

**High-level Segment of the  
17<sup>th</sup> Session of Commission on Sustainable Development**

**Round Table 1  
Responding to Food Crisis through Sustainable Development**

**Discussion Paper**  
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### Issues/Questions to Guide Discussions

During the High-level Segment of the 17<sup>th</sup> Session of the Commission on Sustainable Development, three Ministerial roundtables are being organized. The purpose of these roundtables is to promote frank and interactive dialogue among the Ministers and other stakeholders with regard to using sustainable agriculture and rural development as the main entry point to overcome the multiple crises the world is facing today. The food crisis of 2008 was the result of a confluence of factors at the national and international levels, some which are short-term in nature while others are more deeply rooted. The impact of these crises varied from country to country, depending on the degree to which a country addressed the causes underlying the crises.

Beyond the current crises, the agriculture for development agenda faces a number of longer term challenges in the form of population increase, resource constraints, climate change, and increasing competition for land and water resources for production of nutritious food vs biofuel crops. Discussion on the following issues will help in shaping a future vision to meet the food security challenge both in the short- and long-term.

1. We know about the major drivers behind the recent food crisis. The situation varied from country to country and different Governments used different policy instruments. What are the lessons learned of the handling of the recent food crisis to avoid future food crisis and steep rise in food prices?
2. Over the past few years, national and international efforts had focused on reducing poverty and accelerating the implementation of MDGs. Yet, somehow agriculture and more importantly sustainable agriculture was not prioritized in national or international development agendas. Recent food crisis has reminded us the need to prioritize agriculture in development agenda. What are the main areas that require enhanced investments from both public and private sources to foster sustainable agricultural and rural development in developing countries?
3. Do we have successful models that could be offered to countries that are serious about mobilizing investments from both public and private sources in support of infrastructure development in the agricultural sector?
4. Some experts argue that higher commodity prices represent an opportunity for farmers to increase food production. What actions are needed to enable the small farmers to benefit from this opportunity? Which institutions will foster smallholder market inclusion as opposed to exclusion?
5. What would be the key elements of international and national approaches to the sustainable production of biofuels without jeopardizing food security and degradation of ecosystems?
6. What key messages should go out of this round table to be incorporated in the shared vision?

## **Introduction**

The Johannesburg Plan of Implementation (JPOI) adopted by the World Summit on Sustainable Development in 2002 reaffirmed, *inter-alia*, that agriculture must increase food production in a sustainable way and enhance food security in an environmentally sound manner so as to contribute to sustainable natural resource management. The JPOI also called for the implementation of the World Food Summit and Millennium Declaration goals to halve global hunger and poverty by 2015. The seventeenth session of the Commission on Sustainable Development (CSD) will take decisions on policy options and measures to accelerate the implementation of sustainable agricultural development, among other thematic issues. This discussion paper aims at facilitating the Commission's deliberations in one of the high-level round tables on: "*responding to food crisis through sustainable development*".

For several reasons, it is especially timely for the multi-stakeholders forum such as the CSD to explore how policy and program initiatives can foster agriculture's contribution to sustainable development. First, because world food prices spiked at such high levels in 2008, governments are still seeking lessons regarding the impact and effectiveness of various policy responses. Second, preliminary evidence suggests that hard earned gains in MDGs are being eroded by the food, fuel and financial crisis. Third, mounting evidence suggests that investment in agricultural public goods such as research, extension services, and infrastructure has the broadest and greatest impacts especially in reaching the smallholders and landless farmers. Fourth, reforming agricultural trade policies could contribute to as much as two-thirds of the global welfare gains from removing all merchandise trade restrictions and agricultural subsidies, even though agriculture accounts for less than 9% of world GDP and exports<sup>1</sup>.

Despite the widely recognized growth in food insecure households and food price related riots in many countries, food-aid volumes fell to their lowest levels in 40 years during 2008, even as the number of countries requiring emergency assistance grows.<sup>2</sup> While global food and fuel price increases began to moderate and decline during the final months of 2008, prices remained much higher than previous years. The global food import bill is set to be 23% higher than in 2007 and 64% higher than 2006.<sup>3</sup>

## **Food Crisis: Origins and Issues**

The food crisis of 2008 was the result of a confluence of factors at the national and international levels, some which are short-term in nature and others that are more deeply rooted. These include low productivity and investment in agriculture; supply-capacity constraints in many developing countries; trade-distorting measures such as subsidies to production and exports so far permitted by multilateral trading rules for the agricultural sector; insufficient fair competition in markets dominated upstream by suppliers of production inputs and downstream by buyers of agricultural produce, record-high oil prices, promotion of biofuels based on food crops; and speculation in food commodity markets.

