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Product Standards and Trade in Environmentally Sensitive Goods: A Study of South Asian Experience

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I. Introduction

In last decade or so the debate on trade liberalization and its impact on environment has intensified in different fora. The linkages between trade and environmental measures in promoting sustainable development have been a matter of concern for the developing countries especially in the context of WTO. The issue of whether to link trade agreements to environmental standards, is all set to be closely followed, in the Post Ministerial Doha meetings at WTO. However, the growing evidence of inconsistent approaches for environment management have actually given fillip to the widely raised issue, questioning the very usage of trade, as a tool for environment management (Roberts 1999). Actually, at the base of this problem, one finds a contradiction, in the sense that, on the one hand there is a proliferation of environmental and other standards while on the other hand trade in environmentally sensitive goods (ESGs) has also gone up many times.

The trade in ESGs have been analyzed by Low and Yeats(1992); Xu (1999) and Henson and Loader (2001) among others. Low and Yeast have shown that the developed countries have specialized in the ESGs emanating from manufacturing sector while share of developing countries have largely remained in agricultural sector. Overall these studies have given global trends in the trade of ESGs.

One important concern of the South is the stringent environmental standards put forward by the North. An added issue to this debate pertains to national technical regulations and standards. These environmental standards are seen as non- tariff barriers against trade with South. Though empirical evidence on this in the literature is extremely limited, some developing countries, have experienced losses in exports because of difficulties to comply with certain sanitary and phyto-sanitary (SPS) measures in the import markets. Though WTO Agreements on SPS measures and TBT aim to ensure that these standards and regulations do not cause adverse impacts on trade but

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in practice, it has actually happened the other way, that is, trade of developing countries have been affected. Enhancing understanding of constraints faced by the developing countries in meeting the standards set by the developed countries is of key importance in the context of SPS and TBT measures.

This paper is an attempt to look into the trade in ESGs from South Asian perspective and in light of emerging product standards regime affecting trade of South Asian countries. Section II discusses the trends in SPS and TBT measures and their possible usage as non-tariff barrier. Section III looks into the conceptual aspects of ESGs while Section IV attempts to analyse trade in ESGs in South Asia. The environment debate has new additions from biotechnology and Kyoto Protocol and some other concerns are also analyzed in Section V. The last Section VI draws the conclusions.

II Emerging environmental standards and other Product Standards Regime

As the liberalization of tariff and quantitative restrictions on trade in agricultural and food products has progressed, there has been an increased concern about the impact of technical measures on the exports of these products. The technical standards such as food safety regulations, labeling requirements and quality and compositional standards have proliferated, particularly in the developed countries. Environmental and health related standards and regulations in the developed country markets have the potential to create barriers to trade. Another issue of concern is that the distinction between environmental, health and quality standards is gradually becoming very blurred. For instance, in the food sector what may be described as quality standard for food may also fall in the category of environmental standards. It is now widely believed that these technical measures impede trade of the developing countries, either implicitly or explicitly. The trade impacts of SPS measures can be grouped into three categories. First, they can prohibit trade by imposing trade ban on the product or on the inputs used for its production. Second, they can divert trade from one trading partner to another by laying down regulations that discriminate across potential supplies. Third, they can reduce overall trade flows by increasing costs or raising barriers for all potential suppliers. In certain cases, stricter SPS measures are applied to imports than domestic supplies. Hence, the exports from developing countries lose their competitiveness due to the higher costs they face.

A broader indication of impact of SPS requirements on South Asian exports of agricultural and food products is provided by data on rejections of exports from this region. At present such a data is available only for United States. Table-1 shows that, over the period August 2000 to July 2001, there were significant rejections of imports from South Asia due to microbiological contamination and filth. This shows the considerable problems that South Asian countries have in meeting basic food hygiene requirements. The table also shows that these countries also have a problem meeting the stringent labeling requirements of United States. More than 15 percent of total agricultural imports from India and Sri Lanka were rejected because of their failure to meet these requirements. Other than that inadequate food additives, presence of pesticide residual and heavy metals and low acid canned foods are commonly cited reasons for contravention. More sophisticated monitoring and testing facilities, and therefore more costly procedures, are required for meeting these regulations. On top of that, the cost of rejection at the border can be considerable, as it includes loss of product value, transport and other export costs and product re-export or destruction.

