



THE CHALLENGE

Agriculture in the 21st century faces multiple challenges: it has to produce more food, feed and fibre for a growing population with a smaller rural labour force, more feedstocks for a potentially huge bioenergy market, contribute to overall development in agriculture-dependent developing countries, adopt more efficient and sustainable production methods and adapt to climate change.

FOOD DEMAND AND PRODUCTION

World population is expected to grow by 2.3 billion people, between 2009 and 2050. Nearly all of this growth is forecast to take place in the developing countries. Among the latter group, sub-Saharan Africa's population would grow

the fastest (+114 percent) and East and South East Asia's the slowest (+13 percent). Urbanization is foreseen to continue at an accelerating pace with urban areas to account for 70 percent of world population in 2050 (up from 49 percent at present) and rural population, after peaking sometime in the next decade, actually declining. At the same time, per capita incomes in 2050 are projected to be a multiple of today's levels, with relative inequality in incomes being considerably reduced. There is a general consensus that the recent trend whereby the economies of developing countries have been growing significantly faster than the developed ones is likely to continue in the future.

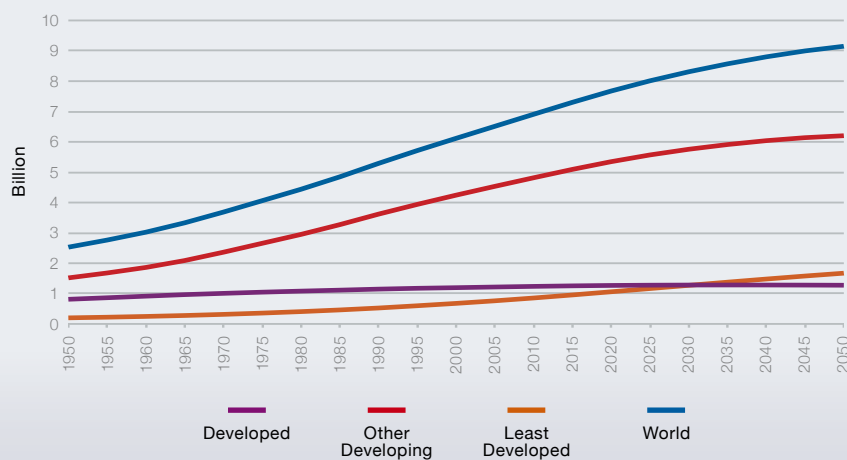
The projections show that feeding a world population of 9.1 billion people

in 2050 would require raising overall food production by some 70 percent between 2005/07 and 2050. Production in the developing countries would need to almost double.

These trends mean that market demand for food and feed would continue to grow. Demand for cereals, for both food and animal feed is projected to reach some 3 billion tonnes by 2050, up from today's nearly 2.1 billion tonnes. The advent of liquid biofuels has the potential to change some of the projected trends and cause world demand to be higher, depending mainly on energy prices and government policies. The demand for other food products that are more responsive to higher incomes in the developing countries (such as meat and dairy products, fish and aquaculture products, vegetable oils) will grow much faster than that for cereals for food use. Livestock, which already constitutes 30 percent of agricultural GDP in the developing world, is one of the fastest-growing sub-sectors in agriculture.

The expected increasing purchasing power in developing countries will lead to dietary changes that are increasingly orientated towards animal source foods and away from staple foods of vegetal origin. Overall meat consumption in developing countries is expected to account for around 82 percent of projected global growth in the next decade. Much of this expansion will take place in Asia and the Pacific region, especially in China and

Population growth



Source: UN Population Division, from van der Mensbrugghe et al. 2009

also in Latin America, led by Brazil, and is expected to outpace growth in OECD countries by a factor of 2:1 in the next decade. Renewed investment, capacity building, improved infrastructures and the introduction of modernised, intensive and integrated production technologies are the main factors spurring higher growth in these countries. This is especially true for poultry in China, Brazil and India, and to some extent in the Commonwealth of Independent States (CIS) countries. Livestock also provides traction for about half of the world's farmers and is a source of organic fertilizer for most of the world's crop lands.

