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**Lecture in honour of Frank L. McDougall
delivered by
Mr Olivier De Schutter,
Special Rapporteur on the Right to Food**

Mr Director-General

Excellencies

Ladies and Gentlemen

I am extremely honored to be invited to deliver this lecture, and to address the FAO Conference at the start of its deliberations. It is an honor which I share with all those who work so tirelessly to defend the right to food in the world. I am humbled also to stand in the company of the great figures who addressed you in the past, and whose efforts to work towards a world free from hunger continue to inspire me.

Almost exactly five years ago, the governments within the FAO Council approved unanimously the Voluntary Guidelines to Support the Progressive Realization of the Right to Adequate Food in the Context of National Food Security, the only text of intergovernmental nature clarifying the concrete measures States should take in order to comply with the human right to adequate food. And yet, more than one billion people are hungry today. At least twice that number lack the essential micronutrients that are needed to lead a healthy and active life. Deficiencies of iron, vitamin A, and zinc still rank among the top ten leading causes of death through disease in developing countries. In these countries, one in three children is stunted, and one in two are born to women who suffer from anemia at the moment of birth.

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This failure does not mean that the Voluntary Guidelines are ineffective. It means that we have failed to implement them effectively. The guidelines were based on the conviction of the international community, that first emerged at the 1996 World Food Summit, that we needed to address the question of global hunger not as one of production only, but also as one of marginalization, deepening inequalities, and social injustice. It is a lesson we must be taught again. We live in a world in which we produce more food than ever before and in which the hungry have never been as many. There is a reason for this: for too many years, we have focused on increasing food availability, while neglecting both the distributional impacts of our ways of producing food, and their long-term environmental impacts. We have succeeded, remarkably, in increasing yields. But we must now come to realize that we can produce more, and fail to tackle hunger at the same time; that increases in yields, while a *necessary* condition for alleviating hunger and malnutrition, are not a *sufficient* condition; and that as we spectacularly boosted overall levels of production during the second half of the twentieth century, we also created the conditions for a major ecological disaster in the twenty-first century.

As the world population grows and as diets change, feeding the planet will require that we put the best science at the service of agriculture. But we would be repeating the mistakes of the past if we focused only on that goal. However much we increase food production, we will not alleviate the fate of the billion who are hungry today, not because there is too little food available, but because they are too poor to buy the food that is available. We must therefore ask with humility: where did we go wrong ?

The present situation of hunger has its primary source in modes of production that have made small-scale farming generally non-viable, relegating it, at best, to subsistence agriculture. Unable to compete, relegated to the poorest soils – the hilly, the arid, and the erosion-prone – small farmers have been pushed to the margins: they were valued neither as a political constituency since they were unable to mobilize effectively, nor as an economic sector since they had no access to the global supply chains and were not a source of foreign currency. They were forgotten from public policies because they were considered irrelevant. We know what the results were. Rural flight was massive. More than 1 billion people today – one in six people, and 43 percent of the population in developing countries – already live in slums, and by 2030, when the global population will have reached the mark of 8 billion,¹ that figure will increase to one in three individuals.² The vast majority of these urban poor have access to no social protection of any kind. Those who remained in the countryside have often been relegated to subsistence agriculture, on which they barely manage to survive. Often, they find themselves forced to sell their land, or even to abandon it, and to become landless laborers, living off seasonal work on the larger farms. The consequences of these developments are well known; the purchasing power of large groups of the population is now insufficient to buy the food that is available on the markets. Hunger stems, historically, from this large mass of small farmers being robbed of their livelihoods. It is not a calamity. It is a developmental process. It could have been different. And it can be changed.

In the face of a crisis of such magnitude, it is tempting to see the right to adequate food as a long-term objective, perhaps desirable to achieve, but clearly beyond reach for the moment, and thus of little immediate relevance. This betrays a fundamental misunderstanding about what the right to food really is about. The role of the right to food is more central, not less, in times of crisis. It is not simply an objective: it also shows the way towards fulfilling it.

¹ During the twentieth century, world population increased from 1.65 billion to 6 billion, and experienced the highest rate of population growth (averaging 2.04 per cent per year) during the late 1960s. The largest annual increase to world population (86 million) took place in the late 1980s. The rate of population growth is currently around 1.2 per cent per year, and the annual increase is now approximately 75 million. Over the next generation, the fastest increases in population will take place in Africa: the population of the continent, now at one billion, increases by about 24 million people each year, and it will have doubled by 2050.

² UN Habitat, International tripartite conference on urbanization challenges and poverty reduction in African, Caribbean and Pacific countries, First meeting, Nairobi, 8–10 June 2009, HSP/EC/ACP.1/4, 2 June 2009.

I. Putting the most vulnerable at the centre

The right to food requires from us, first, that we take the plight of the most vulnerable as our departure point. It is time now to descend from the lofty heights of the commodity prices on the international markets to the situation of those who work in the fields or live from petty trade in the outskirts of the cities. Poor farmers do not sell on the Chicago Board of Trade; poor consumers buy their bag of rice from the local market, not from the commodities exchanges. By not taking that perspective on hunger, we fail to see the political economy problems that arise in the food production and distribution chain. We see hunger as a problem of supply and demand, when it is primarily a problem of unscrupulous employers and traders, of an increasingly concentrated input providers sector, or of insufficient safety nets to support the poor. This is why the Voluntary Guidelines require, as a first step, that we map food insecurity and vulnerability. Only by knowing who the hungry are, why they are hungry, and where they reside, can we design truly effective policies to remove or lower the obstacles to their enjoyment of the right to food. In many countries, however, reliable data remains a major challenge. The FAO and the WFP, in particular, are making commendable efforts to improve information gathering and to allow for early responses to impending crises.³ By and large however, data on hunger and malnutrition often remain fragmentary or outdated, or based on questionable methodologies. Even where such data exist, they may be ignored or kept under wraps by policy-makers wanting to rely on a purported 'lack of solid facts' as an excuse for remaining passive. They must know nothing, in order to be allowed to do nothing.

