

## NEW GLOBAL GOVERNANCE FOR AGRICULTURE, CLIMATE CHANGE, SUSTAINABILITY, AND FOOD SECURITY\*

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### **Key Words**

World Agriculture Organization (WAO), global public goods, climate change, sustainable agriculture, food security, WTO, agricultural trade

### **Abstract**

This article questions whether the WTO regime is the most appropriate institution for governing the global agriculture and trade in the wake of the problems that our world faces today. Specifically, climate change, potentially unsustainable agricultural practices, food insecurity in less developed countries (LDC), and expected imbalance in the global food demand and supply by 2050 are emerging as major challenges to humanity and the WTO while it is still struggling to resolve issues (related to agricultural protectionism that arises from the special facets of agriculture) of the 20<sup>th</sup> century while completely lacking the capacity to tackle such new global issues of the 21<sup>st</sup> century. Given this outmoded institution, the primary objective of this article is to propose that a new structure of governance is needed so as to exclusively and effectively deal with problems arising from the interactions of the problems related to climate change, agricultural sustainability, food security, and trade. Four broad rationales are offered in this article that support the creation of a new system of governance for the global agriculture: (i) inability of the WTO in resolving

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\* This article represents a revised version of the manuscript presented at the Japan Korea Taiwan International Conference on Agricultural and Resource Economics on August 10, 2010 in Taiwan.

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agricultural protectionism of the 20th century; (ii) potential adverse effects of liberalized agricultural trade on the environment (climate change and sustainability of food production) and hunger/poverty in LDCs; (iii) global public good properties associated with the problems of climate change, sustainability, and food security and consequent need for collective action (transnational cooperation) at the global level, and (iv) the need to address the interactions among climate change, sustainability, and food security holistically in a concerted manner. We suggest the World Agriculture Organization (WAO) as a possible form of global institution that will play a central role in the new system of governance for the global agriculture.

## I. Introduction

It is increasingly questionable whether the WTO regime is the most appropriate institution for addressing global problems associated with agricultural trade, the environment, and food insecurity in least developed countries (Gonzalez, 2002; Clapp, 2006; Rao, 2009). In particular, climate change, deteriorating land/water resources which may cause unsustainable agricultural production, hunger/poverty in LDCs, and expected imbalance in food demand-supply by 2050 pose grave challenges to humanity (Godfray et al, 2010; Foresight, 2011). Yet, the WTO is still struggling to resolve issues (related to the multifunctional roles of agriculture and agricultural protectionism) of the 20<sup>th</sup> century while grossly lacking the capacity to tackle global issues of the 21<sup>st</sup> century.

In consideration of the apparently ineffective institution, this article pursues two objectives: (i) propose that a new system of governance is needed so as to exclusively and effectively deal with agricultural issues of importance at the global scale, and (ii) propose the creation of the World Agriculture Organization (WAO) as a global institution playing a central role for the new system of governance. Four broad rationales will be presented in this article in support of the need for a new governance of the global agriculture including (i) inability of the WTO in resolving agricultural protectionism of the 20<sup>th</sup> century (ii) potential adverse effects of liberalized agricultural trade on the environment (climate change and sustainability of food production) and hunger/poverty in LDCs; (iii) global public good properties associated with the problems of cli-

mate change, sustainability, and food security and consequent need for collective action (transnational cooperation) at the global level, and (iv) the need to address the interactions among climate change, sustainability, and food security holistically in a concerted manner. The key idea behind the four rationales is that transnational cooperation is critically important in effectively tackling agricultural problems at the global scale.

The new system of governance for agriculture will aim at promoting food security for the entire humanity now and in the 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, mitigate global warming, promote sustainability in the face of growing land degradations and water shortages, and enhance food security in developing countries. The concept of global public goods has received a great deal of attention in recent years from economists and international relations scholars as a key theoretical framework underpinning the process of globalization (e.g., Stiglitz, 1999; Kapur, 2002; Unnevehr, 2004). Provision of global public goods is central to enhancing the well-being of individuals living in today's globalizing world. As a nation requires an array of basic public goods (e.g., highways and legal infrastructure protecting property rights) for economic development, the global community is in need of global collective goods for sustainable and equitable progress of globalization. Consequently, any national or international efforts to deal with the problems of climate change, unsustainable agricultural practices, and food insecurity in developing countries and in the future would constitute a collective good of importance for the global community.

