

Agricultural Trade Liberalisation, Inequality and Poverty in Bangladesh

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Abstract

The purpose of this study is to investigate the changes in inequality and poverty of rural households in Bangladesh in the post-liberalisation era. The study used household survey data from secondary sources. It estimated generalised entropy to measure inequality and applied Datt and Ravallion (1992) measurement approach for growth inequality decomposition. It calculated headcount index to measure poverty. The study found that income distribution across rural households was uneven in the post-liberalisation period. Although agricultural trade liberalisation generated significant growth, inequality also increased and the rich gained more from this growth than the poor. Therefore, poverty reduction in the post-liberalisation period was not as significant as the economic growth. Amongst rural households, non-farm households gained more than farm households from post-liberalisation growth because of a relatively large reduction in consumer price compared to increases in productivity of rice. The study suggests that holding inequality constant at the 1985-86 level, rural poverty in Bangladesh could be reduced to zero with the growth experienced during 1985-86 to 2005. However, the total reduction in poverty was insignificant during this period because of a gradually higher increase in inequality and the effects of high economic growth resulting from agricultural trade liberalisation were not fully converted to reduction in poverty. More than 40 percent of the population lived in poverty in 2005. The study argues that a reduction in poverty at a substantial level is a big challenge for policy makers because of the increase in inequality along with economic growth. Therefore, the government should formulate policies to reduce inequality in order to reduce poverty significantly. Policies to reduce inequality may include a progressive income tax to impose higher tax on higher income and income transfer to the poor.

Keywords: Agricultural trade liberalisation, income distribution, income growth, inequality, decomposition of inequality, poverty, Bangladesh

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1. Introduction

Bangladesh is an agricultural country. More than 80 percent of its population depend directly or indirectly on agriculture for their livelihoods. This segment of the population is also predominantly made up of rural households. The agricultural sector contributes around 20 percent to gross domestic product (GDP) and employs more than 60 percent of the total labour force of the economy.

Bangladesh went through a series of deregulation and agricultural trade liberalisation measures in the late 1980s and early 1990s. 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. The economy experienced significant productivity growth in agriculture over the last two decades (1990-2010). The technological transformation in agriculture 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 1990-2010. 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).

Despite this impressive growth performance, the rate of decline in the incidence of poverty over the two decades 1985-2005 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, 2007: 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 welfare (inequality and poverty reduction) of rural households in Bangladesh?

Given the significant impact of agricultural trade liberalisation policy-exercise on more than 80 percent of the country's population (dependent on agriculture and predominantly rural households), there is a strong justification for a study into its consequences and implications.

Therefore, the focus of this study was to investigate the impact of agricultural trade liberalisation on the welfare of rural households through changes in inequality and poverty in the post-liberalisation era. Although other factors might also have affected inequality and poverty due to changes in the growth of real income, agricultural trade liberalisation was the most important policy reform because of rural households' crucial dependence on agriculture in terms of both income and consumption.

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 and all other agricultural inputs and equipment (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).

3. Literature Review

The advocacy for free trade was based not only on the Ricardian principle of comparative advantage but also on the argument that free trade would contribute to development through competition and learning (Chang *et al.*, 2005: 2; García-Vega *et al.*, 2011: 58; McCulloch *et al.*, 2003: 15, 16; Montalbano, 2011: 1; Zhang, 2008: 175). Trade liberalisation promotes the efficient allocation of resources through comparative advantage, allows the dissemination of knowledge and technological progress, and encourages competition in domestic and international markets (Chang, *et al.*, 2005: 2; McCulloch, *et al.*, 2003: 15, 16; Montalbano, 2011: 1; Stiglitz, 2003: 59; Stone and Shepherd, 2011: 5; Zhang, 2008: 175). This is because of the fact that trade liberalisation is meant to work by getting relative prices 'right', which should lead to reallocation of resources from import substitutions to export sectors (Foster, 2008: 544; Krueger, 2010: 5; McCulloch, *et al.*, 2003: 16; Zhang, 2008: 175).

The theoretical models, as illustrated in endogenous growth models by Young (1991), Grossman and Helpman (1991), Lee (1993), Eicher (1999), and Eaton and Kortum (2002), explained that there were long-run positive growth effects when the areas of specialisation promoted by trade enjoyed increasing return to scale. According to these models, liberalisation could raise growth by facilitating import of capital and intermediate goods not available domestically, resulting in an increase in productivity of domestic manufacturing and agricultural sector, in turn, leading to higher economic growth (Foster, 2008: 545; Henry *et al.*, 2009: 237; McCulloch, *et al.*, 2003: 25; San Vicente Portes, 2009: 944, 945). Furthermore, liberalisation allows improved access to the new ideas and technologies embodied in foreign products. Such access can, in principle, enhance a country's technological capability and assist in productivity improvement (Foster, 2008: 545; Henry, *et al.*, 2009: 237; McCulloch, *et al.*, 2003: 25).