Combating hunger on the basis of the right to food also requires that we design policies that remove the obstacles to its enjoyment by each individual.⁴ The Guidelines on the Right to Food call for the adoption of national strategies that define which actions should be taken, by whom, within which precise timeframe, and according to which process. Such national strategies or action plans serve to ensure that the appropriate resources will be mobilized. They seek to improve coordination across different branches of government, ensuring that all the many (and interrelated) causes of hunger or malnutrition are addressed. They also enhance accountability: by assigning role players and defining responsibilities, they allow civil society organisations and independent bodies – such as national human rights institutions or courts – to better scrutinize the conduct of various state agencies. In certain cases, this will also allow public prosecutors or ombudsinstitutions to intervene where these agencies remain passive. They favor collective learning: since progress is monitored through appropriate indicators, policies that are misguided and fail to achieve results can be corrected at an early stage. Finally, because such strategies are participatory and inclusive, they contribute to democratization and empowerment – particularly when they are institutionalized into framework laws, as they are in Brazil, in Guatemala, or in Nicaragua – they therefore limit the risk of arbitrariness or favoritism in decision-making, and they ensure that the decisions are made in the light of the real needs, as expressed by the ultimate beneficiaries.

So the right to food is a method; it is a way of doing things, which is more bottom up than top down, more democratic than technocratic, and participatory rather than exclusive. But the right to food is also a set of legal entitlements, grounded in international law, and it imposes a number of clear obligations on States. States must respect the right to food; they must protect it from interference by private parties; and they must fulfil the right to food by appropriate policies.

³ FAO's Global Information and Early Warning System (GIEWS) keeps track of the current and near-term food situation at the country and global levels, and provides early warnings of upcoming crises. Similarly, the joint FAO and WFP Crop and Food Security Assessment Missions (CFSAM) provide an up-to-date assessment of the food security situation – and humanitarian needs – in countries in crisis.

⁴ See in particular Arjun Sengupta, 'The Right to Food in the perspective of the Right to Development', in Wenche Barth Eide and Uwe Kracht (eds), *Food and Human Rights in Development, vol. II: Evolving Issues and Emerging Applications*, Intersentia, Antwerpen-Oxford, 2007, p. 131; and Sibonile Khoza, 'The Role of Framework Legislation in Realising the Right to Food: Using South Africa as a Case Study of this New Breed of Law', in Wenche Barth Eide and Uwe Kracht (eds), *Food and Human Rights in Development, vol. I: Legal and Institutional Dimensions and Selected Topics*, Intersentia, Antwerpen-Oxford, 2005, pp. 187-204, at pp. 196-197.

Courts increasingly understand their role as having to protect the right to food, from South Africa⁵ to India⁶, and from Colombia⁷ to Nepal.⁸ Today more than ever, this constitutes an essential safeguard for the most vulnerable. The next few years will witness a rapid and decisive transformation of the livelihoods of many poor around the world, and we cannot afford to fail. Grounding our choices on the right to food will help us to move in the right direction; it will lead to a social and economic development that will be fairer and more sustainable.

II. Reinvesting in agriculture and the obligation of States to respect the right to food

Massive changes lie ahead, first, because the global food, energy and climate crises have led to a renewed interest in agricultural investment. Foreign direct investment flows in agriculture jumped to 3 billion USD annually in the 2005-2007 period, up from 600 million USD during the 1990s.⁹ This is a welcome development. Investments in agriculture can have a powerful impact in the reduction of poverty. And one of the reasons why the food system is going through such a crisis today is because, since the 1980s, investments in agriculture have been sorely insufficient.¹⁰

But these new opportunities also represent threats. Speculation on land is increasing, sometimes leading cash-strapped farmers to be priced out of land and exposing the fragility of market-based land reforms. Large-scale land leases or acquisitions are becoming increasingly common as a result of a number of drivers. Fiscal incentives and subsidies in developed countries have triggered a rush towards the production of agrofuels as an alternative to fossil fuels. Countries confronted by the growth of their population and urbanization, combined with the exhaustion of natural resources, see large-scale land acquisitions as a means to achieve long-term food security. They worry also about the availability of freshwater, which is becoming a scarce commodity in a number of regions. Demand for certain raw commodities from tropical countries, particularly fiber and other wood products, is also rising. Finally, expected subsidies for carbon storage through plantation and avoided deforestation increase the value of farmland in the eyes of investors.¹¹ Some investments in farmland, particularly by private investment funds, are purely speculative.

Local populations may benefit from the arrival of investors, but they may also lose their livelihoods as a result. Biofuel Africa Ltd has acquired over 23,700 hectares of Ghanaian land,

⁵ See South Africa, High Court, *Kenneth George and Others v. Minister of Environmental Affairs and Tourism*, 2 May 2007.

⁶ Supreme Court of India, *People's Union for Civil Liberties and Another v. Union of India & Others*, In the Supreme Court of India, Civil Original Jurisdiction, Writ Petition (Civil) No. 196 of 2001, judgment of 2 May 2003.

⁷ Corte Constitucional, *Acción de tutela instaurada por Abel Antonio Jaramillo y otros contra la Red de Solidaridad Social y otros*, Sentencia T-025/2004. On this and the South African and Indian examples, see Christophe Golay, *The right to food and access to justice. Examples at national, regional and international levels*, FAO, 2009. See also generally, on the role of courts in upholding the right to food, Marco Borghi and Letizia Postiglione Blommenstein (eds), *The Right to Adequate Food and Access to Justice*, Bruylant / Schulthess, Bruxelles / Geneva, 2006.

⁸ On 25 September 2008, on the basis of the interim Constitution, the Supreme Court of Nepal issued an interim order according to which the Government of Nepal had to supply immediately food to 12 food-short districts.

⁹ UNCTAD, *World Investment Report 2009. Transnational Corporations, Agricultural Production and Development*, 17 September 2009.

