# ANALYSIS OF THE IMPACT OF INFLATION ON DIFFERENT HOUSEHOLD GROUPS IN BANGLADESH

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# ACRONYMS

| | |
|---|---|
| ADB | Asian Development Bank |
| BBS | Bangladesh Bureau of Statistics |
| BIDS | Bangladesh Institute of Development Studies |
| HIES | Household Income and Expenditure Survey |
| CPI | Consumer Price Index |
| EV | Equivalent Variation |
| FAO | Food and Agriculture Organization |
| LFS | Labour Force Survey |
| NREG | National Rural Employment Guarantee |
| R & D | Research and Development |
| RMG | Readymade Garment |
| VAR | Vector Auto Regression |

# FOREWORD

This research study was funded by the BIDS Research Endowment Fund (REF) which provides a window for the BIDS researchers to conduct policy oriented research on priority development challenges facing Bangladesh.

In 2009, BIDS received Tk. 200 million from the government to create the REF to carry out policy research at the Institute. The creation of BIDS-REF has significantly enhanced our scope of conducting institutional research. Under the BIDS-REF, several research studies have been initiated with the expectation that this will enable the researchers to bring their knowledge into the mainstream of development research and evidence-based policy making in the country through conducting policy relevant works.

These research studies are included in the Annual Research Programmes (ARPs) of BIDS which are prepared every year through a rigorous and participatory process in consultation with the government, civil society, private sector and other concerned stakeholders. As such, several of these studies are undertaken in response to emerging challenges and/or at the request of the government and other agencies.

This is for the first time that BIDS is publishing the BIDS-REF study reports as a part of its commitment to establishing transparency and accountability to its stakeholders including fellow researchers and policymakers who are working towards promoting evidence based policies in Bangladesh. I hope the study report will be useful to all stakeholders concerned with the theory and practice of development in general and of Bangladesh in particular.

I would like to express my deep appreciation to all my colleagues in BIDS who have cooperated and contributed to the preparation and publication of these research studies. I would also like to express my deep gratitude to the Hon'ble Minister of Planning and Chairman of BIDS Board of Trustees and its distinguished members who are providing continuous guidance and support to BIDS in the effort to further concretising its long term vision of being part of a process that places BIDS firmly on the level of engagement in furthering better research and better policy leading to better Bangladesh.

April 2013                                                    Mustafa K. Mujeri
                                                                Director General

# EXECUTIVE SUMMARY

1. The rising rate of inflation in recent years has raised significant concerns regarding its adverse effect on the economy including negative welfare consequences on different socioeconomic groups, particularly the poor. Bangladesh was worst hit by inflation in 2007-08 and 2010-11 when inflation crossed the two-digit level with significant upward movements of food inflation. In 2007-08, the 12-month average inflation rate rose to 12.28 per cent (2005-06 base), which after slowing down in the next two years again reached 10.89 per cent in 2010-11—the highest ever levels in the recent history of Bangladesh. One characteristic of the recent inflation in Bangladesh is that it is mostly led by food inflation.

2. In the backdrop of rising inflation, it is important for the policy makers to know which types of households are more affected by rising inflation and what measures can be adopted to redress their disadvantages at least partially. The persistence of inflation and inflationary expectations over a sustained period underscores the need for a fresh look at the pattern of inflation faced by various groups of households particularly to understand how different groups could cope with sustained inflation in terms of their consumption behaviour as well as earning strategies.

3. In terms of the nature of recent inflationary episodes in Bangladesh, particularly with a dominant role of food inflation, the effect of rising food prices might differ across households based on the share of food consumption in their consumption baskets. Therefore, the focus of this study is to investigate the inflationary impact on two specific groups of households—day labourers and fixed income earners. More specifically, households differentiated in terms of four categories e.g. the poor, lower middle income, upper middle income and high income, have been examined to see how these groups adjust to higher levels of inflation. In addition to estimating CPIs for these household groups, the study examines the wage-inflation dynamics and assesses how their consumption and welfare are affected by the dynamics.

4. The analysis indicates that both day labourers and fixed income household groups faced higher food inflation than non-food inflation during 2008-2010. In relative terms, the urban household groups faced higher food inflation than those in the rural areas.

5. In terms of food inflation, relatively poor fixed income household groups face higher inflation than the daily wage labour households in the rural areas. In contrast, poor and lower middle income day labourers in urban areas face higher inflation than those of fixed income households. It is observed that the share of medium quality rice in the consumption basket of the urban day labour households is higher, which might have been reflected in their respective inflation rates. In general, poor and lower middle income households face higher inflation in both rural and urban areas than their other counterparts.

6.  Non-food inflation tended to be lower than food inflation during 2008-2010, and it started crossing food inflation only in 2010-11. In terms of non-food inflation, there had been no significant differences among rural and urban households. Rural poorer households faced slightly higher non-food inflation than the other groups. On the other hand, in urban areas, high income groups faced higher non-food inflation than others until 2010; however, when non-food inflation crossed the double-digit level, poorer households started facing higher non-food inflation than others. It suggests that there might exist non-linearity in non-food inflationary characteristics, especially in the urban areas.

7.  For measuring changes in income and cost of living in recent years, the cumulative growth in nominal wages and CPI inflation in each year over 2000 is estimated. The estimates show that agricultural wages in Bangladesh on average increased by 9.1 per cent per year over the 2000-2010 period. Similar changes are 9.3 per cent for manufacturing workers, followed by 8.0 per cent for fisheries and 7.5 per cent for construction workers. The cost of living of the workers, on the other hand, increased at an annual average growth rate of 6.6 per cent during this period. This suggests positive change in real consumption of the labourers who mostly belong to poor households in the country.

8.  The annual growth of the wage rate index (both nominal and real) over the past decades shows that almost all indexes experienced higher growth than inflation during the period of the 2000s. In particular, the agricultural wage rate index experienced the highest growth during the last decade in real terms and its growth rate was second only to the manufacturing wage index. This shows that the average returns to labour has risen robustly in the past decade, contributing positively toward improving the living standards of the working population.

9.  In nominal terms, one can see a consistent rise in both agricultural and non-agricultural wage rates over the period. In 2009-10, the average nominal wage of agricultural labour was Tk. 192 per day, while the same was Tk. 170 for non-agricultural labour. The wage rate increased by 14 per cent and 7 per cent in 2010-11 and 2011-12 respectively for agricultural labour, while the increase was by 25 per cent and 18 per cent respectively for non-agricultural labour. Moreover, the trend in agricultural wages shows fluctuations with distinct seasonal peaks while the non-agricultural wage has a more smooth growth. It is seen that agricultural wage remained higher than the non-agricultural wage until the end of the year 2010 probably due to the high response of rural agricultural wage to rising rice price. The situation was reversed afterwards with the average non-agricultural wage rate exceeding the agricultural wage.

10. Daily real wage rates are estimated by deflating the nominal wages by group-specific CPI deflators calculated in the present study. It is evident that the real agricultural wage rate has remained consistently below the non-agricultural wage rate since the middle of 2010 and the gap has widened over time. Moreover, the real agricultural wage has witnessed wider fluctuations relative to non-agricultural wage.

11. The variance decomposition analysis suggests that wage formation does not have any impact on inflation in Bangladesh; rather inflationary pressures exert upward pressure on wage adjustments for daily wage labourers, at least in the short run. The daily labour households could adjust 40 per cent of inflationary shocks within three months of inflationary shocks; however, afterwards the rate of adjustment becomes rather slow.

12. The variance decomposition shows that compared with the daily labour households, fixed income households are mostly unable to adjust inflationary shocks into wages/earnings. The poorer and lower middle income fixed income groups could adjust only about 10 per cent of inflation shocks into wages after five months in urban/semi-urban areas. The results show that the non-agricultural poor fixed income households are able to adjust 25 per cent of inflation shocks into wages in 10 months of inflation shock, while the upper income households could adjust about 30 per cent to wages in 10 months after the inflationary shocks. However, wage itself could not explain price shocks for any of the inflation series.

13. The impulse responses show that an innovation in the rate of inflation responds positively to the increase of daily wage rate for daily labour households, particularly for the poor. The wage response to inflationary shocks is prominent in three months; afterwards the response is very low for daily labour households irrespective of their income levels. The analysis indicates that the day labourers can adjust a substantial portion of inflation to real wages very quickly, for which the adverse impact of inflation on them appears to be less. Therefore, although poor daily labour households face relatively high inflation, not much loss in terms of welfare takes place due to flexibility in wage adjustments. However, fixed income households cannot adjust the inflationary shocks quickly—there exists substantial time lag in wage adjustments. Thus, these groups of households face the most hardship resulting from inflationary shocks.

14. In Bangladesh, supply side factors resulting from disruptions in domestic production and supply (e.g. due to floods or natural disasters) and unusually high and rising global prices of food, fuel and other essential commodities usually trigger inflationary pressures in the economy. This highlights the importance of prudent supply management as an important strategy to fight inflation. In a situation when inflation becomes persistent, direct measures are important to reduce inflationary pressures instead of leaving the burden of keeping inflation at low levels on demand management policies alone. With rising food prices, one useful way to dampen the price effects of food supply shocks is to maintain adequate strategic buffer stock of food that could be released when needed through different food transfer programmes targeted to the poor and food insecure households.

15. Keeping in view the financial burden of subsidies in the context of limited fiscal space of the government, targeted safety nets programmes, feeding programmes

for school children, food-for-work programme, open market sales, and guaranteed employment programme for the poor and disadvantaged households, especially during the lean seasons, are some useful measures that can be used in the short run to enhance food entitlements and stabilise prices. Along with mitigating the inflationary impact on the poor through generating short-term employment opportunities and providing access to transfer incomes in the rural areas, it is important to ensure food to the poor at subsidised prices, especially in the urban areas, as they do not have any surplus food at home.

16. The analysis shows that while daily wage labourers in agricultural and non-agricultural activities have some ability to adjust their nominal wages to inflation in the short run at least partially with minimal impact on real wages, ensuring real wages and salaries of low paid fixed income workers (including workers for example in the RMGs industry) is a priority. Similarly, along with ensuring fair prices at the producer level to small farmers, supply of food items to the urban poor at reasonable prices would be useful to lessening the inflationary impact on poverty.

# CHAPTER 1

# INTRODUCTION

The Bangladesh economy had experienced a moderate rate of inflation in the 1990s and first half of the 2000s, at an average rate of less than 4.0 per cent, before it moved to a two-digit level in 2007-08. An important upward surge in inflation is observed since then. Bangladesh was worst hit by inflation in 2007-08 and 2010-11 when inflation crossed two-digit level with significant upward movements of food inflation. In 2007-08, the 12-month average inflation rate rose to 12.28 per cent (2005-06 base), which after slowing down in the next two years again reached 10.89 per cent in 2010-11—the highest ever in the recent history of Bangladesh.[1] One characteristics of recent inflation in Bangladesh is that it is mostly led by food inflation. The inflationary episodes thus largely follow the trends of high global commodity price volatility, particularly rice prices in domestic and global markets.

However, the sources of high inflation were not the same throughout the earlier decades. While inflation was dominated by non-food items in the first half of the 1990s, the opposite was seen in the latter half of the 1990s. Similarly, food inflation dominated the whole decade of 2000s, but an increasing relative importance of non-food inflation is seen from 2010.

The rising rate of inflation in recent years has raised significant concern regarding its adverse effect on the economy including negative welfare consequences on different socioeconomic groups, particularly the poor. The immediate adverse effects of higher inflation include, among others, reduced real income of the households. In addition, inefficiencies and inequities may result from inflation-induced changes in relative prices. In Bangladesh, it is important to recognise the high costs of inflation for the poor and disadvantaged groups. The traditional claim is that inflation is costly for the poor. As their purchasing power is eroded especially for those groups whose earnings are fixed in nominal terms, their assets are devalued more as they hold a larger share of their assets in liquid form compared with the non-poor, and it is difficult for the poor to hedge against inflation due to their limited access to the financial system.

In the backdrop of rising inflation, it is important for the policy makers to know which types of households are more affected by rising inflation and what measures can be adopted to redress their disadvantages at least partially. The persistence of inflation and inflationary expectations over a sustained period underscores the need for a fresh look at the pattern of inflation faced by various groups of households particularly to understand how different groups could cope with sustained inflation in terms of their consumption behaviour as well as earning strategies.

In terms of the nature of recent inflationary episodes in Bangladesh, particularly with a dominant role of food inflation, the effect of rising food prices might differ across households based on the share of food consumption in their consumption baskets. It is

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[1] Recently Bangladesh changed the base year for estimating inflation to 2005-06 from its earlier base of 1995-96. This study reports/estimates inflation using 2005-06 as the base year.

widely argued that while daily labour households (both farm and non-farm) are able to adjust their wages with rising inflation at least partly, fixed income households are in a disadvantageous position as their purchasing power erode with rising inflation. In addition, among the fixed income groups, relatively poorer households might be able to undertake some inflation-coping strategies by involving with other part-time jobs and income-generating activities. Thus, it is important to investigate the effect of inflation on these two different groups of households—day labour and monthly-salaried (fixed income) households. Moreover, even the nature of inflation might vary depending on income levels among these two types of households. Therefore, the focus of this study is to investigate the inflationary impact on two specific groups of households—day labour and fixed income, with four categories of each, such as poor, lower middle income, upper middle income and high income.

To see the effects of inflation, the first step would be to estimate separate consumer price index (CPI) for each of the above groups. In the next step, it is useful to examine how different groups can adjust, if at all, to higher levels of inflation. The redistributive role of inflation through its effect on wages has been widely recognised in the literature. Empirical literature suggests that wages lag behind inflation. When inflation is on a rising trend, price rises tend to run ahead of increases in wages. Therefore, inflation leads to a shift of income away from wage earners, and toward profits. This has led to the claim that inflation increases income inequality as it hurts the poor relatively more than the rich (see Laidler and Parkin 1975, Fischer and Modigliani 1978). However, several empirical studies in the United States (US) suggest that inflation has not generated major impact on the distribution of income. More surprisingly, several researchers point out that inflation has redistributed income to the lower-income quintiles and toward labour income in the US (Bach and Stephenson 1974, Blinder and Esaki 1978). This shows that inflation may even improve income distribution in specific situations. On the other hand, the study by Cardoso, de Barros and Urani (1995) provides some evidence on how inflation eroded the poor's income in Brazil during the 1980s. Similar empirical evidence is obtained for Russia, Poland and China as these countries experienced significant and rapid inflation during their transition to the market economy.

Another important channel of redistribution of income and wealth through inflation is the debtor-creditor channel. The redistribution is from nominal creditors to nominal debtors if interest rates on assets are denominated in terms of money without fully adjusted to the inflation rate. As summarised by Laidler and Parkin (1975), the losers from inflation appear to concentrate on the rich and the poor, because the middle-income group, having more nominal debt than those at either extreme of the wealth distribution, is likely to be less affected. But there is evidence that, in adjusting to inflation, the rich react more quickly than the poor. The evidence on these issues is, however, overwhelmingly based on US data and it is not clear to what extent one may generalise from it to other economies as no empirical regularity has emerged yet.

## 1.1 Objectives of the Study

The study aims to identify the major socioeconomic groups who are most affected by the adverse impacts of inflation in Bangladesh and recommend policy measures such that

the vulnerability of these groups to inflationary hardships can be reduced. More specifically, the study has the following four broad objectives:

1. Analyse the pattern and characteristics of recent inflationary episodes in Bangladesh and examine the underlying sources of inflationary dynamics;

2. Assess the extent of inflation faced by different household groups, such as poor, middle income and rich in urban and rural areas and within this context, examine how their positions vary across the income/expenditure distribution;

3. Examine the wage-inflation dynamics of different income groups and assess how their consumption and welfare are affected by the dynamics; and

4. Draw policy implications and suggest measures for protecting the vulnerable populations from the adverse impact of inflation.

## 1.2 Data and Methodology

For the study, relevant price data are collected from the Bangladesh Bureau of Statistics (BBS) and the group specific consumption weights have been calculated from the unit level data of the Household Income and Expenditure Survey (HIES) 2010 of BBS.

Historical wage indexes from 1970 to 2012 for different groups are taken from various publications of BBS. In addition, wage rate for different professional groups have been collected through a primary survey conducted in November 2012. The survey was conducted in randomly selected 14 districts of seven divisions with emphasis on rice producing areas. A total of 1,473 respondents were interviewed to understand their employment history, income pattern, wage earnings and related characteristics. The details of sampling techniques, sample areas and types of income groups interviewed are given in Appendix I. Basic characteristics of the selected household groups are given in Tables A.3-A.5 in Appendix II.

### *Construction of Consumer Price Indexes*

Inflation in Bangladesh is measured by changes in the consumer price index (CPI) which is calculated using Laspeyre's index with consumption share as fixed weights. The BBS, as the national statistical agency, has the sole responsibility of estimating the CPI inflation. The current practice is to use the average weights in rural and urban areas to estimate respective CPIs in the two locations.

In the present study, in order to calculate CPIs for different household groups, we first identified different income groups, such as poor, lower middle income, upper middle income and higher income categories. The poor households are specified using the per capita income thresholds available from HIES 2010, while other groups have been defined using evidence collected from other studies and definitions available in the relevant literature. The definitions of poor, lower and upper middle income and higher income households are given in Table A.1 in Appendix II.

In the next step, consumption weights have been estimated by using consumption expenditure of these groups from the HIES 2010. Price data are taken from BBS which

collects the information on a regular basis through price survey from different parts of the country. As noted earlier, the study uses 2005-06 as the base for calculating inflation rates of different groups in consistent with the current BBS practice of using 2005-06 as the base year for estimating the country's inflation rate instead of 1995-96 as used earlier.

*Vector Auto-Regression (VAR) Technique*

Calculating CPI separately for different household groups gives us the first-cut answer about the extent of inflation faced by the households. However, to get a complete picture on the impact of inflation, it is necessary to analyse reaction to wage adjustments. To assess the welfare consequences of rising inflation, it is important to examine how the selected households can adjust to real wages. Available evidence also shows that wages react significantly over time to price shocks, probably reflecting the backward indexation of nominal wages. To assess as to whether any innovation in the rate of growth of nominal wages generates significant impulses on inflation, we have used the Vector Auto Regression (VAR) model. The analysis thus focuses on the short-run links between CPI inflation and nominal wage movements. The standard VAR model has thus been used to examine which groups of households can adjust real wages and to what extent within a short period of time.

## 1.3 Organisation of the Report

The Report is organised as follows. After the introductory remarks of the present chapter, Chapter 2 provides a brief review of the relevant literature on inflation and its consequences on household welfare and poverty. Chapter 3 then analyses the trends and sources of inflation in Bangladesh. The estimates of CPI-based inflation for different household groups, particularly for the daily wage labourers and fixed-income household groups, are given in Chapter 4. Chapter 5 discusses the wage-inflation dynamics in Bangladesh, while Chapter 6 tests the short-run links between inflation and wages using appropriate econometric techniques. Finally, Chapter 7 concludes the Report with some major policy recommendations.

# CHAPTER 2

# INFLATION AND HOUSEHOLD WELFARE: A REVIEW

There are numerous studies that have examined the effect of price change on the household's welfare, especially in the context of developing countries. However, these analyses are mostly confined to the explanation of the mechanism of inflationary effect on different households leaving aside specific conclusions regarding the effects across different income groups.

The World Bank (2009) assesses the impact of the 2007-08 food price inflation on poverty in three countries—Bangladesh, Nepal and Pakistan. It expands on the traditional analytical approach in which the poverty impact is determined exclusively by the household's net marketing position (i.e. net producer or net consumer), by simulating the "second round" effects of behavioural adjustments made by consumers and producers in reaction to price changes. The study analyses the welfare effects of food price inflation by categorising household's net marketing position. Equivalent Variation (EV) measure has been used to estimate the welfare effects of changing food prices. The results show that in Bangladesh, households incur welfare losses by 25 per cent as a result of a 50 per cent increase in the price of rice. Welfare losses are smallest in Pakistan, where the maximum loss is about 6 per cent. The EV measure is negative for about 80 per cent of all households in Bangladesh, which means that there are many more losers than gainers.

Ivanic and Martin (2011) assess the short-run poverty impacts of the 2010-11 surges in food prices. The study identifies in the context of rising food prices that the adverse welfare impact on net buyers outweighs the benefits to net sellers, resulting in an increase in the number of poor and in the depth of poverty.

Another recent study, conducted by the Asian Development Bank (ADB 2008), evaluates the macroeconomic impacts of high and rising food prices and its impact on households. Applying the Oxford Economics Global Model, the study traces the impacts of fast climbing food and energy prices on developing economies in Asia under two situations—the first supposing that the 57.5 per cent increase in world food prices in the first quarter of 2008 continues through the year-end and the second assuming that the 66.5 per cent rise in world oil prices is added on top of the food price increase. Simulations are conducted adopting three different scenarios where the increase in food prices is 10 per cent, 20 per cent and 30 per cent. The results of the study show that the increase in food prices in the Philippines by 10 per cent, 20 per cent and 30 per cent could create an additional 2.72 million, 5.65 million and 8.85 million poor people respectively. The increase in food prices also tends to intensify income inequality in the Philippines. The results show that increases in food prices by 10 per cent, 20 per cent and 30 per cent raise the Gini index by 0.55, 1.10 and 1.65 percentage points respectively. The study also indicates that a reduction in the average standard of living of different income groups specifically a 4.16 per cent decline precipitated by 10 per cent jump in food prices.

To address the adverse impact of the increase in food prices, the ADB study recommends that export restrictions should be discouraged, domestic markets should be unrestricted, and government controls over prices and resource allocation should be avoided. To alleviate the social impacts of such price shocks, the extremely poor must be provided well-targeted assistance in the form of cash transfers, food-for-work, feeding programmes and food stamps, small and marginal farmers must have equal access to credit, fertiliser, improved seeds, pesticides, electricity and water and should be provided market access across the region and in the global marketplace. It is also recommended that in the long-run, improvements should be made in land and labour productivity in agriculture through long-term investments and technological advances including up scaling of research and development (R&D), and sustainable land use.

