

AGRICULTURAL TRADE LIBERALISATION AND GROWTH IN INCOME OF RURAL HOUSEHOLD IN BANGLADESH: A QUINTILE-GROWTH APPROACH TO THE ANALYSIS OF DISTRIBUTIONAL CONSEQUENCES

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ABSTRACT: *The study has investigated the growth in income of rural households in Bangladesh with a view to analysing distributional consequences in the post-liberalisation era. Using data from secondary sources, it has applied a quintile-growth approach by dividing each group of households into five income clusters (quintiles) to analyse the incidence of growth in real income. It has found that although all groups of rural households experienced a moderate to high increase in real income, non-farm households experienced a larger increase than farm households due to a large reduction in consumer price. Farm households gained from the increase in productivity but experienced losses from producer price reduction. The two opposite forces – increase in productivity and reduction in producer price – offset the effects of each other, thereby affecting the income growth of farm households. Amongst the farm households, large and medium farmers gained the most and small farmers gained the least from the growth in real income, indicating that rich households experienced a much higher increase in real income than poor households – thereby adversely affecting the distribution of income and widening the income gap between rich and poor households. These findings demonstrated that while agricultural trade liberalisation benefited rural households generally, the benefits were not distributed equally and in fact, inequality increased amongst rural households. This study argues that the growth in real income of rural household was not pro-poor during 1985–86 to 2005. This study suggests that agricultural trade liberalisation contributed to higher growth in the rural economy but it contributed to greater inequality in income distribution amongst the rich and poor income groups (quintiles). Government should reduce inequality through policy interventions with income transfer from the rich to the poor.*

Key words: *Agricultural trade liberalisation, growth in income, inequality, rural households, Bangladesh*

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1. INTRODUCTION

Bangladesh went through a series of deregulation and agricultural trade liberalisation measures in the late 1980s and early 1990s with a view to increasing productivity in agriculture and achieving self-sufficiency in food-grain production. Major reforms in agricultural policy included liberalisation of input markets, shrinking the role of government agencies in distribution of inputs, substantial reduction and rationalisation of tariffs, removal of quantitative restrictions, moving from multiple to a unified exchange rate, and from fixed to a flexible exchange rate system (Ahmed *et al.*, 2007: 9; Ahmed and Sattar, 2004: 11, 12; Hoque and Yusop, 2010: 39; Hossain and Verbeke, 2010: 78; Islam and Habib, 2007: 4; Moazzem *et al.*, 2012: 9; Salim and Hossain, 2006: 2569). Agricultural trade liberalisation generated significant impacts on major structural reforms and technological transformation in rice production, enabling the country to achieve self-sufficiency in food-grain production in the early 1990s (Ahmed and Sattar, 2004: 19; Faroque *et al.*, 2013: 2; Islam and Habib, 2007: 4; Klytchnikova and Diop, 2006: 3).

Despite this impressive growth performance, the rate of decline in the incidence of poverty over the two decades 1990-2010 was rather insignificant. The decline in poverty was an average of less than 1 percent (over the twenty-year period), leaving poverty at a remarkably high level – with more than 40 percent of the country's population and the majority of them in rural areas (Ahmed and Sattar, 2004: 18; BBS, 2007b: 57; Klytchnikova and Diop, 2006: 2; Ministry of Finance, 2010: 177). Thus, a significant question arises – to what extent has agricultural trade liberalisation influenced the income distribution (welfare) of rural households in Bangladesh? Therefore, the focus of this study is to examine the growth in real income of rural households in the post-liberalisation era.

The following sections include agricultural trade liberalisation scenarios in Bangladesh, literature review, methodology and research design, result discussion and analysis, and conclusion.

2. AGRICULTURAL TRADE LIBERALISATION SCENARIOS IN BANGLADESH

Like many other developing countries in the world, Bangladesh had pursued inward-looking policies and strategies for trade and development since its independence in 1971. These policies involved high government interventions in almost all economic activities including agriculture (Ahmed, *et al.*, 2007: 2, 7; Draper and Sally, 2005: 3; Hoque and Yusop, 2010: 1; Rahman, 2008: 5). Bangladesh encouraged cooperative farming with a view to developing a socialist system of agriculture during the 1970s. The government controlled the procurement and distribution of seeds, fertilisers, pesticides, irrigation equipment and all other agricultural inputs (Ahmed, *et al.*, 2007: 2, 7; Ahmed and Sattar, 2004: 11; Salim and Hossain, 2006: 2568).

The government adopted import substitution policies with restrictions on imports to protect and support domestic production. It controlled the foreign trade and exchange

rate system for making interventions effective (Ahmed and Sattar, 2004: 11; Krueger, 2010: 2; Nahar and Siriwardana, 2009: 327; Salim and Hossain, 2006: 2568). A series of measures including quantitative restrictions, highly differentiated tariff rates (ranging from 0 to 400 percent), huge production subsidies, and overvalued exchange rates were put in place to protect domestic production from world competition (Ahmed, *et al.*, 2007: 7; Ahmed and Sattar, 2004: 11; Nahar and Siriwardana, 2009: 327; Salim and Hossain, 2006: 2568).

The government reinforced this protective environment with domestic market policy interventions in the form of credit ceilings, price controls, and arbitrary licensing such as import licence. These licences were granted only when there was no domestic source of supply available (Ahmed, *et al.*, 2007: 19; Islam and Habib, 2007: 10, 14; Krueger, 2010: 2; Salim and Hossain, 2006: 2568). Moreover, traditionally, a government department – the Bangladesh Agricultural Development Corporation (BADC) – had the sole authority and responsibility for procurement and distribution of agricultural inputs including fertilisers, irrigation equipment, pesticides and seeds (Ahmed, *et al.*, 2007: 19, 21; Islam and Habib, 2007: 10, 14; Rahman, 2008: 13; Salim and Hossain, 2006: 2568).

However, these inward-oriented trade policies were not successful in terms of trade expansion as well as import substitution. These policies did not result in a sustained increase in production and productive efficiency. Rather, the gap between demand for and supply of agricultural goods widened over the years (Ahmed, *et al.*, 2007: 7; Hoque and Yusop, 2010: 39; Salim and Hossain, 2006: 2568). With a growing dissatisfaction regarding inward-looking trade and development policies, the sustainability of the government interventions towards long-term food-grain availability was questioned due to the increased inefficiency and corruption in the public management system and the heavy budgetary burden imposed by these operations (Ahmed, *et al.*, 2007: 6, 7; Dorosh and Shahabuddin, 2002: 38; Hoque and Yusop, 2010: 39; Krueger, 2010: 5; Salim and Hossain, 2006: 2569).