A number of agricultural products of India are facing SPS related problems. In case of products like peanuts, other nuts and milk, EC has introduced high level of protection by reducing the maximum level of presence of Aflatoxin in these products. The level of protection proposed by EU is substantially higher than that provided under Codex recommendations. In the case of peanuts, the EU argument has been that the risk involved is of persons contracting cancer in a population of one billion. This is extremely unreasonable because EU population is less than one third of a billion. So the level of SPS protection is not in relation to the extent of risk involved. Other than that, even the quarantine restrictions for fresh fruits and vegetables imposed by many countries are not based on scientific justification. Some of the countries are not even acknowledging the statistics in terms of pest and disease prevalence in various parts of the world, submitted by international organizations. This happened in case of India when china imposed a ban on the grapes for a Mediterranean fruit fly that does not exist in India.

One study that attempts to quantify the costs of compliance with SPS measures by the developing countries is Cato(1998). This study assesses the costs of upgrading sanitary conditions in the Bangladesh frozen shrimp industry to satisfy EU and US hygiene requirements. It is estimated that $ 17.6 million was spent to upgrade plants over 1997-98. The total industry cost that is required to maintain HACCP is estimated to be $2.2 million per annum. The European standards are more stringent than HACCP methods. In the case of marine products, EU regulations

concerning implementation of food safety systems, additive requirements and other process controls are of very high order. A number of companies were also forced to close their factories for a long duration to enable them to upgrade their facilities with heavy investments. Currently, only 90 out of 404 plants in India are approved for fishery exports to EC. Due to this, many of the Indian companies were required to upgrade their facilities which amounts to a huge expenditure. The Sea Food industry of India had to spend US $ 25 million to upgrade facilities to meet the regulations. A study by the United Nations Development Programme has found that the capital costs of complying with the existing effluent charges in Sri Lanka are more than US $69 million. Out of this the capital cost that textile industry has to face is the highest.

Table 1: Number of Contravention cited for US Food and Drug Administration import detention, August 2000-July2001

Reasons for contravention	**India**	**Pakistan**	**Sri Lanka**	**Bangladesh**	**Nepal**
Food Additives	159 (7.4)	12 (1.3)		1 (3.0)	
Pesticide Residues	41 (1.9)				
Heavy Metals	13 (0.6)	4 (0.4)			
Mould	9 (0.4)				
Microbiological contamination	329 (15.3)	49 (5.5)		12 (36.4)	
Decomposition	7 (0.3)				
Filth	568 (26.4)	12 (1.3)	2 (11.1)	12 (36.4)	
Low acid canned foods	87 (4.1)	25 (2.8)	9 (50.0)	3 (9.1)	
Labeling	338 (15.7)	50 (5.6)	3 (16.7)	1 (3.0)	
Others	597 (27.8)	744 (83.0)	4 (22.2)	4 (12.1)	1
Total	**2148**	**896**	**18**	**33**	**1**

Source: US Food and Drug Administration import detention report, 2001.

Note: Parenthesis gives the percentage share

Food Additives implies the presence of unsafe food additives, unsafe colour or other substance, which feared to cause food adulteration; Pesticide residue: presence pesticide residue to the limits that is unsafe; Heavy metals: Presence of poisonous metals which is injurious to health; *Mould: presence of mould in the article.; *Microbiological contamination refers to presence of poisonous bacteria such as Salmonella and Shigella. *Decomposition refers to decomposition of the article because of being prepared packed or held in insanitary conditions.

*Filth implies that the article appears to consist in whole or in part of filthy, putrid, or decomposed substance.

*A low acid canned food implies that food may be injurious to health due to inadequate acidification.

*Labeling implies violation of labeling requirements because of its placement, form, and/or content statement.

III Conceptual Aspects of ESGs

There is no uniformly agreed-upon definition of environmentally sensitive goods. Two approaches have been mostly used to identify environmentally sensitive goods in the existing literature. The conventional approach has been to identify environmentally sensitive industries as those that have incurred high level of abatement expenditure per unit output. The second approach has been to select sectors, which have rank high on actual emissions intensity (emissions per unit of output). The third, less commonly used, approach is based on the effects of the product on large-scale conversions or degradation of natural areas or loss of bio diversity. In this case, the product may not necessarily create any environmental damage during its consumption or disposal in the importing country but it can cause long-term economic losses in the exporting country through irreversible damage to the ecosystem.