In the context of inflationary pressure faced by different household groups, Mortaza and Hasnayen (2008) calculated inflation rates for selected household groups using the 2005 HIES data of Bangladesh. They find that recent inflation is mainly driven by higher food prices; and the inflation rate faced by the poor exceeds the corresponding rates for the non-poor groups. The study, however, does not provide any in-depth analysis on how much adverse impact of inflation exerts to different household groups.

## 2.1 "Welfare Effects" of Inflation: Some Empirical Findings

The relationship between inflation on the one hand and poverty and income inequality on the other remains a debated issue although many find that inflation aggravates poverty and worsens income inequality (see Romer and Romer 1998, Easterly and Fischer 2000, Datt and Ravallion 1998). Various channels have also been posited through which inflation hurts the incomes of the poor more than the incomes of the non-poor (see Neri 1995 for some examples from Brazil like economies of scale, barriers to entry in financial services reducing access of the poor to inflation hedges, relatively competitive labour market for unskilled labour reducing the bargaining power of poor workers, and differences in the consumption baskets of the poor and the non-poor).

Several other channels between inflation and inequality have also been documented in the literature. For example, Dolmas *et al.* (1997) relate inflation and income inequality through central bank independence since pressure for redistributive social programmes with rising income inequality in democratic countries may be financed via higher inflation which paradoxically may further worsen inequality when central banks are not independent. Albanesi (2001), while looking at an economy in which government consumption can be financed via taxation or inflation, shows that in more unequal societies the poor are more vulnerable to inflation due to their dependence on cash balances; while their negotiating power is further weakened relative to the non-poor by this vulnerability leading to higher inflation. The inclusiveness of economic growth is also affected by inflation. The analysis by Ferreira, Leite and Litchfield (2007) in Brazil shows that higher education levels, redistribution programmes and convergence across regions are closely correlated with lower income inequality and inflation has detrimental effect on inclusion. Cardoso, de Barros and Urani (1995) report that inflation increases income inequality and has different effects on various educational groups.

## 2.2 Agricultural Wage and Changing Rice Price

The relationship between agricultural wages and staple food (rice) prices has been a subject of intense empirical analysis especially in Bangladesh as agricultural wages influence the welfare of the poorest groups in the rural areas comprising mostly the agricultural labour households. In particular, rice being the staple, changes in rice prices have a significant impact on agricultural wages in Bangladesh. Several past studies find a positive relationship between agricultural wages and rice prices (e.g. Boyce and Ravallion 1991, Ravallion 1994, Palmer-Jones 1993, Palmer-Jones and Parikh 1998). These studies hypothesise a positive relationship with partial adjustment in the short run and complete adjustment in the long run. The causality runs from higher rice price creating better incentives for raising rice production and leading to greater demand for factor inputs including labour which leads to higher wages. On the other hand, a few studies posit no or negative relationship between rice price and agricultural wages. Rashid (2002), for instance, argues that agricultural wages and rice prices have no long run relationship in Bangladesh.

In Philippines, an analysis of the welfare implications of a decrease in rice prices for agricultural households, who are net purchasers of rice and net suppliers of labour, shows that most households benefit in the short run but lose in the long run (Lasco 2005). Moreover, those households who rely primarily on agricultural wages and spend a large share of their wage income on rice are likely to be adversely affected by an increase in rice prices in both the short- and the long-run.

An important strand of inflation analysis is thus the impact of changes in food prices on the poor. Rising food prices in general raises the incomes of the food producers. This could compensate for lower incomes of the non-food producing households in the rural areas provided the share of such households (e.g. net purchasers of food) is low. Deaton (1989) by analysing the effect of higher rice prices in Thailand shows that higher food prices can benefit many groups in society although the middle class producers of food benefit the most. Ravallion (2000), using data from India, shows that food prices do not have an independent effect on real wages. He observes that, while households may have to bear the immediate burden of rising food prices, rising rural productivity will affect both food producers and wages of rural labourers in the longer term, which would reduce rural income inequality. The effect of higher food prices on income distribution can thus be neutral if wages can adjust sufficiently.

Some studies, however, suggest that wages may not be so flexible. Several empirical studies provide evidence in support of the finding that wages do not fully adjust to higher food prices, in which case the poor suffer more given the higher share of food in their consumption basket (Christaensen and Demery 2006, Rashid 2002, Warr 2005). Overall distributional impact depends, as Wodon and Zaman (2008) point out, on the extent to which households are net producers or consumers of food. In the context of Sub-Saharan Africa, they find that urban areas are more affected than rural areas by higher food prices and that food importing countries are more affected than food exporting countries. In the longer term, however, the incomes of the non-food producing households could rise if the

greater income accruing to food producing households "trickles down" to other households through inducing higher economic activity.

In the above context, the prospects of migration may add another dimension to the analysis. In countries where significant potential for rural-urban migration exists (e.g. in Bangladesh), higher rural wages (resulting from higher food prices) relative to urban wages may affect household migration decisions. A shift in relative prices towards food, which constitutes the overwhelmingly large share of the consumption basket of the wage labourers, could have large effect on the migration decision. If the poor urban workers return to their homes due to changing rural-urban wage differentials, the proportion of the poorest segments in the urban areas will decline, *ceteris paribus* reducing urban inequality and somewhat mitigating the effects of higher food prices on income distribution. On the other hand, if higher food prices encourage the extreme poor households in rural areas to migrate to urban areas to take advantage of higher urban wages, the net effect in the rural areas will be the reverse: it is likely that those households with relatively high and stable incomes would not migrate, indicating that the rural poor who would emigrate are likely to be poorer, and their movement to the urban areas would reduce inequality.[2]

The evidence is thus relatively strong that headline inflation exacerbates income inequality, but there seems to exist some evidence that rising food prices may have a more moderate or even benign impact on inequality. One issue that emerges from the above is: does this indicate that non-food inflation is particularly damaging to the poor? For instance, if higher food prices in rural areas pass through to wages, that is if rural wages are elastic to food price increases, then food inflation should be less harmful, and could be even beneficial to income inequality in the rural areas. A similar relationship could also hold in the urban areas, but as most of the rural households are engaged in agriculture, the relationship will be stronger in the rural areas. In contrast, non-food inflation should be detrimental to income inequality in both rural and urban areas.

The analysis by Walsh and Yu (2012) with three samples of data (international, India and China) shows that higher non-food inflation is associated with worsening income inequality across all three samples supporting the view that income inequality is aggravated by higher levels of inflation. However, they report lower detrimental effect for food inflation. Taking into account the endogeneity of inflation, inequality and growth, the analysis using international and Chinese data shows that higher food inflation is associated with declining income inequality. For the Indian data, the results show that non-food inflation widens income inequality in both urban and rural areas. However, food inflation has different effects. The effect on urban inequality is ambiguous, but food inflation is strongly associated with lower inequality in the rural areas.

The above results, however, need to be interpreted in the context of specific features of the Bangladesh economy. In particular, Bangladesh may be considered as a "closed

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[2]The potential migrants, however, may not include the hardcore and the lowest income rural households including the elderly, disadvantaged, disabled, and poor female-headed households as these households probably would not have the minimum assets needed and social contacts required for migration to urban areas and big cities.

economy" in the case of its staple food, rice, as most of the product is grown domestically. Moreover, the country faces a very different food price dynamics and income in equalising process than countries like India and China or countries which import a large share of their food needs. Most of the rural households are also rice growers and they may not be as susceptible to global commodity price shocks as others. In addition, Bangladesh has significant regional variation in terms of surplus or deficit in availability of food from domestic production so that the effect of food inflation could differ across regions.

With a relatively high growth and transitional economy, Bangladesh is therefore more likely to have a complex relationship between food production and rural wages. With higher growth, there seems to be emerging more productive and remunerative employment opportunities (despite rising agricultural productivity) in the urban areas which make it more attractive as well as less difficult to shift from rural to urban unskilled labour market compared with the past. Along with countering the increase in income inequality, this potential provides a "safety valve" for the rural workers relative to a situation where urban employment opportunities are limited which under food inflation could bring more detrimental effects for the rural consumers.

One study in India on welfare effects at the household level of rising inflation (especially food inflation) shows that, contrary to the conventional wisdom, the main category of poor households negatively affected by the rise in prices is overwhelmingly rural (representing 77 per cent of all losing poor households), both farmers and non-farmers (Janvry and Sadoulet 2009). These rural households account for 79 per cent of the aggregate welfare loss among the poor. From a policy stand point, much of the response to high food prices in many countries is focused on the urban poor as they are presumed to be the main losers. This study shows that the urban poor account for only 22.9 per cent of the total number of poor losers, and 21.4 per cent of total expenditure losses among the poor in India.

Moreover, from the policy perspective it is important to remember that the urban poor are easier to reach, typically through various targeted distribution and cash transfer programmes; and they are politically more organised and vocal, close to the seat of the government and effective in protesting so that their plights are more likely to be addressed. A more pressing reality is that, as the results of the above study show, the rural households are the main categories at risk and they are also the more difficult group to reach through available targeting instruments. This indicates how important it is to respond to food inflation by raising the productivity of land and labour in smallholder farming and facilitating access to even tiny plots of land for landless rural households to produce more of their own food needs. In general, insufficient attention seems to have been given to approaching the food security issues through improved capacity to produce for home consumption by the poor households.

The analysis of data on agricultural wages and outputs in India shows that absolute poverty responds in the short run to changes in agricultural wages and average farm

yields; and wages respond to farm yields, presumably through effects on labour demand (Ravallion and Datt 1995). Higher yields thus help reduce absolute poverty through induced wage effects, as well as the more direct channels, including effects on both employment and own-farm productivity. On the other hand, there is a strongly adverse impact of inflation on real agricultural wages and (hence) on absolute poverty in the short run. The adjustments of real wage rates, however, take time so that the short-ran gains to poor people of labour-demanding productivity growth are far lower than the long-run impacts. Also, the short-run effects operating via the wage rate are minor compared with those operating through other channels. In the long run, the wage effects do matter, accounting for about 30-40 per cent of the steady-state elasticity of absolute poverty to a yield increase (see Ravallion and Datt 1995).

# CHAPTER 3
# TREND AND SOURCES OF INFLATION
# IN BANGLADESH

## 3.1 Trends in Inflation

The estimated inflation rate shows that Bangladesh has been worst-hit by inflation in 2007-08 and 2011-12 (Table 3.1). The yearly average inflation is estimated at 12.28 per cent in 2007-08 and 10.89 per cent in 2010-11 with food inflation at 16.69 per cent and 14.09 per cent respectively. During the period, rural households are observed to experience much higher inflation, mainly driven by food prices. The average food inflation was 17.7 per cent in rural areas and 14.16 per cent in urban areas in 2007-08. After experiencing a high episode of inflation in 2007-08, Bangladesh experienced as somewhat lower inflation in the following two years, ranging between 7 and 8 per cent, when relatively low prices of food, particularly rice price, played the key role to drive down inflation. Again, inflation started soaring from 2010-11 with a new phenomenon of rising non-food inflation.

Table 3.1
**Inflation in Bangladesh, 2008-2012**

|  | National | | | Rural | | | Urban | | |
|---|---|---|---|---|---|---|---|---|---|
|  | General | Food | Non food | General | Food | Non food | General | Food | Non food |
| 2007-08 | 12.28 | 16.69 | 6.35 | 13.58 | 17.73 | 6.73 | 9.84 | 14.16 | 5.84 |
| 2008-09 | 7.68 | 8.10 | 7.15 | 7.96 | 7.84 | 8.26 | 7.16 | 8.77 | 5.61 |
| 2009-10 | 6.83 | 6.33 | 7.66 | 5.82 | 5.00 | 7.39 | 8.83 | 9.66 | 8.02 |
| 2010-11 | 10.89 | 14.09 | 6.21 | 11.71 | 15.01 | 5.70 | 9.34 | 11.88 | 6.71 |
| 2011-12 | 8.76 | 7.89 | 10.19 | 8.78 | 7.71 | 10.94 | 8.72 | 8.35 | 9.15 |

**Note:** Inflation rates refer to 2005-06 as the base year.
**Source:** BBS (unpublished).

The trends of inflation suggest that food inflation is higher than non-food inflation along with increasing gap between food and non-food inflation until 2011-12. Inflation also varies across locations. The reason for this gap is that the weights of the commodities in the consumption bundles vary significantly between rural and urban areas and among various income groups. The average share of food items in the consumption basket is about 58.7 per cent in the rural areas, while the share is 48.2 per cent in the urban areas (HIES 2010). The share of food items in consumption expenditure, particularly of rice, moreover, remains high for lower deciles groups; declining slowly as one move towards higher deciles. Further, rice accounts for about 40 per cent of food expenditure for the poor, while it accounts for 25 per cent of food expenditure for the non-poor; of which the share of coarse rice is higher among the day labourer households in rural areas. On the other hand, the medium quality rice expenditure is higher among the fixed income households and day labourers in urban areas.

The pattern of rice expenditure and rice prices indicates that a sharp rise in the price of rice, and food in general, can be expected to wreak havoc among the lower-income groups. In particular, it can be expected to increase the misery of those who are already living below the poverty line, and who cannot adjust wages to price changes at least in the short run. The current trend indicates that the impact of food price, especially rice price inflation, on the rural people could be significant in view of the high weights of food (rice) items in their consumption basket. Therefore, the burden for the lower income groups with the increase of food prices largely depends on how these groups could adjust their income and consumption behaviour.

## 3.2 Rice Price Movements

Considering food price as an important source of inflation, it is important to examine the trends of rice prices in domestic markets as well as in international markets. The movements of rice prices in the international markets show a rising trend since 2008; a similar trend is also observed in the domestic market (Figure 3.1 and Figure 3.2). In the domestic market, rice price, particularly coarse and medium rice prices, reached its peak at Tk. 30 per kg in 2008 from about Tk. 20 per kg in 2007. In 2007, coarse rice price rose by about 27 per cent, while medium rice price rose by 23 per cent (Table 3.2). However, rice prices declined substantially in 2008 and 2009 mainly due to good harvest and the government's efforts to keep rice prices at lower levels. But these efforts were not sustained as all rice prices started soaring from September 2009 and reached Tk. 35-40 per kg in 2010-2011. In 2010, the price of coarse rice increased by 12 per cent in urban areas and 18 per cent in rural areas.

Table 3.2

**Yearly Changes in Rice Prices (%)**

|  | Rural | | | Urban | | |
|---|---|---|---|---|---|---|
|  | Rice-medium | Rice-coarse | Average difference between medium and coarse (Tk./Kg) | Rice-medium | Rice-coarse | Average difference between medium and coarse (Tk./Kg) |
| 2007 | 24 | 27 | 1.50 | 23 | 25 | 4.85 |
| 2008 | 8 | 11 | 0.82 | -4 | 5 | 2.73 |
| 2009 | -13 | -21 | 3.08 | 5 | -13 | 7.01 |
| 2010 | 10 | 18 | 3.28 | 3 | 12 | 6.46 |
| 2011 | -1 | -1 | 3.64 | 0 | -4 | 9.15 |

**Source:** BBS/DAM.

It is worth noting that the gap between prices of medium and coarse rice has been substantially higher in urban areas than in rural areas, particularly since 2009. While the gap was about Tk. 3 per kg in rural areas, the gap was Tk. 7-9 per kg in urban areas, which might be due to low degree of integration of the rice markets. This gap might have been reflected in inflation rates for the households in urban areas due to higher

consumption of medium quality rice by these households. Although the gap is higher in the urban areas, the price of medium quality rice was higher in the rural areas than in urban areas.

**Figure 3.1: Domestic Price of Coarse and Medium Quality of Rice**
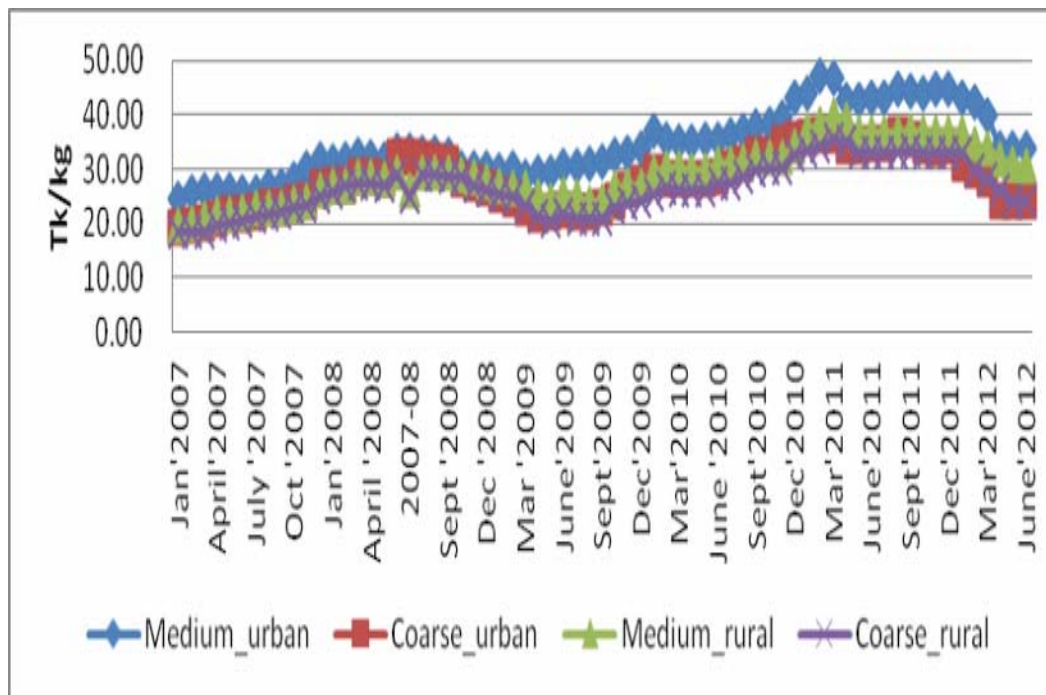


**Source:** BBS/DAM.

The international prices of agricultural commodities have showed increasing pattern during the period under review. According to FAO (2008), international nominal prices of all major food commodities reached their highest levels in nearly 50 years, while prices in real terms were highest in 30 years. The FAO food price index increased by 53 per cent for the first three months in 2008 compared with the same three months in the previous year. Afterwards, as Figure 3.2 shows, prices started declining. The upward movements of prices of commodities, particularly rice, were associated with several factors, the most important one being the worsening of the outlook for crops in major rice producing countries in the respective years, particularly 2007-08 and 2010-11. The resultant outcome was the drawdown of stocks by key rice producing countries with subsequent imposition of ban on rice export in 2007-08 by Thailand, Vietnam and India, *albeit* temporarily. Although the ban on rice export was not imposed in 2010-11, tighter global supply-demand balances due to drawdown of stocks as well as weakening of US dollar from September 2010 also contributed to rising rice prices in this year.

**Figure 3.2: International Price of Selected Commodities ($ per metric ton)**
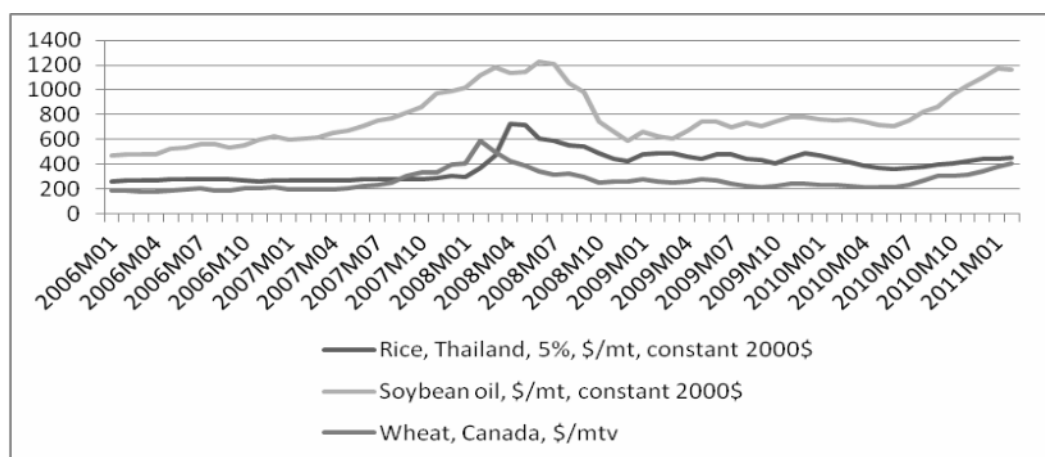


**Source:** Pink data set, World Bank.

Price volatility of different varieties of rice and other commodities, as shown in Table 3.3, indicates intra- and inter-year fluctuations of rice prices. Rice price volatility was significantly higher in 2009-10 and 2010-11, which was about Tk. 3 per kg for coarse and medium rice. Similar pattern of high price volatility was observed for other commodities including Soya bean (edible) oil in Bangladesh and in global markets. The volatility of commodity prices in Bangladesh largely follows the trend of global commodity price volatility. Thus, the upward movements of rice prices and its higher volatility could have important implications for domestic inflation.

