

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

Atsuko Matsumura, Professor of International Economics, Department of Economics, Tokyo International University

### **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 Doha Development Round for the people of LDCs to have higher standard of living.

### **I . 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 so called the gains from trade. For this reason, international trade can be seen as the engine for the 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 ①low-income (three-year average GNI per capita of less than US \$750, which must exceed \$900 to leave the list) ②human resource weakness (based on indicators of nutrition, health, education and adult literacy) ③economic 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) ④population of less than 75 million. The classification currently (as of April 16, 2008) applies to 49 countries.<sup>1</sup>

The current round of WTO, called Doha Development Round, takes its name from the aims expressed in the Declaration announced in Doha on November 14, 2001, for entering into trade liberalization negotiations with the goal of promoting development and reducing 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

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<sup>1</sup> Ministry of Agriculture, Forestry and Fisheries of Japan, WTO Nougyoukoushou ni okeru kaihatsutojoukoku no joukyou ni tsuite, [www.maff.go.jp/wto/tozyo.pdf](http://www.maff.go.jp/wto/tozyo.pdf)

which the number of LDC members are 30. If we clarify WTO members by regions, 41 members are African, 32 members are in Central and South America, and 21 members are Asian developing countries.<sup>2</sup> The increase in members belonging to developing countries and LDCs has 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.'<sup>3</sup>

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 use of production based financial support (the so-called "Blue Box" support) - a step backwards 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).<sup>4</sup>

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 in August 1. The new document referred 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

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<sup>2</sup> Homepage of the Ministry of Foreign Affairs of Japan, [www.mofa.go.jp/mofaj/gaiko/wto/data/kamei.html](http://www.mofa.go.jp/mofaj/gaiko/wto/data/kamei.html).

<sup>3</sup> 14 November 2001, Office of the US Trade Representative, Online speech available at [www.ustr.gov](http://www.ustr.gov).

<sup>4</sup> Chapt.4, Stiglitz=Charlton(2005).

resulted in draft modalities in July.<sup>5</sup> 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.<sup>6</sup> 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 G20<sup>7</sup> pressed the US and EU for greater market access and subsidy reduction. But the richest countries were unwilling to offer serious concessions in the agricultural negotiations.

Agriculture is still 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 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 is 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 Africal are almost same as in East and

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<sup>5</sup> Martin=Anderson(2008),Josling(2007)

<sup>6</sup> OECD(2004) and Stiglitz=Charlton(2005)

<sup>7</sup> 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, Thailand, and Venezuela.

Southeast Asia. In African continent as a whole, the share has increased from 16.8 in 1983 to 17.3% in 2003, so it is shown that the economic dependency on agriculture industry is still high in the 2000s in Africa. Growth rate of agriculture value added is high in developing countries especially in Africa which contains many LDCs as compared to developed countries.

**Table1-1 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
<b>WORLD</b>	6.4	4.4	3.7	3.4	2.9	2.2	1.7
<b>Developed countries</b>	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
<b>Developing countries</b>	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	...	...	...	...	...	...	...
<b>Continental groupings</b>							
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.

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. In Chapter 2, I focus on the agricultural trade situation, using the recent data, and point out the essential agricultural problems from an economic point of view. In Chapter 3, I introduce the basic analysis to clarify the effects of trade liberalization for LDCs. In Chapter 4, I examine the current problems of agricultural protection both in developed and developing countries including LDCs. In Chapter 5, some conclusions and propositions on implications for LDCs to reduce poverty are provided.

## II. Agricultural Trade and Developing Countries (LDCs)

### (1) Survey of World Agricultural Trade

Table2-1 shows the recent change 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.

**Table2-1 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
Share in world merchandise trade %	(2003)	9.2
Share in world merchandise trade %	(2005)	8.4
Share in world exports of primary products %	(2003)	41.2
Share in world exports of primary products %	(2005)	32.8

Trade between EU members is included.

Source: WTO International Trade Statistics 2004 and 2006.

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 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 14 countries and the EU. From this, it is clear that the LDCs' agricultural trade shares are very small.

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

	Value	Share in world		Value	Share in world
	\$bn	%		\$bn	%
<b>Exporters</b>			<b>Importers</b>		
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 <sup>c</sup>	18.02	2.5
Australia	16.34	2.4	Korea, Rep. of	15.56	2.2
Thailand <sup>a</sup>	15.08	2.2	Mexico	13.85	1.9
Argentina <sup>b</sup>	12.14	2.1	Russian Fed. <sup>a</sup>	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. <sup>a</sup>	9.37	1.4	Thailand <sup>a</sup>	5.72	0.8
Chile	7.47	1.1	Indonesia	5.44	0.8
India <sup>a</sup>	7.03	1.2	Turkey	5.22	0.7
<b>Above 15</b>	<b>548.44</b>	<b>81.8</b>	<b>Above 15</b>	<b>580.44</b>	<b>80.4</b>

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

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

“EU members” includes trade between EU members

Source: WTO International Trade Statistics 2004.

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 2.3 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 shows how important agricultural trade is 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 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 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/Baltic States/CIS. Of course, imports of agricultural products in the oil producing Middle East are very important.

