

Agricultural Trade Liberalization and Human Rights : Economic Analysis for Poverty Reduction in LDCs—A Survey

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ABSTRACT

This paper investigates the economic effects of agricultural trade liberalization of developed countries on poverty reduction of least developed countries (LDCs) and considers the problems to be solved to protect human rights of the people of least developed countries (LDCs). As agriculture is important in LDCs' productions, exports, and also imports, it is necessary to assess the trade liberalization effects from several points of view. Overall, it stresses that it is indispensable to overcome the difficulties of trade liberalization negotiation in the Doha Development Round for the people of LDCs to have a higher standard of living.

INTRODUCTION

People in the least developed countries have the right to a higher standard of living in exchange for their labor. However, there are many obstacles to alleviating poverty. Trade theory has shown that international trade can expand aggregate income in every country, joining in trade. This is the so-called gains from trade. For this reason, international trade can be seen as the engine for development and a useful tool to reduce poverty throughout the world. Unfortunately, these goals have been hard to reach due to various trade impediments.

Least developed countries (LDCs), according to the United Nations Committee for Development Policy, exhibit the lowest indicators of socioeconomic development, with the lowest Human Development Index ratings of all countries in the world. A country is classified as a Least Developed Country if it meets criteria based on

- ① low-income (three-year average GNI per capita of less than \$750 USD which must exceed \$900 to leave the list)
- ② human resource weakness (based on indicators of nutrition, health, education, and adult literacy)
- ③ economic vulnerability (based on instability of agricultural production, instability of exports of goods and services, economic importance of non-traditional activities, merchandise export concentration, and handicap of economic smallness, and the percentage of population displaced by natural disasters)
- ④ population of less than 75 million. The classification currently (as of 16 April 2008) applies to 49 countries.¹

¹ Ministry of Agriculture, Forestry and Fisheries of Japan, WTO Nougyoukoushou ni okeru

The current round of WTO, called Doha Development Round, takes its name from the aims expressed in the Declaration announced in Doha on 14 November 2001, for entering into trade liberalization negotiations to promote development and reduce poverty in developing nations. The underlying principle of the Doha Round is to promote development in poor countries. Presently, the number of total WTO members is 153, of which the number of developing countries members (including LDCs) is about 100, and of which the number of LDC members is 30. If we clarify WTO members by region, 41 members are African, 32 members are in Central and South America, and 21 members are Asian developing countries.² The increase in members belonging to developing countries and LDCs have led to an increase in the new negotiation power for development and poverty reduction.

US Trade Representative Robert Zoellick's statement after the WTO Doha Ministerial Conference in 2001 expresses the hope for a successful round of negotiations in the following way:

'Doha lays the groundwork for a trade liberalization agenda that will be a starting point for greater development, growth, opportunity, and openness around the world... we've settled on a program that lays out ambitious objectives for future negotiations on the liberalization of the agriculture market. These objectives represent a cornerstone of more market access priorities for trade, and they will create a framework that will help the United States and others to advance a fundamental agricultural reform agenda. On a range of issues, such as agricultural liberalization and reduction of tariffs on non-agricultural goods, we've shown how our interests can converge with the developing world.'³

Despite hopes for success at the beginning of the talks, Doha achieved little progress on most of the development issues up to the WTO Ministerial Meeting, which took place in Cancun in September 2003. One of the key disappointments was agricultural reform, which many developing countries and NGOs had viewed as the primary objective of the round. The March 2003 deadline for agreement on agricultural modalities was not achieved. In the joint paper presented by US and EU on agricultural issues in August 2003, the framework was widely criticized by developing countries. On domestic support, no specific figures were given for reducing the most trade-distorting support. The text potentially widened the scope for the

kaihatsutojoukoku no joukyou ni tsuite, www.maff.go.jp/wto/tozyo.pdf

² Homepage of the Ministry of Foreign Affairs of Japan, www.mofa.go.jp/mofaj/gaiko/wto/data/kamei.html.

³ 14 November 2001, Office of the US Trade Representative, Online speech available at www.ustr.gov.

use of production based financial support (the so-called “Blue Box” support) - a step backward in terms of liberalization. Also, the text did not focus on the trade-distorting elements of the “Green Box” measures (permissible forms of subsidy under WTO rules).⁴

In the first few months of 2004, another effort was made in Geneva to find common ground in the agricultural positions of the various groups. Eventually, as a result of the work of the “Five Interested Parties,” a compromise was reached on 1 August. The new document referred to as the “July Framework Agreement” covered all the main areas of the Doha Agenda. Although the new framework agreement was reached, only limited progress was made by the Hong Kong Ministerial Meeting at the end of 2005, where the target for the modalities was set. This would have given time for the modalities to be translated into draft schedules of tariffs and subsidies by country and for those schedules to be checked and verified. The negotiations were suspended in July 2006 before a resumption of negotiations in early 2007 resulted in draft modalities in July.⁵ In July 2008, the WTO talks collapsed in Geneva, mainly because of the conflict between the developed countries and emerging countries such as India and China about the agricultural safeguard system.

It is clear that the reform of agricultural trade is of central importance among the WTO negotiation issues for many developing countries, but as Professor Stiglitz points out, agricultural initiatives within OECD countries seemed to be undermining multilateral efforts. The US Farm Bill in 2002 increased the level of support to US farmers and strengthened the link between subsidies and production decisions. Likewise, the EU’s 2003 Luxembourg reforms shifted support from production, by limiting subsidies, to more acceptable forms of farm support, but the actual level of producer support will remain virtually constant. Also, the reform has little effects on export subsidies or import barriers.⁶ With regard to agricultural protection in Japan, the tariff rates of some products are extremely high (between about 200% and 500%), and Japan’s resistance to a proposal to introduce a maximum tariff rates system has been criticized in the WTO negotiations.

After the negotiation failures in Cancun, a group of twenty developing countries, the G20, formed an effective negotiating block on agricultural issues. Led by South Africa, Brazil, India, and China, the G20⁷ pressed the US and EU for greater market access and subsidy

⁴ Chapt.4, Stiglitz=Charlton(2005).

⁵ Martin=Anderson(2008),Josling(2007)

⁶ OECD(2004) and Stiglitz=Charlton(2005)

⁷ G20 is consisted of Argentina, Bolivia, Brazil, Chile, China, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, Guatemala, India, Mexico, Pakistan, Paraguay, Peru, the Philippines, South Africa,

reduction. But the richest countries were unwilling to offer serious concessions in the agricultural negotiations.

Agriculture is still a very important industry for most LDCs. This fact is shown in [Table1-1](#) by comparing the share of agriculture in gross value added between developed and developing countries. This table shows the shares of agriculture in gross value added of each countries' group in 1983, 1993, and 2003. In the world, the shares are 6.4, 4.4, 3.7 in each year, and it is clear the agricultural VA share is decreasing. For developed industrialized countries, the shares of the corresponding year are 3.3, 2.7, and 1.8, which are very low and decreasing. However, if only transition economies are focused, the share was still high at 6.2% in 2003. If we look at continental groupings data, the Share of Europe decreased from 4.3% in 1983 to 2.4% in 2003, and the Share of North America decreased from 2.3% in 1983 to 1.4% in 2003.

On the other hand, if we focus on the developing countries, the corresponding shares are 18.1, 13.1, 11.9, and it is still high compared to developed countries, although it has decreased. Especially Sub-Saharan Africa's share is very high, at 27.0% in 2003. About Asia, both in South Asia and East and Southeast Asia, the share has dramatically decreased, so East and Southeast Asia's share is now 11.1%, but South Asia's Share is second largest in the world at 22.9%. The shares in Near East and North Africa are almost the same as in East and Southeast Asia. On the African continent as a whole, the share had increased from 16.8 in 1983 to 17.3% in 2003. So it is shown that the economic dependency on the agriculture industry is still high in the 2000s in Africa. The growth rate of agriculture value-added is high in developing countries, especially in Africa, which contains many LDCs as compared to developed countries.

In this paper, I examine why agricultural trade reform is important for developing countries, especially in LDCs, in order to benefit from international trade, and how this is linked to the basic human right to a reasonable standard of living. I focus on the agricultural trade situation, using the recent data, and point out the essential agricultural problems from an economic point of view. Then I introduce the basic analysis to clarify the effects of trade liberalization on LDCs. After that, I examine the current problems of agricultural protection both in developed and developing countries, including LDCs. Lastly, some conclusions and

propositions on implications for LDCs to reduce poverty are provided.

AGRICULTURAL TRADE AND DEVELOPING COUNTRIES (LDCs)

(1) Survey of World Agricultural Trade

[Table 2-1](#) shows the evolution of world agricultural trade. Although the agricultural trade value increased in the 2000s', the share of agricultural trade in world merchandise trade dropped from 9.2% in 2003 to 8.4% in 2005. Also, the agricultural share in world exports of primary products declined from 41.2% in 2003 to 32.8% in 2005.

[Table 2-2](#) shows the top 15 agricultural exporters and importers in 2003. For exporters, trade of EU members made up 42.2% of the share, and EU exports to the rest of the world made up 10.9% of the share. The US export share was 11.3%, followed by Canada, Brazil, China, Australia, Thailand, Argentina, Malaysia, and Mexico. As for importers other than trade within EU members, the EU share from outside the EU was the highest (13.6%), the US share was the second largest (10.7%), and the third largest importer was Japan(8.1%) followed by China, Canada, South Korea, Mexico, Russian Fed., Hong Kong, Taipei, Switzerland, Saudi Arabia, Thailand, Indonesia, and Turkey. Both in exports and imports, nearly 80% of the total share was made up of a total of 15 countries. From this, it is clear that the LDCs' agricultural trade shares are very small.

[Table 2-3](#) shows the regional share of agricultural exports in 2005. World agricultural exports in the regions of the developed countries are very high, with Europe at 46.5% and North America at 16.0%. On the contrary, Africa's Share is only 3.1%. Shares of Asia and South and Central America are 18.1% and 11% respectively.

While the share of intra-regional agricultural exports is extremely high in Europe at 80.9%, it is very low in Africa and South and Central America, leading us to conclude that the LDCs rely upon agricultural exports to developed countries for foreign currencies.

[Table 2-4](#) shows how important agricultural trade was in each region in 2003. It is interesting to compare the countries in the two developing regions in this table, Latin America and Africa. The highest share of agricultural exports in total merchandise exports is shown in Latin America at 19.8%, while the share of agricultural imports in total merchandise imports in Latin America is only 9.7%. On the contrary, the second highest export share is shown in Africa at 13.9%, while the import share of Africa is higher at 15.7%. From this, we can assume that the Africa region is actually a net importer of agricultural products. We can surmise that

in Africa, there is a need to import agricultural products because of the large population and the inability to supply a sufficient amount of food for their own region. If we look at developed regions, in North America, the share of agricultural exports is much higher than its agricultural share of imports. In Western Europe, on the other hand, the share of agricultural imports is slightly higher than exports.

Looking at the share of agricultural trade in the trade of all primary products in Latin America and Western Europe, we see that both exports and imports are very important. In North America and Asia, we recognize the importance of agricultural products, especially in exports rather than imports. In contrast to this, we see the importance of agricultural products in all primary products, especially in imports in Africa and Central/Eastern Europe/CIS. Of course, imports of agricultural products in the oil-producing Middle East are very important.

(2) Dependence on Agricultural Trade by Country

In this section, I attempt to show the importance of agriculture trade for each country. First, we focus on the share of agricultural exports for selected countries belonging to the ACP Group⁸, BRICs and Cairns Group, and the developed countries. We can say that many African countries, especially Cote d'Ivoire, Ghana, Kenya, and Tanzania, depend on agricultural exports with a very large share of agricultural products exports in the economy's total merchandise exports. Among those countries, Cote d'Ivoire, Kenya, and Tanzania are getting away from the monoculture economy, by decreasing the agricultural exports share. On the other hand, in Cameroon, Ghana, and Tunisia, the agricultural export share is increasing. (I omitted the data of previous years in [table 2-5](#)) Other than African countries, Nicaragua is very dependent on agricultural exports, with over 80% share.

Look at countries in the BRICs and Cairns Group, especially Argentina and Brazil, which have a large export value and a high share of agricultural exports. Uruguay and Paraguay, members of MERCOSUR have an extremely high share of agricultural exports as much as 65% and 83%, respectively, and those shares are still increasing. In Chile, Colombia, and Guatemala, the dependency on agricultural export is decreasing, but it is still high. Australia, New Zealand, and the Russian Federation had similarly big agricultural export values in 2006, but we can see a particularly large difference between the agricultural export share of New Zealand (59%) and Russia(5.6%). In the Asian countries, the dependency on agricultural exports is not as big as the African and Latin American countries, because of the

⁸ 56 WTO members out of total of 79 of African, Caribbean and Pacific Group of States

industrialization fostered by FDI from USA and Japan. In China and Thailand, exports of agricultural products are large, followed by Indonesia, Malaysia and India. Canada, US and EU maintain an agricultural export share of around 10%.

Next, we focus on imports. We see many developing countries of the ACP Group relying on the imports for their food consumption, especially in Bangladesh, Cuba, Senegal, and Yemen, where the shares are over 20%. For the Cairns Group, Colombia, Costa Rica, Guatemala, and Peru, the import values are only about half of their exports. Turning to the Asian Countries, in India, Indonesia, and Malaysia, imports are also about half the value to their exports. On the other hand, Thailand is a big agricultural exporter, importing about one-third of the value it exports. Philippines imports about the same value as it exports. If we look at the EU and the USA, we see that import values are slightly more than export value, while Japan is outstanding in that its import value is ten times bigger than its export value.

