Introduction of this new technology in turn necessitated the use of fertilizers, pesticides and better cropping patterns. Better techniques were evolved through agricultural research for both water management and plant protection.

1.2 Nature of the Problem

A phenomenal increase in agricultural yield requires the application of various inputs besides improved technology. Since the mid-1960s, the use of varied inputs both material and human including increase in capital intensity has contributed to manifold increase in the agricultural output and productivity. It is important to underline at this juncture that an agricultural worker is a major input, the intensity of which depends on the level of agricultural development. An increase in agricultural productivity may call for increased labour use via the demand effect by increasing the intensification of agricultural operations, increasing cropping intensity or frequency of land utilization, introduction of crops with higher labour absorption capacity and so on. Even if the displacing mechanism of mechanization sets in, the result would be higher agriculture yield per unit of input both capital and human on account of higher agricultural production. Hence, in both cases, higher output per input unit of worker is obtained due to the intensification of agricultural activities. Higher productivity is thus an inevitable outcome of the Green Revolution. The resultant higher agricultural yield with increased labour productivity may lead to higher wages for agricultural workers through labour-
intensive operations. However, if capital-intensive technology is used, it will, no doubt, enhance agricultural output but higher wages to agricultural workers are doubtful. One may assume that there is a one-to-one relation between technological breakthrough and yield. However, its impact on the wages of agricultural workers is less clear. Notwithstanding the positive role of technological breakthrough in enhancing agricultural output, there is thus need to examine whether the increased yield got disseminated into higher returns to the agricultural worker across states of India over time.

1.3 Need for the Research

As stated earlier, the majority of the workforce in India resides in rural areas and engages in agricultural activities. The importance of agricultural workers as a major input for agricultural growth cannot be denied. Agricultural workers, even today, constitute 58.4 per cent of the total work-force. Despite this, incidence of poverty is found to be very high among agricultural workers. Assetlessness, unemployment, low wages, undernourishment, illiteracy and social backwardness induce the poverty syndrome among agricultural labourers. Further, these reinforce each other so as to constitute a vicious circle of poverty (Parthasarathy 1996). Primarily from this point of view, trends in the living standards of agricultural workers need serious consideration and one way to study is to examine real wages of agricultural workers across states over a period of time.

Indian agriculture has passed through different phases of development. Consequent upon the technical breakthrough in the mid-1960s, there has been phenomenal growth in agricultural output, spread across both crops and states. The prosperity brought about by the Green Revolution, however, has not been uniform and is unevenly distributed across states. Many have empirically tested that the states where the Green Revolution was first introduced have higher levels of wages than the late arrivers. This strong relation, however, does not hold over a period of time. There was a gradual weakening of the relationship between agricultural output and high levels of real wages in many states. Several other factors seem to have impacted levels of wages across states over a period of time. How increase in yield or labour productivity has affected
agricultural wages has debated among scholars. The results of different empirical studies have been diverse and sometimes conflicting. Variations in yield or labour productivity may have had an important role in determination of real wages during the mid-1960s and 1970s. Many studies have observed that for some states, there was increase in real wages in agriculture, especially since the mid-1970s and early 1980s, accompanied by increase in yield or productivity. For some states, gains in the productivity or yield explained the increase in the real wages while for others it partially explained or did not result in increase in real wages of agricultural workers. Populous and agriculturally not-so-developed states, which recorded low levels of real wages during the 1970s, witnessed enhanced levels of real wages without matching increase in productivity during the 1980s. Many agriculturally advanced states recorded low levels of real wages during the 1980s despite an increase in labour productivity. Northwestern states of the country recorded higher agricultural output. It is generally argued that higher productivity was not accompanied by higher returns to agricultural workers during the 1980s and 1990s. Reasons, inter alia, include migration from neighbouring states and substitution by capital input. Eastern states of the country, on the other hand are characterized by marginal and small agricultural holdings. Absence of technological breakthrough in agriculture during the 1970s in these states and high growth of population and labour force resulted in low labour productivity or agricultural yield. However, the 1980s saw an improvement on the agricultural front and real wages of agricultural workers in these states recorded phenomenal growth. Similarly, during the 1990s, a few southern states have experienced acceleration in growth of real wages.

