

ACHIEVING FOOD SECURITY THROUGH AGRICULTURE TRADE IN THE CONTEXT OF CLIMATE CHANGE: OPPORTUNITIES AND CHALLENGES FOR INDIA

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INTRODUCTION

Climate change¹ has adverse effects on human lives and property globally (United Nations Development Programme (UNDP, 2008). There is close link between climate change and agriculture via weather patterns causing floods, worsening desertification and disrupting growing seasons. Climate change is adversely impacting agricultural systems and global availability of food across the world. Agricultural operations also influence climate change and contribute 13.5 percent of global greenhouse gas emissions (IPCC, 2007), which could be as high as 32 percent (if both direct and indirect emissions from the food system is taken into account) (Greenpeace, 2008). In the recent past, the impact of climate change on food security² has emerged as a global developmental issue. Climate change has devastating effect upon food security around the world. Nearly 16 percent of the world's population was undernourished, which decline by 9.6 percent to 925 million in 2010 (FAO, 2010), of which developing countries account for 98 percent. World Bank (1986) has distinguished between chronic and sustained food insecurity associated with problems of structural mismatches and transitory food insecurity caused by natural disasters, economic collapses, conflicts and others (Clay, 2002). Majority of small farmers in the developing countries are either net buyers of food or just self-sufficient (World Bank, 2008).

Food security refers to achieving reliable access to adequate, affordable and nutritious food supplies sufficient to avoid chronic hunger. In the recent past, agricultural trade has failed to play a constructive role in addressing food security. Development assistance, food aid and trade preferences have been used to soften the external effects of self-protecting initiatives. After the creation of the General Agreement on Tariffs and Trade (GATT), the subsequent negotiating rounds by and large preserved these instruments of self-protection. In fact, the Kennedy Round tried to extend support

and protection globally and the Tokyo Round occurred during a period of food scarcity globally. The Uruguay Round created a structure for incrementally dismantling the instruments of protection. The Doha Development Round never seemed to agree on either agricultural trade's role in an effective global food system or the additional institutions and resources necessary to create such a system. The collapse of the Doha negotiations and the subsequent emergence of food crisis, financial crisis and economic crisis have weakened support for trade reform. To counteract these developments, we need a better understanding of the role of agricultural trade reform in achieving food security in context of global climate change in developing countries like India. India is facing a critical challenge of how to feed growing population by 2050 while simultaneously reducing and responding to climate change. Majority of poor rural households derive their livelihoods from agricultural production. Agriculture sector is very sensitive to changes in climatic conditions, and will have to adapt if they are to ensure provision of adequate food for an increasing population. Agriculture needs to be part of an international climate change agreement to encourage actions that reduce greenhouse gas emissions while improving food security and strengthening adaptive capacity. Besides above, agricultural trade plays a critical role in food security in India. Overall, there is need to find new ways to adapt to impact of climate change and mitigate the climate damage by changing agricultural practices to ensure food security, promote rural development and improve livelihoods. With above backdrop, the main objectives of the proposed paper are to examine the impact of climate change on agricultural trade flows, and resultant impact on food security in

India, to review adaptation and mitigation options related to the agricultural sector including climate change proofing modes of production, diversifying into new products and services and to assess the extent to which available instruments and mechanisms are being leveraged to meet the challenges of climate change for the agricultural sector in India. The present paper is based on extensive review of existing literature on climate change, agriculture and trade using desk approach to provide a tool for policymakers and civil society groups using the literature from a range of sources, including international and civil society organizations, universities, and international press.

II. REVIEW OF LITERATURE

Human activities are “very likely” the cause of climate change. Agriculture accounts for about 13-15 per cent of global GHG emissions at production level (Lybbert and Sumner, 2010) and not includes production of agricultural inputs and fixed capital equipment, processing and trade of agricultural products and land conversion to agriculture. Agricultural emissions of methane and nitrous oxide grew by 17 per cent during 1990-2005 and GHG emissions in agriculture are predicted to rise by 35-60 percent by 2030 in response to population growth and changing diets in developing countries (IPCC, 2007). However, GHG emissions from agriculture and carbon uptake by soils and vegetation are virtually excluded from the flexibility mechanisms under the Kyoto Protocol (FAO, 2009). Soil carbon sequestration has the highest potential for generating mitigation from agriculture and is outside the scope of the clean development mechanism (CDM) (Smith et al., 2007), which will impede climate change mitigation and food security (FAO, 2009).