Table 3.3

**Commodity-Specific Price Volatility, 2006-2011**

A.   **Bangladesh (monthly)**

|  | Rice boiled (medium) aman, balam, biroi, pajam | Rice (boiled-medium) aman/ atap | Rice (boiled-coarse): aus/ boro/irri | Rice-fine (polau) | Wheat (atta) best quality | Soya bean oil |
|---|---|---|---|---|---|---|
| 2006-07 | 0.65 | 1.06 | 0.71 | 1.42 | 1.87 | 8.29 |
| 2007-08 | 1.74 | 2.47 | 2.65 | 10.38 | 5.21 | 9.53 |
| 2008-09 | 0.49 | 1.83 | 3.13 | 11.24 | 8.45 | 11.88 |
| 2009-10 | 1.56 | 2.51 | 2.38 | 4.85 | 0.79 | 1.34 |
| 2010-11 | 4.83 | 3.26 | 2.67 | 2.28 | 3.45 | 13.22 |

B.   **Global (monthly)**

|  | Rice Thai 5% | Rice Thai 25% | Soya bean oil | Palm oil | TSP | Urea |
|---|---|---|---|---|---|---|
| 2006 | 8.15 | 6.23 | 26.58 | 19.00 | 1.39 | 18.8 |
| 2007 | 5.88 | 6.24 | 70.27 | 80.35 | 79.25 | 39.32 |
| 2008 | 127.06 | 158.85 | 161.49 | 134.49 | 248.13 | 197.12 |
| 2009 | 56.55 | 104.19 | 161.31 | 28.56 | 43.38 | 12.8 |
| 2010 | 36.42 | 32.21 | 51.74 | 20.65 | 60.17 | 48.81 |

**Sources:** A. BBS/DAM; B. World Bank Pink data set.

The above discussion on rice price movements suggests that the upward movement of prices (volatility) of rice in 2007-08 and 2010-11 could have been reflected in food inflation as well as in overall inflation. The relevant question is therefore to assess the extent to which the rising and volatile rice prices contribute to household-specific inflation, which is investigated in Chapter 4.

Several other issues also emerge from the trends and sources of inflation. First, inflation in Bangladesh is seen to be dominated by food inflation. Rice prices, particularly coarse and medium quality rice prices, matter for inflation. International rice and commodity price movements also contribute to inflationary developments in Bangladesh. Second, inflation rates vary with locations; particularly there have been significant differences in inflation rates between urban and rural areas, which are also related to rice market situations. Third, food inflation remained higher than non-food inflation for relatively longer period until 2010-11, afterwards non-food inflation started exceeding food inflation. Finally, as consumption of different varieties of rice matters for inflationary developments, inflation might vary across income levels of households.

# CHAPTER 4

# IMPACT OF INFLATION ON DIFFERENT HOUSEHOLD GROUPS IN BANGLADESH

The trends and sources of inflation discussed in the previous chapter point to the importance of assessing the varying rates of inflation across different household groups in both rural and urban areas. In particular, there seems to exist differences in inflation rates in terms of different food and non-food consumption patterns of these household groups.

This chapter examines the extent of variation of inflation faced by different household groups. For the purpose, group-specific CPIs have been constructed by redefining consumption weights for the selected groups in both rural and urban areas as well as food and non-food items using the HIES 2010 data. These have been constructed using 2005-06 as the base year. The constant weights derived from the consumption baskets of 2010 (from HIES 2010) are used to construct the CPIs for the years 2008 to 2011 by making a conservative assumption that respective households have not significantly diversified their consumption basket during this short period of time. The CPIs and subsequent inflation rates faced by these groups have been separately calculated for food and non-food items in terms of rural and urban locations.

## 4.1 Food Inflation

Table 4.1 reports the estimated yearly average CPI food inflation for day labourers and fixed income households in rural and urban areas for the period 2008-2011. It is observed that different rural households faced low food inflation in 2008-09 and 2009-10 due to a sharp decline of rice prices from the level of 2007-08, while the average food inflation rates remained almost the same ranging between 14 per cent and 16 per cent in other years. The inflationary trends are largely consistent with rice price trends, as shown in Section 3.2. Interestingly, it appears that while poorer households were in most advantageous position during the lowest level of inflation (2008-09 and 2009-10), they became more vulnerable with gradual spiralling of inflation. Overall, food inflation in rural areas was found to be lower than urban areas, as opposed to the recent findings of the BBS. Although the share of rice in food basket does not differ significantly between rural and urban areas, the difference arises due to higher share of medium quality rice in food basket of urban people.[3]

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[3] The price per kg of medium quality rice varies substantially from coarse rice in urban areas (see Table 3.2). One possible explanation could be that the medium quality rice available in the rural areas is perhaps inferior to the ones available in the urban areas, and thus the prices may not strictly comparable.

A comparison of the yearly average food inflation for day labourers and fixed income groups in rural areas shows that the relatively poorer fixed income households face higher inflation than those of the day labour households. In contrast, other categories of day labour households face relatively higher inflation than those of fixed income categories. In urban areas, except the upper income group, low income group of day labour households face relatively high inflation, indicating that they face more hardship due to higher inflation. The important question is: what explains the difference in inflation rates faced by different household groups? One reason is that these groups (e.g. urban day labour groups) mainly prefer medium quality rice, the price of which was much higher than the coarse rice in urban areas (the difference is more than Tk. 5 per kg). Point-to-point inflation also shows that poor and lower middle income categories of households face relatively higher food inflation than the other income groups in both rural and urban areas (Figure 4.3 and Table 4.1).

**Figure 4.1: Point-to-Point Food Inflation in Bangladesh**
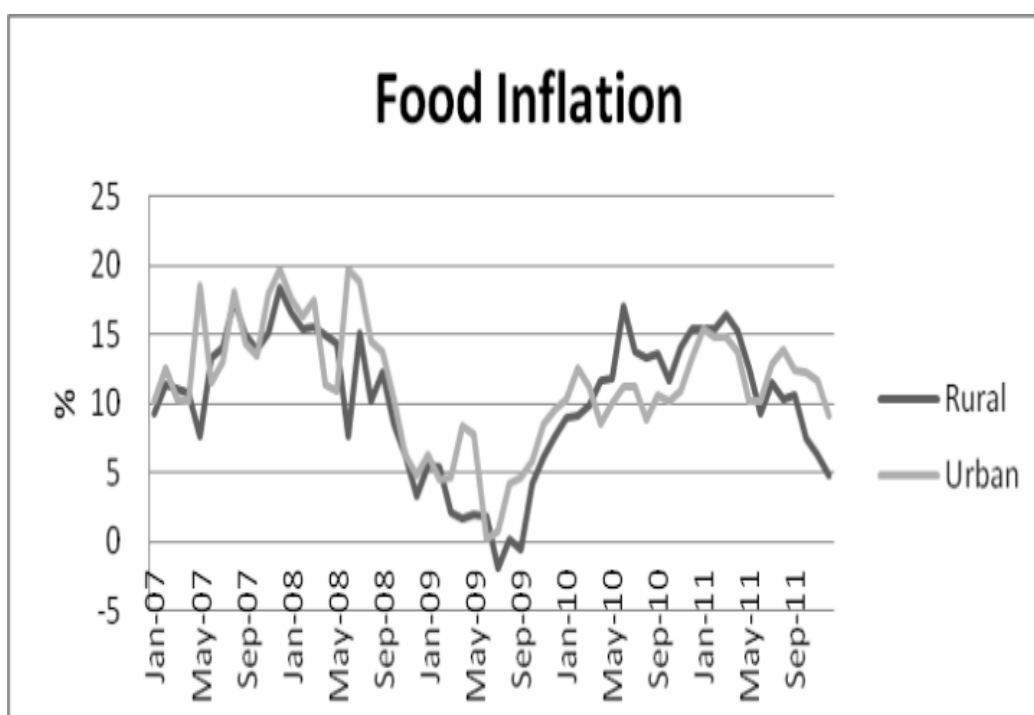


**Source:**  Calculated from BBS data.

**Figure 4.2: Food Inflation (Point-to-Point) Faced by Different Income Groups**
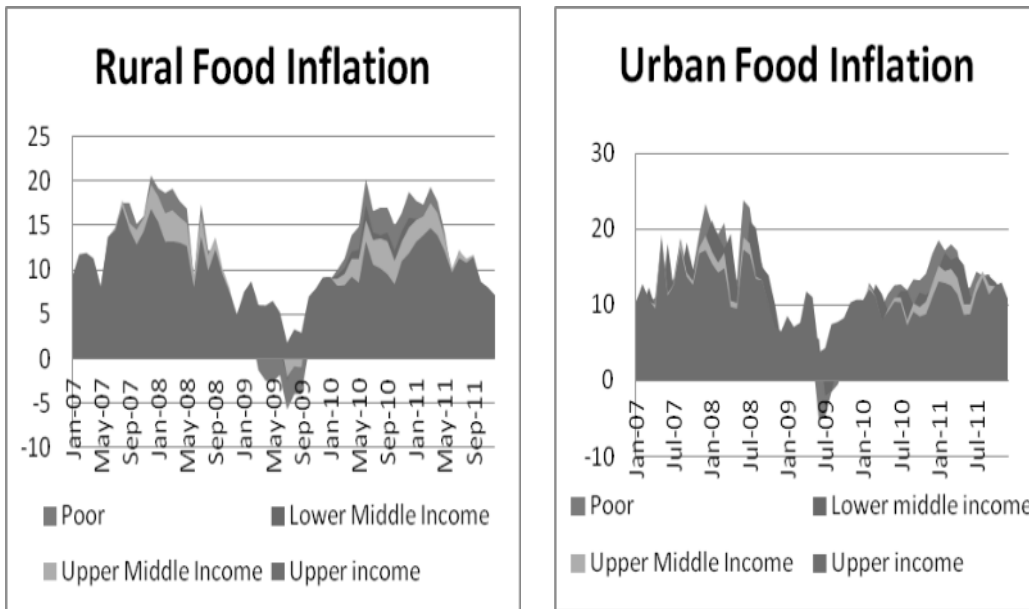


**Source:** Authors' calculation.

**Figure 4.3: Point-to-Point Food Inflation Faced by Day Labour and Fixed Income Households**
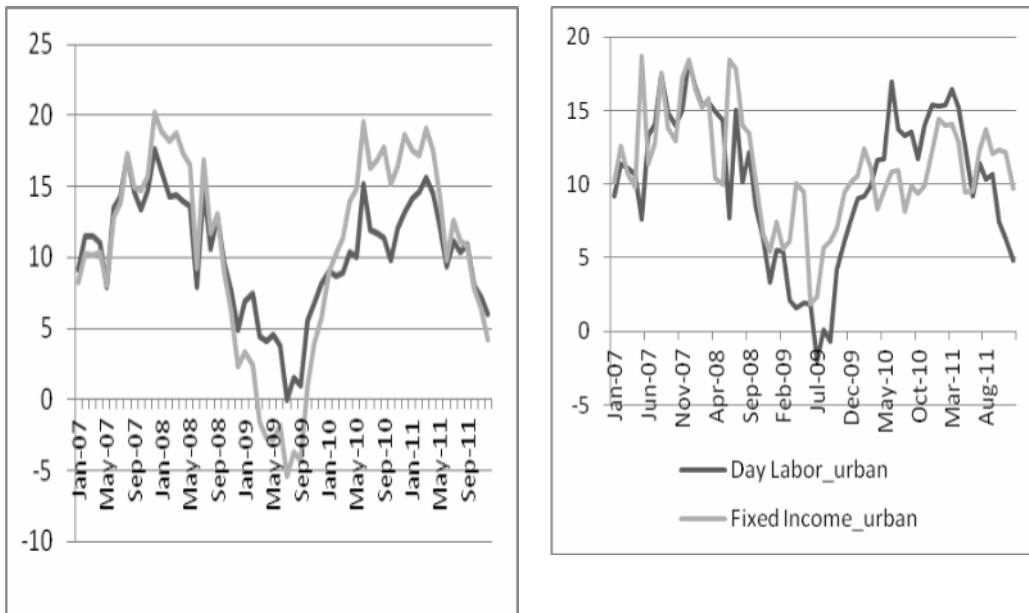


**Source:** Authors' calculation.

Table 4.1

**Estimated Food Inflation for Different Household Groups (Per cent)**

**A. Rural**

|  | Day labour households | | | | Fixed income households | | | | All | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2007-08 | 2008-09 | 2009-10 | 2010-11 |
| Poor | 18.94 | 5.96 | 3.82 | 18.35 | 20.04 | 6.56 | 5.03 | 19.40 | 16.89 | 5.01 | 6.32 | 16.44 |
| Lower middle income | 17.17 | 6.26 | 5.05 | 17.77 | 15.85 | 7.22 | 6.34 | 14.49 | 15.15 | 5.97 | 6.91 | 14.20 |
| Upper middle income | 20.41 | 5.77 | 4.67 | 19.93 | 18.64 | 7.57 | 5.36 | 16.73 | 15.79 | 7.02 | 6.52 | 14.00 |
| Upper income | 20.48 | 7.02 | 4.64 | 19.00 | 16.08 | 8.29 | 6.36 | 13.78 | 13.81 | 8.13 | 7.36 | 11.56 |
| All | 16.33 | 4.68 | 6.36 | 16.39 | 14.33 | 7.66 | 7.11 | 12.55 | 14.86 | 6.15 | 6.99 | 13.82 |

**B. Urban**

|  | Day labourer households | | | | Fixed income households | | | | All | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2007-08 | 2008-09 | 2009-10 | 2010-11 |
| Poor | 18.37 | 6.85 | 5.24 | 15.73 | 16.67 | 7.53 | 7.14 | 13.46 | 18.06 | 6.83 | 6.20 | 14.77 |
| Lower Middle Income | 17.94 | 6.69 | 6.21 | 14.61 | 15.96 | 7.94 | 8.07 | 12.42 | 16.84 | 7.29 | 7.50 | 13.24 |
| Upper Middle Income | 16.79 | 5.84 | 8.04 | 14.07 | 14.85 | 9.00 | 8.66 | 11.32 | 15.41 | 8.50 | 8.39 | 11.69 |
| Upper Income | 13.81 | 8.13 | 7.36 | 11.56 | 13.94 | 9.99 | 9.28 | 10.01 | 14.33 | 9.75 | 9.18 | 10.19 |
| All | 14.86 | 6.15 | 6.99 | 13.82 | 14.92 | 8.99 | 8.64 | 11.22 | 15.81 | 8.33 | 8.11 | 12.01 |

**Source:** Authors' calculation.

**4.2 Non-food Inflation**

Compared to food inflation, non-food inflation continues to remain at a level lower than food inflation during 2007-2011, which hovers around 5-6 per cent. Overall, non-food inflation in urban areas is estimated to be somewhat higher than that of rural areas. From 2010-11, non-food inflation started spiralling and reached its peak at 11 percent in urban and 10 per cent in rural areas, and surpassed the food inflation rate (Table 4.2).

**Figure 4.4: Non-food Inflation in Rural and Urban Areas**
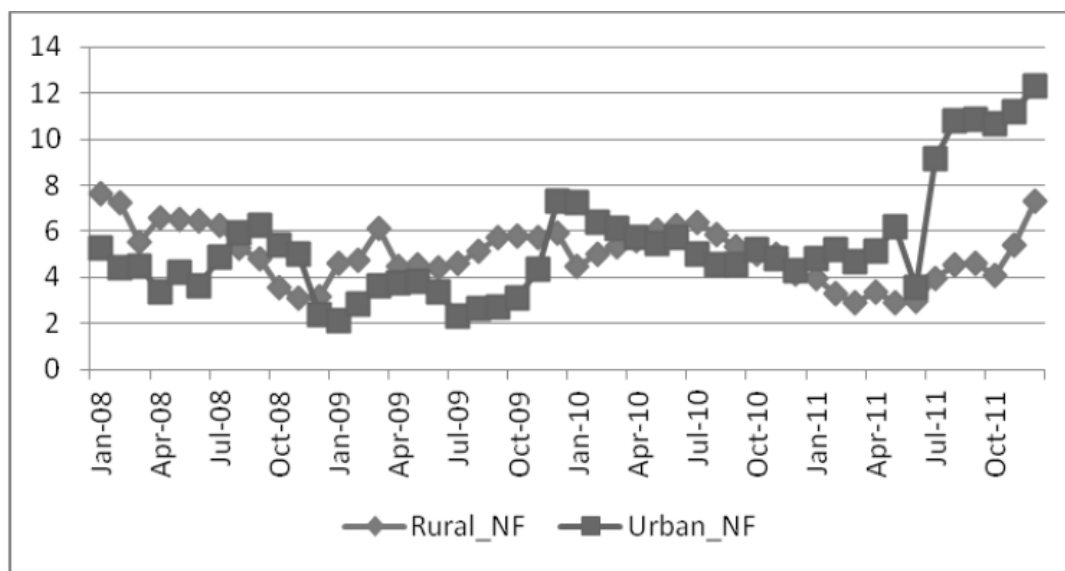


**Source:** Authors' calculation.

Non-food inflation rates for daily labour and fixed income households are plotted in Figure 4.5. One can observe that there is no significant difference in non-food inflation faced by these two groups, particularly in rural areas. However, there have been some differences in non-food inflation faced by day labour and fixed income groups in urban areas. While non-food inflation for day labourers has been fluctuating in a sporadic manner, it is mostly stable for fixed income groups in urban areas.

The characteristics of non-food inflation for different household groups are twofold. First, no significant variations are observed among income groups in terms of non-food inflation they face. Second, there exists non-linearity in non-food inflation in terms of income level and spatial distribution. Across income groups, rural poorer households face slightly higher non-food inflation than the other groups. On the other hand, in urban areas, high income groups faced higher non-food inflation than other groups until 2010; however, when non-food inflation crossed the double-digit level, the poorer households started to face higher non-food inflation than others. While rural households seem to be vulnerable to single digit moderate non-food inflation, urban poorer households find it tolerable until it goes beyond the double-digit level (Figure 4.6).

**Figure 4.5: Non-food Inflation Faced by Fixed Income and Day Labour Households
in Rural and Urban Areas**
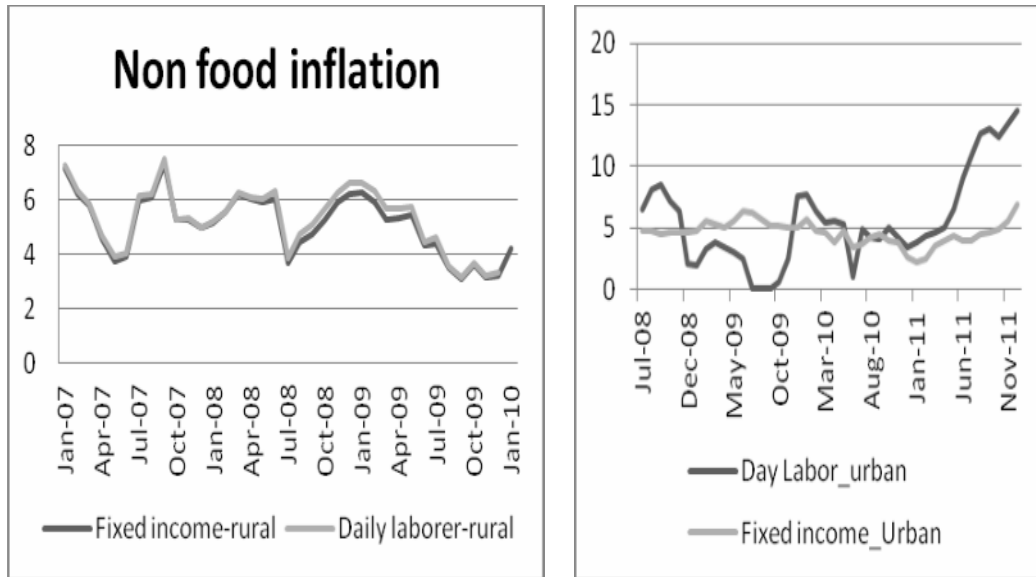


**Source:** Authors' calculation.

**Figure 4.6: Non-food Inflation faced by Different Income Groups**
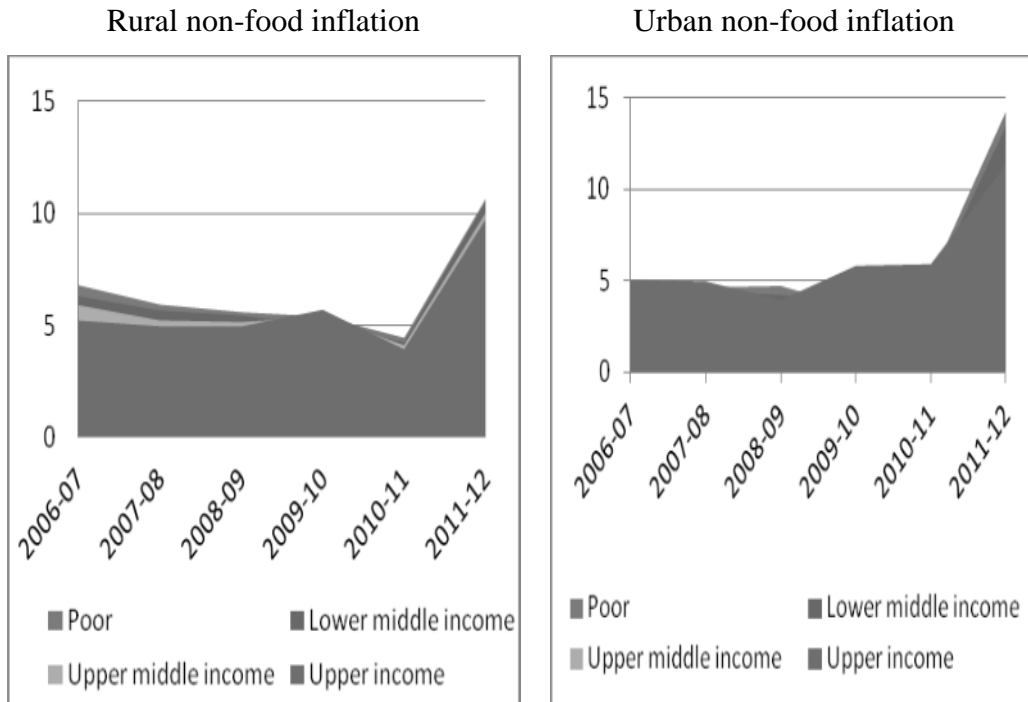


**Source:** Authors' calculation.

Table 4.2

**Non-food Inflation for Different Household Groups**

**A. Rural**

| | Day labourer | | | | | Fixed income | | | | | All | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2011-12 | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2011-12 | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2011-12 |
| Poor | 6.60 | 5.92 | 5.56 | 4.54 | 11.00 | 6.45 | 5.82 | 5.24 | 4.47 | 11.00 | 5.94 | 5.60 | 5.40 | 4.46 | 10.66 |
| Lower middle | 6.60 | 5.89 | 5.04 | 4.46 | 11.14 | 5.97 | 4.91 | 4.90 | 4.40 | 10.33 | 5.67 | 5.44 | 5.02 | 4.26 | 10.51 |
| Upper middle | 5.22 | 5.23 | 5.21 | 4.37 | 10.51 | 6.01 | 5.01 | 4.91 | 4.05 | 10.25 | 5.23 | 5.16 | 5.38 | 4.13 | 10.01 |
| Rich | 5.22 | 5.12 | 5.10 | 4.17 | 10.27 | 5.66 | 5.00 | 5.62 | 3.89 | 9.69 | 4.99 | 4.98 | 5.73 | 3.96 | 9.77 |
| Total | 6.51 | 5.44 | 4.93 | 4.47 | 11.17 | 5.67 | 4.65 | 5.00 | 3.99 | 10.30 | 5.98 | 5.06 | 5.00 | 4.26 | 10.66 |

**B. Urban**

| | Day labourer | | | | | Fixed income | | | | | All | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2011-12 | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2011-12 | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2011-12 |
| Poor | 4.96 | 5.3 | 3.37 | 5.52 | 14.93 | 3.98 | 3.52 | 4.56 | 4.06 | 11.72 | 4.61 | 4.69 | 3.5 | 5.08 | 14.21 |
| Lower middle | 4.83 | 4.65 | 3.43 | 4.77 | 14.48 | 4.28 | 3.45 | 4.33 | 4.28 | 11.99 | 4.39 | 4.2 | 3.84 | 4.71 | 13.44 |
| Upper middle | 4.44 | 3.7 | 3.98 | 4.1 | 13.22 | 4.99 | 3.41 | 5.4 | 4.66 | 10.18 | 4.92 | 3.58 | 4.67 | 4.64 | 11.19 |
| Rich | 3.05 | 3.61 | 4.3 | 4.41 | 12.59 | 5.39 | 3.75 | 5.83 | 5.61 | 10.47 | 4.96 | 3.94 | 5.82 | 5.91 | 11.39 |
| Total | 4.70 | 4.70 | 3.52 | 4.93 | 14.38 | 4.93 | 3.60 | 5.27 | 5.00 | 10.91 | 4.69 | 4.11 | 4.58 | 5.19 | 12.56 |

**4.3 Concluding Remarks**

The analysis of inflationary pressure faced by different groups can be summarised as follows:

1. Both day labour and fixed income household groups have faced higher food inflation than non-food inflation during 2008-2010. In relative terms, the urban household groups face higher food inflation than those in the rural areas.