¹⁰ In 2004, public spending in agriculture was 4 percent of the agricultural GDP in agriculture-based countries, and generally the amount of both private and public investment in agriculture, including through official development assistance, had been declining for a period of twenty years until the recent surge (The World Bank, *World Development Report 2008 – Agriculture for Development*, 19 October 2007, p. 7; and see Independent Evaluation Group of the World Bank, *The World Bank's Assistance to Agriculture in Sub-Saharan Africa: An IEG Review*, October 2007).

¹¹ This is the case particularly under the Clean Development Mechanism (CDM) provided for in Article 12 of the Kyoto Protocol to the United Nations Framework Convention on Climate Change. The CDM allows a country with an emission-reduction or emission-limitation commitment under the Kyoto Protocol (Annex B Party) to implement an emission-reduction project in developing countries, in order to earn certified emission reduction (CER) credits, each equivalent to one tonne of CO₂. The CERs may be traded and can be counted towards meeting Kyoto targets.

allegedly forcing out the inhabitants of seven villages – all of them farming communities – in Tamale district. In Uganda, the Dutch FACE (Forests Absorbing Carbon-dioxide Emissions) Foundation assists with the planting of 25,000 ha of trees to absorb carbon dioxide and hereby offset emissions from a new 600 MW coal-fired power station in the Netherlands, then selling the offsets to GreenSeat, a Dutch carbon-offset business with western clients, mainly airline companies. This project has recently generated controversy, however, as indigenous people known as the Benet have reportedly been displaced to clear the way to tree-planting projects. These, unfortunately, are not isolated examples.

In many developing countries and particularly in Sub-Saharan Africa, the rights of landusers are not properly secured. Much of the land is formally owned by the government, and the landusers have no property titles on the land they cultivate; in many cases too, as a result of a complex combination of property rights and users' rights, those who cultivate the land do not own it, although they may or may not be paying rent in cash or kind or may or may not have a formal agreement with the nominal owner. If they are evicted, they will not have access to legal remedies, and they will not receive adequate compensation. Others use the land for activities such as for grazing and gathering wood: these can be critical sources of livelihood especially for women. In Sub-Saharan Africa, pastoralism is particularly important: almost half of the total amount of about 120 million pastoralists/agro-pastoralists worldwide resides in the sub-continent, where the largest pastoral/agro-pastoral populations (of seven million each) are in Sudan and Somalia, followed by Ethiopia with four million.¹² Which land, then, is 'idle'? Which land can be given away to investors? Under what conditions? Any individual deprived of his or her access to productive resources on which he or she depends is a victim of a violation of the right to food, unless compensatory measures are adopted.

III. The political economy of the food systems and the obligation to protect the right to food

A second reason why the right to food matters, today perhaps more than ever before, is because of the transformation of the food supply chains at local, regional, and global levels. Governments must not only respect the right to food, by ensuring that no one is deprived from existing access to productive resources. But they must also protect the right to food, by controlling private actors whose conduct may lead to similar violations.

To understand why this matters and what this means, let us consider the typical small farmer in Sub-Saharan Africa. She has a small plot of land, perhaps one or two hectares in size. The soil is relatively poor and it is not irrigated: since colonial times, the best land has been occupied by large-scale plantations, such as the one that her husband occasionally works on during the harvest season. The crops are not sufficient to feed the family throughout the year. Nevertheless, after harvesting period, she wishes to sell whatever she can produce and cannot consume within the next month, because if she doesn't, it will rot before it can be eaten, and she has no place to store it. She has only one middleman to sell to. He decides what price to pay. The price is low, but in the absence of means of transportation, she cannot bring her crops to sell them elsewhere. She makes up for this, by not buying inputs from the commercial sector; her seeds are those she saved from last year's harvests, although occasionally she exchanges seeds with the other members of the community. She works without fertilizers, because these are too expensive: the prices have increased 40 percent since two years ago. She farms to feed the family, although she knows that farming hardly even pays for itself: in three months time, with the little she will have made from selling part of the crops, she will buy food on the markets, at probably twice or more the price she was initially paid for her produce.

¹² Nikola Rass, *Policies and Strategies to address the vulnerability of pastoralists in Sub-Saharan Africa*. PPLPI (Pro-Poor Livestock Policy Initiative, FAO) Working Paper No. 37, 2006, available at: www.fao.org/ag/AGAinfo/programmes/en/pplpi/docarc/execsumm_wp37.pdf.

At least 1.5 billion other individuals are in this situation, depending on smallscale farming for their livelihoods – and often, they are hungry.¹³ How can they be supported? There is one approach, which has fascinated a generation of policy-makers, and which is referred to often as the ‘Green Revolution’ model. The term originates in a famous statement made in 1968 by William Gaud, the USAID Administrator, who described the spread of new wheat and rice technology in Asia as containing ‘the makings of a new revolution’. ‘It is not a violent Red Revolution like that of the Soviets or the White Revolution in Iran’, he said: ‘but rather, I call it a Green Revolution based on the application of science and technology’. I use the term here with some reluctance, however, since current programmes with the same label present certain significant differences with the model as it was originally conceived. When it was first launched in 1943 in Mexico with the support of the Rockefeller foundation, before being expanded to other Latin American countries and in South Asia in the 1960s, the ‘Green Revolution’ was based on the development and expansion of new varieties, particularly semidwarf wheat and rice varieties, on the extension of irrigated land and on a massive increase in the use of chemical fertilizers and mechanization.¹⁴ The role of the public sector was important in these developments. The improved seeds which were given out freely or subsidized were not protected by intellectual property rights. And the quality of the infrastructure – particularly roads – was much better where the Green Revolution spread back then than it is in Sub-Saharan Africa today, where there is an attempt to launch such a transformation.

The Green Revolution is credited for having increased yields significantly where it was implemented, and even for having averted famines – and indeed, it allowed for important productivity gains in the regions where the necessary conditions were present. Yet, raising yields is not enough to eradicate hunger. On the basis of his study of certain of the most important famines of this century, Amartya K. Sen, the 1998 Nobel Prize in Economics, has drawn our attention to the fact that people may grow hungry in times of boosting yields, as a result of the incomes of certain groups remaining too low while the incomes of others rise.¹⁵ The originality of Sen’s approach was that it moved away from considerations related to aggregate values and that it focused, instead, on the situation of the most vulnerable groups of society: if their situation does not improve as a result of increased levels of production, then whatever gains we make in improving yields are simply unable, by themselves, to alleviate hunger. The question we must ask, therefore, is not only whether certain forms of agricultural development increase the volumes of production, but primarily what their distributional impacts will be. Who will gain most? Who will not gain, and who may even lose?