The impact of climate change on agriculture and human livelihoods is complicated (Schmidhuber and Tubiello, 2007, Easterling et al., 2007). There is direct climate impacts on crop yields and agricultural output (Lobell et al., 2008, Jones and Thornton, 2003; UNCTAD, 2009; Keane et al., 2009). Higher temperatures affect plant, animal and farmers’ health. Extreme weather may significantly influence both crop and livestock production (Tirado and Cotter, 2010). Agricultural productivity in the most climate-change-exposed developing country regions will decline by 15-30 per cent. More frequent extreme events will create

both a humanitarian and a food crisis (FAO, 2009). Agriculture provides the livelihood to 40 per cent of global population (World Bank, 2008; Herren et al., 2011). Climate change has grave consequences for food security in developing countries that largely rely on agriculture. Climate change impacts food security through a variety of channels (Stern, 2006; World Bank, 2007; Yu et al., 2010a, Yu et al., 2010b) such as changes in food supply, trade flows and commodity prices (Nelson et al. 2010; Breisinger et al. 2011).

Fischer et al. (2002) and Fischer et al. (2005) have quantified the impacts of climate change on food security. Climate change would increase the number of undernourished in 2080 by 5-26%, compared with no climate change (Fischer et al., 2002). Compared with FAO estimates of 820 million undernourished in developing countries today, several studies (Fischer et al., 2002; Fischer et al., 2005) estimate reductions of 75% by 2080. With or without climate change, the millennium development goal of halving the prevalence of hunger by 2015 is unlikely to be realized before 2020-2030. In addition to socio-economic pressures, food production may increasingly compete with bio-energy in coming decades.

There has been serious global challenge of making enough food available for growing populations and changing dietary patterns under conditions of escalating resource scarcity and climate change (Godfray et al., 2011; Foley et al., 2011). To meet global food demand, cereal production in 2050 will need to be about 70% higher than 2006 levels (FAO, 2006) and long-term yield reductions are estimated to be associated with climatic trends and extremes (Easterling et al., 2007; Knox et al., 2011). Not only this, different consumers access food differently - poorest rural populations continue to rely for their sustenance and livelihoods primarily on local food (Barrett, 2008). Investment in smallholders’ agriculture has double the impact on poverty reduction (World Bank, 2008). Future impacts of climate change on food security of poor households will very much depend on agricultural yields. However, climate is not the only determinant of food security (Ingram et al., 2010). Agriculture is also a major contributor to greenhouse gas emissions directly (Barker et al., 2007) and land use change (Harvey and Pilgrim, 2011). The challenge is to mitigate climate change without compromising food security.

Numerous studies discuss the impact of climate change on agricultural and food security in developing countries Asia, Africa and Latin America (Jacoby et al., 2011; Skoufias et al., 2011; Hertel et al., 2010; Ringler, 2010; Fankhauser and Tol, 2005; Winters et al. 1998). Tirade et al. (2010) analyzes impact of climate change on food security and nutrition of people and addresses the major challenges that threatens the current as well as future food security issues. International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) (2008) examines how agricultural knowledge, science and technology can be used to reduce hunger and poverty, and facilitate environmentally, socially and economically sustainable development. Greenpeace (2008) finds the total global greenhouse gas contribution of agriculture from both direct and indirect sources is between 17% and 32%. International Trade Center (ITC) (2007) finds that agriculture is both a cause and a victim of climate change, but organic farming is a useful tool to mitigate the impacts of the industry. According to Organization for Economic Cooperation and Development (OECD) Joint Working Party of the Environment Policy Committee and the Committee for Agriculture (2002) there are several links between agriculture and greenhouse gas emissions. IPCC (2007) reports that greenhouse gas emissions from global agricultural production increased by 17% between 1990 and 2005 and proposes an increase in agricultural research and development of modes of agriculture, and increased knowledge and technology transfers. International Fund for Agricultural Development (IFAD) (2008) advocates planned adaptation measures such as the use of more heat or drought-resistant seeds, changing fertilizers or methods of fertilization, more effective use of water, and altering the timing or location of agricultural production. Pretty (2008) argues that improved management of agricultural ecosystems with a focus on sustainability can be hugely beneficial to developing countries.