INTERNATIONAL TRADE

Trade in agricultural commodities is also expected to expand considerably. For example, net cereal imports into the developing countries would increase almost three-fold to reach nearly 300 million tonnes by 2050 and, by then, would account for some 14 percent of their cereal consumption, up from 9.2 percent in 2006/08. Cereals self-sufficiency would continue to be low in the region most dependent on food imports

(i.e. in the Near East/North Africa). At the other extreme, Latin America and the Caribbean, now a net cereals deficit area, may become fully self-sufficient reflecting the surplus production potential of major countries in the region. The other regions may see some decline in self-sufficiency, but they will remain in the 80 to 95 percent range compared with 83 to 100 percent at present.

NATURAL RESOURCES

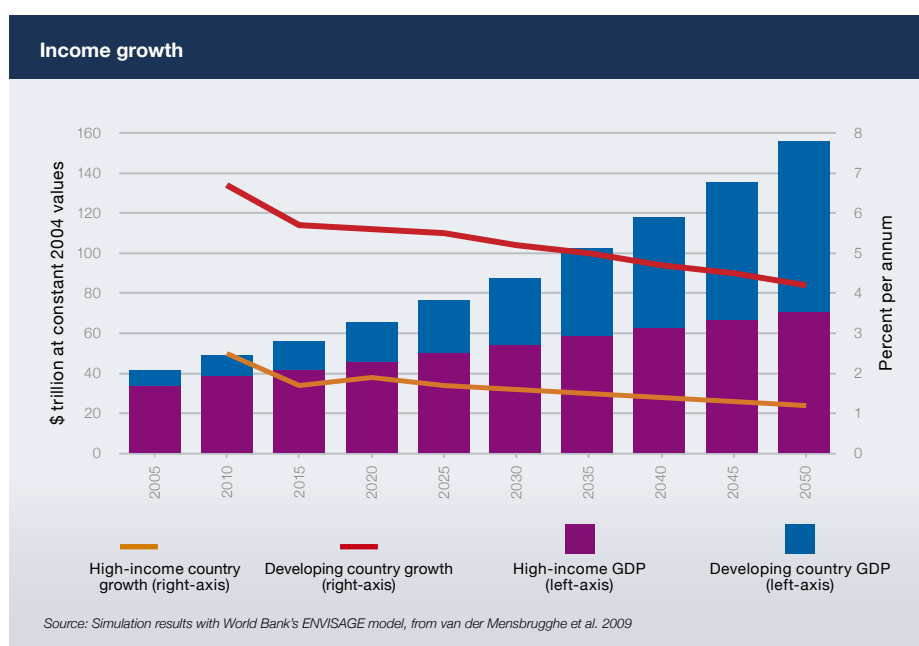
Ninety percent of the growth in crop production globally (80 percent in developing countries) is expected to come from higher yields and increased cropping intensity, such as two crops per year, with the remainder coming from land expansion. Arable land would expand by some 70 million ha (or less than 5 percent), with the expansion in developing countries by about 120 million ha (or 12 percent) being offset by a decline of some 50 million ha (or 8 percent) in the developed countries. Almost all of the land expansion in developing countries would take place in sub-Saharan Africa and Latin America. In CIS countries, the potential for expansion of arable land is 15 million ha.

Land equipped for irrigation would expand by some 32 million ha (11 percent), while harvested irrigated land would expand by 17 percent. All of this increase would be in the developing countries. Due to a slowly improving efficiency in water use and a decline in the area under rice, water withdrawals for irrigation would grow at a slower pace but still increase by almost 11 percent (or some 286 cubic km) by 2050. The pressure on renewable water resources from irrigation would remain severe and could even increase slightly in several countries in the Near East/North Africa and South Asia.

Crop yields would continue to grow but at a slower rate than in the past. This process of decelerating growth has already been under way for some time. On average, annual crop yield growth rate over the projection period would be about half of its historical growth rate.

ARE THE PROJECTED INCREASES IN LAND, WATER USE AND YIELDS FEASIBLE?