The conventional approach is the most widely used concept of ESGs. Industrial activities classified as most pollution intensive on the basis of the abatement and control costs they incur, tend to be concentrated in relatively few sectors, including cement, chemicals, pulp and paper, certain wood industries, petroleum refinery, and ferrous and nonferrous metal industries. James Tobey (1990) used this approach and defined a polluting intensive industry as those whose pollution abatement costs in the United States were 1.85% or more of total costs. Industries meeting this standard were pulp and paper, mining, iron and steel, primary nonferrous metals and chemicals. Low and Yeats'(1992) list of pollution intensive was also selected on the basis of pollution abatement costs in the U.S. They identified environmentally sensitive goods as ones that have incurred pollution abatement and control expenditures of approximately 1 percent or more of the values of their total sales. As defined by Low and Yeats, environmentally sensitive goods comprise of the following in SITC: iron and steel (67), nonferrous metals (68), metal manufactures (69), pulp and waste paper (251), organic chemicals (512), inorganic chemicals (513, 514), radioactive material (515), coal and petroleum chemicals (521), manufactured fertilizers (561), paper and paperboard (641), paper articles (642), veneer plywood (631), wood manufactures (632), petroleum products (332), agricultural chemicals (599), and cement (661).
The World Bank in collaboration with United States Environment Protection Agency and United States Census Bureau identified some sectors as pollution-intensive sectors in United States, using the actual emission intensity method. (Mani and Wheeler,1997). Iron and steel, non-

ferrous metals, industrial chemicals, petroleum refineries, non metallic mineral product, pulp and paper, other chemicals, rubber products, leather products and metal products were identified as dirty industries. Another World Bank team (Lucas, Wheeler, and Hettiage, 1992) identified metals, cement, pulp and paper, and chemicals as dirty industries, on the basis of aggregate toxic releases per unit of output. Letchumanan (1999) used United States toxic release data and arrived at a similar list of environmental sensitive goods.

The Government of India has classified 64 types of polluting industries/ industrial activities as "Red Category" industries (Central Pollution Control Board, India) on the basis of their emissions / discharges of high pollution potential or generation hazardous wastes. These are mainly concentrated in iron and steel, Petrochemicals, metal products, pulp and paper, chemicals, fertilizer, leather, rubber goods, cement and fermentation industries. The environmental standard committee (ESC) of Pakistan has classified industries into three main categories. Category A refers to the most hazardous industry which include textile processing industry, tanning and leather industry, petroleum refining, fertilisers, chemicals. Category B refers to moderately hazardous industries, such as dairy industry, fruit and vegetable processing, sugar, detergent, etc. In the category C are the least hazardous industries, such as pharmaceuticals, marble, cement industry.

The third approach by the World Bank (1998), based on effect of product on degradation of natural areas or loss of bio diversity, has hardly been used in existing literature. Using this approach, timber and wood products, fish and other seafood, and endangered species can be identified as environmentally sensitive products. These products have a long-term impact on the environment. Veena Jha, Anil Markandya, and Rene Vossenaar, in their book "Reconciling Trade and the Environment" (2000) have included marine product, wood and wood products and timber products in the list of environmentally sensitive products. In a study by Imme Scholz (1996), on the impact of environment regulations on Chile's trade, wood and wood pulp, furniture

Other products that may influence the balance of plant species or the bio diversity of wildlife are genetically modified foods. There are a number of issues that arise in the context of WTO rules with respect to such products. The first is whether naturally fruits and genetically engineered fruits should be regarded as 'like products' in the context of WTO rules. One argument advanced is that, as genetically engineered fruits may not reproduce at the end of their life span, the final product characteristics are affected by the process and production method, therefore they cannot

be regarded as 'like products'. At the same time as the end use of GMOs may be same as naturally grown products, they could be regarded as 'like products'. Another related issue that is particularly relevant in the context of the Biosafety Protocol relates to the labelling of products using GMOs. While some countries believe that such labelling would be entirely consistent with WTO rules on the grounds of public health concerns, other countries argue that their exports may be affected by such labelling.

The definition of environmentally sensitive industries is crucial to our study. Various existing studies have used different concepts of ESGs. However, this problem is not that serious, as several different definitions seem to yield similar lists of polluting industries. The definition that are most used in most studies rely on abatement costs or pollution data. Unfortunately, such information is not consistently available for developing countries such as India. Therefore, we need to rely on definition based on the use of abatement costs and pollution data from the developed countries. We assume that this will yield similar list of polluting industries, as data from developing countries would yield.

