Crisis in a Global Economy. Re-planning the Journey
Pontifical Academy of Social Sciences, Acta 16, 2011
www.pass.va/content/dam/scienzesociali/pdf/acta16/acta16-vonbraun.pdf

AGRICULTURE, FOOD AND NUTRITION RESPONDING TO THE CRISES

JOACHIM VON BRAUN

Agriculture, food and nutrition must be part of a necessary policy re-planning, because it matters most for the poorest

Hunger increased in the context of the inter-linked food and economic crises of 2007-2010. The food crisis actually came first while overlapping with the onset of the economic recession, and may actually have had some role in the onset of the latter due to the inflationary forces of food (and energy) prices to which macro policies reacted. Not only food and energy markets but also food and financial markets have become closely linked and these links pose added risks for the poor, increasing their vulnerability. To remind about basic concepts: food and nutrition security depend upon the availability of food (through production and trade), access to food due to purchasing power, and the utilization of food by people, including their health situation, which transforms availability and access into more or less satisfactory nutrition. The food and economic crisis was triggered by and had adverse impacts on all three: availability, access and utilization of food.

The chronic food and nutrition crisis is deepening, as high and volatile food prices and global recession undermine the food and nutrition security of the poor and threaten their livelihoods. The food price crisis was the consequence of neglect of investment in agriculture in developing countries, inappropriate agriculture energy subsidization policies in industrialized countries and triggered by adverse weather events and exasperated further by inappropriate policies, such as export restrictions, lack of regulation of commodity trade that increased speculation (von Braun 2009).

The food and nutrition crisis expanded and deepened and actions taken so far are not sufficient to prevent the next acute crisis, let alone reduce the chronic hunger problems

Global progress in combating malnutrition has been slow in past decades, with dramatic differences among countries and regions. The 2008 Global Hunger Index (GHI)[1] score fell to 15.2 compared to 18.7 in 1990, indicating a slight improvement in the overall hunger situation. But the absolute number of undernourished people in developing countries actually increased from 823 million in 1990 to 848 million in 2002-05, and 963 million in 2008 (FAO 2008) and now probably to more than one billion. Even before the food price crisis in 2007-08 hit, roughly 160 million people were living in ultra poverty, on less than 50 cents a day. The poorest have been left behind.

The prices of staple foods that the poor depend on skyrocketed during 2007-08. At their peak in the second quarter of 2008, world prices of wheat and maize were three times higher than at the beginning of 2003, and the price of rice was four times higher. In response to high food prices, poor households had to limit their food consumption, shift to even less-balanced diets, and spend less on other goods and services that are essential for their welfare, such as clean water, sanitation, education, and health care (von Braun 2008). Food price hikes have also worsened micronutrient deficiencies, with negative consequences for people's nutrition and health, such as impaired cognitive development, lower resistance to disease, and increased risks during childbirth for both mothers and children. Since children's nutrition is crucial for their physical and cognitive development and for their productivity and earnings as adults, the health and economic consequences of insufficient food and poor diets are lifelong – for the individuals as well as for the society. Hoddinott *et al.*'s (2008) article shows that men who benefitted from a randomized nutrition intervention when they were young children earned wages that were 50 percent higher than those of nonparticipants three decades later (Hoddinott *et al.* 2008). Thus, it must be assumed that even when a multi-year price shock ends, the adverse consequences for the poor and food insecure continue for decades.

People in more than 60 countries turned to the streets in protest in 2007 and 2008. IFPRI estimates that recession and reduced investment in agri-

[1] The GHI of IFPRI is a combined measure of three equally weighted components: (i) the proportion of undernourished as a percentage of the population, (ii) the prevalence of underweight in children under the age of five, and (iii) the under-five mortality rate.

culture could raise international grain prices by 30 percent and push 16 million more children into malnutrition in 2020 compared with continued high economic growth and maintained investments (von Braun 2008). Existing land and water constraints, as well as further challenges for natural resources such as climate change, make the needed task of doubling food production in the next four decades more challenging.

Taking actions for change

The necessary response to the food crisis is multifaceted, including actions in production, consumption, as well as trade and grain reserve policies. The world also needs to reduce waste in consumption and food processing. However, the often stated idea that the world food problem is just a problem of distribution, i.e. that there is enough food in the world for all and that it just needs to be shared more fairly and equally, is a gross simplification. The root cause of the food crisis was lack of agricultural productivity. Distortions in markets and policy failures followed as secondary effects. Both the productivity deficiencies and the institutional arrangements that fail the poor must be addressed. And in addition, hunger and under-nutrition need to be addressed directly with new and strong actions.