The Global Agro-Ecological Zone study shows that there are still ample land resources with potential for crop production available, but this result needs to be qualified. Much of the suitable land not yet in use is concentrated in a few countries in Latin America and sub-Saharan Africa, but many countries with growing rural populations in these regions are extremely land-scarce, and much of the potential land is suitable for growing only a few crops that are not necessarily those for which there is the highest demand. Also much of the land not yet in use suffers from constraints (chemical, physical, endemic diseases, lack of infrastructure, etc.) that cannot easily be overcome or has important environmental characteristics.

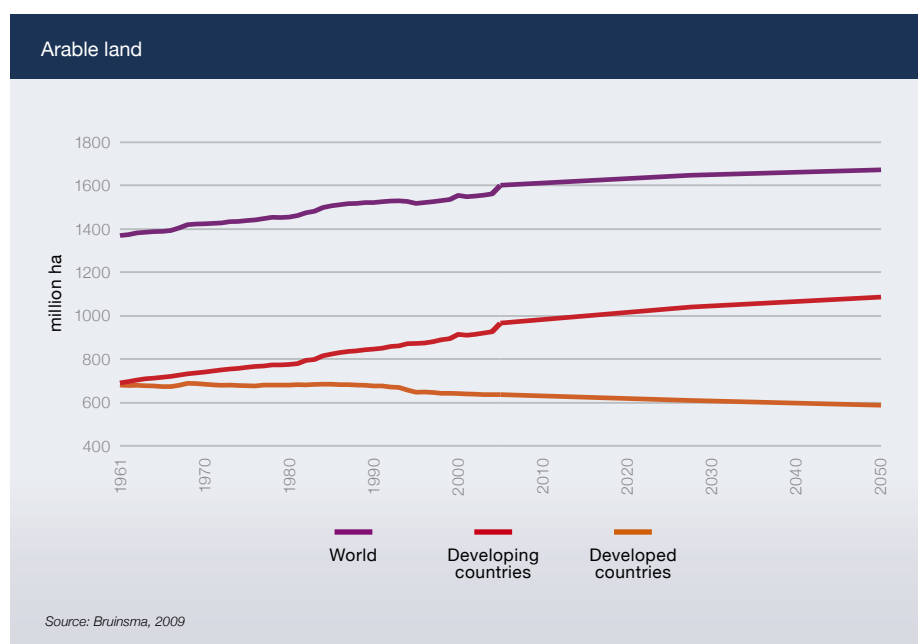


The availability of fresh water resources shows a similar picture as land availability, i.e. globally more than sufficient but very unevenly distributed, with an increasing number of countries or regions within countries reaching alarming levels of water scarcity. This is often the case in the same countries in the Near East/North Africa and South Asia that have no land resources left. A mitigating factor could be the fact that there are still ample opportunities to increase water use efficiency.

The potential to raise crop yields even with the existing technologies seems considerable. Provided the appropriate socio-economic incentives are in place, there are still ample 'bridgeable' gaps in yield (i.e. the difference between agro-ecologically attainable and actual yields) that could be exploited. Similarly there is considerable scope for narrowing performance gaps in the livestock production. Aquaculture, the fastest growing food production system (7 percent annually) offers new opportunities with comparatively less use of freshwater if well managed.

ACCESS TO FOOD

The projected global economic growth of about 2.9 percent annually would lead to a significant reduction or even near elimination of absolute "economic" poverty in the developing countries (persons living on less than USD1.25/day in 2005 prices). Nevertheless, even in 2050 the world will still be far from solving the problem of economic deprivation and malnutrition for significant parts of the population: the USD1.25/day poverty line is simply too low. On less stringent criteria, deprivation and undernutrition would remain widespread, though significantly less than today.