Realising such inefficiencies as well as constant pressures from the donor countries and international development agencies such as the World Bank and the IMF, the government started to pursue a policy-shift from state intervention to more market-oriented policies in the mid 1980s with a view to achieving high economic growth and reducing poverty (Ahmed, *et al.*, 2007: 9; Hoque and Yusop, 2010: 39; Hossain and Verbeke, 2010: 78; Islam and Habib, 2007: 3; Nahar and Siriwardana, 2009: 327; Rahman, 2008: 11; Salim and Hossain, 2006: 2567, 2569). Deregulation and agricultural trade liberalisation generated a momentum that began in the late 1980s and peaked in the early 1990s. Major reforms in agricultural policy included liberalisation of input markets, shrinking the role of government agencies in distribution of inputs, substantial reduction and rationalisation of tariffs, removal of quantitative restrictions, moving from multiple to a unified exchange rate, and from fixed to a flexible exchange rate system (Ahmed, *et al.*, 2007: 9; Ahmed and Sattar, 2004: 11, 12; Hoque and Yusop, 2010: 39; Hossain and Verbeke, 2010: 78; Islam and Habib, 2007: 4; Salim and Hossain, 2006: 2569).

Similarly, the government pursued a wide range of policy reforms to liberalise agricultural input markets including privatisation of the distribution system of key agricultural inputs, initiatives for deregulation measures to improve the investment climate for private enterprises, gradual elimination of subsidies on fertilisers and small irrigation equipment, and improving the maintenance of agricultural equipment through encouraging participation of the private sector (Ahmed, 2004: 11, 12; Ahmed, *et al.*, 2007: 9; Klytchnikova and Diop, 2006: 3; Salim and Hossain, 2006: 2569).

As a consequence of these reforms, the fertiliser trade was almost entirely handled by the private sector in 2005 (Ahmed, *et al.*, 2007: 19, 20; Ahmed and Sattar, 2004: 13, 19; Klytchnikova and Diop, 2006: 3; Salim and Hossain, 2006: 2569). Further policy reforms included rationalisation or elimination of import duties on agricultural inputs and spare parts; elimination of the government monopoly in fertiliser imports; and abolition of standardisation requirements (Ahmed, *et al.*, 2007: 19, 20; Ahmed and Sattar, 2004: 13, 19; Klytchnikova and Diop, 2006: 3; Salim and Hossain, 2006: 2569).

There were encouraging responses to these liberalisation and reform initiatives from market forces. Therefore, the private sector participation in the input market rose sharply. Irrigation equipment became cheaper and farmers had easy access to the equipment. Different types of high yielding variety (HYV) seeds were available to farmers, thereby promoting both extensive and intensive cultivation by increasing the irrigated area and use of fertilisers (Klytchnikova and Diop, 2006: 3; Salim and Hossain, 2006: 2569).

Consequently, agricultural trade liberalisation generated significant impacts on economic growth through productivity improvement in the agricultural sector. It contributed to technological innovation in agriculture, leading to productivity improvement of agricultural inputs (Ahmed and Sattar, 2004: 19; Islam and Habib, 2007: 4; Klytchnikova and Diop, 2006: 3). The reform measures – including liberalisation of the input markets for fertilisers, pesticides, and irrigation equipment and adoption of high yielding variety seeds for rice production – led to major structural reforms and technological transformation, resulting in a significant increase in productivity and growth in the agricultural sector. Technological changes in agricultural production enabled the country to achieve self-sufficiency in food-grain production in the early 1990s (Ahmed and Sattar, 2004: 19; Islam and Habib, 2007: 4; Klytchnikova and Diop, 2006: 3). The rising volume of rice production was accompanied by a decline in rice prices during 1990-2009. Moreover, because of significant structural transformation and technological changes, productivity of this sector was at its highest level (BBS, 2009: 3; Klytchnikova and Diop, 2006: 2; Ministry of Finance, 2010: 84).

These structural transformations reflected the government's efforts to open the economy, liberalise agricultural trade and reform domestic markets in the 1980s and 1990s (Ahmed and Sattar, 2004: 12; Klytchnikova and Diop, 2006: 2). They enabled the economy to achieve a significant growth in the 1990s – increase in real GDP by an average of 4.2 percent per year and significant increases in agricultural production (Klytchnikova and Diop, 2006: 2; Salim and Hossain, 2006: 2570).

3. LITERATURE REVIEW

Advocates of trade liberalisation argue that agricultural trade liberalisation will expand the small domestic market, provide access to foreign direct investment, create greater competition, facilitate technology transfer, generate marketing networks, and provide much-needed technical and managerial skills, resulting in higher economic growth (Annabi *et al.*, 2006: 4; Henry *et al.*, 2009: 237; McCulloch *et al.*, 2003: 15, 16; Stone and Shepherd, 2011: 5; Zhang, 2008: 175). They argue that agricultural trade liberalisation contributes to higher economic growth through technological transformation and productivity improvement and thereby reduces poverty. However, there has been a substantial debate on welfare gains and losses from economic growth resulting from technological transformation as a consequence of agricultural trade liberalisation. This debate is much more about distributional consequences and welfare implications than net gains and net losses (DFID, 2004: 10; Mendola, 2007: 373; Orden, 2006: 378; Pyakuryal *et al.*, 2010: 20, 31; San Vicente Portes, 2009: 945). The distributional impact of this growth can be mixed despite the extensive spread of technological transformation in agriculture. Even where agriculture retains comparative advantage, the liberalisation of trade raises questions about the pro-poor effects of agricultural productivity improvement due to issues related to income distribution (Acharya, 2011: 61; Acharya and Cohen, 2008: 1057; Gabre-Madhin *et al.*, 2002: 1; Gerard and Piketty, 2007: 2; Keleman, 2010: 13; Rakotoarisoa, 2011: 147). Therefore, the effect of agricultural trade liberalisation on welfare is highly contested in the development economics literature (Cassel and Patel, 2003: 6; Keleman, 2010: 13; Rakotoarisoa, 2011: 147; Sexton *et al.*, 2007: 253).