**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 Statistics 2004, includes trade between EU members

## (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 Group<sup>8</sup>, 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 exports 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.

Looking at countries in the BRICs and Cairns Group, especially Argentina and Brazil 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 exports 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 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 imports 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 of 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 values, 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 at Table 2-6, 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 the 11 out of top 20

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<sup>8</sup> 56 WTO members out of total of 79 of African, Caribbean and Pacific Group of States

countries with the biggest agricultural share as part of their merchandise exports are also small African countries.

Table 2-5

Exports	Value(mil.\$) 2006	Share(%) 2006	Imports	Value(mil.\$) 2006	Share(%) 2006
<b>ACP Group</b>			<b>ACP Group</b>		
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
<b>BRICS, Cairns Group</b>			<b>BRICS, Cairns Group</b>		
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
Malaysia	15573	9.7	Malaysia	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			
<b>Developed Countries</b>			<b>Developed Countries n.e.c</b>		
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 are taken for the data of 2006.

Source: WTO, World Trade Statistics 2007.

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

Imports				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%

Source: FAO, Key Statistics of Food and Agricultural Trade, 2005

### **(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 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, in 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 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 an agricultural comparative advantage. In contrast, those countries such as Nicaragua, Malawi, Paraguay, Chad, Moldova, Belize, Uruguay, Honduras, Ghana, New Zealand, and Côte 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 net total trade value, all the countries except Guinea-Bissau and Côte 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**

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		-1069	-2063	-2531		25	-140	-42
Côte d'Ivoire	137	487	1977	2654	1222	1693	2579	2382

Source:FAO Statistical Yearbook 2004

#### (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 Asian small countries, in most of those countries, the production falls short of the consumption and they have to import a lot of 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 the high agricultural labor productivity or/and land productivity such as China, USA, India, Russian Federation, France Germany, Canada, and Australia can be big net cereals exporters. The table2-8 shows the food balance for cereals (excluding beer) for only 30 countries out of 132 countries due to space limitation.

**Table2-8** **Food Balance - Cereals Excluding Beer** *(1,000tonnes)*  
(2001-2003)

<b>COUNTRIES</b>	<b>Production (+)</b>	<b>Exports (-)</b>	<b>Imports (+)</b>	<b>Stock changes &amp; other uses (-)</b>	<b>Consump- tion (=)</b>
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
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

Source: FAO Statistical Yearbook 2004.

Food Balance for vegetable oils in 2001-2003 is also examined analogously. Vegetable oils are also fundamental foods for the people in the 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, Côte d'Ivoire, Bolivia, Paraguay, Ghana, Cameroon, Costa Rica, Senegal, Guatemala, Mali, Benin, Chad, Guinea-Bassau, and Lao, the production surpasses the consumption, but if we look at the exports-imports balance, only in Malaysia, Indonesia, Brazil, Argentina, Philippines, Thailand, Côte d'Ivoire, Bolivia, Paraguay and Costa Rica, the exports surpass the imports in vegetable oils due to stock changes and other uses.

In table2-10, 8 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%. And also this difference of agricultural production ability between developing countries and developed countries has become larger since 1960s. In 1960s, the production of grains and soybeans equilibrated between the group of developing countries and the group of developed countries. But in the end of 1980s, the surplus of the group of developed countries grew to 4.9 million tons and in the end of 1990s, this number increased to 101million tons.<sup>9</sup>

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 a small range of agricultural products, and they have to manage in the poor monoculture economy situation.

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<sup>9</sup> Chapt.1, Yamashita(2004)

Table2-9 Production of Selected Agricultural Commodities (1000 tonnes)

Wheat		Rice		Coarse Grains		Barley	
World	629,873	World	608,368	World	1,032,119	World	153,830
China	91,952	China	180,523	USA	319,858	RussianFed.	17,180
India	72,060	India	128,000	China	140,692	Canada	13,186
USA	58,738	Indonesia	54,088	Brazil	44,809	Germany	12,993
RussianFed	45,413	Bangladesh	39,754	India	32,300	Ukraine	11,084
France	39,705	Viet Nam	35,888	France	30,714	France	11,040
Canada	25,860	Thailand	23,860	RussianFed	30,348	Spain	10,609
Germany	25,427	Myanmar	23,700	Mexico	29,659	Turkey	9,000
Turkey	21,000	Philippines	14,497	Canada	26,823	Australia	6,454
Australia	20,376	Brazil	13,277	Germany	25,670	USA	6,091
Pakistan	19,500	Japan	10,912	Ukraine	23,396	UK	5,815
Ukraine	17,520	USA	10,470	Poland	19,743	Denmark	3,589
UK	15,473	Pakistan	7,537	Nigeria	19,170	Poland	3,571
Argentina	14,560	Korea, Rep.	6,945	Argentina	18,592	China	3,222
Soybeans		Potatoes		Sugar Cane		Coffee	
World	206,408	World	330,125	World	1,328,217	World	7782
USA	85,013	China	70,036	Brazil	416,256	Brazil	2467
Brazil	49,793	RussianFed.	35,914	India	236,180	Viet Nam	835
Argentina	31,500	India	25,000	China	90,979	Indonesia	700
China	17,600	Ukraine	20,755	Thailand	64,974	Colombia	681
India	7,500	USA	20,686	Pakistan	53,419	Mexico	311
Paraguay	3,584	Poland	13,999	Mexico	45,127	India	270
Canada	3,048	Germany	13,044	Colombia	40,020	Ethiopia	260
Bolivia	1,670	Belarus	9,902	Australia	36,993	Guatemala	217
Indonesia	723	Netherlands	7,488	Philippines	32,500	Uganda	186
RussianFed.	555	France	7,254	USA	26,320	Honduras	185
Italy	518	UK	6,316	Indonesia	25,600	Peru	185
Nigeria	465	Canada	5,171	Cuba	24,000	Côte d'Ivoire	160
Uruguay	377	Turkey	4,800	Argentina	19,300	Costa Rica	126