Decades of depressed commodity prices led many governments in developing countries to neglect investments in agricultural productivity and infrastructure. In Sub-Saharan Africa, for example, public spending on farming is 4 per cent of total government spending and only 4 per cent of global ODA is directed to agriculture.

The shortage of investment in developing countries' agriculture has been due in large measure to the low or declining world food commodity prices spurred by subsidies in developed

countries and food aid in crop. As a result of the low incentives, LDC yields have suffered an annual decline of 0.1% between 1961-2003, while other developing countries have seen a slight rise of 0.6%<sup>4</sup>. Low productivity stems from many factors, including a limited use of agricultural inputs such as agro-ecologically adapted seeds and fertilizers; insufficient investment in extension services and R&D; and a reduction in arable land due to urbanization, degradation, and climate change.

Therefore, the agricultural sector in Africa, and to a lesser extent in other developing countries, is generally characterized by low yields, low purchased inputs, low credit access, no extension services, poor road and other infrastructure making access to domestic and international markets difficult and costly<sup>5</sup>. Women are particularly affected as they form the majority of the farmers in developing countries, especially in Africa. The majority of the farmers cannot respond to higher food prices and start producing more because they are too constrained. This is evidenced by the lack of supply response by the majority of poor farmers in developing countries in 2008 and very limited response in 2007<sup>6</sup>. This poor agricultural performance and lack of incentives is a source of food insecurity only partially compensated by food imports and food aid<sup>7</sup> - indeed, food aid in kind has often undermined incentives for agricultural production in developing countries and, hence, long-term food security.

The Uruguay Round that was supposed to open up agricultural markets to developing countries has seen very little net decrease in agricultural support. The Doha Round that had a development agenda has been unsuccessful. Developing countries have insisted on special and differentiated treatment in market access to protect their population from food crisis (through special products), and to keep a policy space to respond to crisis like the ones we had in 2008 and protect their nascent industry against multinationals and other well-established and financed corporations. The UN estimated that the WTO package proposed before the Doha talks collapsed would cost the developing world approximately USD 63 billion in lost government revenue on an annual basis. For many developing countries, tariff revenue comprises over 20 percent of budgets that are already straining to counteract the crisis. In addition, the projected gains for developing countries were very limited. According to studies by the leading research institutions and the World Bank, the global gains for 2015 are just USD 21.5<sup>8</sup> - 96 billion, with only USD 16 billion going to the developing world, or 0.16 percent of developing countries' collective GDP in the highest World Bank estimate. Major WTO reforms are needed if development is to be supported by agricultural markets.

In addition, the WTO should seriously address the highly concentrated global commodities markets, dominated by agribusinesses that can capture a large share of the revenue out of these value chains. Competition policies are needed to ensure trade liberalization benefit all players along the supply chain.

Relatively high fossil energy prices mean that agriculture is increasingly important as a supplier to energy market. The potential demand from the energy market is so large that it has the potential to change the world's traditional agricultural market systems completely.<sup>9</sup> Moreover, climate change is predicted to increase climate variability, the frequency and severity of extreme weather events, while climate change policies can place additional upward pressure on energy prices. These longer-term factors pose serious challenges to the global food and agriculture system.

It also appears increasingly likely that the global food price surge is linked to recent volatility and turmoil in the global financial regime. Speculators looking for assets with rising prices have reoriented their portfolios to buy food commodity-linked assets (commodity indices,

futures and options contracts). The amount of money that funds invested in the commodity indices is estimated at about \$170 billion<sup>10</sup> and, in the first quarter of 2008 the volume of globally traded grain futures and options increased by 32 per cent relative to the same period in 2007. While there is no precise information on or analysis of the impact of speculative funds on food prices, there are reasons to believe that increase in the prices of some key staples are attributable, to a substantial extent, to speculation in food commodity markets feeding the price rise spiral.