Organic agriculture has the potential to increase food security, education, skills and health, improve infrastructure and markets, and increase farmer and household incomes (United Nations Conference on Trade and Development (UNCTAD) and the United Nations Environment Programme (UNEP, 2008). Growing food requires small proportion of energy used by the food system (one-fifth) compared to off-farm sources such as transport, processing, packaging, food retailing,

restaurants and caterers, and home refrigeration and preparation (four-fifths). Food trade results increasingly unsustainable food consumption patterns due to more use of processed foods causing increased transportation, refrigeration and packaging-related energy consumption (Earth Policy Institute, 2005). Pretty et al. (2005) advocate for organic farming, localized food systems and sustainable transport to reduce the environmental costs of the UK food system. Taxing food that entered international trade hurt developing countries more due to higher transportation costs with less environmental impact compared to domestically produced goods. Not only this, the greenhouse gas impact of goods traded (e.g milk produced in New Zealand and shipped to the UK versus milk produced and sold domestically) is significant for domestic economy due to energy intensity of animal feeds compared to grazing system. Therefore, option of eating locally produced and seasonal fruits and vegetables is neither practical nor realistic. Agricultural exports generates income and employment in the developing world and reduce carbon emissions in developed world (Shah and Hasit, 2008). However, with globalization and trade liberalization, transportation costs may be creating larger barriers to trade than tariffs and causing re-domestication of the U.S. and Canada industries formerly outsourced to Asia and South America (Rubin and Tal, 2008).

Agricultural and household food waste is a major problem causing several environmental and economic impacts (Food Navigator (2004). Up to half of all food produced is lost through the food chain (from the field to pre-processing, transport, storage, processing, marketing and finally, the kitchen). In developing countries most food losses occur due to poor harvesting, storage and transport facilities, whereas in industrialized countries, the losses occur toward the end of the food chain (SIWI, 2008). Livestock sector contributes more to climate change and is responsible for an estimated 18 percent of anthropogenic emissions worldwide, which must be cut by half to avoid further damage (Steinfeld et al., 2006), besides reducing meat production and increasing its price of meat (Food Ethics Council, 2007). It is ironic that the world is facing a food crisis and at the same time, agri-business companies (e.g Cargill's Mosaic Corporation, Canada's Potash Corp, Archer Daniels Midland, Charoen Pokphand Foods) are making huge profits (GRAIN, 2008). There has been significant decline in small-scale agriculture globally causing long distance travel from food production to

plate in the domestic economy. With improved efficiency and productivity of small-scale farming, food can be produced inexpensively and transported to other regions of the world, which may depress local markets and undermines local food production (McKibben, 2003). Large agricultural corporations are stockpiling seeds patents, however, due to heavy marketing measures, the countries most affected by climate change will turn to these seeds without sufficient impact analysis and bio-safety rules (ETC Group, 2008) and harmful for the small farmers (Shand, 2008) calling governments to respond to the climate challenge by promoting and strengthening farmer-based breeding and conservation programmes.