A growing number of pundits have been 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 insecurity (hunger/malnutrition) in developing countries. Mattoo and Subramanian (2009) suggested that a new multilateral trade talks beyond the Doha Development Agenda (DDA) should be launched to tackle challenges posed by increasing global integration such as fluctuating commodity prices, threats to the economic security of middle-class workers, financial instability,

and environmental insecurity. Most recently, Schwab (2011), a former US Trade Representative of the Doha trade negotiations, suggests that it is time to stop trying to revive the Doha round, salvage any achievements from it, and launch brand-new multilateral talks. While in line with their thinking in terms of the perceived ineffectiveness of the Doha Round, the new system of global governance envisioned in this article highlights the distinctiveness of agriculture from other sectors, its gravity for humanity, and the need to separate it from the rest of the economy in designing trade rules so as to effectively tame the problems of adverse effects of climate change on agriculture, unsustainable agricultural practices, and food insecurity in developing and least developed countries (LDCs).

This article is structured in the following order. The next section presents a brief history of agricultural exceptionalism (protectionism) and WTO multilateral trade talks designed to dismantle it along with their lack of progresses in liberalizing agricultural trade, thereby demonstrating the inadequacy of the WTO in handling national agricultural issues. The third section questions whether the WTO regime is most appropriate for dealing with global agricultural problems and trade. The fourth section introduces the concept of global public goods as a theoretical framework underlying the need for a new governance dealing with climate change, sustainability of agricultural production, food insecurity and trade issues. The fifth section provides an outline of the current structure of the global governance of agriculture centered on the WTO. Signifying the need for a new system of governance for the global agriculture, the World Agriculture Organization (WAO) is introduced in the sixth section. The final section presents concluding thoughts about the role of agriculture in the global community of the 21<sup>st</sup> century.

## II. Agricultural Exceptionalism

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 the flows of environmental/ecosystem services that stem

from natural resource stocks supporting agricultural production. Clearly distinctive on the production side, agriculture is also different from other sectors on the consumption side in that people cannot exist without food, thereby provoking them (and governments representing them) to be overly (or maybe legitimately) concerned about securing a certain extent of domestic agricultural production.

Such distinctiveness of agriculture was plainly recognized when the General Agreement on Tariffs and Trade (GATT), which was created in 1947, permitted agriculture to be exempted from its basic principle of free trade. The exemption has provided the fundamental institutional permission leading to the intensification of government intervention across developed countries. Such agricultural exceptionalism (protectionism)<sup>1</sup> has continued to be tolerated until its harmful consequences have become lucidly apparent by the mid-1980s in the forms of budgetary burdens, surplus production, and distortions in the world market (especially the export subsidy war between the U.S. and Europe). The Uruguay (1986-1994) and Doha Development (2001-2010) Rounds were meant to curb such agricultural exceptionalism. The outcome of the Uruguay Round (Agreement on Agriculture, AoA) is considered a remarkable step-forward in the sense that it placed domestic agricultural policies and trade barriers under the discipline of international rules for the first time in history. Yet, the Doha Round has been characterized by unwillingness of developed countries to make real cuts in farm subsidies, unbending conflicts of producer-based agricultural interests between developed and developing countries and consequent lack of progresses in further liberalizing agricultural trade beyond the achievements of the Uruguay Round.

Overall, agricultural exceptionalism is largely intact today and the extent of liberalization in agricultural trade is not substantially 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 (Moon, 2010): (i) the notion of food sovereignty representing the fundamental rights of nation-states

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<sup>1</sup> 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.

to pursue national security, food security, and cultural/anthropological values that are associated with domestic agricultural production (Rosset, 2008; Patel, 2005; Lanoszka, 2009 pp 81-95), (ii) efforts to mitigate excessive market fluctuations (boom-bust cycles) inherent in agriculture as reflected in the theories of irreversible supply functions and asset fixity, (iii) correction of market failures associated with the multifunctional roles of agriculture that refer to nonmarket goods and services (food security, rural amenities, recreational opportunities, ecosystem services such as flood control, nutrient recycling, ground water recharge, carbon sink) that agriculture produces with varying degrees of jointness with market commodities or farmlands, and (iv) interest group politics including rent-seeking behaviors of farm organizations, collectively known as the political economy of agricultural protection hypothesizing that the interests of politicians, bureaucrats, and farm organizations are the driving forces increasing government protection (Swinnen and van Der Zee, 1993; Swinnen, 2010).

