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**World Agriculture Organization (WAO):
New Global Governance for Agricultural Trade**

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Abstract

It is increasingly questionable whether the WTO regime is the most appropriate form of governance for addressing global problems related to agriculture. In particular, climate change, sustainability, hunger/poverty in developing countries, and expected imbalance in food demand-supply by 2050 are emerging as grave challenges to humanity and the WTO is still struggling to resolve issues (related to the multifunctional roles of agriculture) of the 20th century while completely lacking the capacity to tackle such new global issues of the 21st century. Given this outmoded institution, the primary objective of this article is to propose that a new system of governance is needed so as to exclusively and effectively deal with problems arising from the interactions among climate change, agricultural sustainability, food security, and trade.

Key Words: Global public goods, climate change, sustainable agriculture, food security, WTO, agricultural trade

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World Agriculture Organization (WAO): New Global Governance for Agricultural Trade

1. Introduction

It is increasingly questionable whether the multilateral trade talk under the WTO regime is the most appropriate form of governance for addressing global problems that arise from the interactions among agriculture, trade, food security, and the environment (Runge, 1998; Runge and Senauer, 2000; Sutherland and Sewell, 2000; Gonzalez, 2002; Clapp, 2006; Mattoo and Subramanian, 2009). In particular, climate change, deteriorating land/water resources raising questions about agricultural sustainability, hunger/poverty in developing countries, and expected imbalance in food demand-supply by 2050 pose grave challenges to humanity. Yet, the WTO is still struggling to resolve issues (related to the multifunctional roles of agriculture and agricultural protectionism) of the 20th century while grossly lacking the capacity to tackle global issues of the 21st century.

Given the apparently ineffective institution, the primary objective of this article is to propose that new form of governance is needed so as to exclusively and effectively deal with agricultural issues associated with the global problems. To support the proposition, we present five rationales including (i) inability of the WTO in resolving agricultural protectionism; (ii) global public good properties associated with the problems of climate change, sustainability, and food security; (iii) the need to address the interactions among climate change, sustainability, and food security simultaneously in a concerted manner; (iv) the need for international cooperation given the problems of underprovision associated with global public goods; and (v) potential adverse effects of liberalized trade when there are no adequate measures at the global scale internalizing the externalities associated climate change, sustainability, and food security.

New form of governance for agriculture will promote food security for the entire humanity now and in future by effectively addressing global public good properties associated with knowledge/information of how to cope with potential adverse effects of climate change on agriculture, mitigating global warming, promoting sustainability in the face of growing land degradations and water shortages, and enhancing food security in developing countries. The concept of global public goods has received a great deal of attention in recent years from economists and scholars in international relations as a key theoretical framework underpinning the process of globalization (e.g., Stiglitz, 1999; Kapur, 2002; Unnevehr, 2004; Maskus and Reichman, 2004). Provision of global public goods is central for enhancing the well-being of individuals living in today's globalizing world. For example, the global public good of climate stability will help people to maintain lives of their choice with less risk of damage from extreme weather. As a nation requires an array of basic public goods (e.g., highways, legal infrastructure protecting property rights) for economic development, global community is in need of global collective goods for sustainable and equitable progress of globalization (Deneulin and Townsend, 2007). Consequently, any national or international efforts to deal with the problems of climate change, sustainability, and food security in developing countries and in future would constitute a collective good of critical importance for the global community.

There have been some pundits pointing to the inadequacy of the WTO multilateral trade talks for addressing important issues for the world economy, thereby endorsing new forms of global governance. For instance, Runge et al (1994) have called for a World Environment Organization (WEO) to holistically deal with global environmental problems. Runge and Senauer (2000) contended that a larger and more comprehensive multilateral vision (when compared to the WTO Doha Round) is required to respectfully address food security (hunger/malnutrition) in developing countries. Mattoo and Subramanian (2009)

suggested that a new multilateral trade talks beyond the DDA should be launched to tackle challenges posed by increasing global integration such as fluctuating commodity prices, threats to the economic insecurity of middle-class workers, financial instability, and environmental insecurity. Similarly, in the wake of the global financial crisis of 2008, British Prime Minister Gordon Brown has proposed post-Bretton Woods II regime to reshape the international financial system.

While in line with their thinking, the new system of global governance we envision in this article highlights the gravity of agriculture for humanity and the need to separate it from other sectors in designing trade rules so as to effectively address the problems of climate change, sustainability, food security, and their interactions in an integrated manner.

Methodologically, our study relies on literature review and historical evidence to advance our argument about the need for new or improved global governance for agriculture and takes the normative position that everyone in every country now and in the future is entitled to food security and such food security is indispensable for the world economy to grow in a sustainable manner and for economic globalization to progress in an ethical and equitable manner. As a first step, the next section presents a brief history of agricultural exceptionalism (protectionism) and multilateral trade talks designed to dismantle it along with their progresses in liberalizing agricultural trade and limitations in coping with agriculture-related issues of the 21st century. The third section questions whether the WTO regime is most appropriate for dealing with global problems related to agriculture. The fourth section introduces the concept of global public goods as a theoretical framework underlying the need for new governance dealing with agriculture, climate change, and trade issues. New form of governance for agriculture along with the current system of governance is introduced in the fifth section. The final section presents

summary and concluding thoughts about the role of agriculture in the global community of the 21st century.