Developing world already contends with chronic food problems (FAO, 2007). Climate change issues are required to be included in trade policies. Agricultural trade patterns are also likely to change and the food import bill of less developing countries (LDCs) has already gone up from \$9 billion in 2002 to \$24 billion in 2008 (UNCTAD, 2010a and 2010b). High import dependence will likely be exacerbated by increases in agricultural prices (Nelson et al., 2010; Nellemann et al., 2009) and might imply a more than 50 per cent increase in the net cereals' import bill of developing countries (Nelson et al., 2009). Despite this, governments underestimate the climate-related threats and there is little work on how the negative effects can be mitigated (Braun, 2008). Agricultural trade flows are influenced by comparative advantage, climate change and trade policy (Nelson, 2009). The scope of Aid for trade includes trade policy and regulations, trade development, trade-related infrastructure, building productive capacity, trade-related adjustment, and other trade-related needs. Special funds are needed for assistance on energy use and shifting to low carbon production including "climate-proofing" development projects. There is need to link trade and environmental initiatives by analysing the relationship between Multilateral Environmental Agreements (MEAs) and trade agreements. Implementing trade-related climate agreements will benefit the world as a whole. Most efficient ways to reduce emissions and improve energy efficiency may be through investment in developing countries. There has been difficulties of linking trade capacity building to poverty reduction strategies in countries' aid programmes. Funds targeted at climate change also raise the same issues of inconsistency in trade capacity building.

Developing countries like India are predicted to be the hardest hit by climate change. The World Bank, WTO and other organizations argue that these countries will have to increasingly rely on international trade to secure enough food as their own production levels fall. They ignore the contribution of trading agricultural commodities to increased greenhouse gas emissions. Both trade and industrialized agricultural production are heavily dependent on fossil fuels and therefore increase greenhouse gas emissions and exacerbate climate change. There is need for further research on emissions from export-oriented agriculture, including processing, packaging, storage and transportation. United Nations Economic and Social Council (ECOSOC) (2000) addresses the various ways in which globalization and trade liberalization have affected human rights throughout the world. Shrybman (2000) argues that the ways in which we assess the impacts of agricultural production on climate change need to be changed. According to Shrybman, agricultural trade policies dictate the way that agricultural production and distribution systems operate. Therefore, trade policymakers must take into account rising greenhouse gas emissions and the energy that their policies demand. World Bank (2008) reveals that the countries that are most affected by climate change will have to increase their involvement in international trade as their environment worsens (and they become unable to adequately provide for themselves). Economic reforms that would help countries negatively affected by climate change could include the introduction of flexible land-use policies and the elimination of subsidies. Increased access to financial services such as credit, marketing systems, training and irrigation would also mitigate the impacts. According to International Centre for Trade and Sustainable Development (ICTSD) (2008) globalization tends to heighten agricultural vulnerability and trade liberalization has become a threat to agricultural development in developing countries. Significant mitigation and adaptation of agricultural practices will need to occur, particularly in developing countries, to stabilize prices and realize comparative advantage.

III. AGREEMENT ON AGRICULTURE AND THE DOHA ROUND

WTO Agreement on Agriculture (AoA) focuses on the impact of trade liberalization in agricultural commodities on the right to adequate food (Kerstin Mechlem, 2006). The AoA essentially imposes on the

parties three sets of obligations: (i) they must increase market access for agricultural products, (ii) the members must reduce the level of domestic support, and (iii) the members must reduce existing export subsidies. Export subsidies are the most harmful form of subsidies for the developing countries causing subsidized products arriving on domestic markets and displacing local production. The food-importing countries would be hurt by the inflationary impact of the removal of subsidies, aggravating the impact on food security of the current peak in prices (Panagariya, 2005; Stiglitz and Charlton, 2005). In the long term, export subsidies discourage local production in the importing countries and create a dependency on international markets, which is a major source of vulnerability, particularly as the prices on international markets will be increasingly volatile. AoA also refers to 'non-trade concerns', of which 'food security and environment protection' are explicitly mentioned. Food security is to be achieved through the reform programme, including food aid. AoA is premised on the ability of international markets to provide food security and consistent with the idea that trade shall lead to allocative efficiency and food self-sufficiency. Therefore, countries should specialize in the production of goods with comparative advantage, which would bring sufficient export revenues to buy food from abroad.