From the perspective of the realization of the right to food, these are the questions that are decisive. And even Norman Borlaug, the architect of the Green Revolution who was awarded the Nobel Peace Prize in 1970 for his contributions to global food security, recognized that from this angle, the success of the Green Revolution was at best a partial one: ‘Obviously’, he stated in 2004, ‘wealth has increased more in irrigated areas relative to less-favored rainfed regions, thus increasing income disparities’.¹⁶ Perhaps this is an understatement. The Green Revolution encouraged the concentration of land in the hands of the larger entrepreneurial farmers who were best positioned to benefit from the productivity gains of the new, capitalized agriculture.¹⁷ It did

¹³ World Bank, *World Development Report 2008 – Agriculture for Development*, Washington, D.C., 2007, p. 3.

¹⁴ On the Green Revolution, see in particular Norman E. Borlaug, *The Green Revolution Revisited and the Road Ahead*, Special 30th Anniversary Lecture, Norwegian Nobel Institute, Oslo, 2000; Gordon Conway, *The Doubly Green Revolution: Food for All in the 21st Century*, Cornell Univ. Press, Ithaca, New York, 1999 (orig. Penguin Books, London, 1997).

¹⁵ A.K. Sen, *Poverty and Famines. An Essay on Entitlement and Deprivation*, Oxford Univ. Press, 1981.

¹⁶ Norman Borlaug and Christopher Dowsell, ‘The Green Revolution: An Unfinished Agenda’, CFS Distinguished Lecture Series, Committee on World Food Security, Rome, 20-23 September 2004, para. 7.

¹⁷ This is highlighted in particular by a review literature of Donald K. Freebairn, which showed that in 80 percent of the studies of the Green Revolution over 30 years, the researchers who considered the equity dimension concluded that

not reach the poorest farmers working on the most marginal soils. It largely bypassed women, because women have less access to credit than men, received less support from extension services, and therefore could not afford the inputs on which the technological revolution was based.¹⁸ It sometimes locked cash-strapped farmers into a dependency on high-value external inputs that proved unsustainable for a number of them. It operated a switch from labour-intensive forms of production to a capital-intensive agricultural model, accelerating rural flight in the absence of alternative jobs. Increases in grain production can go hand in hand with the persistence of important inequalities.¹⁹ In South Asia, while the production of food per capita increased by 9 percent, the number of hungry people increased by the same percentage between 1970 and 1990. In South America over the same period, food availability per capita rose by 8 percent, yet there were 19 percent more hungry people.²⁰

A few lessons can be drawn. First, you cannot dissociate production from distribution; different models of agricultural production exist, as well as different models of agricultural development, whose impacts on the structure of incomes in rural areas vary significantly and that may, or may not, contribute to more equity. Second, you cannot ignore the questions of political economy raised by the current food production and distribution systems. It is worth asking, for instance, whether we can afford today to promote new varieties of seeds that will lock farmers into a system in which the top 10 seed companies account for 67 percent of the global proprietary seed market, with the world's largest seed company alone accounting for 23 percent of that market, and the top three companies accounting for 47 percent of the market²¹. Should we not treat this concentration as a problem, rather than focus simply on lack of access to the technology which is thus fenced by monopoly privileges? Are solutions that increase dependence on high-value technologies sustainable, with such an extraordinary degree of concentration? Third, perhaps most important, you cannot work for people without people: as the failure of the Green Revolution to decisively tackle hunger illustrates, by putting participation at the heart of the design and implementation of public policies, we may have a better chance of addressing the real needs of the poor, and of getting the policies right, while permanently revising them in the light of their impacts.

Indeed, what is perhaps most striking about the current talk surrounding the 'Green Revolution' is that alternative approaches to supporting agriculture are not explored, although they could in fact correspond better to what certain smallholders, working in the most difficult environments, need to improve their livelihoods. In a number of countries, the Green Revolution was effectively a substitute for agrarian reform: instead of encouraging increases in food production by

inequality increased as a result of the technological shift: see Donald K. Freebairn, 'Did the Green Revolution Concentrate Incomes? A Quantitative Study of Research Reports', *World Development*, 1995, vol. 23, issue 2, pp. 265-279.

¹⁸ International Food Policy Research Institute, *Women: The Key to Food Security*, 8. Findings, www.ifpri.org/pubs/ib/ib3.pdf

¹⁹ For critical approaches to the Green Revolution, see Eric Holt-Giménez and Raj Patel, *Food Rebellions! Crisis and the Hunger of Justice*, Pambazuka Press, Food First Books, and Grassroots International, 2009, pp. 26-37; Vandana Shiva, *The Violence of the Green Revolution: Third World Agriculture, Ecology, and Politics*, London, Zed Books, 1991; Tony Weis, *The Global Food Economy. The Battle for the Future of Farming*, Zed Books, London and New York, and Fernwood Publ., Halifax, 2007, at pp. 107-109.

²⁰ Eric Holt-Giménez and Raj Patel, *Food Rebellions!*, cited above, p. 27 (citing Frances Moore Lappé, Joseph Collins, Peter Rosset, and Luis Esparza, *World Hunger: 12 Myths*, Oakland, Institute for Food and Development Policy, 1986).