However, if we look at the importance of agricultural trade for each country including the small poorer countries of Africa and the West Indies, we are surprised to find that 15 out of top 20 countries with the largest share of agriculture as part of their merchandise imports are in fact the small African countries, and 11 out of top 20 countries with the biggest agricultural share as part of their merchandise exports are also small African countries ([Table 2-6](#)).

(3) Which Countries Benefit From World Trade Liberalization?

It is clear from [Table 2-6](#) that the small African countries are monoculture agricultural exporters. Despite the small size of their exports to the rest of the world, they would benefit to some extent from the world's agricultural trade liberalization. On the other hand, by looking at [Table 2-2](#), it seems that large agricultural exporters like Canada, Australia, Brazil, which belong to the Cairns Group, might gain much more by the world agricultural trade liberalization.

At the same time, agricultural imports for small African countries play an important part in their total merchandise imports. So for those agricultural importers, agricultural price increase, which might occur with the abolition of agricultural subsidies in the developed countries, could be harmful. In [Table 2-6](#), the countries appearing in both imports and exports, Gambia, Benin, Comoros, are dependent on agricultural exports, but at the same time, they cannot produce enough agricultural products for their own populations.

Finally, on the right-hand side of [Table 2-7](#), we focus on the 20 countries where the agricultural exports share of each country's merchandise exports are highest, in order to see

whether their net agricultural trade values are positive or not. In poor African countries, such as Benin, Gambia, Comoros, Ethiopia, the agricultural net trade values are negative, where both agricultural export shares and import shares are very high. We assume that these countries have monoculture economies, and they have to export some kind of agriculture products, but at the same time, they have to feed their population.

In Guinea-Bissau and Burkina Faso, the agricultural net trade value turned positive in the 2000s and maintained a comparative agricultural advantage. In contrast, those countries such as Nicaragua, Malawi, Paraguay, Chad, Moldova, Belize, Uruguay, Honduras, Ghana, New Zealand, and Cote d'Ivoire have had a net agricultural trade surplus since 1979, so a clear comparative advantage exists in agriculture in those countries. However, if we see total net trade value, all the countries except Guinea-Bissau and Cote d'Ivoire, have net trade deficits in the 2000s, so it is suggested that specializing completely in agricultural production is not enough to cover the overall import demand value.

From those data, it is difficult to say whether developing countries will necessarily gain from trade liberalization in developed countries because they have two aspects as agricultural exporters and importers, the former would gain by international agricultural price increase whereas the latter would gain by international agricultural price decrease. ([Table 2-7](#))

(4) Agricultural Production and Consumption of Developed Countries and LDCs

Agricultural trade in each country is indeed a balance of production and consumption of agricultural products in each country. For example, if we examine the food balance of cereals (excluding beer) for 132 countries, focusing on the African, South American, and small Asian countries, in most of those countries, the production falls short of the consumption, and they have to import many quantities. The countries in which production surpasses consumption in cereals are Indonesia, Argentina, Bangladesh, Pakistan, Viet Nam, Thailand, Nigeria, Myanmar, Philippines, South Africa, Nepal, Sudan, Tanzania, Burkina Faso, Niger, Cambodia, Mali, Uganda, Madagascar, Lao, Uruguay, Paraguay, Chad, Benin, Nicaragua, Togo, Guyana, Rwanda, and Burundi, but the countries with positive net cereals exports are Argentina, Pakistan, Viet Nam, Thailand, Myanmar, Uruguay, Paraguay, and Guyana only, because of stock or other uses. The countries with high agricultural labor productivity or/and land productivity, such as China, the US, India, Russian Federation, France, Germany, Canada, and Australia, can be big net cereals exporters. [Table2-8](#) shows the food balance for cereals (excluding beer) for only 30 countries out of 132 countries due to space limitation.

Food Balance for vegetable oils in 2001-2003 is also examined analogously. Vegetable oils are also fundamental foods for people in developing countries. Similar to the food balance for cereals, the small countries in Africa, South America, and Asia, the production is short of consumption, so they import from the abundant countries. In Malaysia, Indonesia, Brazil, Argentina, Nigeria, Philippines, Thailand, Colombia, Cote d'Ivoire, Bolivia, Paraguay, Ghana, Cameroon, Costa Rica, Senegal, Guatemala, Mali, Benin, Chad, Guinea-Bissau, and Lao, the production surpasses the consumption, but if we look at the exports-imports balance, only in Malaysia, Indonesia, Brazil, Argentina, Philippines, Thailand, Cote d'Ivoire, Bolivia, Paraguay, and Costa Rica, the exports surpass the imports in vegetable oils due to stock changes and other uses.

In [table 2-9](#), eight agricultural commodities are selected to compare the importance of small developing countries as producers. For wheat, coarse grains, barley, and soybeans, the production shares of developed countries are very high, and if we add China, Argentina, and Brazil to developed countries, the sum of production shares are almost 100%. Moreover, this difference in agricultural production ability between developing countries and developed countries has become larger since the 1960s. In the 1960s, the production of grains and soybeans equilibrated between the group of developing countries and the group of developed countries. But at the end of the 1980s, the surplus of the group of developed countries grew to 4.9 million tons, and at the end of the 1990s, this number increased to 101million tons.⁹

On the other hand, for rice, the Asian poorer countries' production shares are very high, and for coffee, cocoa beans, and sugar cane, most of the producing countries are in South America, South-East Asia, and Africa. We can say that the developing countries, especially LDCs, have specialized in the small range of agricultural products, and they have to manage in the poor monoculture economy situation. ([See table 2-9](#))

In this section, we clarified statistically, the difference in the situation of agricultural production and trade between the developed countries and the developing countries. In the next section, the developing countries' situation and the effects of agricultural trade liberalization

⁹ Chapt.1, Yamashita(2004)

will be analyzed by simple economic tools.

ECONOMIC ANALYSIS OF AGRICULTURAL TRADE LIBERALIZATION IN DCs AND LDCs

(1) Agricultural Market Analysis in developed and developing nations

In general, the demand curve for agricultural products is close to vertical, as the agricultural demand tends to be inelastic to the price fluctuation. Under such a vertical demand curve, the price fluctuates a lot by the supply curve shift in order to restore the demand-supply equilibrium. For example, if the crops are very abundant because of good weather, the price decrease will be very big, on the contrary, if the crops are very poor because of bad weather, the price has to increase a lot in order to restore the demand-supply equilibrium. According to Yamashita(2004), the situation of the agricultural market of the developed countries and that of the developing countries can be compared as follows.

Actually, in the developed countries since the 1960s, thanks to the improvement of agricultural technology and the increase of fertilizer use, the crops per unit land surface increased. Consequently, the supply curve has shifted outward. On the contrary, in developing countries with scarce capital accumulation, they could not use the new technology developed in the developed countries. So, a big difference in the agricultural productivity between the developing countries and the developed countries resulted.

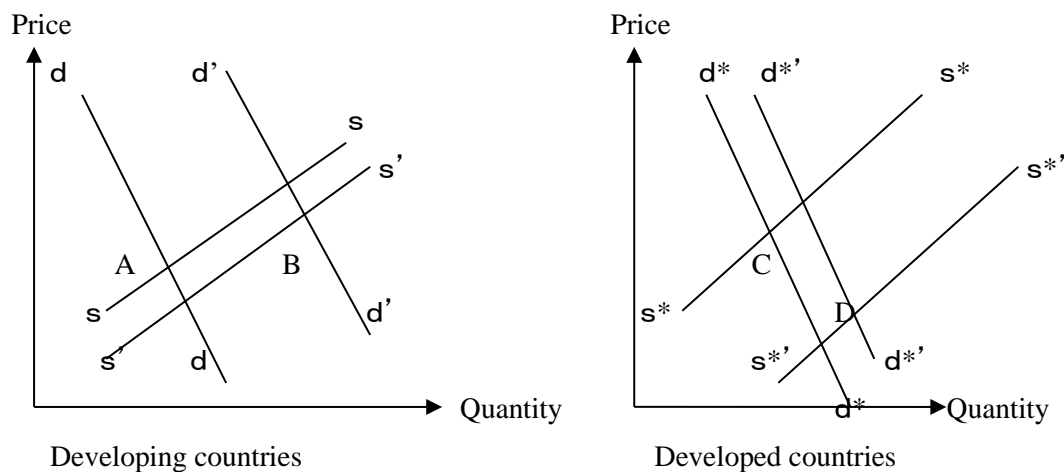


Figure 3-1 Shifts of Demand Curve and Supply Curve, 1960s~1980s

On the other hand, it is generally said that income elasticity for agricultural products is bigger for low-income people than for people with relatively high incomes. So, no big outward shift in the demand curve occurred in developed countries with economic growth. However, in developing countries, the social demand curve for a country as a whole has shifted by the economic growth, in addition to the shift that occurred by the big population increase. Figure

3-1 shows the change in the agricultural market situation from the 1960s to the 1980s, in developed and developing countries, respectively.

For developing countries, the demand curve shifted from dd to $d'd'$, and the supply curve shifted from ss to $s's'$. So the equilibrium point moved from A (the intersection of dd and ss) to B (the intersection of $d'd'$ to $s's'$). On the other hand, in developed countries, the demand curve shifted from $d*d*$ to $d*'d*'$, and the supply curve shifted from $s*s*$ to $s*'s*'$. So the equilibrium point moved from point C (the intersection of $d*d*$ and $s*s*$) to point D (the intersection of $d*'d*'$ and $s*'s*'$). Consequently, the equilibrium price decreased in developed countries, and it increased in the developing countries.

As a result of the agricultural price decrease in the developed countries, the agricultural price support system was taken in the US and Western Europe. With this policy in the developed countries, the agricultural supply increased with fiscal expenditure and excess supply of major agricultural products resulted. This agricultural product surplus by the EC and US were to be sold in the international market with the export subsidies. For agricultural products with high internal prices, the surcharge was collected by the difference between the low import prices and the high internal price. After this manner, the West European countries and the US have turned net agricultural exporters since the 1980s. On the other hand, in Japan, high import tariffs and import restrictions are levied on several agricultural products.

From developing countries' side, considering the importance of agriculture production in developing countries shown in the previous chapters, there must be potential gains for developing countries and LDCs from trade liberalization in the developed countries. In the next section, I attempt to clarify the consequences of GATT-WTO multinational trade negotiations.

(2) WTO Agricultural Negotiations after Uruguay Round

According to WTO(2004a), up to 1995, GATT rules were largely ineffective in disciplining key aspects of agricultural trade. The 1986-1994 Uruguay Round negotiations went a long way towards changing all that. Numerical targets for agricultural trade liberalization agreed in the Uruguay Round reduction in agricultural subsidies and protection are shown in [table 3-1](#). Least-developed countries do not have to reduce tariffs or subsidies. The base level for tariff cuts was the bound tariffs, or for unbound tariffs, the actual rate charged in September 1986 when the Uruguay Round began.¹⁰

¹⁰ WTO(2004a)

[Table 3-2](#) shows the average tariff equivalents of import market access barriers by goods category by source and destination region in 1995 when the trade liberalization, according to the Uruguay Round Agreement, started. We find that it was much higher for agriculture than manufacturers generally, and tariffs for agriculture exports from the low-income region to both high-income regions and low-income regions were over 15%.¹¹

In addition to agricultural products tariffs cut, the Uruguay Round Agreement on Agriculture “tariffed” and bound many non-tariff barriers, and some progress was made in reducing tariffs on fast-growing, high-value-added products. However, much remains to be done, including reducing tariff peaks and tariff escalation.

As developed countries had completed the Uruguay Round agricultural liberalization and developing countries have been continuing their efforts, the recent bound tariffs on agricultural products are 51% in developed countries 57% in developing countries, and 79% in LDCs, while recently applied tariffs are 48%, 20%, and 17% respectively.¹²

As already mentioned in Chapter 1, we have difficulties to go on the Doha Development Round negotiations for further agricultural trade liberalization recently due to strong conflicts of interests among nations. Developed Cairns Group members such as Canada and Australia expect the ambitious trade liberalization; however, countries, including Japan, Norway, and Switzerland want more flexibility. Most developing countries want the developed countries to liberalize, but mainly for reasons of food security and multi-functionality of agriculture, including environmental issues, those developed countries are reluctant to open their market. On the other hand, the EU does not want to eliminate export subsidies, and the US does not want to reduce export credits, according to Figure 3-2.

In May 2008, WTO released revised draft modalities for agriculture, intending to reflect the negotiation process. For market access, the tiered formula is suggested for all final bound tariffs to be reduced. This formula is set so that where the final bound tariffs or ad valorem equivalent are greater, the reduction rates are higher. Also, the formula is set so that tariff escalation is to be eliminated. For domestic support, a tiered formula is also proposed for reducing the overall reduction of trade-distorting domestic support. For developed country members, it is proposed that the reductions shall be implemented in six steps over five years, whereas for the developing country members with no final bound total AMS commitments

¹¹ WTO(2004a), Hertel et al.(2004), and Anderson(2004)

¹² Peters=Vanzetti(2004)

shall not be required to undertake reduction commitments in their base overall trade-distorting domestic support.¹³

In order to judge if the developing countries would benefit from trade liberalization of developed countries, the empirical studies might be useful. In the next section, the economic impact of trade liberalization will be examined according to some scenarios.