2. Agricultural Exceptionalism and WTO Multilateral Trade Talks

Agriculture is distinctive from other industries owing to its biological production process directly involving natural resources (climate, land, soil and water) and consequent instability in commodity markets and producers' incomes. The direct linkage to the nature has further ramifications of profound importance in managing natural resource base and the flows of environmental/ecosystem services. Such a distinctiveness of agriculture was plainly recognized when General Agreement on Tariffs and Trade (GATT) created in 1947 permitted agriculture to be exempted from its basic principle of reducing barriers to free trade. Two prominent outcomes were resulted from the exemption: (i) massive government intervention providing subsidies and border protection to farmers in developed countries, and (ii) defiance of agriculture from the trend of integration (globalization) across borders. For the next three decades, agricultural exceptionalism (protectionism)¹ has continued to be accepted until adverse consequences (budgetary burdens, surplus production, distortions in the world market) of excessive government intervention got unbearable, culminating in the export subsidy war between the U.S. and Europe.

The Uruguay (1986-1994) and Doha Development (2001-2010) Rounds were designed to end such agricultural exceptionalism and place agricultural policies and trade under the discipline of international rules. Specifically, the Uruguay Round produced AoA (Agreement on Agriculture) specifying how reform would proceed over the next ten years

¹ The phenomena of subsidizing agriculture in developed countries have been termed agricultural protectionism in the literature. In this article, we use the term 'agricultural exceptionalism' instead of agricultural protectionism to detach the connotation that subsidies to agriculture are all illegitimate.

with respect to three major pillars (market access, domestic support, and export subsidies). During the Uruguay Round, the notion of multifunctional agriculture emerged, collectively referring to a broad range of nonmarket goods and services agriculture produces with varying degrees of jointness with either market commodities or farmlands (Hall et al, 2004; Potter and Burney, 2002; Randall, 2002; Vatn, 2002). The rise of the concept of multifunctional agriculture led the WTO to create the so called 'traffic light box system' that categorizes agricultural policies and subsidies into three boxes (Green, Amber, and Blue) based on two criteria: (i) whether or not they distort trade patterns and (ii) whether or not they are targeted at supporting the multifunctional roles of agriculture.

The box system was intended to achieve two goals simultaneously: (i) permitting member countries to facilitate the provision of nonmarket goods and services of agriculture and (ii) ensuring that such support is decoupled from production decision, thereby minimizing trade distortion. In practice, the box system motivated developed countries to shift farm subsidies from Amber to Green boxes, and hence making them less trade-distorting but leaving the overall size of subsidies unchanged. Started in 2001 with the goals of further advancing the box institution in relation to agriculture negotiations, the Doha Development Round has made little progress to date and the prospect of reaching a multilateral deal or substantially advancing the reform agenda is not bright.

Overall, agricultural exceptionalism is largely intact today and the extent of liberalization in agricultural trade is not fundamentally different from the year of 1947 when the GATT was first instituted with the ambition to create a liberal economic order in international commerce. One can wonder why agricultural exceptionalism has been unrelenting over so many decades. Literature attributes agricultural exceptionalism to four broad factors: (i) market failures inherent in agriculture, (ii) demand for multifunctional roles of agriculture, (iii) strategic need to strengthen the infrastructure of

agricultural production, and (iv) interest group politics including rent-seeking behaviors of farm organizations (Moon, 2010). While the first three factors could be considered legitimate reasons for government intervention, the rent-seeking behaviors of farm organizations are suspected of instigating such intervention to grow beyond economic reasoning (Josling et al, 2010).

3. Global Agricultural Problems and the WTO

While the four factors mentioned above are largely of domestic issues specific to each country, agriculture in the 21st century is faced with new challenges of critical concern to humanity such as mitigating adverse effects of climate change (global warming) on agriculture, enhancing sustainability of agricultural production, eradicating hunger/poverty in developing countries, and coping with expected imbalance in food demand and supply in the future. These problems are intimately intertwined surrounding the epic challenge to the global community (Schimmelpfennig et al, 1996; Ruttan, 1999; Ruttan, 2002) : i.e., increasing agricultural production in an environmentally sustainable and geographically equitable manner in the face of global food demand that is expected to double by 2050 due to projected population increase to 9 billion and growth in per capita income and urbanization and under the adverse condition of deteriorating land degradations and water scarcity (Vorosmarty et al, 2000). Especially, climate change is expected to affect diverse aspects of agricultural systems and bear considerable impugn on agricultural productivity, sustainability, and food security in poor countries specializing in tropical crops, therefore presenting the most pressing problem in tackling with the grand challenge of meeting growing food demand in the near future. Indeed, a joint FAO-CGIAR-IFAD-World Bank statement on food security and climate change, a side event to Copenhagen conference, explicitly spoke of the need to address climate change and food security together rather than in isolation from each other (FAO, 2010).

When compared to the old (domestic) problems, the issues of the 21st century are of much greater gravity in their potential impact and global in scope. The big question is whether or not the WTO's agenda of liberalizing agricultural trade is conducive to coping with the global problems. Of special concerns are the relationships of agricultural trade liberalization with sustainability, climate change, food security in developing countries, and meeting future demand for food.² Liberalized trade is associated with promoting efficiency, competition, and productivity in the short-run, but intrinsically inept to handle transboundary externalities or long-term problems, so requiring special international agreements (Mahe, 1997; Daly et al, 1998; Ikerd, 2005; Tisdell, 2009). The WTO has instituted several measures in order to overcome such deficiencies of liberalized market mechanisms in handling adverse effects of trade on the environment (e.g., Sanitary and Phytosanitary Measures, and the Agreement on Technical Barriers to Trade). However, it is not certain whether they are relevant in enhancing agricultural sustainability. Indeed, in consideration that countries with high agricultural protection tend to be associated with high rates of chemical use, some studies indicate that widely spreading agricultural production across the world could have more desirable effects on agricultural sustainability than permitting crop production to be concentrated in some regions heavily subsidized by governments (Anderson and Strutt, 1994; Mahe, 1997).

