

Food security in 2050 on a global scale achievable but greatly challenging

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With today's crops, it would be possible to feed the 2050 global population of nine billion people. But agricultural land will have to be used optimally. And this demands solid economic and institutional preconditions. Food prices will probably eventually rise. This was discussed by Professor Martin van Ittersum on 12 May 2011 at the ceremony at which he accepted the post of Professor of Plant Production Systems with a personal chair at Wageningen University.

Will there be enough food for the world to eat in 2050? For the second time in just three years, prices are peaking. The recent price increase also influenced the unrest in the [Middle East](#). But does this point at a trend break, or an isolated incident?

In 2050, the global population will have increased from the seven billion people alive today to nine billion. Between now and then, meat consumption in emerging economies like India and China will increase sharply, and at the same time there will be a shift in raw material production from fossil fuels (oil) to renewable resources (plants). These three aspects together mean that [agricultural land](#) will be in high demand. In particular, the necessary transition to the so-called biobased economy may make unbelievably high demands on agriculture.

Professor Van Ittersum estimates that current global agricultural production amounts to approximately 7 gigatonnes of grain equivalent (GE). Poorer countries will need more food, because of population increases and because of their current poor diet; middle-income

countries will need more animal feed (for meat and milk) and raw materials because of increasing meat consumption and the rise of the biobased economy; and rich countries will primarily need green raw materials to support the biobased economy.

It is estimated that in 2050, the global population will need 12 gigatonnes of grain equivalent in food. If ten percent of the present global energy needs are provided for by agricultural products, this will necessitate at least five gigatonnes extra, and if the entire world follows a European eating pattern, this will necessitate an additional six gigatonnes, bringing the total requirements to 23 gigatonnes of grain equivalent.

For this reason, [food prices](#) will probably be higher in the future than they were in past decades. There will be variation in prices, particularly in the transition period of the trend shift. As Professor Van Ittersum explains, 'Both private and public policymakers have a short-term horizon. If current prices are low, they expect low prices in the future, and vice versa. As a consequence, investments in agricultural research (in order to ensure sufficient food over the long term) are meagre in times of decreasing prices.' As such, the current price increases and those of 2007-2008 can be partly explained by the low prices in the 1980s and 1990s, as a result of which investments in agricultural research were low, Professor Van Ittersum indicates.

But Professor Van Ittersum can offer some reassurance. "In the previous century, the world was able to achieve an annual growth in food production of 2%; while over the same period, the [global population](#) doubled from 3 billion to 6 billion people. This was not the result of a large increase in the area of land used for agriculture. That increased by only 10%. This is how we will have to do it in the future. But the easy progress has already been achieved, and scarcities in materials like phosphate, water and energy and climate change make the problem complex. And we will have to take the environment into account on a

greater scale."

Calculations by Wageningen researchers indicate that it is theoretically possible to meet future demands. The 23 gigatonnes of grain equivalent, mentioned above as a possible maximum demand, can be produced with current [crops](#) and grasslands. The main question is how to bridge the gap between what is currently being produced and what is theoretically possible.

In his speech Future harvest – the fine line between myopia and utopia, Professor Van Ittersum examines the optimisation of the current food production system, in which the difference between actual and possible production (the ‘yield gap’) has to be eliminated. As part of this process, short-sighted and utopian solutions must be ruled out. He brings up the importance of solid economic and institutional preconditions in order to allow farmers to actually realise higher yields. But even in areas where preconditions are equal, there are large differences between farmers. Studies of rice farmers in Southeast Asia reveal that the farmers with the highest yields generally do not use much more fertiliser or work harder, and are often more highly educated. Van Ittersum also looks at the possibilities for making more efficient use of the limited amounts of phosphate. He concludes “The low prices have kissed policy and society asleep – policy and society became short sighted. Thinking that it can be fixed by just gene and cell research is utopian. Closing the gap between potential and actual yields requires a major, integrative effort."

Provided by Wageningen University

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