#### Box 1: Key reasons for soaring food prices

Most common explanations for the leap in food prices during 2008 included the following. Their relative importance in terms of contributing to price rise differ and yet has not been fully analyzed:

- Increased demand for certain agricultural products as feedstocks for biofuel production, particularly maize for ethanol and soybeans for biodiesel.
- Increased oil prices and environmental concerns strengthened interest in alternative energy sources. High oil prices also had a direct impact on the costs of agricultural production and prices.
- Rapid economic growth in certain emerging economies, notably India and China, caused increasing demand for food, especially for livestock products which generated increased cereal and oilseed demands for feed.
- Supply side was affected as a result of drought in major exporters and the lowest cereal stock levels of the last 30 years.
- Once world prices began to rise significantly, the market and policy responses this provoked added to the inflationary pressure: hoarding against expectations of further price rises, or export restrictions, for example.

## Economic and Social Impacts

The multiple crises experienced in 2008 led to a range of humanitarian, socioeconomic, environmental and development challenges, including threats to global food and nutrition security. The crisis has also exposed existing and potential vulnerabilities of individuals, households, governments and the international system to food and nutrition insecurity. The impact of the crises varied from country to country, depending on the degree to which a country addressed the causes underlying the crises, and to the extent it was integrated in the global economy. Some notable impacts are summarized below.

- High food and fuel prices contributed to increases in inflation rates adversely affecting the balance of payments of net food and fuel importing countries and their response capacities. The total cost of food imports for developing countries was already 33 per cent higher in 2007 than in 2006, and annual food import bills for low income food deficit countries (LIFDC) are now more than double their 2000 level.
- The food crisis has endangered millions of the world's most vulnerable, and threatened to reverse important gains made in achieving the MDGs on poverty and hunger reduction targets<sup>11</sup>.
- Recent studies find that a doubling of rice prices results in a 12% decrease in real incomes for the poorest income quintile<sup>12</sup>. Households are reported to have reduced their food intake or to have attempted to maintain it by reducing their spending on more expensive foods and other non-food items. Permanent damage results to the health of millions of children when poor households are forced to reduce the quantity or quality of food.

- The number of undernourished people in 2007 was estimated to be 923 million, and this number was increased to 967 million in 2008 due to further price increases and the financial crisis<sup>13</sup>. This figure may surpass the one billion mark as the full impacts of higher food prices are felt by the poor.
- Developing countries and their vulnerable populations bear the burden of escalating food import costs. Food imports in 2008 for the most economically vulnerable country groups, the LDCs and LIFDCs, is set to increase by around one third for each group from 2007 levels. This would be the largest year-to-year increase on record. And rising food import bills do not necessarily result in more imported food.
- The most visible indicator of the negative impact of food crisis was the social unrest and rioting that erupted around the world. Disturbances were mostly concentrated in urban areas where dependency on imported food and exposure to international food prices is probably highest and consumers felt the brunt of the impact of soaring food prices. However, the rural poor are also affected because a large proportion of the smallholders are net food purchasers.

These trends could become worse if urgent actions are not taken. The only positive experience of high food prices was the recognition to place the agriculture back on the top of development agenda.

#### Box 2: Impact of food and fuel crises on sustainable development

Coming on the heels of the food and energy security crises, the global financial crisis will most likely substantially set back progress towards poverty reduction and the MDGs. The tightening of access to credit and weaker growth will cut into public revenues and limit the ability of developing country Governments to make the necessary investments to meet education, health and other human development goals. Unless adequate social safety nets are in place, the poor will no doubt be hit the hardest. An estimated 125 million people in developing countries were already driven into extreme poverty because of the surge in global food prices since 2006. Lessons from earlier major financial crises point to the importance of safeguarding (public) investment in infrastructure and social development so as to avoid major setbacks in human development and allow a recovery towards high-quality economic growth in the medium term. Currently, most developing countries lack the capacity to undertake public works programs through deficit spending as are being envisaged by the developed countries as well as a few emerging economies that have such capacity. Therefore, substantial increases in compensatory financing, official development lending and assistance are needed for developing countries to increase their fiscal space, enhance their scope for countercyclical responses and avoid having to cut into necessary public expenditures.

Source: World Economic Situation and Prospects, United Nations (2009) and UN DESA Policy Brief no 12, A Global Green New Deal for Sustainable Development.

### **Policy Responses: Lessons Learned**

There is a pressing need to promote the implementation of actions that will minimize the impact of food crisis on sustainable development, especially on the achievement of the MDGs. The short-term actions should target ensuring supply of food, extensions and other necessary inputs such as sufficient biomass to food-deficit areas, while medium to long-term actions should promote achieving food security through reinforcing sustainable agricultural development. However, policy and program responses to the food and financial crisis need to balance demands for helping the broader population, with the urgency of protecting the very poor.