The first fundamental theorem of welfare economics argues that subject to certain exceptions – such as externalities, public goods, economies of scale and imperfect competition – every competitive-equilibrium is Pareto-optimal. Similarly, the second fundamental theorem states that every Pareto-optimal allocation of resources can be realised as the outcome of competitive equilibrium after a lump-sum transfer of claims on income (Blaug, 2007: 185; Bliss, 1987: 27; Greenwald and Stiglitz, 1986: 230; Krugman and Obstfeld, 2006: 225; Stiglitz and Charlton, 2007: 28, 29; Tribe *et al.*, 2010: 186). In fact, Pareto-optimality may not be achieved in the farm sector in the sense that agricultural trade liberalisation may affect some groups of rural households adversely despite the gains from this process by other groups. Moreover, perfect competition may not exist in the agriculture of developing countries due to market failure in the form of some externalities.

Although many studies indicated that agricultural trade liberalisation had made a significant contribution to economic growth through technological transformation in the agricultural sector, understanding the process of pro-poor economic growth and explaining the vast differences in economic performance across countries have been fundamental challenges for researchers as well as for policy makers (Chiquiar, 2008: 71; Gerard and Piketty, 2007: 2; Henry, *et al.*, 2009: 72; Kong, 2007: 1; Topalova, 2010: 3). One of the main reasons for the lack of empirical consensus on growth determinants relates to model specification, the choice of control variables and measurement shortcomings

(Acharya, 2011: 61; Achterbosch and Roza, 2007: 33, 34; Daniel and Perraud, 2009: 133; Durlauf et al., 2008: 2; Narayanan *et al.*, 2010: 755).

The impact of agricultural trade liberalisation on the welfare of rural households depends on not only how income is distributed to them but also what happens to average living standards of rural households. Even the same level of productivity growth may result in various levels of poverty reduction in different countries depending on their respective policies and income distribution (Chang *et al.*, 2009: 2; Duncan and Quang, 2003: 14; Ravallion, 2004: 12; Winters *et al.*, 2004: 107, 108). Ravallion (2004) argued that it should point to implications for policies that would be needed for rapid poverty reduction, in addition to promoting higher growth. He suggested that two sets of factors could be identified as the main proximate causes of the differing rates of poverty reduction at given rates of growth – the initial level of inequality, and how inequality changes over time. The higher the initial inequality in a country, the less is the gain from growth that tends to be shared (Orden, 2006: 379; Ravallion, 2004: 12; San Vicente Portes, 2009: 946; Susila and Bourgeois, 2008: 72, 76).

One of the key issues raised repeatedly in development economics is the mechanism through which an economy can grow fast and at the same time can lead to a more productive use of underutilised resources (Duncan and Quang, 2003: 6; Nissanke and Thorbecke, 2007: 2; Ruda, 2007: 711; Susila and Bourgeois, 2008: 75). This is another way of saying that development economics and good development strategies are about identifying technological transformations that lead to higher economic growth while simultaneously contributing to a decline in the numbers of underemployed and unemployed workers – ultimately accelerating poverty reduction (Duncan and Quang, 2003: 6; Nissanke and Thorbecke, 2007: 2; Ruda, 2007: 711; Susila and Bourgeois, 2008: 75).

Agricultural growth may reduce poverty through direct effects on farm productivity, incomes, and employment. It may also generate indirect impacts on the welfare of rural households through the growth linkage with the non-farm sector as well as through its impacts on food prices (Adeoti and Sinh, 2009: 6; Bezemer and Headey, 2008: 1343; Byerlee *et al.*, 2005: 4; Popli, 2010: 803; Thirtle *et al.*, 2001: 11; Valenzuela *et al.*, 2005: 1). There have been arguments that the poor typically spend a high share of their income on staple food; therefore, they benefit from a decline in the price of staple food induced by productivity improvement as a result of agricultural trade liberalisation. Benefits are greater for the urban poor and landless rural labourers since they are net food purchasers (Adeoti and Sinh, 2009: 6; Bezemer and Headey, 2008: 1343; Byerlee, *et al.*, 2005: 5).

Although agricultural trade liberalisation may improve productivity through technological innovation, this growth may not be pro-poor (Meijerink and Roza, 2007: 11; Popli, 2010: 803, 811; Ravallion, 2003: 15; 2009: 28, 29). However, some studies such as Byerlee, Diao and Jackson (2005), Winters, McCulloch and McKay (2004), and Bezemer and Headey (2008) argued that interaction of productivity growth, farm income, employment, and food prices could lead to a pro-poor outcome depending on two key condi-

tions. Firstly, agricultural productivity per unit of labour must increase to raise farm income, but agricultural productivity per unit of land must increase at a faster rate than that of labour in order to raise employment and rural wages. Secondly, increased total factor productivity (TFP) in agriculture must result in a decrease in real food prices, but the TFP must increase faster than food prices decrease for farm profitability to rise and for poor consumers to benefit from lower food prices.

Based on conventional wisdom, Anderson (2004) argued that higher economic growth would contribute to greater reduction in poverty; and aggregate economic growth differences were largely responsible for the differences in poverty alleviation across regions. He argued that initiatives to boost economic growth were, therefore, likely to be helpful in poverty reduction. Agricultural trade liberalisation is such an initiative that tends to boost economic growth through enhancing productivity of agricultural inputs. However, it may also alter relative product prices, which in turn may affect factor prices (Anderson, 2004: 1; Burstein and Vogel, 2011: 25; Topalova, 2010: 3; Xu, 2003: 417). Hence, the net effect of agricultural trade liberalisation on income distribution also depends on the directions of those domestic product price changes and, in turn, how they affect domestic factor prices. It is argued that if the price changes are pro-poor, then they will tend to reinforce any positive-growth effects of agricultural trade reform on the poor. Moreover, the outcome of this reform also depends on complementary pro-poor domestic policies (Anderson, 2004: 2; Meijerink and Roza, 2007: 12; Susila and Bourgeois, 2008: 75).

While trade liberalisation has facilitated agricultural growth through diffusion of modern technology and knowledge, the agro-pessimists argue that the contribution of agriculture to development is passive. Conversely, agro-pragmatists argue that agriculture has a significant role in growth as well as in poverty reduction. However, agricultural trade liberalisation may worsen the conditions of the poor in the form of higher prices due to the price of food in liberalised markets being determined more by world prices than by domestic productivity. This is because many governments of developing countries use control over external trade to hold domestic food prices below world prices (Anderson *et al.*, 2011: 1, 2; Byerlee, *et al.*, 2005: 8; Huylenbroeck *et al.*, 2007: 3; Keleman, 2010: 13, 26). Similarly, technological transformation as a result of agricultural trade liberalisation is sometimes seen as a source of impoverishment in the form of loss of employment leading to an increase in poverty because it is associated with a process of creative destruction. In this process, jobs and livelihoods are destroyed in some sectors whilst being created in others. Therefore, there may be some gainers as well as some losers resulting from agricultural trade liberalisation (Banerjee and Newman, 2004: 16; Gore, 2007: 31; OECD, 2011: 12; Susila and Bourgeois, 2008: 74, 75).