Global production increases alone will not be sufficient to ensure food security for everyone, unless governments ensure that access to modern inputs by smallholder farmers and to food by the needy and vulnerable is significantly improved. Otherwise, while the prevalence of chronic undernourishment in developing countries could fall from 16.3 percent (823 million) in 2003/05 to 4.8 percent in 2050, this would still mean that some 370 million persons would be undernourished in 2050. Of the three developing regions with the highest numbers of undernourished people currently, declines would be most pronounced in Asia (both East and South Asia), but less so in sub-Saharan Africa. On these prospects, the World Food Summit target of halving the numbers of hungry people by 2015 (from the 813 million of 1990/92) may not be reached until well into the 2040s. These calculations underline the importance and urgency of putting in place effective poverty reduction strategies, food and nutrition security initiatives, safety nets, and rural development policies and programmes focussed on increasing

smallholder agriculture production and productivity in developing countries. One major cause of the persistence of hunger is the fact that the food is not produced in the countries where 70 percent of the world's poor live.

HUNGER AND POVERTY REDUCTION AS ECONOMIES TRANSFORM

Experience of countries that have succeeded in reducing hunger and malnutrition shows that economic growth and poverty reduction policies as such do not automatically ensure success: the source of growth matters too. Cross-country analysis shows that GDP growth originating in agriculture is, on average, at least twice as effective in benefiting the poorest of a country's population as growth generated in non-agricultural sectors. This is not surprising as 75 percent of the poor in developing countries live in rural areas and derive significant parts of their livelihoods from agriculture and related activities. For agriculture-dependent countries in particular, agricultural growth is key for overall growth and development and for poverty reduction.

A vibrant agricultural sector has been the basis for a successful economic transformation in many developed countries. It was the precursor to the industrial revolutions in Europe and the USA and more recently to those in China, Republic of Korea, Thailand, Viet Nam and other rapidly growing Asian economies. During these transformations, investment in agriculture and in education created agricultural surpluses, kept real food prices low and helped stimulate overall economic growth. At the same time, overall economic development created new employment opportunities that helped absorb the rural labour surplus that emerged from the transformation of agriculture. The result in those countries has been a transition from many, small subsistence producers to fewer and larger commercial farmers, more non-farm employment and larger farm operations overall. The outlook to 2050 suggests that many developing countries would be on the pathway to such transformation.

While the role of agriculture as a driver of overall growth would diminish over time along with its share in GDP, the experience of today's middle income countries suggests that its role in poverty and hunger reduction would continue to be significant. Agriculture's contribution to hunger reduction consists not just in producing food where needs are most pronounced, but also in creating employment, generating income and supporting rural livelihoods.

POLICY CONSIDERATIONS ARISING FROM THE FAO HIGH-LEVEL EXPERT FORUM ON HOW TO FEED THE WORLD IN 2050 (ROME, 12-13 OCTOBER 2009)

- There was consensus that the technical ability to produce enough food globally to feed the world in 2050 does not necessarily mean that the world will be free from hunger. Hunger is a poverty problem. It is a manifestation of a lack of access to food, not or not necessarily a question of food production.
- However, agriculture can help address the poverty problem. 75 percent of the poor live in rural areas and many of them depend on agriculture for their livelihoods. Making agriculture more productive and profitable can be an important element in the fight against hunger. This requires more investments in agriculture and rural areas in developing countries.
- There was also general consensus that agriculture alone will not be sufficient to put an end to hunger. Investments in agriculture need to be broader and investments should aim to promote income generating activities for the poor and thus improve their ability to purchase food. It was felt that a future food security approach has to be broader and go beyond primary agriculture. For economic growth to be sustainable in the long-run, investments in agriculture have to be accompanied by investments in infrastructure, institutions and ultimately in the manufacturing and service sectors.

- There was consensus that future agricultural price variability will increase. More variability, greater uncertainty and higher risks were seen as important issues that affect the poor and could potentially hold back development in the long-run. Shocks can come from numerous areas. These include higher weather variability and climate change, less interest to hold stocks, more speculation, greater transmission of price signals from other more volatile commodity markets, particularly from the energy market. The conclusion was that agriculture has to be made more resilient to exogenous shocks and that better risk management options and policies need to be developed.
- Future development and hunger reduction strategies also have to be tailored to country and context specific problems. For some countries, particularly those with limited agricultural resources, high population growth rates and limited non-agricultural development possibilities, special efforts will be required.

For further information



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