The proponents of openness argue that trade liberalisation has positive impacts on economic growth, which ultimately helps poverty reduction.

They argue that if initial inequality is low and growth does not worsen income distribution, the proportion of the population living in poverty will fall as the average income increases (Achterbosch and Roza, 2007: 45; Kirkpatrick and Scricciu, 2006: 2; McCulloch, *et al.*, 2003: 21; Naranpanawa *et al.*, 2011: 328, 329; Susila and Bourgeois, 2008: 72). Moreover, if income grows it will be easier for governments to raise and re-allocate resources for supporting poverty reduction policies and programmes.

Critics argue that if market or institutional imperfections exist, openness can lead to sub-utilisation of human and capital resources, concentration on extractive economic activities, or specialisation away from technologically advanced increasing return sectors (Chang, *et al.*, 2005: 2; Chang *et al.*, 2009: 1; Krugman and Obstfeld, 2006: 405, 406; Panagariya, 2004: 1150). Grossman and Helpman (1991), and Matsuyama (1992) provided theoretical models where a technologically backward country specialises in a non-dynamic sector as a result of openness, thus, losing out on the benefits of increasing returns. Underlying these models there is an imperfection in contracts or in financial markets that causes people to observe a myopic notion of comparative advantage (Chang, *et al.*, 2005: 2; Panagariya, 2004: 1149, 1150; Stiglitz and Charlton, 2007: 25, 89). Sachs and Warner (1999) developed a model where specialisation in the extractive economic activities, the natural-resource sector prevents a country from technological progress that eventually leads to long-run growth.

In this case, the underlying imperfection is an institutional weakness that encourages natural-resource depletion for quick gains appropriated by certain influential groups of the economy, leading to serious distortions in income distribution and welfare changes against the weak (poor) groups of the economy (Chang, *et al.*, 2005: 2; Krugman and Obstfeld, 2006: 405; Panagariya, 2004: 1150; Stiglitz and Charlton, 2007: 37). Rodriguez and Rodrik (1999) reviewed the theoretical arguments as to why openness could be detrimental to developing countries. They argued it in the context of theory of the second best, in which trade liberalisation is the policy lever for such quick gains appropriated by certain influential groups in society whilst market imperfections and institutional weakness are accepted as imminent characteristics of the economy.

Krugman and Obstfeld (2009) argued that if there was imperfection in domestic markets, a government intervention that appeared to distort incentives in one market might increase welfare by offsetting the consequences of market failures in other markets.

The effects of trade on income distribution, inequality and poverty reduction have been a subject of intense discussion in the literature. The most well known analytical frameworks were based on the work of Wolfgang Stolper and Paul Samuelson, also known as the Stolper-Samuelson Theorem (Stolper and Samuelson, 1941). Working in the context of the Heckscher-Ohlin model with two factor inputs (labour and capital) and two goods, the theorem demonstrates that a move from a situation of no trade to free trade will reduce the return of relatively scarce factors because of specialisation in favour of abundant factors (Ahmed and Sattar, 2004: 4; Eicher *et al.*, 2009: 82, 83; Falvey *et al.*, 2010: 230; Stolper and Samuelson, 1941: 59). Tariffs, for example raise the price of the good employing abundant factor intensively, and will tend to benefit the relatively scarce factor. In most cases in developing countries, labour appears to be relatively the abundant factor and capital is relatively the scarce factor. So under the framework of the Heckscher-Ohlin model of trade in developing countries, tariff would likely benefit capital at the expense of labour, arguing that protection is pursued at the cost of abundance factor, which is the reflection of the complexity of government trade policies (Ahmed and Sattar, 2004: 4; Falvey, *et al.*, 2010: 230; Stiglitz, 2003: 59, 60).

There are arguments that agricultural trade liberalisation contributes to technological transformation and improves productivity of agricultural inputs allowing competition and efficient factor-allocation, leading to higher economic growth (Henry, *et al.*, 2009: 237; McCulloch, *et al.*, 2003: 25; San Vicente Portes, 2009: 944, 945; Stiglitz, 2003: 59; Stone and Shepherd, 2011: 5). It facilitates technological transformation in the agricultural sector with improved access to imported inputs, machinery and knowledge leading to an increase in productivity (Foster, 2008: 545; Henry, *et al.*, 2009: 237; Lipton, 2006: 60; McCulloch, *et al.*, 2003: 25; Meijerink and Roza, 2007: 10). These arguments further suggest that the agricultural input market becomes more competitive through diffusion of modern production technology and knowledge in agriculture as a result of agricultural trade policy reforms. Improved technology contributes to agricultural growth and welfare of the rural economy (Foster, 2008: 545; Henry, *et al.*, 2009: 237; Lipton, 2006: 60; McCulloch, *et al.*, 2003: 25; Thirtle *et al.*, 2001: 4).