IV Trade in ESGs

In the existing literature it is generally acknowledged that developing countries have had to adjust their production processes in response to changing environmental regulations in the developed countries. Measures such as pesticide residue levels permitted in foodstuffs, emissions standards for machines, and packaging requirements have exerted pressure on the exporters. However, what remains to be seen is whether these measures have had any significant impact on trade.

The share of environmentally sensitive goods in total exports of developing countries is quite large. In 1998, more than 42 percent of India's exports consist of ESGs, whereas more that 63 percent of Pakistan's exports was attributed to these goods. Even among the ESGs certain goods contribute more heavily to exports than others (table 2). For instance, Bangladesh's export of ESGs is largely consisting of meat and preparations and petroleum products, which together constitute about 75 percent of exports of ESGs. Similarly, about 48 percent of Sri Lanka's exports in ESGs consist of Coffee, Tea, Cocoa and spices. In India, more than 35 percent of exports of ESGs is attributed to the textile sector. Even the textile exports of Pakistan attribute more than 80 percent to total exports of ESGS. It is obvious from these facts that certain goods are more vulnerable to stringent regulations than other goods.

Table 2: Share of exports of selected ESGs in total exports of Esgs							
Commodities	**India**	**Pakistan**	**Sri Lanka***	**Mexico**	**Thailand**	**China**	**Bangladesh**
Meat and Preparations							
Fish and Preparations			2.92		3.97	1.58	
Cereals and Preparations	1.51	9.53	1.24	6.84	1.73	1.73	11.05
Vegetables and Fruits	3.66	3.81	4.40	2.46	0.73		2.99
Coffee, Tea, Cocoa, Spices		6.96	0.87				0.34
Tobacco and Manufactures			1.69			0.25	0.59
Crude Fertilizers, Minerals n.e.s.	2.02				3.03	2.30	0.36
Organic Chemicals	9.08	0.76		1.62	1.48	2.59	
Dyes, Tanning, Colour Prod	0.89		0.68	1.25	0.81		1.12
Leather		1.45					0.25
Rubber Manufactures n.e.s.		34.00	15.60	7.58	28.56	14.03	13.87
Textiles Yarn, Fabrics, etc.	2.05	13.29	2.12	9.88	8.40	8.30	2.38
Iron and Steel	7.35	1.83	1.43	2.33	1.78	1.39	1.69
Non-Fer Base Metals Nes	7.01						
Metal Manufactures n.e.s.	1.66	3.62	1.48	2.82	2.43	2.50	1.51
Pulp & waste Pulp	1.46	6.70	3.77		2.74	5.91	2.92
Coal, Coke and Briquette	6.15		0.69	1.82	1.16	4.49	
Petroleum & Products	44.60	2.40	1.43	6.15	1.51		1.29
Inorganic Chemicals	6.17	2.35	49.38	13.21	6.24	26.57	40.71
Radioactive etc material		7.90	6.20	13.39	18.17	15.50	12.54
Fertilizer, Manufacture	4.35	2.43	1.98	7.69	7.02	8.20	3.02
Cork and Wood	2.03	2.96	4.12	22.93	10.23	4.41	3.36

Source: International Trade Statistics Yearbook, United Nations, various issues.
Note: * the data of Sri Lanka is for the year 1995

To study the impact of environmental regulations on trade, we examine the trade pattern of various environmentally sensitive goods in some developing and developed countries, for the period 1985-90 and 1990-98. The developing countries have experienced a significant fall in the growth rate of share of some environmentally sensitive goods export in the countries total exports, in the period 1990-98 (see Table 3). Most South Asian countries have experienced a falling share of food and agricultural exports in the total exports. In the manufacturing sector, different sectors have performed differently. While the share of exports of leather goods, iron and steel, and textiles are falling, rubber manufactures, non-ferrous metal goods, metal manufactures and organic chemicals have performed well. The rising share of exports seems to suggest that comparative advantage of South Asian region is shifting towards manufacturing goods such as rubber manufactures, non-ferrous metal goods, metal manufactures and organic chemicals.