While the first three factors could be considered legitimate rationales for government intervention, the rent-seeking behaviors of farm organizations have likely instigated such intervention to grow beyond economic reasoning (Josling et al, 2010). Hence, the WTO trade liberalization efforts may induce member countries to reduce the extent of government intervention that arises from such rent-seeking behaviors, but the intrinsic need for government intervention to address domestic objectives associated with agriculture (the first three factors) remains undiminished and poses a limit on the extent that agricultural trade can be liberalized. Such intrinsic need renders agriculture incompatible with the WTO doctrine of establishing market-oriented system of global trade (Mahe, 1997; Batie and Schweikhardt, 2009). In fact, the WTO recognizes the special aspects of agriculture and there are a number of measures in place within the WTO that are designed to allow member countries to address domestic (economic, social, environmental, or developmental) objectives related to agriculture including the box system, the special and differential treatment (SDT) provisions, and Sanitary and Phytosanitary (SPS) measures. The list of special provisions has kept growing during the Doha negotiations and now includes proposals for special/sensitive products and special safeguards for import surges. Such a long list of exemptions to free trade makes it extremely difficult for diverse groups of member countries with immense conflicts of agricultural interests to agree on a multilateral deal on agriculture.

### III. Global Agricultural Problems, Free Trade, and the WTO

While the four factors listed above as causes of agricultural exceptionalism are largely of domestic issues specific to each country, agriculture in the 21<sup>st</sup> century is faced with challenges of critical concern at the global level, such as mitigating adverse effects of climate change (global warming) on agriculture, enhancing sustainability of agricultural production, and eradicating hunger/poverty in LDCs. These problems are intimately intertwined surrounding the challenge to the global community (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 linkage to agricultural productivity, sustainability, and food security in 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 the Copenhagen and Cancun conference on climate change, 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 21<sup>st</sup> century are of much greater gravity in their potential impact and global in scope. While still struggling to resolve controversies associated with the multi-functional roles of agriculture based on their mandate to liberalizing agricultural trade, the WTO multilateral trade talks have neither the willingness nor the capacity to address the newly emerging problems of global scale (Pieterse, 2004). 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).

Further, it is questionable whether the current WTO regime with the doctrine of free trade is the most appropriate institution governing trade when it comes to agriculture. In relation to free trade, 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 his view does not fairly recognize the substantial role that international trade has played in fostering economic growth and development across the world, it reminds us that free trade is one of many tools available 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. Indeed, 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 such as climate change, unsustainable agricultural practices, social cohesion, and inequality between nations (Mahe, 1997; Tisdell, 2009; Batie and Schweikhardt, 2009; Storm, 2009). In particular, Pinstrup-Andersen (2004) makes a note of the diverging gap between Africa and the rest of the world in economic development,

“I believe the major challenge facing humankind today is not economic growth but the reduction of inequality (unequal distribution of wealth, rights and access) and inequity (social injustice, poverty and hunger). While efficiency in resource allocation and use must continue to be pursued, it should be pursued as a means to reduce inequality and inequity rather than a goal in itself.”

Specifically addressing the importance of food security, 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 (Arbour and Majlessi, 2007; 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) underscores the need to incorporate social justice and ethical judgment in development and welfare economic analysis (Robeyns, 2009). In order for African countries (LDCs) to reverse the growing divergence with the rest of the world and promote food security, many pundits contend that it is critical that they protect their agriculture because free trade would deprive them of the opportunities to nourish agricultural development and achieve pro-poor growth (Koning, 2007; Gonzalez, 2006 Rao, 2009)

With the old issues (related to agricultural exceptionalism) still unresolved and new issues fast-growing to be problems of grave importance to the global community, it is time to break out of the frame of the WTO-led trade liberalization and embrace a radical change in thinking about how to best cope with the agricultural issues at the global scale and how to best serve the needs of humanity. The theory of global public goods below provides important clues in such an endeavor.