This suggests that technological progress particularly in irrigation, fertiliser, pesticides, and hybrid seeds can enhance significant growth in agriculture and contribute to poverty alleviation.

Agricultural growth in developing countries has received considerable attention as a vehicle for poverty reduction. The dominant paradigm shift of structural transformation since the 1980s has seen agriculture as an 'engine of growth' in countries that are in the early stages of development. This is particularly because of agriculture's high share of economic activity and strong growth linkages with the rest of the economy (Byerlee *et al.*, 2005: 1; Mosley and Chiripanhura, 2009: 750; Novielli, 2010: 1; Thirtle, *et al.*, 2001: 11; World Bank, 2008: 44). In this paradigm, agricultural growth is perceived as the prime factor to enhance the welfare of rural households in developing countries, because the sector is dominated by small-scale rural farm households (Byerlee, *et al.*, 2005: 1; Popli, 2010: 803; Thirtle, *et al.*, 2001: 11; Valenzuela *et al.*, 2005: 1). Furthermore, agricultural productivity growth has extensive multiplier effects on both farm and non-farm sectors (Byerlee, *et al.*, 2005: 1; Popli, 2010: 803; Thirtle, *et al.*, 2001: 11; Valenzuela, *et al.*, 2005: 1).

The poverty reduction and welfare enhancement effects of the agriculture-driven growth paradigm is predicated on arguments that the adoption of technological innovations in agriculture has a direct impact on increased productivity and an indirect impact on the price of food for net buyers and labour effects by generating employment in both the farm and non-farm sectors and income through higher wages (Byerlee, *et al.*, 2005: 1; Meijerink and Roza, 2007: 14; Mosley and Chiripanhura, 2009: 751; Popli, 2010: 803; Thirtle, *et al.*, 2001: 11; Valenzuela, *et al.*, 2005: 1). These growth linkage effects might be powerful when agricultural growth is driven by broad-based productivity increases in a rural economy dominated by small and medium-sized farm households. Because of these strong growth linkage effects, agricultural growth can lead to wider economic growth through technological innovation (Adeoti and Sinh, 2009: 6; Byerlee, *et al.*, 2005: 4; Meijerink and Roza, 2007: 10; Popli, 2010: 803; Thirtle, *et al.*, 2001: 8, 9; Williams and Smith, 2008: 8).

However, 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 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 the rural livelihoods. 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).

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 conditions.

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 productivity in agriculture must result in a decrease in real food prices, but productivity must increase faster than food prices decrease for farm profitability to rise and for poor consumers to benefit from lower food prices.

Agricultural trade liberalisation may not produce similar welfare impact across all rural households. In practice, some households might have experienced benefit and others might have experienced loss from this liberalisation resulting in diverse distributional consequences across rural households (Hossain and Verbeke, 2010: 77, 78; Isik-Dikmelik, 2006: 3; Klytchnikova and Diop, 2006: 4; World Bank, 2008b: 29, 53). The reason for such possible diverse outcomes can be explained by the fact that agricultural trade liberalisation affects the prices of goods and factors. Thus the changes in prices of goods and factors may diversely affect the welfare of rural households due to their various degrees of involvement with goods and factors markets such as producers or consumers; farm or non-farm households; and net buyers or net sellers (Hossain and Verbeke, 2010: 77, 78; Isik-Dikmelik, 2006: 3; Klytchnikova and Diop, 2006: 4; World Bank, 2008b: 29, 53).

Hertel (2006), Popli (2010), and Gingrich and Garber (2010) found that the impacts of agricultural trade liberalisation on poverty and inequality would depend on a number of important factors. First, the extent of price transmission from the border to the local markets could vary widely – even within a given country, as was seen in the case of Mexico. Poor infrastructure and high transaction costs insulate rural consumers from world price rises, while penalising exporters. Thus, households would gain from price increases due to agricultural trade liberalisation if they were net suppliers.

However, in the case of the poorest households, their ability to increase production might be constrained by the lack of key productive assets, thereby limiting their supply response. This limited supply response can hinder the potential for such commodity price increases to pull the poor households out of poverty in the absence of complementary policies such as improved access to credit and advanced technology. Consequently, trade liberalisation resulted in adverse effects on poverty and income distribution in Mexico (Hertel, 2006: 11; Nicita, 2009: 26; Nissanke and Thorbecke, 2007: 2, 7; Popli, 2010: 811).