Kompas (2004) and Isik-Dikmelik (2006) found that agricultural trade liberalisation positively influenced the productivity of rice in Vietnam. However, the productivity slowed in the post-liberalisation period due to falls in the price of rice and slow increases in input prices. Large farmers exhibited more productivity and efficiency than

small farmers, suggesting the need for additional agricultural reforms to augment productivity. Yu and Nin-Pratt (2011) found that agricultural trade liberalisation positively influenced structural transformation in the input and output markets of agriculture in Sub-Saharan Africa, thereby contributing to productivity growth in the post-liberalisation era. They found that this growth was not sustainable due to the small contribution of technological change to productivity of agriculture. Yoo *et al* (2012) found that South Korean agriculture experienced a significant productivity growth resulting from trade liberalisation, and agricultural research and extension. They found that the elasticity of productivity growth with respect to trade openness was significantly larger in the post-reform period than that in the pre-reform period. They argued that Korean consumers also gained from trade reforms and productivity growth in the form of lower output prices.

Many studies have attempted to shed light on productivity of agriculture and income distribution in Bangladesh. Some of these major studies on this effect include: Rice Price Stabilization on Bangladesh: An Analysis of Policy Options (Dorosh and Shahabuddin, 2002); Trade Liberalisation and the Crop Sector in Bangladesh (Hossain and Deb, 2003); Poverty Alleviation Through Agriculture and Rural Development in Bangladesh (Hossain, 2004); Market Deregulation, Trade Liberalisation and Productive Efficiency in Bangladesh Agriculture: An Empirical Analysis (Salim and Hossain, 2006); Trade Reforms, Farm Productivity, and Poverty in Bangladesh (Klytchnikova and Diop, 2006); Impact of Shallow Tube-wells and Boro Rice on Food Security in Bangladesh (Hossain, 2009); Evaluation of Rice Markets Integration in Bangladesh (Hossain and Verbeke, 2010); and Welfare Impact of Policy Interventions in the Foodgrain Markets in Bangladesh (Alam *et al.*, 2011). However, these studies did not attempt to analyse growth in real income of different groups of rural households (distributional consequences) in the post-liberalisation era, which is the main focus of this study.

3. METHODOLOGY AND RESEARCH DESIGN

3.1 Data and Post-liberalisation Period

The study used secondary data on household income mainly from two household surveys of the Bangladesh Bureau of Statistics (BBS) including *Household Income and Expenditure Survey (HHIES) 2005* (BBS, 2007b), and *Household Expenditure Surveys (HHES) 1985-86* (BBS, 1988). It has selected 1985-86 as a the base year because of availability of data as well as the substantial agricultural trade liberalisation in the late 1980s. Similarly, it has selected 2005 as the current year due to availability of the latest household survey data. Therefore, changes in household income is measured using data of *HHES 1985-86* as the base year and data of *HHIES 2005* as the current year.

The study encountered limitations in the use of secondary data due to a lack of disaggregation. The aggregate data approach uses summaries and thus cuts out much variation, resulting in higher correlations than with disaggregated data. In HHIES 2005, all

households were aggregated under 19 income or expenditure groups. For the purpose of regression and poverty analyses, this study overcame this limitation by disaggregating household data into 100 observations using respective household groups' weight (percentage share) as the basis for disaggregation. For instance, in HHIES 2005, households having income between TK3000 and TK3999 represented 14.87 percent of the total households (BBS, 2007b) and they were disaggregated into 15 observations (households) having similar distance of income between two observations. This disaggregation is based on the assumption that keeping the same average income-distance between two observations will not change the original characteristics of the data.

The study has also conducted a *Data Exploratory Analysis* to identify outliers. Two outliers were found in the data set of HHES 1985-86 and these outliers were dropped from this data set. However, no outlier was found with the data set of HHIES 2005.

The study also used primary data (Household Survey 2010, conducted by the authors) as complementary to secondary data. It applied a mixed method research design in primary data collection. Questionnaire and face-to-face interview techniques were used for collecting primary data. A structured survey questionnaire was designed with both closed-ended and open-ended questions. Therefore, the datasets included both quantitative (closed-ended) information through using a closed-ended checklist and qualitative (open-ended) information through interviews with participants. The choice of this method was warranted to achieve the objectives of the study.

The household head or a senior person of the household who had access to information of all household members answered this structured interview questionnaire. I conducted this structured interview through asking participants the questions and writing their answers. If a participant did not have information about all members of the household, the participant was not requested to participate in the survey.

The study used both probability and non-probability sampling methods for field survey to collect primary data. Using *convenience* and *judgment sampling*, non-probability sampling methods (Bartlett-II et al., 2008: 47), it selected Comilla amongst the sixty-four districts of Bangladesh for conducting the field survey. According to the Bangladesh Bureau of Statistics (BBS, 2007a), there are thirteen upazilas (sub-districts) in the Comilla district. They are: 1) Barura, 2) Brahmanpara, 3) Burichang, 4) Chandina, 5) Chauddagam, 6) Daudkandi, 7) Debidwar, 8) Homna, 9) Comilla Sadar, 10) Laksam, 11) Meghna, 12) Muradnagar, and 13) Nangalkot.

The study selected Comilla Sadar Upazila, then Chouara Union from that upazila and finally Shrimontapur village from that union for conducting the field survey. Based on cluster sampling, the households of the selected village were divided into three clusters (A, B and C) and then, using the random sampling technique, the cluster C was selected for the field survey. The study surveyed all 60 households from this cluster. Therefore, the sample size of this survey was 60 households of that village. The details of observations are presented in Table 1.

Table 1: *Distribution of observations by household types: HHS 2010*

Households	Observations
Total	60
Farm	52
Non-farm	8
<i>Distribution of Farm- households</i>	
1. Farmer	38
2. Agricultural labourer:	14
<i>Distribution of Farmers</i>	
1. Small farmer	30
2. Medium farmer	7
3. Large farmer	1

If a participant did not have information about all members of the household, the participant was not requested to participate in the survey. Therefore, all 60 observations for all questions were found correct/valid and no sample was dropped from the original data set. The study also conducted a *Data Exploratory Analysis* to identify outliers and no outlier was found in this data set.