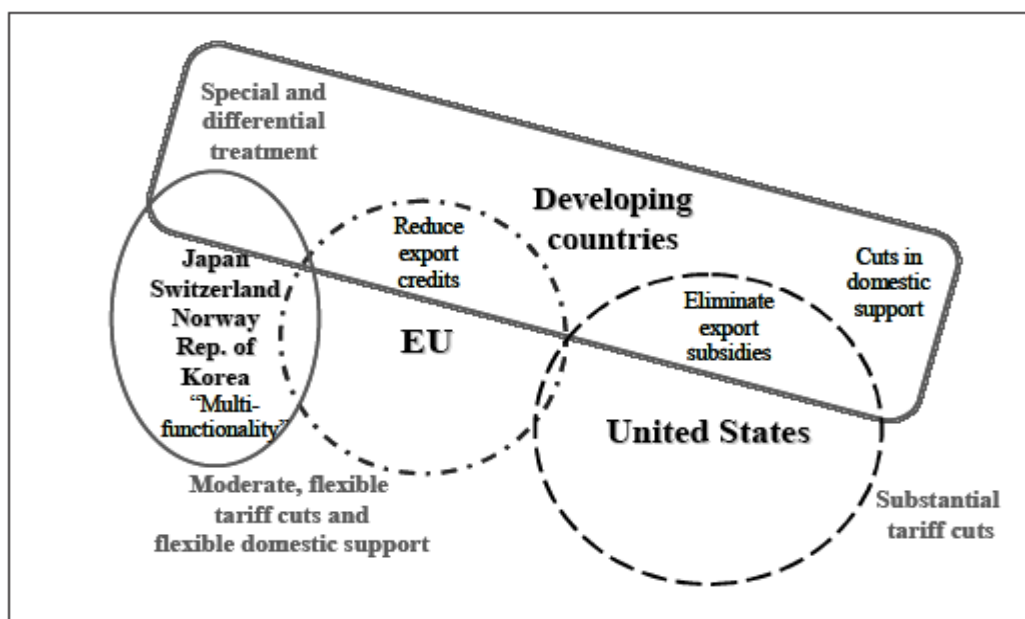


Figure 3-2 Interests and Alliances Peters=Vanzetti(2004) Source UNCTAD

(3)Simulation Model Analysis of Potential Gains from Agricultural Trade Liberalization

Here, I introduce two types of empirical research, one is the partial equilibrium model, and the other is the general equilibrium model, to assess numerically how important trade liberalization is for developing countries' economies.

①Agricultural Trade Policy Simulation Model of UNCTAD/FAO (ATPSM model)

This model is used in the research of Peters=Vanzetti(2004). In this study, four alternative agricultural trade liberalization scenarios are considered, but here I refer two of them, Cancun and Harbinson Scenarios.

i) Cancun Ministerial Meeting framework Scenario

= Developed countries:

40 % of tariff lines are subject to the Uruguay Round formula, where bound out-quota tariffs of the four most sensitive products are reduced by 15% and the next ten most

¹³ WTO(2008)

sensitive products by 44.4%, 40% of tariff lines are subject to the Swiss formula with a coefficient of 25, 20% of tariff lines with the lowest initial bound values are reduced to zero; export subsidies are reduced by 80% and domestic support by 60%.

= Developing countries:

10% most sensitive tariff lines are reduced by 5% (Special Products), next 40% most sensitive products are subject to Uruguay Round formula, where bound out-quota tariffs of the four most sensitive products are reduced by 10% and the next ten most sensitive products by 26.7% (average of last two categories 24%), 40% of tariff lines are subject to the Swiss formula with a coefficient of 50, while the remaining 10% are reduced to 5%; export subsidies are reduced by 70%, domestic support reduced by 20%.

= Least-developed countries; No reductions.

ii) Harbinson suggestions scenario

= Developed countries;

A reduction in bound out-quota tariffs of 60% where the initial tariff is higher than 90%, 50% (initial tariff between 15% and 90%), or 40% (initial tariff smaller than 15%); an 80% reduction in export subsidies; and a 60% reduction of domestic support

= Developing countries

40% reduction where the initial tariffs are higher than 120%, 35% (initial tariffs between 60% and 120%), 30% (initial tariff between 20% and 60%) and 25% (initial tariff smaller than 20%); a 70% reduction of export subsidies; and 20% reduction of domestic support.

= Developed + Developing countries

A 20% expansion of import quota

= Least-developed countries; No changes

ATPSM model is a deterministic, comparative static, partial equilibrium model, where no stochastic shocks or other uncertainties are considered, and there is no specific time dimension to the implementation of the policy measures or to the maturing of their economic effects. Also, whereas the model aims at estimating far-reaching details of the agricultural economy, it does not deal with the repercussions of barrier reductions on the industrial and service parts of the national economy. Commodities included in ATPSM are meat, dairy products, cereals, sugar, oils, vegetables, fruit, beverages, and tobacco, and cotton. The data of year 2000 are used in this analysis.

The equation system for all countries includes four equations. Equation 1 and 2 specify

that the new demand and supply are determined by the price changes, trade policy changes, and the corresponding elasticities and cross-price elasticities. Equation 3 ensures that the relation between imports and domestic supply is determined by the price ratio of domestic supply and imports. Equation 4 clears the market so that production plus imports equals domestic consumption and exports. Domestic prices are all functions of the world market prices and border protection or special domestic support measures. Once changes in world prices and hence domestic process are determined from the model solution, volume changes can be derived from equations 1-4. Given the volume responses, the trade revenue and welfare effects can be computed.

The computed results of this research are summarized in [table 3-3](#). The distributional impacts on groups of consumers, producers, and taxpayers differ among various country groups. In developed countries, consumers gain and producers lose from reductions in domestic prices. In the EU, because of the reduction in export subsidy expenditure, the positive effect arises on government revenue. The aggregate welfare in developed countries is 7,220 million US\$ and 11,983 million US\$, respectively, in Cancun and Harbinson scenario.

In developing countries and LDCs, consumers lose as a group, and producers gain because the rise in world prices lifts domestic prices. In developing countries, the government revenue decrease is bigger in the Cancun scenario than Harbinson. However, a negative effect on consumer surplus and positive effect on producer surplus and positive effect on export revenue is bigger in the Harbinson scenario than the Cancun scenario, so the aggregate welfare increase is bigger in the Harbinson scenario.

In LDCs, the impacts are smaller than the developed and developing countries groups, with a negative impact on consumer surplus, positive effect on producer surplus, and very few positive impact on government revenue, positive effect on export revenue, and slightly negative impact on aggregate welfare. As the authors of this empirical study comment, LDCs, with a higher proportion of net food-importing countries, would gain only if they liberalize themselves. However, it is important to note that the LDCs' export revenue is shown to increase by 22% (US\$ 904 million) and 30% (US\$ 1,254 million), respectively, by the trade liberalization of developed and developing countries. Increases in export revenue in a group of 20 and developing countries group are as high as 21% and 17%, respectively, in the Harbinson scenario.

Those results seem quite reasonable, and the important possible outcomes from trade

liberalization are clarified numerically. Next, I introduce the research with the general equilibrium framework and compare the results with the partial equilibrium research.

Applied General Equilibrium Model (Global Trade Analysis Policy Model)

The impacts of further trade liberalization after the Uruguay Round are assessed in Dimaranan=Hertel=Martin(2007), using the general equilibrium Global Trade Analysis Policy (GTAP) Model framework, which includes all the sectors in each country. The GTAP model of global trade is a fairly standard, multi-region model that includes the explicit treatment of international trade and transport margins, a global bank designed to mediate between world savings and investment, and a consumer demand system designed to capture differential price and income responsiveness across countries. The model includes demand for goods for final consumption, intermediate use, and government consumption. The GTAP database distinguishes 66 regions and 57 sectors in the global economy, but in this analysis of Dimaranan et al., 23-region, 28-sector aggregation of the GTAP database is used. The developed country regions accounted for 76 % of global GDP and the developing country regions for 24% in base year 1997. Agriculture and food represent 8 % of total global value-added while manufacturers represent 21% and services represent 72% of total value-added.

The advantage of a general equilibrium approach is that economy-wide effects can be explored. This research produces results suggesting that with full liberalization, global agricultural exports would increase by more than 10% while those of manufacturing and services would increase by 5%. Removal of the much higher level of protection in agriculture would have stronger impacts on trade levels.

The welfare impacts of trade liberalization are the change in utility for the regional household, the change in efficiency gains, and changes in terms of trade. The estimated gains from liberalizing trade in the general equilibrium model are much more significant than those generated by partial equilibrium model analysis. The estimated value of world total welfare impact is \$58,086 million, with \$42,325 million in developed countries and only \$15,761 million in developing countries if both developed and developing countries liberalize, however, if only developed countries liberalize the estimated total welfare impact is much smaller in developed countries and slightly smaller in developing countries.

The sources of welfare gains from tariff elimination are very different between developed and developing countries, according to [table 3-4](#). Developed countries benefit most from agricultural tariff liberalization and the removal of domestic farm support, whereas

developing countries benefit most from the liberalization of manufacturing. But we have to notice that most of the gains to developing countries from tariffs elimination in agriculture and food come from developed countries tariffs elimination for developing countries exports, and the gains from own liberalization, which decreases agricultural import prices, are not so big. The elimination of export subsidies and domestic support has a negative effect on developing countries, including LDCs. On the other hand, these effects are positive in developed countries, especially the effect of eliminating domestic support is very large in developed countries.

However, if the distinction between developing countries and LDCs were made, we would have known more precise result about what developed countries can do for the poor countries. Dimaranan=Hertel=Martin(2007) concludes about the importance of agricultural trade liberalization as following: “About half of the global gains from merchandise trade liberalization following completion of the Uruguay Round are associated with food and agriculture- a sector that accounts for just 10% of global GDP. This highlights the critical importance of making progress on the agricultural negotiations in the Doha Development Round.”

(4)Diagrammatic Analysis of the Effects of Developed Country Subsidies on LDCs

At the beginning of this section, the agricultural policies in developed countries, the US, Japan, and EU are compared. According to [table 3-5](#), domestic support and export subsidies are mainly used in US and E.U. On the other hand, Japanese protections are concentrated in particular items by adopting extremely high tariff rates on several products such as peanuts, konjac, rice, bean, butter, wheat, milk powder, and starch, or by introducing high Producer Support Estimate particularly on cereals.

Notably, it is well known that export subsidies are the major problem for the EU; on the other hand, export credits are implemented mainly in the US. Also, several sorts of domestic supports for producers are used in all three. Producer Support Estimate(PSE), which is developed for monitoring the agricultural protection level of each country, is the amount transferred from consumers or taxpayers to producers ($PSE = \text{price difference between internal and world} \times \text{production quantity} + \text{subsidies to producers}$). PSE for the US, Japan, and EU is \$38.9 billion, \$44.7 billion, \$121.4 billion, respectively, so it is shown very high in the EU for total agricultural products. However, if we look at PSE for cereals only, the PSE share in producers' revenue is extremely high in Japan (88%), whereas 0% and 16% in the US and the

EU respectively.

The import protection in the developed countries limits market access to the agriculture exporting LDCs, thereby impacting adversely on the quantity as well as the value of their exports. On the other hand, domestic support and export subsidies by the developed countries depress the world prices, so those policies influence both agriculture exporting LDCs and agriculture importing LDCs. We can make clear the possible effects of domestic support and export subsidies of developed countries on LDCs by diagrammatic economic analysis. Panagariya(2005) shows these effects with very simple partial equilibrium analysis. Those are introduced in **Figure 3-3** (an output subsidy) and Figure 3-4 (export subsidy).

Figure 3-3 shows the situations when an output subsidy for an agricultural commodity is introduced in a particular developed country, say Japan. Figure 3-3(a) corresponds to the situation of that commodity market in that developed country, and Figure 3-3(b) corresponds to the situation of the same commodity market in the rest of the world.

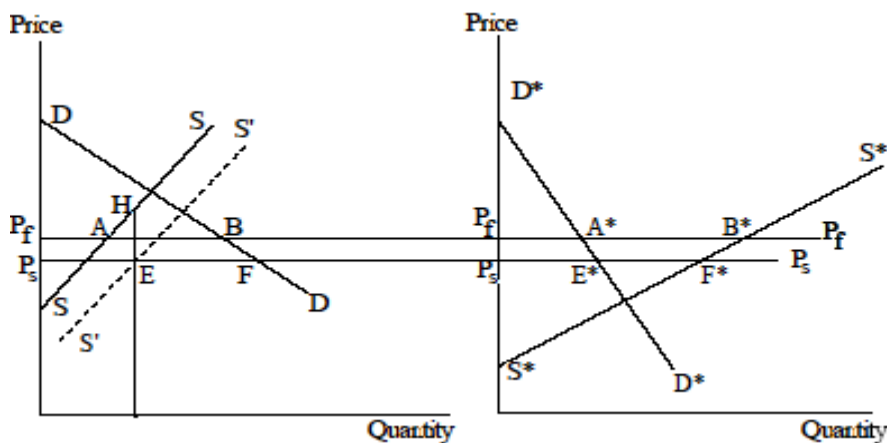


Figure3-3 (a) Japanese Output Figure3-3(b) Japanese Output Subsidy.. Source: Panagariya(2005)

In Figure 3-3(a), DD and SS respectively show the demand curve and supply curve for an agricultural commodity, say, wheat. In Figure3-3(b), D*D* and S*S* respectively show the demand curve and supply curve of the rest of the world for the same commodity. As the equilibrium autarky price is higher in the developed country, Japan (cross point of DD and SS) than the rest of the world (cross point of D*D* and S*S*), under free trade, Japan imports the wheat with the price settling at P_f . At this price, Japanese demand for imports, AB, equals the rest of the world supply of exports, A*B*. By output subsidy by the Japanese government, the supply curve shifts outward to S'S', where the vertical distance between SS and S'S' represent

per-unit output subsidy, so under the initial price P_f , Japanese supply becomes larger, and its demand for imports is now smaller than world supply A^*B^* .