² There is a large literature theoretically and empirically investigating the linkage between trade and the environment (e.g., Bhagwati, 1993; Bhagwati and Srinivasan, 1996; Copeland and Taylor, 2004; Chichinisky, 1994; Esty, 2001). While this particular study is not intended to delve into such literature, there are two camps of thinking: (i) neoclassical/environmental economics arguing that free trade will have a positive impact on the environment due to rising income and governments' ability to meet growing consumer's demand for environmental quality; and (ii) ecological economists who are suspicious of such a positive role of trade based on arguments embedded in "the race to the bottom" and "pollution heaven" or "polarization" (Roepke, 1994; Leveson-Gower, 1997; Daly and Goodland, 1994; Muradian and Martinex-Alier, 2001).

With respect to the relationship between food security and trade, a UN special rapporteur invokes the human rights to adequate food as specified under Article 25 of the Universal Declaration on Human Rights and Article 11 of the International Covenant on Economic, Social and Cultural Rights, and argues that trade rules need to recognize the specificity of agricultural products, rather than to treat them as any other commodities (United Nations, 2009). This application of human rights to food security is in line with the school of thinking that integrates ethics into the practice of economics. Most notably, influenced by the theory of social justice of John Rawls (2003), Amartya Sen (1992; 1999) underscores the need to incorporate social justice and ethical judgment in development and welfare economic analysis (Robeyns, 2009).³ Further, there are some authors who argue that the WTO enables developed countries to keep subsidizing agricultural production (through the institution of green box) while demanding market openness in developing countries and such asymmetry can exacerbate hunger and environmental degradation by bolstering pre-existing inequities in the global trading system (Stringer, 2000; Gonzalez, 2002; Gonzalez, 2004).

Taken together, when viewed from the perspective of the nature of the global problems that are closely interconnected and require long-term supranational cooperation, it does not appear prudent to put too much emphasis on short-term economic benefits from liberalizing agricultural trade. While still struggling to resolve controversies associated with the multifunctional roles of agriculture based on their mandate to liberalizing agricultural trade, the multilateral trade talks have neither the willingness nor the

³ In particular, Sen's theory of capabilities has exerted a profound influence on development economics and laid the foundation for the creation of the UN's Human Development Index (HDI) incorporating multidimensional aspects of defining an individual's well-being. The capability approach presents a comprehensive normative frame that facilitates the evaluation of individual's well-being and social arrangements, public policies, and proposals for social change (Robeyns, 2005).

capacity to address the newly emerging problems of global scale (Runge, 1998; Runge and Senauer, 2000). In the most recent incidence of food price crisis of 2007-2008, the WTO was able to do very little to mitigate the sharp rises in food prices that pushed as many as 100 million people into food security problem and to prevent the embargoes placed on grain exports by 18 developing countries intended to secure their own domestic supplies which no doubt exacerbated the food price crisis (Mattoo and Subramanian, 2009; Timmer, 2010).

In summary, it is not certain whether the current WTO regime with the doctrine of free trade is the most appropriate form governing global challenges associated with agriculture. In relation to free trade, Herman Daly (1998) once observed,

“The presumption that free trade is good is the cornerstone of the GATT. Yet that presumption should be reversed. The default position should favor domestic production for domestic markets. When convenient, balanced international trade should be used, but it should not be allowed to govern a country’s affairs at the risk of environmental and social disaster. The domestic economy should be the dog and international trade its tail.”

Although Daly’s view does not fairly recognize the positive role of international trade in economic growth and development, it reminds us that free trade is one of many tools useful for the betterment of human lives (e.g., when it comes to agriculture, promoting food security for every country) but not the ultimate goal itself. With the old issues still unresolved and new issues growing to be problems of grave importance to the global community, it is time to embrace a radical change in thinking about how to best cope with agricultural issues at the global scale and how to best serve the needs of humanity. The theory of global public goods below provides a clue in such an endeavor.

4. Theory and Typology of Global Public Goods

This section delineates concepts such as globalization, global community, and global public goods, and why they are important in the discourse of governance of agriculture at the global scale. We show that climate change, sustainability, food security

(hunger/poverty), and future imbalance in food supply-demand are global challenges that need to be addressed cooperatively by the global community.

In general, the concept of a global public good is defined as a public good whose benefits transcend national boundaries. Hence, it extends the conventional concept of a public good across national borders. Since introduced by Samuelson (1954, 1955), public goods have been an important component of microeconomic theory as a cause of market failures along with externalities and noncompetitive market structures. In comparison to private goods, public goods are best characterized by two properties: nonexcludability and nonrivalry in consumption. Nonexcludability indicates that individuals who do not pay for a good cannot be effectively excluded from the benefits of the good, while nonrivalry denoting that the use of a good by an individual does not reduce the quantity or quality (congestion) of the good available by others.