2. In terms of food inflation, relatively poor fixed income household groups faced higher inflation than the daily wage labour households in the rural areas. In contrast, poor and lower middle income day labourers in urban areas faced higher inflation than those of fixed income households. It is observed that the share of medium quality rice in the consumption basket of the urban day labour households is higher which might have been reflected in their respective inflation rates. In general, poor and lower middle income households face higher inflation in both rural and urban areas than their other counterparts.

3. Non-food inflation tended to be lower than food inflation during 2008-2010, and it started crossing food inflation only in 2010-11. In terms of non-food inflation, there have been no significant differences among rural and urban households. Rural poorer households faced slightly higher non-food inflation than the other groups. On the other hand, in urban areas, high income groups faced higher non-food inflation than others until 2010; however, when non-food inflation crossed the double-digit level, poorer households started facing higher non-food inflation than others. It suggests that there might exist non-linearity in non-food inflationary characteristics, especially in the urban areas.

# CHAPTER 5

# INFLATION AND WAGE ADJUSTMENTS IN BANGLADESH

The impact of wage formulation mechanisms in inflation persistence has received wide attention in recent policy discourse. In this context, downward wage rigidity and its consequences on employment remain an issue of intense debate in the labour market analysis of developing countries. It has been argued that, in the presence of rigidities, wages could exhibit several features, such as wages may not adjust fully to productivity shocks as wage rigidity exists in the market, the rigidity may be asymmetric with adjustment particularly hindering in the downward direction and the rigidity may affect nominal wage reductions while real wage adjustments taking place through inflation. It is further argued that such rigidities may deepen the impact of recessions and heighten employment volatility (see Tobin 1972, Greenwald and Stiglitz 1987). In addition, such rigidities also help explain the apparent labour market imperfections in poor countries, such as differences in labour allocation on small and large farms (see Rosenzweig 1988, Behrman 1999).

Liviatan and Piterman (1986), for instance, emphasise the role of wage indexation mechanisms in the transmission of exchange rate movements to domestic prices. Similarly, the wage or cost-push view suggests that exogenous shocks in the wage bargaining process can create independent impulse effects on inflation which could persist over time in the presence of accommodative monetary policy. In the New Structuralist tradition, the demand for an increase in real wage by the workers may trigger an unstable spiral between nominal wages and prices (Taylor 1983).

One analysis, conducted by Agenor and Hoffmaister (1997) in four middle-income developing countries (Chile, Korea, Mexico and Turkey), shows that any innovation in the rate of growth of nominal wages generates an increase in inflation along with rise in real wages creating conflicting demand and supply side effects associated with rise in wages. This suggests that accounting for wage shocks is important for understanding the inflationary process in developing countries. It also appears that wages react significantly over time to price shocks, probably reflecting the backward indexation of nominal wages.

This chapter examines inflation and wage adjustments in the labour market of Bangladesh especially keeping in view the rising food inflation in recent years.

## 5.1 Rural Labour Market and Agricultural Wages

Early development theories adopt the view that there exists surplus labour in the rural economy in countries like Bangladesh so that additional employment would have no effect on the real wage (see, for example, Lewis 1954, Ranis and Fei 1961). By this view, the rural sector has a large labour surplus and so there is little scope for the poor to gain via real wages. However, alternative views of the rural labour market allow a labour surplus to co-exist along with a process of wage determination in which labour-augmenting technical progress can lead to higher real wages (see, Drèze and Mukherjee 1989, Osmani 1991, Mukherjee and Ray 1992, Datt 1996). In developing countries, labour markets are often found to exhibit short-run stickiness in wages, and there is some

evidence that this is also true in agricultural labour markets in similar settings (e.g. for evidence in the context of Bangladesh, see Ravallion 1991, Boyce and Ravallion 1991).

## 5.2 Agricultural Employment: Dynamics of Wage Changes

In general, the framework for labour market analysis in developing countries is characterised by the existence of "dualism" and strong entry barriers across different segments of the labour market. The dualism presumes the existence of two distinct segments of economic activity, typically classified as "organised" and "unorganised" sectors. The organised sector offers more regular, stable and higher paid jobs, while the unorganised sector is associated with irregular, unstable and low paid jobs. In similar tradition, the labour market dualism in Bangladesh is well documented along with varying explanations for the existence of wage differentials across different segments of the labour market, covering demand and supply side factors as well as institutional impediments.

The employment characteristics, especially of the poor households, show that the share of working population having primary employment as agricultural wage labour is extremely high among the two lowest consumption quintiles. Overall, about 50 per cent of all male labour aged 15 and above were employed as agricultural labour in 2000 and the share declined to 40 per cent in 2010 (BBS 2011b). For women, although far fewer are recorded as economically active, the importance of employment as agricultural labour is even more pronounced. For women, the percentage of labour engaged in agricultural labour category has increased over time (from 48 per cent in 2000 to 65 per cent in 2010). Given that the rural population has been growing steadily, this also indicates quite a sizeable increase in the number of agricultural labourers in rural Bangladesh.[4] Moreover, the characteristics of these households show strong correlations between employment as agricultural labour and low living standards in terms of per capita consumption, education status and other welfare indicators. In addition, these relationships seem to have remained relatively unchanged over the years. In the context of India, similar situations have been explained in terms of increasing "proletarianisation" that pushes out smallholder cultivators from agriculture into wage labour emanating from both push and pull effects, with agricultural labour emerging out as the "last-resort" employment option (see Kijima and Lanjouw 2005).

Several analysis in India shows that the expansion of informal non-farm employment is strongly correlated with rise in agricultural wages (see, for instance, Lanjouw and Murgai 2008, Berg *et al.* 2012). This is consistent with the process of labour market tightening. Although the poor and unskilled agricultural wage labourers may find it difficult to gain access even to the informal non-farm employment, the siphoning off of the better segments of agricultural labour puts pressure on wages across the entire market. These dynamics have significant implications on the changing composition of the agricultural labour force with the poor and unskilled segment of the market gaining more significance.

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[4] The number of day labourers, who mostly work in agriculture, increased from 8.6 million in 2005-06 to 10.6 million in 2010, an increase of 23 per cent. Over the same period, total employed labour in the country rose by 14 per cent. See BBS (2011b).

There is evidence that real agricultural wages respond positively to higher farm yields, presumably through effects on labour demand, such as due to multiple cropping. There is also a strong link through food prices. While the impact of agricultural growth on food prices is quantitatively small, even small food price changes can have large effects on absolute poverty. Inflation also has adverse effects on the poor via its short-term effect on real wages and food prices.

Using time series data, several studies have reported that the real agricultural wage experienced a downward trend during the period from 1949-50 to 1980-81 in Bangladesh although overall agricultural productivity increased (Khan 1984, Ravallion 1991, Boyce and Ravallion 1991, Ravallion 1994). Boyce and Ravallion (1991) further argue that, as the short-run elasticity of wages to rice price is low, an increase in nominal rice price can have adverse effects on the poor, for whom wage is the main source of income and rice occupies a major share of their expenditure.[5]

However, by re-analysing the data of the above studies, Rashid (2002) reports contrary results using a co-integration framework. His results suggest that agricultural wage and rice price maintained a strong co-integrating relationship during the period under review. He also shows substantially higher long run elasticities of agricultural wage rate with respect to rice price compared with the earlier estimates (0.72 and 0.69 for Boyce-Ravallion and Palmer-Jones data sets relative to 0.46 and 0.47 respectively in the two studies). Further, the study shows that rice price, a variable that maintained strong relationship with agricultural wage until the late 1980s, lost its significance in the later periods while the urban wage rate, proxied by the wage of unskilled construction workers, became the most significant variable in explaining the dynamics of agricultural wage. This is consistent with the long term trend of falling real rice price and the rising urban wage rate relative to agricultural wage rate, explaining the unprecedented growth of urban population in the country.

Examining the markets for casual daily wage labourers at the district level in India, Kaur (2012) reports that wage responses are consistent with downward rigidities. The wage adjustment is reported to be asymmetric; while nominal wages rise robustly in response to positive shocks, they do not fall fully during unfavourable periods (e.g. droughts). The transitory positive shocks cause a persistent increase in wages. However, when a positive shock in one year is followed by a non-positive shock in the next year, wages do not fully adjust back down—they remain higher than they would have been in the absence of the lagged positive shock. In consistent with nominal rigidity, inflation moderates these wage distortions. When inflation is higher, unfavourable events are more likely to result in lower real wages. In addition, transitory positive shocks are less likely to have persistent wage effects. For example, when inflation is above 6 per cent, positive shocks have no impact on future wages. The findings support the hypothesis that inflation "greases the wheels" of the labour market.

There is some evidence that wages are less rigid in areas where the costs of rigidity are high. For instance, certain crops are especially sensitive to planting and harvesting in

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[5] Available studies suggest that expenditure elasticity of rice for the bottom quartile of the rural population in Bangladesh ranges from 0.68 to 1.01. See Ahmed and Shams (1996), Goletti (1994) and Hossain (1988).

time; and they experience large output losses if not planted on time or harvested immediately upon reaching maturity. In areas with such crops, wage flexibility is particularly important because inefficient labour allocation would lead to large income losses. Consistent with this, regions that grow more labour-sensitive crops are more likely to experience nominal wage cuts during off-season periods. In addition, while these areas are more likely to raise wages in response to transitory positive shocks, such shocks are less likely to have persistent wage effects. In such cases, wage rigidities are somewhat endogenous to local economic conditions.

In addition to their broad implications for unemployment, the presence of nominal rigidities in the village labour markets has particular relevance for the study of developing country labour markets. Such rigidities give rise to an additional route through which production volatility (e.g. adverse weather shocks) can have negative consequences for the poor. The development literature indicates that shocks cause shifts in the production frontier leading to volatility in income causing welfare loss because the poor have limited ability to smooth income across periods. In the presence of wage rigidity, production may often not be at the frontier in the presence of volatility because labour markets do not adjust to optimise fully in each period. This means rigidities may lower the levels and increase the volatility of output and income compounding the adverse consequences of production volatility.

The fact that those with less land respond to rationing by increasing production on their own farms provides another channel through which rigidities impact efficiency and output. Specifically, it suggests the presence of "separation failures" in rural labour markets. This is consistent, for example, with the inverse relationship between farm size and output per acre that has been widely documented in Bangladesh and other developing countries. This suggests that the distribution of landholdings in poor countries does not have only distributional consequences—it can impact the allocation of labour use in production, and through it, aggregate output.

Kaur (2012) argues that the fairness norms against wage cuts are strong, but they also differ substantially across regions. But it is unclear whether such fairness preferences are inherent features of utility or whether they arise endogenously—for example, in response to worker demand for wage stability. The implicit insurance literature has discussed this as a potential source of wage rigidities. Insurance demand may be especially relevant given the low income levels in the poor countries. In decentralised markets where it is difficult to contract on real wages and explicit contracts are difficult to enforce, fairness norms around nominal wages could be a way to maintain stable real wages. However, it is unclear why workers should be willing to accept employment losses in exchange for wage stability. Ultimately, identifying the cause of nominal rigidities requires better understanding of these factors.

There seems to exist a strong general view that economic growth in Bangladesh has not been inclusive enough, and the poor have mostly been left behind in the process. While the view is supported by many indicators of economic and social development, this does not seem to be backed by recent data that matter the most e.g. trends in the wages of agricultural labourers in rural areas. The available nominal wage rate index from BBS

shows that over the period of 30 months from January 2010 to July 2012, the average nominal agricultural wage has shot up by 41 per cent in Bangladesh. Similar increase in the case of wage for construction worker is 57 per cent compared with 17 per cent for manufacturing worker and 19 per cent for wages of fisheries worker. These are significant improvements even after allowing for inflation during the period.

### 5.3 Agricultural Labour Market: Dominant Features

In Bangladesh, almost all households depend on employment as their primary source of income. This is especially true for the poor households because the only abundant because productive resource that the poor have is their own labour. Another important aspect of the labour market in Bangladesh is the formal-informal divide in employment which has significant consequences for return to labour and security of employment. The concept captures forms of employment that lack regulatory, legal, and/or social protections. Informal employment is defined in terms of the nature of enterprise in which the work takes place (e.g. the informal sector) and the relationships in employment.[6] The vast majority (87 per cent) of the total employed labour in Bangladesh is engaged in informal activities. The gender difference in this respect is wide: of the total female employed labour, 92 per cent are employed in the informal sector, while similar share is 85 per cent for male labour.

According to the Labour Force Survey 2010, the total number of day labourers is 10.6 million, which constitutes nearly 20 per cent of the total employed labour force. Of the total, 5.8 million (55 per cent) are categorised as agricultural day labourers. The day labourers predominantly work in the rural areas with nearly 80 per cent of them working in the rural labour market. The share of agricultural day labourers in the rural areas is even higher at 92 per cent who are predominantly male workers (93 per cent). The Survey reports the weekly earnings of nearly 44 per cent of the male and 29 per cent of the female agricultural day labourers in the range of Tk. 501 to 1,000 with not much variation between the rural and urban areas.[7] The shares of male and female agricultural day labourers with weekly wage earnings in the range of Tk. 1,001 to 1,500 are 27 per cent and 12 per cent respectively.

With the overwhelming dominance of smallholding farms (having land less than 2.50 acres of land) in Bangladesh, hired agricultural labour is traded mostly in decentralised local markets. The composition of farm employment varies with the size of farms; marginal farms are mostly dependent on family labour, while large farms are found to be

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[6] In practice, enterprises are considered informal in Bangladesh if they are not registered with the relevant authority. Thus employment in the informal sector comprises all employment that takes place in informal enterprises including self-employed/own account workers, unpaid family helpers, day labourers, paid employees in informal enterprises, informal employers, and similar other categories. Outside the unregistered and/or small enterprises sector, employment may be considered as informal if it lacks core legal or social protections (e.g. domestic workers). Moreover, *de facto* informal employment may also exist within the formal sector such as for different categories of casual workers.

[7] According to the Household Income and Expenditure Survey (HIES) 2010, nearly 48 per cent of the poor workers work in the agriculture sector, 27 per cent are in the services sector and the rest in the manufacturing sector. It is also reported that half of the poor workers are concentrated in daily wage employment. See BBS (2011a).

more dependent on hired labour. Thus the farm-level employment pattern is often a mix of family and hired labour with hired labour mostly engaged in standard crop production activities including plowing, sowing, weeding and harvesting. Under the decentralised setting, the wage setting behaviour is mostly non-institutional. In most cases, the contracts are negotiated between the landowners and the labourers bilaterally. It is also important to recognise that wage contracts for casual agricultural labourers are typically of very short durations (often on a daily basis) and hence can easily reflect recent changes in market conditions and/or commodity prices. As such, the agricultural labour market features in Bangladesh are quite flexible and reflect few institutional constraints.

Moreover, as agricultural production exhibits considerable seasonality in work intensity determined by the well-defined time span of major farm activities related to crop production, agricultural labour demand in various seasons is significantly affected by the crop calendar of the location.

## 5.4 Inflation and Wage Adjustments: A Framework for Analysis

In Bangladesh, rising inflation, especially led by food inflation in recent years, has raised the question relating to whether there has been a compensating rise in the incomes of the poor for whom a major chunk of total expenditure is accounted for by food articles. The present section deals primarily with the agricultural labourers, for whom wages constitute the principal source of income and probably the most important determinant of their economic status. In addition, agricultural wage labourers constitute a major segment of the rural poor and the relative incidence of poverty is also more severe among the agricultural labourers in Bangladesh. According to the Household Income and Expenditure Survey (HIES) data, poverty incidence among the agricultural workers was 37.0 per cent in 2010 compared with the national average of 31.5 per cent (BBS 2011a).

The major goal of economic policy in Bangladesh is to promote rapid economic growth that is both inclusive and sustainable. For ensuring such growth, an important prerequisite is to maintain a stable macro environment and create conditions for economic and social justice. Since Independence, despite rising economic growth which has averaged more than 6 per cent in recent years, inflation has continuously eroded the purchasing power of the people, especially the poor. For instance, the last four decades since the 1970s have witnessed a 24-fold increase in the nominal price of rice, the staple food, at the retail level.  This section provides an analysis of the economic impact of inflation vis-à-vis the income changes of the agricultural labour households using a simple model.

We assume that the total consumption of an agricultural wage earner household i ($C_i$) is described by a Cobb-Douglas function (which is linearly homogeneous) in nominal income $Y_i$ and price level $P_i$:

$$C_i = A Y_i^{\alpha} P_i^{1-\alpha} \tag{5.1}$$

Equation (5.1) in turn gives the real consumption $c_i$ of the household as a function of real income ($Y_i/P_i$) or the purchasing power:

$$c_i = C_i/P_i = A (Y_i/P_i)^{\alpha} \tag{5.2}$$

Through log differentiating of the function (5.2), one can get the percentage change in the real consumption of the household i:

$$\dot{C}_i = \varepsilon_i (\dot{Y}_i - \dot{P}_i) \tag{5.3}$$

where $\varepsilon_i$ is the real income elasticity of consumption and a dot above a variable indicates percentage change.

Equation (5.3) shows that a fall in the purchasing power (that is, when $\dot{P}_i > \dot{Y}_i$) is translated proportionally into consumption ($\dot{C}_i < 0$) as $\varepsilon_i$ is positive.

For household i who is a poor agricultural wage earner, our interest is to assess the effect on its consumption of a price rise due to inflation vis-à-vis wage adjustment as by assumption agricultural wage is the principal source of household income of the wage labourer.

We assume that the post-inflation price is $P_1$ which is higher than the pre-inflation price by a fraction k of price $P_1$ so that pre-inflation price becomes $P_1(1-k)$. This gives the inflation rate (which is the percentage increase in price) as:

$$\dot{P}_1 = k/(1-k) \tag{5.4}$$

Now let us assume that the household's wage income, $Y_1$, in the post-inflation period is higher than that in the pre-inflation period by an amount t so that:

$$\dot{Y}_1 = t \tag{5.5}$$

Hence, we can write:

$$\dot{C}_1 = \varepsilon_i (t - s) \tag{5.6}$$

where $s = k/(1-k)$.

Equation (5.6) shows that the compensation cost for inflation is high in terms of the required income increase, t. For instance, if we want to compensate for a 20 per cent rise in prices, income has to increase by 25 per cent or more for ensuring $\dot{C}_1 \geq 0$.

For simplicity, we assume that there are two individuals in society; individual 1 is poor and individual 2 is non-poor. Denoting $C_1$ and $C_2$ as their respective consumptions, the total national product is:

$$C = C_1 + C_2 \tag{5.7}$$

and the percentage change in national product will be given by:

$$\dot{C} = (1-\delta) \dot{C}_1 + \delta \dot{C}_2 \tag{5.8}$$

where $\delta = C_2/C$.