Source:FAO Statistical Yearbook 2005-2006.

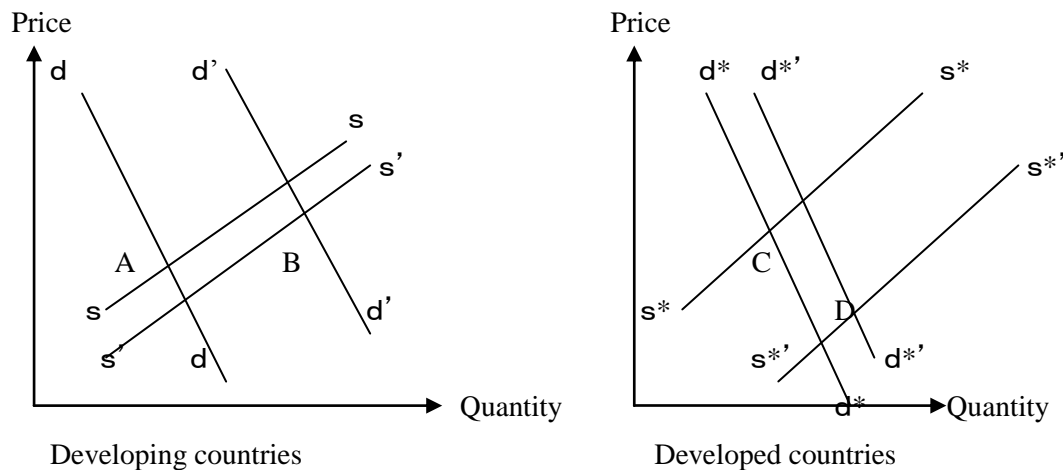
In this chapter, we clarified statistically, the difference of the situation of agricultural production and trade between developed countries and developing countries. In the next chapter, the developing countries situation and the effects of agricultural trade liberalization will be analyzed.

### III. Economic Analysis of Agricultural Trade Liberalization

#### (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 agricultural market of the developed countries and that of the developing countries can be compared as following.

Actually in the developed countries since 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 the developing countries with scarce capital accumulation, they could not introduce the new technology like developed countries. So, big difference in the agricultural productivity between the developing countries and the developed countries resulted.



**Figure3-1 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 the people with relatively high income. So, no big outward shift in demand curve occurred in developed countries with the 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 occurred by big population increase.

Figure 3-1 shows the change in the agricultural market situation from 1960s to 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 the 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 products 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. 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.<sup>10</sup>

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

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<sup>10</sup> WTO(2004a)

agriculture than manufactures generally, and tariffs for agriculture exports from low income region to both high income region and low income region were over 15%.<sup>11</sup>

**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

In addition to agricultural products tariffs cut, the Uruguay Round Agreement on Agriculture “tariffied” 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.

**Table3-2 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)

As developed countries had completed the Uruguay Round agricultural liberalization and developing countries have been continuing their efforts, the recent bound tariffs on

<sup>11</sup> WTO(2004a),Hertel et al.(2004), and Anderson(2004)

agricultural products are 51% in developed countries 57% in developing countries, and 79% in LDCs, while the recent applied tariffs are 48%, 20%, and 17% respectively.<sup>12</sup>

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, 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 formula is set so that tariff escalation is to be eliminated. For domestic support, a tiered formula is also proposed for reducing overall reduction of trade-distorting domestic support. For developed member countries, 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 shall not be required to undertake reduction commitments in their base overall trade-distorting domestic support.<sup>13</sup>