As stated earlier, different studies that have attempted to examine the condition of agricultural workers in terms of real wages since the advent of the Green Revolution have thrown up a mixed conclusion. Some have shown deceleration during 1990s while others have shown consistent increase in real wages in most of the states. Apart from technological breakthrough and intensification of agricultural activities, the agricultural sector has seen many other changes. There have been diversification of agricultural workers into the non-farm sector and mechanization of various agricultural operations. Further, there have been region-specific government-sponsored programmes under the
Sixth Five Year Plan, their restructuring under the Seventh Five Year Plan and various relief works. Over time, different variables have played an active role leading to prosperity in the agriculture sector and significantly affecting real wages of agricultural workers.

There have been various budgetary allocations to the agricultural sector over different periods of time under different schemes resulting in increased public investment in infrastructure such as irrigation. This has facilitated agricultural growth and development in numerous ways as well as positively impacting real wages. Further, apart from these budgetary allocations, which directly impacted agricultural growth and consequently agricultural workers, the Indian economy has undergone reforms for stabilisation and structural adjustment. Consequent upon the process of liberalization and globalisation, it is necessary to analyse the impact of the economic reforms of the 1990s on the agricultural sector and agricultural workers. The policy reforms of the 1990s more or less eliminated the bias against agriculture by lowering industrial tariffs and liberalizing exports of agricultural commodities. This change provided the necessary incentive in favour of agriculture and led to higher private-sector investments in agriculture (Srivastava and Singh 2005). The resultant upswing in agricultural production from 1992-93 to 1996-97, was however, not matched by a rising trends in real wages. Indeed the period saw a sharp fall in growth of agricultural wages in most states. Many have stated that the agricultural sector reverted to its traditional role as a residual sector for rural workers and non-farm activities lost its momentum during the 1990s. As per the 1991 census, the share of the rural workforce in secondary sectors declined due to the collapse of rural household industry. The year 1990 witnessed structural retrogression in the Indian economy (Bhalla 1997). This being so, the surplus workforce had to be absorbed by the agricultural sector. This exerted a downward pressure on the real wage rates of agricultural workers. Many studies empirically tested that the increasing trends in real wages observed during the 1980s was not sustained during the 1990s.

Against the background of these findings, it is worth assessing the condition of agricultural workers by analysing the variables which directly or indirectly affect their
economic wellness across states. A good indicator for the same is agricultural wages. The present study analyses the variation in real wages of agricultural workers and the factors which affect the same across the major Indian states over time from 1960-61 to 2005-06.

1.4 Newness of the Present Study

Different scholars have highlighted different factors determining agricultural wages. Most studies have used a neoclassical demand and supply framework to explain variations in real wages across states. The underlying factor operating on the demand side is productivity. On the supply side, size of agricultural workforce relative to total workforce is an important factor. Taking the two together, increased use of agricultural workers would reflect a dynamic economy. Improvement in the condition of agricultural workers is an indication even a consequence of a growing economy including the agricultural sector. It is a reflection of higher wages which are consequent upon numerous factors such as increase in labour-intensive operations in the agricultural sector, absorption of workforce into other sectors, out-migration, skill development, strong bargaining power and various region-/ state-specific development programmes of the government.

It may be stated that several factors may have contributed positively or negatively towards determining agricultural wages in the Indian economy. Different factors, as stated earlier, might have caused variations in wages across states depending upon the stages of agricultural development. Further, the factors which may have affected wages in the pre-Green Revolution period will be different from those affecting them in the post-Green Revolution period. The same holds true for the pre- and post-reform periods also. There is need to establish the relative importance of factors causing variations in real wages in different states over time.

The reference period of the study is so chosen as to incorporate all the major changes in Indian agriculture and make a comprehensive analysis of trends in level of real wages. It studies these trends over the last four and half decade’s from 1960-61 to
2005-06 by using time series across fourteen major states.

The study also aims to analyse underlying factors causing variations or determining the wages of agricultural worker in India for more than four and half decades by using a time series analysis for its reference period across fourteen major states.

The study has used a structural break technique to assess the growth rate of wages of Indian agricultural workers. Across the fourteen major states, it tries to identify a mark period of a distinct step-up in the temporal movement of real wages by finding the break date endogenously. This is free from all assumptions and prior information which may influence the partitioning of the period into sub-periods.