This paper focuses mainly on the first – necessary re-planning of the the journey in production technology policies and the opportunities of biotechnologies, because policy change is overdue to change policy in this field. In the second area of action – access to food – market and policy failure needs to be corrected by institutional change. The third area of urgent change is nutrition action, as that vital area has been neglected for a long time and was further undermined by diverting attention to crisis management. Many children's lives are ruined as a consequence.

Action Area 1: Agricultural technology for food and nutrition security

Numerous studies have shown that spending on agricultural research and development (R&D) is among the most effective types of investment for promoting growth and reducing poverty. However, public R&D investments have been stagnating since the mid-1990s, and the gap between rich and poor nations in generating new technology remains high (Pardey, Alston, and Piggott 2006). The current resources are hardly enough to work at the frontiers of new science, and the recent financial crunch further constrains the availability of capital for agriculture sci-

ence in parts of the developing world. To enhance agricultural productivity, investments should be scaled up in the areas of R&D, rural infrastructure, rural institutions, and information monitoring and sharing. Doubling investments in public agricultural research from US$5 to US$10 billion would significantly increase agricultural output and millions of people would emerge from poverty. If these R&D investments are targeted at the poor regions of the world – Sub-Saharan Africa and South Asia – overall agricultural output growth would increase by 1.1 percentage points a year and lift about 282 million people out of poverty by 2020 (von Braun, Fan, *et al.* 2008).

Part of this action should be *modern biotechnology, including genetically modified (GM) crops*, appropriately tested and used to comprehensively address food and nutrition insecurity of the poor. New research insights exist that now suggest wider and faster utilization of these contentiously debated technologies. Food and environmental safety concerns have been well addressed in many developing countries in recent years. Genetically modified foods currently available on the international market have passed risk assessments and are not likely to present risks for human health, stated the WHO (2009). The technology seems over-regulated. Also, the fears that multi-national corporations dominate seed systems and would exploit small farmers is less and less relevant as developing country-based corporations and public sector research entities have entered the scene, for instance in China, India, Brazil. Still, further support of public research on GM crops is called for to assure that non-commercial traits that serve the poor are actually developed quickly.

The three pathways for food and nutrition security pointed out above – availability, access, utilization – are all positively contributed to by GM crops (see the comprehensive assessment by Qaim 2009). Specific examples on GM contributions to food and nutrition security are described below.

Reduction of crop losses and improved efficiency: A significant proportion of the potential world harvest is lost to weeds, animal pests, and diseases. A sizeable portion of these potential losses is avoided through chemical pesticides and other pest-control strategies. Actual losses are higher in developing countries than in developed countries, because pest pressure in tropical and subtropical climates is often stronger than in temperate zones. Moreover, given more severe technical and financial constraints, pest control is often less effective in developing countries. Positive yield effects of pest-resistant crops are expected to be higher in developing countries (Qaim and Zilberman 2003). Insect resistance was among the first GM trait

to be commercialized in some crops, but fungal- and bacterial-resistant GM crops are also emerging. Important are also efficiency gains in animal feed to reduce the food-feed competition. China recently issued bio-safety certificates for its nationally-developed proprietary phytase maize. Phytase maize will reduce pollution from lower phosphate in animal waste and increase feed use efficiency.

Yield increase through crop tolerance to abiotic stresses: GM traits address higher plant tolerance to various abiotic stresses such as heat, drought, flood, coldness, or soil salinity. Such technologies could also contribute to higher and more stable yields, especially in regions affected by erratic weather conditions. Developing countries could benefit more than developed countries, because of higher weather variability and limited access to irrigation and other risk-reducing technologies. The first drought- and heat-tolerant GM crops are expected to be commercialized within the next five years and could significantly raise agricultural productivity and thus ensure food availability. Rice that survives submergence due to floods – a product of biotech, not GM – has already been developed and is relevant for river deltas where many of the world's poor live (Bangladesh, etc.)

Increasing small farmers' incomes: a large proportion of the food-insecure world population is part of the small farm communities of the developing world. GM technologies can be suitable to raise incomes in the small farm sector. Inbuilt in the seed, they are scale neutral and not just for big farmers. Bt Cotton has significantly increased small farmers income in large parts of India, thereby reducing poverty and food insecurity. China has recently announced the first steps toward commercialization of Bt rice. The technology has been field tested extensively in field stations and on farms. The available data are in line with results for already commercialized Bt crops: insecticide-reducing and yield-increasing effects can lead to significant economic and social benefits (Huang *et al.* 2005).

Increasing nutritional value of foods for the poor: the food price crisis has further undermined healthy diets for the poor. Until income growth among the poor permits sufficient purchasing power to afford healthy diets complementary actions are needed. A complementary strategy is biofortification, that is, the breeding of staple food crops for higher micronutrient contents. While this partly builds on conventional breeding, GM approaches are promising when certain micronutrients are absent from a crop or not available in sufficient amounts.