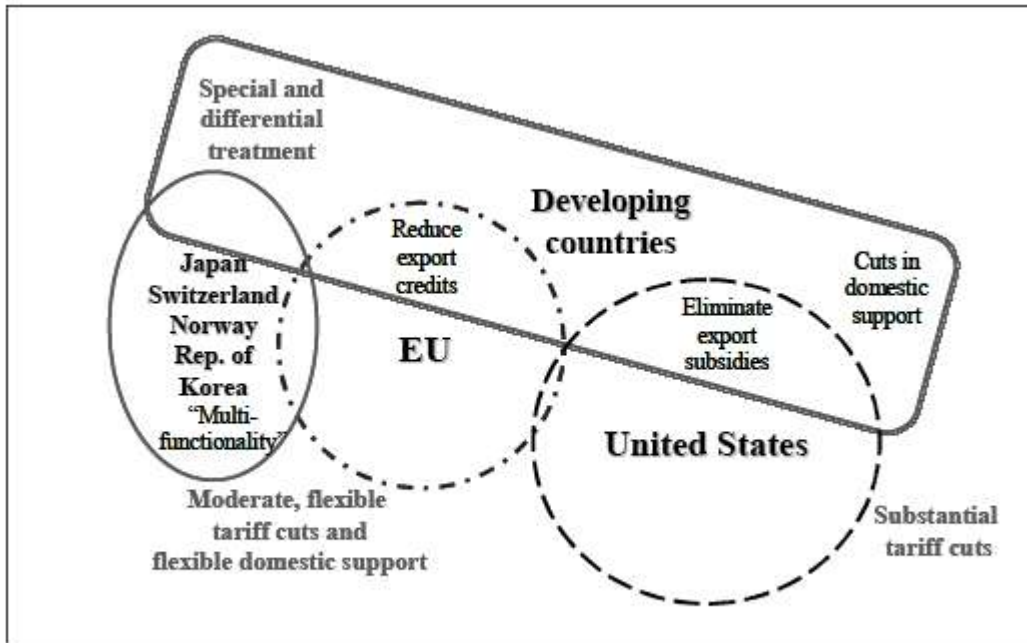
In order to judge if the developing countries would benefit from trade liberalization of developed countries, the empirical studies might be useful. In the next section, economic impact of trade liberalization will be examined according to some scenarios.

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<sup>12</sup> Peters=Vanzetti(2004)

<sup>13</sup> WTO(2008)

Figure 3-2 Interests and Alliances



Source: UNCTAD

Peters=Vanzetti(2004)

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

Here, I introduce two types of empirical research, one is partial equilibrium model and the other is 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, 4 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 10 most 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 10 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 of imports and domestic supply are 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 Table3-3. 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 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 Cancun scenario than Harbinson, but negative effect on consumer surplus and positive effect on producer surplus and positive effect on export revenue are bigger in Harbinson scenario than Cancun scenario, so the aggregate welfare increase is bigger in Harbinson scenario.

In LDCs, the impacts are smaller than the developed and developing countries groups, with 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 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.

**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\$million	US\$million	US\$million	US\$million	US\$million	US\$million
<b>Developed</b>	20,032	34,735	-16,543	-24,403	3,730	1,652
<b>Developing</b>	-14,529	-18,023	17,707	19,204	-3,014	-140
<b>LDC</b>	-1760	-2,455	1,600	2,230	19	26
<b>World</b>	3743	14,256	2,764	-2,970	735	1,538
<b>Group of20</b>	-11,123	-11,558	11,481	12,097	-162	381
<b>Cairns</b>	-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\$million	US\$million	US\$million	US\$million	%	%
<b>Developed</b>	7,220	11,983	-938	1,189	-1	1
<b>Developing</b>	163	1,040	12,272	16,557	13	17
<b>LDC</b>	-141	-199	904	1,254	22	30
<b>World</b>	7,242	12,824	12,237	19,001	6	10
<b>Group of20</b>	196	920	7,861	10,951	15	21
<b>Cairns</b>	1,228	2,027	6,415	8,297	8	10

Source:Peters=Vanzetti,2004

## ②Applied 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 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 disaggregation 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 manufactures represent 21% and services represent 71% 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%. Apparently, 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 general equilibrium model are much bigger 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 Table3-4. 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 negative effect on developing countries including LDCs because of the world prices increase, 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 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: “Nearly 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. ”

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

(US\$million)

	<b>Tariffs</b> <i>Agri&amp;food</i>	<b>Tariffs</b> <i>Manuf.&amp;Services</i>	<b>Export</b> <b>Subsidies</b>	<b>Domestic</b> <b>Support</b>	<b>Total</b>
<b>Developed liberalize</b>					
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
<b>Developed&amp;Developing liberalize</b>					
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)

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

In the beginning of this section, the agricultural policies in developed countries, US, Japan and EU are compared. According to Table 3-5, domestic support and export subsidies are mainly used in US and EU. On the other hand, Japanese protections are concentrated in particular items by adopting extremely high tariff rates on several products such as peanuts, konjak (jelly like food made from the starch of devil's tongue), rice, bean, butter, wheat, milk powder, and starch, or by introducing high Producer Support Estimate particularly on cereals.

**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,)	○ (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”.

Particularly, it is well known that export subsidies are the major problem for the EU, on the other hand export credits are implemented mainly in US. Also, several sorts of domestic supports for producers are used in all of three. Producer Support Estimate(PSE), which is developed for monitoring the agricultural protection level of each country, is the amount transferred from consumers or tax-payers to producers (PSE = price difference between internal and world × production quantity + subsidies to producers). PSE for US, Japan and EU are \$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 US and the EU respectively.

The import protection in the developed countries limits market access of 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.