There are two types of impure public goods exhibiting only one of the two properties: club goods (e.g., public lands recreation, golf course, cinema) are excludable but non-rivalry up to the point of congestion; common pool resources (e.g., fish, water) are rivalry but nonexcludable. Public goods can be distinguished further by the scope of geographic regions affected by the benefits of the public good. Community public library is a local public good whose benefits are accrued largely by local residents. Yet, most public goods are national in scope. Defense is a national public good that benefits the whole population in a nation; the highway system and law enforcement (property rights) are also public goods facilitating economic activities at the national level. Given that public goods suffer from free-rider and under-provision problems when left to market mechanism, national governments typically undertake to provide public goods of national importance. The provision of national public goods benefits the entire nation and plays an important role in

determining the competitiveness of a nation's economy in international markets and hence, providing public goods is incentive-compatible for nation-states.

The concept of global public goods is a direct extension of geographic boundary of a public good into a global scope: i.e., the benefits of a public good with the properties of either nonexcludability or nonrivalry are shared by multiple number of countries (e.g., knowledge, environmental quality, peace/security). In addition to such difference in terms of geographic scope, there is a fundamental point that should be noted between national and global public goods. As indicated earlier, nation-states have incentives to supply national public goods in order to strengthen their economies and therefore boost their competitive edge in international markets. For the case of global public goods, there is an incentive for nation-states to become free-riders and there is no world government equipped with jurisdictional authority and enforcement power to govern who pays for the provision of such goods (Griffith, 2003). This lack of incentive-compatibility coupled with the absence of a world government gives rise to the problem of under-provision of global public goods.⁴

In addition to the above standard accounts of market failures related to the properties of public goods, economists present more insights into why market-based systems are not appropriate for addressing issues related to global public goods, thereby calling for improved system of governance. For example, Tisdell (2009) argues that Western market system is inclined to suffer from intrinsic problems in handling environmental externalities in view of both buyers and business behaviors. First, buyers tend to lack felt moral responsibility related to their purchase behaviors due to two reasons: (i) buyers are not likely to be aware of the negative social or environmental consequences of

⁴ However, when a global public good threatens the very existence of our planet, the above logic may not hold (Barret, 2007). Then, every country may be willing to voluntarily participate in the provision of the global public good to secure its survival.

their purchases, and (ii) buyers are not directly responsible for decisions made in most of the links in the product chain and feel that they are free of moral responsibility for any negative social or environmental consequences of decisions made in earlier links in this chain. He sees globalization and consequent increases in the remoteness of geographical sourcing of products as further contributing to the lack of felt moral responsibility. Second, businesses, in many cases, multinational corporations, are characterized by three properties: (i) decisions are made by committees, thereby diminishing individual responsibility for decisions that have adverse social consequences or cause significant environmental harms, (ii) central managers engaged in international activity may feel little social responsibility for adverse consequences of the company's activities in remote locations, and (iii) intense competition both in product and capital markets is likely to cause failure of businesses to consider environmental spillovers from their activities.⁵

4.1 Globalization and Global Community

The notion of global community plays a central role in rationalizing the need for global governance to overcome the under-provision problem associated with global public goods. Global community is an entity disposed to have a vested interest in enhancing equitable economic development across countries and simultaneous prosperity of the entire humanity, and therefore has an intrinsic incentive to provide global public goods whose benefits are not exclusive to a certain country. The phenomena of globalization underlie the emergence of the notion of global community and the need for global public goods. Referring to the growing interconnectedness of people, institutions, and ways of lives across borders, globalization is a process that influences a wide spectrum of our lives today encompassing political, social, cultural, and economic aspects. At the center of the

⁵ In addition, Tisdell (2009) offers insights into interesting debates such as whether globalization will lead to environmental improvement in the absence of greater government regulation.

globalization process is the evolution of economic systems and institutions that facilitate the integration of world economy. Economic globalization is intimately connected with neoliberalistic trends that have started in the 1980s underlining the role of market mechanisms as a primary means of promoting economic growth and development. Specifically, proponents contend that economic globalization enhances the efficiency of resource allocations across the world and fosters economic convergence between developed and developing countries.⁶ In accordance with the increasing economic openness, a sense of global community has been developing across countries. Hence, the emergence of the concept of global community is a direct outcome of deepening globalization and providing global public goods plays a critical role in further nurturing global community.

4.2 Typology of Global Public Goods

With the background information on what underlies the emergence of the concept of global public goods, it will be helpful to take a closer look at what constitutes a global public good. In addition to nonrivalry in consumption and nonexcludability, Kaul et al (1999) suggest in their seminal book that global public goods should meet the criterion that their benefits are quasi universal in terms of countries, and people, and generations. This criterion makes humanity as a whole the beneficiary of global public goods. More specifically, to be qualified as “global”, the benefits of public goods should reach more than one group of countries, diverse groups of socio-economic status, and future generations. Obviously, there could be ‘impure’ global public goods that weakly or partially satisfy the criterion. If a public good benefits only countries within a particular region (e.g., South Asia), it is a regional public good. Global public goods can be further distinguished between

⁶ Opponents argue that globalization has widened the gap between across the world (the rich and poor countries) and within a country. The debate on the effects of globalization has been of considerable interest to many social scientists and economists over the last two decades and continues to generate tremendous amount of research topics (Stiglitz, 2007).

final and intermediate goods: final global public goods denote outcomes rather than goods in the standard sense either tangible (e.g., the environment) or intangible (e.g., peace or financial stability); and intermediate global public goods represents international organizations/treaties/efforts that contribute towards the provision of final global public goods.