Among agricultural exports, fish and preparations; meat and preparations; beverages and spices have been hit the most. It is clear from Table 2 that most of these goods form the bulk of exports.

In India, the tea exports is the most seriously hit among agricultural exports. The share of tea exports in total exports was growing at an average rate of 9.4 percent in 1985-90, but in 1990-98 the share of these exports was falling at the rate of 3 percent. The Sri Lanka's exports largely consist of beverages such as tea and coffee, spices, vegetable and fruits, rubber manufactures and textiles. The share of beverages, spices, vegetables and fruits in total exports has declined considerably, in the last decade. Since 1985, the vegetable and fruit exports have been falling at a sharp rate of 7.8 percent. The share of tea exports has fallen at an increasing rate.

The fish products and meat product exports in Thailand have also seen a falling share in total exports. The share of fish exports in Thailand experienced a negative growth rate of –3.3 percent in the period 1985-98. This could be because Thai fish exports were subject to a number of potentially damaging external regulations. In 1991, the Japanese Anti-additive Import regulation threatened Thai exports of shrimps and shellfish. In 1994, various restrictions imposed by U.S on tuna and the French ban on fishery product imports could have been responsible for the declining share of fish exports.

Table 3: Average growth rate of the share of ESGs in the various developing countries total exports

Commodities	India		Pakistan		Sri Lanka		Thailand	
	1985-90	1990-98	1985-90	1990-98	1985-90	1990-98	1985-90	1990-98
Meat and Preparations	-6.0	5.3					8.8	-3.9
Fish and Preparations	-3.7	2.3	17.7	-8.2	-2.1	2.8	2.2	-3.3
Cereals and Preparations	-5.4	9.0	-16.7				-10.9	-3.9
Vegetables and Fruit	-6.6	-0.4	-4.6	0.8	-4.8	-7.8	-7.6	-7.7
Coffee, Tea,Cocoa, Spices	9.4	-3.0	11.6	-11.1	-4.0	-10.9	-16.7	
Tobacco and Manufactures	-8.0	0.3	-16.7			34.9	-10.3	-12.5
Crude Fertilizers, Minerals n.e.s	-0.5	-6.1	-16.7		1.7	-10.9	-4.2	-12.5
Organic Chemicals	-8.9	14.4					3.1	20.0
Dyes, Tanning, Colour Prod	15.0	0.8						4.6
Leather	4.3	-10.2	-1.1	-6.4		-16.7	5.7	5.2
Rubber Manufactures n.e.s.	-0.6	3.1			5.8	8.3	2.5	3.0
Textile Yarn, Fabrics, etc.	3.9	3.0	5.8	0.7	-0.4	22.1	-5.1	-1.6
Iron and Steel	34.4	16.2	-16.7				-6.5	5.8
Non-Ferrous Metals	5.5	5.5					-14.2	-2.2
Metal Manufactures n.e.s.	6.1	9.3	-8.6	0.7	34.9	33.7	16.8	16.2
Pulp & waste Pulp								
Coal, Coke and Briquette								
Petroleum & Products	-8.1	-8.1	-2.5	21.6	-14.4	-8.9	1.7	52.9
Inorganic Chemicals	-16.7							
Radioactive etc material								
Fertilizer, Manufacture			-16.7					
Cork and Wood					-8.1	-16.7		