Consequently, excess supply has occurred, and this excess supply pushes down the equilibrium world price of wheat. The new international equilibrium is reached at price P_s , with Japanese import demand, EF , which is equal to the world export supply E^*F^* . Per unit output subsidy of EH makes Japanese producers bear the cost only the height of E instead of the height of H ; consequently, they can sell at the price of P_s despite their actual high production cost.

As a result of the decrease of wheat imports to Japan and drop off in world wheat price caused by the Japanese output subsidy, the terms of trade in Japan is improved. From the viewpoint of the exporting countries in the rest of the world, the terms of trade deteriorate, which leads to the rest of the world to be worse off. But we have to remember that the rest of the world is made up of both exporters and importers of wheat. The effects of the output subsidy on these two groups in the rest of the world are asymmetric, with the importers actually made better off in the post-subsidy equilibrium since they are able to buy wheat at the lower world price. But as shown in Figure 3-3, the rest of the world as a whole loses because of the deterioration of the terms of trade.

Now, the effects of export subsidies are examined in Figure 3-4 using the same tools as Figure 3-3, according to Panagariya (2005), where EU is the developed region that adopts the export subsidy policy for the wheat producers. In the initial situation, before the subsidy is adopted, the free trade equilibrium must be at a price P_f , with the EU exporting AB and the rest of the world importing A^*B^* such that $AB=A^*B^*$.

After the subsidy policy is adopted, only producers who export avail of the subsidy, so the wedge has resulted between the price at which they are willing to export and the one at which they are willing to sell in the domestic market, with the wedge equaling the subsidy per-unit. In the equilibrium under the export subsidy policy, the internal price in the EU rises to P_d while the world price falls to P_s . Imports of the rest of the world increase to E^*F^* as the export price of the EU drops to P_s because of the EU subsidy. To export $E^*F^*(=EF)$, the domestic price of the EU must be P_d , with the domestic demand is equal to E on the demand curve, and the supply is equal to F on the supply curve.

Consequently, EU producers sell $EF (=E^*F^*)$ in the world market at P_s , but receive the same gross price as in the domestic market once we add the export subsidy. However, the

exporters in the rest of the world who cannot get a subsidy like the exporters in the EU have to export at the low price such as P_s because of the export subsidies in the EU and suffer adverse effects. On the contrary, the importers of wheat in the rest of the world are better off by the price decrease.

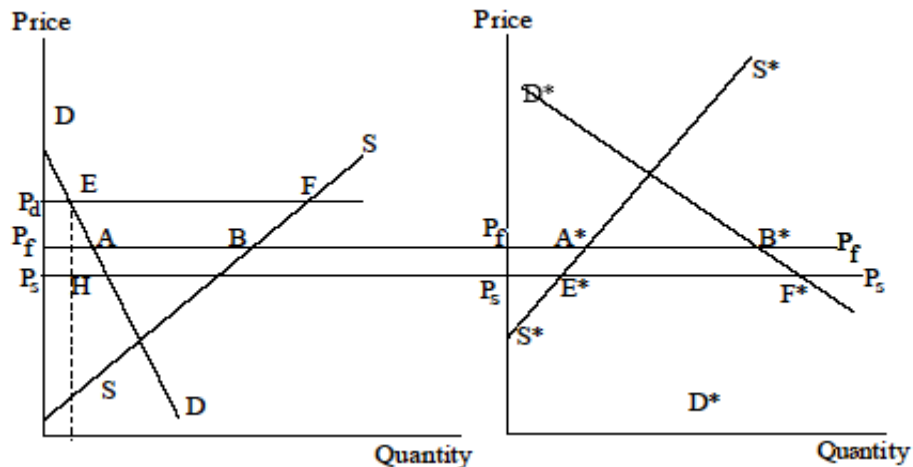


Figure 3-4(a) EU Export Subsidy: EU Figure 3-4(b) EU Export Subsidy: ROW. Source: Panagariya(2005)

Now we have to infer if the LDCs are importers or exporters of the agricultural commodities such as wheat. As already shown in the previous chapters, many LDCs are importing the important agricultural commodities to be fed. A similar fact can be taken from Panagariya(2005) by the following data. Out of 148 whole developing countries (defined by the World Bank), 105 developing countries are net food-importing countries, and 48 out of 63 Low-Income Countries(also defined by the World Bank) are net food-importing countries.¹⁴ Accordingly, we can conclude that many LDCs, which are actually net agricultural importers get gains from output subsidy and export subsidy in developed countries, and their removal will raise the world prices and hurt the real incomes of the importing countries of those agricultural products while the LDCs which are net agricultural exporters are likely to be worse off by the subsidies of developed countries, so their removal will bring about preferable effects.

However, we have to remember that there is the other possibility for the LDCs to gain from the removal of output subsidy in the developed countries. That is the possibility for those LDCs to turn to exporters by the removal of output subsidy of developed countries, because of the increase of world price.

According to Figure 3-5, the world price of wheat in the presence of the production

¹⁴ Panagariya(2005) takes this data from Valdes=McCalla(1999).

subsidy is P_s , and the LDCs are importing wheat at P_s . The removal of the subsidy raises the world price to the free trade level, P_f . At P_f , the LDCs may supply wheat competitively in the world market, so they could turn to be wheat exporters. However, for the LDCs to gain from turning to be exporters, the sum of consumer surplus and producer surplus must be bigger after having turned to the exporters. In Figure 3-3, after subtracted the common area, the total surplus of importer is area **a** while that of exporter is area **b**. So, it can be shown that only if the world price increases sufficiently to make area **b** larger than area **a**, LDCs would get a net gain to turn to exporters from a removal of the subsidy of the developed countries.

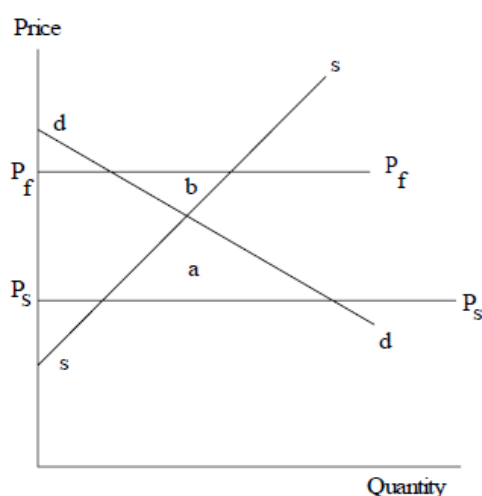


Figure 3-5 Source: Panagariya(2005)

IMPORTANT ISSUES OF AGRICULTURAL TRADE LIBERALIZATION FOR REDUCING POVERTY IN LDCs

(1) Tariff Problems

As already seen in section (3) of the previous chapter, gains for developing countries and LDCs from agricultural tariffs elimination of developed countries can be shown in the results obtained by the computable general equilibrium model. However, we have also confirmed the possibility that developing countries would have positive welfare effects by eliminating tariffs of their own. [Table 4-1](#) shows bound and applied tariffs on agricultural products in each country group. Even after some progress in reducing tariffs was made in agriculture following the Uruguay Round Agreement, tariffs in agriculture in all the countries groups, developed countries, developing countries, and LDCs are still high, including tariff peaks and tariff escalation.

As warned by Panagariya(2005), if the protectionists of developing countries claim that they do not need to liberalize, it only hurts themselves since their ability to export depends not just on the openness of the partner markets but on their own openness as well. This is partly

because the developing countries which lower their tariffs would have the incentive to grow productivity in agricultural production, and the ability to export would expand. We will deal with the productivity problem in section (2) below.

Beside the high level of tariffs on agricultural products, tariff escalation is also one of the problems. Tariff escalation is implemented when low rates are applied on unprocessed and intermediate inputs (such as bulk farm products), and high rates on final products (such as processed foods). This causes high effective rates of protection to secure high value-added in importing countries. On the contrary, from the side of exporting countries of agriculture, they have fewer opportunities for processing their own products. This has adverse effects on the economic development of LDCs since the growth in trade, which could be the engine of economic growth is accelerated by specializing in processed products for higher value-added.

According to Figure 4-1, we can confirm the escalated tariff structure all over the world. The pattern of tariff escalation is peculiar in Japan, with very low tariffs on raw material, since Japan lacks in main raw materials. In the middle-income countries, we can see the big gap between tariff rates on intermediate and final products, with the comparatively high tariffs on final products. In addition, in the middle-income countries, the tariff rates are highest in all three types of commodities, and these tariffs in middle-income countries likely impede the market access of the LDCs.

However, we should keep in mind that, as Josling (2007) notes, comparing tariffs across broad commodity groups is only a rough indicator of the extent of tariff escalation since it does not capture input-output relationships among commodities, so more research on a commodity-specific basis is needed to estimate more precisely the extent of tariff escalation.

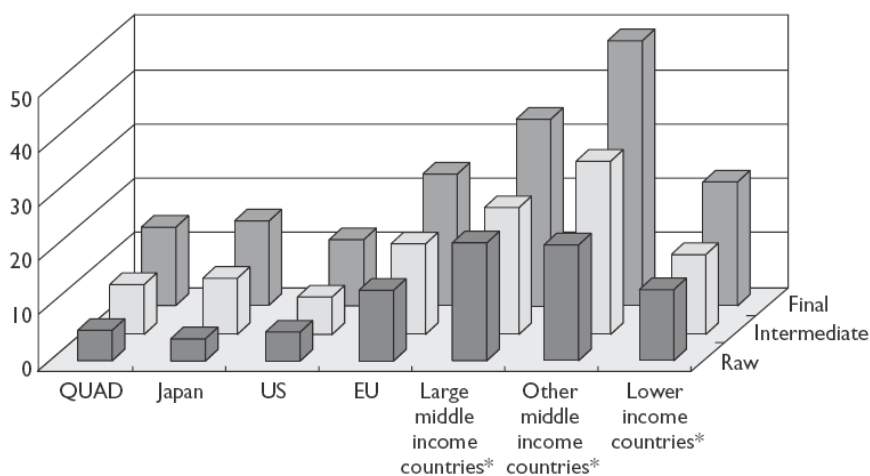


Figure 4-1 Tariff Escalation McCalla=Nash (2007) Source World Trade Integrated Database 2001

In fact, many countries with rising incomes shift the composition of food expenditure from basic and unprocessed staple foods to more varied diets with processed foods. Figure 4-2 shows that the ratio of food processing to agricultural value-added rises with per-capita incomes. In this context, poorer countries would have gains if their production situation could correspond to this demand shift in the world gradually. The food processing industry is also labor-intensive, so this is suitable for labor abundant rural areas in developing countries and LDCs. In this situation, it is important for the developing countries to access international markets with processed agricultural products, and tariff escalation structure with high tariffs on the processed products in the developed countries would impede this.¹⁵

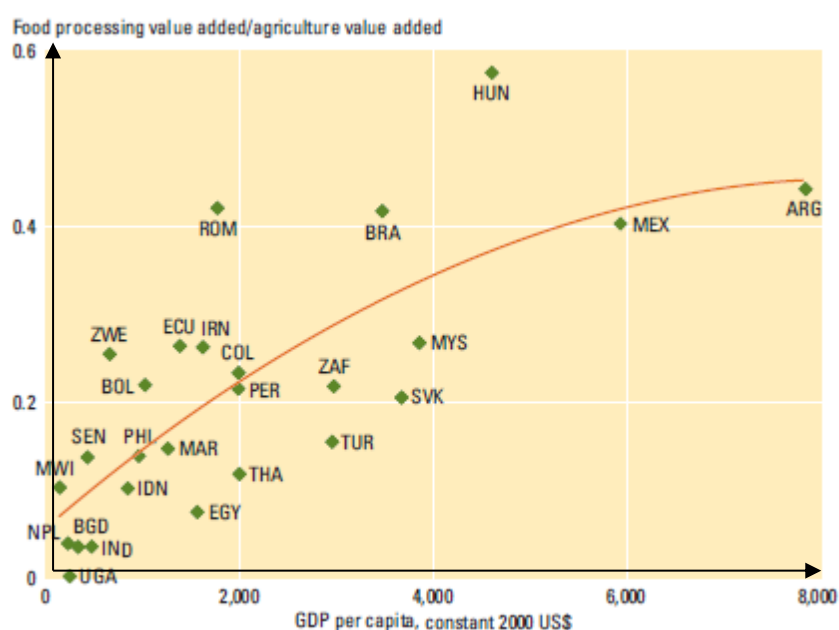


Figure 4-2 Share of Food Processing Value Added and GDP per Capita Source World Bank 2006y, UNIDO Industrial Statistics Database 2005

(2) Comparison of Agricultural Productivity between developed countries and LDCs

As we have already seen, agriculture is the most important sector in LDCs, as Sub-Sahara Africa and South Asia are two regions with the highest share of agriculture in gross value added, according to Table 1-1. So we can say that the comparative advantage sector in LDCs is still agriculture. As warned by UNCTAD (2004), the LDCs cannot be expected to gain much from further multilateral trade liberalization unless improvements are made to their productive capacities to enable them to benefit from any subsequent global growth in trade.