²¹ ETC Group, *Who Owns Nature? Corporate Power and the Final Frontier in the Commodification of Life*, November 2008, p. 13. The UNCTAD secretariat has noted a significant increase of concentration in the input providers sector, which extends beyond seeds to all agricultural inputs: as a result of mergers and acquisitions, agrochemical companies have entered into the biotechnology and seeds business, leading to "unprecedented convergence between the key segments of the agriculture market (agrochemicals, seeds and agricultural biotechnology)", a process further reinforced by contractual agreements between companies in these sectors. See *Tracking the trend towards market concentration: The case of the agricultural input industry*, UNCTAD secretariat, United Nations Conference on Trade and Development, April 2006. For further developments and more updated information, see the report (A/64/170) presented by the Special Rapporteur on the right to food at the 64th session of the UN General Assembly, *Seed policies and the right to food: enhancing agrobiodiversity, encouraging innovation* (October 2009).

redistributing land to the rural poor, it did so by technology. But other measures, less politically sensitive, could be implemented, that would significantly improve the lives of smallholders in ways that are perhaps more sustainable for them than by the use of technological fixes.

Among them are, primarily, institutional innovations, and the provision of public goods. Let us think, again, of this woman, cultivating a small plot of land in an African country. This woman needs to be able to obtain a higher price for her crops, and she needs to be supported to be able to produce. By favoring the establishment of cooperatives at village level, we can both increase her bargaining power vis-à-vis the middlemen who capture a disproportionate part of the value of the crop, and contribute to her empowerment and to that of the other members of the village; we can also allow them to achieve certain economies of scale in the transport and marketing of their products, and perhaps help them to climb up the value chain by moving towards the processing of food. By improving communication routes and information about prices, we expand her range of choices, and thus her ability to strike a better deal. By creating storage facilities at local level, we allow her to choose when to sell – instead of obliging her to get rid of the crops within weeks after the harvest, when the prices are at their lowest. By developing extension services and making sure that they reach her village, we can improve the dissemination of the best farming practices to her and to the other members of the village, that are adapted to the local environmental conditions: it is on this kind of support to the farming communities that Japan launched its successful path to development. By establishing a public system to buy a certain segment of the main staple crops at sufficiently remunerative prices for farmers, we not only ensure that private traders will be under pressure to raise the prices they pay – we also allow the establishment of food reserves, that can limit the volatility of prices between the harvest seasons and the dry seasons, provided that the agency tasked with this role is held accountable and involves the participation of both small producers and consumer groups. By specifically supporting smallholders in support schemes – such as by granting credit at low interest rates or by sourcing from smallholders in school feeding programmes (both of which Brazil has done recently) we can help ensure that smallscale farming will be viable for those who depend on it. These reforms can have a deep and lasting impact in increasing the ability of the most marginal farmers to produce food. They are institutional rather than technological, and they consist mostly in the provision of public goods rather than in the subsidization of private goods such as inputs. By implementing them, the State discharges its obligation to protect the right to food. Save in situations of natural disasters or civil strife, the right to food is not the right to be fed; it is the right to feed oneself in dignity, and for her, for this woman living from her crops, it is the right to produce food in ways that allow her and her family to live a decent life.

IV. The environmental challenge: fulfilling the right to food in this century

One reason why the Green Revolution approach has exercised such a powerful grip on our minds, so much so that it is almost impossible to imagine other, complementary ways to innovate in agriculture, is because there has been no real alternative tested on a large scale. But this also reveals the fundamental poverty of our unilinear understanding of progress: while we express wonder at the yield increases achieved by the Green Revolution, we tend to forget that those increases are impressive not as measured against other paths of agricultural development, but against no development at all. We should not measure the success of the Green Revolution against the lack of innovation; we should examine its merits against those of other modes of innovation, whether they complement the ‘Green Revolution’ or whether they compete against it. But the question of evaluation is itself fraught with dangers. It is clear enough that we should not take the increase in the yields of one crop alone as the sole criterion of progress: total productivity by hectare (on intercropped fields, by the addition of different crops) is a better measure. Nor should we confuse profitability with productivity; while large scale mechanized agricultural practices and relying on monocropping can be hugely productive per active laborer, it has also been shown to be less productive per hectare than more small-scale, labor-intensive modes of production, except

when the units are so small that they do not command sufficient attention or labor from the users.²² Even more important, productivity should not be seen separately from the impact of incomes and on food security. Smallholders contribute to greater food security, particularly in backward areas where locally produced foods avoid the high transport and marketing costs associated with many purchased foods.²³ And, for most of them, because of the lack of access to credit and insurance schemes against weather-related events, achieving reasonably good yields on a regular basis may be more desirable than achieving high yields with greater uncertainty. One reason for them to rely on intercropping is that this limits the risk, by the diversification and 'portfolio effect' it contributes to, that certain shocks will result in irreparable consequences, such as a spiral of debts that are impossible to repay.

The choice is about size, and whether we continue favoring the concentration of food production by a limited number of large producers, or whether we support smallholders by providing them with the kind of services they require. But the choice today is also about different modes of agricultural production. Low tillage and low external input agriculture practiced on small farms, relying on intercropping rather than on monocultures, and using biopesticides and manure instead of chemicals to fight against the attacks of nature or to fertilize soils, in fact has the potential of significantly raising yields. In what remains one of the most impressive cross-country comparisons to date, Jules Pretty and his team have surveyed 286 projects using resource-conserving technologies in 57 developing countries, covering a total area of 37 million hectares. The average crop yield increase was 79 percent.²⁴ These results are peer-reviewed, and they were published in the *Philosophical Transactions of the Royal Society*, the oldest scientific institution on Earth.²⁵ Spectacular increases in incomes of small farmers can result from the use of such techniques. The planting of nitrogen-fixing legumes or trees can limit dependence on chemical fertilizers, for instance, and reliance on locally produced inputs may be more sustainable, for most marginal farmers, than the use of high-value external inputs.