Table 4: Average growth rate of the share of ESGs in the various developed countries total exports								
Commodities	**U.S**		**U.K**		**Germany**		**Australia**	
	1985-90	**1990-98**	**1985-90**	**1990-98**	**1985-90**	**1990-98**	**1985-90**	**1990-98**
Meat and Preparations	8.4	1.7	-1.2	-2.8	2.6	-5.0	3.1	-2.7
Fish and Preparations	7.9	-6.1	7.8	-0.7			-2.4	0.4
Cereals and Preparations	-6.2	-5.1	0.4	-5.5	5.8	-0.2	-8.9	-0.1
Vegetables and Fruit	2.9	-1.9	-0.4	-11.1	2.5	-0.6	1.4	2.1
Coffee, Tea,Cocoa, Spices			-2.6	-0.5	-5.3	1.8		
Tobacco and Manufactures	4.3	-4.9	1.1	0.3				
Crude Fertilizers, Minerals n.e.s	-16.7		0.6	-1.9			-2.5	3.9
Organic Chemicals	1.3	-1.8	-1.3	-0.7	-3.6	-2.1		
Dyes, Tanning, Colour Prod		3.0	4.6	-2.1		-1.0		3.3
Leather							7.2	7.0
Rubber Manufactures n.e.s.	2.9	3.8	3.2	0.7	0.4	0.6		
Textile Yarn, Fabrics, etc.	2.1	0.6	1.8	-2.0	0.3	-2.9	-6.1	24.9
Iron and Steel	9.6	0.2	4.5	-3.2	-4.0	-2.7	-0.9	2.6
Non-Ferrous Metals	7.2	-1.9	3.3	-3.3	-1.3	-1.0	0.9	-0.7
Metal Manufactures n.e.s.	1.4	0.3	-0.7	-0.7	0.8	-1.1	6.5	-0.1
Pulp & waste Pulp	3.9	-5.6						-0.2
Coal, Coke and Briquette	-7.5	-6.7			-9.7	-11.1	-4.4	0.3
Petroleum & Products	-3.9	-5.1	-10.8	-5.2		-2.1	-11.9	-1.8
Inorganic Chemicals	-6.1	-3.1	-4.4	-2.5		-3.0		1.8
Radioactive etc material		-11.1	-8.1	-11.1				
Fertilizer, Manufacture	-5.8	-3.0						
Cork and Wood	4.6	-6.1					-15.8	21.1

In the Indian manufacturing sector, leather is one of the most seriously hit sectors among exports. The share of leather exports in total exports was growing at an average rate of 4.3 percent in the period 1985-1990, but after 1990 share of leather exports experienced a negative growth rate. This could be due to stringent standards imposed by the developed countries. The leather industry in India is faced with a ban in European countries on the use of pentachlorophenol (PCP). Various studies indicate that such measures could increase the cost by nearly three times. Its possible imposition of such measures has effected leather exports. Other environmentally sensitive goods that saw fall in the share of exports in India are textiles, beverages, iron and steel, metal manufactures and dyes and colour products. The dyeing industry in India has to incur large costs due to ban of cobalt blue, sulphur black, benzidine and this could be responsible for the falling share of dyes and its products in total exports. The growth in the share of dye exports was 15 percent in 1985-98, but in the period 1990-98 it has grown by just 0.3 percent. In addition to the stipulations pertaining to dyes, several other regulations are also imposed on textile and garment exports by the OECD markets. About 63 percent of ready-made garment exports in India come from the SMEs. Hence, a high proportion of this industry faces severe difficulties in complying with external regulations. Pakistan's textile industry has also suffered from the

external restrictions. The steep compliance cost is likely to reduce the volume of South Asian textile export the OECD countries. Therefore, the potential gain from the textile negotiations concluded at Marrakesh may be diminished.

While the share of exports of ESGs is rising in the developing world, the share of some of these environmentally sensitive products is falling in the developed countries (Table 4). The developed countries' exports of pulp and paper, metal manufactures, inorganic chemicals, fertilizers have fallen in share. It seems that Australia has eaten up the South Asian region's share of exports in agricultural commodities and textiles. The growth rate of share Australia's textile exports in its total exports has risen sharply from 0.3 percent in 1985-90 to 24.9 percent in 1990-98. While the agricultural exports of the developing countries have suffered a set back due to stringent external regulations, Australia's exports of these goods are increasing. The share of metal manufactures in U.K exports has decreased at the rate of 0.3 percent. All developed countries that were studied showed a decline in exports of non-ferrous goods.

The examination of import data does not bring out any clear results. Most of the countries, particularly the developed nations, experienced a fall in the share of food products in total imports. The share of rubber manufactures, iron and steel, non-ferrous and metal manufactures in total imports of all developed countries, excluding Australia, seems to be increasing at an increasing rate. On the other hand the share of the same goods in imports of developing countries is increasing at a decreasing rate.

V Other Emerging Concerns

In last decade or so environmental concerns have proliferated encomapssing a large section of trade. This emanates from different international commitments such as Cartegena Biosafety Protocol and Kyoto Protocol. In the wide ranging commentaries on these protocols one finds huge list of possible area for conflicts with these protocols and the provisions made in various agreements in WTO[1]. These environmental concerns are affecting trade prospects for developing countries and any dispute at WTO Dispute Settlement Panel can only indicate the course it would take.

[1] For details see Zarrilli, 2000, Nielson et. al, 2000.