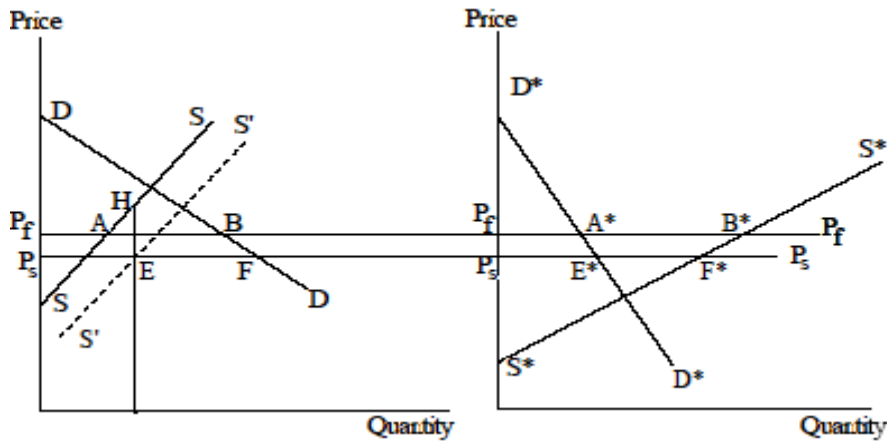


Figure3-3 (a)

Figure3-3(b)

Japanese Output Subsidy: Japan

Japanese Output Subsidy: ROW

Source:Panagariya(2005)

In Figure 3-3(a), DD and SS respectively show the demand curve and supply curve for an agricultural product X. 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 product X. As the equilibrium autarky price is higher in the developed country (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 product X with the price settling at Pf. At this price, Japanese demand for imports, AB, equals the rest of the world supply of exports, A\*B\*. By output subsidy by Japanese government, 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 Pf, Japanese supply becomes larger and its demand for imports is now smaller than world supply A\*B\*, consequently excess supply is occurred and this excess supply pushes down the equilibrium world price of the product X. The new international equilibrium is reached at price Ps, with Japanese import demand, EF which is equal to the world export supply E\*F\*. Per unit output subsidy of EH makes Japanese producers to bear the cost only the height of E instead of height of H, consequently they can sell at the price of Ps in spite of their actual high production cost.

As a result of decrease of imports of X to Japan and drop of world price of X 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 world, the terms of trade deteriorate which lead for 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 the product X. The effects of the output subsidy on these two groups in the rest of world are asymmetric, with the importers actually made better off in the post-subsidy equilibrium since they are able to buy product X 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 which adopts the export subsidy policy for the producers of X. In the initial situation before the subsidy is adopted, the free trade equilibrium must be at the 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 is 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 which cannot get the 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 the product X in the rest of the world are better off by the price decrease.

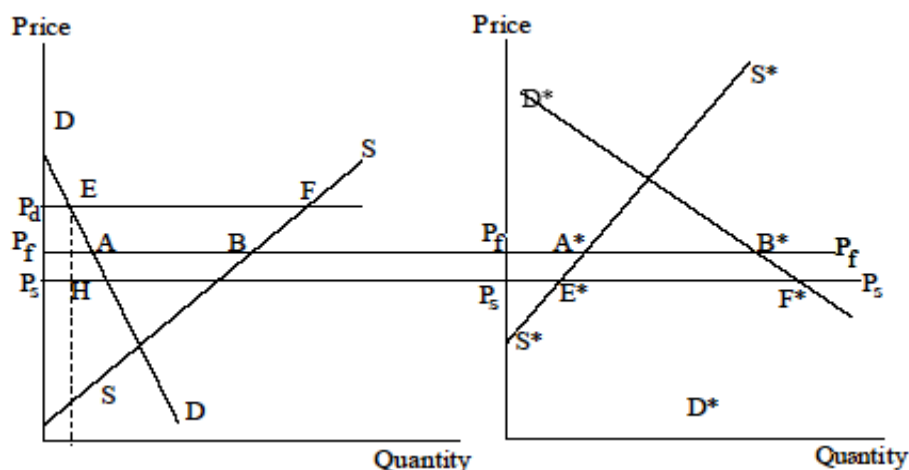


Figure 3-4(a) EU Export Subsidy: EU      Figure 3-4(b) EU Export Subsidy: ROW

Source: Panagariya(2005)