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 poverty reduction 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).

Many studies attempted to shed light on the impact of agricultural trade liberalisation on the welfare (inequality and poverty reduction) of rural households in Bangladesh.

Mujeri (2002) argued that while Bangladesh's greater integration into the world economy was generally "pro-poor", the gains were relatively small due to structural bottlenecks and other constraints. The World Bank (2002) showed that the benefits of economic growth during the 1990s had not been distributed evenly across the regions. The World Bank (2004) report showed that Bangladesh experienced a significant improvement of the rural non-farm sector in recent years. In another report, the World Bank (2006) argued that trade liberalisation made available cheap imports of agricultural inputs such as pesticides, irrigation equipment, fertilisers and seeds. The report claimed that the application of these inputs affected the environment adversely in the form of loss of soil fertility, loss of bio-diversity and water pollution. Salim and Hossain (2006) found that there were wide variations in productive efficiency across farms as a result of agricultural reforms. Average efficiency increased modestly from pre-reform to the post-reform period. The efficiency differentials were largely explained by farm size, infrastructure, households' off-farm income, and reduction of government anti-agricultural bias in relation to trade and domestic policies.

Klytchnikova and Diop (2006) found that reform in the agricultural sector contributed significant growth to the economy but its impact on the reduction of rural poverty was considered very insignificant. They argued that agricultural trade liberalisation improved the production of rice considerably, leading to a significant decrease in rice price. They found that net buyers gained and net sellers lost from this process. BBS (2009) found that during last decade significant changes took place in the agricultural sector. These changes included new production structures with a combination of irrigation, fertilisers, high yielding varieties of seeds and pesticides, and mechanisation in land preparation. All these changes contributed to an increase in production of food-grains in Bangladesh.

Nahar and Siriwardana (2009) conducted an ex-ante analysis using a computable general equilibrium (CGE) model and found that the complete removal of import tariffs could reduce absolute poverty for all groups, both in rural and urban areas. Hossain (2009) found that agricultural trade liberalisation contributed to the development of minor irrigation dominated by shallow tube-wells leading to the expansion of Boro rice cultivation. Consequently, rice production increased significantly. Hossain and Verbeke (2010) found that agricultural trade liberalisation contributed to the integration of rice markets across the six regions (divisions) and therefore the long-run equilibrium was stable.

Conversely, in the short run the market integration as measured by the magnitude of market interdependence and the speed of price transmission between the divisional markets was weak.

Alam, *et al.* (2011) attempted to analyse the welfare impact of policy interventions in food grain markets during 1980–2003. They argued that the loss in consumer surplus exceeded the gain in producer surplus from government control over food grain markets, resulting in a deadweight loss for the society. Conversely, they further argued that the gain in consumer surplus and government revenue from liberalisation of foodgrain markets was greater than the loss in producer surplus, implying a net welfare gain to the society. Similarly, Karfakis *et al.* (2011) attempted to identify the impact of rice price changes on household welfare. They argued that rural households exhibited higher welfare losses than urban households from an increase in the rice price.

Based on the above situations, this study seeks to address the following research question: how has agricultural trade liberalisation influenced the welfare (inequality and poverty reduction) of rural households in Bangladesh?

4. Methodology and Research Design

4.1 Data

The study used data from secondary sources to achieve its objectives. There are requirements for data sets from at least two distinct time-periods to measure the impact of agricultural trade liberalisation on the welfare of rural households.

The study used data on household income and consumption from two household surveys of Bangladesh Bureau of Statistics (BBS) including *Household Income and Expenditure Survey 2005* (BBS, 2007), and *Household Expenditure Surveys 1985-86* (BBS, 1988). It also used data from various statistical yearbooks of Bangladesh.

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 the analysis of inequality and poverty, 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, 2007) 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 also conducted a *Data Exploratory Analysis* to identify outliers. It identified two outliers in the data set of HHES 1985-86 and these outliers were dropped from the data set. However, no outlier was found in the data set of HHIES 2005.

4.2 Measurement of Poverty, Inequality and Growth

Agricultural trade liberalisation may contribute to economic growth, but that growth may not be completely translated to poverty reduction because of the existence of inequality. This study considered both inequality and population growth that might have slowed down poverty reduction.

4.2.1 Measuring Inequality: Generalised Entropy (GE)

The study measured Generalised Entropy (GE) following Haughton and Khandker (2009: 106) approach:

$$GE(\alpha) = \frac{1}{\alpha(\alpha-1)} \left[\frac{1}{N} \times \sum_{i=0}^N \left(\frac{y_i}{\bar{y}} \right)^\alpha - 1 \right]; \quad (1)$$

where N is the number of individuals in the sample, y_i is the income of individual i , and \bar{y} is the per capita mean income (or expenditure). The parameter a in $GE(a)$ represents the weight given to distances between incomes at different parts of the income distribution and can take any real value.