3.2 Changes in Rice Prices and Household Income

The study considered rice as the representative of agriculture, thereby, considering changes in the rice price for analysing the impact of agricultural trade liberalisation on the real income of rural households for two main reasons. Firstly, agricultural trade liberalisation influenced rice production significantly: agricultural trade liberalisation directly impacted on new technology for rice production (such as irrigation, fertilisers, and high-yielding-varieties seeds). Secondly, rice is the major agricultural product in Bangladesh, capturing the largest share of the agricultural sector. It accounted for 75 percent of the total crop production value, 63 percent of total crop sales, and 75 percent of total cultivated area of the country in 2005 (Klytchnikova and Diop, 2006: 13). In addition, rice is the staple food in the economy. Therefore, any change in rice production and the price of rice impacts directly on the livelihoods and welfare of most households in the country.

The study focused on the impact of agricultural trade liberalisation on the changes in prices of agricultural products. Proponents of trade liberalisation argue that it is supposed to make the factors more competitive and efficient resulting in an outward or upward shift in rice production possibility frontier, leading to a downward (right) shift of supply function of rice. Given the demand function, a downward shift of the supply curve should push the domestic price down to settle at a new equilibrium point because rice is a non-exported good in Bangladesh as the government imposed restrictions on rice exports. Thus, the study explored the implications of the changes in price of rice by focusing on two types of prices, namely: producer price and consumer price.

The study deflated current year prices to base year prices by using the producer price index and the consumer price index from various statistical yearbooks of the Bangladesh Bureau of Statistics (BBS). It examined the effects of changes in producer and consumer prices of rice on the distribution of real income across different groups of rural households.

3.3 Analytical Techniques

The literature review showed that agricultural trade liberalisation could produce diverse welfare-impacts across rural households. Some households might have experienced benefits and others might have experienced losses. This is because agricultural trade liberalisation affects both goods and factor prices, which in turn affect household welfare in different ways, depending on their different characteristics (Nicita, 2009: 19).

All rural household groups were divided into five quintiles on the basis of income:

1. Bottom 20 percent (Quintile 1),
2. Lower middle 20 percent (Quintile 2),
3. Middle 20 percent (Quintile 3),
4. Upper middle 20 percent (Quintile 4), and
5. Top 20 percent (Quintile 5).

They were classified into two main groups on the basis of their involvement in farming activities, namely:

- a. Farm households, and
- b. Non-farm households.

Other classification included:

1. Farmers, who owned farm land, and
2. Agricultural labourers.

Farmers were further divided into three sub-groups based on their farm size (as used by the BBS during the Household Income and Expenditure Survey 2005, and Agricultural Sample Survey 2005):

- a. Small Farmers (0.05-2.49 acres),
- b. Medium farmers (2.50-7.49 acres), and
- c. Large farmers (7.5 acres and above).

Finally, households were classified on the basis of their participation in the rice market either as

1. Net buyers or
2. Net sellers.

The study applied the Deaton methodology to identify net seller and net buyer households. Deaton (1989) formalised the concept of net benefit ratio (NBR), which is a proxy for the net-trading position of a household, to estimate the first-order impacts of price

changes on household welfare. The net benefit ratio for a commodity is the difference between the production ratio (PR) (value of production as a proportion of income, or expenditure) and consumption ratio (CR) (value of consumption as a proportion of income, or expenditure) of that commodity. It is the proportion of net sales to income or expenditure and is approximated by the difference between income share of the commodity and consumption share of the commodity.

Following the Deaton's (1989) methodology, Klytchnikova and Diop (2006), and Isik-Dikmelik (2006) expressed as follows:

$$NB = (PR - CR) = \frac{p_i^p q_i}{X} - \frac{p_i^c y_i}{X};$$

where q_i is the production and y_i is the consumption, X is the total income and p_i^p and p_i^c are producer and consumer prices respectively. The NB is used to determine net seller and net buyer households.

3.4 Empirical Frameworks of the Study

3.4.1 Growth in Household Income

The study measured growth in real income by quintiles of the different groups of rural households. It measured the ordinary growth rate, pro-poor growth rate and growth rate in mean as defined and calculated by Ravallion and Chen (2003), and Ravallion (2004).

Ordinary Growth Rate (g_t):

$$g_t = \left(\frac{y_t - y_0}{y_0} \right) \times 100;$$

where y_t is the current year income and y_0 is the base year income.

Growth Rate at Quintile p :

$$g_t(p) = \left[\frac{y_t(p)}{y_{t-1}(p)} \right] - 1, \quad \text{with } p = 1, \dots, 5;$$

where p represents a quintile.

Growth Rate at Mean Income:

$$g_{t(avg)}(hh) = \left[\frac{y_{t(avg)}(hh)}{y_{t-1(avg)}(hh)} \right] - 1;$$

where (hh) represents a particular household group (such as small farmer, agricultural labourer, net seller etc.), $y_{t(avg)}(hh)$ is the average income of current period (t) for a par-

ticular group of household and $y_{t-1(avg)}(hh)$ is the average income of base period $t-1$ for a particular group of household.

Pro-poor Growth Rate:

$$g_t(pp) = \frac{1}{5} \sum_{i=1}^5 g_t(p_i);$$

where $g_t(p_i)$ represents the quintile growth rate of i th quintile for a particular group of rural households. In fact pro-poor growth rate is the mean of quintile growth rates.

3.4.2 Decomposition of Income Growth

The study presented the actual changes in each income source for all rural households by decomposing the growth in real income by sources. The sum of these changes constitutes the total growth in real income. The study has decomposed the growth in real income by six sources of income such as agriculture, wage and salary, business and commerce, house rent, gift-remittance-assistance, and other sources as divided by the Bangladesh Bureau of Statistics in HHES 1985-86 and HHIES 2005.

The study first measured the actual growth of each of these sources. Then it summed up all individual growth rates from all sources. It divided each source's growth rate by the summed-value of their total growth for calculating the weight of each source's growth to the total growth. The study multiplied the calculated weight of each source by the actual growth in mean income experienced by all rural households as a group. The decomposition of income growth by sources provided insights into the components of the actual income-growth experienced by rural households.