In the short run, $\dot{C} = 0$ and if the policy is to maintain the same percentage change in the consumption of the poor and the non-poor ($\dot{C}_1 = \dot{C}_2$), then

$$\dot{C}_1 = \varepsilon_i (t - s) \dot{C}_2 \tag{5.9}$$

This shows that the wage increase of the poor must fully compensate the loss in purchasing power due to inflation (t = s) if the consumption distribution is to be

maintained. However, if s > t that is the inflation rate exceeds wage increases, then the consumption of the poor will fall relative to the non-poor and vice versa. It shows that, in the short run when the total supply is fixed, the process of distribution of consumption among the poor and the non-poor is a zero-sum game: if one gains, the other loses. And as the gains are determined by changes in the purchasing power, the poor need to be compensated adequately to ensure that their relative position in society is not worsened.

## 5.5 Wage Change-Inflation Dynamics

We now examine the wage change-inflation dynamics over time in Bangladesh with agricultural wage labour as the focal group in order to bring out the implications of inflation on the cost of living of the poor. We start with an analysis of the changes in their purchasing power over time by comparing the increases in agricultural wages and inflation, assuming that the agricultural wages constitute the sole source of income for these workers ($y_1=w$), and the price level facing them is represented by the consumer price index (CPI). Table 5.1 shows that food prices rose faster relative to general price level (as measured by the CPI) in both rural and urban areas since the mid-1990s. The relative price increases are also higher in recent years and in urban years.

Table 5.2 gives the average nominal wage rate index for four different groups of daily wage workers (manufacturing, construction, agriculture and fisheries). It can be seen that although the manufacturing wage index was nearly 10 per cent lower than the agricultural wage index during 1970-75, the situation reversed during 2008-11 and the manufacturing wage index stood at 42 per cent higher than the agricultural wage index. It can also be seen that the wage indexes of construction, agricultural and fisheries workers move rather closely and their absolute values are also quite similar.

Table 5.1
**Average Inflation and Changes in Relative Price**

| | | Average Inflation rate (%) | | | | Price relative to general price level (CPI) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1996-00 | 2001-05 | 2006-10 | 2008-12 | 1996-00 | 2001-05 | 2006-10 | 2008-12 |
| National | General | 6.17 | 4.29 | 7.66 | 8.35 | 1.00 | 1.00 | 1.00 | 1.00 |
| | Food | 7.48 | 4.26 | 8.80 | 11.21 | 1.06 | 1.02 | 1.15 | 1.10 |
| | Non-food | 4.34 | 4.40 | 5.99 | 6.66 | 0.99 | 0.98 | 0.92 | 0.87 |
| Rural | General | 6.31 | 4.36 | 7.72 | 8.40 | 1.00 | 1.00 | 1.00 | 1.00 |
| | Food | 7.37 | 4.24 | 8.51 | 9.20 | 1.02 | 1.01 | 1.04 | 1.07 |
| | Non-food | 4.50 | 4.61 | 6.27 | 6.84 | 0.96 | 0.99 | 0.93 | 0.89 |
| Urban | General | 5.83 | 4.10 | 7.49 | 8.23 | 1.00 | 1.00 | 1.00 | 1.00 |
| | Food | 7.76 | 4.32 | 9.39 | 9.81 | 1.04 | 1.05 | 1.12 | 1.17 |
| | Non-food | 3.94 | 3.89 | 5.27 | 6.21 | 0.96 | 0.95 | 0.88 | 0.83 |

**Note:**   The inflation rates refer to 1995-96 as the base because figures for earlier years are not available with the new base of 2005-06.

**Source:** BBS.

Table 5.2
**Average Nominal Wage Rate Index**

*(1969-70=100)*

|  | General | Manufacturing | Construction | Agriculture | Fisheries |
|---|---|---|---|---|---|
| 1970-75 | 147 | 141 | 161 | 156 | 117 |
| 1975-80 | 311 | 277 | 371 | 334 | 295 |
| 1980-85 | 615 | 604 | 674 | 564 | 628 |
| 1985-90 | 1,179 | 1,232 | 1,263 | 1,023 | 1,145 |
| 1990-95 | 1,634 | 1,743 | 1,558 | 1,503 | 1,664 |
| 1995-00 | 2,136 | 2.369 | 2,008 | 1,880 | 2,054 |
| 2000-05 | 2,891 | 3,430 | 2,570 | 2,429 | 2,560 |
| 2005-10 | 4,399 | 5,358 | 3,707 | 3,735 | 3,823 |
| 2008-11 | 4,904 | 5,954 | 4,171 | 4,198 | 4,217 |

**Source:** BBS.

For measuring changes in income and cost of living in recent years, the cumulative growth in nominal wages and CPI inflation in each year over 2000 is given in Table 5.3 and Table 5.4 respectively. Table 5.3 shows that agricultural wages in Bangladesh on average increased by 9.1 per cent per year over the 2000-2010 period. Similar changes are 9.3 per cent for manufacturing workers, followed by 8.0 per cent for fisheries and 7.5 per cent for construction workers.

The cost of living of the workers, on the other hand, increased at an annual average growth rate of 6.6 per cent during this period (Table 5.4). This, in terms of equation (5.3), suggests positive change in real consumption of the labourers who mostly belong to poor households in the country. Table 5.5 provides further information that explains equation (5.3) in terms of the real wage rate of the agricultural workers (taking $´y_1 = ´w$, where $w$ is the wage rate).

Table 5.3
**Percentage Increase in Nominal Wage Index over 2000**

|  | General | Manufacturing | Construction | Agriculture | Fisheries |
|---|---|---|---|---|---|
| 2000-01 | 4.14 | 4.81 | 3.06 | 5.11 | 3.20 |
| 2001-02 | 10.33 | 12.32 | 6.91 | 11.05 | 8.55 |
| 2002-03 | 22.43 | 29.57 | 14.79 | 19.93 | 15.40 |
| 2003-04 | 30.17 | 39.34 | 16.75 | 26.76 | 24.94 |
| 2004-05 | 37.78 | 48.59 | 20.65 | 33.48 | 24.13 |
| 2005-06 | 46.69 | 58.88 | 26.38 | 43.59 | 41.06 |
| 2006-07 | 58.12 | 71.58 | 37.14 | 54.93 | 50.02 |
| 2007-08 | 76.86 | 92.34 | 55.25 | 73.00 | 65.20 |
| 2008-09 | 110.28 | 126.81 | 88.60 | 107.98 | 90.88 |
| 2009-10 | 128.44 | 141.91 | 103.46 | 137.24 | 113.50 |
| Average per year | 8.69 | 9.31 | 7.50 | 9.12 | 7.98 |

**Source:** BBS.

As Table 5.5 shows, the real wage rate indexes for all categories of workers have shown rising trends since the 1970s. The real wage rate index of manufacturing workers has shown the highest increase, followed by the indexes of construction and fisheries workers. The index of agricultural workers has shown the least growth. It largely stagnated during the decade beginning since the mid-1990s and has shown some rising trend after 2005.

Table 5.4
**Percentage Increase in CPI Inflation over 2000**

|  | 2000-01 | 2001-02 | 2002-03 | 2003-04 | 2004-05 | 2005-06 | 2006-07 | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2011-12 | Average per year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| General | 1.93 | 4.79 | 9.38 | 15.76 | 23.26 | 32.10 | 41.63 | 55.69 | 66.06 | 78.21 | 93.89 | 114.47 | 6.59 |
| Food | 1.38 | 3.04 | 6.61 | 13.99 | 23.00 | 32.54 | 43.31 | 60.90 | 72.46 | 87.17 | 108.40 | 130.21 | 7.25 |
| Non-food | 3.04 | 7.80 | 13.90 | 18.87 | 24.02 | 31.96 | 39.74 | 48.57 | 57.34 | 65.91 | 72.80 | 92.07 | 5.61 |

**Source:** BBS.

Table 5.5
**Average Real Wage Rate Index**

*(1969-70=100)*

|  | General | Manufacturing | Construction | Agriculture | Fisheries |
|---|---|---|---|---|---|
| 1970-75 | 77 | 76 | 81 | … | … |
| 1975-80 | 73 | 65 | 87 | … | … |
| 1980-85 | 87 | 85 | 96 | … | … |
| 1985-90 | 104 | 109 | 111 | 81 | 90 |
| 1990-95 | 110 | 118 | 105 | 90 | 101 |
| 1995-00 | 119 | 132 | 112 | 105 | 112 |
| 2000-05 | 138 | 164 | 123 | 105 | 115 |
| 2005-10 | 149 | 183 | 123 | 115 | 121 |

**Source:** BBS.

Table 5.6 interprets equation (5.3) in terms of the ratio of the cumulative growth of nominal wage index for agricultural labourers to that of CPI inflation ($w^{\cdot}/p_1^{\cdot}$) where $p_1$ is the CPI inflation. From the above model, one can conclude that when ($w^{\cdot}/p_1^{\cdot}$) <1, there would be a fall in the real consumption of the working households ($q_1^{\cdot}$<0).

The information given in Table 5.6 shows that the ratio remained above unity in all years during the period 2000-01 to 2011-12. This indicates that the consumption of the agricultural workers did not experience any fall in the 2000s despite rises in inflation, especially in recent years. As a matter of fact, the absolute value of the ratio was the lowest in 2007-08, after which it has been rising steadily. This suggests that on average the wage rate of the agricultural workers has risen by a margin that has been adequate to neutralise the adverse impact of price rise in recent years.

Table 5.6

**Growth of Agricultural Wages relative to Growth of CPI Inflation over 2000**

| 2000-01 | 2001-02 | 2002-03 | 2003-04 | 2004-05 | 2005-06 | 2006-07 | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2011-12 | Average |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 2.64 | 2.31 | 2.12 | 1.70 | 1.44 | 1.36 | 1.32 | 1.31 | 1.63 | 1.75 | 2.64 | 2.31 | 1.76 |

**Source:** BBS.

The annual growth of the wage rate index (both nominal and real) over the decades shows that almost all indexes experienced higher growth during the period of the 2000s (Table 5.7). In particular, the agricultural wage rate index experienced the highest growth during the decade in real terms and its growth rate was second only to the manufacturing wage index. This shows that the average returns to labour has risen robustly in the past decade contributing positively toward improving the living standards of the working population.

Table 5.7

**Growth in Wage Rate Index in Bangladesh**

*(Per cent per year)*

|  | 1970-1980 | 1980-1990 | 1990-2000 | 2000-2011 |
|--|-----------|-----------|-----------|-----------|
| Nominal wage rate index (1969-70=100) | | | | |
| General | 17.50 | 12.78 | 5.31 | 8.69 |
| Fisheries | 34.25 | 12.26 | 4.63 | 7.98 |
| Construction | 19.92 | 11.78 | 4.52 | 7.50 |
| Manufacturing | 15.67 | 14.69 | 6.06 | 9.31 |
| Agriculture | 18.50 | 11.12 | 5.06 | 9.12 |
| Real wage rate index(1969-70=100) | | | | |
| General | -0.77 | 3.06 | 1.00 | 4.27 |
| Fisheries | … | 2.51 | 0.97 | 0.61 |
| Construction | 1.47 | 2.03 | 0.35 | 1.01 |
| Manufacturing | -1.72 | 4.67 | 1.82 | 5.01 |
| Agriculture | … | 1.42 | 1.02 | 1.98 |

**Source:** BBS.

## 5.6  Recent Wage Movements in Agriculture and Non-agriculture

As wage adjustment plays an important role in withstanding inflationary impacts, movement of wages of daily wage labourers is a significant aspect of the process. For examining recent wage movements, the present study collected wage data of daily agricultural labourers from 14 districts during December 2012 covering five regions of the country.[8] From each district, around 100 sample households were selected covering both rural and urban areas. The total sample size was 1,434 daily wage labourers in both agriculture and non-agricultural activities. The agricultural labourers included farm and

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[8]The five regions are: Northern (Rangpur division), Western (Rajshahi division), Central (Dhaka division), Eastern (Chittagong and Sylhet divisions), and Southern (Barisal and Khulna divisions).

fisheries workers, while non-agricultural labourers covered unskilled labour from a wide range of occupations such as construction labour, transport workers including rickshaw/van pullers, tailors, hotel/restaurant workers, and temporary housekeepers/ maids.

In view of a somewhat limited coverage of the above data for certain categories of non-agricultural unskilled workers e.g. helpers in construction sites, carpenters and other daily labourers, the above information was also supplemented by the daily wage data taken from the *Monthly Statistical Bulletin* of the BBS. Figure 5.1 and Figure 5.2 show the average rural daily nominal and real wages respectively for the period covering Bangla months of Baishakh to Chaitra (from mid-April of the earlier year to mid-April of the following year) during 2009-10 to 2012-13 (data for the latest year was until December 2012). In nominal terms, one can see a consistent rise in both agricultural and non-agricultural wage rates over the period. In 2009-10, the average nominal wage of agricultural labour was Tk. 192 per day while the same was Tk. 170 for non-agricultural labour. The wage rate increased by 14 per cent and 7 per cent in 2010-11 and 2011-12 respectively for agricultural labour, while the increase was by 25 per cent and 18 per cent respectively for non-agricultural labour. Moreover, the trend in agricultural wages shows fluctuations with distinct seasonal peaks while the non-agricultural wage has a more smooth growth. It can be seen that agricultural wage remained higher than the non-agricultural wage until the end of the year 2010 probably due to the high response of rural agricultural wage to rice price. The situation was reversed afterwards with the average non-agricultural wage rate exceeding the agricultural wage.

**Figure 5.1: Nominal Daily Wage Rate in Agriculture and Non-agriculture**
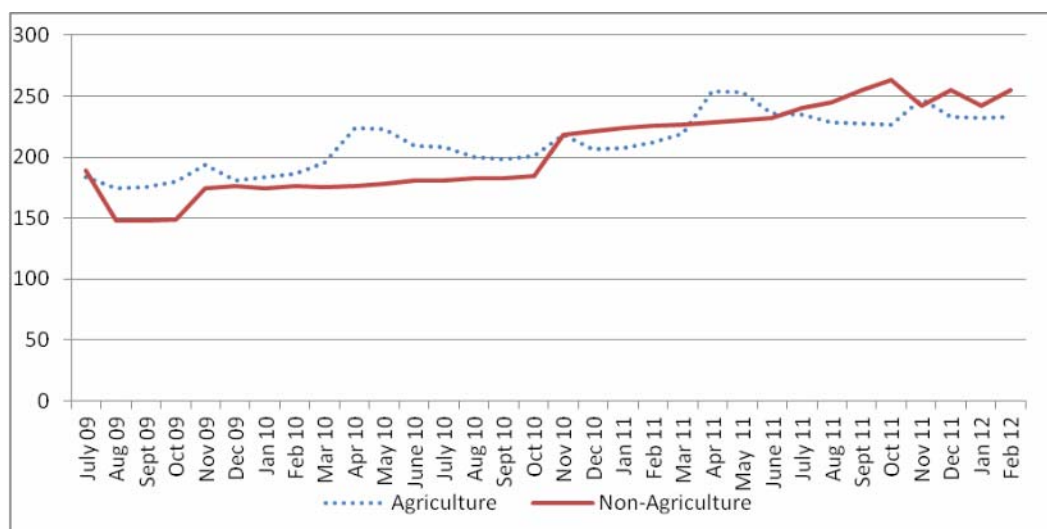


**Source:** Field Survey 2012 and BBS.

In Figure 5.2A, daily real wage rates are shown by deflating the nominal wages by group-specific CPI deflators calculated in the present study. From the figure, it is evident that the real agricultural wage rate has remained consistently below the non-agricultural

wage rate since the middle of 2010 and the gap has widened over time. Moreover, the real agricultural wage has witnessed wider fluctuations relative to non-agricultural wage.

As seen in earlier chapters, food accounts for the largest share of expenditure for most households in Bangladesh and this is especially true for the poor rural households. It is worthwhile therefore to examine the trend of real wages in terms of food inflation. In this context, rice is the main staple food with a high share in total household food expenditure and contributes nearly two-thirds to the total per capita caloric intake. As coarse rice is the staple for the poor households, Figure 5.2.B plots the patterns of real wage in terms of kg of coarse rice equivalence.

**Figure 5.2: Real Daily Wage Rate in Agriculture and Non-agriculture**

**A.   Deflated by Group Specific CPI**
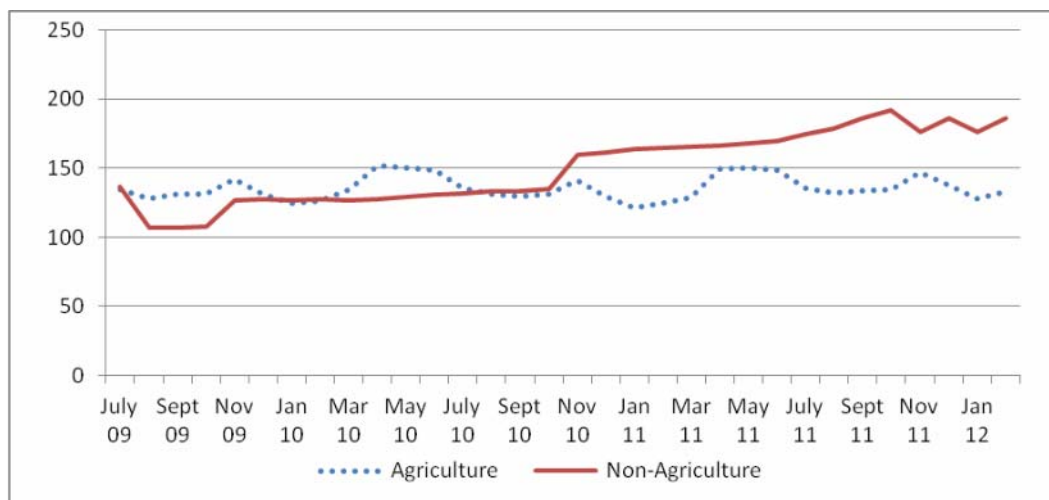


**B.   Kg. of Coarse Rice Equivalent**
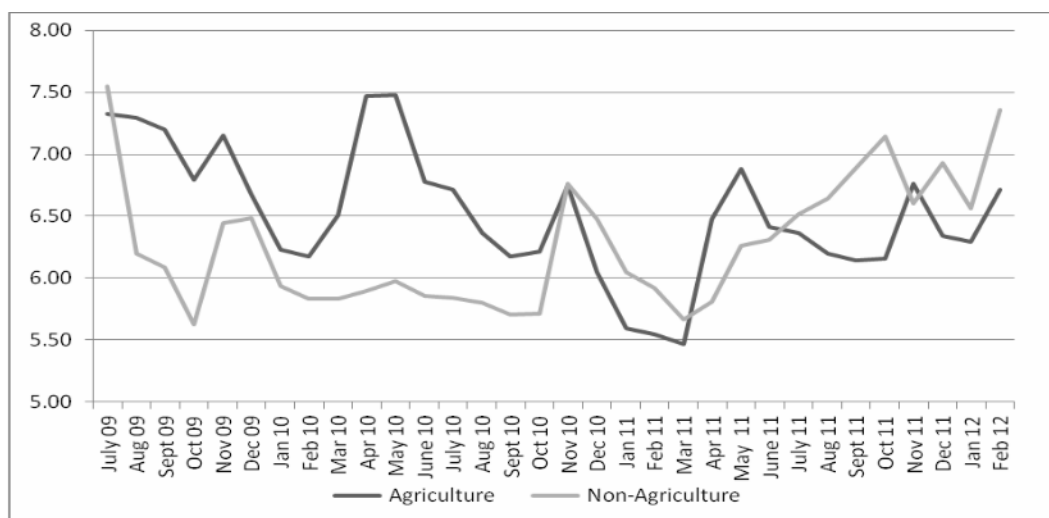


**Source:** Field Survey 2012 and BBS.

From the Figure, it can be seen that, in July 2009, an agricultural labourer on average could buy 7.3 kg of coarse rice with his/her daily wage, while for the non-agricultural labour the amount was 7.6 kg. In July 2010, labourers in agricultural activities could buy about 6.7 kg of rice using one day's wage, while a non-agricultural labourer's daily wage was equivalent to 5.8 kg of rice. In July 2011, the purchasing power of daily wage of an agricultural labour further eroded to 6.4 kg of rice, while that of a non-agricultural labour rose to 6.5 kg of rice. In February 2012, it has risen to 6.7 kg of rice for agricultural labour and 7.4 kg of rice for the non-agricultural labour. Despite these increases, the real wages of both groups of labourers in 2012 remain lower than their respective rice equivalent values in 2009.

There also exist significant variations in the wage rate across different regions of the country. Table 5.8 gives the average rural wages of agricultural labourers for the five regions considered in the study. It also contains peak and lean season wages during the years. Panel A gives the nominal daily wage in Taka. As can be seen, the average wage rate is the highest in the Central region and the lowest in the Western region; the difference between the two regions was more than three times in 2009-10, which marginally reduced to two-and-a half times in 2012-13. Similar high variation is also observed between the peak and lean season wages in the two regions. There has, however, been a trend of lowering of differences between the peak and the lean season wages among the regions. The above can probably be taken as a sign of greater integration of the labour markets across the regions and lower fluctuations in the demand for labour over different times of the year. The coefficients of variation have also shown declining trends.

In Panels B and C, real wage rates are given for the same period.[9] In panel B, the real wage rate is computed by deflating nominal wage by group-specific CPI computed in the present study while Panel C gives the real wage in terms of kg of coarse rice equivalence of the nominal wage. Both the alternative measures show moderate growth as well as declines in real wage in different regions during the period. In terms of group-specific CPI deflated real wage of the agricultural labourers, the average wage marginally declined in all regions over the three year period (2009-10 to 2011-12). The peak and the lean period wages remained mostly unchanged in different regions. The trends are similar in terms of the quantity of rice that can be purchased with the daily nominal wage. Although no definite regional pattern can be seen, the declines are more prominent in regions where real wages are relatively high (e.g. Central, and Eastern regions) compared with regions with depressed wages (e.g. Southern Western and Northern regions).