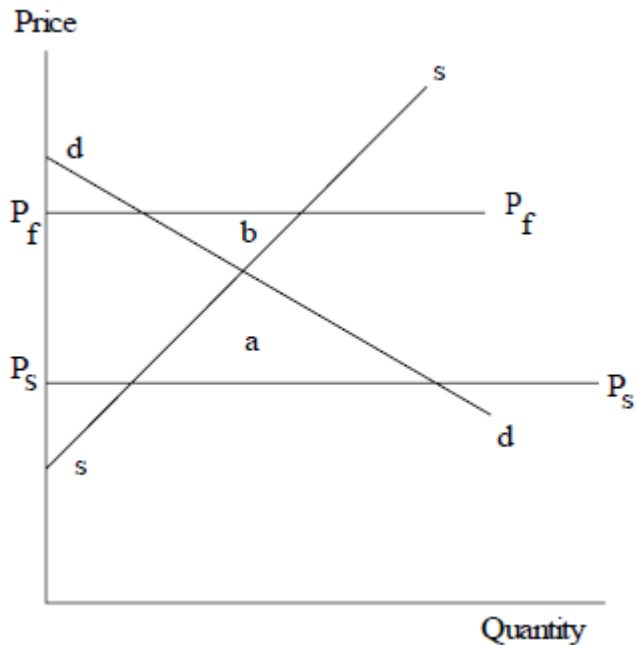
Now we have to infer if the LDCs are importers or exporters of the agricultural commodities. As already shown in the previous chapters, many LDCs are importing the important agricultural commodities to be fed. The similar fact can be taken from Panagariya(2005) by the following data. Out of 148 whole 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.<sup>14</sup> 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 X in the presence of the production subsidy is  $P_s$ , and the LDCs are importing X 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 this product competitively in the world market, so they could turn to be exporters of this product. However, for the LDCs to gain from turning to be exporters, 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

<sup>14</sup> Panagariya(2005) takes this data from Valdes=McCalla(1999).

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)

#### **IV. 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 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 groups. Even after some progress in reducing tariffs were 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 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.

Table 4-1

**Agricultural weighted average import tariffs, by region, 2001**(percent, *ad valorem* equivalent, weights based on imports)

	<b>Bound tariff</b>	<b>MFN applied tariff</b>	<b>Actual applied tariff<sup>a</sup></b>
<b>Developed countries</b>	27	22	14
<b>Developing countries</b>	48	27	21
<i>of which: LDCs</i>	78	14	13
<b>WORLD</b>	37	24	17

a Includes preferences and in-quota TRQ rates where relevant, as well as the ad valorem equivalent of specific tariffs.

Note: 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.

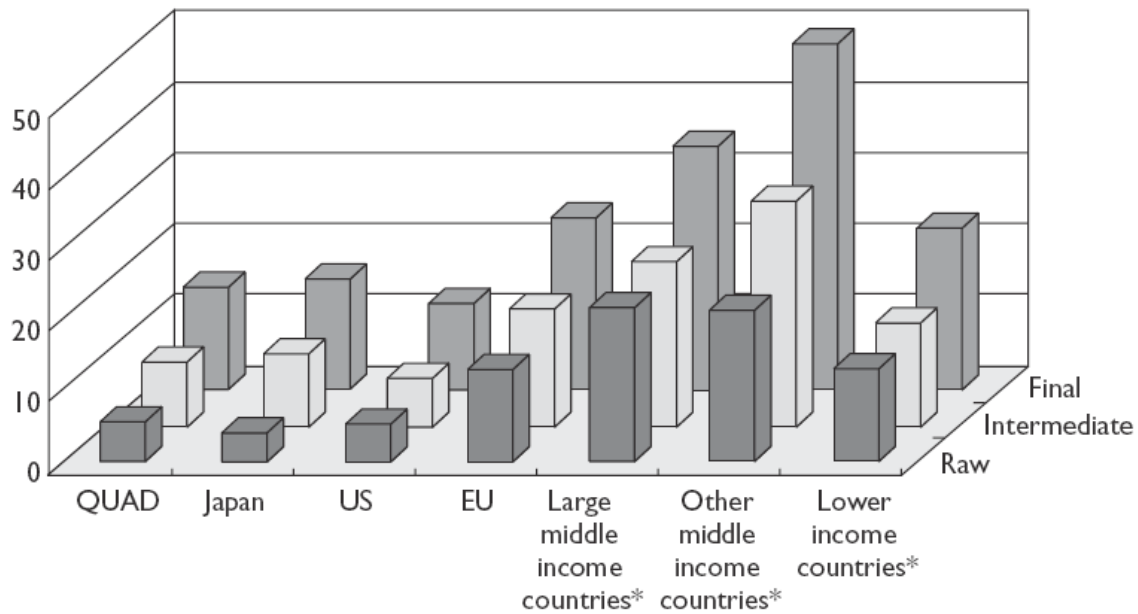
Source: Jean= Laborde=Martin (2005), Martin=Anderson (2005)

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 less 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 of 3 types of commodities, and it is likely that these tariffs in middle income countries 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**



Source: World Trade Organization Integrated Database, 2001.