However, the most common values of α used are 0, 1 and 2. $GE(a=0)$ is sensitive to changes in the lowest tail, $GE(a=1)$ is sensitive to changes in the middle part and $GE(a=2)$ is sensitive to changes in the highest tail of the distribution.

4.2.2 Growth-Inequality Decomposition

The study measured the sectoral decomposition of changes in poverty by farm and non-farm households as introduced by Datt and Ravallion (1992) and as applied by Ravallion and Datt (2002), Ravallion and Chen (2003), and Ravallion (2004).

The growth-inequality decomposition quantifies the relative conditions of economic growth and redistribution to changes in poverty (Datt and Ravallion, 1992: 277). It can explain whether changes in welfare distribution have offset gains from economic growth in reducing poverty.

$$P_{t_n} - P_{t_0} = G(t_0, t_n; r) + D(t_0, t_n; r) + R(t_0, t_n; r); \quad (2)$$

The growth component: $G(t_0, t_n; r) \equiv P\left(\frac{z}{\mu_{t_n}}, L_r\right) - P\left(\frac{z}{\mu_{t_0}}, L_r\right); \quad (3)$

The redistribution component: $D(t_0, t_n; r) \equiv P\left(\frac{z}{\mu_r}, L_{t_n}\right) - P\left(\frac{z}{\mu_r}, L_{t_0}\right); \quad (4)$

The residual: $R(t_0, t_n; r)$ represents interaction term not represented by the other two components.

where $P_{t_n} - P_{t_0}$ is the changes in poverty, t_n is the final year of the period, t_0 is the initial year of the period, and r is the reference year at which the welfare distribution and mean welfare are held constant (fixed). Similarly, z is poverty line, μ is the mean income or consumption, L is the Lorenz curve.

4.2.3 Measuring Poverty: Headcount Index (P_0)

The study measured the headcount index of poverty using the Haughton and Khandker (2009) approach:

$$P_0 = \frac{N_p}{N}; \quad (5)$$

where P_0 is headcount index or poverty, N_p is the number of poor, and N is the total population. This equation can be rewritten as below:

$$P_0 = \frac{1}{N} \sum_{i=1}^N I(y_i < z); \quad (6)$$

where, z represents the poverty line, $I(y_i < z)$ is an indicator function that takes on a value of 1 if the bracketed expression is true, and 0 otherwise; y_i is consumption expenditure. The study used poverty lines (z) as used by the Bangladesh Bureau of Statistics during HHES 1985-86 and HHIES 2005. If individual consumption (y_i) is less than poverty line (z), then $I(y_i < z)$ is equal to 1 and the person would be counted as poor.

4.3 Analytical Techniques

The literature review suggested 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 and involvement with the goods and factor markets (Nicita, 2009: 19).

Rural households were divided into five sub-groups (quintiles) using income:

- (i) Bottom 20 percent (Quintile 1),
- (ii) Lower middle 20 percent (Quintile 2),
- (iii) Middle 20 percent (Quintile 3),
- (iv) Upper middle 20 percent (Quintile 4), and
- (v) Top 20 percent (Quintile 5).

They were further classified on the basis of their involvement in farming activities, namely:

- (i) Farm households, and
- (ii) Non-farm households. Other classification included:
 - (i) Farmers, who owned farm land, and
 - (ii) 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):

- (i) Small Farmers (0.05-2.49 acres),
- (ii) Medium farmers (2.50-7.49 acres), and
- (iii) Large farmers (7.5 acres and above).

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

- (i) Net buyers or
- (ii) Net sellers.

5. Result Discussion and Analysis

5.1 Inequality

The distribution of income scenario reveals the inequality over the entire population of rural households. The Gini coefficient is the most widely used single measure of inequality (Haughton and Khandker 2009: 104). It ranges from zero (perfect equality) to one (perfect inequality).

As shown in Table 1, the Gini coefficient increased from 0.36 in 1985-86 to 0.42 in 2005, implying increased inequality in income distribution between the poorest and richest households during this period.

The consistent increase in the Gini coefficient over the course of time suggests that the inequality in income distribution between the poor and the rich gradually became greater during 1985-86 to 2005. Thus, the Gini coefficient increased by an average of 0.98 percent per year during that period.