Stiglitz (1995) identifies five public goods of global scale including international economic stability, international security (political stability), the international environment, international humanitarian assistance and knowledge. International economic stability can be provided by the system of international institutions comprised of IMF, World Bank, and WTO along with other regional institutions such as APEC, EU, and NAFTA. International institutions including NATO, G7, and United Nations are designed to bring regional or global security and peace. Global public goods associated with the international environment are expected to be delivered by a number of international institutions such as United Nations Environment Protection (UNEP) and other non-permanent conferences and summits among global leaders. International humanitarian assistance and knowledge can be provided by private institutions such as Gates & Melinda Foundation as well as global institutions like World Bank and United Nations.

There are a number of other global public goods including equity and distributive justice (Rao, 1999; Kapstein, 1999; Sen, 1999), cultural heritage (Serageldin, 1999), and global health (Zacher, 1999; Chen et al, 1999). In relation to the food system, Unnevehr (2004) demonstrates that food safety and innovation are global public goods and discusses institutional innovations including the Sanitary and Phytosanitary (SPS) agreement and the Trade Related Aspects of Intellectual Property Rights (TRIPS) agreement under the WTO designed to manage them as global public goods. At a more detailed level, Unnevehr (2006) identifies sharing of costs, coordination of risk management, and capturing

international spillovers from investments as three major types of global public goods associated with food safety. Prior to discussing agriculture-related global public goods, the environment and knowledge/information are showcased below as general examples of global public goods.

4.2.1 The Environment As a Global Public Good

Environmental degradation caused by emissions of various pollutants and toxic wastes from human beings' economic activities is going beyond national boundaries and increasingly globalizing, posing questions about the sustainability of economic growth across the world. Herman Daly (2009) views that our economy is a subsystem of the larger ecosystem, which is finite and non-growing. Therefore, in a biophysical sense, there are limits to the growth of the subsystem. This view is in line with the 1972 report from the Club of Rome arguing that economic growth could not continue indefinitely due to the limited availability of natural resources. The limits to economic growth today refer to the limits of the ecosystem to absorb wastes and replenish raw materials in order to sustain the economy. In relation to this limits to growth, Daly (2009) uses the term 'uneconomic' growth to denote a situation where growth takes place beyond the optimum, which implies that growth increases costs by more than benefits. Given that it is politically unthinkable to plan a world without growth, he epitomizes the dilemma between growth and ecological/biogeophysical limits as 'physical impossibility (continual growth) vs. political impossibility (limiting growth). Literature discusses intrinsic difficulties associated with designing institutions aimed at achieving sustainable development. In particular, Tisdell (2009) raises eight political issues that can impede the design of effective global governance of environmental problems: (i) Reactive political behavior; (ii) Bargaining problems; (iii) A prisoner's dilemma; (iv) Lack of global enforcement mechanisms; (v) Monitoring limitations; (vi) Imprecise specification of environmental objectives; (vii) Partial solutions to global

environmental problems; and (viii) The need to pander to the wishes of special interest groups.

In contrast to the neo-Malthusian view above, pundits in the school of neoclassical economics believe that greater allocative efficiencies achieved through liberalized trade and globalization coupled with technological advances and appropriate regulations will overcome the biophysical limits. This optimistic view was reflected in the 1987 Brundtland Report. The report defines sustainable development as

“the development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: the concept of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs.”

The major concern of the Brundtland Report was to enhance global equity through redistributing resources towards developing nations so as to encourage their economic growth. According to the report, our world can simultaneously accomplish equity, growth and environmental protection. Technological and social changes also play an important role in the Brundtland report in achieving those three goals. In short, emphasizing that our world needs to change the ways we develop and use technologies to preserve the environment and our resource base, the report is cautiously optimistic about the future of sustainable economic development.

The above discussion of two contrasting views about the future of our world reveals that it is essential for the global society to take steps in order to incorporate environmental/ecological capacity in planning for future growth of the world economy. Protecting the environment is beneficial for every country in the world. Indeed, reducing the emission of ozone-depleting chemicals such as chlorofluorocarbons (CFCs) and greenhouse gases (CO₂) by any country will benefit every country. The country that reduces CFCs or CO₂ will pay for such reduction in the form of increased production or

regulatory costs and diminished competitiveness in international market, while other countries have desires to be free-riders. The consequence is under-provision of the reductions of CFCs or CO₂. Therefore, protecting the environment (reducing ozone-depleting or global warming chemicals/gases) is a global public good critical for sustainable development of our world economy. Developing a system of governance for international cooperation remains as the only feasible means of optimally supplying such global public goods. Often cited as a successful example of governance for reducing ozone-depleting chemicals, Montreal Protocol induced almost universal participation from countries around the world through balanced use of carrots and sticks: i.e., carrots in the form of compensations to developing countries for the incremental costs of complying with the agreement, and sticks in the form of a threat to impose trade sanctions against nonsignatories (Barrett, 1999). The challenge faced by the global community in relation to climate change is to develop a mechanism (global governance) for reduction of greenhouse gases as effective as the Montreal Protocol.