There are many examples to choose from. In Tanzania, the Western provinces of Shinyanga and Tabora used to be called "The Desert of Tanzania". Yet, starting in the late 1980s, the use of agroforestry techniques and participatory processes allowed some 350,000 hectares of land to be rehabilitated. Benefits for households were as high as USD 500 every year. Moreover, the increased use of trees in agroforestry schemes improves the resilience of farming systems, which is especially important in the context of climate change. In Malawi, in 2005, some 100,000 smallholders benefitted to some degree from the use of fertilizer trees. Where maize is intercropped with a nitrogen-fixing tree, an average 3.7 tonnes a hectare can be produced – compared to just 1.1 tonnes on plots without such trees; yields could further reach 5 tonnes with small additions of mineral fertilizer. This successful experience led in 2007 the Government to launch Malawi's Agroforestry Food Security Programme, funded by Irish Aid, and targeting over 42,000 farming households. This programme now benefits around 1.3 million of the poorest people in Malawi whose ability to produce food has increased with a minimal investment of financial resources. Scientists from the World Agroforestry Centre in Nairobi have proven that the use of fertilizer trees can reduce the need for commercial nitrogen fertilizers by up to 75 percent while doubling or tripling crop yields. Agroforestry could also result in 50 billion tons of carbon dioxide being removed from the atmosphere, about a third of the world's total carbon reduction challenge. The Intergovernmental Panel on Climate Change (IPCC) estimates no less than a billion hectares of developing country farmland is suitable for conversion to carbon agroforestry projects.

²² Nancy L. Johnson and Vernon R. Ruttan, 'Why are farms so small?', *World Development*, vol. 24 (1994), pp. 691-706.

²³ OECD, *Promoting Pro-Poor Growth: Agriculture*, Paris, 2006, p. 31.

²⁴ Jules Pretty et al., 'Resource Conserving Agriculture Increases Yields in Developing Countries', *Environmental Science & Technology*, vol. 40 (2006).

²⁵ Jules Pretty, 'Agricultural Sustainability: concepts, principles and evidence', *Phil. Trans. R. Soc.*, 12 February 2008, vol. 363 no. 1491, pp. 447-465.

The science upon which such sustainable forms of agriculture is based is called agro-ecology, which is the result of the fusion of the best agronomic science with the science of ecology. Many of the scientists I consult consider that it may be better equipped to address the huge environmental challenges we are facing than current farming methods. Making better varieties of seeds available to farmers and improving irrigation can be hugely important. But support of that kind is part of a much larger set of improvements to be made to the farming systems. And in order to make the best choices, we must explore the full range of possibilities. There is not one single way to support agriculture: what matters is to ensure that all farmers can receive the support that best suits their own, specific needs.

In deciding how to support agriculture however, we cannot underestimate the importance of environmental challenges ahead. The first challenge is climate change.²⁶ As we have seen recently in East Africa, in India,²⁷ or in the Central American regions affected by the El Niño phenomenon, climate change is already threatening the ability of entire regions, particularly of regions living from rainfed agriculture, to maintain actual levels of agricultural production. In Sub-Saharan Africa, as well as in Eastern Asia and South Asia, climate change will affect rains. It will increase the frequency of droughts and average temperature. Less fresh water will be available for agricultural production. UNDP reports an estimate according to which by 2080, the number of additional people at risk of hunger could reach 600 million, as a direct result of climate change.²⁸ In Sub-Saharan Africa, arid and semi-arid areas are projected to increase by 60-90 million hectares, and the Intergovernmental Panel on Climate Change has estimated that in Southern Africa yields from rainfed agriculture could be reduced by up to 50 percent between 2000 and 2020.²⁹ Losses in agricultural production in a number of developing countries, particularly in Sub-Saharan Africa, could be partially compensated by gains in other regions, but the overall result would be a decrease of at least 3 percent in productive capacity by the 2080s, and up to 16 percent if the anticipated carbon fertilization effects³⁰ fail to materialize. William Cline considers that 'a prudent range for impact on global agricultural capacity by the 2080s (...) [could] lie in the range of reductions of 10 to 25 percent'.³¹ The losses would be particularly important in Africa and Latin America, with 17 percent and 13 percent average losses respectively if the carbon fertilization effects materialize, and 28 percent and 24 percent respectively in the absence of carbon materialization effects.³² As summarized by the Stern Review of 2006: 'In

²⁶ A more complete picture of the environmental challenges facing agriculture is presented by Lester Brown, 'Could Food Shortages Bring Down Civilization?', *Scientific American Magazine*, 22 April 2009.

²⁷ Some 252 out of India's 626 districts have been hit by drought as a result of the weak June-to-September monsoon that is running at 26 percent below normal. While the impacts on the harvests are not known with certainty at the time of writing, it is estimated that the crop shortfall could be 15 to 20 percent.

²⁸ UNDP, *Human Development Report 2007/2008. Fighting Climate Change: Human solidarity in a divided world*, 2007, p. 90 (citing Rachel Warren, Nigel Arnell, Robert Nicholls, Peter Levy and Jeff Price, 'Understanding the Regional Impacts of Climate Change', Research Report prepared for the Stern Review on the Economic of Climate Change, Research Working Paper No. 90, Tyndall Centre for Climate Change, Norwich).

²⁹ IPCC, *Climate Change 2007: Climate Change Impacts, Adaptation and Vulnerability. Working Group II Contribution to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller, eds), Cambridge Univ. Press, Cambridge and New York, chapter 9.

³⁰ These consist in the incorporation of carbon dioxide in the process of photosynthesis, which uses solar energy to combine water and carbon dioxide to produce carbohydrates, with oxygen as a by-product (definition adapted from William R. Cline, *Global Warming and Agriculture. Impact Estimates by Country*, Center for Global Development and the Peterson Institute for International Economics, 2007, at p. 24).

³¹ William R. Cline, *Global Warming and Agriculture. Impact Estimates by Country*, Center for Global Development and the Peterson Institute for International Economics, 2007, at p. 96.