Table 1: Gini Coefficients for Household Income Distribution: 1985-86 to 2005

	1985-86	1991-92	1995-96	2000	2005	Average (%)	Change
<i>Gini coefficient</i>	0.36	0.36	0.38	0.39	0.42	0.98	

Note: Changes shown between years 1985-86 and 2005

Source: Compiled and calculated (bold) from HHES 1985-86 and HHIE 2005 of BBS

5.2 Inequality Decomposition

Generalised Entropy (GE) is another commonly used measure of inequality. The values of GE vary from zero (0) to infinity (∞), with zero representing an equal distribution and higher values representing higher levels of inequality. The parameter α in $GE(\alpha)$ represents the weight given to distances between incomes at different parts of the income distribution and can take any real value. However, the most common values of α used are 0, 1 and 2. $GE(\alpha=0)$ is sensitive to changes in the lowest tail, $GE(\alpha=1)$ is sensitive to changes in the middle part and $GE(\alpha=2)$ is sensitive to changes in the highest tail of the distribution (Haughton and Khandker, 2009: 106, 107).

As shown in Table 2, all rural households (as a group) experienced relatively high inequality in 2005 with higher values of corresponding $GEs(\alpha = 0, 1, 2)$ compared to those of 1985-86. As we moved from the lowest to highest tail of the distribution, inequality also increased with gradually higher values of GEs in both 1985-86 and 2005.

It is evident from the table that the values of $GE(\alpha=2)$ are relatively large compared to the other two values of GEs in both years, suggesting that the largest inequality was present with the highest tail of the distribution of income of rural households in these years. The values of GEs the non-farm households were very small in both years, implying low inequality in the distribution of income amongst non-farm households.

On the contrary, the values of GEs for farm households were very large in both years, indicating relatively high inequality in the distribution of income amongst farm households.

Each value of GE is decomposed into two inequality components: within-group and between-group inequality. The component "within-group inequality" represents variation of income inside each group of households and "between-group inequality" represents variation in income from one group to another group of households. The summed up value of within-group and between-group inequality represents the total value of respective GE (inequality) of the rural households.

As presented in Table 2, the results show that the inequality is mostly generated from within-group component and not from between-group inequality in both years because of very high inequality within the farm households.

Table 2: Decomposition of Inequality by Farm and Non-Farm Households

	1985-86			2005		
	GE($\alpha=0$)	GE($\alpha=1$)	GE($\alpha=2$)	GE($\alpha=0$)	GE($\alpha=1$)	GE($\alpha=2$)
All Rural household	25.6	51.1	201.7	38.4	80.1	401.7
Household Type						
Non-farm household	1.6	1.5	1.5	9.4	14.0	26.0
Farm household	31.9	60.3	218.2	48.0	95.9	449.5
Within-group inequality	22.9	48.6	199.4	36.4	78.3	400.0
Between-group inequality	2.7	2.5	2.3	2.0	1.9	1.8
Within as a share of total	89.4	95.1	98.9	94.8	97.7	99.6
Between as a share of total	10.6	4.9	1.1	5.2	2.3	0.4

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

Further decomposition of inequality by types of rural households is presented in Table 3. Amongst all groups of rural households, medium farmers experienced the highest inequality for all cases of GEs in both 1985-86 and 2005. The magnitude of inequality with medium farmers was very similar across GEs in 1985-86 but the trend in inequality increased significantly from GE ($\alpha=0$) to GE ($\alpha=2$) in 2005.

Noticeably, inequality amongst the highest tail of the distribution of medium farmers is the largest with a GE value of 344.5 compared to either the lowest tail or the medium part of the distribution. Interestingly, the GE values for large farmers were very similar and not large across GEs in 1985-86 as well as in 2005, indicating a similar pattern of income distribution from the lowest to the highest tail of the distribution of large farmers during this period. Like those for non-farm households, the values of GEs for small farmers and agricultural labourers were very small in both 1985-86 and 2005, indicating low inequality in income distribution amongst these groups of households. Noticeably, in 2005, the value of GE($\alpha=0$) for large farmers (closest tail to medium farmers) was the highest (20.5) and the value of GE($\alpha=2$) for small farmers (closest tail to medium farmers) was the largest (11.1) suggesting that the source of inequality amongst rural households is generated mainly from inequality of medium-farmer households.

This situation may be attributed to increased productivity of rice and the selling-buying behaviours of medium farmers. The benefit from increased productivity was not distributed equally amongst medium farmers because of differences in their involvement with rice markets. As revealed in the HHE 2010, all medium farmer households were net sellers – 14.29 percent sold rice during the lean season and 85.71 percent sold rice during both lean and peak seasons but mostly in the lean season. Those who sold rice during the peak season received a much lower price than those who sold in the lean season, suggesting a large difference in income from the same amount of rice sold, resulting in large inequality amongst medium farmer households.