At the very outset, it needs to be emphasized that Indian states apart from their linguistic differences also lay in different agro-climatic regions which results in different cropping patterns, crops, agricultural techniques and thereby yield. Likewise access to resources in terms of availability of workers for the agricultural sector, land endowment and availability of infrastructure differs across the states. So each state is bound to deliver a different level of wages over a time-span of forty-six years. Second, given the agro-climatic heterogeneity and diversity the states, a single known break date of change in real wages may not be applicable to all the states and may fail to capture state-wise true growth. An attempt, consequently, is made to identify state-wise different break dates in the temporal movement of real wages which would precisely capture state-wise and all-India-level growth. This would be more reliable and accurate as it takes into account state-specific factors. Third, the study, thus, does not limit itself to exploring the reasons of variations in real wages but also investigates a long-run equilibrium relation among real wages and its demand and supply variables. Given any short-run shock, it examines how quickly the variables adjust to restore back to the equilibrium level of real wages. It examines a long-run equilibrium for a period of forty-six years for all fourteen states, capturing state-wise agro-climatic and other differences by taking up each state separately for analysis. Yet another contribution of this study to the literature is investigation of state-wise the long-run equilibrium relation among real wages and
demand and supply variables. Fourth, apart from using its demand and supply factors to identify the relative importance of variables in determining wages, the study uses the lagged variables of factors by using an Auto-Regressive Distributed lag model. It applies recently developed robust econometric techniques in time series such as Bound Testing approach to cointegration developed by Pesaran and Shin (1995, 1998) within an Autoregressive Distributive Lag (ARDL) framework. This technique has been rarely used in the literature concerning real wages in Indian agriculture. This model takes lagged value of the different independent variables as an explanatory factor of the model. Not only this, it tries to use lagged values of dependent variables as one of the explanatory variables of the model.

1.5 Research Objectives

The agricultural real wages depend on the following variables: (a) demand side variables, (b) supply side variables. The demand side variables include labour productivity, yield, net area irrigated to gross cropped area, net sown area per agricultural worker and cropping intensity. The supply side variables include supply of agricultural workers, occupational diversification, and land-man ratio.

Objectives:

(i) To analyse trends in and growth of real wages from 1960-61 to 2005-06.

(ii) To identify a set of factors determining real wage rates in agricultural sector in a neoclassical demand and supply framework.

(iii) To examine state-wise cointegration among real wages and a set of variables such as yield, labour productivity, irrigation, cropping intensity, supply of labour, net area sown to the male agricultural worker and diversification.

(iv) To investigate the state-wise long-run equilibrium relation among the variables
of interest.

(v) To examine state-wise stability of the real wage function.

**Hypotheses:**

(i) Real wages are positively related to demand-side variables such as yield, labour productivity, irrigation.

(ii) Supply-side variables negatively affect real wages of agriculture workers. These variables are supply of agricultural workers, net sown area to agricultural worker.

(iii) Diversification of workers into non-farm activities exerts an upward pressure on the real wages of agricultural workers.

(iv) The period of break defined by step-up in temporal movement of real wages differs across states.

(v) Cointegration among real wages and the set of variables exists in the long run.

(vi) The long-term equilibrium relationship between the variables determining wage rates differs across states.

(vii) There is a stable real wage function state-wise.

### 1.6 Organisation of the Thesis

The study has been organised in the following manner. This chapter introduces the subject, by providing a background and a brief sketch of the subject of real wages in Indian agriculture and also discusses the research objectives, hypotheses and newness of the present study. Chapter 2 gives an extensive review of the literature and the various issues being considered in the study. Chapter 3 discusses the levels and trends in real wage rates. The growth rate of real wages both at state level and at all-India level is
analysed. Inter-state disparities in real wage rates are also taken up. Chapter 4 briefly outlines the important model of wage determination, reviews the factors/variables which have been undertaken by earlier studies and establishes the importance of numerous variables in wage determination. This chapter also uses panel data regression analysis by combining cross-section data of major fourteen states over forty-six years. Chapter 5 provides state-wise analysis of real wages, Bounds Tests approach to cointegration. It takes up the stationarity test of the relevant variables. It also uses bounds tests procedure for testing cointegrating properties among the variables in the long run. The chapter also discusses the long-run equilibrium and short-run dynamics for individual states. Chapter 6 provides a summary of the findings of the study and discusses the policy implications for Indian agriculture.