4. RESULT DISCUSSION AND ANALYSIS

4.1 Change in Prices of Rice and Household Income

Agricultural trade liberalisation contributed to the increase in productivity of rice, resulting in higher volumes of rice production during 1985-86 to 2005. Since the government put a ban on rice exports, the increased volume of rice production also increased the supply of rice in the domestic market, leading to a decrease in rice prices. An estimate using data from HHES-1985-86 and HHIES-2005 indicates that both producer and consumer prices of rice decreased during this period. The producer price declined by a total of 22.78 percent with an average of 1.14 percent per year and the consumer price decreased by 13.95 percent with an average of 0.70 percent per year over the same period as shown in Table 2. A decrease in the producer price implies a decline in welfare (income) of rice farmers whereas a decrease in consumer price suggests an increase in the welfare (income) of rice consumers. The magnitude of decrease in producer price is much greater

than the decrease in the consumer price, indicating that rice traders or intermediaries between producers and consumers gained largely from this liberalisation process.

Table 2: *Change in producer and consumer prices of rice during 1985-86 to 2005*

Price type	Total change (percent)	Average change per year (percent)
Producer price	-22.78	-1.14
Consumer price	-13.95	-0.70

Source: Authors' calculation using data from BBS HHES 1985-86 and HHIES 2005

A disproportionate decrease in producer and consumer prices of rice affected the income distribution and welfare of rural households in accordance with their involvement with the rice market. The change in welfare of rural households was reflected in their income, which is analysed in the following sections.

4.2 Real Income Growth and Distribution

The descriptive statistics of household income is presented in Table 3. All household groups experienced an increase in mean income but standard deviations for all groups of rural household income increased significantly in 2005 compared to their levels in 1985-86, indicating that there was a significant dispersion of household incomes from their respective mean – suggesting a larger inequality in income distribution.

Table 3: *Descriptive statistics: household income by household types, 1985-86-2005*

Household type	1985-86		2005	
	Mean (taka)	Std. Deviation	Mean (taka)	Std. Deviation
All rural households	2168.61	1359.93	6043.61	7122.08
Farm household	2479.70	1465.11	6559.09	8091.20
Non-farm household	1406.96	571.30	4718.07	3361.88
Large farmer	5236.80	3013.95	34950.00	27625.24
Medium farmer	4070.27	589.59	10899.14	7637.13
Small farmer	2252.07	541.56	4786.45	2581.47
Agricultural labourer	1148.41	322.11	2343.92	1258.38

Source: Authors' calculation using data from HHES 1985-86 and HHIES 2005

An increase in productivity of rice and simultaneously a decrease in the price of rice jointly affected the welfare of rural households through distribution of income. Although other factors might also have affected the growth in real income of rural households, agricultural trade liberalisation is the most important policy reform because of households' critical dependence on rice in terms of both income and consumption.

Table 4 shows the growth in real income of different groups of rural households during 1985-86 to 2005. All rural households as a group experienced an increase in growth of real income by an average of 2.74 percent per year. The non-farm households experienced a

higher increase in real income growth with an average of 4.33 percent per year than that of farm households with an average of 1.90 percent during the same period. This is arguably because agricultural trade liberalisation significantly impacted on the growth of the rural non-farm sector such as markets, rice mills, agricultural equipment repair workshops and transportation logistics through the multiplier effects in the post-liberalisation era.

Amongst the farm households, medium and large farmers experienced the highest income growth with an average of 2.68 percent per year. The annual average growth rate of real income for small farmers and agricultural labourers were 1.58 and 2.08 percent respectively. In terms of household involvement with the rice market, net buyers gained a much higher average growth in real income with an average of 3.56 percent per year than that of net sellers with an average of only 1.24 percent. Amongst all groups of rural households, small farmers experienced the least growth in real income. This is because the majority of small farmers are both sellers and buyers of rice. They sell rice during harvest (peak) seasons at the lowest price to repay loans and meet essential household expenditure, and then buy rice during lean seasons at the highest price to meet household rice consumption. There were remarkable seasonal variations in producer and consumer prices of rice. In 2005, it is estimated that the producer and consumer prices of rice varied by 18.87 and 10.01 percent respectively over the peak and lean seasons. The Household Survey (HHS)-2010 (conducted by the authors) revealed that small farmers sold rice during peak seasons. Amongst small farmers, 57 percent sold rice during the peak season, 7 percent during the lean season, 33 percent in the both peak and lean seasons but mostly in the peak season, and 3 percent in both seasons but mostly in the lean season. On the contrary, 67 percent of them were rice buyers and they bought rice only during lean seasons. Therefore, small farmers experienced loss in both cases of rice selling and buying. Compared to this scenario, 25 percent of large and medium farmers sold rice during lean seasons and 75 percent in both peak and lean seasons but mostly in lean seasons.

Amongst the poor farm households, agricultural labourers experienced a higher income growth than that of small farmers, even higher than that of all farm households. This situation suggests that they received higher real income during that period because they were net buyers of rice and they bought rice at a lower price because 100 percent of agricultural labourers were net buyers. The HHS-2010 revealed that 93 percent of them bought rice during both peak and lean seasons equally and 7 percent bought during peak seasons. Similarly, agricultural labourers enjoyed higher wages with greater opportunities of employment during 1990-2010. Amongst the agricultural labourers, 86 percent of respondents confirmed an increase in nominal wages and 100 percent opined that there was a greater opportunity for employment during this period than pre-liberalisation era. This result suggests that agricultural labourers experienced higher growth in real income through higher wages with higher opportunity for employment and lower rice prices. This is an indication that agricultural trade liberalisation generated greater opportunities for employment and income for agricultural labourers.

Non-farm households experienced a higher growth in real income with a lower consumer price of rice. According to the HHS-2010, amongst the non-farm households, 57 percent bought rice

during peak seasons at the lowest price of the year and 43 percent bought during both peak and lean seasons equally. This finding suggests that non-farm households, being net buyers, gained the most from the lower rice price amongst all groups of rural households.

From the quintile analysis in Table 3, it is clear that rich households experienced higher average growth in real income than poor households, irrespective of all groups of rural households. The first quintile (Q-1) represents the bottom 20 percent income group (the poorest) and the fifth quintile (Q-5) represents the top 20 percent income group (the richest) for each group of rural households. The rate of pro-poor growth represents the mean growth rate of income for all quintiles of a particular group of households. This rate is less than the growth rate of real income in mean for all groups of rural households, suggesting that income growth during 1985-86 to 2005 was not pro-poor.