Since 2007 many countries implemented a range of policies with a view to mitigating the impact of higher prices on consumers. These policy responses have varied in nature and effectiveness. In many cases these have used existing policy measures already in place. Key lessons learned with regard to the effectiveness of various policy responses are summarized below.

- Export bans and price controls are the most disruptive to markets and are likely to suppress incentives to producers to increase production. Export bans, quotas, or taxes have a limited impact on domestic price levels, a significant negative effect on the earnings of domestic producers and exporters, and leads to higher prices in countries that depend on grain imports<sup>14</sup>.
- Social protection programs play an important role in forestalling increases in poverty, helping households maintain access to food, energy, and essential services. Scaling up existing food assistance, nutrition interventions, school feeding and job creation programs are among the most cost effective short term measures to assist vulnerable populations.
- Countries with existing, well-targeted safety net systems can react more quickly to rising food and fuel prices by increasing the value and/or coverage of benefits. Safety net programs do not necessarily require large amounts of resources, but they take time to develop and need an upfront investment.
- 'Near cash' instruments such as food stamps or transport vouchers can be politically popular but have higher administrative costs than cash transfer programs.
- The need to support and strengthen ongoing assessment, monitoring and surveillance systems to better prepare for future crisis, ensuring that actions are taken to minimize the effects of high food and fuel prices on the poor.

A survey of policy responses for 77 countries undertaken by FAO in May 2008, showed the following: reduction or elimination of cereal import duties in about half of the 77 countries; price controls or consumer subsidies in 55 percent of the countries; some form of export restrictions, including taxes, in one-quarter of the countries; and roughly the same proportion took measures to increase supply, drawing on cereal stocks. On the other hand, only 16 percent of countries surveyed took no policy responses whatsoever<sup>15</sup>.

## **Future Outlook**

A year ago, food crisis associated with sharply rising food prices was at the top of the development agenda. More recently, this crisis has been overshadowed by the global financial crisis. It is felt that the food crisis has affected even more people more severely than those affected by the financial crisis resulting in larger adverse human impact. Re-emergence of the food crisis this year appears to be a real possibility. Many of the factors that led to this crisis in 2008 are lingering and interacting making predictions difficult. In addition, most developing countries have dismantled their production and price monitoring and information systems making it even harder to predict and react for both farmers and policy makers.

The international food system continues to remain vulnerable and needs to be strengthened. Preliminary indications suggest decline in global cereal production in 2009 due to reduced plantings and adverse weather and some countries, including Bangladesh, Haiti and

Zimbabwe, who may need urgent foreign food assistance in 2009. Brazil is expected to have significantly reduced its corn planting. Grain prices, though lower than last year, are currently 25% higher than 2005 levels and the pressure on prices have not been relieved by increased supply but by depressed demand caused by the financial crisis<sup>16</sup>.

The financial crisis may also have hindered supply responses. Agro-food processors which often extend credit and accept payment in future crop production have ceased this practice in many countries, and governments have for the most part not stepped in to provide credit or extension services to increase productivity without purchased inputs. The result is likely to be a reduction in planting especially by farmers relying on loans to finance seed, fertilizer and other inputs. In addition, farm input prices remain high, especially in Africa, having doubled or tripled in some countries.

FAO has identified 33 developing countries in need of food assistance this year, 20 in Africa, 10 in Asia and 3 in South America. The prevalence of hunger exceeds 35 percent in 16 countries in Africa, with populations particularly vulnerable to higher food prices. South America, once thought to have almost conquered hunger, has witnessed a reversal due to the 2007-08 food crisis.

Thus, it is clear that high food prices were not an opportunity for the majority of farmers in developing countries: their supply response was limited in 2007 and has been virtually zero in 2008. Global cereal stocks remain quite low, while the demand for biofuel continues to grow. Price volatility may continue in the future, since climate change is likely to increase the level of uncertainty regarding food production.

#### Box 3: Impact of declining food prices

Lower prices in general are good news for consumers at least in the short-run, but will suppress incentives for producers to make the investments which were considered necessary and desirable to secure greater food security in the medium term. Whether falling prices are really good news for consumers depends on what happens to incomes, which will fall along with employment in the event of worldwide recession. Many developing countries are also highly dependent upon remittances, so downturns in the developed economies may have an indirect impact on domestic demand in developing countries as employment and incomes of migrant workers fall. Remittances also provide funds for investment including in agriculture.