4.2.2 Knowledge/Information as a Global Public Good

The importance of knowledge/education in the process of economic growth and development has been well recognized in the literature. As early as 1960s, Schultz (1961) underscores the role of human capital (knowledge) for developing countries to catch up with industrialized countries. In addition to labor and physical capital, human capital was incorporated into analytic growth models in the 1980s (Romer, 1986; Romer, 1990; Rucas, 1988). Such analytical models were needed to reconcile the predictions of the neoclassical growth models that have failed to be supported by real world experiences: i.e., most developing countries did not grow faster than developed countries in the 1970s and 1980s and there was no convergence of income between the rich and poor countries. These limitations of the neoclassical models gave rise to modern growth theory called “endogenous

growth theory” that highlights the role of increasing returns in economic growth due to the external economies (spillover effects) of knowledge, innovations, and ideas, thereby explaining why the gap has been widening between developing and developed countries (Kosempel, 2004).

In his report to the United Nations, Stiglitz (1999) considers the spillover effects of knowledge as transcending national boundaries, thereby bestowing knowledge the status of a global public good. Knowledge is nonrivalrous in consumption in that there is zero marginal cost from an additional individual benefiting from it. Knowledge is excludable to a certain degree in some cases. For example, patents provide the exclusive right to inventors to reap the benefits of their invention for a limited period of time. Yet, they have to disclose the details of their invention to the public, rendering patented knowledge some degree of nonexcludability. Most types of knowledge such as a mathematical theorem or other scientific truths are purely nonexcludable within a country as well as in the whole universe. Given that private firms have limited incentive to produce knowledge (patents) because they cannot fully reap the returns from them, Stiglitz underlines the need for government to play some role in the provision of knowledge and correct the under-provision problem. At the global scale, he stresses the need for international collective action for efficient production and equitable use of global knowledge. On the part of developing countries who are trying to gain access to the global knowledge pool, it is important for them to build the capacity to close the knowledge gap as East Asian countries have done so by heavily investing in secondary and tertiary education.

4.2.3 Sustainability, Climate Change, and Food Security

The discussion of knowledge and the environment as global public goods indicates that enhancement of agricultural sustainability, knowledge/information on how to mitigate global warming and how to adapt to changing climate, and eradication of hunger (food

security) are global public goods that are directly related to agriculture. Note that spillover effects related to agricultural sustainability and climate change are not only transnational but also transgenerational.⁷ Agricultural sustainability poses a problem to our world because soil and water use decisions give rise to user costs not reflected in typical farmers' input use decisions (Tilman et al, 2002). While the current generations may not suffer from the consequences of such decisions, future generations could be at greater risks of facing food crises. Hence, promoting agricultural sustainability is a global public good that will enormously benefit future generations.

When it comes to research measuring the impacts of climate change on agriculture, there is a considerable extent of uncertainties and climate science has to provide more reliable data on questions such as: how much will the planet warm?, how much will precipitation change?, and how will these changes be distributed across the planet? (Mendelsohn and Dinar, 2009). Progresses in biological/physical/geological sciences related to climate change will tremendously facilitate economic research and make its results more realistic and credible, potentially enabling all countries to make more informed adaptations to climate change and subsequent socio-economic changes. Hence, improved scientific information about the nature of climate change and economic analyses about plausible impacts of climate change on agriculture represents global public good that would help all countries better maneuver the problems associated with global warming.

Food security is a global public good in a difference sense than agricultural sustainability and climate change. While the latter two are global public goods in

⁷ There may be conflicts of interest between fostering transnational and transgenerational public goods. For example, constructing dams in a developing country with foreign aid designed to reduce poverty may cause significant loss of biodiversity, potentially harming the welfare of future generations. Sandler (1999) discusses major issues related to differences in remedies between transnational and transgenerational spillover effects including bargaining, strategic interactions, and institutional design.

connection with their transnational and transgenerational spillover effects, food security is considered to be a global public good based on the following two factors: (i) people care about hunger/poverty and inequality across the world, and (ii) reduction/eradication of poverty and inequality is conducive to the growth of the global economy, benefitting all other countries. Hence, food security is a global public good because of ethical considerations as well as transnational spillover of positive externalities.

5. Global Governance for Agriculture

5.1 Agriculture as a Global Public Good?

While agricultural commodities are clearly private goods traded in international markets with rivalry in consumption and excludability, agriculture is at the heart of the global challenges as represented by the problems of climate change, sustainability, and food security. Upon accepting these challenges as global public goods, the production, distribution, price determination, and consumption of agricultural commodities across the globe get to hold many facets of a global public good (Matthew et al, 2009). In other words, the provision of the four global public goods will be facilitated through effective management of agriculture by international cooperation at the global scale. Consequently, some form of governance of agriculture at the global scale is needed to realize the best outcomes in providing the four interrelated global public goods including adaptations to climate change, enhancing sustainability, and eradicating hunger. We argue that a balanced use of international cooperation and market rules (competition) will be critical in effectively governing global agriculture in the best interests of humanity. The current WTO regime (Doha Development Agenda) is not optimally positioned for fostering cooperation essential in providing global public goods and therefore new system of global governance is called for.