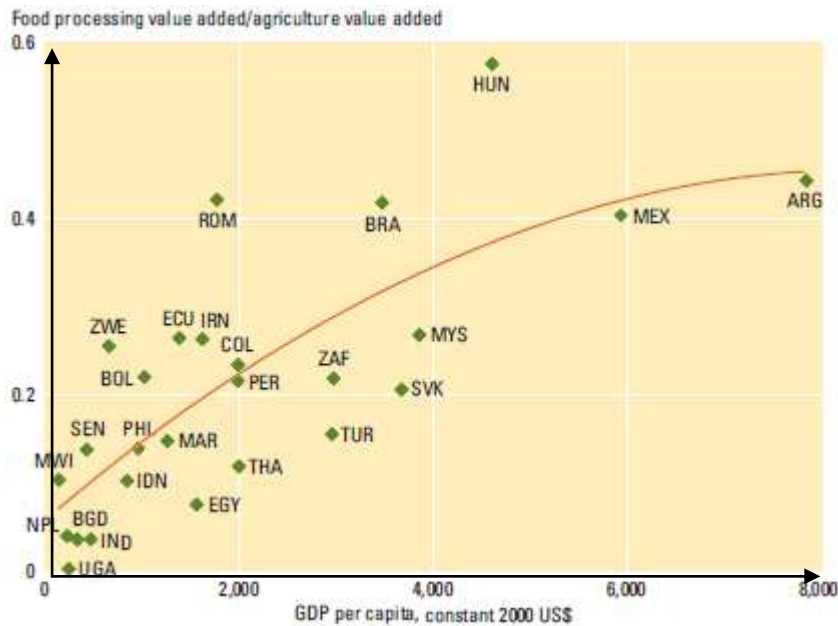
McCalla=Nash (2007)

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. In this context, poorer countries would have gains if their production situation could correspond to this demand shift in the world gradually. Food processing industry is also labor intensive, so this is suitable for labor abundant rural area in developing countries and LDCs.

Figure 4-2 shows the combination of GDP per capita and the share of food processing value added in agriculture value added in 26 countries. We see that per capita GDP and the ratio of food processing value added are positively related. So in this situation, it is important for the developing countries to access international markets with the processed agricultural products, and tariff escalation structure with high tariffs on the processed products in the developed countries would be impediment for this.<sup>15</sup>

<sup>15</sup> Chapt.1, UNCTAD(2008)

**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, the agriculture is 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 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 agricultural sector in LDCs must be examined. In Table 4-2, big differences of agricultural population share in total population among the regions are shown. The biggest share of 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 two highest. What are the determinants of such high land productivity in these regions?

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

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

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 high dose of inputs like fertilizers and pesticides. On the other hand, in Sub-Saharan Africa, inorganic fertilizer and tractors are used very scarcely.<sup>16</sup>

From these two tables, we find huge differences of 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 is absolutely needed. In the next section, we examine what the developed countries can do for this purpose by financial aid.

<sup>16</sup> Nanda(2008)

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

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

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

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

The U.N. Least Development Countries Report 2007 explores how national and international policies can promote more effective technological learning and innovation in LDCs. At first, from 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 about 40 times bigger than LDCs and about 12 times bigger than other developing countries. On the other hand, percentage of tertiary students in science and engineering in total tertiary students is about the same between OECD countries and total LDCs.

Table 4-4

## Selected Science&amp;Technology-Related Indicators for LDCs and High-income Countries

	R&D	Researchers in R&D	School enrollement, tertiary	Tertiary Students in science,engineering	Literacy rate, adult total	Average year of schooling
Countries	(%ofGDP)	(per million people)	(% of age group)	(% total tertiary)	(% of people ages 15 and above)	
	2003	1990-2003	2004	1999-2004	2004	2000
<b>LDC</b>	0.3	94.3	3.5	24.0	56.5	3.0
<b>African LDCs</b>	0.3	94.7	2.7	20.0	52.8	2.8
<b>Asian LDCs</b>	0.5	59.0	6.1	21.3	61.8	4.0
<b>Island LDCs</b>	...	127.0	4.5	43.7	85.2	...
<b>ODCs</b>	0.8	313.0	23.0	21.5	86.1	7.1
<b>High income OECD</b>	2.4	3728.1	68.7	24.7	92.2	11.4

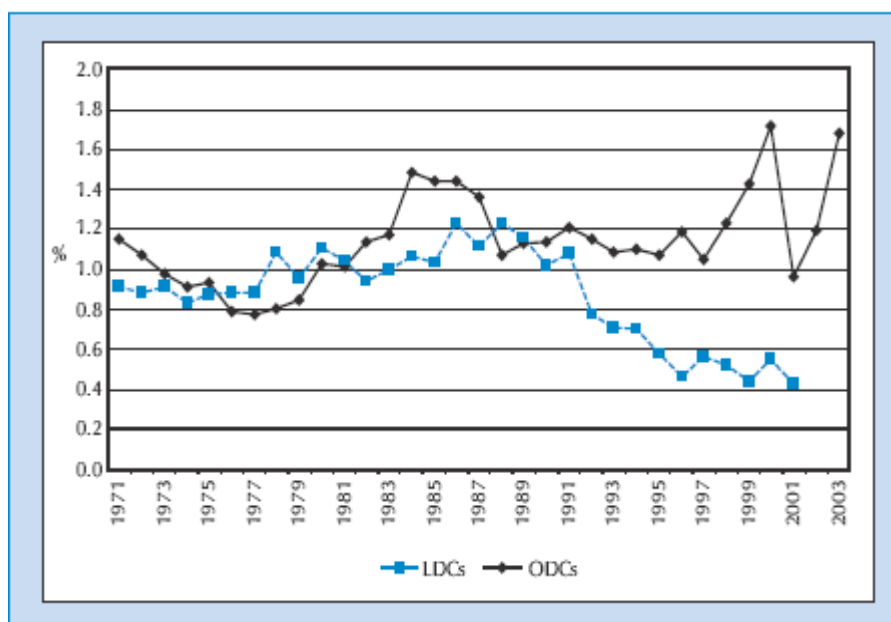
Note: ODC means Other Developing Countries.

