

Introduction

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Short Abstract: This book is on trade in Climate Smart Goods and Other Specialized Products of Ecuador. The interest in the subject of Trade in Climate Smart Goods was fuelled by Ecuador's positive trade balance with the rest of the Andean Community and MERCOSUR region in 2010. This may be a reflection of Ecuador's maturity in dealing with environmental issues since the early 1980s. The study is also able to identify some specialized industries and identify markets for the two digit and 6 digit industries for Ecuador using RCA and Export Specialization indices. There are 20 such products at the two digit level and 238 products/ industrial codes at 6 digit level disaggregation in 2010 where in Ecuador has a comparative advantage in production. These industrial sectors are potential for inviting FDI into Ecuador. The study further identifies CSG goods in which Ecuador has advantage in production and its trade. The study then uses simulations done through SMART analysis (within WITS) for evaluating the relative benefits of tariff liberalization of CSG and specialized goods (both for 20 and 238 products) with MERCOSUR, China, Japan and the US, and EU27 separately by giving numbers to trade creation, trade diversion, revenue, welfare and consumer surplus effects of liberalizing trade in 2010. The study at the end then uses a variant of Baier and Bergstrand (2001) gravity formulation for working out the basis of trade and export potential in CSG and trade in 20 products of Ecuador in 2010. National and International Policies are recommended for promoting CSG goods at country and regional level.

Long abstract

The book works out different trade indices based on trade data of Ecuador from 2002 through 2010. The study calculates RCA and Export Specialization Index, among others, to identify 20 (at 2 digit level disaggregation) and 238 products (at 6 digit level disaggregation) and their markets of Ecuador in 2010. The paper also used 64 goods list of Climate Smart Goods used in APTIR, UNESCAP (2011, a, b). The Trade in CSG will help Ecuador to promote alternative industries in the face of Global Economic Downturn. Also, it will help countries to look for safe, alternative and reliable energy source rather than believing in trade of crude and Petroleum Oil only or investing a great deal in nuclear energy. Nuclear energy was in the brink of being affected in Japan due to recent Earthquake in Japan. Ecuador can direct its social spending in promoting small industries which can provide CSG goods (low carbon emanating goods) at low cost. Identification of goods for diversifying Ecuadorian economy is also done using different trade indices. The study then uses simulations done through SMART analysis (within WITS) for evaluating the relative benefits of tariff liberalization of CSG and specialized goods (both for 20 and 238 products) with MERCOSUR, China, Japan and the US, and EU27 separately by giving numbers to trade creation, trade diversion, revenue, welfare and consumer surplus effects of liberalizing trade in 2010. One finds that for Ecuador it is beneficial to trade in 20 (2 digit level) and 238 products (at 6 digit level) with the MERCOSUR trading partners while for trade in CSG it is better to liberalize trade with the Japan, the US and the China, the main suppliers (exporters) of CSG products.

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The study at the end then uses Baier and Bergstrand (2001) gravity formulation for working out the basis of trade and export potential in CSG and trade in 20 products of Ecuador in 2010. National and International Policies are recommended for promoting CSG goods at country and regional level.

One finds that there is export potential of 34 million US \$ in CSG to four Latin American trading partners of Ecuador. The four Latin American Countries are Bolivia, Chile, Columbia and Peru. This is less than the export potential when Ecuador liberalizes its trade of CSG with China, Japan and the US. Theoretical justification of the Gravity formulation used is given along with equations of Trade Creation and Trade Diversion. The latter will depend on the import demand elasticity, substitution elasticity and supply elasticity. Small country assumption is made while pursuing SMART analysis in WITS.

The study has **three main specific objectives**. The **three main specific objectives** of the book are the following

1. Work out different trade indices based on trade data from 2002 through 2010 for Ecuador. Understand the trade relations of Ecuador with its trading partners for total trade, some selected products and trade in CSG(Climate Smart Goods²) using some of the trade indices and trade and tariff data from the World Integrated Trade Solution(WITS) software. The indices include Export share of Ecuador in World Exports, Product Concentration and Market Concentration of Ecuadorian Exports, Revealed Comparative Analysis, Export Specialization Index, Trade Complementarity and Trade Intensity Indices, Export Diversification and Herfindahl- Hirschman indices of trade concentration .The above indices will help us to examine the role of international trade of Ecuador over the years(Export share in World Exports) and perform comparative analysis with other nations and regional groups over the years, identify the specialized products of Ecuador and their markets over the years by examining the changing comparative advantage in production of some products (RCA and Export Specialization Indices), also identify the extent of matching of Ecuadorian products with its trading partners (Trade Complementarity index), its intensity of trade relations with its trading partners