So, the productivity of the agricultural sector in LDCs must be examined. In [table 4-2](#),

¹⁵ Chapt.1, UNCTAD(2008)

big differences in agricultural population share in total population among the regions are shown. The biggest share of the agricultural population is in Sub-Saharan Africa, with 62.97%, followed by East Asia(60.72%) and South Asia. (57.31%). Together with the fact that the value of crops per worker is very low in Sub-Saharan Africa, East Asia, and South Asia, which are less than 1% of the US, we can say that in Sub-Saharan Africa and East and South Asia, agriculture is highly labor-intensive and with low labor productivity. However, if we look at the value of crops per hectare, Europe and East Asia are the two highest. What are the determinants of such high land productivity in these regions?

According to [table 4-3](#), the regions with high land productivity are associated with high use of inorganic fertilizers. While Europe has the highest mechanization of agriculture, as shown by the number of tractors, East Asia uses the highest quantity of labor per unit of land, reflecting the situation of China. Regions with high labor productivity, namely North America and Europe, also use a high dose of inputs like fertilizers and pesticides. On the other hand, in Sub-Saharan Africa, inorganic fertilizer and tractors are used very scarcely.¹⁶

From these two tables, we find huge differences in the nature of agricultural production between developed countries and LDCs. For the LDCs to improve labor and land productivity, intense research and development for agriculture are absolutely needed. In the next section, we examine what the developed countries can do for this purpose by financial aid.

(3) Agricultural Technological Learning and Innovation in LDCs, Foreign Aid

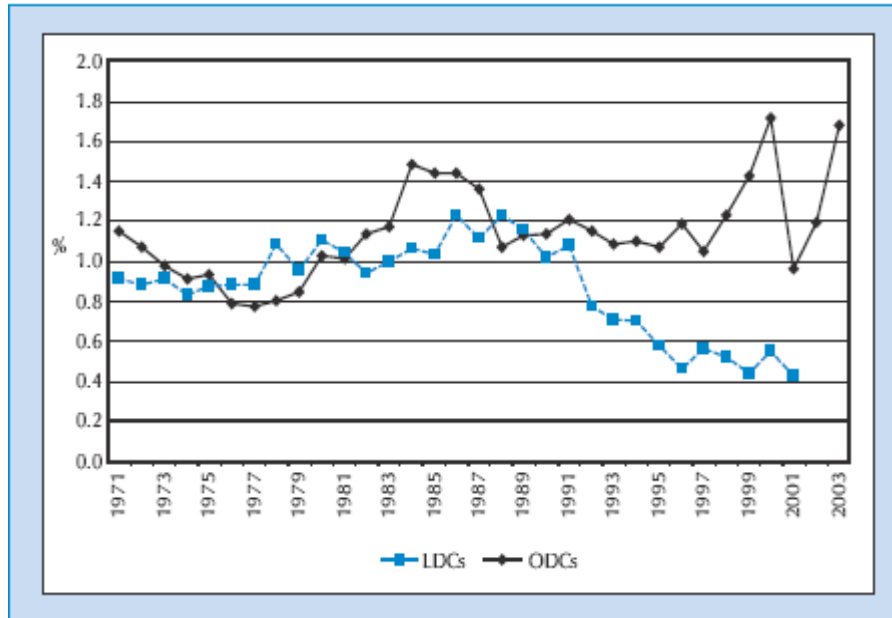
The UN Least Development Countries Report 2007 explores how national and international policies can promote more effective technological learning and innovation in LDCs. At first, from a macro economic perspective, the gap between developed countries and LDCs in selected Science and Technology related indicators is shown in [table 4-4](#). Especially as for index of researchers in R&D which is very symbolic, the high-income OECD countries have 40 times bigger than LDCs and 12 times bigger than other developing countries. On the other hand, the percentage of tertiary students in science and engineering is about the same between OECD countries and total LDCs.

Next, focusing on agriculture, Figure 4-3 shows the average evolution of public agricultural research intensity, namely the intensity ratios for agricultural R&D investments, for the LDCs and Other Developing Countries(ODCs) from 1971 to 2003. The agricultural

¹⁶ Nanda(2008)

research intensity was at about the same level in each countries group until 1991 when that of the LDCs dropped by more than half. Raising the level of agricultural R&D expenditure, even just 1.5 percent of agricultural value added by 2015 to achieve the World Bank target will require a major increase in investment in the agricultural R&D.¹⁷

Figure 4-3 Agricultural Research Intensity in the LDCs & Other Developing Countries



Source: UNCTAD secretariat calculations based on data extracted from the ASTI database on 5 May 2007.

As the background of this sharp decrease in agricultural research intensity in the LDCs, we can confirm the change in the composition of science, technology, and innovation (STI) related aid to the LDCs, in [table 4-5](#). If we compare this kind of aid between two periods, 1998-2000 and 2003-2005, aid commitments for advanced and specific human skills have more than doubled between these two periods. However, the major driving force behind this was an increase in commitments to higher education and research institutions. Aid commitments for agricultural education and training and agricultural extension actually fell between those two periods. Especially total commitments of agricultural education and training fell to half. As for commitments for agricultural research, it also fell by 50% between those two periods.

Two main problems are pointed out by UNCTAD(2007) about the agricultural aid to LDCs. First is the reluctance to increase levels of aid owing to disappointing results from past aid for agricultural R&D. However, there is an increased understanding of the weaknesses in national agricultural research system (NARS), and the emphasis is now being placed on a systems approach to agricultural innovation through a pluralistic institutional structure with

¹⁷ UNCTAD(2007)

many actors, including NGOs and private sector for new competitive mechanism.

The other problem is about the gap yielded in a global scientific linkage. The reason is that rich developed countries' agricultural agendas are shifting away from simple productivity concerns to high-technology inputs (such as precision farming technology), which are not as easily adapted by the LDCs. To solve this current problem, the role of the network of international agricultural research centres known as the Consultative Group on International Agricultural Research (CGIAR), is particularly important in undertaking scientific research relevant to increasing agricultural productivity in LDCs. UNCTAD(2007) concludes that aid for STI in the LDC agricultural sector is expected to ensure that CGIAR work remains LDC-relevant.

In addition, broadening the research agenda towards post-harvest handling, food processing, food safety, and environmental issues is also important for LDCs when we consider the possibility for LDCs to sell more foodstuff to the international market because as warned by Panagariya (2005), in anticipation of the liberalization under the Doha Round, the politics within the developed countries are already pushing the import barriers up in the form of Sanitary and Phytosanitary (SPS) measures

So, to avoid this kind of danger associated with trade liberalization in the developed countries, it is important to do agricultural research concerning SPS measures. As part of the capacity building program for LDCs related to WTO, the Japanese government is eager to host the seminars for developing countries and LDCs, especially in Asia, about the mechanism of SPS measures agreement in WTO.

(4) Consideration of Domestic Support and Export Subsidies in Developed Countries

In this section, the effects of domestic support and export subsidies in developed countries are considered in relation to the development in LDCs. As we confirmed from the economic analysis, those policies may serve to lower international agricultural prices. Consequently, the food importing LDCs could gain from these policies.

However, in fact, the developed countries increase the amount of domestic support or export subsidies when the world agricultural prices are lowing, and decrease this amount when the prices are high at the time the LDCs are in great difficulty to buy food, to match the needs for the farmers of developed countries. According to Yamashita (2004), at the time of high food prices, the EU used to levy export taxes. A similar situation occurs in food assistance in the US; namely, the US decreased food aid to 1.31 \$billion in 1996 when the grains were very

expensive and increased to \$2.34 billion in 1999 to dispose of its excess supply. Consequently, the food importing LDCs cannot rely upon those policies in developed countries whose purpose is to serve the agricultural producers in the developed countries.

[Table 4-6](#) shows how big the amount of export subsidies in EU and domestic support in EU and US. Although the export subsidies in the EU decreased from 6,495.9 \$million in 1995 to 2,516.6 \$million in 2000; it is still high. Regarding domestic support, the US increased the total amount by increasing Amber Box and eliminating Blue Box during 1995 and 1999. On the other hand, the EU decreased all the Boxes but still has a big amount. Japan halved the total amount between 1995 and 1999.

If we compare these amounts with the development commitments to agriculture by donors in [Table 4-7](#), we know how big the support and export subsidies are. Total agricultural commitments in 1999 in constant price were 11,904 \$million, so this amount is just 13% of the total domestic support in the EU in the same year 1999. Naturally, these policies are practical upon the fiscal basis, and this is why only the developed countries with the industries from which the governments can raise funds can implement these policies. So, the LDCs are definitively opposed to those policies as the source of unfair distortion of international agricultural trade.

(5) Implications of Recent Higher Food Prices for Poverty in LDCs

The world price of many staple food commodities has augmented since 2005. According to FAO data, the price of maize increased by 80% between 2005 and 2007, milk powder by 90%, wheat by 70%, and rice by about 25%. The welfare and poverty impacts of changes in the world prices of key staple food commodities, wheat, rice, dairy products, maize, sugar, beef, and poultry are examined within partial equilibrium framework by Ivaničević-Martin(2008).

To assess the impact of those changes in commodity prices, they use a simple model with an expenditure function to characterize household consumption, factor supply behavior and profit function to represent household production activities through unincorporated enterprises such as family farms.

According to this empirical study, some results are clarified about the impact of the observed increases in the global food prices over the period of 2005 to 2007. There are considerable variation among the countries and the types of households in both the impacts of a given commodity price change, and in the effect of the particular constellation of price

changes over the 2005-2007 period.

In most cases, poverty, even rural poverty, increased by the rise of food prices, and the overall sample average poverty impact was clearly adverse. While it is possible that higher prices of staple foods could lower the poverty of farmers by raising their income, this effect was in most cases, offset by adverse impacts on poor households that were net buyers of food.

From this research, the adverse effect of recent high food prices is confirmed. The high shares of staple foods in the expenditures of poor people increase their vulnerability to food price rises, while the limited share of output marketed by small, subsistence farmers reduce their benefits. As the authors of this study conclude, there are many possibilities for mitigation of these poverty impacts, but there are also risks that the full costs could be even greater, particularly if the surge in food and energy prices is transmitted into higher overall inflation rates. This is the biggest current problem in LDCs with no solution so far.

CONCLUDING REMARKS

In this paper, the possible economic solutions for reducing poverty in LDCs are considered from the points of view of agricultural trade reforms, by surveying the economic analyses about agricultural trade both theoretically and empirically. We confirmed that agriculture is still an important sector in LDCs as compared to developed countries, as the industrial structure has not developed enough for their economies to be relied on manufacturing products and services, especially in the LDCs in Africa. Consequently, the agricultural trade reforms through multilateral trade negotiations are presently indispensable for the development of LDCs.

We examined if trade liberalization of developed countries is gainful or not for the LDCs very carefully, from many points of view. We confirmed that the export revenue in LDCs would increase by agricultural trade liberalization in developed countries, from the results of some empirical analyses. On the other hand, even if some forms of trade impediment in the developed countries would bring some gains for LDCs as can be shown by economic analysis, we understand that those policies in developed countries aim to save the producers of their countries, by considering the mechanism of those policies examined in this paper. So what is good for the LDCs is the trade liberalization by reducing tariffs and eliminating production support and export subsidies in the developed countries, and this would possibly bring export opportunity for LDCs. Further liberalization by eliminating tariff escalations and increasing and reforming international agricultural aids from developed countries could accelerate development in LDCs by increasing agricultural productivity and promoting the processing of

their export products to make higher valued-added in LDCs.

In the absence of a Doha Development Round agreement, it seems that developing countries and even LDCs would need to use bilateral or regional trade agreements to promote trade reforms, which are less efficient and more costly than further global reform.¹⁸ As the increasing FTA (Free Trade Agreement) networks are ironically called spaghetti bowls, trade liberalization through regional trade agreements would complicate the world trade system, and delay the agreement by WTO. Moreover, as it seems difficult for the LDCs to join the FTA networks, LDCs would be left behind in the world trading system.

In this manner, meeting an agreement in Doha Round is the necessary solution for the development and trade expansion in the developing countries, including LDCs. As UNCTAD(2008) states, the agreement would capture some of the benefits of liberalization for LDCs, if the agreement lowers tariff bindings significantly below actual levels, reduces subsidies in developed countries where they matter most of developing countries, limits sensitive-product tariff lines and reflects the net-buyer status of the poor in special-product agreements. On the contrary, the ultimate failure of a Doha Round would be a spiraling back to global protection, which would reverse past efficiency gains from multilateral negotiations.