The above results indicate that, in the face of inflation, the wage labourers are able to adjust wage rates in order to make up, even if partially, for the loss in real income. Even though a clearly rising trend in the daily wage of agricultural labour in real terms is not observed in different regions, the figures indicate that the agricultural labourers are at least able to prevent any drastic fall in their purchasing power through nominal wage adjustments. The real wage of unskilled workers (which is relevant to the poor) in non-agriculture sector also follows a similar trend (see figures at Appendix II).

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[9] For details on nominal and real wages at regional levels, see figures at Appendix II.

Table 5.8

**Daily Wage Rate of Agricultural Labourers by Regions**

| Region | 2009-10 | | | 2010-11 | | | 2011-12 | | | 2012-13 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | P | L | A | P | L | A | P | L | A | P | L |
| **A. Nominal wages in Tk.** | | | | | | | | | | | | |
| Northern | 142 | 152 | 136 | 158 | 180 | 145 | 177 | 186 | 171 | 187 | 191 | 184 |
| Western | 98 | 152 | 83 | 109 | 148 | 98 | 132 | 217 | 108 | 136 | 213 | 116 |
| Central | 320 | 369 | 285 | 330 | 386 | 288 | 344 | 409 | 303 | 361 | 434 | 322 |
| Eastern | 234 | 250 | 224 | 255 | 260 | 254 | 280 | 281 | 270 | 295 | 297 | 290 |
| Southern | 183 | 205 | 177 | 211 | 220 | 202 | 241 | 250 | 231 | 240 | 255 | 215 |
| CV | 0.44 | 0.40 | 0.43 | 0.40 | 0.39 | 0.39 | 0.36 | 0.32 | 0.36 | 0.36 | 0.35 | 0.37 |
| **B. Real wage (deflated by group specific CPI)** | | | | | | | | | | | | |
| Northern | 106.1 | 118.2 | 98.4 | 101.7 | 112.7 | 94.9 | 104.9 | 118.2 | 98.4 | … | … | … |
| Western | 78.1 | 122.7 | 62.1 | 74.9 | 127.5 | 57.6 | 75.8 | 122.7 | 62.1 | … | … | … |
| Central | 209.5 | 250.2 | 172.0 | 208.0 | 243.5 | 178.8 | 204.3 | 250.2 | 171.9 | … | … | … |
| Eastern | 169.1 | 187.2 | 159.6 | 159.8 | 166.3 | 148.6 | 163.5 | 172.0 | 154.8 | … | … | … |
| Southern | 139.3 | 151.0 | 125.3 | 135.3 | 155.0 | 121.0 | 139.1 | 151.0 | 125.3 | … | … | … |
| CV | 0.37 | 0.33 | 0.36 | 0.38 | 0.32 | 0.39 | 0.36 | 0.33 | 0.36 | … | … | … |
| **C. Real wage (in terms of kg. of coarse rice)** | | | | | | | | | | | | |
| Northern | 5.2 | 5.9 | 4.8 | 4.7 | 5.0 | 4.4 | 4.8 | 5.3 | 4.6 | … | … | … |
| Western | 3.5 | 4.7 | 2.7 | 3.5 | 5.5 | 2.5 | 3.3 | 4.9 | 2.9 | … | … | … |
| Central | 10.5 | 12.6 | 10.3 | 9.6 | 11.2 | 8.3 | 8.8 | 11.0 | 8.2 | … | … | … |
| Eastern | 8.6 | 10.3 | 7.8 | 7.4 | 8.3 | 6.4 | 7.7 | 8.1 | 7.3 | … | … | … |
| Southern | 6.9 | 8.4 | 6.1 | 6.2 | 7.1 | 5.2 | 6.6 | 6.7 | 6.3 | … | … | … |
| CV | 0.39 | 0.38 | 0.46 | 0.38 | 0.33 | 0.41 | 0.35 | 0.35 | 0.36 | … | … | … |

**Note:** The years refer to Bangla calendar months (April-March). For 2012-13, the data cover April-December 2012. A is average, P is the peak season and L is lean period reported daily wage. CV is the coefficient of variation. For definition of the regions, see text.

**Source**: Study survey, December 2012.

Thus it appears from the above analysis that the daily wage labourers in both agriculture and non-agriculture sectors, who constitute the largest poor group in the country, are usually able to protect the level of their daily real wage in the face of rising inflation through upward adjustment in the nominal wage rate without any substantial time lag.[10] One factor that facilitates such quick indexation of the nominal wage rate to inflation is the prevailing characteristics of the agricultural labour market that ensure flexibility and permit almost daily wage bargaining keeping in view the reservation wage of a minimum quantity of the wage good (rice). A similar behaviour is also noticed in the informal labour markets that set the daily wage rates in construction, services, transport

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[10] This has often been made possible through the pursuit of the widely used traditional practice of setting nominal wage rate in many locations on a daily basis keeping in view the price of rice in the local market. This not only protects the real income of the poor day labourers but also ensures their access to a minimum quantity of the wage good (rice).

(including rickshaw pulling) and other low-paid activities in which the poor are the major participants.

The evidence on wage adjustment thus indicates that the poor day labourers in Bangladesh have some ability to at least partially revise their nominal wage income rather quickly to compensate for the loss in real income due to inflation. This shows that nearly half of the poor in the rural areas and more than one-third in the urban areas (who belong to the daily wage labour households) can negotiate an upward adjustment in their major source of earning, the wage component of household income, in the face of inflation. This group therefore can somewhat protect themselves against the onslaught of inflation although the net welfare impact could go either way as they would probably receive higher prices for some of the commodities that they sale while they would pay higher prices for many of their purchased goods.

On the other hand, most of the components of income and expenditure of the poor households belonging to the self-employed category, who constitute more than one-third of the poor households in both rural and urban areas, are affected in diverse ways so that the net impact of inflation is difficult to predict a priori. The welfare of the salaried poor households, though constitute only around 5 per cent of the rural poor households but around a fifth of urban poor households, are more likely to be negatively affected as their real income is eroded by rising inflation while they pay higher prices for purchased goods. The remaining major poor group comprising nearly 10 per cent of the poor households in both rural and urban areas belongs to unemployed/not working category households and these households no doubt become extremely disadvantaged with rising inflation.

## 5.7 Seasonal Labour Migration: A Coping Strategy

Labour migration remains an important component of the traditional livelihood strategies, especially of the agricultural labour households in Bangladesh. While migration to the Middle-East and other global destinations has of late assumed a significant role, seasonal migration (e.g. "labour circulation") across different regions of the country still remains a major feature of the country's labour market. Various studies, especially those focusing on village level dynamics, point out large scale seasonal labour migration, particularly of male labour, from certain parts of the country (e.g. the northern region) to other regions (e.g. the eastern and central regions) in search of temporary livelihood. Such migration contributes to the rural economy of these primarily seasonally-dominated crop-employment intensive areas in different ways e.g. providing access to employment in migration destinations (having somewhat more diversified local economies) at higher wages as job opportunities become scanty in these depressed locations, and enhancing incomes and food security for these poor households during difficult times.

Despite the decline in the relative importance of agriculture, the seasonal migration patterns, however, are more dominated by agriculture. Sharp contrasts in the composition

of economic activities and differences in agro-ecological characteristics create push factors that provide incentives for labour to migrate seasonally in search of short term livelihood opportunities. In addition, there exist pull factors that create migration opportunities in certain locations.

The important issue, however, is: Does seasonal migration contribute to reducing wage differential across locations and make a positive contribution to the livelihoods of the migrant labour households? While answer to these questions are beyond the scope of the present study, one may observe that, for the seasonal migrants, such migration is at least in a large part a component of their coping mechanism although, for some households, temporary migration plays an important contributory role in improving their livelihoods. Obviously, the gains from such migration can be significantly enhanced by making the labour market more efficient through improved information flows and reduced transaction costs.

From the perspective of improving the labour market outcomes, the priority is to reduce the push factors especially through developing alternative and supplementary livelihood opportunities in employment deficit areas and strengthen the pull factors that would encourage labour to migrate in response to positive economic opportunities. Right policies based on credible information on the numbers involved in seasonal migration and understanding various flow patterns and their characteristics can make the process more effective and productive from the poor's perspectives.

## 5.8 Some Concluding Remarks

In Bangladesh, supply side factors resulting from disruptions in domestic production and supply (e.g. due to floods or natural disasters) and unusually high and rising global prices of food, fuel, and other essential commodities usually trigger inflationary pressures in the economy. This highlights the importance of prudent supply management as an important strategy to fight inflation. In a situation when inflation becomes persistent, direct measures are important to reduce inflationary pressures instead of leaving the burden of keeping inflation at low levels on demand management policies alone. With rising food prices, one useful way to dampen the price effects of food supply shocks is to maintain adequate strategic buffer stock of food that could be released when needed through different food transfer programmes targeted to the poor and food insecure households.

Keeping in view the financial burden of subsidies in the context of limited fiscal space of the government, targeted safety nets programmes, feeding programmes for school children, food-for-work programme, open market sales, and guaranteed employment programme for the poor and disadvantaged households, especially during the lean seasons, are some useful measures that can be used in the short run to enhance food entitlements and stabilise prices. Along with mitigating the inflationary impact on the poor through generating short-term employment opportunities and providing access to transfer incomes in the rural areas, it is important to ensure food to the poor at subsidised prices, especially in the urban areas, as they do not have any surplus food at home.

  The analysis in this chapter shows that, while daily wage labourers in agricultural and non-agricultural activities have some ability to adjust, at least partially, their nominal wages to inflation in the short run with minimal impact on real wages, ensuring real wages and salaries of low paid fixed income workers (including workers for example in the RMGs industry) is a priority. Similarly, along with ensuring fair prices at the producer level to small farmers, supply of food items to the urban poor at reasonable prices would be useful to lessening the inflationary impact on poverty.

# CHAPTER 6

# INFLATION AND WAGE DYNAMICS: AN ECONOMETRIC ANALYSIS

This chapter provides an analysis of the short-run links between nominal wages and inflation across different daily labour and fixed income group households using Vector Auto Regression (VAR) techniques. The VAR model allows to examine the impulse response of wages to inflationary shocks, and vice versa. Although it has been widely recognised that wage shocks might have led to inflationary developments, the analysis in the previous chapter (Chapter 5) suggests that wages follow the pattern of inflation in Bangladesh, at least during the short run. Thus it seems important to examine econometrically the impulse response of nominal wages to price (CPI) shock. As our focus is on the short run links between nominal wages and prices, we have abstracted from considering explicitly longer run determinants of wages and prices, such as productivity and product market structure.

Although the role of wages in the inflationary process is well recognised in theory, it has been investigated by several empirical studies as well. While Montiel (1989) finds an important role of wages on inflation, some other studies, such as Haan and Zelhorst (1990), Moser (1995), Loungani and Swagel (1996), find no significant impact of nominal wage on inflation. Similarly, based on structural VARs, Hoffmaister and Roldos (1997) find that while it is possible to capture indirectly the effect of wage shocks on prices through their impact on aggregate nominal shocks, they could not identify the specific contribution of wages to nominal price fluctuations.

## 6.1 The VAR Model

The standard VAR model has been used to estimate impulse response function and variance decomposition to analyse the effect of inflationary shocks on wage adjustments by different household groups.

Consider the following VAR model:

$$C(L)y_t = \mu_t \tag{1}$$

Where $y_t$ is a vector containing the k variables in the model, $C(L)$ is a lag polynomial matrix with the VAR coefficients, and the vector $\mu_t$ contains the VAR innovations with $E[\mu_t] = 0$ and $E[\mu_t \mu'_t] = \Omega$.

Assuming that the system described in (1) is invertible, the impulse response function for the orthogonal shock $\varepsilon_t$ is obtained by solving this system for $y_t$:

$$y_t = C(L)^{-1} R\varepsilon_t \tag{2}$$

The variance decomposition of $y_t$ is obtained by splitting the mean square forecasting error (MSFE) into the portions attributed to each shock. Consider the expression for $y_{t+s}$ from equation (2):

$$y_{t+s} = C(L)^{-1} R \, \varepsilon_{t+s}$$

$$= A_o\varepsilon_{t+s} + A_1\varepsilon_{t+s-1} + A_2\varepsilon_{t+s-2} + \ldots\ldots + As \, \varepsilon_t + A_{s+1} \, \varepsilon_{t-1} + \tag{3}$$

That implicitly defines $A(L) = C(L)^{-1}R$. The mean forecast of $y_{t+s}$ in period t is then:

$$y_{t+s|t} = As \, \varepsilon_t + A_{s+1} \, \varepsilon_{t-1} + \tag{4}$$

Where the expected values for $\varepsilon_{t+s}$ for s>0 are equal to zero, that is, equal to their expected value in period t. From equations (3) and (4) it is clear that the forecasting error in period t is:

$$y_{t+s} - y_{t+s|t} = A_o \, \varepsilon_{t+s} + A_1\varepsilon_{t+s-1} + A_2\varepsilon_{t+s-2 +\ldots\ldots} + A_{s-1} \, \varepsilon_{t+1} \tag{5}$$

Note that equation (5) expresses the forecasting error of $y_{t+s}$ using the first s terms in $A(L)$.

The MSFE is obtained by taking the expectation of

$$[(y_{t+s} - y_{t+s|t})( y_{t+s} - y_{t+s|t})^{/}] \tag{6}$$

To split the MSFE into the portion associated with each of the k shocks in $\varepsilon_{n,}$ with n = t+1, ...., t+s, it is convenient to partition the square matrices $A_i$ into k columns.

The MSFE can be expressed as the sum of k components, each associated with individual elements of $\varepsilon$, as follows:

$$MSFE(y_{t+s}) = E \, [\sum_{j=1}^{k} \{e_j e_j^{/} (A_{0j}A_{0j}^{/} + A_{1j}A_{1j}^{/} + \ldots\ldots + A_{s-1j}A_{s-1j}^{/})\}]$$

Note that because $E(\varepsilon\varepsilon') = I$, that is, the variance of each shock $e_j$ is unity and these shocks are orthogonal, the expectation term on the left hand side of the above equation contains no covariance terms. Thus, the contribution of shock j to the forecasting error of $y_{t+s}$ will equal

$$(A_{0j}A_{0j}^{/} + A_{1j}A_{1j +\ldots\ldots}^{/} + A_{s-1j}A_{s-1j}^{/})$$

It should be clear that as $A(L)$ depends on the ordering used to calculate the Choleski decomposition, the variance decomposition will vary with the ordering. However, in this study, as we are considering only two variables, namely CPI and Wage rate, it does not matter how the ordering is.[11]

*Data*

For estimating variance decompositions, we use rural daily wage rate of day labourers and monthly wage rate of non-agricultural labour obtained through the primary survey conducted under the study. For inflation, estimated CPIs (Chapter 4) for different income categories of day labourer and fixed income groups are used. The monthly wage data for the time period spanning over 2009-2012 are used.

The Augmented Dickey-Fuller test shows that all the variables are stationary in their logarithmic forms. Therefore, these two variables are used to estimate basic VAR models.

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[11] For further details on the VAR model, see Sims (1980) and Hamilton (1994).

## 6.2 Empirical Results: Variance Decomposition

*Daily Labour Households*

At a forecast horizon of less than one year (10 months), variance decomposition shows that inflation shocks are a very important source of fluctuations in daily wages, accounting for 40.46 per cent shocks in wage after three months in rural areas (Table 6.1, Panel A:II). This shows that the rural daily labour households have been able to quickly adjust 40 per cent of inflation shocks into wages within three months of inflation shock, and thereafter with a slow adjustment they could adjust 54 per cent in 10 months of inflation shocks. However, wage itself could not explain price shocks for any of the inflation series (Table 6.1, Panel A:I), mainly due to short-term nature of the data.

It can be observed that extreme income groups, such as poorer and higher income day labour households, could adjust inflation to wages quicker than those of other day labour households. They could adjust 56 per cent of inflation shocks through wage adjustment by three months and about 60 percent by 10 months. For other day labour households, adjustment pace remains almost the same (40 per cent in three months and 55 per cent in 10 months).

The variance decomposition analysis suggests that wage formation does not have any impact on inflation in Bangladesh, rather inflationary pressures exert upward pressure on wage adjustments for daily wage labourers, at least in the short run. The daily labour households could adjust 40 per cent of inflationary shocks within three months of inflationary shocks; however, afterwards the rate of adjustment becomes rather slow.

*Fixed Income Households*

The variance decomposition shows that compared with the daily labor households, fixed income households are mostly unable to adjust inflationary shocks into wages. The poorer and lower middle income fixed income groups could adjust only about 10 per cent of inflation shocks into wages after five months in urban/semi-urban areas (Table 6.2, Panel A:II). The results show that the non-agricultural poorer fixed income households are able to adjust 25 per cent of inflation into wages in 10 months of inflation shock, while the upper income households could adjust about 30 per cent to wages in 10 months after the inflationary shocks. However, wage itself could not explain price shocks for any of the inflation series (Table 6.2, Panel A:I).

## 6.3 Impulse Responses

The impulse responses (Figure 6.1) show that an innovation in the rate of inflation responds positively to the increase of daily wage rate for daily labour households, particularly for the poor. The wage response to inflationary shocks is prominent in three months, afterwards the response is very minimum for daily labour households irrespective of their income levels. The analysis indicates that the day labourers can adjust a substantial portion of inflation to real wages very quickly, for which the adverse impact of inflation on them appears to be less. Therefore, although poor daily labour households face relatively high inflation, not much loss in terms of welfare takes place due to flexibility in wage adjustments. However, as Figure 6.2 shows, fixed income households cannot adjust the inflationary shocks quickly—there exists substantial time lag in wage adjustments. Thus, these groups of households face the most hardship resulting from inflationary shocks.

Table 6.1

**Variance Decomposition of Daily Wages**

**A.  Variance decomposition of daily wages (rural) to food inflation (rural)**

| I. Variance decomposition of LWAGE_R: | | | II. Variance decomposition of LCPI_R: | | | |
|---|---|---|---|---|---|---|
| Period | S.E. | LWAGE_R | LCPI_R | Period | S.E. | LWAGE_R | LCPI_R |
| 1 | 0.0234 | 100.00 | 0.00 | 1 | 0.044 | 2.59 | 97.413 |
| 2 | 0.034 | 99.27 | 0.73 | 2 | 0.051 | 2.256 | 97.744 |
| 3 | 0.04 | 99.38 | 0.62 | 3 | 0.065 | 40.460 | 59.539 |
| 7 | 0.051 | 99.46 | 0.54 | 7 | 0.074 | 51.169 | 48.831 |
| 10 | 0.054 | 99.47 | 0.5 | 10 | 0.076 | 54.209 | 45.791 |

**B.  Variance decomposition of daily wages (rural) to food inflation of poor daily labour households (rural)**

| Variance decomposition of LWAGE_R: | | | Variance decomposition of LCPI_DLP: | | | |
|---|---|---|---|---|---|---|
| Period | S.E. | LWAGE_R | LCPI_DLP | Period | S.E. | LWAGE_R | LCPI_DLP |
| 1 | 0.024 | 100.000 | 0.000 | 1 | 0.0359 | 1.603 | 98.397 |
| 2 | 0.034 | 96.578 | 3.422 | 2 | 0.0406 | 3.712 | 96.289 |
| 3 | 0.0392 | 96.059 | 3.940 | 3 | 0.058 | 53.226 | 46.774 |
| 7 | 0.048 | 96.344 | 3.656 | 7 | 0.070 | 62.630 | 37.369 |
| 10 | 0.050 | 96.345 | 3.655 | 10 | 0.073 | 64.878 | 35.122 |

**C.  Variance decomposition of daily wages (rural) to food inflation of lower middle income day labour households (rural)**

| Variance decomposition of LWAGE_R: | | | Variance decomposition of LCPI_DLM1: | | | |
|---|---|---|---|---|---|---|
| Period | S.E. | LWAGE_R | LCPI_DLM1 | Period | S.E. | LWAGE_R | LCPI_DLM1 |
| 1 | 0.024 | 100.00 | 0.000 | 1 | 0.048 | 0.568 | 99.431 |
| 2 | 0.035 | 98.835 | 1.164 | 2 | 0.051 | 0.544 | 99.455 |
| 3 | 0.039 | 98.375 | 1.624 | 3 | 0.067 | 40.274 | 59.725 |
| 7 | 0.049 | 98.365 | 1.634 | 7 | 0.077 | 53.501 | 46.498 |
| 10 | 0.052 | 98.349 | 1.650 | 10 | 0.0803 | 56.156 | 43.843 |

**D.  Variance decomposition of daily wages (Rural) to food inflation of upper middle income day labour households (rural)**

| Variance decomposition of LWAGE_R: | | | Variance decomposition of LCPI_DLM2: | | | |
|---|---|---|---|---|---|---|
| Period | S.E. | LWAGE_R | LCPI_DLM2 | Period | S.E. | LWAGE_R | LCPI_DLM2 |
| 1 | 0.0217 | 100.00 | 0.000 | 1 | 0.035 | 6.359 | 93.64147 |
| 2 | 0.032 | 89.912 | 10.088 | 2 | 0.036 | 12.088 | 87.91211 |
| 3 | 0.036 | 83.348 | 16.652 | 3 | 0.044 | 39.45 | 60.55042 |
| 7 | 0.044 | 81.831 | 18.169 | 7 | 0.056 | 52.138 | 47.86151 |
| 10 | 0.046 | 81.383 | 18.618 | 10 | 0.059 | 55.049 | 44.95115 |