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2. CSG are defined as components, products and technologies which tend to have relatively less adverse impact on the environment. CSGs constitute low carbon technologies such as solar photovoltaic systems, wind power generation, clean coal technologies and energy-efficient lighting. Trade and investment in CSGs and climate-smart services have recently received much attention as a triple win scenario where trade, climate and environment, and development all benefit (UNESCAP,2011,a,b).The study is able to define 64 such goods under 6 digit HS code(2002) by putting together various lists that have been defined by various international organizations recently. The list is arrived by defining concordance series from series of list given by the World Bank, ICTSD, WTO, APEC and the OECD. The study consider these 64 CSG as one category and calculates the below mentioned trade indicators for this category. This list builds on the 43-product list amalgamated by the World Bank, which was tabled as an initial starting point for discussions. The list at UNESCAP proposes an additional 21 products that appeared on one of the recent ICTSD lists (Renewables and Buildings) and also on the APEC, OECD or WTO list. In total, the list comprises of 64 climate smart goods classified by H.S. 2002 codes at the 6-digit level. The 64 goods list is attached below in the appendix I. The term “climate smart” was chosen over the previously used classification of “climate friendly” owing mainly to the fact that many goods/technologies contained within the UNESCAP list are not only “friendly” to the climate (i.e. assist in mitigation efforts by reducing GHG emissions), but also contribute to fostering “climate-smart” development by improving adaptive capacity such as by conserving water or by improving access to energy.

(Trade Intensity Index), share of specialized and CSG products in exports of Ecuador (Product Concentration), share of markets in total exports of Ecuador (Market Concentration) and diversification and concentration of products in exports of Ecuador (Export Diversification and Herfindahl-Hirschman indices). The study will further suggest measures to develop trade relations with India by examining the trade statistics and indices for India and Ecuador. The study will use World Integrated Trade Solution (WITS) for the above analysis. WITS gives 2 digit, 4 digits and 6 digit disaggregated trade and tariff data from Commodity trade statistics of the UN and UNCTAD TRAINS data base.

2. Use SMART analysis (within WITS) to do simulations for trade liberalization effects for specialized and CSG products of Ecuador with MERCOSUR countries and the US, China, Japan and the EU27. Examine and analyze the trade creation, trade diversion, total trade effects along with revenue, welfare and consumer surplus effects of tariff liberalization for defining policy on the differential gains of such trade and tariff liberalization efforts with host of other trading partners/ regional trading partners of Ecuador mentioned above.
3. Use Gravity analysis to explain Ecuadorian trade of specialized and CSG products by identifying the host of determinants explaining such trade. These factors may include absolute size in terms of GDP of the trading partners; inter country dispersion of incomes, trade costs, prices of products prevailing in the two trading partners, dummies for common border, common trading arrangement, common language and common colony, among others. Use Gravity model to work out 'export potential' of Ecuador and its trading partners for CSG and specialized products

The book will be divided into **three main chapters** based on three main specific objectives. These will be (a) Use of Trade Indices to Understand Trade Relations of Ecuador for Climate Smart Goods, Total Trade and Specialized Products. The second chapter will be (b) Trade Liberalization of CSG and Other Specialized Products: Comparative Analysis Using SMART (c) Export Potential and Basis of Trade of Climate Smart Goods and Specialized Products of Ecuador Using Gravity Analysis. The research study besides these three main chapters will have sections on the identified research problem, Definition of Research, Justification of taking up such study, Limitations, General and Specific Objectives, Environmental Sustainability in Ecuador, Conclusions and Policy Recommendations, Future Research and the Experience Gained.