As Director-General of WTO, Pascal Lamy declared in his speech in New Delhi on 13 August 2008, “moving the Doha Round to its successful conclusion remains a good test for our collective determination to a global partnership for development.”¹⁹ It is time for determination toward poverty reduction and human rights support for people in LDCs, through finding a compromise on the difficulties, including the current issue of the special safeguard mechanism in agriculture for emerging countries, in addition to the agricultural trade liberalization issues of developed countries.

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¹⁸ UNCTAD(2008)

¹⁹ Speech available at http://www.wto.org/english/news_e/sppl_e/sppl98_e.htm

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APPENDIX

Table 1-1 Agriculture, Value Added Growth and Share in Gross Value Added

| World/Region | Share of Agriculture in Gross Value Added (%) | | | Growth Rate (%) | | | |
|---------------------------------|---|------|------|-----------------|-----------|--------------------------|-----------|
| | 1983 | 1993 | 2003 | GDP | | Agriculture, value added | |
| | | | | 1983-1993 | 1993-2003 | 1983-1993 | 1993-2003 |
| WORLD | 6.4 | 4.4 | 3.7 | 3.4 | 2.9 | 2.2 | 1.7 |
| Developed countries | 3.3 | 2.7 | 1.8 | 3.1 | 2.6 | 1.1 | 0.1 |
| Industrialized countries | 3.2 | 2.3 | 1.6 | 3.1 | 2.6 | 1.2 | 0.0 |
| Transition economies | ... | 11.1 | 6.2 | ... | 2.4 | ... | 0.6 |
| Developing countries | 18.1 | 13.1 | 11.9 | 4.7 | 3.9 | 3.1 | 2.5 |
| Latin America and the Caribbean | 10.2 | 7.6 | 6.5 | 2.5 | 2.3 | 2.1 | 2.5 |
| Near East and North Africa | 11.0 | 12.5 | 11.3 | 3.3 | 3.2 | 3.4 | 2.3 |
| Sub-Saharan Africa | 31.2 | 30.3 | 27.0 | 2.6 | 3.7 | 2.9 | 3.9 |
| East and Southeast Asia | 23.4 | 12.7 | 11.1 | 8.2 | 5.2 | 3.5 | 2.4 |
| South Asia | 35.6 | 29.7 | 22.9 | 5.3 | 5.5 | 3.1 | 2.5 |
| Oceania developing | 30.6 | 14.4 | 14.4 | 4.3 | 1.1 | 2.4 | 0.2 |
| North America developing | ... | ... | ... | ... | ... | ... | ... |
| Continental groupings | | | | | | | |
| Africa | 16.8 | 17.1 | 17.3 | 2.3 | 3.6 | 3.1 | 3.5 |
| Asia | 12.6 | 6.6 | 7.0 | 5.0 | 2.7 | 2.4 | 1.7 |
| Latin America | 10.4 | 7.7 | 6.7 | 2.4 | 2.2 | 2.2 | 2.5 |
| Caribbean | 6.9 | 4.3 | 3.7 | 3.2 | 3.7 | 1.1 | 1.3 |
| North America | 2.3 | 1.9 | 1.4 | 3.1 | 3.4 | 2.8 | 0.1 |
| Oceania | 6.9 | 4.8 | 2.7 | 2.8 | 3.7 | 2.1 | 1.8 |
| Europe | 4.3 | 3.5 | 2.4 | 2.6 | 2.4 | 1.2 | 0.7 |

Note: The growth rates are calculated using production data at constant prices in U.S. dollars. Regional sub-totals are obtained by summing values for countries with a complete time series of data for the period. Countries with an incomplete time series are excluded from the aggregate.

Source: FAO, Summary of World Food and Agricultural Statistics 2005.

Table 2-1 World Trade in Agricultural Products

| | | |
|-----------------|-----------|-----|
| Value \$bn | 2003 | 674 |
| Value \$bn | 2005 | 852 |
| Annual change % | | |
| | (1980-85) | -2 |
| | (1985-90) | 9 |
| | (1990-95) | 7 |
| | (1995-00) | -1 |
| | -2001 | 0 |
| | -2002 | 6 |
| | -2003 | 16 |
| | -2004 | 15 |
| | -2005 | 8 |
| | 2003 | 9.2 |
| | 2005 | 8.4 |

Source: WTO International Trade Statistics, 2004 and 2006.

Table 2-2 Top 15 agricultural exporters and importers, 2003

| | Value | Share in world | | Value | Share in world |
|---------------------------|---------------|----------------|---------------------------|---------------|----------------|
| | \$bn | % | | \$bn | % |
| Exporters | | | Importers | | |
| EU members (15) | 284.14 | 42.2 | EU members (15) | 308.87 | 42.8 |
| (EU to rest of world) | (73.38) | (10.9) | (EU from rest of world) | (98.11) | (13.6) |
| United States | 76.24 | 11.3 | United States | 77.27 | 10.7 |
| Canada | 33.69 | 5.0 | Japan | 58.46 | 8.1 |
| Brazil | 24.21 | 3.6 | China | 30.48 | 4.2 |
| China | 22.16 | 3.3 | Canada ^c | 18.02 | 2.5 |
| Australia | 16.34 | 2.4 | Korea, Rep. of | 15.56 | 2.2 |
| Thailand ^a | 15.08 | 2.2 | Mexico | 13.85 | 1.9 |
| Argentina ^b | 12.14 | 2.1 | Russian Fed. ^a | 13.73 | 1.9 |
| Malaysia | 11.06 | 1.6 | Hong Kong, China | 10.81 | - |
| Mexico | 9.98 | 1.5 | Retained imports | 6.47 | 0.9 |
| | | | Taipei, Chinese | 7.96 | 1.1 |
| Indonesia | 9.94 | 1.5 | Switzerland | 7.12 | 1.0 |
| New Zealand | 9.6 | 1.4 | Saudi Arabia | 6.26 | 0.9 |
| Russian Fed. ^a | 9.37 | 1.4 | Thailand ^a | 5.72 | 0.8 |
| Chile | 7.47 | 1.1 | Indonesia | 5.44 | 0.8 |
| India ^a | 7.03 | 1.2 | Turkey | 5.22 | 0.7 |
| Above 15 | 548.44 | 81.8 | Above 15 | 580.44 | 80.4 |

a Includes WTO Secretariat estimates. , b 2002 instead of 2003, c Imports are valued f.o.b.

note: Exports are valued f.o.b and Imports are valued c.i.f , if not specified.

Source: WTO International Trade Statistics, 2004. "E.U. members" includes trade between E.U. members

Table 2.3 Exports of Agricultural Products by region, 2005

| | Value | Share of intra-regional exports in the region | Share in world exports |
|---------------|-----------------|---|------------------------|
| | Billion dollars | % | % |
| World | 851.8 | | 100.0 |
| Europe | 396.1 | 80.9 | 46.5 |
| Asia | 154.4 | 57.8 | 18.1 |
| North America | 136.6 | 46.4 | 16.0 |

| | | | |
|---------------------------|------|------|------|
| South and Central America | 93.5 | 14.5 | 11.0 |
| Africa | 32.3 | 17.1 | 3.8 |
| CIS | 26.5 | 31.3 | 3.1 |
| Middle East | 12.4 | 48.8 | 1.5 |

Source: WTO Trade Statistics 2006

Table 2-4 Agricultural Products' Share in Trade, by Region, 2003

| | Exports | Imports | | Exports | Imports |
|--|---------|---------|---|---------|---------|
| Share in total merchandise trade, % | | | Share in primary products trade, % | | |
| World | 9.2 | 9.2 | World | 41.2 | 41.2 |
| North America | 11.0 | 6.2 | North America | 56.6 | 32.2 |
| Latin America | 19.8 | 9.7 | Latin America | 47.2 | 44.0 |
| Western Europe | 9.6 | 10.4 | Western Europe | 57.6 | 48.3 |
| C./E. Europe/Baltic States/CIS | 8.8 | 10.1 | C./E. Europe/Baltic States/CIS | 22.7 | 47.6 |
| Africa | 13.9 | 15.9 | Africa | 20.2 | 59.4 |
| Middle East | 3.4 | 12.4 | Middle East | 4.4 | 68.0 |
| Asia | 6.3 | 8.9 | Asia | 46.3 | 33.2 |

Source: WTO International Trade

Table 2-5 Exports and Imports of Agricultural Products. Value and Share in the economy's total merchandise exports and imports

| Exports | Value(mil.\$) | Share(%) | Imports | Value(mil.\$) | Share(%) |
|----------------------------|---------------|----------|----------------------------|---------------|----------|
| | 2006 | 2006 | | 2006 | 2006 |
| ACP Group | | | ACP Group | | |
| Cameroon | 1011 | 28.3 | Bangladesh | 2709 | 21.0 |
| Côte d'Ivoire | 3508 | 41.7 | Cuba | 1261 | 22.7 |
| Ghana | 1616 | 43.6 | Dominican Republic | 1336 | 11.9 |
| Kenya | 1503 | 45.6 | Jamaica | 840 | 14.9 |
| Morocco | 2629 | 20.7 | Morocco | 2832 | 12.0 |
| Nicaragua | 843 | 82.0 | Nigeria | 2963 | 14.3 |
| Pakistan | 2210 | 13.1 | Pakistan | 4131 | 13.9 |
| Sri Lanka | 1697 | 24.6 | Senegal | 917 | 26.7 |
| Tanzania | 704 | 41.6 | Sri Lanka | 1336 | 13.0 |
| Tunisia | 1467 | 12.7 | Tunisia | 1697 | 11.4 |
| | | | Yemen | 1084 | 22.0 |
| BRICS, Cairns Group | | | BRICS, Cairns Group | | |
| Argentina | 21333 | 45.8 | Argentina | 1396 | 4.1 |

| | | | | | |
|----------------------------|--------|------|----------------------------------|--------|------|
| Australia | 22178 | 18.0 | Australia | 7268 | 5.5 |
| Brazil | 39528 | 28.8 | Brazil | 5899 | 6.2 |
| Canada | 44230 | 11.4 | Canada | 23951 | 6.8 |
| Chile | 11492 | 19.8 | Chile | 2657 | 6.9 |
| China | 32543 | 3.4 | China | 51653 | 6.5 |
| Columbia | 4922 | 20.2 | Columbia | 2704 | 10.4 |
| Costa rica | 2675 | 32.6 | Costa rica | 1176 | 10.2 |
| Guatemala | 2229 | 37.0 | Guatemala | 1379 | 11.6 |
| India | 14412 | 11.7 | India | 7840 | 4.2 |
| Indonesia | 18320 | 17.7 | Indonesia | 7487 | 9.3 |
| Malyasia | 15573 | 9.7 | Malyasia | 8505 | 6.5 |
| New Zealand | 13235 | 59.0 | New Zealand | 2329 | 8.8 |
| Peru | 3812 | 16.3 | Peru | 1795 | 11.7 |
| Philippines | 3075 | 6.5 | Philippines | 3719 | 7.2 |
| Russian Federation | 17055 | 5.6 | Russian Federation | 23377 | 14.3 |
| South Africa | 5022 | 8.6 | South Africa | 3687 | 5.3 |
| Thailand | 21584 | 16.5 | Thailand | 7366 | 5.7 |
| Uruguay | 2566 | 64.9 | | | |
| Paraguay | 1582 | 83.0 | | | |
| Developed Countries | | | Developed Countries n.e.c | | |
| European Union 25 | 405247 | 8.9 | European Union 25 | 433662 | 9.1 |
| Japan | 6482 | 1.0 | Japan | 65623 | 11.3 |
| USA | 92664 | 8.9 | USA | 103648 | 5.4 |

Note: For Kenya, the data of 2005 is taken for the data of 2006 Source: WTO, World Trade Statistics 2007

Table 2-6 Agricultural Share in Each Country's Merchandise Trade(2004)

| | | | | Exports | | | |
|--------------------|--------|-------------------|-------|------------------|--------|------------------------|-------|
| Top 20 countries | | Last 20 countries | | Top 20 countries | | Last 20 countries | |
| Djibouti | 77.39% | Turkmenistan | 3.07% | Vanuatu | 91.44% | Angola | 0.01% |
| Mauritania | 71.85% | Hungary | 3.85% | Guinea-Bissau | 90.43% | Kuwait | 0.06% |
| Gambia | 71.07% | USA | 3.92% | Nicaragua | 84.62% | Qatar | 0.11% |
| Guinea-Bissau | 58.73% | Argentina | 3.95% | Malawi | 81.06% | Libyan Arab Jamahiriya | 0.14% |
| Dem. Rep. of Congo | 52.85% | Thailand | 4.06% | Benin | 75.11% | Algeria | 0.17% |
| Benin | 44.51% | Uzbekistan | 4.36% | Gambia | 74.39% | Antigua and Barbuda | 0.29% |
| Congo | 43.48% | Cambodia | 4.61% | Paraguay | 67.98% | Japan | 0.33% |
| Cape Verde | 41.77% | Australia | 4.63% | Comoros | 65.61% | Saudi Arabia | 0.39% |
| Comoros | 40.42% | China | 4.65% | Chad | 64.75% | Gabon | 0.41% |

| | | | | | | | |
|---------------------------|--------|---------------------|-------|---------------------------|--------|---------------------|-------|
| Haiti | 35.95% | Republic of Korea | 4.73% | Burkina Faso | 61.03% | Central Africa Rep. | 0.56% |
| Saint Kitts and Nevis | 35.23% | Turkey | 4.78% | Republic of Moldova | 60.12% | Bahrain | 0.57% |
| Dem People's Rep of Korea | 34.99% | Antigua and Barbuda | 5.33% | St Vincent and Grenadines | 60.12% | Venezuela | 0.62% |
| Sao Tome and Principe | 33.36% | India | 5.43% | Belize | 59.10% | Equatorial Guinea | 0.73% |
| Eritrea | 30.30% | Botswana | 5.44% | Uruguay | 55.05% | Norway | 0.75% |
| Senegal | 29.60% | Slovakia | 5.45% | Honduras | 53.71% | Bahamas | 0.77% |
| Liberia | 29.44% | Brazil | 5.46% | Ghana | 52.07% | Rep Korea | 0.84% |
| Yemen | 28.58% | South Africa | 5.49% | New Zealand | 50.58% | Maldives | 0.85% |
| Angola | 27.50% | Malaysia | 5.55% | Djibouti | 50.07% | Russia Fed | 1.20% |
| Samoa | 26.54% | Canada | 5.55% | Ethiopia | 49.59% | Lesotho | 1.21% |
| Niger | 26.14% | Czech Republic | 5.64% | Côte d'Ivoire | 49.54% | Botswana | 1.50% |