**E.  Variance decomposition of daily wages (rural) to food inflation of higher income day labour households (rural)**

| Variance decomposition of LWAGE_R: | | | Variance decomposition of LCPI_DLU: | | | |
|---|---|---|---|---|---|---|
| Period | S.E. | LWAGE_R | LCPI_DLU | Period | S.E. | LWAGE_R | LCPI_DLU |
| 1 | 0.022 | 100.000 | 0.000 | 1 | 0.0344 | 8.245 | 91.754 |
| 2 | 0.0327 | 91.389 | 8.610 | 2 | 0.0360 | 13.672 | 86.327 |
| 3 | 0.0368 | 86.907 | 13.092 | 3 | 0.0458 | 45.663 | 54.336 |
| 7 | 0.0447 | 86.515 | 13.484 | 7 | 0.057 | 57.744 | 42.255 |
| 10 | 0.0474 | 86.344 | 13.655 | 10 | 0.0610 | 60.494 | 39.505 |

Table 6.2

**Variance Decomposition of Monthly Wages**

**A.  Variance decomposition of monthly wages of to food inflation (poor)**

| Variance decomposition of LWAGE_FI: | | | Variance decomposition of LCPI_FIP: | | | |
|---|---|---|---|---|---|---|
| Period | S.E. | LWAGE_FI | LCPI_FIP | Period | S.E. | LWAGE_FI | LCPI_FIP |
| 1 | 0.034 | 100.00 | 0.00 | 1 | 0.04 | 0.52 | 99.47 |
| 5 | 0.070 | 96.01 | 3.98 | 5 | 0.04 | 10.15 | 89.84 |
| 8 | 0.090 | 94.66 | 5.33 | 8 | 0.04 | 19.68 | 80.31 |
| 10 | 0.102 | 94.18 | 5.81 | 10 | 0.05 | 25.43 | 74.56 |

**B.  Variance decomposition of monthly wages of to food inflation (lower middle income)**

| Variance Decomposition of LWAGE_FI: | | | Variance Decomposition of LCPI_FIM1: | | | |
|---|---|---|---|---|---|---|
| Period | S.E. | LWAGE_FI | LCPI_FIM1 | Period | S.E. | LWAGE_FI | LCPI_FIM1 |
| 1 | 0.0348 | 100.000 | 0.000 | 1 | 0.0519 | 0.147 | 99.853 |
| 5 | 0.0742 | 99.574 | 0.426 | 5 | 0.057 | 15.527 | 84.473 |
| 8 | 0.0967 | 99.515 | 0.484 | 8 | 0.061 | 25.904 | 74.095 |
| 10 | 0.111 | 99.496 | 0.504 | 10 | 0.064 | 32.225 | 67.77477 |

**C.  Variance decomposition of monthly wages of to food inflation (upper middle income)**

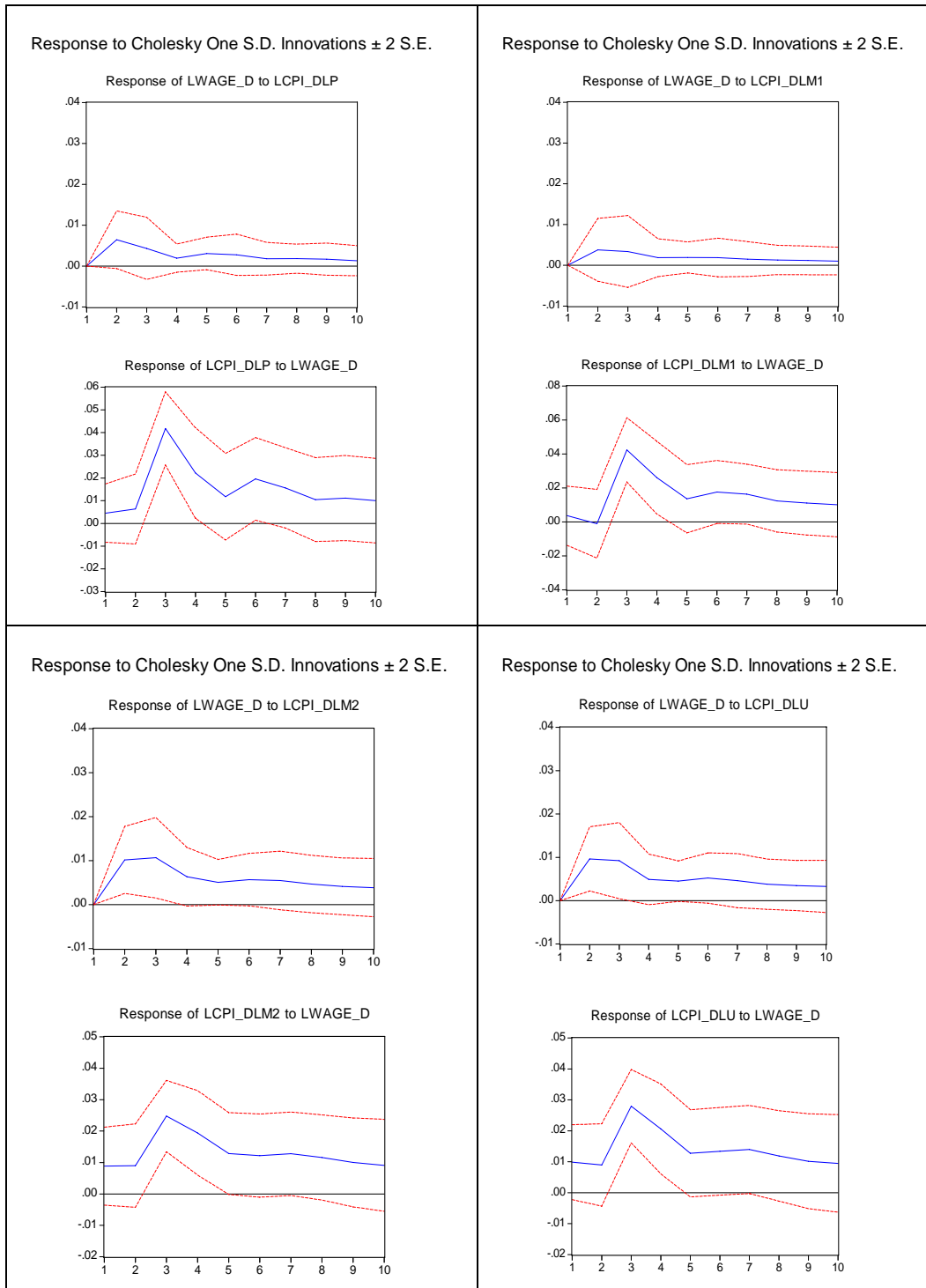| Variance Decomposition of LWAGE_FI: | | | Variance Decomposition of LCPI_FIM2: | | | |
|---|---|---|---|---|---|---|
| Period | S.E. | LWAGE_FI | LCPI_FIM2 | Period | S.E. | LWAGE_FI | LCPI_FIM2 |
| 1 | 0.034 | 100.00 | 0.000 | 1 | 0.0487 | 0.387 | 99.612 |
| 5 | 0.0731 | 98.849 | 1.1503 | 5 | 0.0528 | 15.229 | 84.771 |
| 8 | 0.0948 | 98.643 | 1.356 | 8 | 0.0567 | 26.289 | 73.71 |
| 10 | 0.1083 | 98.572 | 1.427 | 10 | 0.059 | 32.862 | 67.138 |

**D.  Variance decomposition of monthly wages of to food inflation (higher income)**

| Variance Decomposition of LWAGE_FI: | | | Variance Decomposition of LCPI_FIU: | | | |
|---|---|---|---|---|---|---|
| Period | S.E. | LWAGE_FI | LCPI_FIU | Period | S.E. | LWAGE_FI | LCPI_FIU |
| 1 | 0.0349 | 100.00 | 0.000 | 1 | 0.0523 | 0.1233 | 99.876 |
| 5 | 0.074 | 99.711 | 0.288 | 5 | 0.0585 | 18.030 | 81.969 |
| 8 | 0.097 | 99.674 | 0.326 | 8 | 0.0631 | 29.574 | 70.425 |
| 10 | 0.111 | 99.661 | 0.339 | 10 | 0.066 | 36.372 | 63.627 |

**Figure 6.1: Impulse Responses to Wages for Daily Labour Household Groups**

**Figure 6.2: Impulse Responses to Wages for Fixed Income Household Groups**



Response to Cholesky One S.D. Innovations ± 2 S.E.

Response of LWAGE_FI to LCPI_FIP

Response of LCPI_FIP to LWAGE_FI

Response to Cholesky One S.D. Innovations ± 2 S.E.

Response of LWAGE_FI to LCPI_FIM1

Response of LCPI_FIM1 to LWAGE_FI

Response to Cholesky One S.D. Innovations ± 2 S.E.

Response of LWAGE_FI to LCPI_FIM2

Response of LCPI_FIM2 to LWAGE_FI

Response to Cholesky One S.D. Innovations ± 2 S.E.

Response of LWAGE_FI to LCPI_FIU

Response of LCPI_FIU to LWAGE_FI

# CHAPTER 7

# CONCLUSIONS AND POLICY RECOMMENDATIONS

## 7.1 Major Conclusions

The study makes an in-depth analysis to assess the impact of inflation on different groups of household in Bangladesh in the face of recent inflationary episodes. For the assessment, day labourer and fixed income households are specially targeted, and within these households, various income groups such as poor, lower middle income, upper middle income and higher income groups are considered. Separate consumer price indexes (CPIs) are constructed for each of these groups to assess the extent of inflation they had faced during 2008-2011. Moreover, in order to get a complete picture on the hardship that these households face due to rising inflation, wage-inflation dynamics are also analysed.

In the context of recent trends and sources, inflation in Bangladesh is seen to be dominated by food inflation. Rice prices, particularly coarse and medium quality rice prices, significantly matter for inflation among these groups. International rice and commodity price movements also contribute to the inflationary developments in Bangladesh. It is also observed that inflation rates vary with locations; In particular, there have been significant differences in inflation rates between urban and rural areas, which are also related to rice market situations. Food inflation remained higher than non-food inflation for relatively longer period until 2010-11, afterwards non-food inflation started to overshoot food inflation. The trends and sources of inflation justify the categorisation of households in terms of income levels as consumption of different varieties of rice matters for inflationary developments across households.

The results based on CPIs suggest that both daily labour and fixed income household groups faced higher food inflation than non-food inflation during 2008-2010. Urban household groups faced relatively high food inflation than those in the rural areas. In terms of food inflation, poorer fixed income household groups faced higher inflation than those belonging to daily labour groups in the rural areas, indicating that the day labourers are somewhat able to adjust their nominal incomes with rising inflation through keeping track with their real wages. In contrast, poor and lower middle income daily labourers in urban areas face higher inflation than those of fixed income households. It is observed that the share of medium quality rice in the consumption basket of urban daily labour households is higher, which might have been reflected in their respective inflation rates. In general, poor and lower middle income households face higher inflation in both rural and urban areas than their other respective counterparts. Thus, poorer fixed income groups in rural areas and day labourers in urban areas face relatively high food inflation than the other groups.

Non-food inflation tended to be lower than food inflation during 2008-2010, but it started to overshoot food inflation in 2010-11. In terms of non-food inflation, there have been no significant differences among rural and urban households. Rural poorer households face slightly higher non-food inflation than the other groups. On the other hand, in urban areas, high income groups faced higher non-food inflation than others

until 2010; however, when non-food inflation crossed the double-digit level, poorer households started facing higher non-food inflation than others. It suggests that there exists non-linearity in non-food inflationary characteristics in the urban areas.

The analysis in this study suggests that food prices, *inter alia*, remained at the centre point of inflation during the period. Various income groups including poorer households are found to be highly sensitive to food inflation. The critical question therefore relates to finding ways so that these income groups can cope with the inflationary developments. The primary survey, conducted under the study, examined the wage rate developments for specific groups of households, such as agricultural day labourers and non-agricultural fixed-income households. In addition to some descriptive analysis, Vector Auto Regression (VAR) model has been used to examine the short-run links between wages and inflation rates for different households.

The variance decomposition and impulse response functions suggest that the daily labour households can adjust up to 40 per cent of inflationary shocks very quickly, within three months. Afterwards, the rate of adjustment becomes slow and they could adjust up to 55 per cent within a period of 10 months. On the other hand, the rate of adjustment of inflationary shocks to wages/salary is very low for the fixed income groups, which is about 30 per cent in one year. The findings suggest that although day labour households are in an advantageous position in the face of rising inflation, they cannot adjust a major portion of inflationary shocks within a year. More importantly, fixed income poorer households face the hardship of inflation most as they are able to adjust only a small part of inflationary shocks even within a year. Therefore, appropriate policies in the short-to-medium run are necessary to mitigate the adverse welfare consequences of inflation on these groups of households.

## 7.2 Key Policy Recommendations

In view of the existence of significant heterogeneity among different poor groups and the conflicting nature of impact of specific policies on different groups, it is important to devise policies keeping the priority of specific poor sub-group in view. Such policies need also to consider the group's access to key productive assets and keep its characteristics of livelihood strategies in consideration rather than anchoring policies on average impact estimates on the poor. Although the issue has not been explicitly addressed in the present study, the net welfare loss of female-headed households is generally higher than that for the male-headed ones, so that special attention is needed on female-headed households within the mitigation programmes. At the same time, providing agricultural credit, making input supplies more reliable and relaxing trade policies may bring consumer gain in the short run while providing timely market information would assist the producers to take informed decisions.

The distributional consequences of rising prices of domestically produced rice and other agricultural products suggest that it is important to adopt policies that reduce seasonal variability in prices of different commodities, especially rice, and provide a remunerative and fair price of rice to the growers after harvest. For vegetables and other non-rice food crops, the priority should be to strengthen the marketing links both horizontally and vertically, promote market integration, and support processing and high

value activities. The thrust of the macroeconomic policies should be on increasing domestic production and stabilising supply because it is more likely that the average income of the poor is negatively related to aggregate demand variability in Bangladesh. The monetary policy framework should reflect the above concerns through its support to growth augmenting policies along with ensuring reasonable price stability.

*Public Works Programmes*

As a large majority of the poor belongs to the category of landless labourers who subsist on casual agricultural wage employment, it is possible that, in addition to direct transfers, policies that put upward pressure on agricultural wages can be effective in raising the welfare of these poorest groups. From this context, public works programmes, which employ large numbers of unskilled workers from poor households to improve public infrastructure, raise the demand for labour which, if it is large enough, can push wages up through general equilibrium effects. In such a case, the welfare gains of public works programmes would bring benefits even to other households who are not directly employed under these programmes.[12]

With regard to the public works programmes, it is argued that such programmes have three potential effects on welfare: (i) a direct effect on those who are employed under the programmes; (ii) a labour market effect relating to shift in labour demand; and (iii) an increase in productivity resulting from the public goods in which labour is employed under the programmes (see Ravallion 1990). The major element of the labour market effect is the increase in wages.[13] The nature and magnitude of the effect on wages would, however, be determined by many other factors. For example, the effect on wages could be minimal, if at all, when public works programmes are implemented during the slack agricultural seasons when the demand for rural labour is low or if these programmes employ labourers who are not normally demanded in the labour market.

Although no empirical analysis of the labour market effect of public works programmes in Bangladesh is available, studies in India report boosts for real agricultural wage rates. One study on National Rural Employment Guarantee (NREG) reports that an additional per capita person day of NREG work in a district raises the real daily agricultural wage rate by 1.6 per cent which, given the average district intensity of 3.3 person days of NREG employment per rural inhabitant, implies a 5.3 per cent increase in the real daily agricultural wage rate in an average district in India (Berg *et al.* 2012). It is also reported that NREG mainly affects unskilled wages and the effect is equally strong for men's and women's wages. In view of the large magnitude and coverage of the public

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[12] In this context, one may argue that the welfare gain in society as a whole is somewhat ambiguous as a rise in wages would have a negative welfare effect on the employers. It may, however, be argued that the labour-employing households are invariably better off than the labour-supplying households and are fewer in number. Hence, from the social point of view, the trade-off is more likely to be welfare enhancing and hence worth accepting.

[13] Other benefits may include, for example, efficiency gains in the distorted agricultural labour market through reduced monopsony power of the employers of wage labour or limiting the scope of adopting exploitative practices like labour-tying. See, for example, Basu (2011).

works programmes in Bangladesh, it is more likely that the impact of workfare programmes on real agricultural wages would be similar to those reported for India.

*Poverty and Agricultural Wage Employment*

Historically, there exists a close association between poverty and agricultural wage employment in Bangladesh. Hence, other dimensions of well-being such as education levels and nutrition status are also likely to be strongly and inversely correlated with agricultural wage employment. Different rounds of HIES data show that the probability of being employed in agricultural wage labour falls monotonically as one moves up the consumption distribution. As such, changes in poverty are likely to be correlated with changes in agricultural wages in the rural areas.

As we have noted before, agricultural wage employment continues to employ over 20 per cent of adult males, and has expanded steadily since the 1980s, until a recent decline during the 2000s. For women, although far fewer are judged to be economically active, the importance of agricultural labour employment is even more pronounced.[14] The LFS 2010 data show that employment over time in agricultural labour has not shown a clear declining trend. Similarly, the HIES 2010 data show that employment in agricultural labour is strongly correlated with low consumption levels. Thus agricultural labour remains a "last resort" option for the rural population. The present analysis also notes that real wages have risen over time (continuing a trend that started in the early 1980s), and the rate of increase appears to have accelerated in recent years.

Available evidence indicates that a sizeable non-agricultural sector has also grown in rural Bangladesh. While this sector appears to have grown in step with overall population growth, its share in total employment still remains low. Moreover, as the LFS data show, non-farm employment comprises three major sub-sectors in Bangladesh: regular employment, casual employment and self-employment. These developments bring out important dynamics in the country's labour market, especially in the rural areas.

The nature of employment in the regular non-farm category, in general, is characterised by better terms and involves higher skills and wages; and, hence, can support higher consumption levels. In most cases, however, the poor households do not have access to such employment. In the case of casual non-farm employment, education and other positive elements of quality labour are not particularly relevant; and lower education is not a major hurdle in getting such employment in the non-farm activities as long as such employment opportunities exist. As such, casual non-farm employment can be accessed by the poor, especially those who have some education. On the other hand, self-employment in the non-farm sector is a truly heterogeneous category, comprising of

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[14] In India, available evidence suggests that agricultural wage employment and agricultural wages, in particular, can serve as a valuable window on living standards in rural areas. Deaton and Drèze (2002) suggest that agricultural wages in India can be viewed not only as useful proxies of poverty but can also be seen as indicators of poverty in their own right insofar that they capture the reservation wages of the rural labour force. For an analysis of some interesting developments in the non-farm sector in India, see Lanjouw and Murgai (2008).

productive and remunerative employment at the one end and the "last resort" option at the lowest end.

In view of these complex dimensions of the rural non-farm employment, the poverty impact of the expansion of the non-farm sector depends more on the nature of activities that drive the expansion of the sector. More importantly, the pro-poor expansion of the non-farm sector is largely determined by activities that are education and skill intensive and provide productive and remunerative employment opportunities.

In the labour force surveys, some changes in the relative importance of the three avenues of non-farm employment in the rural areas are observed. In 2010, the share of regular employment declined to 24 per cent (from 38 per cent in 2005-06) despite an increase by more than 0.3 million of regular non-farm jobs in absolute number. On the other hand, the share of self-employment rose to 41 per cent (from 35 per cent in 2005-06), while the share of casual employment increased to 34 per cent (from 27 per cent in 2005-06).

Given the nature of labour demand, the expansion of non-farm employment led by casual and self-employment at the lower end directly competes with wage employment in agriculture. This indicates that a positive interaction between farm and non-farm employment has been taking place in the country's labour market over the last decade. Such induced impact of expansion of the non-farm sector could be substantial through putting upward pressure on wage rates in agriculture as rising agricultural wages are strongly correlated with rural poverty reduction. The policy implication for poverty reduction of these changes could be two-fold. First, vigorously pursue the options for promoting the rural non-farm sector along with focus on opportunities that do not impose any barriers to entry. This will directly raise the income levels of the poor who gain access to such jobs. Second, such farm-nonfarm transformation would also benefit the wage labourers who remain in the agricultural labour market by raising their wages.

In the medium term, responses such as improving institutional capacities and governance structures including investments in agricultural research, technology, and extension services and in improving trade, marketing, and post-harvest facilities are the feasible ways of sustaining positive outcomes. Similarly, investment in education and health in rural areas and infrastructure, such as irrigation and rural roads, can bring out productivity gains and alleviate the trend of higher rice prices and food prices in general. As the poor have limited income to spend on essential non-food items, priority public expenditures should be reviewed to ensure their access to critical non-food items pertaining to long term human development such as education and health. At the same time, efforts to stay on inclusive growth path would facilitate policies for addressing the challenges of rising and high food prices facing the poor.

Obviously, efforts to keep inflation within tolerable limits involve a long term battle with support of prudent policies. For this, it is important for Bangladesh to ensure high

and sustainable growth in domestic output consistent with price stability that requires: continuous pursuit of supportive macroeconomic policies; heightened business confidence and growth in private sector led investment; measures to address power, transport, and other infrastructure constraints; speedy implementation of ongoing structural, institutional, and financial sector reforms; and policy continuity and reasonable socio-political stability over the medium term.