The **justification** of taking up such research is to (a) develop capabilities to create products friendly to the environment and other products for diversification of economy at the country and at the regional level. (b) Mapping the capabilities of trade to environmentally friendly countries and working out the export potential of Ecuador in CSG and Specialized Products at different levels of disaggregation (c) Establishment of regional indicators and indices related to export and import of CSG and total trade, competitiveness, comparative advantage and export specialization indices, among others, for specialized goods and CSG alike (d) Definition of CSG-commerce capabilities at Country, Regional and its sub-regional level, (e) Learning of new developments in the field of Gravity Analysis including literature on linking volume of trade with equality of incomes across countries (f) Proposal for designing economic policy to boost competitiveness, trade patterns, and changes by development of trade relations, economic growth and environmental stewardship through the implementation of policies, for which it seeks to develop capabilities to create products friendly to the environment, or CSG, at country and at the regional level of the MERCOSUR and ANDEAN member countries. (g) Enhance the skills of negotiators in understanding the relative benefits of trade liberalization with host of countries and regions by working on trade software WITS (h) Identifying Policies at the National and International Level for enhancing production of CSG goods. (k) The research work will be useful for all policy makers and negotiators designing and evaluating economic agreements, students, teachers and researchers in the field of international trade and environmental economics

The following are some of the **main conclusions of the research study**.

Trade Indices research indicates the factual position of country. The following can be derived from the research

Ecuador needs to rethink its trade policy by diversifying its trade into manufactured products and more diversified production structure. Information Technology services, Tourism, Manufacturing of Automobiles, Education and Training Services, Bio combustibles, Housing materials, Pharmaceutical industries, Health Products and Hospital services, Hardware production, Industrial and Textile Goods and Chemicals are some areas where Ecuador can think of developing niche in the coming future and cater to European markets. Production and Trade in Climate Smart Goods is another area of focus. In particular, the study identifies the following industries for further diversifying industrial structure of Ecuador for its gain in future. These are Industrial Codes- 61(Articles of apparel and clothing accessories, knitted or crocheted), 62(Articles of apparel and clothing accessories, not knitted or crocheted),42(Articles of leather; saddlery and harness; travel goods, handbags and similar containers; articles of animal), 90(Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical instruments and apparatus; parts and accessories thereof), 84(Electronic appliances), 85(Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles),87 (Vehicles other than railway or tramway rolling-stock, and parts and accessories thereof), 83 (Miscellaneous articles of base metal), 73 (Articles of iron or Steel), 69 (Ceramic products), 30 (Pharmaceutical products),29(Organic chemicals), Climate Smart Goods- 840510(Clean Coal Technologies), 850720,853710 and 854140(Solar Photovoltaic systems), 848340 and 848360(Wind Power Technologies), 853931(Energy Efficient Lighting), among others. In services sector, Tourism, IT and ITES, Hospital services, Education and Training Services(training of English), Cultural Services, Knowledge Processing Outsourcing and Financial Analytics, Infrastructure services have lot of potential of bring the necessary foreign exchange and stability into the system .Ecuador need to diversify into the following industries and services for higher and more stable export earnings, job creation and learning effects, and the development of new skills and infrastructure that would facilitate the development of even newer export products.

SMART Analysis results shows that It is beneficial to trade in 20(2digit level) and 238 products(at 6 digit level) with the MERCOSUR trading partners while for trade in CSG it is better to liberalize trade with the Japan, the US and the China, the main suppliers (exporters)of CSG products.

Gravity Analysis has been used in this study to explain the basis of trade of CSG goods of Ecuador and Trade of 20(at 2 Digit level) specialized products in 2010. Further, the variant of the Baier and Bergstrand (2001) gravity model has been used to work out the export potential of CSG and specialized products to and from Ecuador. The theoretical justification of extending the most simple Gravity model, as used in this study, is done using extensions of the work done by Helpman and Krugman (1985). The Export potential of Ecuador is worth 34.79 million US \$ with the four Latin American countries (Bolivia, Chile, Columbia, and Peru in CSG products). However, SMART analysis had shown that for Ecuador it is better to liberalize trade of CSG products with the Japan, US and the China for overall gains.