#### IV. Theory of Global Public Goods

This section delineates concepts related to global public goods, and why they are important in the discourse of agricultural governance at the global scale. We show that climate change, agricultural sustainability, food insecurity (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 non-rivalry 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: (i) club goods (e.g., public lands recreation, golf course, cinema) that are excludable but non-rivalry up the point of congestion, and (ii) common pool resources (e.g., fish, water) that are rivalry but nonexcludable.

Kaul et al (1999) suggest that global public goods should meet the criterion that their benefits are quasi-universal in terms of countries, 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. 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 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 represent international organizations/treaties/efforts that contribute towards the provision of final global public goods. In short, public goods can be distinguished 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; defense is a national public good that benefits the whole population by promoting national security within the national territory; and the highway system and law enforcement (property rights) are public goods facilitating economic activities at the national level. Social welfare programs generate public goods in the forms of social equity and cohesion. 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 plays an important role in determining the competitiveness of a nation’s economy in international markets, hence nation-states have every incentive to be interested in providing public goods. The pertinent question in this article is who should provide global public goods and why.

#### 4.1. Who Provides Global Public Goods and Why?

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 dictate who pays for the provision of such goods (Griffith, 2003). Even when there is a world government, it does not have rivals to compete with and therefore has little incentive to enhance its competitiveness. The consequence is that global public goods tend to be underprovided.<sup>2</sup>

The notion of global community plays a central role in rationalizing the need for global governance aimed at addressing the under-provision problems associated with global public goods. Global community is an entity disposed to have intrinsic interest in enhancing equitable economic development across countries as well as its survival and simultaneous prosperity of the entire humanity, and therefore has a fundamental 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 globalization process is the evolution of economic systems and institutions that facilitate the integration of the world economy.

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<sup>2</sup> 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.

Economic globalization is intimately connected with the neoliberal trend that has surfaced 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.<sup>3</sup> In accordance with the increasing economic openness and integration, a sense of community has been emergent at the global scale and there is growing academic interest in subject issues such as the democratization of global governance of the world economy and cosmopolitanism (Pieterse, 2004; Standing, 2004; Griffin, 2004). Such discourse on ideological issues may lay the groundwork for bringing about fundamental changes in the way global public goods are handled. In short, the rise of the concept of global community is a direct outcome of the deepening globalization and the provision of global public goods should play a critical role in sustaining the continuation of humanity and in further nurturing the process of globalization in an ethical and equitable manner.

#### 4.2. The Environment and Knowledge/Information as Global Public Goods

Stiglitz (1995) identifies the environment and knowledge as public goods of global significance along with international economic stability, international security (political stability), and international humanitarian assistance. The following presents an elaborate depiction on the environment and knowledge/information as general types of global public goods that underlie agriculture-related global challenges.

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 the growth of the global economy. Daly (2009) views that our

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<sup>3</sup> Opponents argue that globalization has widened the gap across the world (between the rich and poor countries) and within a country. The debate on the effects of globalization has been of considerable interest to social scientists and economists over the last two decades and continues to stimulate a large volume of intellectual discourse (Stiglitz, 2007).

economy is a subsystem of the larger ecosystem that 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 unattractive to conceive a world without growth, he epitomizes the dilemma between growth and ecological/biogeophysical limits as 'physical impossibility (continual growth) vs. political impossibility (limiting growth).

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 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 two contrasting views about the future of our world indicates that it would be sensible for the global society to take steps so as to incorporate environmental/ecological capacity in planning for future growth of the world economy. It is undeniable that protecting the environment at the global scale is beneficial for every country in the world. Indeed, reducing the emission of ozone-depleting chemicals such as chlorofluorocarbons (CFCs) and greenhouse gases (CO<sub>2</sub>) by any country will benefit every country. The country that reduces CFCs or CO<sub>2</sub> will pay for such reduction in the form of increased production or regulatory costs and diminished competitiveness in international market, hence they have an incentive to be free-riders. The consequence is under-provision of the reductions of CFCs or CO<sub>2</sub>. 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.

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; 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 a 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.