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# APPENDIX I

<u>**Required Sample Size for Wage Rate Survey**</u>

To decide about a nationally representative sample of wage workers, we apply the following formula:

$$N_c = Z^2[P(1-P)/d^2] * def$$

where $N_c$ represents the number of workers to be interviewed and *deff* represents design effect. For household survey, *def* is usually considered to be between 1.5 and 2. We assume it 1.5 and consider Z at 10% level of significance, precision d=0.1 at 10% level. Here P is the proportion of households having specific type of workers (see Table below; Source: HIES 2010 and LFS 2010). Therefore, the required number of workers would be N = 193 from each Division. As we have decided to conduct the survey in all 7 divisions to make the sample representative, thus, a total of 1,351 respondents (wage workers) were interviewed.

| | P | Z | d | def | $N=Z^2 *P*Q*def/d^2$ |
|---|---|---|---|---|---|
| Agriculture day labourer/fisheries worker | 0.21 | 1.68 | 0.1 | 1.5 | 70 |
| Construction worker | 0.05 | 1.68 | 0.1 | 1.5 | 20 |
| Fishermen (culture) | 0.02 | 1.68 | 0.1 | 1.5 | 8 |
| Tailor/garment worker | 0.01 | 1.68 | 0.1 | 1.5 | 4 |
| House maid | 0.012 | 1.68 | 0.1 | 1.5 | 5 |
| Housekeeper (darwan, aya, gardener) | 0.012 | 1.68 | 0.1 | 1.5 | 5 |
| Rickshaw/van puller | 0.07 | 1.68 | 0.1 | 1.5 | 28 |
| Driver/helper | 0.07 | 1.68 | 0.1 | 1.5 | 28 |
| Carpenter | 0.05 | 1.68 | 0.1 | 1.5 | 20 |
| Weaver | 0.013 | 1.68 | 0.1 | 1.5 | 5 |
| Total (Each division) | | | | | 193 |
| For 7 divisions | | | | | 1,351 |

## Sample distribution

| Divisions | Districts | Sample |
|---|---|---|
| Dhaka | Dhaka and Tangail | About 100 samples (proportionately) from each of the districts |
| Chittagong | Chittagong and Comilla | About 100 samples (proportionately) from each of the districts |
| Rajshahi | Naogaon and Sirajgonj | About 100 samples (proportionately) from each of the districts |
| Khulna | Jessore and Satkhira | About 100 samples (proportionately) from each of the districts |
| Barisal | Bhola and Patuakhali | About 100 samples (proportionately) from each of the districts |
| Rangpur | Dinajpur and Gaibandha | About 100 samples (proportionately) from each of the districts |
| Sylhet | Sylhet and Hobiganj | About 100 samples (proportionately) from each of the districts |

# APPENDIX II

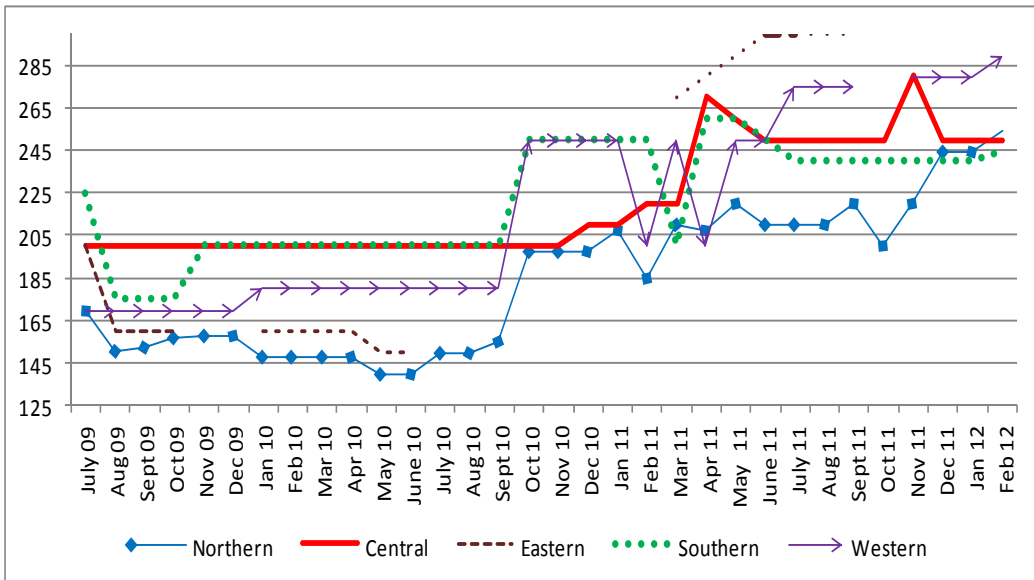## TABLES AND FIGURES

**Figure A.1: Nominal Daily Wage of Agricultural and Non-agricultural Labour by Region**
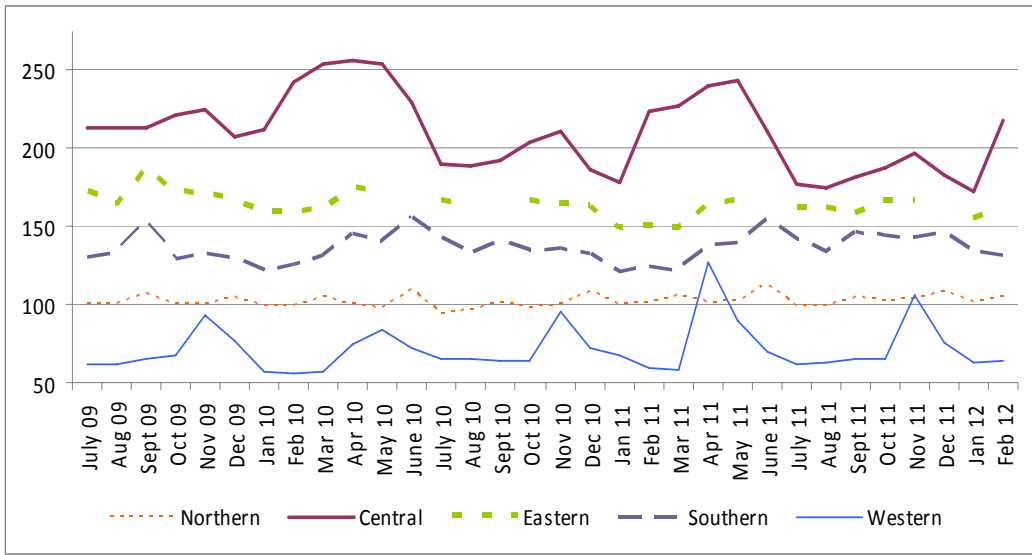
### A. Agriculture
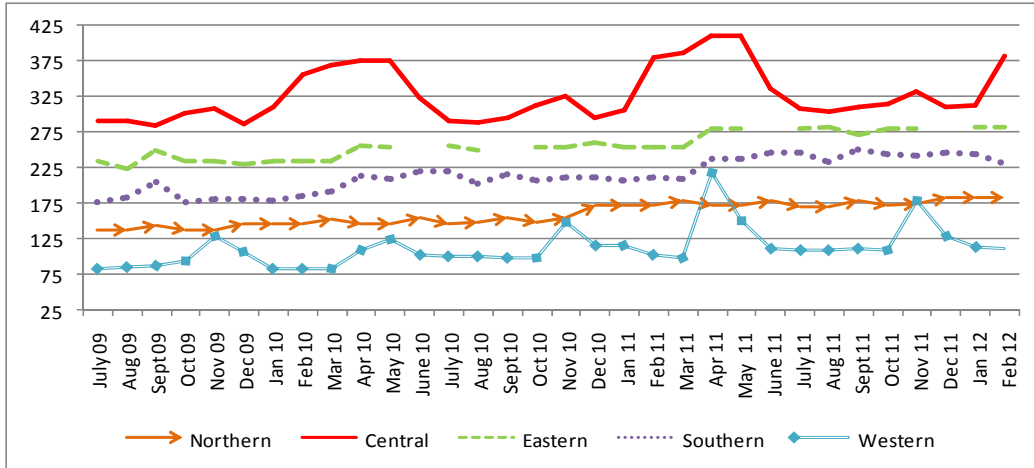


### B. Non-agriculture

**Figure A.2: Real Daily Wage of Agricultural Labour by Region**

**A. Deflated by Group-Specific CPI Inflation**



**B. Coarse Rice Equivalence in Kg.**

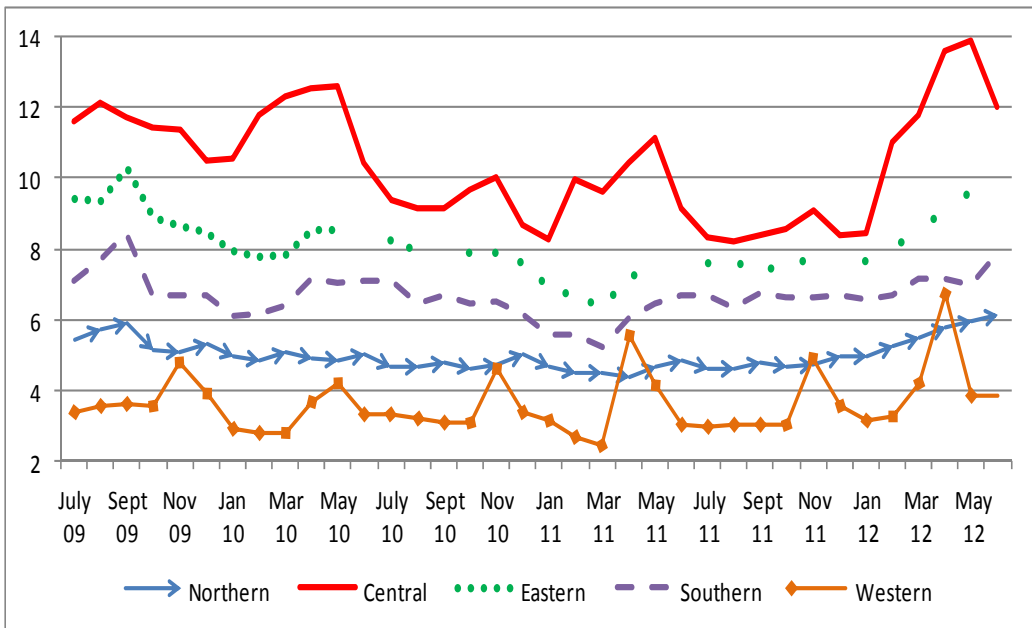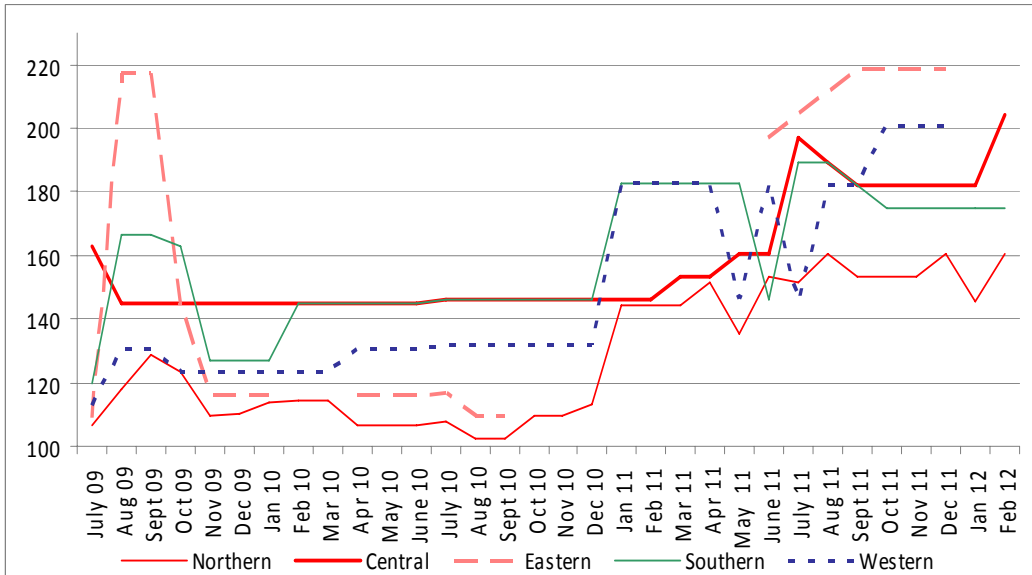**Figure A.3: Real Daily Wage of Non-Agricultural Labour by Region**

**A.  Deflated by Group-Specific CPI Inflation**



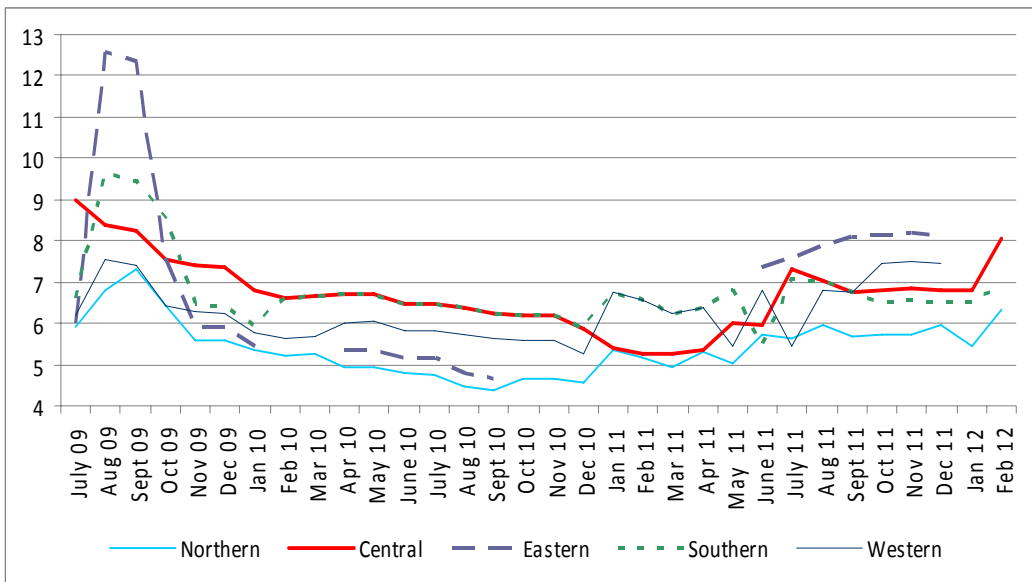**B.  Coarse Rice Equivalence in Kg.**

Table A.1

**Definitions of Different Household Groups**

| Groups | | Definition for rural (in terms of per capita monthly income) | Definition for urban (in terms of per capita monthly income) | Definition for national (in terms of per capita monthly income) |
|---|---|---|---|---|
| Poor households | Daily wage labourer | >= Tk. 1,130 (according to BBS upper poverty line) | >= Tk. 1,200 (according to BBS upper poverty line) | >= Tk. 1,280 (according to BBS upper poverty line) |
| | Monthly salaried (fixed income) | | | |
| Lower Middle Income | Daily wage labourer | Tk. 1,131-3,000 | Tk. 1,201-3,000 | Tk. 1,281-3,000 |
| | Monthly salaried (fixed income) | | | |
| Upper Middle Income | Daily wage labourer | Tk. 3,001-4,000 | Tk. 3,001-4,000 | Tk. 3,001-4,000 |
| | Monthly salaried (fixed income) | | | |
| High Income | Daily wage labourer | >Tk. 4,000 | >Tk. 4,000 | >Tk. 4,000 |
| | Monthly salaried (fixed income) | | | |

**Note:** Different groups are defined in terms of per capita income by adjusting ratio of population under each category (particularly poor) based on HIES 2010.

Table A.2

**Food Basket**

| | | Day labourer households | | | | Fixed Income households | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Poor | Lower middle income | Upper middle income | Higher income | Poor | Lower middle income | Upper middle income | Higher income |
| Rural | Rice-fine | 0.68 | 0.83 | 0.94 | 1.22 | 0.77 | 0.88 | 0.62 | 1.37 |
| | Rice medium | 6.21 | 3.85 | 16.62 | 11.24 | 43.80 | 20.30 | 44.49 | 30.36 |
| | Rice-coarse | 34.18 | 28.18 | 19.26 | 15.82 | 18.59 | 21.28 | 9.61 | 10.04 |
| | Total | 41.07 | 32.86 | 36.82 | 28.28 | 63.16 | 42.46 | 54.72 | 41.77 |
| Urban | Rice-fine | 0.38 | 0.43 | 0.63 | 0.58 | 0.74 | 0.84 | 1.23 | 1.73 |
| | Rice medium | 15.60 | 15.13 | 19.32 | 16.21 | 19.87 | 18.82 | 17.87 | 14.93 |
| | Rice-coarse | 24.64 | 18.49 | 9.82 | 6.42 | 13.74 | 7.82 | 5.60 | 2.42 |
| | Total | 40.62 | 34.04 | 29.77 | 23.21 | 34.35 | 27.48 | 24.70 | 19.07 |

Table A.3
**Percentage Distribution of Households According to Income Groups**

|  | Rural | Urban | Total |
|---|---|---|---|
| Poor | 32.86 | 23.45 | 30.33 |
| Lower middle income | 41.07 | 39.12 | 40.55 |
| Upper middle income | 8.82 | 11.07 | 9.42 |
| Higher income | 17.25 | 26.37 | 19.7 |

**Note:**    For definition of income groups, see text.
**Source:** HIES 2010.

Table A.4
**Percentage Distribution of Profession/Occupation of Day Labourers**

|  | Poor | Lower middle income | Upper middle income group | Higher income | Total |
|---|---|---|---|---|---|
| **A. RURAL** | | | | | |
| Agriculture (code: 61) | 49.73 | 50.25 | 49.82 | 50.17 | 50.02 |
| Food/beverage (code:77) | 2.44 | 1.28 | 1.79 | 1.33 | 1.74 |
| Carpenter (code:81) | 3.14 | 3.59 | 3.58 | 5.33 | 3.65 |
| Smith/parts manufacturer (code: 83) | 1.89 | 1.79 | 1.79 | 2.44 | 1.91 |
| Technical/professional worker (code: 19) | 2.36 | 2.31 | 4.30 | 2.00 | 2.44 |
| Driver/conductor (Code: 36) | 8.80 | 8.58 | 7.89 | 8.22 | 8.56 |
| Unclassified service provider (code: 59) | 5.66 | 7.24 | 5.02 | 6.22 | 6.37 |
| Not engaged in any particular activity | 9.19 | 7.69 | 11.11 | 9.56 | 8.73 |
| Others | 16.81 | 18.31 | 14.89 | 16.45 | 17.27 |
| **B. URBAN** | | | | | |
| Agriculture (code: 61) | 19.82 | 20.91 | 20.35 | 19.12 | 20.18 |
| Technical/professional worker (code: 19) | 4.20 | 5.91 | 6.19 | 5.39 | 5.32 |
| Transport supervisor | 2.10 | 1.36 | 0.00 | 1.96 | 1.56 |
| Driver/conductor (Code: 36) | 16.22 | 17.27 | 16.81 | 17.65 | 16.97 |
| Sells person | 9.01 | 4.55 | 2.65 | 3.43 | 5.50 |
| Unclassified service provider (code: 59) | 8.71 | 7.27 | 6.19 | 8.82 | 7.89 |
| Weaver (code: 75) | 2.10 | 1.82 | 3.54 | 1.96 | 2.11 |
| Carpenter (code:81) | 6.61 | 4.55 | 7.08 | 3.92 | 5.32 |
| Not engaged in any particular activity | 7.51 | 9.09 | 10.62 | 8.33 | 8.62 |
| Others | 23.72 | 27.27 | 26.55 | 29.41 | 26.51 |

**Source:** HIES 2010, BBS.

Table A.5
**Distribution of Profession/Occupation of Fixed Income Groups**

| | Poor | Lower middle income | Upper middle income group | Higher income | Total |
|---|---|---|---|---|---|
| **A. RURAL** | | | | | |
| Not engaged in any particular activity | 17.70 | 12.87 | 10.98 | 11.38 | 13.69 |
| Teacher | 11.09 | 8.19 | 7.51 | 8.40 | 8.97 |
| Professional/technical worker | 2.99 | 2.78 | 2.89 | 3.79 | 3.07 |
| Clerk | 3.41 | 3.51 | 2.89 | 1.36 | 2.95 |
| Driver/conductor | 3.20 | 4.24 | 4.05 | 3.25 | 3.72 |
| Sells person | 5.54 | 6.29 | 5.20 | 6.50 | 6.02 |
| Security guard | 4.05 | 4.09 | 8.67 | 2.17 | 4.13 |
| Agriculture | 21.32 | 13.30 | 9.83 | 5.15 | 13.39 |
| Tailor | 2.77 | 4.53 | 6.36 | 5.69 | 4.48 |
| Others | 27.93 | 40.20 | 41.62 | 52.30 | 39.59 |
| **B. URBAN** | | | | | |
| Not engaged in any particular activity | 11.41 | 14.81 | 18.02 | 10.33 | 13.16 |
| Teacher | 9.78 | 10.32 | 18.02 | 13.33 | 12.02 |
| Professional/technical worker | 4.89 | 2.91 | 5.41 | 2.33 | 3.39 |
| Clerk | 4.89 | 3.44 | 0.90 | 8.33 | 4.93 |
| Driver/Conductor | 4.35 | 4.23 | 1.80 | 4.33 | 4.01 |
| Manager(retail/wholesale business) | 2.72 | 3.17 | 1.80 | 4.00 | 3.19 |
| Insurance/real-estate sales person | 3.80 | 2.65 | 4.50 | 3.67 | 3.39 |
| Unclassified sells person | 10.33 | 9.79 | 5.41 | 5.00 | 7.91 |
| Security guard | 2.17 | 3.17 | 0.90 | 3.00 | 2.67 |
| Unclassified service provider | 3.26 | 3.17 | 1.80 | 3.67 | 3.19 |
| Agriculture | 8.15 | 2.91 | 0.00 | 1.33 | 3.08 |
| Weaver | 2.17 | 1.85 | 2.70 | 2.33 | 2.16 |
| Tailor | 2.17 | 1.85 | 1.80 | 0.33 | 1.44 |
| Others | 29.89 | 35.71 | 36.94 | 38.00 | 35.46 |

**Note:** For definition of income groups, see text.
**Source:** HIES 2010.

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