5.2 Current Global Governance of Agriculture

Governance is a broad term encompassing all the processes of accomplishing common goals of global community by cooperative efforts. Typically, governance consists of various public, civil, and private institutions geared toward resolving conflicts, facilitating cooperation, or more generally, alleviating collective-action problems in a world of interdependent actors (Young, 1994). Currently, the WTO plays a central role in the governance of world trade in goods and services with the mandate of reducing barriers to their trade. Emerged as a response to the failures in the management of international economic relations between two world wars, the WTO (formerly GATT) was part of a system of international organizations along with International Monetary Fund (IMF) and World Bank: IMF was designed to promote commerce by helping to maintain financial stability; the World Bank was responsible for financing the reconstruction of war-damaged economies and the development of capital-constrained countries; and GATT was charged with expanding international commerce through the elimination of tariffs and other trade barriers.⁸

Overall, the system was given the mission of fostering growth and stability through the progressive liberalization. Such system of international institutions was based on the consensus among post-war leaders that a liberal international order would be most conducive to economic stability and growth. Yet, the system allowed countries to develop measures that can cushion the impact of the open world economy on domestic economies (e.g., macroeconomic stability) and social welfare needs of particular groups of population (e.g., farm sector). Hence, the 1945 system of international institutions was a compromise

⁸ GATT was a weakened version of what would be International Trade Organization (ITO) responsible for creating and enforcing equitable rules of the in the sphere of trade. Most developing countries did not participate in GATT discussions. The idea of ITO was vetoed by the United States (Griffin, 2003).

between international economic liberalism and domestic interventionism (Sutherland and Sewell, 2000).

The compromise was most notable in the case of agriculture. As indicated earlier, for the four decades since the birth of GATT in 1947, countries were virtually allowed to exempt agriculture from the rigorous implementation of reducing tariff and other trade barriers that apply to manufacturing sector. We make the following three observations in view of the history of agricultural exceptionalism and unsuccessful efforts to dismantle it over the last six decades: (i) to some extent agriculture had been legitimately exempted from the system of liberal international order in 1945; i.e., considerable portion of farm subsidies/protection has been pertaining to issues of national sovereignty, (ii) liberalization efforts toward agriculture during the UR and DDA should have been directed at eliminating the portion of farm subsidies that are attributable to rent-seeking behaviors of farm organizations, and (iii) agriculture needs to be separated out from other sectors in designing trade rules. In short, much of agricultural exceptionalism of 1947 is still alive today in the 21st century and a thinking different from manufacturing sectors is required for governing agricultural trade.

In addition to the WTO, a list of other international organizations has been playing some roles in addressing global challenges related to agriculture. Particularly, the following has made notable contributions to global management of agriculture: Organization of Economic Cooperation and Development (OECD), Food and Agriculture Organization (FAO), and United Nations Environment and Development (UNED). They conduct agricultural policy/trade-oriented research and provide updated information that can be of use to farm policy-makers and multilateral trade negotiators. In addition to research, the FAO is also engaged in coordinating and harmonizing rules and regulations across countries in an effort to promote food safety (e.g., Codex Alimentarius Commission).

Other institutions such as International Food Policy Research Institute (IFPRI), International Rice Research Institute (IRRI) conduct research primarily designed to help agriculture in developing countries. World Bank, Asian Development, and African Development Bank provide loans and aids designated to assisting the design and implementation of development strategies (frequently agriculture-related projects) in developing countries.

The approaches and strategies of each institution are not coordinated at all, leaving a great deal of room for improvement in efficiency in using global resources allocated for agricultural problems. Further, while providing global public goods in terms of knowledge and information that can be useful to developing countries, they do not have the authority to legislate, implement, and enforce legally binding rules/laws. In other words, they lack the power to act on problems.

5.3 New Global Governance for Agriculture: World Agriculture Organization (WAO)

The new institution playing a central role in global governance for agriculture can take a wide spectrum of forms ranging from modest reform within the current WTO regime (similar to the traffic light box system or special measures designed to allow countries to protect the environment) to an establishment of a completely independent institution. At any form, the new system of governance will appropriately use both multilateral cooperation and competition (through market mechanisms and freer trade) to achieve the grand goal of achieving increases in agricultural production in an environmentally sustainable and geographically equitable manner in the face of global food demand that is expected to double by 2050.

We propose to create World Agriculture Organization (WAO) as an institution that is central to the system of governance for agriculture and independent from the WTO.⁹

While there will be a number of political hurdles before international society could converge toward such a far-reaching idea, the notion of the WAO eloquently symbolizes the pressing need to deal with the multitude of global agriculture-related problems holistically and separately from other sectors given their enormous implications for human civilization, management of natural/environmental resources, and equitable progress of globalization.

Once created, the overriding mandate of the WAO will be to address the challenge as described in the special U.N. Rapporteur (2009);

“our challenge today is not simply to produce more. It is to produce it in a way which preserves the environment, particularly by reducing the amount of greenhouse gas emissions which contribute to global warming; and it is to organize such production so that it raises the incomes of those who are, today, most food insecure – smallscale farmers and agricultural laborers in developing countries, and so that it allows States to adequately protect the urban poor.”

The WAO will inherit meritorious mechanisms from the WTO. For example, the traffic light box system of the WTO is an innovative device combining market disciplines and country-specific needs stemming from multifunctional agriculture. Dispute settlement mechanism in the WTO is another asset that the WAO can take over. While market discipline is an essential component of the WAO, trade liberalization itself is not the ultimate goal of the new governance, but it is only one of diverse potential paths to dealing with global problems related to agriculture.

The WAO will clearly identify global public goods/bads in relation to agriculture and develop mechanisms in which most member countries can participate in contributing to the reduction of global public bads (e.g., greenhouse gases) and in providing global public goods.