Table 4: *Annual average growth in real income by household types during 1985-86 to 2005*

Household type	Quintile income growth rate (percent)					Average growth rate (percent)	
	Q-1	Q-2	Q-3	Q-4	Q-5	Rate of Pro-poor Growth (mean of quintile growth rates)	Growth rate in mean
All rural households	1.11	1.70	2.02	2.60	3.04	2.10	2.74
Non-farm household	2.06	3.00	3.25	3.68	6.12	3.62	4.33
Farm household	0.60	1.19	1.57	2.10	2.21	1.53	1.90
Agricultural labourer	0.57	1.14	1.46	1.89	3.20	1.65	2.08
Small farmer	0.90	1.27	1.70	1.89	3.42	1.83	1.58
Medium and large farmer	0.79	1.67	2.06	2.89	4.41	2.36	2.68
Net seller	-0.54	0.24	0.71	1.43	2.28	0.82	1.24
Net buyer	1.52	1.89	2.46	3.28	6.28	3.09	3.56

Source: Authors' calculation using data from HHES 1985-86 and HHIES 2005

The growth in real income experienced by different groups of rural households can also be presented with growth incidence curves. The growth incidence curve demonstrates the growth in real income by quintile and presents the distribution of growth in income for different household groups as shown in Figure 1. Growth incidence curves revealed that all rural households experienced moderate to high-income growth during 1985-86 to 2005. The poor households for all groups of the rural communities experienced a lower growth in real income than the average growth rate of their own particular household groups, indicating that the poor benefited less than the rich from agricultural trade liberalisation. Similarly, income growth of the poorest farm households (lowest quintile) is much lower than the average income growth of the lowest quintile (the poorest) of non-farm households and a lower than the average income growth of all rural households as a group. This evidence suggests that agricultural trade liberalisation benefited non-farm households more than farm households. For the same reason, net-buyers gained more than net-sellers from these policy reforms. Small farmers experienced an even distribution of income growth more than any other groups of rural households because of their homogenous and non-diversified income from rice and a similar pattern of involvement

with the rice market – most of them sell rice during harvest seasons at lower producer prices and buy rice during lean seasons at higher consumer prices.

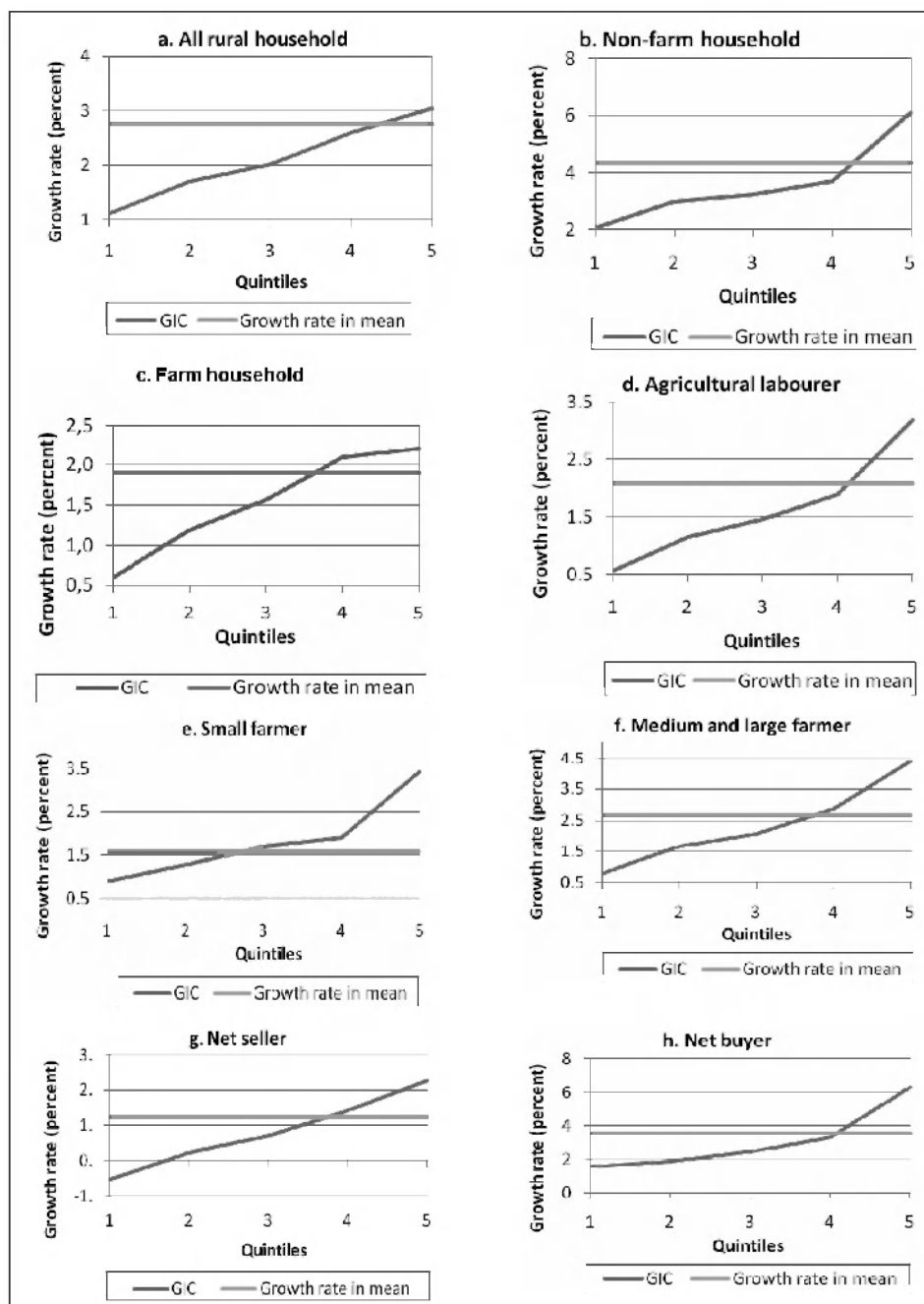


Figure 1: *Growth Incidence Curves (GIC) – real income growth rate: 1985-86 to 2005*