Rice in Asia: A case in point is rice, where the endosperm of conventional grain does not contain any beta-carotene, which is a precursor of vitamin

A. Hence, GM techniques were used to develop Golden Rice, which now contains significant levels of beta-carotene. It is no longer just a hope but progress in research shows that Golden Rice, if consumed at normal quantities, would make a big difference. Using a disability-adjusted life years (DALYs) approach, Stein *et al.* (2008) calculated the disease burden associated with Vitamin A Deficiency (VAD) in India. Widespread consumption of Golden Rice could reduce the burden of VAD by 59%, which includes saving almost 40,000 lives every year. The positive effects are most pronounced in the poorest income groups. Golden Rice is a humanitarian project where seeds will be distributed without a technology fee. According to the projections by Stein *et al.* (2008), the cost per DALY saved through Golden Rice is in a magnitude of 3 US$, which is very low. Similar effects could be achieved in other parts of Asia.

Sorghum and cassava in Africa: Since 2005, a consortium of 11 organizations has been working to develop a biofortified variety of African sorghum – a crop very relevant for poor people (Fiedler 2009). An *ex ante* analysis of the impact of this crop was based exclusively on the functional health impacts produced by increasing the amount of vitamin A and the bioavailability of iron and zinc.

It is estimated that its benefit/cost ratio is 4. According to criteria established by the World Health Organization and the World Bank, this is a very cost-effective health intervention. A similar analysis for cassava – one of Africa's most important staple crops – is even more advantageous (Fiedler 2009). It is estimated that the net present cost per disability adjusted life years (DALY) saved of this biofortified crop is $33.

Action Area 2: Making food markets work and reduce extreme price volatility

Food price volatility affects the poorest the most. In the food price crisis many commodity exchanges closed or food trade was discontinued. Markets failed. To prevent extreme volatility, it is essential to ensure open trade, and transparent, appropriately regulated market institutions that identify prices reliably. Excessive speculation opportunities in food commodities which did play a role in the food price crisis should be curbed by regulations, i.e. by *increasing costs of speculation* for non-commercial traders.

Two global collective actions for food security are needed: first, a small, independent physical reserve should be established exclusively for emergency response and humanitarian assistance. Second, a *shared and virtual reserve and intervention mechanism* should be created to help avoid extreme

price spikes. The organizational design of the virtual reserve would include a high-level technical commission that would intervene in futures markets and a global intelligence unit that would signal when prices head toward a spike (von Braun and Torero 2009). This reserves concept is not a price stabilization fund, but it is an institutional tool for risk reduction (to prevent extreme spikes).

The virtual reserve calls for a coordinated commitment by the group of participating countries. Each country commits to supplying funds, if needed, for intervention in grain markets. The resources needed are promissory and not actual budget expenditures. The concept of virtual reserves is based on signaling theory where a strong commitment is required to increase the risk assumed by speculators in entering the market, which in turn, would increase their discount rate and, as a result, lower the probability of them participating excessively in the food market. The size of this commitment should be significant enough to have a strong signal in the market.

Discussion continues about international grain reserve policies. The G8/20 raised this as an option to be further explored. Regional policy bodies, such as ASEAN, SARC, and African regional and sub-regional bodies have discussed joint reserve policies. The initial reservation against a new institutional arrangement has declined after it become clearer to policy makers that there is a serious institutional vacuum at the international level. The existing agricultural and food organizations (FAO, IFAD) have the capacity to address supply issues (before crises), and emergencies (in and after crises WFP), but none can address market volatility itself; the WTO has no such mandate either. The issue needs to move from debate to action.

Action Area 3: Expanding social protection and child nutrition programs

To protect the basic nutrition of the most vulnerable and improve food security, agricultural growth and reducing market volatility must be accompanied by social protection and nutrition actions. Protective actions are needed to mitigate short-term risks while preventive actions are needed to avoid long-term negative consequences. Protective actions include conditional cash transfers, pension systems, and employment programs. Preventive health and nutrition interventions such as school feeding and programs for improved early childhood nutrition should be expanded to ensure universal coverage. As such, social safety nets not only ease poverty momentarily, but also enable growth by allowing poor households to create assets,

and protect their assets. Interventions need to be developed and include the following options:

Conditional cash transfers (CCTs): These programs, which condition transfers to households based on their meeting certain requirements like sending children to school, have proven successful in reducing poverty in the short run (through cash transfers) and in the long run (through the human capital formation that they encourage). They work particularly well in countries with low school attendance and an adequate schooling infrastructure. They are not a magic bullet, however – they do not work in every country and alone they are not sufficient for reducing poverty sustainably. Early childhood nutrition actions should be connected to them where needed. The large progress in nutrition in Mexico and Brazil is to a great extent due to these transfer programs.