Research Problem

The basic thrust of this study came after looking at some Gross Exports and Gross Imports figures of Ecuador to and

from other MERCOSUR³ and ANDEAN communities⁴ for Climate Smart Goods for the year 2010. The figures are reproduced below in Table I

Table I: Gross Exports and Gross Imports of CSG by Ecuador to and from the ANDEAN and MERCOSUR Regions /Countries, the EU, Japan, the USA, China and All Countries of the World in 2010

| Product Code | Partner Name | Trade FlowName | ECU in 1000 USD |
|--------------|-------------------------------------|----------------|-----------------|
| CSG2002 | All countries | GrossExp. | 91319.906 |
| CSG2002 | All Countries | Gross Imp. | 487572.047 |
| CSG2002 | andeancustomsunionwithoutecuador -- | GrossExp. | 49834.952 |
| CSG2002 | andeancustomsunionwithoutecuador -- | Gross Imp. | 46908.311 |
| CSG2002 | Argentina | GrossExp. | 119.609 |
| CSG2002 | Argentina | Gross Imp. | 3312.600 |
| CSG2002 | Bolivia | GrossExp. | 573.611 |
| CSG2002 | Bolivia | Gross Imp. | 13.377 |
| CSG2002 | Brazil | GrossExp. | 3.201 |
| CSG2002 | Brazil | Gross Imp. | 16427.403 |
| CSG2002 | Chile | GrossExp. | 7283.650 |
| CSG2002 | Chile | Gross Imp. | 7755.537 |
| CSG2002 | China | GrossExp. | 3.685 |
| CSG2002 | China | Gross Imp. | 61667.021 |
| CSG2002 | Colombia | GrossExp. | 17937.610 |
| CSG2002 | Colombia | Gross Imp. | 22124.861 |
| CSG2002 | EU27 --- EU27 members --- EU27 | GrossExp. | 375.621 |
| CSG2002 | EU27 --- EU27 members --- EU27 | Gross Imp. | 61096.945 |
| CSG2002 | Japan | GrossExp. | 0.122 |
| CSG2002 | Japan | Gross Imp. | 2054.675 |
| CSG2002 | latinamericancommonmarket --- merco | GrossExp. | 71477.799 |
| CSG2002 | latinamericancommonmarket --- merco | Gross Imp. | 55834.663 |
| CSG2002 | Peru | GrossExp. | 31200.921 |
| CSG2002 | Peru | Gross Imp. | 4850.125 |
| CSG2002 | Paraguay | Gross Imp. | 0.099 |
| CSG2002 | Uruguay | Gross Imp. | 179.846 |

3 MERCOSUR, a common market, has the following core members-Argentina, Brazil, Paraguay, Uruguay and Venezuela. Associate members are Bolivia, Chile, Columbia, Ecuador and Peru. We consider all core and associate members of the MERCOSUR excluding Ecuador in our study because we consider Ecuadorian trade relations with other members.

4 ANDEAN Region, a customs union, has the following core members-Columbia, Ecuador, Peru and Bolivia. The Associate members are Argentina, Brazil, Paraguay and Uruguay. We consider all core and associate members except Ecuador as we need to consider trade relations of Ecuador with all its trading partners.

| | | | |
|---------|--------------|------------|------------|
| CSG2002 | Venezuela | GrossExp. | 14359.197 |
| CSG2002 | Venezuela | Gross Imp. | 1170.815 |
| CSG2002 | UnitedStates | GrossExp. | 1183.914 |
| CSG2002 | UnitedStates | Gross Imp. | 273645.369 |

Source: WITS data base. 64 goods CSG list is based on HS 2002 but 2010 data.