Similar concern is also being raised about the effectiveness of Kyoto protocol in terms of implementation and its possible conflicts with the rights being given under the various WTO agreements. Some of the industrial organisations[2] have suggested that the Kyoto Protocol's empowerment should be developed to be consistent with the existing WTO disciplines, observing MFN, like product rules and sound science criteria. They have also suggested to avoid discrimination based on methods of processing and production (PPMs) which was at the basis of Kyoto deliberations on behalf of developing countries. Business organisations are also concerned about some forms of domestic implementation which seeks to offset "Carbon leakage" could lead to the establishment of trade barriers in the form of tariffs, border taxes, discrimination and labeling.

There are several views about trade of goods, which would be affected by Kyoto protocol. For instance, the study by Montgomeri et.al. 2001 suggest that compliance with the Kyoto Protocol would result in loss of economic welfare to the tune $ 900 million and the cost will not be limited to developed countries. The adoption of Clean Development Mechanism (CDM), which allows developed countries to invest in low cost energy reductions in developing countries which may reduce cost of compliance. It also refers to an emerging division among developing countries themselves as countries like China and India export, energy intensive goods and benefit from energy price increases in developed countries.

It is worth recalling here that the Cartegena Protocol on Biosafety was negotiated under the auspicious of Convention on Biological Diversity (CBD) in 1992. The Protocol was adopted by a large number of countries (64) in 2000. This protocol provides rules for safe transfer, handling, use of and disposal of, living modified organisms (LMOs). The wide objective of the protocol is to address the threats posed by LMOs to biological diversity along with to human health. There are three major areas of concerns which are generally found to be conflicting with the spirit and provisions in the SPS /TBT agreement under WTO.

In terms of its spirit SPS agreement seems to be restrictive in nature while the Biosafety Protocol empowers for even taking grand measures for protection. Though the SPS agreement covers a wide spectrum of issues concerning human health which may affect access for trade of GMOs while the Biosafety Protocol apart from being GMO specific talks of biodiversity and health in

[2] Please see the Policy Statement from International Chamber of Commerce, October 26, 1999.

general. The whole understanding of precautionary principle under article 5.7 of SPS and article 11.8 of Biosafety Protocol is contradictory in nature. Another area of concern is the acceptable level of risk which may be allowed while trading GMOs. On the areas of risk assessment and management SPS broadly sets the tone for acceptable level of risk at the international level being endorsed by any international institution while Biosafety Protocol refers to an excluvist approach which may be adopted at national level.

Though in last decade the trade in biotechnology products has grown many fold but due to lack of adequate classification of such products there is hardly any evidence from the South Asian region to substantiate this perception. The current estimated biotechnology market size for India is $1849 million.[3] The product range from biotechnology related instruments, drugs and even agricultural and food products containing transgenic traces, commercial field trials of which, has not been permitted in many South Asian countries.[4]

However, in case of US a conscious effort has been made to develop a concept of collecting trade data on Advance Technology Products (ATP) by the US Census Bureau. All of the biotechnology products on the ATP list appear to belong to biologics. This is largely of therapeutic products derived from living organisms these include vaccines, human blood, plasma, proteins and monoclonal antibodies. This definition does not match with the definitions evolved by other countries. The OECD in a separate exercise is attempting to evolve biotechnology statistics at least at the level of OECD countries[5]. The growing resistance within Europe of GM crops has already affected US agricultural exports. Soyabean, where 35% of US output is composed of genetically modified varieties exports to the EU declined from 9 million tons in 1997 to 6 million tons in 1998. Similarly, exports of corn (maize) in 1997 from US to EU was 1.6 million tons which has now declined to 0.3 million tons[6]. The global market for transgenic crops and related products has grown very fast in the last quinquennium. The sales have increased from $ 75 million in 1995 to $ 3 billion in 2000. This is likely to reach $ 25 billion by 2010.[7]

It is fairly possible that a conflict between SPS agreement and biosafety protocol may come up in not such a distant future. Though they have emerged in two different settings but addresses

[3] Ghosh (1995)
[4] In fact Sri Lanka had to withdraw an official order banning imports of all food items containing GMOs. See BDR Vol. 4 No. 1 for more details.
[5] OECD, 2001.
[6] Perdikis et. al, 2001

similar issues in contradictory terms. SPS is to address health issues in a wider context while biosafety protocol addresses health in a narrow context of trade in GMOs. The SPS imposes a restrictive regime emmanating from international product standard setting institutions while biosafety protocol allows member countries to evolve their own necessary measures to protect their health and environment. Therefore the protocol has not laid any provisions for addressing disputes while, SPS, being mandatory in spirit, has a backing from a strong Dispute Settlement Provision (DSP).