Social security: This tool has been shown to address the vulnerability faced by the young, the unemployed, and the elderly. In South Africa, for example, social security benefits for parents with young children and for the elderly have greatly reduced poverty. For social security to work in low-income countries, national governments need to increase financing from general taxation, separate social security from labor market status, and create institutions to administer social security programs. The need for administrative efficiency and good governance are two key challenges in implementing programs. Introduction of an efficient and fair taxation system is needed for that, too.

Market-based or civil society-based insurance: In providing insurance for the poorest, it is useful to start with group-based informal insurance that is already in place. Doing this reduces the costs of providing insurance and ensures that new forms of insurance do not weaken these groups that are already effective at dealing with some types of risk. There is often a trade-off between the provision of insurance and credit, and micro-credit and micro-insurance should be designed together. One product will not fit all problems because different types of risk have different challenges. To provide health insurance to the poorest, schemes should leverage the large amounts that poor people spend on health care out of pocket. Developing a private cooperative health insurance scheme and contracting the provision of health care based on performance is one way to do this.

Ultimately, a mix of health and nutrition approaches is needed. The goal is to ensure that the poorest households do not find themselves constrained in making health and education decisions. Improving the nutritional status of children will also require improving the nutritional status of their mothers.

Despite the recent improvement in child malnutrition in South Asia, the region still has the highest prevalence of underweight children in the world. The main reason proposed to explain a higher child malnutrition rate in South Asia than in poorer Sub-Saharan Africa is that South Asian women's nutrition and feeding and caring practices for young children are inadequate. Women's rights, information and education opportunities need strengthening.

Conclusions

Prioritization, transparency, and accountability are crucial for successful implementation of agriculture, food and nutrition policy. Related governance deficiencies in many developing countries must be addressed, as well as global governance of food which currently does not deliver the necessary public goods for food security to the poor. The food crisis needs to be responded to by actions that require overcoming accustomed mainstream thinking, such as about biotechnologies, market regulation, and social security. Food and nutrition security need to be given higher priority.

REFERENCES

Bouis H. 2007. The potential of genetically modified food crops to improve human nutrition in developing countries. *J. Dev. Stud*. 43:79-96.

Fan, S., A. Gulati, and S. Thorat. 2008. Investment, subsidies, and pro-poor growth in rural India. *Agricultural Economics* 39(2):163-170.

Fiedler, J. 2009. An *Ex Ante* Analysis of the Impact and Cost-Effectiveness of the African Biofortified Sorghum Project. Unpublished paper.

Fiedler, J. 2009. An *Ex Ante* Analysis of the Impact and Cost-Effectiveness of the Bio-Cassava Plus Project. Unpublished paper.

Hoddinott, J., J.A. Maluccio, J.R. Behrman, R. Flores, R. Martorell. 2008. Effect of a nutrition intervention during early childhood on economic productivity in Guatemalan adults. *The Lancet* 371 (610):411-416.

Huang J., Hu R., Rozelle S., Pray C. 2008. Genetically modified rice, yields and pesticides: assessing farm-level productivity effects in China. *Econ. Dev. Cult. Change* 56:241-63.

Pardey, P.G., J.M. Alston, and R.R. Piggott, eds. 2006. *Agricultural R&D in the developing world: Too little, too late*. Washington, DC: International Food Policy Research Institute.

Qaim, M. 2009. The Economics of Genetically Modified Crops. *Annu. Rev. Resour. Econ*. 2009. 1:665-93.

Qaim M., Pray C.E., Zilberman D. 2008. Economic and social considerations in the adoption of Bt crops. See Romeis *et al.*, 12:329-56.

Qaim M., Stein A.J., Meenakshi J.V. 2007. Economics of biofortification. *Agric. Econ*. 37(Suppl. 1):119-33.

von Braun, J. 2008. *Food and financial crises: Implications for agriculture and the poor*. Food Policy Report. Washington, DC: International Food Policy Research Institute.

von Braun J. and M. Torero. 2009. *Implementing physical and virtual food reserves to protect the poor and prevent market failure*. Policy Brief 10. Washington, DC: International Food Policy Research Institute.

von Braun, J., S. Fan, R. Meinzen-Dick, M.W. Rosegrant, and A. Nin Pratt. 2008. *International Agricultural Research for Food Security, Poverty Reduction, and the Environment – What to Expect from Scaling Up CGIAR Investments and 'Best Bet' Programs*. Washington, DC: International Food Policy Research Institute.

WHO (World Health Organization). 2009. 20 questions on genetically modified (GM) foods. Available at: www.who.int/foodsafety/publications/biotech/20questions/en/.