³² *Ibid.* See also, confirming these views, David B. Lobell, Marshall B. Burke, Claudia Tebaldi, Michael D. Mastrandrea, Walter P. Falcon, and Rosamond L. Naylor, 'Prioritizing Climate Change Adaptation Needs for Food Security in 2030', *Science*, 1 February 2008, vol. 319, pp. 607-610 (showing, on the basis of an analysis of climate risks for crops in 12 food-insecure regions, that South Asia and Southern Africa are two regions that, without sufficient

tropical regions, even small amounts of warming will lead to declines in yield. In higher latitudes, crop yields may increase initially for moderate increases in temperature but then fall. Higher temperatures will lead to substantial declines in cereal production around the world, particularly if the carbon fertilization effect is smaller than previously thought, as some recent studies suggest'.³³

While these findings may sound bleak, they still err in the direction of optimism. They do not include the impact of more frequent extreme weather events, such as floods and droughts, which are the most immediate manifestation of changing weather patterns, although the reliability, the accuracy, and the timeliness of weather forecasts and climate information have recently scored some victories in their race against nature. Nor do they take into account the fact that rising sea levels may contaminate coastal freshwater aquifers with salt water. They do not consider, finally, the risks of diminished agricultural production due to scarcity of water for irrigation. But the melting of the great glaciers of the Himalayas, for instance, could increase flooding from river overflows, while at the same time affecting the water resources of a large number of people in Central and South Asia: more than one billion people could be affected by the 2050s and, as a result, crop yields could decrease by up to 30 percent in Central and South Asia by 2050.³⁴

While agriculture is a victim of climate change, it is also an obvious culprit. Unsustainable forms of agriculture and unsustainable patterns of consumption are accelerating the trend towards global warming, as they have contributed massively to the 70 percent increases in man-made GHG emissions we have witnessed between 1970 and 2004.³⁵ Global increases of CO₂ and other GHG concentrations³⁶ are primarily due to fossil fuel use, deforestation and non-sustainable agricultural practices.³⁷ Thus, a considerable part of GHG emissions comes from the way we currently produce and consume food. Modern agriculture accounts for 14 percent of the total annual GHG emissions (fertilizers representing 38 percent of that total, and livestock for another 31 percent). Land-use change, including forest deforestation to develop agricultural land, contributes another 19 percent. While forests play an essential role in capturing CO₂ – they store 45 percent of terrestrial carbon³⁸ –, they are currently being destroyed on a large scale.

Unsustainable modes of consumption in the rich countries are, in part, responsible for this situation. The food we eat determines how we produce food. The increase in livestock production, in response to our demand for meat, results in huge negative externalities that are not accounted for. In 2006, FAO published a study called *Livestock's Long Shadow - Environmental Issues and Options*. The study noted that livestock are responsible for 18 percent of greenhouse gas emissions, about double the share of transport. Together, grazing land and cropland dedicated to the production of feed-crops and fodder account for 70 percent of all agricultural land, or about 30 percent of the land surface of the planet. Livestock grazing alone is 3 433 million hectares, which is equivalent to 26 percent of the ice-free terrestrial surface of the planet, and the rapid expansion of pastures is one of the major reasons for deforestation, particularly in the Amazon region. The total area dedicated to feedcrop production amounts to 471 million hectares,

adaptation measures, will likely suffer negative impacts on several crops that are important to large food-insecure human populations).

³³ *Stern Review Report on the Economics of Climate Change*, by Nicholas Stern, prepublication at www.hm-treasury.gov.uk, published in Cambridge, Cambridge Univ. Press, 2007, p. 67.

³⁴ IPCC, *Climate Change 2007: Climate Change Impacts, Adaptation and Vulnerability. Working Group II Contribution to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, cited above, p. 13.

³⁵ IPCC, *Climate Change 2007: Synthesis Report, Summary for Policymakers, An assessment of the Intergovernmental Panel on Climate Change ('IPCC Synthesis Report 2007')*, available at http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf.

³⁶ Carbon dioxide (CO₂) is the most important anthropogenic GHG, in conjunction with methane (CH₄), nitrous oxide (N₂O) and others (*Ibid.*).

³⁷ IPCC Synthesis Report 2007; IPCC, *Fourth Assessment Report, Working Group III, Chapter 1*, 2007.

³⁸ On the contribution to mitigating climate change of adequate forest management policies, see IPCC, *Fourth Assessment Report, Working Group III, Chapter 8*, 2007 (dealing with mitigation in the sector of agriculture).

equivalent to 33 percent of the total arable land, and this surface is rapidly increasing. Vast areas of farmland are now being dedicated to maize and soybean production for animal feed, with severe impacts on the tropical forests in countries such as Brazil; some 70 percent of previously forested land in the Amazon is used as pasture, with feed crops covering a large part of the remainder.

This is not the best use of our scarce natural resources.³⁹ Earlier this year, UNEP published a report on ‘The Environment’s Role in Averting Future Food Crises’. It noted that by reducing meat consumption in the industrialized world⁴⁰ and restraining it worldwide in 2050 at 37,4 kg/capita – the level in 2000, we would free an estimated 400 million tons of cereals per year for human consumption. This is enough to cover the annual calorie need for 1.2 billion people. Under a business-as-usual scenario, by 2050, 1,573 million tonnes of cereals will be used annually for non-food, of which at least 1.45 million tonnes will be used as animal feed – enough to cover the calorie need for about 4.35 billion people. If we take into account the energy value of the meat which would be produced under such a scenario, the loss of calories by feeding the cereals to animals instead of using the cereals directly as human food represents the annual calorie need for more than 3.5 billion people.

Of course, the picture is a complex one, and other factors should be taken into consideration. Farm animals raised in industrialized countries consume more than 5 calories in feedstock for each calorie of meat or dairy food produced. In India the rate is a less than 1.5 calories. In Kenya, where animals are not fed grain but live off grass or agricultural by-products which humans cannot eat, livestock actually yield more calories than they consume. And it is equally important to acknowledge that livestock rearing – an activity that requires no formal education and requires no ownership of land – represents a source of income for perhaps up to one billion people, representing one third of the poor in the rural areas. What I am suggesting however, is that we cannot define quantitative objectives in the production of food – such as the need to increase meat output by more than 200 million tonnes to reach 470 million tonnes in 2050⁴¹ – without questioning trends on the demand side of the equation, particularly when epidemiologists constantly warn us of public health problems resulting from the meatification of diets.⁴²

Nor is climate change the only challenge we are facing. In 1996, FAO’s *Report on the State of the World’s Plant Genetic Resources*, based on more than 150 country reports, warned about the loss of genetic diversity. It noted that ‘the spread of modern, commercial agriculture and the

³⁹ Lester R. Brown and H. Kane, *Full house: Reassessing the earth’s population carrying capacity*, New York, W. W. Norton, 1994 (proposing to discourage further expansion of livestock production based, primarily, on environmental considerations).