Source: State of Agricultural Commodity Markets, FAO, December 2008

## **Balancing Food and Energy Demands**

The main drivers behind policies supporting biofuels have been the objectives of energy security and climate-change mitigation through reduced greenhouse gas emissions combined with a desire to support agriculture. However, many voices have raised doubt about the ability for biofuels to deliver on climate change.

In addition to competing directly for food crops, biofuel compete for agricultural inputs leading to increase in their prices, especially land value. Competition for water is also an issue that is emerging. However, large areas of the developing countries arable land are not currently under productive use (number vary by definition of productive use) and could be planted to food and fuel to alleviate both the impact of the food and fuel crises in these countries. These lands are of course those furthest from market and without good road access, which would need to be



developed. Suitable land could be targeted for food production and lesser productive lands to fuel production. Competition could be decreased by using non-food feedstock such as jatropha or multiple purpose crops such as sweet sorghum. It is hoped that technological innovations within the biofuels industry will ultimately reduce dependence on food crops, but in the meantime policymakers must provide added incentives towards innovation and social protection for those most at risk — the food-insecure poor<sup>17</sup>.

The Scientific Committee on Problems of the Environment (SCOPE) concluded in their International Biofuel Projects Rapid Assessment released in 2009 that “opportunities for biofuel production that maximize social benefits while minimizing environmental impacts exist, but the extent of these win-win situations is limited, and their contribution to society’s energy budget will be very small. As total biofuel production grows, the environmental costs increasingly overshadow societal benefits.”<sup>18</sup>

#### Box 4: Biofuels: prospects, risks and opportunities

- Demand for agricultural feedstocks for liquid biofuels will be a significant factor for agriculture markets over the next decade and beyond.
- Rapidly growing demand for biofuel feedstocks has contributed to higher food prices threatening the food security of poor.
- In the longer term, expanded demand and increased prices for agricultural commodities may represent an opportunity for agriculture and rural development.
- The impact of biofuels on greenhouse gas emissions differs according to feedstock, location, agricultural practices and conversion technology.
- Liquid biofuels are likely to replace only a small share of global energy supplies.
- Given existing technologies, production of liquid biofuels in many countries is not currently economically viable without subsidies.

Source: The State of Food and Agriculture Report, FAO, 2008

Given the sustainability concerns associated with the production of first generation biofuels, it is important to place emphasis on second generation technologies to reduce competition for natural resources. This requires investments in science and technology development, especially in developing countries. While there is need for establishment of international sustainability criteria and guidelines for biofuel, each country need policy framework to deal with the issue on merit.

### **Looking Beyond the Food Crisis**

Beyond the food, fuel and financial crisis, the agriculture for development agenda faces a number of longer term challenges. First, world population is projected to grow to nearly 9.2 billion by 2050. To feed a population of more than 9 billion, global food production must nearly double by 2050. Higher productivity requires more investment in agriculture (sustainable land and water management, infrastructure and market networks, technology, extension, research etc.), as well as more skilled farmers and better functioning agricultural value chains.

Second, who produces the food is important. We currently produce enough food to feed the 6 billion world citizen yet growing numbers go hungry. Strengthening capacities of small farmers holders and landless to produce food using adapted varieties and low input sustainable agriculture is key to ensure sufficient food is produced and affordable to the world’ poor.

Third, the unprecedented absolute rate at which the future intensification of crop and animal production must occur in the coming decades has to be achieved against decreasing land and water resources and increasingly stringent environmental and biosafety standards. A sustainable path for world agriculture requires policies and incentives to draw on and encourage yet-unused yield-enhancing resources, which could increase productivity substantially for many crops, livestock and fisheries. The new techniques could greatly assist the development of crop varieties able to thrive in difficult fragile environments where many of the world's poor live and farm. Some promising results have already been achieved in the development of varieties with complex traits such as resistance or tolerance to drought, soil salinity, insect pests and diseases, helping to reduce crop failures. It also calls for public policy support that would enable farmers to access improved seeds and fertilizer at affordable prices, but that is with a clear exist strategy in order not to create permanent market distortion.