All groups of rural households experienced a relative increase in the values of GEs in 2005 compared to those in 1985-86, indicating that the increase in productivity of rice and reduction in rice prices resulting from agricultural trade liberalisation contributed to a higher inequality in income distribution in the rural economy of Bangladesh in the post-liberalisation period.

Table 3: Decomposition of Inequality by Household Types

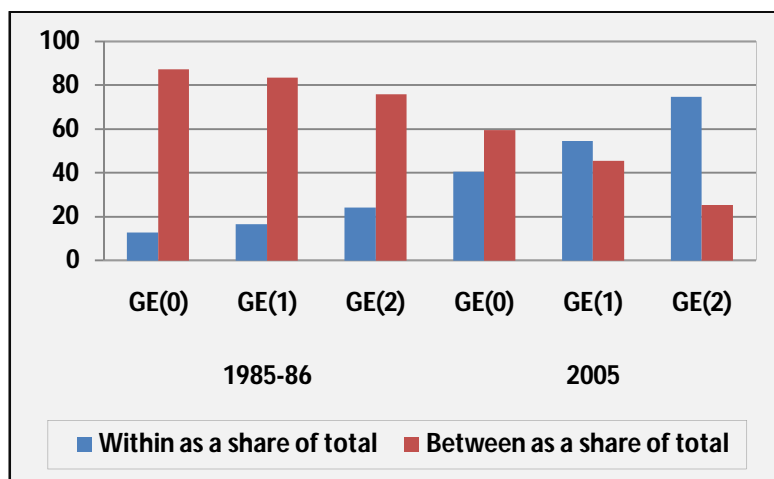
Household type	1985-86			2005		
	GE($\alpha=0$)	GE($\alpha=1$)	GE($\alpha=2$)	GE($\alpha=0$)	GE($\alpha=1$)	GE($\alpha=2$)
All rural household	25.6	51.1	201.7	38.4	80.1	401.7
Large farmer	7.3	7.4	7.9	20.5	14.7	11.7
Medium farmer	34.6	34.8	41.6	77.2	113.2	344.5
Small farmer	1.0	1.0	1.0	4.7	6.8	11.8
Agricultural labourer	0.5	0.5	0.5	2.0	1.8	1.7
Non-farm household	1.6	1.5	1.5	9.4	14.0	26.0
Within-group inequality	3.2	8.4	48.5	15.6	43.7	299.9
Between-group inequality	22.4	42.7	153.1	22.8	36.4	101.9

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

As shown in Figure 1, initially in 1985-86 shares of between-group inequality across GEs were much larger than those of within-group inequality.

This was reversed in 2005, with larger shares of GEs of within-group inequality. This scenario suggests that the rural inequality was generated largely from within-group inequality in the post-liberalisation period.

Figure 1: Within-Group and between-Group as a Share of total Inequality by Household Types: 1985-86 to 2005



Source: Author's calculation based on Table 3

A significant inequality in income distribution across groups of rural households contributed to low reduction in poverty during 1985-86 to 2005. The poor gained less but the rich received most of the benefit from agricultural trade liberalisation, thus leaving a high level of poverty during this period as analysed in the following section.

5.3 Poverty: Head Count Index

The conventional view of poverty is the pronounced deprivation in well-being. It is measured by comparing individual or household income or consumption with some defined threshold below which they are considered poor. In this case, poverty is largely seen in monetary terms – and is the starting point for most analyses of poverty. Sen (1987) argued that well-being would come from a capability function in society. Thus, poverty arises when people lack key capabilities, and so they have inadequate income or education, or poor health, or insecurity, or low self-confidence, or a sense of powerlessness, or the absence of rights such as freedom of speech (Haughton and Khandker, 2009: 3).

This study measured and considered poverty by comparing household consumption with poverty lines defined and estimated by the Bangladesh Bureau of Statistics (BBS) based on various household surveys.

Despite agricultural trade liberalisation improving productivity of rice and all groups of rural communities experiencing positive growth in income over two decades – 1985-86 to 2005 – the distribution of income was uneven. Thus, the reduction in rural poverty was insignificant over this period. Table 4 shows the headcount rate of poverty that provided the pictures of rural poverty during 1985-86 to 2005 in Bangladesh.

The headcount index is the most widely used measure of poverty. It calculates the proportion of the population with a standard of living below the poverty line that is counted as poor (Haughton and Khandker, 2009: 69; Ravallion and Huppi, 1991: 60). The main strength of the headcount index is that it is simple to construct and easy to understand (Haughton and Khandker, 2009: 69). As estimated by the Bangladesh Bureau of Statistics (BBS) in HHES 1985-86 and HHIES 2005, this study followed the same values of the upper and lower poverty lines to calculate the headcount index of poverty of rural households. The lower poverty line represents food and non-food consumption expenditure that is equal to food expenditure (food poverty line) corresponding to meeting minimal nutritional requirements, 2122 kilocalories per capita per day. It corresponds to the extremely poor households whose total expenditure on food and non-food is equal to the food poverty line. Therefore, the lower poverty line represents smaller food intake than 2122 kilocalories. On the other hand, the upper poverty line represents food consumption expenditure with a value equal to the food poverty line plus a typical non-food consumption expenditure which is close to the food poverty line (BBS, 2007: 155, 156). Therefore, the upper poverty line corresponds to the moderately poor households.