⁹ Without detailed and well-defined descriptions about the functions, limits, authorities and organizational form of the WAO, we are using it in this article in a loose sense to underscore the need for actions geared toward problem-solving.

In order to optimize the supply of agriculture-related global public goods, the WAO will maintain the central authority to coordinate/control various existing institutions such as United Nations Conference on Trade and Development (UNCTD), OECD agriculture committee, FAO, and World Bank agriculture committee. Another major task of the WAO will be to develop global public funds to facilitate R&D (research and development) on agricultural systems specific to respective regions of the world. This task is critically important in view of the noticeable slowdown in agricultural productivity growth and grain yields since the 1980s across the world (Alston, Beddow, and Pardey, 2009).

The WAO will devise mechanisms in which short- and long-term issues related to climate change, sustainability, and food security are fully considered in the design of international trade rules. For example, it may explore operationalizing the concept of ‘Development’ and ‘Food Security’ boxes that have been tossed around by some countries during the Doha Development Round. The main goal of such exploration is to incorporate regional and country-specific needs (related to agriculture) into the system of global governance of agriculture. Ideally, *the WAO is expected to facilitate every country to develop agricultural system that suits its own economic, cultural, social, and natural environmental conditions, rather than coercing specialization of agricultural production based on comparative advantages evaluated at the present time.* Agriculture in industrialized countries has been developed through sizeable and systematic investments in research by public and private sectors since the second World War. Other countries should be given similar opportunities to build adequate infrastructure for agricultural production and rural communities that their constituencies would collectively prefer to sustain in the long-term. Helping them to realize such opportunities will promote food security at the global scale and enhance the well-being of everyone in the global community.

An advantage of separating agriculture from the WTO trade talks and placing it under the jurisdiction of the WAO is that it will allow multilateral trade negotiators to focus on nonfarm issues more in-depth. For example, given the severity of the harmful effects of oil producing countries' cartel on the global economy, Mattoo and Subramanian (2009) suggest that the WTO can work on drafting a new set of rules on global energy trade with an eye to outlaw collusion on supply quotas. Without thorny issues related to agricultural exceptionalism and protection, the WTO can be considerably more effective in addressing trade barriers in nonagricultural sectors and in reaching a multilateral deal, thereby fostering economic globalization.

6. Conclusions

Agricultural exceptionalism has been prevalent in developed world in the 20th century and continues to characterize global agriculture in the beginning of the 21st century. Such tenacity of government interventionism in agriculture reflects that agriculture produces not only private commodities but also public goods and services or externalities in the form of land conservation, maintenance of landscape structure, reduction of soil erosion and runoff, biodiversity preservation, and nutrient recycling and loss reduction. In other words, agriculture possesses considerable aspects of public goods at the national level, as elaborated in the debate about the multifunctional roles of agriculture (Moon, 2010).

In addition to such national issues concerning agriculture, our world faces global challenges of coping with climate change, sustainability, and food security. These challenges represent global public goods/bads that exhibit nonrivalry and nonexcludibility in consumption at the global scale and agriculture is the central hub of managing such global challenges. Therefore, governance of the provision of such global public goods necessarily involves cooperative management of some aspects of agriculture at the global

scale. As nation-states intervene in agricultural markets to address public goods properties at the national level, a world government is called for to intervene in international agricultural markets to arrange the supply of global public goods. Given the absence of a world government, it is necessary to develop a system of governance whose primary goal is to manage global public good properties of agriculture. The system of new governance will rely on cooperation/collective action as well as international competition (market rules) to optimally manage both private and public good properties of agriculture at the global scale.

In summary, five rationales were presented in this article that support the need for new global governance for agriculture: (i) inability of the WTO in resolving agricultural protectionism of the old days; (ii) global public good properties associated with the problems of climate change, sustainability, and food security; (iii) the need for international cooperation given the problems of underprovision associated with global public goods; (iv) the need to address the interactions among climate change, sustainability, and food security simultaneously in a concerted manner; and (v) potential adverse effects of liberalized trade when there are no adequate measures at the global scale internalizing the externalities associated climate change, sustainability, and food security. The key idea penetrating commonly across the five rationales is that cooperation is as important as market disciplines for effectively tackling global agricultural problems.

Accounting for about 4 percent of the value of global outputs and less than 8 percent of the world trade in goods and services, agriculture is not a major contributor to the world economy when compared to other sectors. Nonetheless, the general perception is that agriculture is a disproportionately much more significant sector for the continuation and development of humanity. Global economic interdependence and consequent rising of global community should be built on food security not only for people in wealthy countries but also for people of all countries and all income groups and for future generations.

Achievement of such food security should precede any further progress of economic globalization. Healthy and stable global agriculture and food security is indispensable for the sustainability of our civilization. The first step is to construct a system of global governance that is solely devoted to addressing problems and issues related to agriculture and food security. The WAO will be asked to play a central role in such a system of global governance.

The burgeoning global public good literature addresses a number of important issues that arise in the course of designing, constructing, and managing governance for the provision of global public goods including the role of political globalization (Held and McGrew, 2003); fairness and equity (Albin, 2003); creating incentives for cooperation (Barrett, 2003); and financing such provision (Kaul and Le Goulven, 2003). In addition to articulating the mandate, functions, limits, authorities, and organizational form of the WAO in greater sophistication, future research will have to address such institutional and international relation issues as they apply to the particular problems of agriculture, climate change, sustainability, and food security.

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