After carefully looking at the figures for Ecuador one finds that Ecuador has a positive trade balance for CSG with the other ANDEAN and MERCOSUR countries. One would have least expected the same after finding that Ecuador is a net importer of Climate Smart Goods(basically components to cleaner technologies) from China, Japan, the US ,the EU27 and World at large. Then why would it have a positive trade balance with its Latin American Trading Partners? Does this reflect the matured response of Ecuador on having growth with environment policies since early 1980s, reflected by its early ratification of Kyoto Protocol, CBT and protection of its Amazon jungles? Would it also mean that that Ecuador has realized the benefits of CSG goods early to have positive trade balance with its neighbouring countries? .We will outline the national and international policies adopted by Ecuador as far as cleaner and environment friendly policies are concerned to answer the above. Would it mean then that by further liberalizing trade by MERCOSUR and ANDEAN Countries including Ecuador and other Latin American Countries would bring some further gains to Ecuador⁵? Would Ecuador gain more by liberalizing Ecuador's trade with the suppliers of the CSG- the Japan, the Hong Kong, China, EU and the US. One needs to do simulations with SMART analysis (within WITS) to answer the same (second part of study). Would it further mean that Ecuador will have the same trend (positive trade balance) with all its Latin American in all other products and some identified specialized products? If yes will it be beneficial to liberalize its trade with MERCOSUR or countries like the Japan, the US, China, and the Hong Kong for other products than CSG. The last two questions will entail use of various trade indices to identify the integration of Ecuador with the outside world and also help in identifying specialized products for Ecuador along with its markets. In particular, the above indices will help us to examine the role of international trade of Ecuador over the years(Export share in World Exports) and have comparative analysis with other nations and regional groups over the years, identify the specialized products of Ecuador and their markets over the years by examining the changing comparative advantage in production of some products (RCA and Export Specialization Indices), also identify the extent of matching of Ecuadorian products with its trading partners(Trade Complementarity index), its intensity of trade relations with its trading partners (Trade Intensity Index) , share of specialized and CSG products in exports of Ecuador(Product Concentration), share of markets in total exports of Ecuador(Market Concentration) and diversification and concentration of products in exports of Ecuador(Export Diversification and Herfindahl-Hirschman indices).Continuing, the study will suggest measures to develop trade relations with India by examining the trade statistics

5 Liberalizing trade in this study would mean a scenario of zero tariffs for imported products. This would have total trade effects as sum of price or terms of trade effect and quantity effects as sum of trade creation and trade diversion effects. These effects along with consumer surplus, revenue effects and welfare effects will accrue to the importer. Such effects are estimated by SMART (partial analysis). In addition, the export potential of exporters is also worked out. In this study we have done liberalization simulation for Ecuador (importer) country only. Therefore, any export potential effects of Ecuador for imports coming into MERCOSUR or EU, the Japan, The China and the US is examined by not working on the liberalization efforts of its trading partners but by Gravity Analysis (Third Objective). Liberalization in general would mean that zero tariffs for products emanating out of the importing country into the partner country and zero tariffs for products coming into importing country from partner country. Multilateral liberalization will always bring larger welfare than regional liberalization. The study discusses the various strategies related to regional liberalization as global trade talks are not succeeding as expected.


and indices for India and Ecuador. Thereafter, SMART analysis will be done to make judgments of liberalizing trade of specialized products with MERCOSUR and the developed nations. At the end Gravity Analysis is done to explain Ecuadorian trade of specialized and CSG products by identifying the host of determinants explaining such trade. The study uses Gravity model to work out export potential of Ecuador and its trading partners for CSG and specialized products.

The study will be divided into three main chapters, based on three main specific objectives. These will be (a) Use of Trade Indices to Understand Trade Relations of Ecuador for Climate Smart Goods, Total Trade and Specialized Products. The second chapter will be (b) Trade Liberalization of CSG and Other Specialized Products: Comparative Analysis Using SMART (c) Export Potential and Basis of Trade of Climate Smart Goods and Specialized Products of Ecuador Using Gravity Analysis. The research study besides these three main chapters will have sections on Background and Importance of the Climate Smart Goods, sections on Definition of Research, Justification of taking up such study, Limitations, General and Specific Objectives, Conclusions and Policy Recommendations, Future Research and the Experience Gained.

Background and Importance of the Climate Smart Goods

The CSG forms part of the broader group named 'environmental goods and services (EGS). The Environmental goods and services industry consists of activities which produce goods and services to measure, prevent, limit, minimize or correct environmental damage to water, air and soil, as well as problems related to waste, noise and eco systems. This includes cleaner technologies, products and services which reduce environmental risk and minimize pollution and resource use.

An Environmental good can be understood as equipment, material or technology used to address a particular environmental problem or as a product that is itself 'environmentally preferable' to other similar products because of its relatively benign


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impact on environment. Environmental services are services provided by eco systems or human activities to address environmental problems. EGS can be also classified as Environmental Goods comprising of pollution management products, cleaner technologies and products, resource management products and environmentally preferable products. EGS also has Environmental services comprising of sewage services, refuse services, sanitation and similar services and others. The EGS were first discussed as part of the liberalizing agenda in the DOHA round of the multilateral trading round in 2001. The countries had wanted the tariff and non-tariff barriers to go down for trade of such EGS as this may lead to adoption of cleaner and cost effective technologies by firms and country at large and possibly mitigate climate change and improve energy efficiency. Liberalization has followed three routes namely the list approach, project/integrated approach and request for offer approach. Environmental Goods were always part of trade agenda but were subsumed within industrial or agricultural negotiations.