4.4 Decomposition of Income Growth

The above finding is reinforced by the results of a decomposition of growth in real income – an illustration of the importance of the growth links during 1985-86 to 2005. The decomposition of income growth for different groups of rural households is presented in Table 5. The contribution of each source of income is presented in such a way that their sum equals the total income growth experienced by different income groups of rural households by quintile income distributions. During 1985-86 to 2005, out of 2.74 percent of average real income growth in mean for all rural households, wage and salary contributed the highest by an average of 0.81 percent followed by business-commerce with a contribution of 0.76 percent to the real income growth in mean. Although agriculture is the largest income component of rural households, the contribution of agriculture to this income growth was only 0.62 percent, indicating that the income growth of rural households was mainly attributed to non-agricultural components. The share of income from gift-remittance-assistance was the largest contributor to income growth for poor households (Q-1, Q-2, and Q-3) whereas wage-salary and business-commerce played an important role in the income growth of rich households (Q-4 and Q-5). Considering agricultural contribution, rich households (Q-4 and Q-5) experienced higher income growth from agriculture than poor households (Q-1, Q-2, and Q-3). The contribution of agriculture to the growth in real income of rural households might be attributed to the improved productivity of rice resulting from agricultural trade liberalisation because the households' share of agricultural income in rural areas was dominated by income from rice.

Table 5: *Decomposition of annual average growth in real income by sources: 1985-86 to 2005*

Sources	Growth rate in mean (%)	Growth rate in quintiles (%)				
		Q-1	Q-2	Q-3	Q-4	Q-5
All rural households	2.74	1.11	1.70	2.02	2.60	3.04
Agriculture	0.62	0.02	0.19	0.27	0.53	0.73
Wage and salary	0.81	0.13	0.51	0.61	0.92	1.09
Business and commerce	0.76	0.01	0.17	0.45	0.75	0.81
House rent	0.05	-0.01	0.01	-0.02	0.01	0.10
Gift, remittance and assistance	0.34	0.95	0.63	0.65	0.14	0.16
Other sources	0.17	0.01	0.19	0.06	0.25	0.17

Source: Authors' calculation using data from BBS HHES 1985-86 and HHIES 2005

5. A COMPARISON BETWEEN BANGLADESH, THAILAND AND TANZANIA

This study has found that increased productivity and the subsequent reduction in both producer and consumer prices of rice generated differences in changes in real income of different groups of rural households in Bangladesh in the post-liberalisation era. Similar evidence was found in the case of agricultural trade liberalisation in Thailand and Tanzania.

In general, agricultural trade liberalisation significantly increased domestic production and the flow of both exports and imports in Thailand (Pupongsak, 2009; Warr, 2008). In particular, the government agricultural trade policies could not contribute to raising the productivity of rural people or to assisting them to find better economic opportunities outside agriculture (Warr, 2008: 268). Trade liberalisation made them worse-off as they did not have enough access to the markets or to the government policy-making process (Jitsanguan, 2008: 3; Zamroni, 2006: 65). Trade liberalisation increased inequality because of the increase in real income of skilled labour and the decrease in real income of unskilled labour. Farmers experienced losses from higher input prices and lower output prices. Therefore, farm households experienced an increase in the incidence of poverty. Although the government increased programmes for rural development through cash transfer to village organisations, subsidised loans and infrastructure development, these programmes were not directly linked to increasing agricultural production (Akapai-boon, 2010; Boossabong and Taylor, 2009; Pupongsak, 2009; Warr, 2008).

As in the case of Thailand, evidence from various studies suggests that the impact of agricultural trade liberalisation on the Tanzanian economy is also mixed. Although some studies found positive impacts on the economy (Kazungu, 2009; World Bank, 2000), these studies were highly criticised due to the model specification and measurement shortcomings (Kilma *et al.*, 2008). Agricultural trade liberalisation could not influence technological transformation and productivity of agriculture. Although the total maize production increased due to expansion of cultivable land, the average yield decreased – suggesting a decreasing return to scale in the post-liberalisation period (Kilma, *et al.*, 2008; Tuwa, 2007). Agricultural trade had an insignificant impact on poverty reduction. The poor became more vulnerable due to volatility of maize (staple) prices and farmers shifting production from staple to other cash crops, thus reducing food security. Large farmers gained more from crop diversification than small farmers. Small farmers faced multiple constraints related to access to agricultural inputs and extension services (Leyaro and Morrissey, 2010; Pan and Christiaensen, 2011; Urassa, 2010).

The empirical evidence from the above economies provides a useful basis for understanding the impact of agricultural trade liberalisation on the welfare of rural households in Bangladesh. Agricultural trade liberalisation could not improve distribution of income among rural households due to the lack of government policies related to productivity stimulation and income distribution, suggesting that mere ‘price is right’ or trade liberalisation would not automatically promote welfare of rural communities. Besides trade reform measures, there is the need for complementary policies to enhance productivity as well as to reduce inequality between the poor and the rich.

6. CONCLUSION

The above findings and analyses suggest that increased productivity and the subsequent reduction in both producer and consumer prices of rice generated differences in changes in real income of different groups of rural households. Findings of this study indicated that non-farm households gained more than farm households from the large reduction

in consumer price. Farm households gained from the increase in productivity but experienced losses from producer price reduction. The two opposite forces – increase in productivity and reduction in producer price – offset the effects of each other, thereby affecting income of farm households.

Although rural households experienced a moderate to high increase in real income, non-farm households experienced a larger increase than farm households. Amongst the farm households, large and medium farmers gained the most and small farmers gained the least from the growth in real income, indicating that rich households experienced a much higher increase in real income than poor households – thereby adversely affecting the distribution of income and widening the income gap between rich and poor households. These findings demonstrated that while agricultural trade liberalisation benefited rural households generally, the benefits were not distributed equally and in fact, inequality increased amongst rural households. The above findings suggest that the growth in household income was not pro-poor during 1985-86 to 2005. Although all rural households experienced moderate to high growth in real income and consumption, rich households gained more from agricultural trade liberalisation through higher real income than poor households. This suggests that agricultural trade liberalisation contributed to higher growth in the rural economy but it contributed to greater inequality in income distribution amongst the rich and poor income groups (quintiles). Therefore, the government should formulate policies such as a progressive income tax to impose higher tax on higher income and income transfer to the poor to reduce inequality amongst different groups of rural households. The government should also formulate other complementary policies which could improve the situation of the poor in the form of institutional changes [as seen in the case of Vietnam (Abbott *et al.*, 2009) and China (Huang *et al.*, 2007)] including higher investment in education and infrastructure and development of markets, finance, input services for agro-products, organisation of agro-food chains and cooperatives.

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