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 not only within a country but also 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 the Far East Asian countries have done so by heavily investing in secondary and tertiary education.

The above discussion of the environment and knowledge/information as global public goods implies that enhancement of agricultural sustainability and knowledge/information on how to mitigate global warming and how to adapt to changing climate are global public goods of direct relevance to agriculture. Note that spillover effects related to agricultural sustainability and climate change are not only transnational but also transgenerational.<sup>4</sup> Agricultural sus-

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<sup>4</sup> 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.

tainability 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. In relation to scientific 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 represent global public good that would help all countries better maneuver the problems associated with global warming.

The promotion of food security in developing countries is considered to be a global public good in connection with the fact that reduction/eradication of poverty and inequality is conducive to the growth of the global economy, benefitting all other countries. In particular, realizing the full potential of agricultural growth/development in LDCs is critically important for the global society to deal with the expected imbalance in food demand-supply in the future given the increasingly smaller room for enhancing agricultural productivity in developed countries (Thurow, 2010). Hence, enhanced food security in developing countries promotes transnational spillover effects of positive externalities in the form of contributing to equitable progresses of global economic growth and mitigating potential uncertainty in meeting future growth in food demand.

## V. Current Governance of the Global Agriculture

Governance is a broad term encompassing all the processes of accomplishing common goals of the global society by cooperative efforts. Typically, gover-

nance 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 global agricultural trade with the mandate of establishing a market-oriented system. 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.<sup>5</sup>

Overall, the system was given the mission of fostering growth and stability through 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 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 the GATT in 1947, member countries have been allowed to exempt agriculture from the pursuit of reducing trade barriers, and the bulk of agricultural exceptionalism of 1947 is still alive today in the 21<sup>st</sup> century despite the multilateral efforts of the Uruguay and Doha round over the last three decades.

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 (Randall, 2002; Vatn, 2002). The rise of the concept

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<sup>5</sup> GATT was a weakened version of what would be International Trade Organization (ITO) responsible for creating and enforcing equitable rules 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).

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) facilitating member countries to promote 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 produced little perceptible progress to date. The prospect of achieving a substantial liberalization of agricultural trade is very slim given the reluctance of the developed world to significantly reduce their farm subsidies coupled with the emergence of developing countries (particularly, the BRICS including Brazil, Russia, China, India, and South Africa) as a major negotiating party who is staunchly against the farm subsidies of developed countries (Josling, 2004; Schwab, 2011).

As such, the WTO has been playing a salient role in the governance of agricultural trade in recent decades, particularly through the traffic light box system. In addition to the WTO, a list of other international organizations has performed important tasks to address global challenges related to agriculture. Specifically, the following has made notable contributions to the global management of agriculture: Organization of Economic Cooperation and Development (OECD), Food and Agriculture Organization (FAO), United Nations World Food Programme, 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) and International Rice Research Institute (IRRI) conduct research primarily to help agriculture in developing countries. World Bank, Asian Development Bank, 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 fragmented and not very well coordinated, leaving a great deal of room for enhanced efficiency in using global resources allocated for agricultural problems. More importantly, while providing global public goods in terms of knowledge and information, they do not have the authority to legislate, implement, and enforce legally binding rules/laws.

## VI. The World Agriculture Organization (WAO)

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, unsustainability of agricultural production, and food insecurity in LDCs. Upon accepting these challenges as global public goods, the production, distribution, price determination, and consumption of agricultural commodities across the globe get to hold considerable facets of a global public good. In other words, the provision of the three global public goods will be facilitated through effective governance of agriculture by international cooperation at the global scale. We argue that a balanced use of international cooperation and market rules (competition) will be critical in effectively governing the global agriculture in the best interests of the global community. The current WTO regime is far from being positioned to foster transnational cooperation essential in providing agriculture-related global public goods and, therefore, a new system of global governance is called for.