Source:UNCTAD(2007)

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 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.<sup>17</sup>

<sup>17</sup> UNCTAD(2007)

**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 emphasis is now being placed on a systems approach to agricultural innovation through a pluralistic institutional structure with many actors including NGOs and private sector for new competitive mechanism.

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

	<b>Total Commitments</b>	<b>Total Commitments</b>	<b>Sector share in total defined STI-related aid</b>	<b>Sector share in total defined STI-related aid</b>
	<b>Million,2004\$</b>	<b>Million,2004\$</b>	<b>%</b>	<b>%</b>
	<b>1998-2000</b>	<b>2003-2005</b>	<b>1998-2000</b>	<b>2003-2005</b>
<b>Research</b>	<b>84.7</b>	<b>86.8</b>	<b>20.5</b>	<b>10.5</b>
Agricultural	65.4	32.0	15.8	3.9
Medical	5.4	26.1	1.3	3.2
Environmental	1.2	16.1	0.3	1.9
Industrial technologyR&D	1.3	6.7	0.3	0.8
Other	11.5	5.9	2.8	0.7
<b>Advanced and specific human skills</b>	<b>329.4</b>	<b>740.4</b>	<b>79.5</b>	<b>89.5</b>
Higher education	141.3	427.5	34.1	51.7
Vocational training	67.3	99.0	16.3	12.0
Advanced technical and managerial training	15.5	16.3	3.8	2.0
Research institutions	9.6	37.2	2.3	4.5
Agricultural education and training	23.2	10.2	5.6	1.2
Agricultural extension	13.7	12.4	3.3	1.5
Other	58.7	137.9	14.2	16.7
<b>Total</b>	<b>414.1</b>	<b>827.3</b>	<b>100.0</b>	<b>100.0</b>

Source:UNCTAD(2007)

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 for 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 international market, because as warned by Panagariya (2005), in anticipation of the liberalization under the Doha Round, the politics within the developed countries is 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 make agricultural research concerning SPS measures. As part of capacity building program for LDCs related to WTO, 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 in Chapter 3, it is possible that those policies serve for lowering 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 EU used to levy export taxes. The similar situation occurs in food assistance in US, namely, 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 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 EU decreased from 6,495.9 \$million in 1995 to 2,516.6 \$million in 2000, it is still high. About domestic support, US increased total amount by increasing Amber Box and eliminating Blue Box during 1995 and 1999. On the other hand, EU decreased all the Boxes but still have a big amount. Japan halved the total amount during 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 was 11,904 \$million, so this amount is just 13% of the total domestic support in 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 fund are able to implement these policies. So, the LDCs are

definitively opposed to those policies as the source of unfair distortion of international agricultural trade.

**Table4-6 Total Expenditure on Export Subsidies and Domestic Support for Agriculture by Country**

(US\$ millions)

<b>Export Subsidies</b>	<b>1995</b>	<b>1999</b>	<b>2000</b>						
<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						
<b>Domestic Support</b>	<b>Total</b>		<b>Amber Box</b>		<b>Blue Box</b>		<b>Green Box</b>		
<i>year</i>	<i>1995</i>	<i>1999</i>	<i>1995</i>	<i>1999</i>	<i>1995</i>	<i>1999</i>	<i>1995</i>	<i>1999</i>	
<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)

**Table4-7** Development Commitments to Agriculture by Donors (US\$ millions, in 1995 constant prices)

<i>year</i>	<i>1996</i>	<i>2000</i>	<i>2002</i>
<b>Total Commitments(EAA)</b>	<b>12,085</b>	<b>11,904</b>	<b>11,842</b>
<b>Bilateral</b>	<b>5,401</b>	<b>4,619</b>	<b>4,468</b>
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
<b>Multilateral</b>	<b>6,684</b>	<b>7,285</b>	<b>7,375</b>
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
<b><i>Total Assistance</i></b>	<b><i>111,886</i></b>	<b><i>116,349</i></b>	<b><i>124,706</i></b>
<b><i>EAA/Total Assistance(in %)</i></b>	<b><i>10.8</i></b>	<b><i>10.2</i></b>	<b><i>9.5</i></b>

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.

### (5) Implication 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 Ivanic=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 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 reduces 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.

## **V. 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 the agriculture is still important sector in LDCs, 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 the aims of those policies in developed countries are 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 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.<sup>18</sup> As the

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<sup>18</sup> UNCTAD(2008)

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, to meet an agreement in Doha Round is a necessary solution for 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.”<sup>19</sup> It is time for determination toward poverty reduction and human rights support for people in LDCs, through finding 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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<sup>19</sup> Speech available at [http://www.wto.org/english/news\\_e/sppl\\_e/sppl98\\_e.htm](http://www.wto.org/english/news_e/sppl_e/sppl98_e.htm)

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