Table 2-7 Net Total Trade Value and Net Agricultural Trade Value (Exports - Imports)

| Countries | Net Total Trade Value | | | | Agricultural Net Trade Value | | | |
|----------------------|-----------------------|-----------|-------|-------|------------------------------|-----------|------|------|
| | (US\$ million) | | | | (US\$ million) | | | |
| | 1979-1981 | 1999-2001 | 2003 | 2004 | 1989-1991 | 1999-2001 | 2003 | 2004 |
| Vanuatu | -29 | -70 | -63 | -103 | -2 | -4 | -8 | 3 |
| Guinea-Bissau | -43 | 5 | 0 | 0 | -11 | 14 | 2 | 22 |
| Nicaragua | -221 | -1222 | -1274 | -1274 | 95 | 76 | 96 | 211 |
| Malawi | -136 | -131 | -213 | -449 | 284 | 383 | 310 | 334 |
| Benin | -282 | -320 | -614 | -552 | -22 | 5 | 43 | -153 |
| Gambia | -100 | -205 | -170 | -200 | -58 | -61 | -47 | -141 |
| Paraguay | -177 | -1839 | -668 | -1019 | 628 | 326 | 782 | 1075 |
| Comoros | -16 | -44 | -45 | -45 | -4 | -9 | -10 | -8 |
| Chad | 53 | -240 | -810 | -810 | 101 | 83 | 42 | 49 |
| Burkina Faso | -254 | -372 | -544 | -596 | -14 | -43 | 153 | 162 |
| Moldova, Republic of | | -251 | -613 | -783 | | 232 | 265 | 309 |

| | | | | | | | | |
|------------------------------|------|-------|-------|-------|------|------|------|------|
| Saint Vincent and Grenadines | -36 | -117 | -162 | -166 | 27 | 1 | -14 | -14 |
| Belize | -42 | -235 | -347 | -347 | 45 | 67 | 60 | 43 |
| Uruguay | -489 | -1097 | -8 | 32 | 606 | 592 | 896 | 1301 |
| Honduras | -137 | -1535 | -1925 | -2388 | 516 | 130 | 27 | 174 |
| Ghana | -91 | -1347 | -1902 | -2888 | 222 | 117 | 408 | 174 |
| New Zealand | 106 | -748 | -1670 | -2333 | 4293 | 4865 | 6418 | 8241 |
| Ethiopia | 238 | -1069 | -2063 | -2531 | | 25 | -140 | -42 |
| Côte d'Ivoire | 137 | 487 | 1977 | 2654 | 1222 | 1693 | 2579 | 2382 |

Source:FAO Statistical Yearbook 2004

Table 2-8 Food Balance - Cereals Excluding Beer (2001-2003) (1,000tonnes)

| COUNTRIES | Production (+) | Exports (-) | Imports (+) | Stock changes & other uses (-) | Consumption (=) |
|--------------------|-------------------|----------------|----------------|--------------------------------------|-----------------|
| World | 1,879,601 | 294,688 | 294,068 | 936,253 | 942,728 |
| China | 334,013 | 15,969 | 10,485 | 112,286 | 216,242 |
| USA | 321,240 | 84,698 | 7,073 | 210,893 | 32,722 |
| India | 187,171 | 7,940 | 50 | 15,149 | 164,133 |
| Russian Federation | 77,780 | 9,599 | 2,660 | 48,896 | 21,945 |
| France | 61,576 | 31,586 | 2,770 | 25,740 | 7,019 |
| Brazil | 54,860 | 682 | 9,292 | 43,848 | 19,622 |
| Indonesia | 44,208 | 162 | 6,637 | 8,045 | 42,639 |
| Germany | 44,145 | 12,835 | 5,241 | 27,184 | 9,367 |
| Canada | 43,290 | 18,542 | 5,056 | 26,136 | 3,667 |
| Argentina | 33,730 | 21,096 | 48 | 7,505 | 5,178 |
| Ukraine | 32,153 | 7,259 | 1,576 | 18,533 | 7,937 |
| Australia | 31,893 | 17,651 | 340 | 12,890 | 1,692 |
| Turkey | 30,281 | 1,443 | 2,695 | 16,046 | 15,488 |
| Mexico | 29,976 | 916 | 17,483 | 28,629 | 17,914 |
| Bangladesh | 26,779 | 1 | 3,243 | 3,547 | 26,474 |
| Poland | 25,743 | 513 | 1,147 | 20,424 | 5,953 |
| Pakistan | 25,487 | 3,220 | 207 | 1,454 | 21,020 |
| Viet Nam | 25,086 | 3,687 | 1,214 | 7,605 | 15,008 |
| Thailand | 22,263 | 8,435 | 1,228 | 7,451 | 7,606 |
| United Kingdom | 21,145 | 4,730 | 4,273 | 14,057 | 6,632 |
| Nigeria | 20,482 | 61 | 3,940 | 6,731 | 17,630 |

| COUNTRIES | Production (+) | Exports (-) | Imports (+) | Stock changes & other uses (-) | Consumption (=) |
|------------------------|-------------------|----------------|----------------|--------------------------------------|-----------------|
| Spain | 20,120 | 2,425 | 10,249 | 23,909 | 4,035 |
| Italy | 19,268 | 4,504 | 9,971 | 15,414 | 9,321 |
| Iran, Islamic Republic | 17,712 | 61 | 7,193 | 10,670 | 14,174 |
| Egypt | 17,317 | 567 | 9,316 | 9,064 | 17,002 |
| Myanmar | 15,767 | 843 | 118 | 4,760 | 10,282 |
| Kazakhstan | 15,446 | 4,934 | 132 | 8,054 | 2,590 |
| Romania | 15,412 | 562 | 1,316 | 11,467 | 4,698 |
| Philippines | 13,391 | 23 | 4,435 | 6,455 | 11,349 |
| South Africa | 11,869 | 1,203 | 2,191 | 4,515 | 8,342 |

Table 2-9 Production of Selected Agricultural Commodities (1000 tonnes)

| Wheat | Rice | Coarse Grains | Barley | Soybeans | Potatoes | Sugar Cane | Coffee |
|------------------|-------------------|------------------|-------------------|-----------------|-------------------|-------------------|-------------------|
| World 629873 | World 608368 | World 1032119 | World 153830 | World 206408 | World 330125 | World 1328217 | World 7782 |
| China 91952 | China 180523 | USA 319858 | RussianFed. 17180 | USA 85013 | China 70036 | Brazil 416256 | Brazil 2467 |
| India 72060 | India 128000 | China 140692 | Canada 13186 | Brazil 49793 | RussianFed. 35914 | India 236180 | Viet Nam 835 |
| USA 58738 | Indonesia 54088 | Brazil 44809 | Germany 12993 | Argentina 31500 | India 25000 | China 90979 | Indonesia 700 |
| RussianFed 45413 | Bangladesh 39754 | India 32300 | Ukraine 11084 | China 17600 | Ukraine 20755 | Thailand 64974 | Colombia 681 |
| France 39705 | Viet Nam 35888 | France 30714 | France 11040 | India 7500 | USA 20686 | Pakistan 53419 | Mexico 311 |
| Canada 25860 | Thailand 23860 | RussianFed 30348 | Spain 10609 | Paraguay 3584 | Poland 13999 | Mexico 45127 | India 270 |
| Germany 25427 | Myanmar 23700 | Mexico 29659 | Turkey 9000 | Canada 3048 | Germany 13044 | Colombia 40020 | Ethiopia 260 |
| Turkey 21000 | Philippines 14497 | Canada 26823 | Australia 6454 | Bolivia 1670 | Belarus 9902 | Australia 36993 | Guatemala 217 |
| Australia 20376 | Brazil 13277 | Germany 25670 | USA 6091 | Indonesia 723 | Netherlands 7488 | Philippines 32500 | Uganda 186 |
| Pakistan 19500 | Japan 10912 | Ukraine 23396 | UK 5815 | RussianFed. 555 | France 7254 | USA 26320 | Honduras 185 |
| Ukraine 17520 | USA 10470 | Poland 19743 | Denmark 3589 | Italy 518 | UK 6316 | Indonesia 25600 | Peru 185 |
| UK 15473 | Pakistan 7537 | Nigeria 19170 | Poland 3571 | Nigeria 465 | Canada 5171 | Cuba 24000 | Côte d'Ivoire 160 |
| Argentina 14560 | Korea, Rep. 6945 | Argentina 18592 | China 3222 | Uruguay 377 | Turkey 4800 | Argentina 19300 | Costa Rica 126 |

Source:FAO Statistical Yearbook 2005-2006.

Table3-1 Numerical Targets for Agricultural Trade Liberalization Agreed in the Uruguay Round

| | Developed Countries 6 years :1995-2000 | Developing Countries- 10 year:1995-2004 |
|---|---|--|
| Tariffs | | |
| Average cut for all agricultural products | -36% | -24% |
| Minimum cut per product | -15% | -10% |
| Domestic Support | | |
| Cuts in total support | -20% | -13% |
| Exports | | |
| Value of subsidies (outlays) | -36% | -24% |
| Subsidized quantities | -21% | -14% |

Source: WTO, Agricultural Negotiations: Backgrounder,2004

Table 3-2 Average Tariff Equivalents of Import Market Access Barriers 1995 (%)

| Exporting Region | Importing Region High Income | Importing Region Low Income | World |
|------------------|---------------------------------|--------------------------------|-------|
| Agriculture | | | |
| High Income | 16 | 22 | 18 |
| Low Income | 15 | 18 | 16 |
| World | 16 | 20 | 17 |
| Manufactures | | | |
| High Income | 1 | 11 | 4 |
| Low Income | 3 | 13 | 7 |
| World | 2 | 12 | 5 |

Source: Hertel et al.(2004), Anderson(2004)

Table3-3 Welfare and Export Revenue Impacts from the Cancun and Harbinson Scenarios

| | <i>Consumer surplus</i> | <i>Consumer surplus</i> | <i>Producer surplus</i> | <i>Producer surplus</i> | <i>Government Revenue</i> | <i>Government revenue</i> |
|-------------------|--------------------------|--------------------------|-------------------------|-------------------------|---------------------------|---------------------------|
| | <i>Cancun</i> | <i>Harbinson</i> | <i>Cancun</i> | <i>Harbinson</i> | <i>Cancun</i> | <i>Harbinson</i> |
| | US \$ m | US \$ m | US \$ m | US \$ m | US \$ m | US \$ m |
| Developed | 20,032 | 34,735 | -16,543 | -24,403 | 3,730 | 1,652 |
| Developing | -14,529 | -18,023 | 17,707 | 19,204 | -3,014 | -140 |
| LDC | -1760 | -2,455 | 1,600 | 2,230 | 19 | 26 |
| World | 3743 | 14,256 | 2,764 | -2,970 | 735 | 1,538 |
| Group of20 | -11,123 | -11,558 | 11,481 | 12,097 | -162 | 381 |
| Cairns | -5,954 | -7090 | 7,266 | 8,900 | -84 | 217 |
| | <i>Aggregate Welfare</i> | <i>Aggregate welfare</i> | <i>Export revenue</i> | <i>Export revenue</i> | <i>Export revenue</i> | <i>Export revenue</i> |
| | <i>Cancun</i> | <i>Harbinson</i> | <i>Cancun</i> | <i>Harbinson</i> | <i>Cancun</i> | <i>Harbinson</i> |
| | US \$ m | US \$ m | US \$ m | US \$ m | % | % |
| Developed | 7,220 | 11,983 | -938 | 1,189 | -1 | 1 |
| Developing | 163 | 1,040 | 12,272 | 16,557 | 13 | 17 |
| LDC | -141 | -199 | 904 | 1,254 | 22 | 30 |
| World | 7,242 | 12,824 | 12,237 | 19,001 | 6 | 10 |
| Group of20 | 196 | 920 | 7,861 | 10,951 | 15 | 21 |
| Cairns | 1,228 | 2,027 | 6,415 | 8,297 | 8 | 10 |