In 1985-86, considering the upper poverty line, 65.5 percent of the population lived in poverty (64.96 million) and this figure in 2005 was 44.9 percent of the total population (59.36 million). Considering the headcount rate of poverty and the absolute number of poor population, a large number of the rural population lived in poverty during this period, albeit decreasing by about five million between 1985-86 and 2005.

Table 4: Poverty in Rural areas of Bangladesh: 1985-86 to 2005

Poverty lines	Headcount Index					
	1985-86	1988-89	1991-92	1995-96	000	005
Upper poverty line	65.2	62.5	58.7	54.5	52.3	44.9
Lower poverty line	47.0	44.6	43.7	39.4	37.9	27.3

Source: Compiled from BBS for the respective years household surveys

Although the trend of poverty was declining, progress was slow with a large variation in poverty reduction across different groups of rural households. As shown in Table 5, the reduction in poverty across different groups of rural households was not even – some groups experienced a larger reduction rate than others. Considering both the upper and lower poverty lines, non-farm households experienced the largest reduction in poverty for the period 1985-86 to 2005. On the contrary, farm households experienced the lowest rate of poverty reduction – far below that of non-farm households. This fact reinforced the argument that non-farm households are net buyers of rice and they benefited most from a decrease in the consumer price of rice as a result of agricultural trade liberalisation. In addition, agricultural trade liberalisation facilitated growth in the non-farm sector with a greater opportunity for employment and higher wages in the non-farm sector that contributed to a larger reduction in poverty than that of the farm sector. Although agricultural trade liberalisation improved productivity of rice, farmers experienced a large decrease in the producer price, thus reducing their welfare. This fact is reflected again through the lower rate of poverty reduction in the group of farm households than that of other groups of rural communities.

Table 5: Change in Overall Poverty by Household Groups: 1985-86 to 2005

	Headcount rate			
	1985-86	2005	Total change	Average change
Upper poverty line				
Rural household	65.2	4.9	-20.3	-0.97
Non-farm household	80.1	48.8	-31.3	-1.49
Farm household	58.8	43.2	-15.7	-0.75
Lower poverty line				
Rural household	47.0	27.3	-19.6	-0.93
Non-farm household	68.5	21.4	-47.1	-2.24
Farm household	37.9	29.9	-8.0	-0.38

Note: Changes shown between years 1985-86 and 2005

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

6. Conclusion

The above findings and analyses suggest that the income distribution across rural households was uneven in the post-liberalisation period. Although agricultural trade liberalisation generated significant growth, inequality also increased and the rich gained more from this growth than the poor. Therefore, poverty reduction in the post-liberalisation period was not as significant as the growth in the economy. Amongst rural households, non-farm households gained more than farm households from post-liberalisation growth because of a relatively large reduction in consumer price compared to increases in productivity of rice. The above findings suggest that, holding inequality constant at the 1985-86 level, rural poverty in Bangladesh could be reduced to zero with the growth experienced during 1985-86 to 2005. However, the total reduction in poverty was insignificant during this period because of a gradually higher increase in inequality and the effects of high economic growth resulting from agricultural trade liberalisation were not fully converted to reduction in poverty. More than 40 percent of the population lived in poverty in 2005. This analysis suggests that a reduction in poverty at a substantial level is a big challenge for policy makers because of the increase in inequality along with economic growth.

Therefore, the government should formulate policies to reduce inequality or to keep it constant along with high economic growth in order to reduce poverty significantly. Policies to reduce inequality could include a progressive income tax to impose higher tax on higher income and income transfer to the poor.

The current liberal income tax system is not adequate to reduce inequality as it favours the rich (TK165000 or below: nil; TK165001-275000: 10 percent; TK275001-325000: 15 percent; TK325001-375000: 20 percent; and TK375001+: 25 percent income tax whereas per capita income was only TK 53000 in 2010-11) (NBR, 2011: 1). Therefore, the government should also reform the income tax structure, lowering the taxable income threshold to the level of per capital income, increasing tax rates more progressively than existing levels, and raising the highest tax rate to 40 percent of taxable income. Similarly, the government should ensure efficient transfer of these benefits to the poor through subsidised food, health care, and education to reduce inequality.

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