Under Doha Declaration (2001), the WTO members committed themselves to comprehensive negotiations aimed at substantial improvements in market access, reductions of, with a view to phasing out, all forms of export subsidies and substantial reductions in trade-distorting domestic support. WTO members agreed to make special and differential treatment for developing countries in all negotiations. Hong Kong WTO Ministerial Conference (2005) agreed that export subsidies would be ended by 2013. Developing countries can themselves designate some products as 'special products' for which tariff reductions will not be very stringent. The current regime of international trade is not satisfactory and beneficial for the smallholders in developing countries, who are facing food insecurity. In their own domestic markets, agricultural producers have been facing unfair competition from highly subsidized agricultural products exported from OECD countries. Government support to farmers in OECD countries was 258 billion USD in 2007 (23% of total farm receipts), the lowest level of support since 1986,

even then developing countries are unable to compete. Not only this, agricultural producers in developing countries have been facing obstacles in accessing high value markets of developed nations. They have failed to benefit from preferential schemes like 'Everything But Arms' initiative adopted by the European Union in favour of Least-Developed Countries due to complexity of rules involved, non-tariff barriers linked to standards requirements under the Agreement on the Application of Sanitary and Phytosanitary Measures and the Agreement on Technical Barriers to Trade.

Many agricultural products are facing tariff peaks and escalation. This discourages diversification into higher value-added products in developing countries and excessive dependence on limited number of primary commodities (McCalla and Nash, 2007), and less investment in domestic agricultural sector causing unfair competition (World Bank, 2007). Irrigation has been facing huge challenges due to great diversity of agro-ecological conditions. They have been failed to devise effective strategies to maintain their own food security. Besides, there have been significant barriers to expand small farmers' access to credit and markets and improvements in transport infrastructure (IEG, 2007). The official development assistance going to agriculture has been declining significantly (Danielle, 2004). At the same time, the prices of agricultural inputs rose. Farmers were not supported to cope with these cost increases. As a result, their productivity suffered. In addition, conditional access to loans under structural adjustment programme led to dismantle the public support schemes for agricultural sector.

Improved access to export markets for farmers from developing countries will benefit a small proportion of them. The most vulnerable farmers will be excluded, unless affirmative action is taken to support them. Trade is able to ensure food security if it shields agricultural producers in developing countries from the industrialized countries' farmers. Besides removal of existing trade-distorting measures, developing countries require differential treatment (UNCTAD, 2006). Therefore, the idea of establishing a 'level playing field' is meaningless. Food insecurity is mostly concentrated in the rural areas and most vulnerable depends on agriculture for their livelihoods (UN Economic and Social Council (2006). The failure of most developing countries to invest sufficiently in agriculture and the damage to agricultural

sector due to lower import tariffs on agricultural products are attributable the structural adjustment programmes (Adam and James, 2000; Rodwan and David, 2007; Axel, 2006; James, 2002). Domestic policies have paid little attention to agriculture and thereby failed to strengthen their agricultural sector on long term. Adequate domestic policies can be a condition for any opportunities created by improved market access to materialize. There is need to assess the impact of trade liberalization on agriculture and identify the constraints faced by them to implement policies at domestic level to maximize the benefits from trade and minimize the negative impacts. Complementary domestic policies can be implemented to commensurate with the impact of trade liberalization and to reap the the opportunities of trade liberalization (UNCTAD, 2008).

IV. INTERNATIONAL TRADE AND FOOD SECURITY

In the recent past, there has been increased reliance on international trade to meet domestic food needs. This was pursued in tune with decline in world food prices from the mid-1970s to the mid-2000s and considered as a secure and low-cost policy to food security in developing countries, causing restructure of domestic agricultural sectors away from food production for local consumption to specialized commodity production for exports. As a result, world agricultural trade has grown exponentially. The processed foods now account for the majority (over 80%) of world agricultural trade whereas grains and commodities as a share of total world agricultural exports have declined. Developing countries shifted increasingly towards non-food agricultural production including coffee, fresh fruit and vegetables, cut flowers, and semi-processed agricultural goods.