Fourth, in addition to rising resource scarcity, global agriculture must cope with the burden of climate change. If temperatures rise by more than 2°C, global food production potential is expected to contract severely and yields of major crops may fall globally. The declines will be particularly pronounced in lower-latitude regions. In Africa, Asia and Latin America, for instance, yields could decline by 20-40%. In addition, severe weather occurrences such as droughts and floods are likely to intensify and cause greater crop and livestock losses. This calls for a well defined early warning, mitigation and adaptation strategies.

Fifth, rapidly rising energy prices have created an added challenge for global food supplies. Fossil fuel based commercial fertilizer prices have doubled since mid-2006 with rise in fuel prices pushing agricultural production costs higher. In Africa, where biomass is already the largest constraint to agricultural production, alternative sources of fertilizers must be found and competition for biomass for cooking and heating must be removed. Sustainable agricultural practices based on local input, traditional knowledge and the latest science must be expanded quickly.

Previous attempts at intensification of agricultural production have allowed output to keep up with global demand but this has also created new problems of sustainability such as decrease in soil health, increase in soil erosion, excessive water use, the impact of the overuse of fertilizer and especially pesticides, the latter inducing antimicrobial resistance, pest outbreaks and environmental pollution where improperly used. Also, larger farmers benefited most and Africa was by-passed.

## **Agriculture for Sustainable Development**

Sustainable development requires a major contribution from agriculture because it is the major driver of most of the world's economies. The majority of future increases in food and agriculture production in developing countries (some 80%) will come from more intensive production systems based on, improved soil, higher yields and multiple cropping. Agricultural development policies need to be underpinned by production practices that are competitive and sustainable, and production systems and supply chains that are supported by cost-saving policies and institutional support to encourage private sector engagement. These efforts need to be further supported by increased investments in infrastructure, extension services and agricultural R&D, while the international community could support developing countries' agricultural development and ease access to new technologies.

It is clear that increasing the world food supply will require enhanced agricultural research by national governments and the international communities, in partnership with the CGIAR and farmers, including research on improved and adapted crop varieties better adapted to agro-ecological zones and climate change, wide and rapid diffusion of improved varieties, technologies and land, soil and water management practices, notably through capacity-building in extension services. Adaptation to climate change make the use of water and soil management techniques even more important.. Biofuel policies are needed to ensure that local and national food security is not jeopardized and natural resources do not suffer from degradation.

Smallholder farmers and their families represent some 2 billion people, about one-third of the global population. These farm families are central to any solution to both the current global food crisis and the long term problems of hunger and poverty. It is estimated that 85% of farms worldwide (or 450 million farms) are less than two hectares. The majority of smallholder farmers and landless farm workers are net buyers of food and live on less than US\$ 2 a day. The capacity of smallholder farms to grow more food can be enhanced by securing their access to land, enabling them to buy inputs such as fertilizer, or reduce competition for biomass, and quality seeds, and integrating them in supply chains in a sustainable manner.

Sustainable agriculture at small but growing scales around the world has started to get the bottom billion more vulnerable out of poverty getting them on a virtuous cycle so they can produce more from increasing rich soils, using water and biomass more efficiently, at lower costs, while allowing commercial farmers to be less-dependent on weather and global prices fluctuations, increasing their welfare while feeding everyone with nutritious food.

Promoting sustainable agricultural practices (e.g., IPM, rain capture, drip irrigation, no-till etc.) can be an important instrument to enhance food production and alleviate poverty. In this regard, agricultural policies encouraging the provision of public goods, improving the overall performance of markets and having broad-based benefits for the poor could play an important role in scaling up of sustainable agricultural practices. Providing effective extension services such as demonstration of projects on farmers' land, farmer to farmer training, farmer field schools, and a system of feedback from the farmers to the trainers will contribute in disseminating and scaling up of efficient soil-climate management practices.

#### Box 5. Specific examples of the impact of sustainable agriculture practices

##### **Africa**

- Soil and water conservation in the drylands of Burkina Faso have combated land degradation, resulting in the average family shifting from being in cereal deficit of 650 kg per year to producing an annual surplus of 150 kg.
- Soil fertility management using a range of biological pest management methods together with legumes, cover crops and green manures have doubled beans and groundnut yields from 300 to 600 kg/ha in western Kenya.
- In Nigeria, alley crops of *Gliricidia* and *Leucaena* reduced soil erosion by 73 and 83%, respectively.
- In low rainfall areas of Ethiopia, reduced tillage without chemical fertilizer increased gross crop revenue by US\$ 106 per hectare compared to conventional tillage without chemical fertilizer. Moreover, this productivity impact was superior to that of chemical fertilizers with conventional tillage (US\$ 13 per ha). Lower impacts of reduced tillage without chemical fertilizer were found in high rainfall areas (US\$ 6 per ha).