⁴⁰ In what the IFPRI called the ‘next food revolution’, the consumption of meat will continue to rise worldwide, fuelled by urbanization and the increase of incomes in developing countries: see C. Delgado, M. Rosegrant, H. Steinfeld, S. Ehui, and C. Courbois, *Livestock to 2020: the next food revolution*, IFPRI-FAO-International Livestock Research Institute, May 1999. However it is the consumption habits of the rich countries, not the welcome diversification of diets in poor countries, that need to be changed. According to the IFPRI, the average individual in a developing country would consume in 2020 less than half the amount of cereals and just over one third of the meat products consumed by the average individual in the developed world.

⁴¹ *Global Agriculture Towards 2050*, discussion paper prepared for the FAO High-Level Expert Forum, Rome, 12-13 October, 23 September 2009.

⁴² See among others W. Zheng, T.A. Sellers, T.J. Doyle, L.H. Kushi, J.D. Potter and A.R. Folsom, ‘Retinol, antioxidant vitamins, cancers of the upper digestive tract in a prospective cohort study of postmenopausal women’, *American Journal of Epidemiology*, vol. 142, n° 9 (1995), pp. 955-960; World Cancer Research Fund / American Institute for Cancer Research, *Food, nutrition and the prevention of cancer: a global perspective*, Washington, D.C., 1997; WHO, *World Cancer Report*, Geneva, WHO / International Agency for Research on Cancer, 2003, pp. 62-67. These studies identify the impact on the development of certain cancers of diets including animal fats in large quantities, cooked red meats, and low intakes of fruits and vegetables. See also Tim Lang and Michael Heasman, *Food Wars. The Global Battle for Mouths, Minds and Markets*, Earthscan, London, 2004, reprinted 2007, chapter 2.

introduction of new varieties of crops' has been one of its main causes.⁴³ Indeed, uniformity and homogeneity in agricultural are increasing. All efforts have been put into the development of a limited number of standard, high-yielding varieties, so that barely more than 150 species are now cultivated; most of mankind now lives off no more than 12 plant species, with the four biggest staple crops (wheat, rice, maize and potato) taking the lion's share.⁴⁴ As farmers worldwide have abandoned their local varieties for genetically uniform varieties that produce higher yields under certain conditions, about 75 percent of plant genetic diversity has been lost.⁴⁵ And genetic diversity even within crops is decreasing. At both the field level and at global level, this diminishes our resilience to climate change and to attacks from pests and disease.

These challenges present a direct relationship to the realization of the right to food. First, by scaling up the agro-ecological modes of production I have been referring to, we not only may be providing poor farmers living in the most difficult environments with solutions that they need the most – we also preserve the soils and the water of the next generation, and its ability to feed itself; we reduce GHG emissions; and we can even stock carbon, so that agriculture, from being a major problem, becomes part of the solution. Second, applying strategies to realize the right to food ensures that the policies adopted by the State will take into account such relatively long-term considerations, and that they will not be dictated exclusively or primarily by the expectation of short-term profits or by the bait of export opportunities. Third, strategies for the realization of the right to food ensure accountability. It is not enough for governments to pledge to take into account the impact of their agricultural policies on climate change, on soil degradation, or on loss of biodiversity. Reneging on these pledges should come at a high political cost. Accountability raises this cost. It increases the chances that promises that are made are promises that are kept.

V. Conclusion

I have emphasized three major challenges: speculation over farmland, the squeezing of small farmers between increased costs and falling prices, and the environment. These challenges serve to illustrate what the right to food is about, and they present one striking similarity. In all three cases, unless they are carefully monitored, the policies that are aimed at increasing production may at the same time lead to increased inequality, poverty and marginalization in the rural areas. The arrival of investors can, if it goes unchecked, destroy livelihoods. The increased concentration of food production both across and within States, as a result of the pressures of trade liberalization and the removal of the State from the market, can condemn small farmers to fail. The push towards large-scale, highly mechanized farms, relying on high levels of external inputs, can produce huge negative externalities that are not accounted for in the price of food – and either push smallholders onto marginal lands and the low segments of the market or displace them entirely. Each of these developments is sometimes encouraged in the name of producing more. But we must be guided, not only by the need to increase yields, but also by the imperative to do so sustainably – by improving the livelihoods of small farmers and by limiting the ecological footprint of agriculture. The human right to adequate food provides a signpost. It obliges us to pay attention to the situation of the most vulnerable. It requires participation and accountability. It asks questions that are political and not merely technical. It enriches our understanding of what hunger is about, and how to combat it. It offers a better diagnosis of what has gone wrong, and of what to do to eliminate, at last, the injustice of hunger. By acting together, this is a battle we can win.

⁴³ FAO, *Report on the State of the World's Plant Genetic Resources*, prepared for the International Technical Conference on Plant Genetic Resources held in Leipzig, Germany, 17-23 June 1996.

⁴⁴ José Esquinas-Alcázar, "Protection of crop genetic diversity for food security: political, ethical and technical challenges", *Nature*, December 2005, vol. 6, pp. 946-953. See also P.C. Mangelsdorf, "Genetic potentials for increasing yields of food crops and animals", *Proc. National Academy of Sciences U.S.A.*, vol. 56 (1966), pp. 370-375; Timothy Swanson, *Global Action for Biodiversity*, James & James Science Publishers, 2005 (originally published in Earthscan Publ., London, 1997), p. 52.

⁴⁵ D. Nierenberg and B. Halweil, *Cultivating Food Security*, New York, Norton & Co., 2005.

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***Olivier De Schutter** was appointed the UN Special Rapporteur on the right to food in March 2008 by the United Nations Human Rights Council. He is independent from any government or organization, and he reports to the Human Rights Council and to the UN General Assembly. For more on the work of the Special Rapporteur on the right to food, visit www.srfood.org or www2.ohchr.org/english/issues/food/index.htm.*