In the process, the least developed countries (LDCs) have transitioned from being net agricultural exporters to becoming food importers (FAO, 2005, 2006, 2007). LDCs import approximately 20% of their total food consumption and their food import bills more than doubled (UNCTAD, 2009). The increased dependency on international trade with significant domestic food production capacity can have a number of direct and indirect impacts on right to adequate food. There will be loss of export revenues when the prices of export commodities rapidly fluctuate downwards. When low-priced imports arrive on the domestic markets, local

producers are unable to compete and suffer. When the prices of food commodities go up, there will be balance of payments problems for the net food-importing countries. High food import dependence also further exposes producers and consumers to increased vulnerability both to worsening terms of trade and to fluctuations in commodity prices. Such situations significantly reduce the capacity of States that are highly dependent on international trade and imports to buffer external shocks, such as overproduction or harvest failures in other States. The long-term sustainability of overreliance on food imports under conditions of high and rising food prices is now a major issue of concern in global food policymaking (OECD-FAO, 2010). While the risks associated with the dependence on food imports may have appeared low or negligible when world food prices were low, these risks have been aggravated by higher and more volatile food prices. This is evident in the rising cost of food import bills for developing countries and the increasing difficulties they face in securing and financing food imports. As a result, many of the policy recommendations in response to the global food crisis have placed greater emphasis on increasing food production in developing countries in order to decrease their long-term dependence on food imports (OECD-FAO, 2010). There is a renewed global consensus on the need to increase public investment in agriculture and food, and scale-up the capacity of the State in food policy-making to achieve food security, in addition to the importance of seizing the opportunities of increased private investment in agriculture, which must also be regulated (FAO, 2009).

If international trade can play a key role in addressing food insecurity, it must also be stressed that countries can reduce the vulnerability of small-scale farmers and consumers by maximizing their domestic food production capacity (United Nations, 2010). The short-term interest in procuring from international markets the food which they cannot currently produce locally at lower prices should not lead States to sacrifice their long-term interest in building their capacity to produce the food they need to meet their consumption needs (United Nations, 2008).

In the short-term, most food deficit countries applied tariff reductions in response to the global food prices crisis (FAO, 2008), which provided a modest but limited counter-measure as applied tariffs on basic

foods were already low in most food deficit countries prior to the crisis. During the peak of the global food crisis the price of grains doubled to tripled and upward swings of these magnitudes dwarfed whatever price relief could be gained from reducing already low tariffs. States should carefully consider whether such measures are consistent with their longterm objective of raising national food production and reinforcing the capacity of smallholders. Indeed, increasing food production in developing countries will not only require significant amounts of reinvestment in agriculture; it will also likely require States to apply tariffs on certain food imports as complementary measures to protect smallholders from import surges, which otherwise threaten the ability of smallholders to live from their crops and feed their families.

V. TRADE NEGOTIATIONS AND RIGHT TO FOOD

Trade negotiations should not obstacles to the realization of the right to food. Government should define their positions in trade negotiations in accordance with national strategies for the realization of the right to food. However, excessive reliance on international trade in the pursuit of food security should be avoided. At present, a relatively small proportion of the food produced is traded internationally (Ataman and John, 2005). The prices fixed on international markets have an important impact on the ability of farmers to make a decent living. The net food buyers are made vulnerable to increases in prices. The increased prices may result in violations of the right to food. Implementing adequately the Marrakesh Decision would be consistent with the obligation of the WTO Members to respect the right to food. However, the problems of vulnerability of countries as a result of their dependency on international trade as a solution to achieving food security remain real. More food aid and more easily accessible and less conditional financing facilities to meet balance of payments problems are no substitutes for strengthening the agricultural sector to enhance food security and reduce poverty and hunger in developing countries.

VI. OPPORTUNITIES FOR INDIA

India has been experiencing more frequent droughts and cyclonic storms, rapidly melting of the Himalayan glaciers (Lal et al., 2010) and rise in sea level (IPCC, 2007).