CSGs constitute low carbon technologies such as solar photovoltaic systems (Industry Codes 850720, 853710, 854140), wind power generation (industry codes 848340 and 848360), clean coal technologies (840510) and energy-efficient lighting (853931)⁶, among others. Trade and investment in CSGs and climate-smart services have recently received much attention as a triple win scenario where trade, climate and environment, and development all benefit (UNESCAP, 2011,a,b). Climate Smart Goods and technologies allows for production processes that have no or minimum Green House Gas(GHG) emissions and negative impact on environment and which are atleast economically efficient and acceptable. Climate Smart Technologies consists of technology that improve efficiency and conservation of conventional fossil energy and enable the commercial and efficient use of renewable energy sources.

Promoting CSG trade has become important because of the need of such goods by countries in the wake of recent financial crisis in Europe and after events in Japan recently. Countries want to concentrate on low energy consumption and save themselves from relying entirely on nuclear energy which may be prone and be affected by natural disasters like what happened in Japan. Our Gravity analysis has shown that there is potential for trade in CSG by Ecuador and trading nations alike.

Countries need to design sustainable and climate smart growth that entails sharply reduced GHG emissions to a level of 450 ppm(or may be lower) and that limits the global temperature rise to not more than 2 degrees Celsius by the end of the century. The study below lists such policies and is not confined to trade policies alone. Trade policies related to CSG though are the main

6 Climate Smart Goods list of 64 goods(UNESCAP,2011,a,b) include, among 'Other Industries', Industry Codes, Solar Photovoltaic systems(850720- Other Lead Acid Accumulators,853710-For a voltage not exceeding 1000V and 854140-Photosensitive semiconductor devices ,including photovoltaic cells whether or not assembled in modules or made up into panels, light emitting diodes),Wind Power(848340-Gears and Gearing, Other Than Toothed Wheels ,Chain Sprockets and other transmission elements presented separately, ball or rollers screws ,gear boxes and other speed changers, including torque converters, 848360-Clutches and Shaft Couplings(Including Universal Joints),Clean Coal Technologies-(840510- Producer Gas or Water Gas Generators, With or Without Their Purifiers, Acetylene Gas Generators and Similar Water Process Gas Generators With or Without Their Purifiers), Energy Efficient Lighting-(853931-Fluorescent Hot Cathode).

focus of this study. The entire set of policies which can reduce GHG emissions and limit climate change can be structured into regulatory measures(including regulations, standards and labeling), economic incentives(including taxes, tradable permits and subsidies conforming to WTO laws and provisions), trade and investment policies and financial, energy and enterprise development policies, among others. Appendix Table XII lists the various efforts made by international community to tackle the Climate Change. These include the Rio Meet in 1992, Kyoto Protocol of 1997, Copenhagen accord in 2009, the COP 16 meeting, the Bali Action Plan of 2007 and the very ambitious, the Durban meeting of 2011. These meetings are besides the DOHA agenda on liberalizing trade in environmental goods and services. This study believes that economic growth, higher trade and environment sustainability, all three are possible at the same time and there is limited trade off between them. The debate on trade, growth and environment sustainability have arisen as trade and environment sustainability are not always positively related. Grossman and Krueger(1994) argues that trade affects environment through scale effects, technique effect and composition effect. With the rapid increase of trade and investment in recent decades as a result of sustained liberalization, the ecological footprint – including GHG emissions – has also risen sharply. This is called the “scale effect”. When renewable energy replaces traditional fossil fuels, trade and investment are no longer associated with Green House Gas(GHG) emissions. Instead trade and investment become principal components of efforts to mitigate climate change. The other two identified effects are the composition and technique effects. The composition effect refers to the way trade liberalization changes countries’ comparative advantages towards emission-intensive or emission-friendly industries. For example, a changing comparative advantage as a result of trade liberalization may lead carbon-intensive industries to relocate from countries with strict regulations to countries (often developing countries) with less stringent regulations, which are known as “pollution havens” (and, thus, provide a large comparative advantage), leading to “carbon leakage”. The net global composition effect of trade opening on GHG emissions is therefore not necessarily positive. The technique effect refers to the manner in which technological improvements may be adopted to increase production efficiency and reduce emission intensity as a result of trade and trade liberalization. This may happen in two ways: (a) trade liberalization increases the availability of climate-smart technology; and (b) trade income increases incomes and wealth – people with more wealth tend to be more concerned about other aspects of well-being, including a clean environment (Grossmann and Krueger, 1994).