The constrains in the export of environmentally friendly products from India has been discussed in Saqib and Kaushik (2001). Though organic farming has a tremendous scope in India, there exist a number of bottlenecks for farmers who are interested in organic farming and for the industry who want to process and export these products. These impediments are in the area of production, marketing and infrastructure. Certification is seen as a barrier to the small growers due to its costs. Standards are too high and are creating unfair barrier to production and trade. India has no local certification systems for organic products and farmers have to depend on foreign certification like IFOAM and SKAL. This is very expensive and is feasible for big holdings only. The United States is the largest single-country market for organic foods, with $4.2 billion in sales for 1997 (Scott). The 1997 organic food market in the EU is estimated to be worth $4.5 billion (Segger). In Europe, Germany ($1.6 billion), France ($508 million), and the United Kingdom ($445 million) have the largest organic retail sales. Consumer commitment to organics is strong throughout the EU, with 20 per cent to 38 per cent regularly or occasionally purchasing organic foods. Retail price premiums in Europe average from 10 per cent to 50 per cent above conventional products. Import shares are highest in Germany and the United Kingdom, which are major food processors, and in the Netherlands, which is a primary re-exporter. Retail sales are lower in Canada ($68 million) and Australia ($60 million), although both countries are active in exporting organics-Australia to Asia and Canada to the United States and Europe. Price premiums in Canada average 30 per cent, but a range from 12 per cent to 65 per cent is found across the states of Australia. Import share is very high in Canada, purchased mostly from the United States, and very low in Australia, consistent with the organic share of total food sales in each country. Japan ($1.7 billion) and China ($1.2 billion) offer large retail markets, with negligible quantity currently supplied by imports. Price premiums in these countries are similar to

[7] Zarrilli (2000)

those in the EU, averaging 15 per cent to 30 per cent. Market participation rates are also similar, between 27 per cent and 36 per cent.

Table 5: Market Size for Organic Products

Country	Approx. Retail Value (US $)	Year[a]	Organic Share of Total Food Sales	Import Share of Organic Sales
Austria	$270 million	1997	2.5%	30%
Belgium	$75 million	1997	1.0%	50%
Denmark	$190 million	1997	<3.0%	25%
France	$508 million	1996	0.4%	10%
Germany	$1.6 billion	1997	1.5%	60%
Netherlands	$230 million	1997	1.5%	60%
Sweden	$200 million	1997	2.0%	30%
United Kingdom	$445 million	1997	2.0%	70%
Canada	$68 million	1995	1.0%	80%
Australia	$60 million	1995	0.2%	0%-13%[b]
China[c]	$1.2 billion	1995	6.0%[d]	0%
Japan[c]	$1.7 billion	1997	1.0%	1%

[a] Year given is for retail value data; [b] Varies by state;[c] In this country, organic includes "low chemical.";[d] Based on production value, not retail sales.

Source: American Journal for Agriculture Economics, Vol. 80 No. 5, 1998, pp. 1125-1129.

VI Concluding Remarks

The whole urge for international standards and compliance with them in international trade has been a well established practice. Technical trade barriers were adopted by the Contracting Parties to the original General Agreement on Tariffs and Trade (GATT) in 1947, while multilateral trade rules for other "domestic policies" such as investment, services and intellectual property measures were left to future negotiations. The fact that disciplines on the use of technical barriers were subsequently expanded and strengthened in multilateral trade negotiations that took place during the 1973-1979 Tokyo Round and again in the 1986-1993. However, the present regime of SPS and TBT has given a new dimension to the whole debate on technical standards, especially in light of environmental concerns.

The growing trade-off between environmental standards and its effectiveness to govern the trade in environmentally sensitive goods has raised serious questions about the trade as a tool to manage environmental concerns. In fact, in the developing countries especially in South Asian Countries where agriculture dominates the exports the growing convergence between different

product standards ranging from health to environment have also raised lot of concerns and as has been analysed earlier has affected agriculture export to a great extent.

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