Due to high incidence of poverty, food insecurity is widely prevalent in India. Over time, agricultural growth in India has been slower and the current availability of cereals per capita is 390 grams per day compared to required 510 grams per day for a healthy life resulting in considerably low rank in Global Hunger Index (IFPRI, 2010) with high incidences of malnutrition among children and anaemia among women in rural areas (WFP, 2008). Extreme climate events such as rising temperatures and falling rainy seasons have resulted in the destruction of sown seeds and crop failure, worsening food security. Crop productivity has declined due to decreased rainfall and pests and diseases have increased due to increased humidity and temperatures. Besides farmers, fishermen have also been adversely affected by climate change.

India is a net food exporter, whereas other South Asian countries are net food importers and hosting about 40 percent of the world's hungry population due to declining agricultural growth, increasing population and worsening food security and causing Bangladesh, India and Pakistan to lag far behind in reducing hunger. South Asian nations have heavily traded with the outside world, however, the intra-regional trade has been very low due to trade barriers, protectionism and distrust among member countries making it the least integrated region in the world. For example, the SAARC³ nations export 92 percent and import 95 percent of food products from non-SAARC nations but the intra-regional food trade is around five percent despite signing of the SAFTA charter in 1993, which came into force from January 01, 2006. Most SAARC nations have similar comparative advantages over the production of both agricultural and non-agricultural products due to similar nature of factor endowments and cost structure (Hassan, 2000). SAFTA allows the participating countries to achieve larger economies of scale in production, attain specialisation, increase competitiveness and diversify their export base, thus assisting domestic economic reform (Khosro et al., 2011). Keeping in view the role of intra-regional trade in economic prosperity, the respective SAARC governments must work toward realising the SAFTA charter without any political and bureaucratic barriers.

VII. CHALLENGES FOR INDIA

In India, agricultural yields are expected to drop significantly, causing decline in food security and calls for

pursuing and enacting unilateral “climate smart” policies to mitigate against global warming and to ensure greater ability to adapt to the immediate impacts of climate change. There is growing concern that international trade rules unduly impede climate-friendly measures.

There is urgent need to address food security issues in the context of climate change in India by promoting climate resilience agriculture, shifting from traditional rain-fed agriculture to irrigation-based farming, developing rural infrastructure to enhance the market accessibility, and promotion of intra-regional trade in food through greater collaboration among South Asian countries. In order to address climate change and food security, it is suggested that development strategies must be evolved within country though technical and financial assistance can come from international aid agencies.

There is need for mainstreaming sustainable agricultural production methods, for which farmers and researchers in agro-ecological sciences need to work together to determine how to best integrate traditional practices and new agro-ecological scientific discoveries using new channels and platforms for information exchange and skills’ transfer. Besides, there is need to explore carbon or energy taxes to set the right incentives for innovation and desirable changes in production and consumption patterns as well as methods, which needs to be supplemented by a reform of international trade policies that are really supportive of ecological agriculture.

There is need to build up robust agriculture sector catering to the needs of the domestic markets and ensure food security on sustainable basis. The food aid and dependence on international markets are no substitute to domestic agricultural development. Cheap food from international markets has come to an end. The volatility of food prices shall be greater in the future due to merger of the food and the energy markets. However, international trade helps acquisition of export revenues and achieve food security by limiting the volatility of food prices on the international markets.

The Marrakesh Decision should be fully implement by the WTO Members and the impact of the AoA reform should be monitored. There is need to adhere to the notion of ‘adequate supplies’ of basic foodstuffs to ensure that each individual has access at all times to adequate food or to means for its procurement.

Therefore, the increased prices due to the reform process shall not result in violations of the right to food. Trade liberalization leads to strengthen the transnational corporations in the global supply chains without corresponding obligations. Therefore, there is need to adequately regulate private actors in discharge of their obligation to protect the right to food and explore ways to reorient trade towards products and modes of production which better respect the environment and do not lead to violations of the right to food.