The value of World CSG exports were worth 410 billion US \$ in 2008. Ecuador’s export share in World exports of CSG has remained less than 0.02 % in 2002 through 2010. The Leading Exporters Japan, US, Countries in the EU, China and Hong Kong’s export share is more than 3 % in World Exports of CSG.

World Trade Organization (WTO) has recognized 153 environmental goods which have been broadly classified under the following headings:

- Air pollution control
- Management of solid and hazardous waste and recycling systems
- Clean up or remediation of soil and water
- Renewable energy plants
- Heat and energy management
- Waste water management and potable water treatment
- Environmentally preferable products (based on end use or disposal characteristics)
- Natural risks management
- Natural resources protection
- Noise and vibration abatement

World Bank has identified 43 products out of the ‘153’ products list proposed by proponents of Environmental Goods liberalization in the WTO. These 43 products comprise diverse products from wind turbines to solar panels to water saving
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shower. Also there has been a rapid growth in their imports and exports. What is common in all the lists floating around is that they consist of goods which tend to have benign impact on environment and lead to low carbon emanating processes.

Trade and investment in CSG offers opportunities to export international standards, promote the rule of law and good governance, and close the gap between the rich and poor. Trade in CSG will help Ecuador to promote alternative industries in the face of Global Economic Downturn. Also, it will help country to look for safe, alternative and reliable energy source rather than believing in trade of crude and Petroleum Oil only or investing a great deal in nuclear energy. Nuclear energy was in the brink of being affected in Japan due to recent Earthquake in Japan. Ecuador can direct its social spending in promoting small industries which can provide CSG goods at low cost. Countries can gain in terms of their comparative advantage and establish new industries. Positions keep changing in terms of the advantage of producing goods and services. Based on our analysis and review of studies done on CSG (UNESCAP, 2011, a, b, ICTSD, WTO and World Bank) one may conclude that various national and international policies can be followed by Ecuador and its trading partners to promote trade of CSG goods for increasing welfare, diversification and promoting alternative sources of energy .

Definition of Research:

- a) The Research will focus on Ecuadorian Trade Relations in CSG and Other Specialized Products and its liberalization efforts with all its trading partners but focusing more on MERCOSUR and ANDEAN Community, India, EU27, China, Japan and the US
- b) The time period for research is 2002 through 2010. SMART and Gravity analysis is done for 2010.
- c) Trade and Tariff Data will come from the WITS data base. SMART analysis is in WITS. The url is <http://wits.worldbank.org/wits/>
- d) Gravity analysis for working out the basis of trade of CSG and specialized products. The data will come from various sources.

Import data to and from Ecuador of CSG goods-one category made of the list of 64 goods (under 6 Digit HS Combined) is taken from WITS data base for 2010

GDP data of trading partners is expressed in billions of US dollars and the basic source of data is the IMF, World Economic Outlook (April 2011 edition)

Distance data is taken from the dist_cepil.xls file of CEPII data base (www.cepii.fr)

Tariff data is applied weighted tariff (%) on CSG goods for each country available from the TRAINS data (within WITS data base)

Intercountry dispersion is product of two terms $s_i * s_j$ where $s_i = GDP_i / (GDP_i + GDP_j)$ and $s_j = GDP_j / (GDP_i + GDP_j)$. S_i and S_j are constructed from GDP data of trading partners. The product has an inverse relationship with variance of country's share of income in total group income. Variance of country's share of income in total group income is inversely related to volume of trade between countries

Prices data of reporter (importer) and partner (exporter) from the GDP deflators available from the World Bank World Development Indicators available at the World Bank website for 2010 (Index Numbers)