Source:Peters Vanzetti,2004

Table3-4 General Equilibrium Analysis Welfare Impacts of Full Global Liberalization, 2007

| | Tariffs <i>Agri&food</i> | Tariffs <i>Manuf.&Services</i> | Export Subsidies | Domestic Support | Total |
|--|---|---|-----------------------------|-----------------------------|--------------|
| Developed liberalize | | | | | |
| Developed | 6,912 | -12,169 | 6,435 | 13,898 | 15,076 |
| Developing | 5,930 | 16,970 | -5,439 | -5,269 | 12,192 |
| Total | 12,841 | 4,802 | 996 | 8,629 | 27,268 |
| Developed & Developing liberalize | | | | | |
| Developed | 13,963 | 7,585 | 6,337 | 14,441 | 42,325 |
| Developing | 6,571 | 20,544 | -5,486 | -5,868 | 15,761 |
| Total | 20,534 | 28,129 | 850 | 8,573 | 58,086 |

Source: Dimaranan=Hertel=Martin (2007)

Table3-5 Comparison of the Agricultural Policies in US, Japan, and EU.

| | US. | Japan | EU. |
|---|------------|------------------------------|------------------|
| <i>Decoupled Income Support</i> | ○ | × | ○ |
| <i>Environmental Direct Support</i> | ○ | × | ○ |
| <i>Direct Support for Producers</i> | ○ | × | ○ |
| <i>Support for Disadvantage Land Producers</i> | × | ○ | ○ |
| <i>Domestic Support for Production Adjustment</i> | × | ○ | × |
| <i>PSE total (in billion US\$)</i> | 38.9 | 44.7 | 121.4 |
| <i>PSE Share in Producers Revenue for Cereals</i> | 0% | 88% | 16% |
| <i>Export Subsidies</i> | ○ | × | ○ |
| <i>Export Credit</i> | ○ | × | × |
| <i>Tariffs above 500%</i> | × | (rice,peanuts,konjak,starch) | × |
| <i>Tariffs of 300% ~500%</i> | × | ○(bean,butter,sugar) | × |
| <i>Tariffs of 200% ~300%</i> | × | ○(wheat, barley,milk powder) | 2(butter, sugar) |
| <i>Average Agricultural Tariff Rate(PostUR,%)</i> | 10.9 | 64.9 | 15.7 |
| <i>Average Manufacture Tariff Rate(Post UR%)</i> | 3.5 | 1.5 | 3.6 |

Source: Yamashita(2004),Asakura(2003)

Note: All are 2003 data, except PSE shares for cereals, which are 1998 data. Corresponds to “yes,” and × corresponds to” no.”

Table 4-1 Agricultural weighted average import tariffs by region in 2001 (percent, ad valorem equivalent, weights based on imports.)

| | Bound Tariff | MFN applied tariff | Actual applied tariff |
|----------------------|--------------|--------------------|-----------------------|
| Developed countries | 27 | 22 | 14 |
| Developing countries | 48 | 27 | 21 |
| Of which: LDCs | 78 | 1424 | 13 |
| World | 37 | | 17 |

a Includes preferences and in-quota TRQ rates where relevant, as well as the ad valorem equivalent of specific tariffs. Note: In Table 4-1, developed countries include Europe's transition economies that joined the EU in April 2004. The developing countries definition used here is that adopted by the WTO and so includes East Asia's four newly industrialized tiger economies.

Source: Jean-Laborde-Martin (2005), Martin-Anderson (2005)

Table 4-2 Regional Distribution of Value of Crops, Productivity and Population 1995-97 average

| | Value of crops | Share in world | Crops per hectare | Crops per worker | Agricultural labor force | Agricultural population | Agricultural population share |
|-------------------------------|----------------|----------------|-------------------|------------------|--------------------------|-------------------------|-------------------------------|
| | Bil.\$ '89-9 | % | 1989-91\$ | 1989-91\$ | Million | Million | % |
| North America | 99 | 12.60 | 760 | 37,989 | 3.7 | 7.6 | 2.54 |
| Latin America | 77 | 9.80 | 663 | 2,367 | 44.5 | 111.7 | 22.90 |
| Europe | 104 | 13.23 | 1,047 | 6,982 | 20.1 | 41.9 | 8.10 |
| Former Soviet Union | 41 | 5.22 | 342 | 3,111 | 23.5 | 49.7 | 17.03 |
| West Asia/North Africa | 48 | 6.11 | 749 | 1,664 | 41.9 | 104.8 | 29.87 |
| Sub-Saharan Africa | 49 | 6.23 | 317 | 323 | 167.1 | 365.9 | 62.97 |
| East Asia | 189 | 24.05 | 1,141 | 319 | 517.8 | 871.6 | 60.72 |
| South Asia | 113 | 14.38 | 503 | 320 | 334.0 | 729.5 | 57.31 |
| Southeast Asia | 58 | 7.38 | 639 | 435 | 132.6 | 252.4 | 51.70 |
| Oceania | 9 | 1.15 | 425 | 8,491 | 2.1 | 5.3 | 18.34 |
| World | 786 | 100 | | 779 | 1,287.8 | 2,540.4 | 44.15 |

Source: Wood et al.(2001) , Nitya Nanda(2008)

Table 4-3 Regional Distribution of Crop Area and Agricultural Inputs, 1995-97 average

| | Croppe d area | Croppe d area in world | Agricultura l labor | Tractors | Inorgani c Fertilizer | Share of irrigated croplan d | Pesticide s |
|--------------------------|--------------------|------------------------------|------------------------|-------------------------|-----------------------------|---------------------------------------|-------------------|
| | Million hectare | % | Person per hectare | Hectare / tractor | Kg per hectare | % | \$ per hectare |
| North America | 130.3 | 11.0 | 0.02 | 41 | 101.8 | 9.8 | 40 |
| Latin America | 116.2 | 9.8 | 0.28 | 102 | 62.1 | 11.3 | 19 |
| Europe | 99.3 | 8.4 | 0.15 | 14 | 158.4 | 12.5 | 102 |
| Former Soviet Union | 119.8 | 10.1 | 0.11 | 102 | 20.8 | 9.3 | 14 |
| WestAsia/NorthAfric a | 64.1 | 5.4 | 0.45 | 60 | 61.1 | 26.4 | 5 |
| Sub-Saharan Africa | 154.8 | 13.0 | 0.98 | 622 | 11.6 | 3.7 | - |
| East Asia | 165.6 | 14.0 | 3.58 | 47 | 265.0 | 38.7 | 16 |
| South Asia | 224.6 | 18.9 | 1.57 | 123 | 88.8 | 38.0 | - |
| Southeast Asia | 90.8 | 7.7 | 1.47 | 232 | 83.8 | 17.4 | - |
| Oceania | 21.2 | 1.8 | 0.05 | 138 | 50.0 | 5.2 | - |
| World | 1,186.8 | 100.0 | 0.85 | 57 | 89.7 | 17.5 | 23 |

Source: Wood et al.(2001), Nitya Nanda(2008)

Table 4-4 Selected Science &Technology-Related Indicators for LDCs and High-income Countries

| Countries | R&D | | | Human capital | | | |
|------------------|----------------------|---|---|---|---|--|----------------------------------|
| | R&D (% of GDP) | Researchers in R&D (per million people) | Scientific and technical journal articles | School enroll- ment, tertiary (% of age group) | Tertiary students in science, engineering (% total tertiary) | Literacy rate, adult total (% of people ages 15 and above) | Average years of schooling |
| | 2003 ^a | 1990-2003 ^b | 1999 ^c | 2004 ^a | 1999-2004 ^b | 2004 | 2000 |
| LDC | 0.3 | 94.3 | 18.2 | 3.5 | 24.0 | 56.5 | 3.0 |
| African LDCs | 0.3 | 94.7 | 24.2 | 2.7 | 20.0 | 52.8 | 2.8 |
| Asian LDCs | 0.5 | 59.0 ^d | 30.5 | 6.1 | 21.3 | 61.8 | 4.0 |
| Island LDCs | .. | 127.0 ^e | 2.0 | 4.5 | 43.7 | 85.2 | .. |
| ODCs | 0.8 | 313.0 | 628.8 | 23.0 | 21.5 | 86.1 | 7.1 |
| High income OECD | 2.4 | 3 728.1 | 532 308.0 | 68.7 | 24.7 | 92.2 ^f | 11.4 |

Source: UNCTAD(2007)

Table 4-5 Composition of Science & Technology-related aid to the LDCs, 1998-2000 and 2003-2005

| | Total commitments (million, 2004\$) | | Share of total aid commitments (%) | | Sector share in total defined STI-related aid (%) | |
|---|--|--------------|--|------------|---|--------------|
| | 1998-2000 | 2003-2005 | 1998-2000 | 2003-2005 | 1998-2000 | 2003-2005 |
| Research | 84.7 | 86.8 | 0.5 | 0.3 | 20.5 | 10.5 |
| Agricultural research | 65.4 | 32.0 | 0.4 | 0.1 | 15.8 | 3.9 |
| Medical research | 5.4 | 26.1 | 0.0 | 0.1 | 1.3 | 3.2 |
| Environmental research | 1.2 | 16.1 | 0.0 | 0.1 | 0.3 | 1.9 |
| Industrial technology R&D ^a | 1.3 | 6.7 | 0.0 | 0.0 | 0.3 | 0.8 |
| Other | 11.5 | 5.9 | 0.1 | 0.0 | 2.8 | 0.7 |
| Advanced and specific human skills | 329.4 | 740.4 | 1.8 | 2.4 | 79.5 | 89.5 |
| Higher education | 141.3 | 427.5 | 0.8 | 1.4 | 34.1 | 51.7 |
| Vocational training | 67.3 | 99.0 | 0.4 | 0.3 | 16.3 | 12.0 |
| Advanced technical and managerial training | 15.5 | 16.3 | 0.1 | 0.1 | 3.8 | 2.0 |
| Research institutions | 9.6 | 37.2 | 0.1 | 0.1 | 2.3 | 4.5 |
| Agricultural education and training | 23.2 | 10.2 | 0.1 | 0.0 | 5.6 | 1.2 |
| Agricultural extension | 13.7 | 12.4 | 0.1 | 0.0 | 3.3 | 1.5 |
| Other | 58.7 | 137.9 | 0.3 | 0.4 | 14.2 | 16.7 |
| Total | 414.1 | 827.3 | 2.3 | 2.7 | 100.0 | 100.0 |

Source: UNCTAD(2007)

Table 4-6 Total Expenditure on Export Subsidies and Domestic Support for Agriculture by Country (US\$ Mil)

| Export Subsidies | 1995 | 1999 | 2000 |
|-------------------------|-------------|-------------|-------------|
| <i>EU</i> | 6,495.9 | 5,853.7 | 2,516.6 |
| <i>US</i> | 25.6 | 80.2 | 15.3 |
| <i>Switzerland</i> | 454.6 | 268.9 | 187.7 |
| <i>Norway</i> | 83.9 | 116 | 44 |
| <i>ROW</i> | 267 | 177.4 | 442.8 |

| Domestic Support | Total | | Amber Box | | Blue Box | | Green Box | |
|-------------------------|--------------|-------------|------------------|-------------|-----------------|-------------|------------------|-------------|
| <i>year</i> | 1995 | 1999 | 1995 | 1999 | 1995 | 1999 | 1995 | 1999 |
| <i>EU</i> | 119,217 | 91,354 | 66,524 | 49,933 | 27,720 | 20,638 | 24,972 | 20,783 |
| <i>US</i> | 59,285 | 66,611 | 6,214 | 16,862 | 7,030 | 0 | 46,041 | 49,749 |

| | | | | | | | | |
|--------------|--------|--------|--------|-------|-------|-----|--------|--------|
| <i>Japan</i> | 69,986 | 31,541 | 36,767 | 6,689 | 0 | 829 | 33,219 | 24,022 |
| <i>ROW</i> | 41,231 | 16,016 | 12,064 | 4,079 | 1,156 | 967 | 28,011 | 10,970 |

Source: US Department of Agriculture, Economic Research Service calculations based on WTO Notifications., Josling(2007)

Table 4-7 Development Commitments to Agriculture by Donors (US\$ millions, in 1995 constant prices)

| <i>year</i> | <i>1996</i> | <i>2000</i> | <i>2002</i> |
|--|-----------------------|-----------------------|-----------------------|
| Total Commitments(EAA) | 12,085 | 11,904 | 11,842 |
| Bilateral | 5,401 | 4,619 | 4,468 |
| Japan | 2,425 | 1,481 | 965 |
| US | 412 | 607 | 714 |
| Germany | 425 | 444 | 490 |
| UK | 172 | 598 | 429 |
| Others | 1,967 | 1,489 | 1,870 |
| Multilateral | 6,684 | 7,285 | 7,375 |
| World Bank | 3,218 | 2,919 | 4,337 |
| IBRD | 1,923 | 1,154 | 1,034 |
| IDA | 1,295 | 1,765 | 3,303 |
| IFAD | 421 | 476 | 398 |
| Regional Development Banks | 2,066 | 2,520 | 1,423 |
| OPEC multilateral | 297 | 530 | 284 |
| UNDP/CGIAR | 510 | 606 | 529 |
| FAO | 172 | 234 | 234 |
| <u>Total Assistance</u> | <u>111,886</u> | <u>116,349</u> | <u>124,706</u> |
| <i>EAA/Total Assistance(in %)</i> | <i>10.8</i> | <i>10.2</i> | <i>9.5</i> |

Note: Derived by deflating the current price series using the DAC aggregate deflator(DAC Report,2001)

Source: FAO, Summary of Food and Agricultural Statistics 2005