Climate change will affect comparative advantages in agriculture thereby affecting food security in developing countries. Trade patterns are likely to alter as a result of changing yields and food prices. Developing countries’ agricultural imports are likely to double due to climate change impacts on food prices and agricultural production. Agricultural trade has the potential to balance productivity losses and offset shifts in agricultural production patterns to improve food accessibility and availability. Improved market access for exports could enhance capacities to respond to climate-change-induced productivity declines. This improved food access needs to be combined with increased investment in agricultural infrastructure and production to reduce trade-distorting policies such as taxation or export subsidies.

How measures to reduce agricultural emissions could affect trade performance or accessibility and availability of food? The countries that rely on agricultural imports have raised concerns regarding the consequences of mitigation measures taken by their trading partners. Similarly, countries considering emission reductions in agriculture are concerned about losing competitiveness vis-a-vis foreign providers as a result of more stringent domestic environmental regulations. Unless these countries manage to reduce their emissions without affecting production, they will have to make difficult trade-offs between mitigation and export revenues. Some climate change mitigation measures may affect trade patterns or pose challenges to existing trade agreements such as carbon standards and labeling, subsidies, border tax/carbon adjustments, or free allowances in the agricultural sector.

There is need to transform agriculture to ensure food security in the context of climate change in developing countries. A carbon-neutral agricultural sector alongside meeting global food needs is difficult

to achieve. There is need to focus on appropriate policy interventions on meeting food security by improving climate resilience agricultural systems with low emissions. Finance, technology and capacity building are essential to motivate large-scale adaptation efforts and emission reductions and promote more sustainable and climate-friendly agricultural practices. There is need to strengthen existing agricultural monitoring and evaluation systems to implementing effective climate response measures to support food security.

Agricultural trade helps achieve improved food accessibility and availability, which in combination with increased agricultural investment can ensure food security along with climate-friendly agricultural production. Thus, there is need to evolve supportive trade policy to address climate change including the multilateral trading system, both within and outside of established negotiation tracks.

Agricultural trade is subject to the changes in climate as well as trade policy. The developing countries like India depend on agricultural exports for their fiscal and socio-political stability. Climate change could potentially jeopardize agricultural export earnings unless alternatives can be sought. In India, agricultural sector is highly vulnerable to climate change. It is most distorted and heavily influenced by international trade policy calling reform in agricultural policy. India is likely to suffer heavy losses in her total agricultural output due to climate change by 2050, and need to adapt to a significant reduction in earnings from agricultural export. India needs to transit to a low carbon economy for which new products and services will be demanded. The recognition of all types of terrestrial carbon could offer potential new market opportunities in carbon trade. The low carbon products must be certified to transit to a low carbon global economy. Agricultural exporters may benefit from the relocation of agricultural production from high to low emitting locations. At the same time, there is need for a well designed and approved carbon labeling mechanisms.

Climate change will affect what is produced, what is traded, trading rules, the standards traded goods must meet, and the regulations which they must follow. The Indian food system faces substantial challenges. It must help eliminate chronic and crisis hunger and nutritional deficiencies while smoothing the transition from agricultural to industrial societies and increasing security

and opportunity for the poor farmers. It must move food through longer, more integrated supply chains while meeting consumers' rising expectations for safer and healthier products. And it must double food production in a sustainable manner by 2050, which means using no additional land area, consuming less fresh water and mitigating and adapting to climate change.

Achieving these outcomes requires both a much more open food system and institutional and resource support to make that system more equitable and trustworthy. Disassembling the instruments of protection through reciprocal concessions is necessary but not sufficient. It fails to address several core issues of an open and equitable food system - confidence in its performance, ability to pay in the face of challenging times and efficiency in feeding the people in an environmentally sound and socially equitable manner. It will require a package of ambitious reform commitments, institutional innovations in managing food security and sufficient resources to ensure food and nutrition for the hungry, safety and value for the well-nourished and sustainability for all

NOTES

1. Climate change refers to 'change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer' (IPCC, 2007).
2. The Food and Agriculture Organization (FAO) defines food security as a "situation that exists when all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (FAO, 2002).
3. SAARC is the organisation of the eight countries constituting South Asian region: Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka. It was constituted for economic and political purposes and is a trade bloc.

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