The new institution playing a central role in the governance of the global agriculture can take a wide spectrum of forms ranging from modest reform within the current WTO regime to an establishment of a completely independent institution. For example, Guzman (2001) proposes reforming the WTO in order to reduce its bias toward trade issues while extending its jurisdiction into international policy-making such as environmental, labor, human rights, and competition policies. Specifically, he suggests the creation of autonomous and topical departments within the WTO and each department will be in charge of an area of global importance. Although he did not mention of agriculture,

a department accountable for governing the global agriculture could be added. With each department organizing rounds of negotiation within their own issues, he conceives periodic Mega-Rounds to coordinate issues across departments. At any form, the new system of governance needs to be mandated to appropriately use both transnational cooperation and competition (through market mechanisms) 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 the creation of the World Agriculture Organization (WAO) as an institution that is central to the system of governance for agriculture and independent from the WTO. The notion of the WAO 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 the 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, although it needs to be reformed to benefit not only developed countries but also developing countries. Dispute settlement mechanism in the WTO is another feature of value to the WAO. 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 par-

ticipate in contributing to the reduction of global public bads (e.g., greenhouse gases) and in providing global public goods at the most appropriate level not only from economic efficiency but also from global equity perspectives. 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), World Food Programme, OECD agriculture committee, FAO, and World Bank agriculture committee.

The WAO will fully consider short- and long-term issues related to climate change, sustainability, and food security in designing international trade rules. For example, it may explore operationalizing the concept of 'Development' and 'Food Security' boxes that have been tossed around by developing countries during the Doha round negotiations. The main goal of such exploration is to incorporate regional and country-specific needs (related to agriculture) of developing countries into the system of global governance of agriculture. As noted earlier, while the traffic light box system is innovative in the sense that it incorporates the special functions (multifunctional roles) of agriculture, it exclusively benefits developed countries. Ideally, *the WAO is expected to facilitate every country to develop an 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 be conducive to promoting food security and the well-being of 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 ex-

ceptionalism and global public goods, the WTO can be considerably more effective in addressing trade barriers in nonagricultural sectors and in reaching a multilateral deal, thereby fostering economic globalization.

## VII. Conclusion

Agricultural exceptionalism has been prevalent in developed world in the 20th century and continues to characterize the global agriculture in the beginning of the 21<sup>st</sup> century. Such tenacity of government interventionism in agriculture reflects that agriculture produces not only private commodities but also public goods and positive 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.

In addition to such national issues concerning agriculture that require collective actions, our world needs to cope with climate change, unsustainable agricultural practices, and food insecurity in developing countries and LDCs. 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 them. Therefore, the provision of such global public goods necessarily involves some extent of cooperative management 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 that would manage the global public good properties of agriculture. The system of new governance will appropriately use transnational cooperation and collective actions at the global level as well as international competition (market rules) to optimally manage both private and public good properties of agriculture.

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 manufacturing and

service sectors. Nonetheless, agriculture is a disproportionately much more significant sector across all developed, developing, and least developed countries for different reasons. As noted by Pingali (2010), agriculture is the primary engine of economic growth for LDCs and emerging economies. The agricultural sector requires government efforts to sustain productivity gains for industrialized countries, and it is important to promote agriculture's multifunctional roles such as rural amenities and ecosystem services. In a similar context, Hayami and Godo (2005) delineate drastically different nature of agricultural problems across countries and analyze the disequilibrium of the world agriculture from three perspectives: (i) the food shortage problem in Low-Income Countries, (ii) the protection problem in High-Income Countries, and (iii) the disparity problem between farm and nonfarm sectors in Middle-Income Countries. The point is that agriculture is important in every country for different reasons and the new system of governance for the global agriculture should be designed in such a way that each country is entitled to conceiving and developing an agricultural system that fits its economic, ecological, and developmental needs. The WAO will be asked to play a central role in such a system of global governance.

While this article focused on rationalizing the need for a new system of governance for the global agriculture and presenting a broad outline of the main features of the WAO, there are compelling needs for further research on the issue of governing the global agriculture. Future research needs to probe specific organizational scope, functions, structure, and decision-making mechanism of the WAO in much greater detail. Given that the creation of the WAO represents only one option of governing the global agriculture, it is necessary for researchers to explore other possible forms of alternative systems of governance. In addition, 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). Future research will have to address such institutional and international relation issues as they apply to the particular global public goods of agriculture, climate change, sustainability, and food security.

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Date Submitted: Aug. 4, 2010

Period of Review: Aug. 20, 2010~May 17, 2011