##### **Asia**

- In northern Vietnam, contour planting of hedgerows on sloping lands reduced soil loss from 18 to 7.4t/ha/year.
- In Pakistan, yields of citrus fruits increased by 150-200% after adopting sustainable agriculture practices such as mulching, no till production, and composting.

##### **Latin America**

- 45,000 families in Honduras and Guatemala have increased crop yields from 400-600 kg/ha to 2000-2500 kg/ha using green manures, cover crops, contour grass strips, in-row tillage, rock bunds and animal manures.

- Soil and water conservation using contour grass barriers, contour ploughing and green manures has raised maize yields from 3 to 5 tons/ha and soybeans from 2.8 to 4.7 tons/ha in the states of Santa Catarina, Paraná and Rio Grande do Sul in Brazil.
- Some 2000 farmers in Bolivia have improved potato production from about 4 tons/ha to 10-15 tons/ha in particular by using green manures to enrich the soil.

Sources: Pretty et al. 2003; Graves et al. 2004; Kassie et al. (2008, 2009); Third World Network, 2008.

Social and agricultural inputs made available to local farmers and other vulnerable populations must be complemented by macroeconomic actions to ensure sustainability. Actions need to be aligned and adapted to national and local conditions, taking into account climate change and poverty reduction initiatives and integrating those into national strategies.

### **Strengthening the Implementation Framework**

Successful implementation of the global agricultural agenda requires a mix of global institutions to coordinate and integrate agricultural sector concerns into the broader development and environmental agenda, react to emergencies and meet the challenges of equity and justice between the developed and developing countries and between present and future generations.

Multilateral efforts take on particular importance in current economic circumstances, including contributions to designing, funding, coordinating and implementing policy initiatives and practical measures to remedy the financial turmoil, alleviate capacity constraints commodity markets, support low-income food deficit economies, promote sustainable smallholder agriculture for poverty reduction and ensuring access to food by the poor and vulnerable.

In an increasingly water-scarce world, more than a billion small farmers need to adapt to the risk of climate change and variability and new ways of producing from less land through sustainable agriculture practices is vital. This will require a new paradigm to replace the one-size-fits-all agriculture development model with the one that: (i) addresses farmers' specific needs under specific agro-climatic zones, (ii) contributes to increased farm productivity, and (iii) protects the natural resource base. Providing guidance to countries wishing to increase expenditure on agriculture to meet this new paradigm should be a priority.

As agriculture development and support to smallholders move back to the top of the international agenda, some of the new investments should be directed towards policy support and technical assistance for national capacity building to help mainstream sustainable production practices. Research and support could also focus on identifying opportunities for rewarding producers for enhancing ecosystem services.

Productive agriculture requires capital investments in all kinds of asset development. Creating a favourable climate to attract public and private capital to raise agricultural production and bring about the needed structural and organizational changes should serve as an important policy goal. Equally important will be actions leading to completion of the Doha Round of negotiations with a strong development dimension in agriculture.

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<sup>5</sup> DESA, 2008. Trends in Sustainable Development: Africa Report 2008-2009. New York, UN.

<sup>6</sup> Even when taking into account the lag in agriculture's response to prices due to the time it takes to plant and harvest crops and raise livestock.

<sup>7</sup> Supra note 1

<sup>8</sup> Polaski, Sandra (2006), *Winners and Losers: Impact of the Doha Round on Developing Countries* (Washington, DC: Carnegie Endowment for International Peace), Figures 3.1-3.8

<sup>9</sup> FAO. 2008 Food Outlook, November 2008. Rome: FAO.

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<sup>16</sup> FAO, December 2008. State of Agricultural Commodity Markets (Draft), Rome.

<sup>17</sup> Siwa Msangi (2007), Biofuel revolution threatens food security for the poor. Available at: <http://www.scidev.net/en/climate-change-and-energy/biofuels/opinions/biofuel-revolution-threatens-food-security-for-the.html>

<sup>18</sup> SCOPE, 2009, <http://cip.cornell.edu/biofuels/files/SCOPE00.pdf>